NC-NET Employability Skills Resource Toolkit

NC-NET

North Carolina Network for Excellence in Teaching

These materials were prepared for the North Carolina Network for Excellence in Teaching by the Center for Occupational Research and Development.

The North Carolina Network for Teaching Excellence (NC-NET) is a project funded by the Carl D. Perkins Vocational Act through the North Carolina Community College System, http://www.nccommunitycolleges.edu/.

NC-NET's mission is to promote quality teaching and learning in North Carolina community colleges through a collaborative, statewide professional development system committed to sharing best practices, leveraging resources, and avoiding duplication.

Materials are available for free download from http://www.nc-net.info.

Are you currently teaching employability skills within the courses you teach?
Have you developed materials that would be useful to instructors across the state?
The North Carolina Network for Excellence in Teaching website, www.nc-net.info, serves as a clearinghouse for free professional development resources developed for faculty.
To submit a teaching resource for inclusion on the website, please e-mail Hope Cotner at the NC-NET Clearinghouse for details about the submission process.

NC-NET Employability Skills Resource Toolkit

Section 1 – Why Employability Skills Matter

Employability skills are at the center of many conversations about preparing our students to be work ready. Often described as "soft skills" or even "21st century skills," these terms encompass a wide range of skill areas that, when mastered, should ultimately prepare an individual for success in the workplace. Such skills include working well in a team, the ability to problem solve, and the ability to communicate clearly and effectively, just to name a few. How we educate our students on these topics may be as much about modeling effective practices in the classroom as teaching a discrete set of skills. Many organizations have considered this issue and in turn have developed frameworks, models, and assessment tools to aid educators in their efforts to teach employability skills.

A recent project supported by the U.S. Department of Education's Office of Vocational and Adult Education developed an Employability Skills Framework website to serve as a clearinghouse of resources, including a common framework for employability skills based on existing skill sets. The website shares information compiled from a variety of sources that represent a common understanding of employability skills supported throughout the federal government. The project defines employability skills as general skills required for success in the labor market at all employment levels and for all sectors. The project's framework organizes skills into three broad categories:

- **Applied Knowledge**—the thoughtful integration of academic knowledge and technical skills, put to practical use in the workplace.
- **Effective Relationships**—the interpersonal skills and personal qualities that enable individuals to interact effectively with clients, coworkers, and supervisors.
- **Workplace Skills**—the analytical and organizational skills and understandings that employees need to successfully perform work tasks.

The framework, an interactive online tool, allows users to trace the employability skills included in the compilation back to the organizations or agencies that identified them to better understand the relationships among the different sets of skills.

The most important perspectives on employability skills, however, may come from employers. What skills do they see lacking among recent applicants or new hires? What measures are they taking to address these skills needs? These questions and others were asked of over 1,000 employers by the North Carolina Association of Workforce Development Boards in a recent survey. The report *Closing the*

Gap: 2012 Skills Survey of North Carolina Employers identified key workforce skills needs as cited by employers. Among the survey's key findings were the following issues.

- Skill shortages have shifted as the economy and business sectors undergo change. North Carolina Employers indicate Customer Service/Sales and Skilled Trades as being in short supply followed closely by competency in Office Skills and General Maintenance.
- Communication and Interpersonal Skills represent a primary gap in workplace soft skills. Critical and Analytical Thinking and Problem Solving were also frequently indicated.
- Businesses indicated that improved Soft Skills/Personal Effectiveness training would be of most value in the future followed closely by Occupational Skills training.

Specific comments such as those below demonstrate the importance of soft skills to employers.

- "The lack of basic communication skills has been a large obstacle."
- "Employees who have an understanding of problem solving, team work, and continuous learning are very valuable."
- "Attitude, enthusiasm, and appropriate attire are the key basics. Experience and education is next."

Of obvious concern to North Carolina workforce and economic development professionals is that if the needs identified in the 2012 survey are not addressed, the skills deficit will have an adverse effect on the capacity of state and local leaders to attract new business and retain existing companies, as well as the ability of employers to remain competitive.

Unfortunately, the demand for soft skills is not unique to North Carolina. Employers across the country are sharing similar concerns.

The 2012 State of the St. Louis Workforce Report found that employers in this urban area feel that while "technical skills and experience are desirable . . . the most qualified workers are those that also possess a set of soft skills that include a strong, mature work ethic, commitment to company goals, and the ability to communicate and interact appropriately with customers and workplace colleagues."

The *Job Outlook 2013* report, published by the National Association of Colleges and Employers, notes that employers cited "what makes a new graduate stand out from equally qualified competitors . . . is the evidence of the 'soft skills' needed in the workplace. Employers prize skills such as communication skills, the ability to work in a team, and problem-solving skills."

For its *2012 Talent Shortage Survey*, Manpower Group researched the views of more than 38,000 employers in 41 countries and territories. Their findings reveal issues that employers across the globe are experiencing in filling available positions. Eighteen percent of employers surveyed said employability

skills (or soft skills gaps) are where candidates are lacking the most. The top skills identified were the following:

- Interpersonal skills
- Enthusiasm/motivation
- Collaboration/team work
- Professionalism
- Flexibility/adaptability/agility
- Ability to deal with ambiguity/complexity
- Attention to detail
- Problem solving and decision making

When looking more closely at employers who hire entry-level employees from completers of community college certificate and degree programs, a 2013 report from the Seattle Jobs Initiative found that soft skills are at least as critical as technical skills to entry-level employment. *The Importance of Soft Skills in Entry-Level Employment and Postsecondary Success: Perspectives from Employers and Community Colleges* noted that local businesses surveyed "overwhelmingly stressed that soft skills matter a great deal, not only in obtaining a job but also in the success of a business. More than 75% of businesses surveyed stated that soft skills were as important as or more important than technical skills in securing entry-level employment. A similar percentage (71%) stated that soft skills are equally or more important than technical skills in carrying out company goals." The report also explores the value employers place on soft skills by industry sectors and the varying opinions of community college leaders and employers on which soft skills are most critical to student success and applicant success.

The prevalence of employer reports about the gap in employability skills among applicants is an obvious concern, yet, a challenge that can be tackled on several fronts. In the classroom, we can modify our expectations of students to better reflect the types of skills employers say are critically important for workplace success. We can adapt our existing curriculum to teach specific employability skills, and we can enhance our programs of study by incorporating resources, activities, and experiences that will better prepare our students to be successful in their future careers.

In 2012, the North Carolina Community College System's *Code Green Super Curriculum Improvement Project (CIP)* engaged more than 200 faculty members from across the system. The committee reviewed and then revised or created courses and curriculum standards for implementation across the state. A comprehensive list of academic programs is available at http://www.successnc.org/initiatives/code-green-super-cip-curriculum-improvement-project. Information on the redesigned curriculum program standards can be viewed at http://www.nccommunitycolleges.edu/programs/code-super-cip.htm.

As part of this initiative, the Super CIP discussed the importance of teaching employability skills. They identified eight employability competencies for integration across the curriculum:

1. Interpersonal Skills and Teamwork
2. Communications
3. Integrity and Professionalism
4. Problem Solving and Decision Making
5. Initiative and Dependability
6. Information Processing
7. Adaptability and Lifelong Learning
8. Entrepreneurship

In response to the Super CIP's work, the North Carolina Network for Excellence in Teaching (NC-NET) has developed this resource toolkit to support instructors as they seek to further enhance how their courses address the eight competencies.

Table of Contents

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Introduction

Recently the NCCCS Code Green Super Curriculum Improvement Project (CIP) identified and defined critical skills for integration into the curriculum. The eight broad categories of employability skills to be addressed by North Carolina community colleges include:

1. **Interpersonal Skills and Teamwork**—The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks
2. **Communication**—The ability to effectively exchange ideas and information with others through oral, written, or visual means
3. **Integrity and Professionalism**—Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism, and demeanor
4. **Problem Solving and Decision Making**—The ability to identify problems and potential causes while developing and implementing practical action plans for solutions
5. **Initiative and Dependability**—Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability
6. **Information Processing**—The ability to acquire, evaluate, organize, manage, and interpret information
7. **Adaptability and Lifelong Learning**—The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures, and management practices
8. **Entrepreneurship**—The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner

A 2013 report issued by the Seattle Jobs Initiative, synthesizing research conducted by four-year colleges, community colleges, and workforce development organizations in their regions, suggests best practices for developing and assessing soft skills. The six actions outlined by their framework serve as a useful guide when considering methods for incorporating employability skills into community college curricula.

1. Set clear expectations regarding soft skills.
2. Incorporate soft skills in grading system and assessment process.

3. Practice continuously and provide feedback.
4. Incorporate real-world situations and environments.
5. Encourage professional communication between students and their peers, faculty, and community.
6. Maintain a learning organization culture.

There are numerous ways to organize employability skills instruction. Gateway Technical College (Kenosha, WI), for example, takes an immersion approach in its Manufacturing Bootcamps. Although teaching the importance of essential workplace skills like punctuality and reliability can be difficult, Gateway's programs are structured to simulate a work-week timeframe in which those characteristics are mandatory. Classes are scheduled Monday through Friday from 8:00 to 4:30 p.m., with strictly enforced attendance policies that drive home the importance of arriving on time and completing a full day's work.

Clackamas Community College (Clackamas County, OR) takes the single-course approach in their Retail Management Certificate program. Members of the regional Workforce Investment Council helped develop the curriculum for a Retail Entry-Level Skills course. It requires 24 hours of classroom training that familiarizes students with the industry and focuses on employability skills such as work ethics and job readiness.

The Asheville-Buncombe Technical Community College Nursing Program reinforces the concept of employability skills integration throughout the curriculum with the use of a discipline-specific rubric, provided to students in their handbooks. The rubric clearly explains the program's expectations for behavior and performance, describes the attributes of employability skills in discipline-specific terms, and assigns a point value to the criteria.

The preceding examples require buy-in at the department or program level. A simpler, more easily implemented approach involves the integration of employability skills practice within individual courses. While individual instructors may recognize overlaps between workplace skills and course-specific skills, they do not always have access to appropriate teaching materials. The activities and resources in the *NC-NET Employability Skills Resource Toolkit* are designed to help bridge the gap.

Each module covers one of the topics selected by the Curriculum Improvement Project and begins with a table of contents and a broad overview of the topic. This is followed by instructor presentation materials—PowerPoint slides and facilitator notes that can be used as student handouts. The PowerPoint presentations, downloadable as .ppt files from the webpage, provide background information on the modules' employability topics. They can be used to introduce a topic in class or in an online course and can also be adapted by the instructor to include course-specific content.

The teaching resources consist of classroom lessons and related student handouts for teaching employability skills. The activities contain preparatory instructions, student learning objectives, directions for conducting the activity, student materials, and follow-up questions for reflection and discussion. They can be used as is or adapted to fit specific courses by following example modifications for various subject areas or career pathways provided in the activity's instructor preparation section.

The rubrics at the end of each module can be used as observation checklists by the instructor, as peer review instruments by team members, or as student self-evaluations. Each rubric contains blank fields in which additional demonstrable behaviors or tasks can be added.

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Interpersonal Skills and Teamwork

Overview of Teamwork in the Classroom

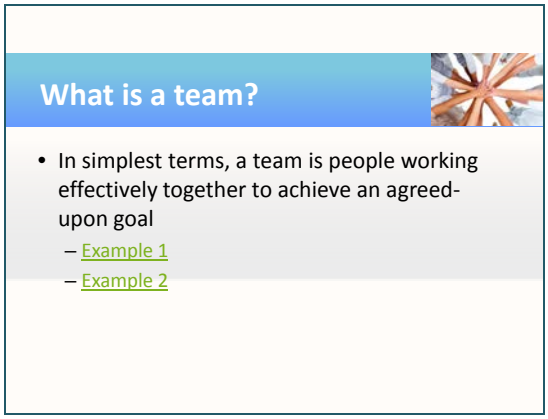
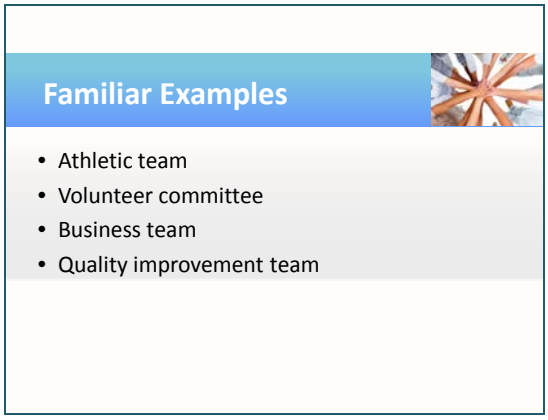
Many students (and their instructors) worry when they hear the word *teamwork*. Their experience with working in groups may have been a negative one in which team members shirked responsibility and left others to do work. This can be remedied through careful structuring of collaborative learning assignments. Collaborative learning is essentially teamwork, the topic of this module. The skills necessary for successful teamwork are not innate; they must be taught and modeled. Instructors should not assume that students come to class equipped with these skills.

The presentation materials for this topic provide students with an overview of the behaviors expected of team members and of the normal stages of team development. Some students may be surprised to learn that conflict is an expected part of the process. Others may be unaware that they dominate discussions and interrupt when colleagues are speaking. Before beginning team assignments, instructors may wish to conduct student role-play of conflict resolution, respectful speaking and listening, or other behaviors essential to positive group dynamics.

In addition to expectations for positive interpersonal communication, students must clearly understand the outcomes (products) they are expected to generate. Instructors should be very specific, particularly with novice team members who are unaccustomed to selecting their own accountability measures. As students become used to team processes, more responsibility for decision-making should be assigned to them.

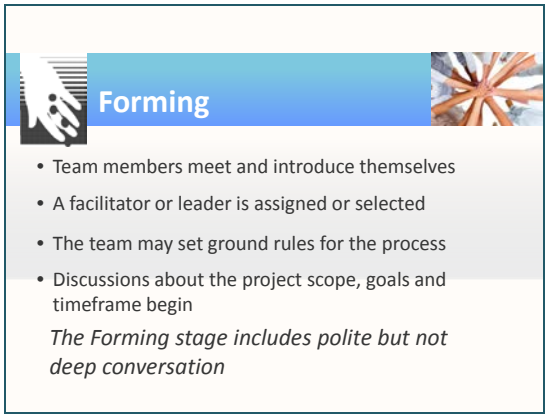
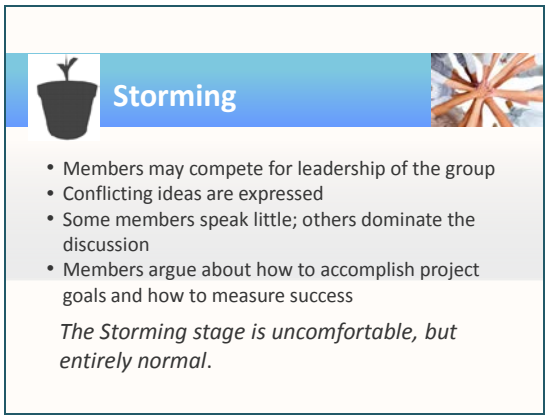
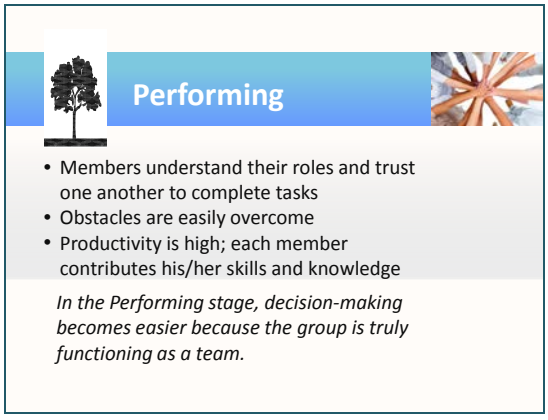
There are assessment tools following the classroom activities on teamwork. The rubrics can be used as observation checklists, peer evaluations, or student self-evaluations. In addition, there are “Team Member Performance Plans” designed to help students reflect on their individual contributions as team members, compare their reflections with their instructors’ or peers’ observations, and formulate action plans for improving attitudes, behaviors, or skills.

Presentation Materials

	SLIDE	TEACHER NOTES
1		
2		Note the important components of this simple definition: *together, effectively, agreed-upon,* and *goal*. Example 1 is a link to a YouTube video of an advertisement for public transportation. In it, penguins work together to defeat a predator. Ask students to name the components of teamwork illustrated by the video. Example 2 is a link to a YouTube video of the Pilobolus dance troupe. In it, members of the troupe work together to create amazing shadow images. Again, ask students to name the components of teamwork illustrated by the video.
3		Discuss formal/informal nature of these types of teams—some may be both. What are the goals of these example teams?

	SLIDE	TEACHER NOTES
4	**Why Use Teams?**  • Benefits to the business, organization or system: – Enhanced creative thinking needed for innovation – Promote employee involvement and buy-in (commitment) to the company's success – A team generates results that are greater than those that could be produced by its individual members	Employee involvement leads to employee commitment to success of the project (emotional and intellectual investment in the success of the business and potentially greater employee job satisfaction and less employee turnover).
5	**Effective Team Characteristics**  • Team is not too big or small • Members are competent in their team roles • The team has a clear goal and all members are committed to accomplishing it • Each member feels comfortable sharing his/her ideas • Team members are willing to consider new ideas • The team marks project milestones and assesses progress toward the goal • Decisions are made via consensus	
6	**Why Use Teams?**  • Benefits to the team member: – Improved professional and personal skills – Better understanding of the whole company/system and how it works – Preparation for upward professional growth (promotion)	Team member = employee Learning how to be an effective team member (and leader) allows employees to practice and demonstrate some of the skills needed for success in the workplace. There are very few jobs that allow employees to work individually with input from only a supervisor or client. On a personal level, communicating and negotiating with team members from other units in the company (or other academic disciplines) allows employees to practice not only their verbal communication skills but also listening and critical thinking.

	SLIDE	TEACHER NOTES
7	**External Support for the Team** • Management supports and encourages the work of the team • The team is provided with sufficient resources to accomplish the task or goal • Team accomplishments are recognized	
8	**Stages of Team Development** 	
9	**Stages of Team Development** 1. Forming 2. Storming 3. Norming 4. Performing 5. Transforming/Adjourning	

SLIDE	TEACHER NOTES
10		
11		
12		

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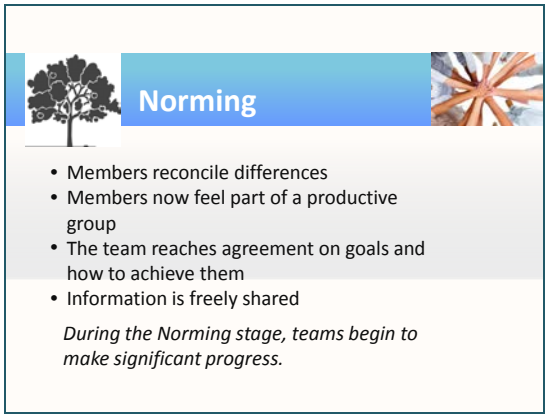
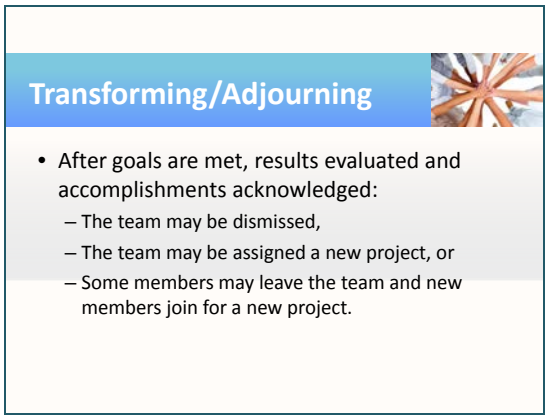
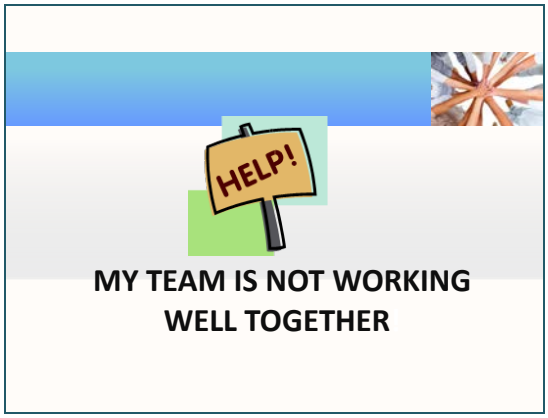
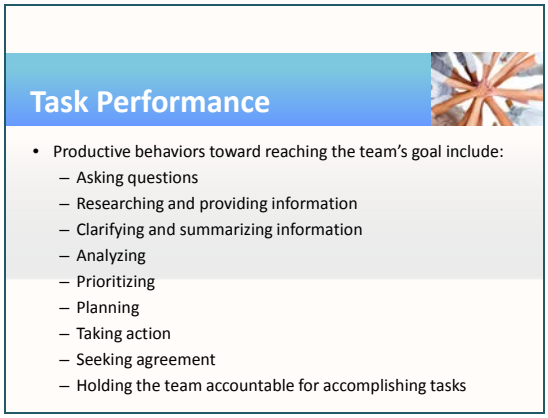
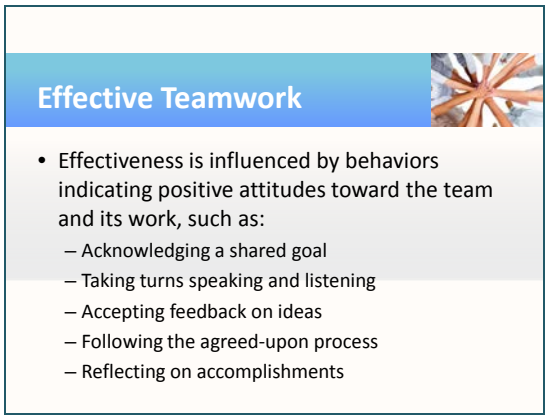
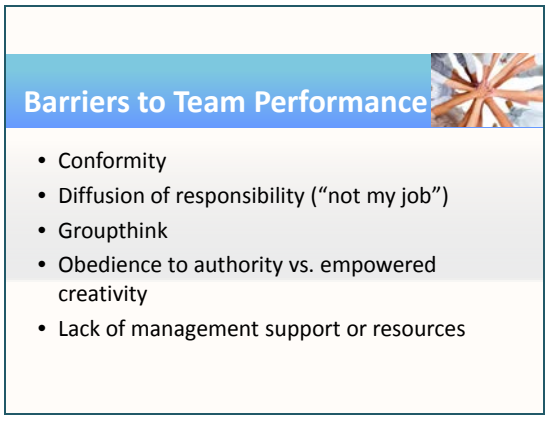
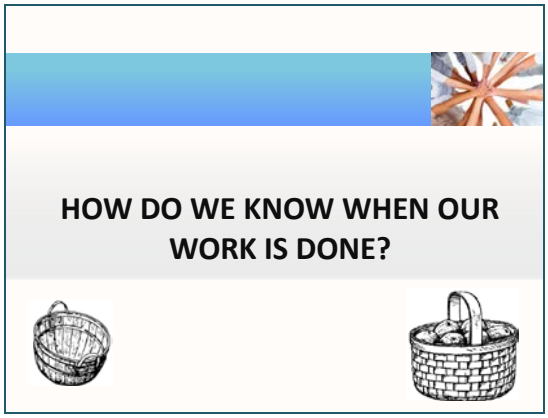
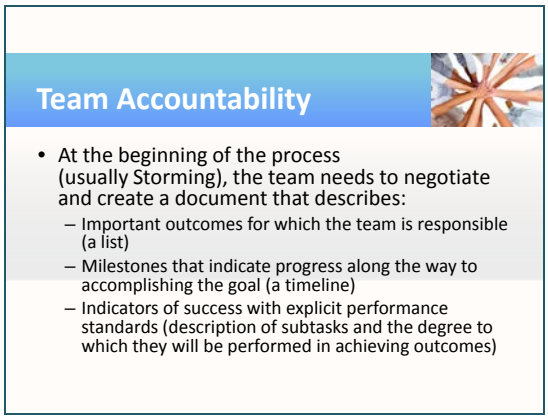
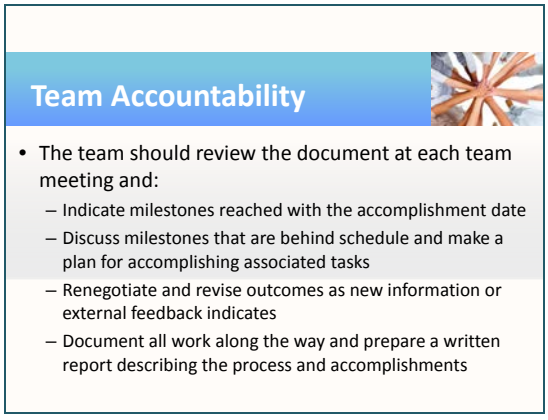
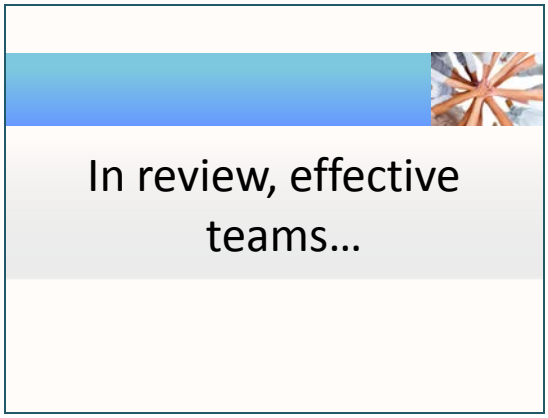
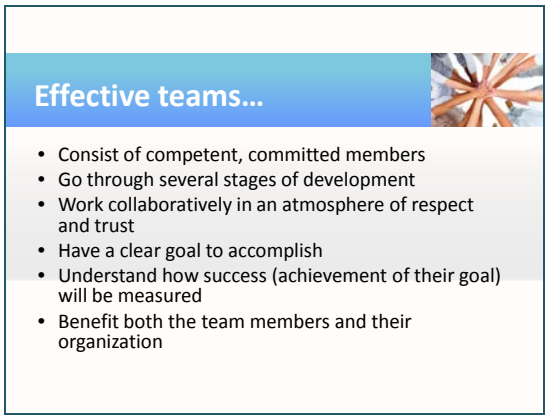
13		
14		
15		

	SLIDE	TEACHER NOTES
16	**Diagnosis?** ***Dysfunctional Team Behaviors***  Members who: • Dominate every conversation • Withdraw from the process altogether • Act verbally or physically aggressive • Naysay/block every idea • Ignore the task at hand/perform unrelated tasks	
17	**Dysfunctional Behaviors Can Be Prevented**  • Recognize that group dynamics involve skills that must be learned; not everyone on a team may have mastered all of the skills required for successful teamwork • Start by establishing—*as a team*—ground rules for operating the team	Instructors may need to lead students through a step-by-step process of team-building. Most students will have experienced group work; this does not mean that they possess good group interaction skills or attitudes or that they have been part of successful teams. Instructors should not assume that adult students already know how to work in teams. Group dynamics are a set of skills that cannot be taken for granted and must be taught.
18	**What are Ground Rules?**  • Ground rules are written agreements among team members about how they will conduct themselves within the group. • Rules typically address how members will: – Behave toward one another – Make decisions – Solve problems – Prevent and manage conflict	

	SLIDE	TEACHER NOTES
19	**Ground Rules Guidelines** 1. The rules should be established by the whole team. 2. The team may modify the rules when necessary. 3. The team should review the rules when needed if group interaction appears to be deteriorating. 4. The team should decide what happens if a member does not follow the ground rules.	
20	**Creating Ground Rules** • Build ground rules around behaviors that support: – Relationship-building – Task performance – Effective teamwork	
21	**Relationship-building** • Behaviors that promote healthy team relationship-building include: – Open communication – Active listening – Encouraging one another – Resolving conflict – Acknowledging feelings – Setting and following standards	

SLIDE	TEACHER NOTES
22 	
23 	
24 	Ask students how each of these barriers affects the potential team outcomes. Their answers may be something like the following: "Conformity means that the team will do what has always been done in the company. Nothing new will come out of the process." "Diffusion of responsibility means that no one takes ownership for specific tasks needed to accomplish the team goals, so nothing gets done." "Groupthink? Is that a bad thing?" [groupthink occurs when the team is so conflict-avoidant that the members don't consider all possible solutions to a problem; harmony is more important than achieving the best outcome] "Obedience to authority implies that team members are afraid to think outside the box, unlike empowered creativity." "If there is a lack of support, the team may have wonderful ideas that can never be carried out. This will lead to bad morale in the future and employees not wanting to serve on teams in the future."

	SLIDE	TEACHER NOTES
25		
26		As with instructional design, team accountability "begins with the end in mind." In other words, the team decides what their end goal is and then decides what accomplishment of that goal looks like—the end product. To keep the team moving toward the goal, the members decide upon milestones of progress that demonstrate they are working productively.
27		Note that documentation of both the process and products will be required by the organization's management. Team members may find their participation and success included in their annual performance reviews.

	SLIDE	TEACHER NOTES
28		
29		The NC-NET Employability Skills Resource Toolkit contains many lessons on teamwork that can be adapted for use in both academic and career-technical courses.

Teaching Resources

ACTIVITIES

The following activities can be completed in class to emphasize specific aspects of teamwork and interpersonal skills. The activities found in this resource can be used "as is," or they can be tailored to fit a specific course. Suggestions for adaptation precede each activity, with examples from several different subject areas/career pathways. The suggested modifications provide instructors with ideas for adapting the activity to fit content they are already teaching. Modifying the activities allows employability skills to be infused in subject area content more easily.

ACTIVITY: HOW GROUPS WORK

Instructor Preparation

How Groups Work is one of a series of three activities aimed at building teamwork skills. Planning Group Research and Presenting a Group Report are the other activities in the series. These activities should be conducted early on when teaching students about teamwork. This activity as written is generic and can be used in any course or easily tailored to relate to specific course content. In this version, students imagine a family trip and then write and perform a group skit. Alternate topics for various courses might include:

- Construction: Group is discussing various flooring for a home remodel. Possible roles might include homeowner/customer, contractor, flooring salesperson, interior designer, and so forth.
- Government/History: Pick a current event, historical topic, case study, or other topic previously covered in class. Have students create a skit about how the topic affects the general populace at the time.
- Science: The group could be tasked with creating an experimental design for a research topic.
- Early Childhood Education: Child care worker/instructor meeting with family to discuss issues related to a child's behavior problems in class and to create a plan for dealing with them.

If an alternate scenario is used, the instructor will need to adapt Handout 3 to the situation assigned.

The dynamics of group interaction are at the heart of developing working relationships. This lesson will focus on these dynamics by providing students with a task to complete as a group and by asking them after the task about their perceptions of their behavior and others in the group as they worked on the task. The role of the group observer is a very important one in this activity. Try to assign this role to alert and perceptive students. Give the group observer a copy of Handout 1. Direct them to read through the questionnaire and take notes discreetly as their group works on its task. During the activity, the instructor's role is essentially that of silent observer. Take note of any pitfalls or obstacles students encounter and suggest strategies for overcoming such group problems after the activity.

Objectives

Students will:

1. Compare the roles and contributions of individuals in a group.
2. Assess the effectiveness of a group at accomplishing a task.
3. Differentiate factors that help and hinder effective group processes.

Materials

- Handout 1—Group Observer Questionnaire
- Handout 2—Group Participant Questionnaire
- Handout 3—A Family Vacation
- Timer for each group (stopwatch, kitchen timer, timer app, watch, etc.)

Activity Guidelines

The instructor should provide the following general instructions and distribute Handout 3—A Family Vacation.

- Your group of 4-5 members needs to envision itself as a family going on a trip. You will have 12 minutes to develop an entertaining, 3-minute skit that you will perform for the whole class at the end of this activity. One member of your group will serve as an observer and will take notes but not contribute to writing or acting in the skit. One member of your group will introduce your skit, giving any background information the audience may need. All members except the observer must have a speaking part. Provide the observer with Handout 1—Group Observer Questionnaire.
- After each skit is performed, ask for a brief class evaluation of the skit.
  - Did it stick to the time limit? Was it entertaining? Did it make sense?
  - Did the groups follow the assignment?

Group Reflection Questions

- How effectively did your group deal with this task? What was difficult about the task? What were some of your group's strengths and weaknesses?
- What factors contributed to or hindered your ability to complete the task well? Record the factors on the board or flip chart. Elicit: Time management; division of labor; respect for others' ideas; ability to reach consensus, stay on task, draw on individual strengths, and encourage participation.
- How could your group members have helped overcome these problems?

Individual Reflection on the Process (Homework)

Distribute Handout 2. Have students (except the group observers) complete the handout and bring it to the next class. Group observers should bring their completed Handout 1 to the next class. Lead a follow-up discussion on this introductory teamwork activity.

Handout 1—Group Observer Questionnaire (2 pages)

Your job is to watch and listen as the group works. Pay close attention to how the group operates and how different students help the group accomplish its task. Jot down notes to answer the questions while the group works.

As an observer, it is important that you not join in the task (not even to make comments aloud!) so that you do not influence how the other group members act or how they complete their tasks.

Name of Group Member	Actions/Behaviors That Supported Group Progress

1. How were parts assigned? Did everyone have a speaking part?

2. How did the group decide what the plot was going to be?

3. How did the script get written? Did the whole group discuss every line?

4. How were disagreements resolved?

5. Did anyone keep track of the time for the group (e.g., “Only five more minutes left to work, guys”)?

6. Did anyone try to keep the group on task when others’ attention started to wander? How did the group react to that person?

7. Did every group member participate in the task? If so, what helped to get members involved? If not, were there any obvious reasons why someone did not participate?

8. What types of comments did group members have for each other (constructive criticism, positive reinforcement, sarcastic criticism)?

Handout 2—Group Participant Questionnaire

1. Did you enjoy working on this activity with your group? Explain why or why not.

   _____

   _____

2. Did you feel that what you contributed helped to complete the task? Explain why or why not.

   _____

   _____

3. Did the rest of the group welcome your ideas? Did you welcome the ideas of others? How did the way the group responded to suggestions influence the making of additional suggestions?

   _____

   _____

4. a) Who gave others the most directions?
   b) Do you think that person's direction helped or hindered the group's progress?

   _____

   _____

5. How satisfied are you with the skit your group performed? Could you have written a better skit in the same amount of time if you'd completed the task by yourself?

   _____

   _____

6. If you were with the same group and were given a different task, what changes would you suggest with respect to how the group members should work together?

   _____

   _____

7. What did you learn that will help you to be more effective in future group projects?

   _____

   _____

Handout 3—A Family Vacation

Your group is assigned to prepare a skit to be performed before the class.

You have only 12 minutes to prepare this skit.

The information you need is listed below:

Topic: A family vacation

Length of finished skit: 3 minutes

Essential elements of your skit: Destination, plot, action, and dialogue by each team member

You also need a **narrator**, to introduce your skit to the class, and an **observer** who will take notes on the process but will not participate in developing or acting in the skit.

ACTIVITY: PLANNING GROUP RESEARCH

Instructor Preparation

This activity and the next activity (Presenting Group Research) are most useful when completed early in the course so that students learn how to operate in teams and can practice and strengthen teamwork skills. In addition to teamwork, this activity teaches students to work on initiative and dependability skills such as creating and adhering to a schedule. For this activity choose a group research project/presentation that you would normally assign in class. Hands-on group projects such as labs, field work, and construction projects will also work provided they include a group presentation at the end for the follow-up activity, Presenting a Group Report.

Objectives

Students will:

1. Analyze contributions of group members.
2. Suggest ways to deploy group members to best accomplish a task.
3. Develop a group action plan for researching an assigned topic.

Materials

- Handout 1—Action Sheet
- Topic or list of topics for students to research
- Access to computers with Internet access, word processor, and presentation software

Activity Guidelines

If all student groups are to research the same topic, the instructor might want to provide an introduction to the topic, an interesting article, or statistics that will help students think about the topic. If student groups are allowed to choose their topic, a more generic introduction to the project and topic can be given. Instructors should provide specific expectations in terms of quality and content. They should also emphasize that teamwork skills will be assessed during the activity in addition to technical content knowledge.

Give students a copy of Handout 1—Action Sheet. They should use it to plan their research and to divide up tasks. Indicate that they may want to revise their Action Sheet during the course of the project and make revisions as needed to ensure they meet the final deadline. Allow students time in class to do their planning; actual research could be completed individually outside of class. For this assignment, research strategies means using the Internet, going to the library, phoning organizations, etc. Presentation format means written paper, PowerPoint presentation, poster sessions, oral presentation, or some combination of these. Let students know if they are expected to complete the assignment outside of class time. The wrap-up and evaluation of teamwork will occur after the groups present their group reports.

Handout—Action Sheet

Research topic _____

Research strategies _____

Final presentation format(s) _____

Presentation date _____

WHAT will we do?	WHO will do it?	WHEN is it due?
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

ACTIVITY: PRESENTING A GROUP REPORT

Instructor Preparation

This is the final activity in the trio of activities on working in groups. The first activity helped students identify how groups work together. The second activity had students develop a plan and timeline for completing the research required to prepare and deliver the group report. At this point, each group should reconvene to share its data and consolidate its information into a written report. This lesson continues the development of skills needed in the workplace as companies rely on the cooperative efforts of employees to accomplish tasks in a short period of time.

The evaluation criteria for this activity are listed on the Evaluation Form. The student groups need to understand these criteria thoroughly before beginning their reports. Each student will use the criteria to rate every group's presentation. The results will not be discussed in class, but the ratings will be collected and given to the appropriate groups for review and discussion. Each group should write a response and describe how they would change their work process in future projects.

Objectives

Students will:

1. Share individually collected information with group members and organize it for a written group report and class presentation.
2. Plan the format for presenting the information.
3. Use review and editing skills to create a final report.
4. Evaluate written reports/presentations using specified criteria.
5. Demonstrate the ability to use presentation software.

Materials

- Computers with Internet access, word processor, and presentation software
- Handout—Evaluation of Group Presentation (There are two forms per sheet; each student needs enough forms to evaluate each group presentation.)
- Scissors or paper cutter to separate the two forms

Activity Guidelines

Begin by explaining the criteria on the Evaluation Form so that students understand performance expectations for the activity. If students were not required to complete all work on the project outside of class, allow student groups time to combine, format, and finalize their written reports and presentation materials. If time permits, begin group presentations.

Prior to the presentations, distribute enough copies of the Evaluation of Group Presentation form to enable each student to evaluate every group report. Direct students to judge each report using the listed categories, and to award 1–5 points per category (5 being the highest rating). Additionally, instruct

students to write a description of the best features of the report and areas for improvement. Collect the completed evaluations and distribute them to the appropriate report group for its review.

During the group presentations the students in each of the other groups should complete the evaluation of the written report and presentation form. Ask them to give constructive feedback instead of comments such as, “I did not like the presentation slides.” Instead have them suggest possible solutions by saying something like, “The presentation slides were distracting to me because they used too many different transitions, and the font was too small for me to read because too many words were on the slides.”

After all of the class presentations are complete, distribute the reviews to the appropriate groups. Have the groups work together to do the following and discuss their team processes.

Group Reflection Questions

- How effectively did your group deal with this task? What was difficult about the task? What were some of your group’s strengths and weaknesses?
- Did you agree with the reviewer comments you received? Were there any comments that surprised you? Were there suggestions or criticisms that you can work on to improve future projects?
- Did anything stand out from the presentations of the other groups that you might want to include in future work?

Handout—Evaluation of Group Presentation

These are the five criteria on which your presentation will be judged and that you will use to rate other groups' presentations. Use these evaluation forms to assign a rating of 1-5 for each group presentation. Rate the reports on each category listed, using 5 as the highest mark.

Report title _____

Quality of technical information _____

Organization of information _____

Visual presentation (use of tables, charts, etc.) _____

Clarity and flow of presentation _____

Team division of labor _____

Total points _____

Best features of this presentation _____

_____

Areas for improvement _____

_____

****Cut Here****

Report title _____

Quality of technical information _____

Organization of information _____

Visual presentation (use of tables, charts, etc.) _____

Clarity and flow of presentation _____

Team division of labor _____

Total points _____

Best features of this presentation _____

_____

Areas for improvement _____

_____

INTRODUCTION TO TEAM DEVELOPMENT AND FUNCTION

The following activities should be built around a group-created product. The students will complete the activity twice. The object will be for groups to create/assemble at least two of the same (or similar with slight variations) product and to improve their process for creating the second edition. They will be interrupted several times along the way to discuss their group process and to identify the stage of team development at which they are operating—forming, storming, norming, or performing. (The instructor presentation provided at the beginning of this Teamwork module explains these stages briefly.)

Example group-created products:

- Building a couple of models from kits of Legos, Erector Sets, K-Nex, or other type of building toy
- Completing jigsaw puzzles. Either use standard puzzles of about 100 pieces or smaller puzzles with a catch such as the nine piece Scramble Squares puzzles.
- Give teams collections of random items and have them "invent" a product from the materials and write an advertising piece that describes what their invention does. They should also be able to demonstrate a working model.

Example course-specific products:

- For a robotics class: Have student groups build a robot from a kit. If the class is more advanced, have them program a robot to complete a maze.
- For a culinary arts class: Give groups raw materials (flowers, fruits, veggies, or other materials) and have them build two centerpieces for a banquet. For a more advanced class, ask groups to create a plan (menu, food order, preparation schedule) for catering a specific function.
- For a horticulture class: Have student groups plan 4' x 4' gardens to meet specific growing goals—an herb garden, the most productive food garden that could provide fresh produce to a food bank, or a flower garden. Specify a season of the year and for the second round have them describe what should be changed for the next season.
- For a basic biology class: Ask student groups to create a model of a cell at a specific stage of mitosis, clearly labeling the parts from random materials such as modeling clay, resealable plastic bags, plastic drink bottles, pipe cleaners, string, tape, stapler, and glue. A different stage can be used for the second model.

The activity should be complex enough to require a group of 4–6 students, but not so complex that it takes hours to complete.

Objectives

1. Participate in the setting of effective ground rules.
2. Demonstrate a willingness to participate in group work.
3. Gain an awareness of the purpose and goals of a team.
4. Coordinate assigned tasks with other members.

5. Identify issues and problems to be addressed.
6. Demonstrate the ability to focus in team meetings.
7. Identify and use the abilities and skills of other team members.

Materials

In addition to the specific materials needed to complete the project selected for your class, you will need:

- A whiteboard or a computer or tablet with projector for class discussions
- Flip charts and markers, or computers/tablets for capturing the work of the individual teams

ACTIVITY: TEAM DEVELOPMENT AND FUNCTION—FORMING, PART 1

Instructor Preparation

The activities described in the Team Development and Function introduction simulate the forming of a team around a manufacturing or other multi-part process. Teams should consist of four to six students and these groups should remain the same through all of the Team Development and Function activities. You will need materials for each group to create their products twice. Divide the classroom into two areas: a discussion area and a work area. Arrange the discussion area in a U-shape, square, or circle so everyone can see each other and the screen or whiteboard. Arrange the work area with one long table or large round table where each group can surround it for an assembly-type configuration. (Adapt the assembly area to the project being completed.)

Objectives

1. Participate in setting effective ground rules.
2. Demonstrate a willingness to participate in group work.
3. Gain an awareness of the purpose and goals of a team.
4. Coordinate assigned tasks with other members.
5. Perform roles and complete responsibilities appropriately.

Activity Guidelines

- Assign the teams and explain that the purpose of the simulation is for students to experience the stages of team development.
- Have students move to the work area of the room and give them the instructions for the activity.
- Have each team discuss the instructions and the task.
- Distribute the materials for one product to each team. They will get the remaining materials once the first product is completed.
- Ask each team to become familiar with the materials and organize them to best accomplish the task. You may want to provide containers such as small paper plates, cupcake forms, small cups, sealable sandwich bags, flat trays, and box lids for the teams to use to organize the parts. Tell team members that they will need to organize themselves to complete the task. Let them know they can work for 20 minutes to accomplish these goals.
- After 20 minutes, stop the team and tell them that they will have several opportunities to work on the plan and assemble their products later. Explain that you would like to discuss the team-member roles and set ground rules to help team meetings run efficiently and effectively.

- Have groups move back to the discussion area of the room. Teams should sit together as they construct team ground rules. The instructor might want to review the PowerPoint slides 18-20 if they have not already been presented.

  Discussion Notes: In society, we have rules to maintain order and to spell out acceptable behaviors. For teams, ground rules perform this function. With many different personalities, temperaments, and preferred work styles, it is critical that team members agree on the acceptable norm for the team. Established ground rules enable the team to address deviations from the preferred behaviors without personally offending any member—since that member did help establish the rules and agreed to them. Ground rules identify how members will be treated, how problems will be solved, how decisions will be made, and how conflict will be managed. It is important to have these rules written down and in plain view.

- Ask students to describe a situation in which having ground rules would have been helpful.
- Explain that setting ground rules is a preventive technique for avoiding team breakdowns.
- Explain that students will have two tasks to accomplish in the next 20 minutes.

  1. They will decide which team members will assume specific functional roles for the team activity such as timekeeper, recorder, and gatekeeper (who is responsible for bringing the team's attention back to the task if it wanders). All team members are expected to participate and work toward building consensus.

  2. They will write 3–5 ground rules for their team and display them prominently for reference throughout the activity. At this point, each team should keep their ground rules to themselves and share them only with the instructor, who will be able to monitor which rules were valued and observed and which rules were ignored. There will be time later in the activity to revise the ground rules if needed.

- Allow students to return to the work area if time permits or at the next class period. Their task will be to develop a plan for team accountability. They will need to address three points in their plan: a clear list of outcomes for which the team is responsible (restating the assignment in terms of team responsibilities), a list of milestones for measuring their progress, and a description of how the team will measure success for each of the outcomes identified.

ACTIVITY: TEAM DEVELOPMENT AND FUNCTION—FORMING, PART 2

Instructor Preparation

This is a Part 2 of the Forming activity. Teams will be working on their team accountability plan to determine the outcomes for the activity, milestones they must meet to stay on track, and the criteria by which they will measure their success. The preparation is the same as for Part 1.

While the teams begin working on their products and their accountability plans, the instructor should be observing the teams as they work. Watch for appropriate and inappropriate behaviors and notice whether any storming occurs.

Objectives

1. Participate in setting effective ground rules.
2. Demonstrate a willingness to participate in group work.
3. Gain an awareness of the purpose and goals of a team.
4. Coordinate assigned tasks with other members.
5. Perform roles and responsibilities appropriately.

Activity Guidelines

- Allow the teams to have time to construct their product and to work on their team accountability plans. Remind them of their ground rules and observe whether the ground rules are enforced and followed.
- Allow student groups time to work on their products until at least one group completes their first product. Then have the groups come together for a debriefing on their team's behavior.

Group Reflection Questions

- The instructor should bring the groups back together for a quick debriefing, asking the following questions.
  - Did your team select a facilitator, or did someone assume the group leader role?
  - Did your team do any planning, or did everyone jump into construction?
  - Did you discuss how to proceed as a group?
  - Did you assign roles to the team members? What were they?
  - Did everyone contribute their ideas about the process? If not, why?
  - How did you coordinate doing the task with your team?
  - Did everyone participate in the actual construction of the product?
  - Did any conflict occur? If yes, what happened? Are there any thoughts about why it happened?
  - What worked well?
  - What difficulties or obstacles affected the process?
  - What guidelines or practices would help the team communicate or work together better?

ACTIVITY: TEAM DEVELOPMENT AND FUNCTION—STORMING, THINK-PAIR-SHARE

Instructor Preparation

Think-Pair-Share is a creative thinking strategy for brainstorming. Developed by Arthur Whimbey, *Think-Pair-Share* encourages students to think on their own first, then collaborate with partners, and finally express as many ideas as possible from the group in a short period of time. This process may help expose problems during team processes and identify issues that can cause stress and conflict within the team. Sometimes the blame is shifted unfairly to an individual when there may be a materials, supply, or process problem that needs to be solved. The instructor should point out that work conditions such as poor tools and difficult work environments happen in real life and can cause stress and storming on a team.

Objectives

1. Identify issues and problems to be addressed.
2. Demonstrate ability to focus in team meetings.
3. Identify and employ the abilities and skills of other team members.

Materials

- Copy of Think-Pair-Share handout

Activity Guidelines

- Have the students return to assembling or creating their product and working out the steps to their process. Tell them to use the procedure they drafted earlier and note where changes might be needed.
- Observe each team and how it is functioning. If you observe problems and issues that are surfacing then have students take a break from the project to come together while you explain the think-pair-share strategy for identifying issues and problems.
- Distribute a *Think-Pair-Share* handout to each student and have teams follow the procedure below.
  - Ask each team member to write down the problems and issues that surfaced during the activity they were just performing under the “Think” column of the handout. Each student should come up with at least three items. NOTE: Not all problems and issues will be related to team behaviors. They could include not having the materials they would like to have, insufficient light or room, and so forth. All issues and problems should be recorded.
  - Next, ask the students to pair up with another student and compare ideas and add other ideas. These new ideas are recorded in the “Pair” column of the handout.
  - Finally, ask each group to present one idea aloud until all the issues are recorded on the flip chart. Students can record new issues in the “Share” column.
  - Point out that this activity allowed teams to verbalize issues and problems—a first step toward solving them. Intervention techniques will be introduced in a later activity.

Handout—Think-Pair-Share

PRODUCT CREATION/ASSEMBLY ISSUES AND PROBLEMS		
THINK	PAIR	SHARE

ACTIVITY: TEAM DEVELOPMENT AND FUNCTION—NORMING AND PERFORMING

Instructor Preparation

In this final Team Development and Function activity, students will complete their products, prepare a final presentation of their product, and reflect on their team experiences.

Activity Guidelines

- Allow students time to complete their projects unless this would cause a major delay.
- Continue to observe and gather examples of team member conflicts to use as discussion points during the wrap-up. For example, you might ask, "What was happening when…?"
- Have each group finalize its process plan and present it to the class.

Group Reflection Questions

- How well is your team working together now? Did you get past the storming and begin to work together more effectively?
- How does each of you feel about the process your team has created? Have your ideas been heard and your personal issues resolved by the team's plan?
- Did your team move into the norming stage or are you still stuck in storming? Why?
- Did your team get to the performing stage?
- Have each team member tell what they appreciated about other members of the team and what they brought to the team effort. You might want to record this positive feedback and give it to each student to encourage them.

ACTIVITY: WHEN YOUR TEAM BREAKS DOWN

Instructor Preparation

This activity involves role playing intervention techniques to help students identify team problems and possible ways of dealing with them. Before working through the role play activities, you should discuss the probability of team conflicts and means for resolving these conflicts. Many team problems can be quite formidable. In the role-play scenarios that follow, students need to be prepared to act out difficult, real-world interpersonal communication arising from miscues in vocal tone, sending negative messages with body language, or misunderstanding a co-worker's intentions. Co-worker "Bob" bears the brunt of the miscommunication when his colleagues inquire about his home life.

A key to resolving problems with the least disruption or risk lies in focusing on prevention or being proactive and not letting small problems develop into major conflicts. This requires the recognition of symptoms that may include backbiting and complaining, warring between cliques, displaying combative behavior, avoidance of differences or potential conflicts, dysfunctional group norms, unequal participation, delaying or changing decisions, a climate of defensiveness or fear of speaking, and/or domination by an individual. Team members should step in at the appropriate time and with the appropriate approach to address the root cause of the problem.

There are various intervention techniques that can be used to handle conflicts, including:

- ***Refocus on prevention***—This may simply involve revisiting the goals/objectives, individual roles, and ground rules for the team as a reminder to everyone about how things are supposed to be done. A team member or leader might ask the team: "Do we need to add any ground rules to be an effective team?" ***"***Do we need to modify any ground rules because they are not effective?" Ask students who might have misplaced their ground rules to make a new copy to keep with them.
- ***Coaching one-on-one***—Perhaps taking an individual aside and working with him/her privately on weaknesses as a team member would be the most effective and efficient way to resolve the issue. This will also protect the dignity of the person.
- ***Structural intervention***—At times the way the team is organized (members, roles, expertise, mission) may need to be addressed.
- ***Introduce information***—This technique is similar to going back to school—assuming the team has had the proper team training—and serves as a refresher to make members aware of the dynamics that occur at each state of team development as well as other group dynamics
- ***Observe/report group dynamics***—This technique requires one team member to critique the group on what is actually occurring (based on observation). The risk of conflict increases here as people may feel singled out and become defensive. If effective ground rules are in place, the problems should be addressed as indicating a lack of respect for them.

- ***Team problem-solving of breakdowns***—This involves getting the team to apply its problem-solving methods. The positive side is the members will have ownership of the solution. The negative is that it is time consuming.
- ***One-on-one confrontation***—This technique, which requires direct confrontation of the person unable to fulfill his/her role, may be used if all else fails. Before matters get to this point, make sure all risks to the team's ability to function and achieve its objective justify using this technique.

Materials

- Copies of the seven Intervention Role Plays for each student

Activity Guidelines

- Ask for two or three volunteers (depending on the individual role play) who are willing to play people involved in conflict to illustrate the use of various intervention techniques. Explain that they will model how others on the team can help work through any breakdown.
- Give the students a minute or two to read through their parts and consult with the other volunteers before presenting the role play to the class.
- The instructor should read the setting information to the class, and have the volunteers to act out their parts. The instructor will participate in the role plays as well.
- After each role play, use the reflection questions below to discuss the situation and alternate behaviors that could have been tried.

Group Reflection Questions

- Which workplace behaviors (interpersonal communication) were appropriate? Which were not?
- Can you think of any other resolutions to the conflict?
- Was there a time in your team production activity when this conflict-resolution technique was needed?
- What could have been said then to avoid a breakdown?
- Referring back to the Think-Pair-Share exercise, discuss which intervention technique would have worked with the listed issues and problems.

Intervention Role-Play 1:

Refocus on Prevention

Setting: Outside the meeting room where the team has just finished a team meeting. Four of the team members are discussing the meeting.

Volunteer 1: Our team meeting was late finishing up again.

Volunteer 2: I know. It seems that we get out later and later every week.

Volunteer 3: Well, I know I was late getting to the meeting today, but I had a good reason. Besides, Bob always wanders way off the important topics.

Volunteer 1: I think we should just stop the meeting one hour after we start, no matter what.

Volunteer 3: I think we should not let anyone in after the meeting starts.

Instructor: Let's think about how we can prevent this from happening again. I propose we take another look at our team's ground rules. We might need to add "starting and stopping meetings on time" as well as "staying on the topic."

Note: *Can you think of other answers that might have been given?*

Intervention Role-Play 2:

Coaching One-on-One

Setting: Two members of the team are talking in the break room about an incident that occurred that morning.

Volunteer 1: I don't think Bob should have told his daughter to move out of the house by the end of the day. After all, she is only 15. I told him I thought that he ought to be ashamed. Brittany is his only daughter.

Instructor: You did? How did he react?

Volunteer 1: He told me to mind my own business. We both got a little hot. But can you imagine telling your daughter to hit the road?

Instructor: No, but I'm not Bob. I don't know the problems he has had. Did you ask him about his problems with Brittany?

Volunteer 1: No, he was so hot that I just walked off. It's funny, but we have not spoken since then. That makes it hard for me to pass the work I've completed on to him to finish the next phase in production.

Instructor: That certainly doesn't help the team. I wondered why we seemed to be running slow. You know, you might think about going back to Bob and letting him know you really are concerned about him and Brittany. He probably needs someone to listen to him. You might not agree with him, but you can certainly listen.

Note: *Can you think of other answer that might have been given:*

Intervention Role-Play 3:

Structural Intervention

Setting: A team meeting. Team members are sitting around a table.

Volunteer 1: I am concerned about the way I am doing things since we added three new color combinations to our product.

Volunteer 2: So *that's* what's been slowing me down! I was planning on discussing it at this meeting. Bob said he was having problems, too.

Volunteer 1: I took a look at last week's reports and saw that we had fallen short of our quota. I think our team has a problem.

Volunteer 2: Our *team* has a problem? I think *you* are the one with the problem. After all, it's your work that is slowing us down.

Volunteer 1: Me? I don't think you can blame this one on me. After all, you are the one who just last week….

Instructor: Hold it. Hold it. It seems to me we have a system problem, not a people problem. If adding more color combinations has slowed our process, then we need to work together, as a team, to solve this process problem. Why don't we try analyzing our process to see if we can come up with another way to organize our work?

Volunteer 2: You're right. I'm sorry I lashed out. The problem really is in our process, not our people.

Volunteer 1: (to the side) Bob, let's consider the work you are doing. You might be able to do things differently and help me out. What do you think?

Note: *Can you think of other answers that might have been given?*

Intervention Role-Play 4:

Introduce Information

Setting: Team receives a memo from the human resources department announcing a team-building session.

Volunteer 1: I'm surprised that Human Resources is still putting money into building teams. We have been working as a team for six months. What else is there to know?

Volunteer 2: I don't know, except that Bob sure could use some help in relationships. If he has had trouble at home, he is a bear here at work. I can't get along with him at all during those times. Did you see what happened Monday morning? Bob came in with a troubled look on his face, so I knew better than to say anything, but I did. Just to lighten him up, I said, "Bob, you look like you just lost your best friend." Bob twirled around and said, "Mind your own business." Well, he didn't speak to me the rest of the day. Later I needed to ask him to redo some of the work he did. I walked up to him and he let me know with one look that I was not welcome in his area.

Volunteer 1: I guess we should recommend that Bob attend the HR training and let us get on with our work. However, we really can't do our work efficiently without Bob.

Instructor: Do you remember when our team first went through team-building sessions? Do you remember during the session when we were building those miniature vehicles and two of you guys got mad at each other but then the trainers showed us how to work through those problems?

Volunteer 2: Yeah, I remember Bob and I were the ones who got mad. But, if you remember, we worked it out just great. You know that situation really isn't too different from this one. Maybe all of us going through a refresher course would be valuable. I'm sure I didn't react to Bob on Monday the way I should have.

Volunteer 1: Let's talk to the other members and sign up for the session. It will be good for all of us.

Note: *Can you think of other answers that might have been given?*

Intervention Role-Play 5: Observe/Report Group Dynamics

Setting: Manufacturing floor during production.

Volunteer 1: Hand me another box of parts, will ya?

Volunteer 2: What do you mean, hand you another box of parts? Why can't you get your own parts? I just handed you a box of parts 30 minutes ago. What are you doing with them, having them for lunch?

Volunteer 1: Very funny. You're closer to them than I am. The least you could do is help me out here. After all, you don't do enough of the work around here to be a real member of the team. Besides, there were a bunch of defective parts in the last box you gave me that I can't use. I think you must have given me old scrap materials.

Volunteer 2: I did not. Besides, I don't think it is my job to keep you supplied with parts. You must be doing something wrong…AGAIN.

Volunteer 1: Hey, I do my job. It is hard to tell if the whole box is defective or if my parts are not fitting right. Occasionally, the parts fit fine, but most of the time they don't. They did just redesign this part of the vehicle, but I thought things were going to be adjusted. All I know is that I don't have what I need to do the work.

Volunteer 2: Well, this is important because we've been getting complaints from up the line that our parts seem not to fit as well as they have in the past, so it must be your work that is making the whole team look bad.

Instructor: Hold it, folks. T here is something more wrong here than just defective parts. You two are going at each other like wildcats. I think maybe just an observation period of our team's work is in order here. We can get the report and find out what problems our team is having. I'll arrange for it right away. It should happen sometime this week. Then we can fix the problems and get on with our work.

Instructor: (at the end of the week) OK. The observation report is back. It seems that we do have several problems that should be addressed. First, we need to adjust the machine that makes your parts (pointing to Volunteer 1). Second, we need to adjust our process. You two do not need to be handing each other boxes of parts (pointing to Volunteers 1 and 2). Third, there is a procedure that you (Volunteer 1) are not doing quite right. An engineer will be here soon to show you the procedure.

Volunteer 1: I think I know what you are talking about. Does it have to do with the three steps in the middle of my process?

Instructor: Yes, I think so.

Note: *Can you think of other answers that might have been given?*

Intervention Role-Play 6:

Team Problem Solving of Breakdown

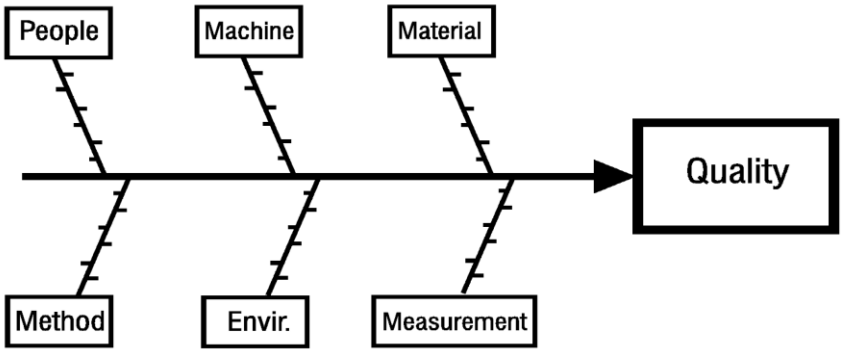
Setting: Team meeting

Instructor: There have been indications that we are not doing well in our area. The problems don't seem to be linked to any one thing, so I thought we might meet to discuss some of the problems. I have printed the agenda each of you suggested.

Volunteer 1: A couple of the items on our agenda relate to my area and I would like to address them first. The first one is material. I think the quality of the material we have received from our supplier lately is not good. I have also noticed that my machine has had numerous breakdowns within the last week. I do not know if that has to do with the material quality or another major problem with the machine.

Volunteer 2: My machine has had problems, too. The control charts are indicating some type of problem today. During the rain yesterday, Bob had a leak right over his area. He got so upset because the leaky roof is also rusted. The rusty water dripped down his back and stained the new shirt his daughter Brittany gave him for Father's Day.

Instructor: Well, I know we had two people out a couple of days last week, which affected production. That really changes our process even when we have temporary help. It sounds like we have several problems that should be addressed. Let's think about using a fishbone diagram to help us sort out all the problems. (Instructor draws out a fishbone similar to the following.)



Instructor: These are the six areas that I hear you identifying as having problems. Let's think about these and others that are possible causes of a drop in our work quality.

Note: *Can you think of other answers that might have been given?*

Intervention Role-Play 7:

One-on-One Confrontation

Setting: During lunch at an outside table.

Instructor: Bob, I understand that you have had some recent problems with different members of the team. What is your point of view of the problem?

Volunteer: I don't know what you are talking about. It is not my problem; they're the ones who have the problem. They're always making me hurry my work. They are always prying into my personal business. And when there is a problem, they always come over and try to "help" me. They just need to leave me alone and let me do my work.

Instructor: Bob, has it occurred to you that when they ask you to hurry, maybe it's only because they need a piece that helps them meet their quota?

Volunteer: No, I just thought they don't like me.

Instructor: Doesn't it seem possible that, when they ask about your personal problems, it's because they care about you? And don't you see that, when you are upset, your work, and eventually theirs, is affected?

Volunteer: No, I don't think my work is affected by my personal problems. And what does what happens to me personally have to do with their work?

Instructor Bob, when your daughter left home last month, you were obviously upset. Some of the team members asked you about it and you became even more upset. That has to be affecting your work and theirs.

Volunteer: You may be right. I know I didn't work well that day. I was so upset I never thought about any of the other team members.

Instructor: Just realize we're all in this together.

Note: *Can you think of other answers that might have been given?*

Assessment Tools/Strategies

This section includes specific strategies and instruments for assessing students' teamwork knowledge, skills, and attitudes.

RUBRICS

Rubrics are valuable assessment tools. Students should be provided with the rubric by which they will be assessed before an activity begins so they will understand the performance expectations. When time permits, students can contribute to the rubrics by brainstorming with the instructor about what a quality behavior or product looks like. For example, before assigning a team project to research a topic and prepare a group presentation, ask students to describe how the ideal team would handle the assignment, how they would assign roles, divide the work, create and make the presentation. Prompt students with specific components. Then have them describe a poor performance. These will be the descriptions of the characteristics for the highest and lowest ends of the Likert scale for each performance criteria. Instructors should add any required attributes to the rubric if the students do not come up with them on their own. Several teamwork evaluation rubrics have been provided as examples.

- The first type of rubric lists attributes that can be observed and includes spaces where the instructor can adapt the rubric for a specific activity, project or career field by inserting additional criteria. There are six of these rubrics dealing with different aspects of teamwork in this section: Teamwork, Listening, Leadership Skills, Planning, Problem Solving and Decision Making, Record Keeping and documentation
- The second type is exemplified by the Rubric for Self-Assessment of Teamwork Skills. This rubric is a self-rating rubric for use by students. The students indicate the degree to which they think they are performing each attribute. They can periodically return to the rubric to reassess and determine whether they are improving those skills.
- The final type of rubric is the most complex. It is exemplified by the rubrics: Team Member Plan for Developing Interpersonal Skills and Team Member Plan for Contributing to the Team's Success. The student completes a rubric by providing examples of satisfactory or exemplary performance of the tasks/behaviors listed. Then the student meets with the instructor or peer observer and compares his/her reflections with their instructor's or peers' observations and formulates an action plan for improving attitudes, behaviors or skills.

  This type of rubric most resembles the type of assessment an employee might receive on the job. It is also the most time consuming. Ideally, this rubric would be used at least three times during a course:

  - At the beginning of the course, to get a baseline and to give students suggestions for specific actions they might take to improve their performance,
  - At the midpoint of the course, to check progress and refine the recommendations for improvement, and
  - At the end of the course, to assess the progress made over the duration of the course. Additional suggestions can be made for students' continued growth beyond the end of the course.

RUBRICS FOR ASSESSING TEAMWORK

Outcome: Teamwork – Participate as an effective member of a team by contributing to the group effort for accomplishing goals. Identify and employ the appropriate role within the group. Use effective interpersonal skills while working with others. Participate in group decision-making processes. Evaluate the team's efforts.

Exhibits concern and encouragement for each team member and team goals.	1 2 3 4 5
Accepts tasks set according to team-established procedures.	1 2 3 4 5
Cooperates with team members to reach realistic, attainable goals.	1 2 3 4 5
Works toward resolving conflict, constructing compromises, and building consensus.	1 2 3 4 5
Participates in observing team's efforts and completing follow-up activities to evaluate team's goals.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Listening – Develop and practice active listening skills including identification of speaker's major points, focusing on speaker's message rather than listener's response, and discrimination between fact and opinion. Use appropriate note-taking techniques. Overcome communication barriers by treating the speaker with courtesy and respect. Seek clarity of communication by rephrasing statements and asking questions.

Selects conversation and behavior style appropriate for the situation.	1 2 3 4 5
Pays attention to given information, directions, and specific details.	1 2 3 4 5
Interprets and evaluates content to identify facts and opinions.	1 2 3 4 5
Checks to verify interpretation of message rather than making assumptions about understanding.	1 2 3 4 5
Takes notes relevant to the situation.	1 2 3 4 5
Documents major points and specific details in writing.	1 2 3 4 5
Demonstrates attentive listening.	1 2 3 4 5
Seeks clarity of communication by rephrasing concepts and asking questions.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Leadership Skills – Demonstrate leadership techniques and qualities to accomplish team goals.

Practices problem-solving and decision-making techniques by recognizing that a problem exists and identifying possible reasons for the problem.	1 2 3 4 5
Identifies goals and challenges that may require alternative solutions.	1 2 3 4 5
Implements, evaluates, monitors, and revises action plan on a continuing basis.	1 2 3 4 5
Values and appreciates the ideas of team members.	1 2 3 4 5
Uses good interpersonal skills to encourage effective, productive team relationships.	1 2 3 4 5
Models high standards with attendance, punctuality, and enthusiasm.	1 2 3 4 5
Builds trust and behaves in an ethical, courteous manner.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Planning – Define a goal and gather background information to determine the feasibility of the goal. Take into consideration variables such as timing, budgetary constraints and staffing concerns. Logically sequence activities to support a plan of action that can be implemented and will support the project goal. Implement the plan, monitor progress toward the goal and make adjustments to the plan as necessary.

Gather and evaluate information.	1 2 3 4 5
Set a realistic goal.	1 2 3 4 5
Assess variables that will affect the plan of action.	1 2 3 4 5
Create a plan of action to reach the goal.	1 2 3 4 5
Implement the plan.	1 2 3 4 5
Monitor progress.	1 2 3 4 5
Make adjustments to plan as needed.	1 2 3 4 5
Evaluate process and final outcome.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Problem Solving and Decision Making – Understand problem-solving and decision-making processes and apply these processes to team projects. Identify root causes. Understand the factors that influence solving problems and making decisions and use this to formulate and implement action plans. Monitor action plans and make adjustments as needed.

Uses problem-solving and decision-making strategies that fit the given set of circumstances and variables.	1 2 3 4 5
Analyzes the source of the problem.	1 2 3 4 5
Applies problem-solving and decision-making strategies.	1 2 3 4 5
Uses the processes of: • identifying, clarifying, and validating the problem or reason for a decision; • exploring options; • considering consequences; • clarifying values related to consequences; and • formulating action plans to follow through on the reasoned-out conclusion of the process.	1 2 3 4 5
Checks status of action plans by monitoring progress of self and others through keeping accurate records, asking pertinent questions of self and others, verifying evidence of progress, and reflecting on relevant consequences.	1 2 3 4 5
Modifies action plans on the basis of information gathered in the problem-solving and decision-making process.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Record Keeping and Documentation – Accurately record information that supports data related to the team's process and progress.

Explains the need for accurate record keeping and documentation.	1 2 3 4 5
Follows team's established policies and procedures for record keeping and documentation.	1 2 3 4 5
Creates a system for tracking team assignments and completion of work.	1 2 3 4 5
Creates a written report documenting the team's activities and accomplishments.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

RUBRICS FOR SELF-ASSESSMENT OF TEAMWORK SKILLS

Use this instrument throughout the course to self monitor your teamwork skills. Note: It is fairly common to overrate your skills during the initial assessment. You may rate yourself a bit lower as you get feedback from others and discover the complexities of each attribute. By the end of the course you should see improvements in your ratings if you focus on improving the quality of your participation in the team's process rather than primarily on getting the assigned group work completed.

Component: Participates as a member of a team.

Essential Attribute	I	II	III	IV
I am aware of the purpose and goals of the team.	Barely	Partially	Mostly	Fully
I provide ideas when the team creates ground rules.	Seldom	Occasionally	Usually	Consistently
I identify issues as the team works.	Seldom	Occasionally	Usually	Consistently
I stay focused in team meetings.	Seldom	Occasionally	Usually	Consistently
I am willing to participate in group work.	Unwilling	Reluctant	Moderately	Completely
I help coordinate assigned tasks with other members	Rarely, if ever	Sometimes	Often	Always

Component: Identifies and employs various roles within the group.

Essential Attribute	I	II	III	IV
I recognize the necessity of being an active team member.	Rarely, if ever	Occasionally	Usually	Always
I know the various team-member roles and responsibilities of each role.	Seldom	Sometimes	Usually	Consistently
I perform the roles and responsibilities appropriately.	Seldom	Occasionally	Often	Consistently
I identify and utilize the abilities and skills of other team members.	Rarely, if ever	Occasionally	Usually	Consistently

RUBRICS FOR IMPROVING TEAMWORK

Team Member Plan for Developing Interpersonal Skills – Demonstrate interpersonal skills for working with others which include the ability to adjust one's own behavior to fit the dynamics of the situation. This covers appropriate expression of feelings and ideas in a working environment that includes teams. It also includes the ability to listen to colleagues and respond appropriately.

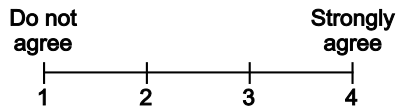
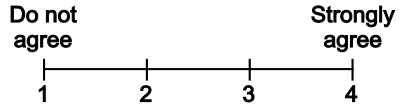
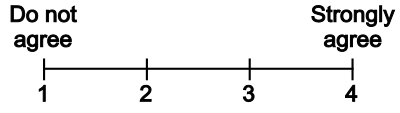
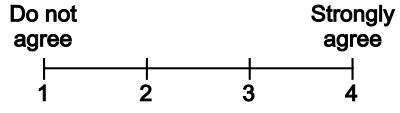
Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your team or instructor, describe the steps you might take to continue or improve your interpersonal skills.
Adjusted your behavior appropriate to the situation to express your feelings, communicate your ideas and opinions, or to listen to others' feelings, ideas, and opinions.	Example: Peer/Instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Recognized and evaluated the appropriateness of your behavior as a team member.	Example: Peer/Instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Gave or received team feedback.	Example: Peer/Instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your team or instructor, describe the steps you might take to continue or improve your interpersonal skills.
Worked as a member of a productive team.	Example: Peer/Instructor review:  	Steps:

Peer comments and suggestions:
Instructor comments:

Team Member Plan for Contributing to the Team's Success – Recognize and value effective work ethic and attitudes and behaviors which support the ability of the team to meet its goals. These include acceptance of the requirements of the job, a willingness to take initiative with new challenges; taking responsibility for decisions and actions; and recognizing the necessity of being prompt, accurate, and reliable in completing tasks.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your team or instructor, describe the steps you might take to continue or improve your attitudes and behaviors for successful team participation
Demonstrated a positive and responsible attitude while fulfilling the requirements of a task.	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:
Took initiative and sought new challenges.	Example: Peer/Instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:
Took responsibility for your own decisions and actions.	Example: Peer/Instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your team or instructor, describe the steps you might take to continue or improve your attitudes and behaviors for successful team participation
Demonstrated promptness, accuracy, and reliability in completing a task.	Example: Peer/Instructor review: 	Steps:
Consistently demonstrated a good attendance record and/or demonstrated punctuality and enthusiasm in completing a task.	Example: Peer/Instructor review: 	Steps:
Demonstrated appropriate interpersonal communication when contributing to the team's decision-making process.	Example: Peer/Instructor review: 	Steps:
Accepted directions or accepted constructive criticism and adjusted your actions to the situation.	Example: Peer/Instructor review: 	Steps:

Peer comments and suggestions:
Instructor comments:

Videos and Weblinks

VIDEOS

The following is an annotated list of videos and websites that are available at the links provided. You may choose to use these in class to give additional background on the subject of teamwork, as scenarios to kick off a discussion, or as tutorials on a particular aspect of the subject.

http://youtu.be/SLqDm0Cg7Sw (2:06)
Inspirational Teamwork quotes (2:06), good for starting (or ending) this module.

http://www.youtube.com/watch?v=FJVS__j_lio (3:35)
Inspirational teamwork message from Mensa Mexico (2009).

http://www.youtube.com/watch?v=OpzH1hPvf38 (3:52)
Inspirational video "TEAM: Together Everyone Achieves More" and available PPT file (see "Show More").

http://play.simpletruths.com/movie/pulling-together/ (3;10)
Inspirational video that considers the teamwork accomplished by a flock of geese.

WEBLINKS

http://humanresources.about.com/od/involvementteams/a/twelve_tip_team.htm
12 Tips for Team Building (Clear expectations, Context, Commitment, Competence, Charter, Control, Collaboration, Communication, Creative innovation, Consequences, Coordination, Cultural change): short paragraphs for each tip to ensure work teams contribute most effectively to your business success.

http://www.career-success-for-newbies.com/behaviors-for-teamwork.html
"Successful Behaviors For Teamwork" (collaborate, constructive criticism, park ego outside, energetic and enthusiastic, empathy, integrity, balanced roles of leading and following); this site provides a short paragraph about each recommended behavior

http://www.nwlink.com/~donclark/leader/teamsuv.html
Online "Teamwork Survey" will help your team identify its current stage within the teamwork model (i.e., Forming, Storming, Norming, or Performing).

http://www.huddle.com/blog/team-building-activities/
http://www.huddle.com/blog/team-building-exercises/
"10 Quick and Easy Team Building Activities and Exercises" includes activities designed to improve communication and problem solving skills and improve employee planning skills while building trust within a team of peers.

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Communication

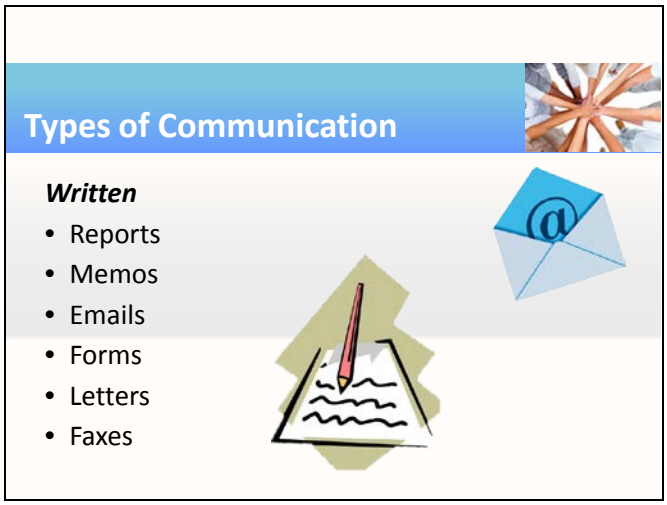
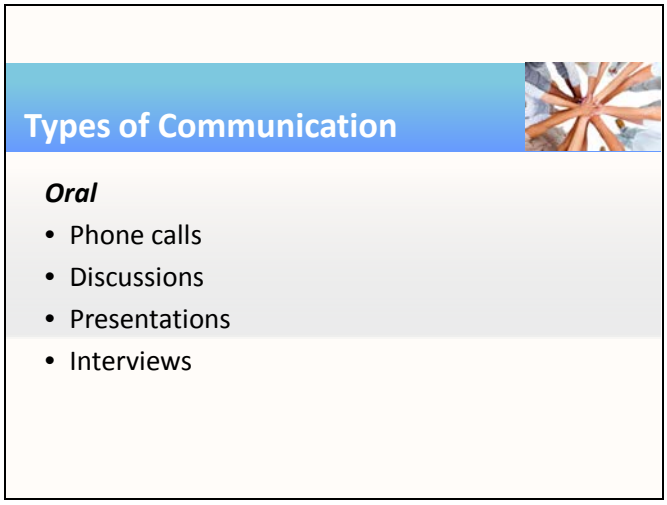
Overview

Effective communication is essential for a motivated and productive workplace. Communication—spoken and written, on paper and in electronic form—is the lifeblood of every workplace. It is impossible to prepare workers for successful careers without preparing them to communicate effectively and successfully. In this module, while we cannot address all the years of language skills training (or lack of training) that students bring to the classroom, we can pause to emphasize the importance of this area to their overall career preparation, and highlight room for improvement. Whether their future employment includes working in quality control teams in factories, at construction sites involving multiple crafts, in laboratories staffed with multi-skilled technicians, or around conference room tables, their success will largely be tied to their abilities to communicate with their fellow workers and with management.

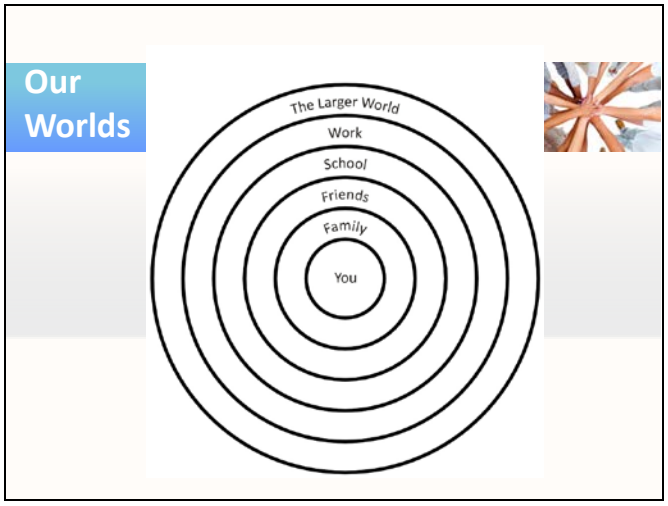
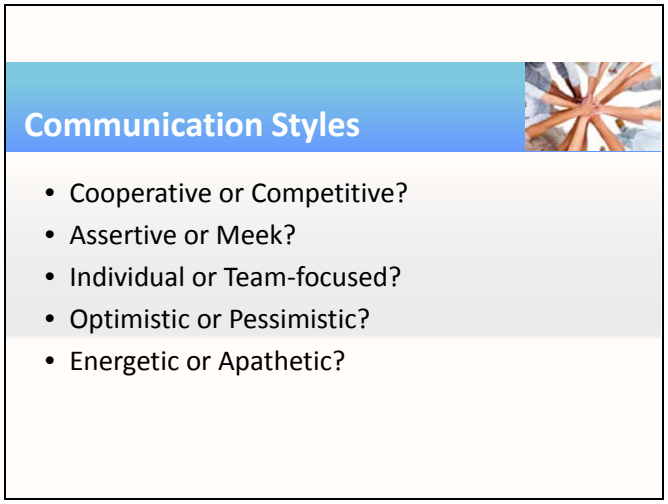
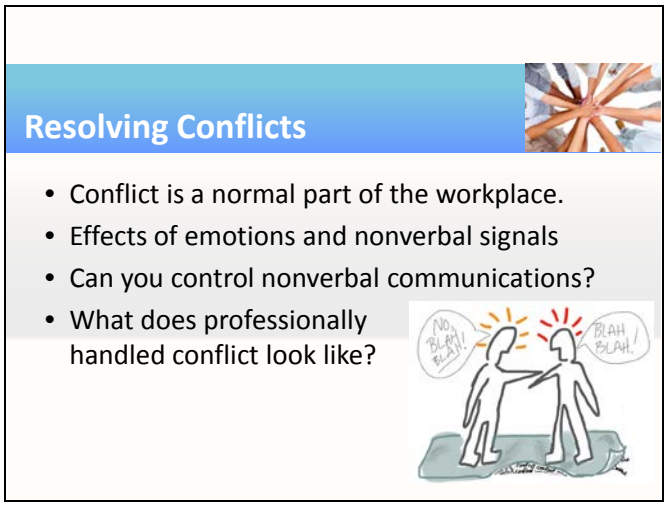
In this module, you will find:

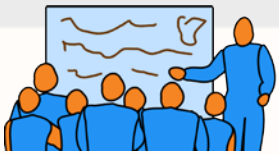
- **Instructor Presentation Materials**—The presentation materials for this topic provide students with an overview of positive communication strategies. The slides offer talking points introducing the concepts addressed in the activities.
- **Classroom Activities**—The student activities allow students to practice many facets of effective oral and written communications.
- **Assessment Tools**—There are a variety of rubrics following the classroom activities section. These can be used as observation checklists, peer evaluations, or student self-evaluations. In addition, there are personal performance plans designed to help students reflect on their individual achievements, compare their reflections with their instructors' or peers' observations, and formulate action plans for improving attitudes, behaviors or skills.
- **Videos and Links**—This collection of resources can be used to encourage further exploration of the topic.

Presentation Materials

	SLIDE	TEACHER NOTES
1		
2		
3		

	SLIDE	TEACHER NOTES
4	**Types of Communication** ***Media*** • Slide shows • Photographs • Drawings • Videos • Audio **Combinations** of oral, written, and media 	
5	**Effective Communications** ***Prepare!*** • Know your audience • Know your subject matter • Use the best delivery method	• Your audience: One person, a small group, or an auditorium filled with people? • Your subject: What are you going to cover? What are you NOT going to cover? • The delivery medium: Oral presentation? Written document(s) and handouts? Multimedia?
6	**Verbal and Nonverbal Signals** **Verbal Signals** • Speech patterns • Accents • Dialects • Vocabulary • Acronyms **Nonverbal Signals** • Gestures • Body language • Emoticons or “smileys” • Eye contact • Dress	• Communicators should be aware of the signals they are sending. Non-verbal cues such as body language can reveal true feelings and attitudes more readily than polite conversation. What do slumped shoulders and lack of eye contact convey?

	SLIDE	TEACHER NOTES
7		• It's perfectly appropriate to use different styles of communication in different circles. We generally speak much less formally with family members and friends (small circles) than we do at work and in the larger world (larger population; less "known" to us; reactions not entirely predictable; may expect greater formality).
8		• The attitudes behind how we communicate add either positive or negative value to our message. In this case, opposites do not attract. Conflict may be a natural outcome when people with divergent communication styles interact.
9		• For most people, the word *conflict* is scary because of the emotional baggage it carries. Since no two people view the world exactly the same way, disagreement is normal. One way of avoiding or resolving conflict is to listen carefully to the other speakers and calmly rephrase what they are saying, e.g. "So, I think what I hear you saying is that we should alternate days off. Is this correct?" This active listening technique can help get disagreeing parties "on the same page."

	SLIDE	TEACHER NOTES
10	**Listening ≠ Hearing** • Tech Support calls • Customer Complaints • Telemarketing calls • Medical Lab Report 	• Listening requires focus, remembering, and responding. How is listening critical in the situations listed on this slide?
11	**Preparing for a Presentation** • Who is the main audience? Is there a secondary audience? • What is desired outcome? • What information is needed?  • Use PowerPoint, flip-chart, or handouts? • Use multimedia—video, audio? • Plan B: what if the computer/projector fails?	• Preparing for a presentation involves putting all the pieces of the communication puzzle together: appropriate word choices, delivery speed, body language, clothing, and delivery tools to suit the audience and occasion.
12	**Delivering a Presentation** • Introduce yourself, welcome the listeners. • Introduce the subject/topic. • Deliver the body of the presentation, according to your plan. • Deliver a closing or summary. • Optional: Q&A 	• The *introduction* explains who the speaker is and why he or she is qualified to address the subject. The *body* should follow a plan that presents the main points in a logical order. Speakers should stick to the plan so that listeners can easily follow the flow of ideas and remember them. The *closing* ties everything together briefly.

Teaching Resources

ACTIVITIES

The following activities can be completed in class to emphasize specific aspects of effective communication and positive interpersonal skills. The activities found in this resource can be used "as-is" or they can be tailored to fit a specific course. Suggestions for adaptation precede each activity, with examples from several different subject areas/career pathways. The suggested modifications provide instructors with ideas for adapting the activity to fit content they are already teaching. Modifying the activities allows employability skills to be infused in subject area content more easily.

ACTIVITY: COMMUNICATING ON THE JOB

Instructor Preparation

Communicating on the Job is one of a set of activities for increasing student awareness of the various types of communication needed on many jobs, including some that could be stressful. On the job, the transmission of information or idea may be accomplished using any of the following:

- Written communication (reports, memos, e-mails, faxes, forms, letters)
- Oral communication (phone calls, personal communication, presentations, interviews)
- Media presentations (PowerPoint™ slides, printed or electronic photographs, graphics, drawings, video, audio recordings)
- A combination of written, oral, and media communication, as might be used for accident investigations, training workshops, or inspections

These communication methods are useful in every career. In addition to the following examples, career-specific vignettes are provided at the end of this activity.

- In a Theater Arts program, extensive planning and discussion are required for every production. The teams designing the costumes, props, backgrounds, music, sound, and lighting effects rely on multiple communication methods to achieve the end result. Students could be asked to focus their attention on one set of such communications and analyze its clarity and effectiveness.
- Ask students to consider how government administrators explain various programs and bureaucracies to the public. Printed materials sometimes suffice, but often multimedia presentations and colorful artwork are most effective. Students could be tasked with preparing a presentation on a particular new law or regulation.
- All Manufacturing programs rely on accurate recordkeeping associated with storage of raw and finished goods. Many different forms are used to initiate, verify, and record the variety of transactions. As students encounter business forms—both paper and electronic—in their courses and employment, ask them to notice the multitude of facts and data values included on the forms.

Not only does communication play a vital role in the workplace, but it is also essential in the classroom. It should be relatively easy to build the case for the following activity by eliciting examples from students' own experiences. Examples of classroom communication vehicles include items such as a class assignment distributed with a handout, a list of items needed for a project, a discussion among students about a misunderstood assignment, or a returned test paper with red ink denoting errors. These items help introduce the importance of oral and written communication to success as students, employees, or even as entrepreneurs.

Objectives

Students will:

1. Identify the communication process needed for effective communication.
2. Compare communication methods.
3. Evaluate each method's effectiveness for the situation.

Materials

- Whiteboard with markers (or other classroom writing surface)
- Paper, pens, pencils
- Projector (optional)

Activity Guidelines

1. Assign a scribe to write on the board and lead students in a discussion of points needed for effective communication. This is not meant to be a definitive list, but here are some ideas to elicit discussion by the students.
   - Know your audience. Is it one person or an auditorium filled with people?
   - Know your subject. What are you going to talk about? What are you NOT going to talk about?
   - Identify the best communication vehicle for your audience—oral, written, multimedia, or a combination—and allow adequate time to prepare it.
   - Introduce yourself to your audience. Who are you and what is your knowledge of or experience with the subject? Tell your audience what you know about the subject. This part—the *body* of the presentation or paper—should be the longest part of the communication. Summarize. This is called the *closing*. Depending on the medium selected, ask for feedback.
2. Form three student groups (one for each type of communication listed below). Briefly present the situation to be discussed in today's activity.

   A company has committed a safety violation. Playing the role of the regional safety officers, student groups will warn the company of the infraction and advise them of the proper course of action. Ask each group to compose and deliver a response to the violation using one of the following types of communication.

   - Memo or e-mail
   - Personal conversation with a manager
   - Presentation with demonstration and handouts

   Each group should present their response. It would be helpful if the written responses could be projected for all to see. The oral and media responses should be delivered by a representative from the group.

Group Reflection Questions

Following the deliveries, engage the students in a discussion of the three modes of communication demonstrated by the groups.

- Compare the three methods and evaluate their effectiveness at addressing the situation.
- Consider the different communication styles observed during the exchange. Did any work better than others? How did the situation define the style that was employed?
- Was there a particular style that was most evident in this situation? Cooperative or competitive? Assertive or meek? Direct or indirect? Individual or team-focused? Optimistic or pessimistic?

Individual Reflection on the Process (Homework)

Have students identify the types of communication involved in the following scenarios:

- Marcus is part of the team preparing for a new 4-act play to be presented at the Munson Theater next month. Following the planning meeting, Marcus uses his notes and the meeting minutes recorded by the team secretary to draft a purchase order for the needed supplies. The purchase order will require approval by the theater owner. Marcus also makes a few phone calls to the theater craftsmen to discuss the materials that will be required.
- Sharon and Richard conduct annual storm spotting seminars at several locations around the state. For each seminar they prepare handouts explaining the proper procedures for storm spotters and a presentation illustrating how to recognize storm formations and threatening weather. The four-hour seminar is presented in an entertaining manner.
- Eunice gave explicit instructions to her two fork-lift drivers about the need to reposition the three stacks of pallets over to aisle K. She told them she wanted that done before the morning break, which normally occurs about 9:30. It's now 10:00 a.m. and the stack of pallets has not been touched. She will need to file a grievance against the drivers.

ACTIVITY: GIVING AND RECEIVING INSTRUCTIONS

Instructor Preparation

Briefly draw the class's attention to two facets of good communication: giving and receiving. The link between the "giving" and the "receiving" can be words, pictures, sounds, etc. In this activity, ask students to join pictures and words, with the students themselves being the link.

This activity requires giver-receiver communication using simple drawings provided for that purpose. However, relevant objects or artwork can be substituted. The activity might take a different form in other courses. For example:

- In a Public Safety course, a 9-1-1 dispatcher must listen carefully to the situation described by the frantic caller and then give carefully worded instructions. Can they do it using only words over the telephone? Will the frantic caller be able to receive, interpret, and follow the instructions?
- In an Agriculture or Construction program, the work plan for the day is articulated and the workers are expected to carry it out. This requires accurate instructions about the day's plan, as well as an accurate interpretation of the plan.
- An Education and Training program requires detailed processes in words and pictures for Training Manuals. Master operators will describe or demonstrate the steps for a certain procedure and others will accurately document the procedure.

Ask students to rate themselves, answering this simple question, on a scale of 1–10: ***Am I a good communicator?*** In this activity, they will get a chance to measure that skill, as both a speaker and a listener.

Objectives

Students will:

1. Assess their ability to be an effective communicator.
2. Practice using words to effectively describe simple objects and processes.
3. Practice giving and receiving instructions to accomplish a task.

Materials

- Copies of the handouts
- Blank paper and pens or pencils (and optionally, a clipboard)

Activity Guidelines

1. Assign students to a role, Giver or Receiver, and form pairs—one Giver with one Receiver.
2. Each pair of students should sit back-to-back.

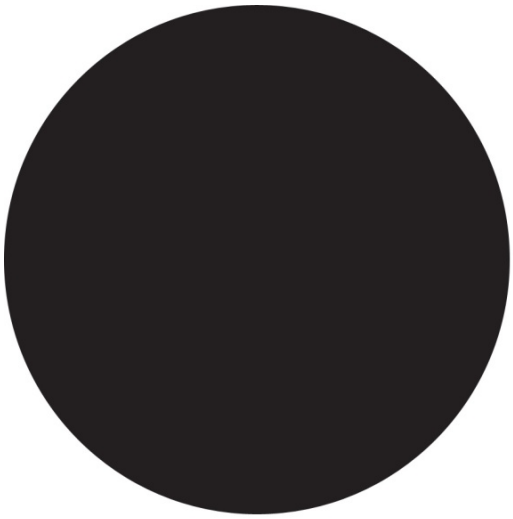
3. Give each Receiver a blank sheet of paper and a pencil. Give each Giver a copy of Handout 1, shielding it from the view of the Receiver.
4. **Instructions to Givers:** Communicate to the Receiver—with words only—what is drawn on Handout 1. **Instructions to Receivers:** Listen to the Giver's words and attempt to replicate the drawing on the blank paper. Neither the Giver nor Receiver is allowed to ask or answer questions.
5. After three or four minutes, have students switch roles and repeat the exercise with Handout 2.
6. After three or four minutes, allow students to compare their drawings to see how effectively they communicated to each other.
7. Encourage a brief class discussion to achieve consensus that feedback and interaction is an important part of clarifying communication.
8. Repeat the preceding activity with Handouts 3 and 4. This time students are permitted to ask and answer questions.

Group Reflection Questions

Use the following ideas as discussion starters.

- Compared to the one-way process at the beginning, how important was ***two-way*** communication?
- Which was a more important role, the Giver or the Receiver?
- What were some limitations to the successful communication of the drawings? (Answers should include things like language, vocabulary, mutual understanding of terminology, and a quiet environment.)

Handout 1—Communication Drawing 1



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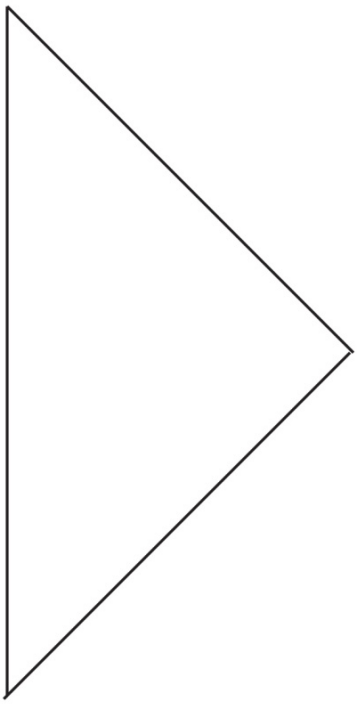
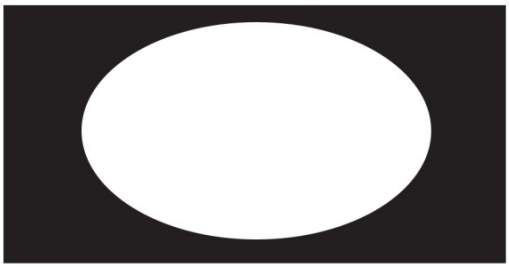
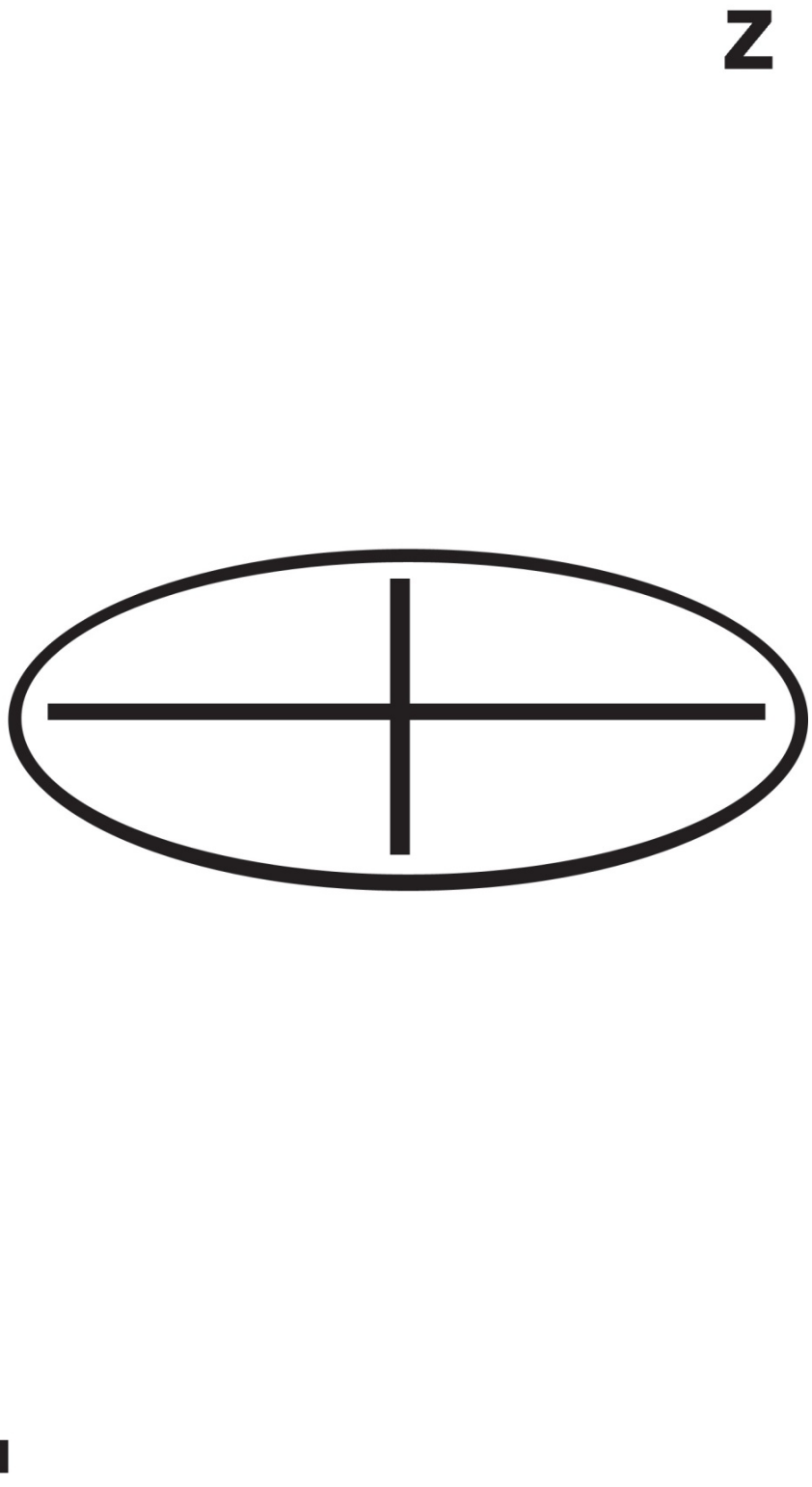
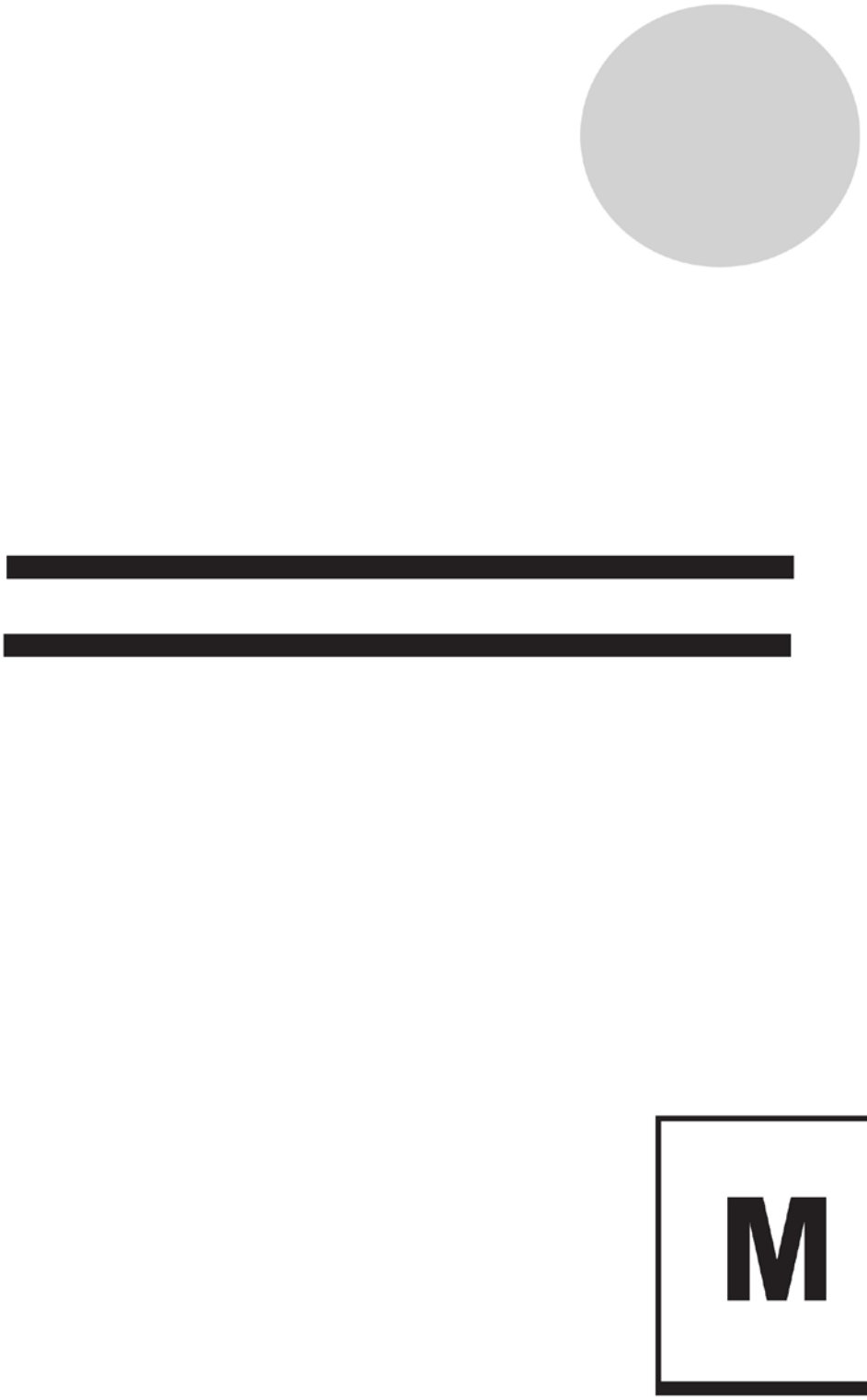




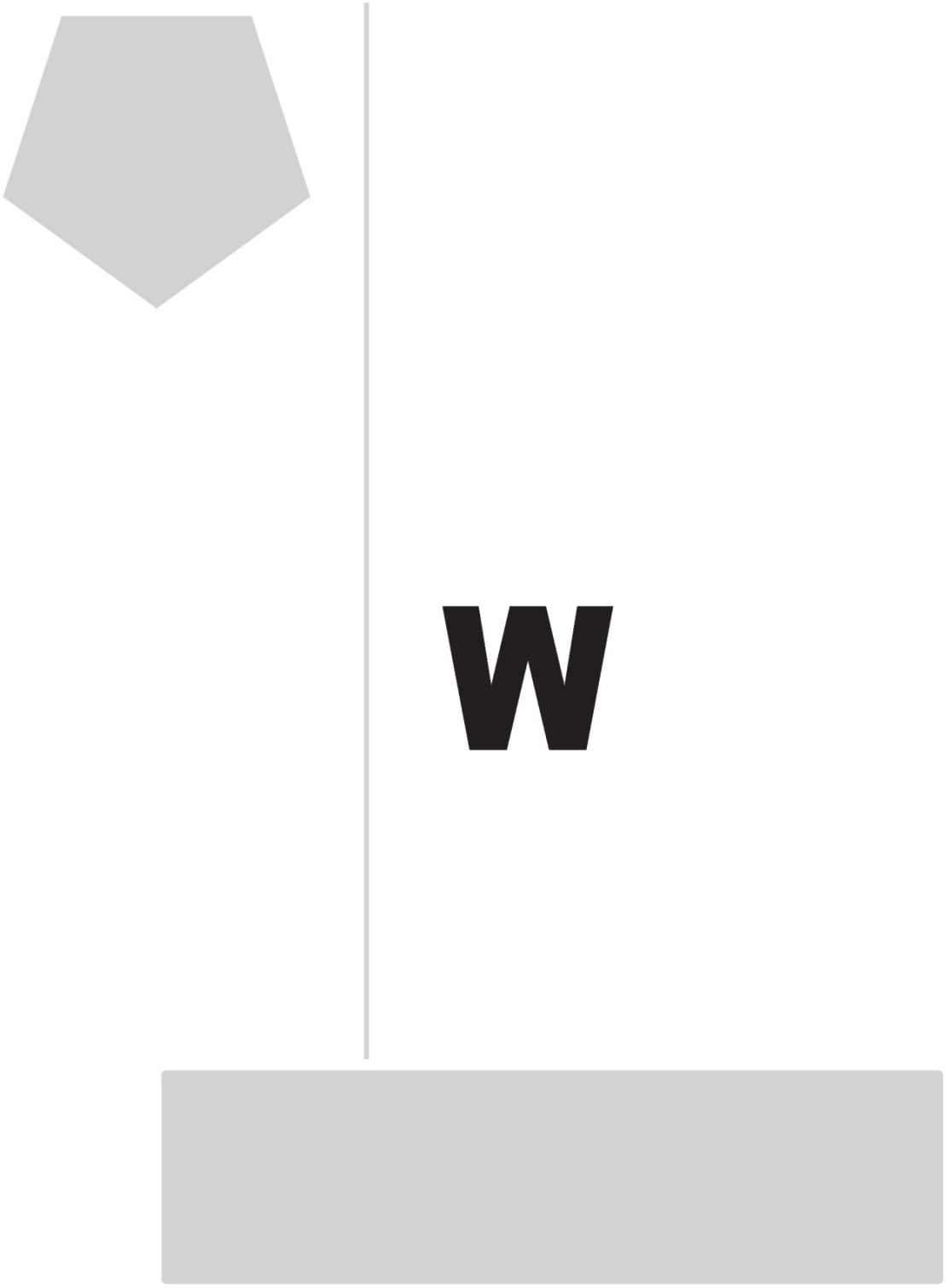
Handout 2—Communication Drawing 2



Handout 3—Communication Drawing 3



Handout 4—Communication Drawing 4



ACTIVITY: ADAPTING COMMUNICATION STYLE

Instructor Preparation

As business professionals, we know that communication happens on both verbal and nonverbal levels. This activity is designed to increase student awareness of the many ways they communicate and accidentally "miscommunicate" to those around them.

Since each career area includes specialized vocabulary, personnel interactions, and customer relations, this activity applies in almost every course. Here are examples:

- In the Hospitality and Tourism industry, style of dress and tone of voice are clearly important to the clientele. So, in a Food Service course, one would expect the staff in a hotel on an island resort to dress and speak differently than the staff at a mountain ski lodge. Is this being deceptive to the customer?
- The concepts taught in a Marketing course are geared towards attaining profitable sales margins, so the vocabulary used will include language and behavior that might be considered aggressive and greedy in any other setting. How far outside the workplace is this type of communication acceptable?

Objectives

Students will:

1. Recognize the consequences of poor communication skills.
2. Give examples of communication signals, both verbal and nonverbal.
3. Demonstrate a change in behavior appropriate for a particular career area.

Materials

- Verbal and Nonverbal Communications (See Handout 1)
- "Our Worlds" handout (See Handout 2)

Activity Guidelines

Break the ice by sharing an anecdote about terms from your personal experience that have changed meanings over the course of your life (e.g., "bad" meaning great). Relate how older adults may have a difficult time understanding young people because slang terms change with each generation.

1. Ask the class: Can you give examples of current phrases that are popular but confusing?
2. Project (as a slide) or distribute (as a handout) **Handout 1—Verbal Signals**. Engage students in a discussion of how each of these types of *verbal signals* might operate between:
   - A student and a younger sibling
   - A police officer and a lawbreaker

- Two strangers in the grocery store
- Two best friends meeting on the street
- A minister or parish priest visiting with a church member
- An employee and a supervisor
- Two strangers meeting online in a chat room

3. Project (as a slide) or distribute (as a handout) the second half of **Handout 1—Nonverbal Signals**. Review the list of signals, asking students what sorts of *nonverbal signals* might be witnessed during each exchange.
4. Distribute **Handout 2—"Our Worlds."** Have students review this handout and explain what the concentric circles represent regarding communications. Questions to stimulate discussion include:
   - How do people at each level perceive you?
   - How do you adapt your communication as you move from one circle to another?
   - What is the effect of using a communication style appropriate for one circle when operating in a different circle? (For example, suggest the incongruity of a short-order cook speaking with a bank officer about a loan or of using texting abbreviations in formal speech.)
   - Think back to your transition from high school to college or the workplace. What changes in behavior did you have to make (regarding communication) to adjust to your new environment? What problems did you face? How did you cope?
   - How might you describe the communication style used in a workplace setting? If you've had more than one job, how did you find the style different in each setting? (For example, students might mention the degrees of formality between workers and supervisors.)

Group Reflection Questions

- Why are multiple communication styles similar to speaking more than one language?
- Reflect on your own verbal and nonverbal communication skills. Identify three areas that, as a result of today's discussions, you might change to be more appropriate for a workplace in your career field.

Handout 1—Verbal and Nonverbal Signals

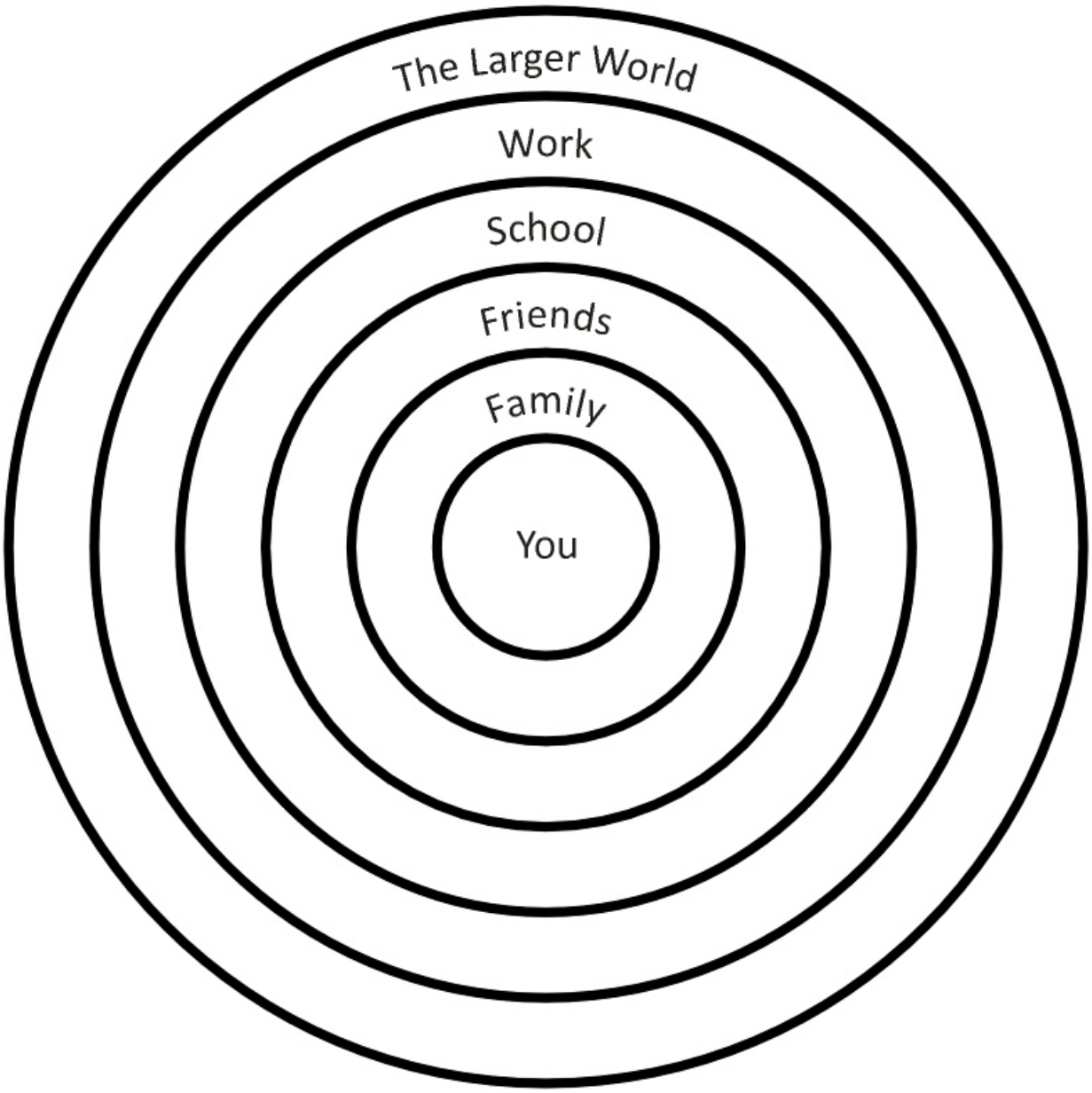
Verbal Signals

- Speech patterns
- Accents
- Dialects
- Vocabulary
- Acronyms

Nonverbal Signals

- Gestures
- Body language
- Emoticons or “smileys”
- Eye contact
- Dress

Handout 2—"Our Worlds"



ACTIVITY: CONFLICT RESOLUTION IN THE WORKPLACE

Instructor Preparation

Conflict is a natural occurrence when two or more people work toward a common purpose and have the opportunity for to express different viewpoints. Resolving conflicts allows movement toward achieving the desired purpose. A short activity cannot teach us how to resolve every conflict, but it is important to recognize the communication that does (or does not) occur in the midst of conflicts.

For most people even the word *conflict* is scary because of the emotional baggage that usually accompanies it. However, not all conflict is bad. Since no two people view the world exactly the same way, disagreement is normal. In fact, anyone who agrees with you all of the time is probably telling you what you want to hear, not what he or she actually believes.

This activity provides an opportunity to evaluate ways to approach conflicts and disagreements. Students will learn (and have fun) by role-playing the scenarios described on the handout.

Alternately, create scenarios from your career area involving fictional characters in typical disputes or miscommunications. Example: Coworkers disagree over who will get to take additional vacation days near a holiday. The scenario could provide relevant background information, such as which coworkers had already taken the most days off.

Objectives

Students will:

1. Recognize conflict as a normal part of the workplace.
2. Practice different styles of handling workplace conflicts.
3. Identify forms of communication involved in conflicts.

Materials

- Scenario descriptions (see Handouts)
- Copy of one situation for all members of each group

Activity Guidelines

Divide the students into groups**.** Assign each group one handout (or instructor-created) scenario. The activity has three phases: 1) role-playing behaving badly, 2) role-playing behaving nicely (or professionally), and 3) post-game class discussion. One student in each group will be an outside observer and note taker, but not a mediator. Ask the students to come up with their own resolutions to each scenario, without instructor hints.

1. Each scenario should first be handled badly, where tensions and emotions escalate and the outcome is not productive.

2. After a brief cool-down period, ask students to re-play the scenario, with the players having a more congenial and constructive attitude, and likewise, a more productive outcome.
3. Each group should be prepared to discuss their outcomes and observations with the class afterwards, with an eye toward noting subtle forms of communication in each exchange.

Conflicts usually result from differences in personality, values, or perceptions. Watch for those in the scenarios that play out here. Acknowledge that there are no right answers, just better ones. Communication between the players, in all its aspects, is the key.

Group Reflection Questions

Vital to this activity is the discussion that occurs *after* the role-playing. Remember the objectives. Students need to 1) recognize conflict as a normal part of the workplace, 2) practice different styles of handling workplace conflicts, and 3) Identify forms of communication that help resolve conflicts. For the last objective, in particular, students should be able to identify the subtle communications that occurred during each scenario—both spoken and unspoken.

- How do emotions and nonverbal communication (facial expressions, tone of voice, and gestures) affect conflict?
- Can nonverbal communications be controlled (i.e., can you fake it)?
- What does handling conflict in a professional manner look like?

Handout

Situation 1

Eric is a new stock clerk in a software store and his job is to stock the shelves with boxes of software. He has been on the job for only two weeks. Frances, who has been with the store for five years, works in the stockroom. Eric lets Frances know which cases of product he needs to fill the shelves. However, Frances spends most of her time talking on the phone with her boyfriend rather than helping Eric find the cases he needs. This has happened repeatedly. What can Eric do?

Situation 2

Michelle has just been hired as the Executive Assistant at a bank. During her first week, Michelle noticed that the Office Assistants are very cool to her. Shane, the one assigned to orient her to the workplace, is almost hostile. Michelle learns that Shane had the Executive Assistant job temporarily, while the bank interviewed prospective replacements. He even interviewed for the position, but Michelle landed the job. Michelle is on the verge of tears every day because of the constant hostility in the office. What can Michelle do?

Situation 3

Harley's supervisor continually asks him to prepare her coffee and to run personal errands for her during his lunch hour. She doesn't mind if Harley returns late from lunch, as long as her personal errands are completed. What can Harley do?

Situation 4

Terra is a courier for a law firm. Because of heavy downtown traffic one day, she comes in to work late. Terra has been late to work three times this month for the same reason. Today her boss yelled at her in front of all the paralegals, calling her lazy and saying her pay will be docked a full hour if she is even a minute late. Terra is embarrassed and angry. How can she respond?

ACTIVITY: LISTENING ACCURACY FOR TECH SUPPORT

Instructor Preparation

It's been said: "Listening is not the same thing as hearing." Of course, listening requires focus, remembering, and, often, responding. One study reported that average adults spend almost 50% of their daily communication time listening. Most of the time it's in casual conversation. But when it is workplace related, it can involve an important, even critical, exchange of information.

Phone calls to technical support or customer service require an accurate exchange of information between the customer and the service representative. For the communication to be reliable, both parties must listen attentively, record information accurately, and then interpret and act precisely to obtain the desired results. In this activity, students will respond to simulated telephone conversations containing important information, notice how well they listen, and consider ways to improve their skills.

Before the class meeting, duplicate and cut apart the telephone scripts in the Handouts. Place sets of scripts in envelopes—one envelope per group. The scripts are to remain hidden from the group members until selected, one at a time, and read. The phone call transcripts cover a few representative career areas, but could easily be supplemented with calls from other fields. Examples: In a Finance program, a call to a credit card validation service; in Human Services, an inquiry to an employment agency about an advertised job opening; or for a Law program, a call to a Jury Service Clerk seeking a written excuse from jury duty

Objectives

Students will:

1. Practice their listening skills.
2. Evaluate their listening skills.

Materials

- Scripts of phone calls (cut from Handouts)—one of each per group, in a folder or envelope
- Answer sheets (cut from Handouts)—enough for each group member to have an answer sheet corresponding to each script

Activity Guidelines

Introduce this activity with a quick story. Suppose that, when you arrive home today, your brother says,

> *"Oh, your friend Mary called. I think she said she will meet you at the corner of 4th Street and 3rd Avenue at 2 PM. Or maybe it was 2nd Street and 4th Avenue at 3 PM. I'm not really sure. Sorry. I didn't write it down. In any case, she didn't say what phone she had today."*

The facts in this story make a big difference in whether you'll ever meet Mary or not!

Hopefully students will do a better job of listening in this activity. Form groups of three or four students and distribute a packet of scripts to each group, with instructions not to open them yet.

Explain that scripts and answer sheets have been provided so that each group member can have a turn being the speaker. The speaker will select a script and read it while the others listen. After each listening session, the speaker should distribute the corresponding question slips. Students should then take a few minutes individually to complete the slips. Finally, the speaker can provide the correct answers and students can score themselves and write their number of correct answers on their question slip. The next student should then take a turn at being a speaker, repeating the process with a different script. When all the scripts have been read, reconvene the class for reflection and discussion. If needed, revisit each of the scripts until everyone is convinced of the correct answers.

Group Reflection Questions

- If you worked in a call center, what could you do to improve your listening skills? What could you do to help your customers improve their listening skills?
- Are there some parts of a conversation which should be considered essential? Nonessential?
- What message do you send when you have to ask the speaker to repeat herself? Is this bad or good?
- What role, if any, do emotions play in listening?
- Is it possible that your listening skills changed a little during this brief activity? In what way?

Handouts

Script 1: Customer Tech Support Call

Hello, my name is Chambers. That's spelled with C-H. I purchased my computer system in January last year, and now my printer isn't working. It's a model J X two-three-thousand. It has always worked fine, until now. It's plugged in and I checked the cable. I haven't changed any of the settings. I know it has plenty of ink. But when I click "print," nothing happens. I have a paper due for class tomorrow morning. I need to get this printed tonight! What do I need to do?

The caller's name: _____ With what equipment is there a problem? _____ What model? _____ What did the customer check to try to fix it? _____ What's the problem now? _____ Why the urgency? _____ SCORE:	The caller's name: _____ With what equipment is there a problem? _____ What model? _____ What did the customer check to try to fix it? _____ What's the problem now? _____ Why the urgency? _____ SCORE:	The caller's name: _____ With what equipment is there a problem? _____ What model? _____ What did the customer check to try to fix it? _____ What's the problem now? _____ Why the urgency? _____ SCORE:

Script 2: Customer Complaint

Hello, is this the Public Transportation Office? I have a problem. I think I need to speak with the City Bus Department. Last week when I inserted two tokens on the 42nd Street line, it took my first token, but then rejected my second coin. In fact, I had to insert two more coins before it was satisfied. I complained to the driver. His name was Ricky, I think. He said I needed to call you guys. I called yesterday and spoke with Ramona at the City Bus Depot and she said I needed to call you guys. What are you going to do about that broken one-armed bandit?!

The caller's name: _____ What department was being sought? _____ What was the complaint? _____ What did the customer have to do? _____ With whom has the customer already spoken? _____ Who is Ricky? _____ SCORE:	The caller's name: _____ What department was being sought? _____ What was the complaint? _____ What did the customer have to do? _____ With whom has the customer already spoken? _____ Who is Ricky? _____ SCORE:	The caller's name: _____ What department was being sought? _____ What was the complaint? _____ What did the customer have to do? _____ With whom has the customer already spoken? _____ Who is Ricky? _____ SCORE:

Script 3: Telemarketing Call

Good morning. Am I speaking with master of the house? Excellent! My name is Mario and I am happy to tell you that you have been selected to receive a free rug shampoo in one room of your home, just for answering three quick survey questions today. Are you interested? Great! OK. Let's get started! Did you know that the carpets in the average American household have not been cleaned in over 10 years? That's right! So, how long has it been since you've had your carpet's cleaned? What?! Never?! <laughing> Ha! Ha! Well, then this is your lucky day, because we're going to clean one of your rooms absolutely free! We will do this with the Power-Vac seven-thousand, made by And-How Industries, one of the leading manufacturers of carpet cleaning machinery in the world. And-How Industries produces twelve different models of cleaners and has a complete line of detergent products guaranteed to leave your carpet looking like new.

The caller's name: _____ What free offer was made? _____ What must you do in exchange? _____ What did the caller claim? _____ What device is being promoted? _____ What is the model number? _____ SCORE:	The caller's name: _____ What free offer was made? _____ What must you do in exchange? _____ What did the caller claim? _____ What device is being promoted? _____ What is the model number? _____ SCORE:	The caller's name: _____ What free offer was made? _____ What must you do in exchange? _____ What did the caller claim? _____ What device is being promoted? _____ What is the model number? _____ SCORE:

Script 4: Medical Lab Report

Hello, Mrs. Sicker? This is Rosa from Doctor Weller's office. I have the results of your lab work from yesterday's office visit. Everything looked pretty good, but Doctor Weller has a few concerns. Your red blood cell count was normal, but your white cell count was a little elevated. That suggests that you might have an infection. Since you just recovered from that bad cold last week that could explain it, so the doctor will not prescribe any new medications at this time. However, he is more concerned about the fat count. Although the normal range is between 120 and 140, your reading of 160 is too high. He wants you to start taking two doses of the red and white pills each day, starting tomorrow. And be sure to drink a whole glass of water with those pills.

The caller's name: _____ From what company? _____ When was the office visit? _____ What was wrong with the white cell count? _____ What was your fat count? _____ What did the doctor change? _____ SCORE:	The caller's name: _____ From what company? _____ When was the office visit? _____ What was wrong with the white cell count? _____ What was your fat count? _____ What did the doctor change? _____ SCORE:	The caller's name: _____ From what company? _____ When was the office visit? _____ What was wrong with the white cell count? _____ What was your fat count? _____ What did the doctor change? _____ SCORE:

ACTIVITY: PREPARING PRESENTATIONS

Instructor Preparation

Almost anyone involved in business or education will make presentations. It might be a five minute summary to a few people sitting around a table, or a one-hour delivery to a large auditorium filled with eager listeners. In any case, preparation is the essential ingredient for a successful presentation. This activity outlines one strategy for being prepared. It is beyond the scope of one activity to actually assemble and polish the presentation, so this activity is confined to the planning phase.

We've offered a typical scenario that students can appreciate, but it can be adapted for a specific career field. For example:

- In Health Sciences, a CPR instructor is notified of a new set of protocols for the corporate training program. A 15-minute presentation will be delivered to summarize the changes to the executive staff of several client companies.
- A Quality Circle Team is ready to unveil their new process for assembling the T-Frame. The Team is scheduled to make their presentation at the next weekly meeting of Manufacturing Management.
- The Starry Skies Travel Agency has been invited to present their Summer Cruise programs to the Ladies Guild as part of Tourism Week

Objectives

Students will prepare for a presentation by

1. Analyzing the audience characteristics.
2. Listing the desired outcomes.
3. Evaluating the delivery options, based on various circumstances.

Materials

- Presentation Planning Checklist (see Handout)

Activity Guidelines

Prepare the class by first working together through this sample scenario. Read the scenario to the class:

> *Imagine that you are employed as an Information Technology (IT) specialist. You are asked to research what improvements should be made to the computers used by the company's Accounting Department and to report your findings to the Chief Financial Officer (CFO). After you research functionality, cost, availability, and reliability, you are convinced the best solution is System X, although it costs a bit more than System Y.*

Referring to the sample scenario, pose the following questions to the class. See the suggested answers following each question.

- **Thinking about the presentation to be prepared for this assignment, who is the audience?** (The CFO who requested the research.)
- **Might the presentation also be used for a secondary audience? How would that audience differ from the primary audience?** (Yes, the information probably will be shown to other s and administrative staff who will need more supporting background information than the CFO.)
- **Thinking about the delivery medium, will a PowerPoint presentation be appropriate for this audience, or must it be low-tech (flip charts and handouts)?** (A computer presentation is appropriate for almost any audience, if technology is available.)
- **Are there any limitations on media, such as colors, sounds, animations, etc.?** (Probably not in this case, but the subject matter may not call for video and audio.)
- **What is the desired outcome of this presentation?** (The presentation will convey the research findings about the pros and cons of available replacement systems and the justification for recommendation of System X. Ideally, the listeners will agree with the selection.)
- **What kinds of information do you need to achieve the desired outcome?** (The presentation needs to contain the most relevant facts from the research, but not every detail of the research, i.e. no details of unproductive research.)
- **How can you communicate the information?** (Side-by-side lists provide good comparisons of features, as long as they are not too text dense. These could be bulleted lists. Bar charts are good for comparing relative magnitudes. Pie charts are good for contrasting percentage, like the market share or customer loyalty of various brands. Short marketing video clips may serve to show the attractiveness of a product.)
- **Should the presentation run automatically or with user intervention?** (Since there will likely be questions along the way, the presentation will be best if slides are advanced manually. Later, a repackaged version that runs automatically could be created to present the new system.)
- **How could the presentation be salvaged if the electronic delivery fails?** (The PowerPoint slides can be printed as handouts and distributed to accompany presentations.)

Develop one or more new career-specific scenarios comparable to the examples in the Instructor Preparation notes, above. Now, distribute copies of the Presentation Planning Checklist and describe a scenario for students to use in completing the checklist.

Group Reflection and Application

Ask students to discuss and compare the results of their checklists in small groups or as a class. If time and relevancy permit, students can take the assignment to the next level and outline or storyboard (frame-by-frame rough sketch) their presentation.

Handout—Presentation Planning Checklist

PRIMARY AUDIENCE

Age bracket _____ Gender _____

Occupation _____

Experience_____

Other_____

Other_____

Style of learning

_____ Visual _____ Other

_____ Auditory _____ Mixed

_____ Hands on _____ Impaired

SECONDARY AUDIENCE(S)

Age bracket _____

Gender_____

Occupation _____

Experience _____

Other _____

Other _____

Style of learning

_____ Visual _____ Other

_____ Auditory _____ Mixed

_____ Hands on _____ Impaired

MISCELLANEOUS

Yes – No Incorporate all audiences into one presentation?

Number of presentations required

_____ Single delivery _____ Multiple deliveries

If you need to create separate presentations for different audiences, what styles will be used?

_____

_____

_____

ELEMENTS

_____ Bulleted lists _____ Hyperlinks

_____ Tables _____ Photos

_____ Quotations _____ Videos

_____ Graphs/Charts _____ Sounds

PRESENTATION CONDITIONS

Primary Audience, Single Delivery

Room size: Large – Medium – Small

_____ Computer w/ projector

_____ Overhead

_____ Web/Kiosk

Primary Audience, Multiple Delivery

Room size: Large – Medium – Small

_____ Computer w/ projector

_____ Overhead projector

_____ Kiosk displaying website

Secondary Audience, Single Delivery

Room size: Large – Medium – Small

_____ Computer w/ projector

_____ Overhead projector

_____ Kiosk displaying website

Secondary Audience, Multiple Delivery

Room size: Large – Medium – Small

_____ Computer w/ projector

_____ Overhead projector

_____ Kiosk displaying website

MEDIA TYPES FOR PRIMARY AUDIENCE

_____ PowerPoint presentation with facilitator

_____ Automated slide show/Kiosk

_____ Handouts _____ Notes

_____ Website _____ Mixed

_____ Other:

ACTIVITY: ENGLISH FOR BUSINESS

Instructor Preparation

People who interview prospective employees will tell you that relatively few applicants are adequately prepared to use standard business English in the workplace. Errors in grammar, spelling, usage, and punctuation on job applications and resumes often disqualify job applicants. Many students seeking employment do not have the language skills required by employers. Students need to understand that mastery of oral and written English is vital to their success.

One activity cannot remedy a lifetime of poor language use, but it can make students more aware of the types of errors that creep into oral and written communication and the word processing tools that can help smooth out some of the rough edges.

Duplicate the two sample letters included as Handouts for this activity.

Depending on the demands of a particular course or career field, this activity can be taken to different levels, as described in the following options:

- Option 1: Have students proof the letters in the handouts. They can practice drafting a letter of inquiry to a prospective employer, seeking a job and introducing their qualifications and prior job experience. They could also prepare for a face-to-face job interview by creating an outline of relevant facts likely to be required during an interview.
- Option 2: In addition to proofing the handout letters, students should draft a letter of application to a prospective employer in response to an advertised job opening. They should include a brief description of their qualifications and prior job experience, and should create and attach a resume.
- Option 3: For English, OST, or business writing courses, in addition to proofing the handout letters in class, students should correct the letters and rewrite them. They should also draft a letter of application, similar to that described above

In all cases, to address writing skills (or prepare for an oral presentation), it would be most helpful if students use a computer with its spelling and grammar checkers. See the *optional extension* at the end of the guidelines.

Objectives

Students will:

1. Analyze and reword written communications according to accepted business English standards.
2. Demonstrate proficiency in proofreading their own work and using a spelling and grammar checker.

Materials

- Handouts 1 and 2: Sample letters for proofing
- Optional: Computer with word processor with spelling and grammar checking features

Activity Guidelines

Although this activity addresses spelling and grammar, students will not be graded as if they were in an English language classroom—unless it is an English language classroom. The message to be conveyed here is that using correct business English is essential for a successful career.

Use Handout 1 in a class discussion as an ice-breaker. This letter is so obviously poor that everyone will have a good laugh before tackling Handout 2—the more serious attempt. Nevertheless, Handout 1 provides many opportunities to discuss practices to avoid.

Students should examine Handout 2 individually or in small groups before discussing it as a class. Ask students to circle the problem words or phrases and indicate the changes they would recommend in the margins.

After a few minutes of small group discussion, bring everyone back together and compare the findings to see if anyone has found an error that others have overlooked.

Clearly, the chances of the two sample letters being well received are slim. Reinforce that good English, both oral and written, is essential to workplace success.

Optional Extension: As time and resources permit, have students compose a letter introducing themselves to a prospective employer and seeking an advertised job position—similar to the handouts of this activity. Online or classified job listings can be used as writing prompts. Here are suggested minimal requirements for the letter:

- Biographical information: name, age, and contact information
- Relevant educational background
- Employment experience
- Awards and recognition for outstanding achievements, both job-related and personal
- Aspirations and goals

The best letters will demonstrate careful selection of relevant facts and meaningful aspirations, but will not include a complete autobiography. Students should also spell-check and grammar-check their finished letter and document examples of how the word processor corrected typos, misspellings, grammar mistakes, punctuation errors, and so on. Are the results reliable or did the computer spelling and grammar checkers *incorrectly* suggest changing something? Be sure students realize that there is no shame in finding mistakes. It's the final version that counts!

Group Reflection Questions

Is it acceptable to speak and write differently in the business environment than at home or with friends?

(Answer: Yes. Just as we dress and behave differently for solemn occasions and casual events, we also use speech and written communication styles in the workplace that are different from our natural, informal speaking and writing styles.)

Handout 1—Memo to Mr. Taylor

M E M O R A N D U M

DATE: March 10

TO: Mr. Taylor

FROM: Mr. Winters

RE: Update?

Dude, some update. Your department are always to little to late. I'm sick and tired of the slow service. It stinks. Those sound card shoulda been installed months ago. And only 5 laptops, that,ll do a whole lotta good for 100 people. Get a bigger server for crying out loud!!!!!!!! Everytime I turn around your asking me to clean files. I feel ilke a stupid maid. Your the dingbat.

Handout 2—Letter with Application

January 28, 2013

Workplace, Inc.
123 Park Avenue, 7th Floor
York, NY 12345

Attn: Personnel

Dear Sir or Madam:

I am a graduated from Taco College, minor computer science. I have enclosed my resume for your perusal.

During my job search and reviewing information about computer businesses, I have locate your address from a website and took the liberty of forwarding my resume. The experience that I need to enhance my career in the field of computer science has been comprehensive. Considering my self-esteem, self motivation, and self-reliance, I will be glad to discuss in detailing with you.

If you should have any available opportunities or should no of any lending opportunities plaese call me at 987-654-3210 or send brochures to my address.

Thank you for your time and consideration, and look forward of hearing from you soon.

Sincerely,

Assessment Tools/Strategies

This section includes specific strategies and instruments for assessing students' communication knowledge, skills, and attitudes.

RUBRICS

Rubrics are valuable assessment tools. Students should be provided with the rubric by which they will be assessed before an activity begins so they will understand the performance expectations. When time permits, students can contribute to the rubrics by brainstorming with the instructor about what a quality behavior or product looks like. For example, before assigning a team project to research a topic and prepare a group presentation, ask students to describe how the ideal team would handle the assignment, how they would assign roles, divide the work, create and make the presentation. Prompt students with specific components. Then have them describe a poor performance. These will be the descriptions of the characteristics for the highest and lowest ends of the Likert scale for each performance criteria. Instructors should add any required attributes to the rubric if the students do not come up with them on their own. Several communication evaluation rubrics have been provided as examples.

- The first four Communication rubrics list cover communication content, oral and written communication, and listening skills and include spaces where the instructor can insert additional attributes to tailor the rubric to a specific project or activity. It was developed to be used by the instructor or other observer who will be assessing a student.
- The next two Communication rubrics are self-rating s for use by students. The students indicate the degree to which they think they are performing each attribute. They can periodically return to the rubric to reassess and determine whether they are improving those skills.
- The final rubrics are the most complex. The student completes a rubric as in the second type, but is asked to provide examples to support his/her ratings. Then the student meets with the instructor or peer observer and compares his/her reflections with their instructor's or peers' observations and formulates an action plan for improving attitudes, behaviors or skills. This type of rubric most resembles the type of assessment an employee might receive on the job. It is also the most time consuming. Ideally, this rubric would be used at least three times during a course:
  - At the beginning of the course, to get a baseline and to give students suggestions for specific actions they might take to improve their performance,
  - At the midpoint of the course, to check progress and refine the recommendations for improvement, and
  - At the end of the course, to assess the progress made over the duration of the course. Additional suggestions can be made for students' continued growth beyond the end of the course.

RUBRICS FOR INSTRUCTOR ASSESSMENT

Outcome: Communication Content – Determine content of communication based on purpose and audience. Select and interpret appropriate references. Identify the appropriate format for communication. Convey information to audience according to accepted practices.

Assesses audience and matches topic to audience needs.	1 2 3 4 5
Displays sensitivity to cultural differences of a diverse audience.	1 2 3 4 5
Speaks and understands audience-appropriate terminology.	1 2 3 4 5
Chooses relevant and current information.	1 2 3 4 5
Documents print and electronic sources.	1 2 3 4 5
Organizes and maintains information.	1 2 3 4 5
Matches information to usable data.	1 2 3 4 5
Converts information into the appropriate format.	1 2 3 4 5
Conveys information in a clear, courteous, concise, and correct manner.	1 2 3 4 5
Delivers information from key ideas connecting relationships between and among elements of a topic.	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Oral Communication – Demonstrate knowledge of the topic, organized in a logical manner and delivered with confidence using effective verbal and nonverbal techniques. Monitor and adjust delivery according to perceived reception, providing response to feedback from the audience as appropriate. Use equipment that supports the purpose of the presentation.

Demonstrates knowledge of the topic.	1 2 3 4 5
Organizes topic in format suitable to the audience and situation.	1 2 3 4 5
Organizes topic to convey the central idea or theme with critical points emphasized.	1 2 3 4 5
Demonstrates interpersonal skills with sensitivity to cultural differences.	1 2 3 4 5
Presents a confident, professional image through diction, voice quality, vocabulary selection, and style of delivery.	1 2 3 4 5
Identifies point of view of the audience.	1 2 3 4 5
Provides opportunities for an audience to gather information by inviting questions and listening to praise or constructive criticism.	1 2 3 4 5
Observes audience's nonverbal messages.	1 2 3 4 5
Responds in an objective, appropriate, and courteous manner to resolve differences of opinion.	1 2 3 4 5
Reflects on, and evaluates the delivery of communication.	1 2 3 4 5
Uses equipment and software programs to generate visuals and handouts to support the oral communication when appropriate.	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Written Communication – Use standard practices for written communication to organize information in the necessary format to achieve a clear objective. When appropriate, use the writing process: prewriting, drafting, proofreading, editing, and revising.

Selects a format based on the target audience and the information to be communicated.	1 2 3 4 5
Uses an outline to organize ideas into a cohesive presentation pertinent to the stated objective.	1 2 3 4 5
Exercises brainstorming techniques in the prewriting stage to accumulate ideas that should be communicated.	1 2 3 4 5
Discards ideas and content deemed unnecessary or not supportive of the objective.	1 2 3 4 5
Writes a rough draft from the outline.	1 2 3 4 5
Proofreads the draft to correct spelling and grammar errors.	1 2 3 4 5
Edits and revises the proofed text to refine the expression of the ideas.	1 2 3 4 5
Uses word processing to produce a formatted document.	1 2 3 4 5
Uses word processing tools to yield an error-free document.	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Listening – Develop and practice active listening skills including identification of speaker's major points, focusing on speaker's message rather than listener's response, and discrimination between fact and opinion. Use appropriate note-taking techniques. Overcome communication barriers by treating the speaker with courtesy and respect. Seek clarity of communication by rephrasing statements and asking questions.

Assesses an audience or speaker in a social situation.	1 2 3 4 5
Selects conversation and behavior style according to the situation.	1 2 3 4 5
Pays attention to given information, directions, and specific details.	1 2 3 4 5
Interprets and evaluates content to identify facts and opinions.	1 2 3 4 5
Checks to verify interpretation of message rather than making assumptions about understanding	1 2 3 4 5
Takes notes or completes forms based on listening and reading information relevant to the situation.	1 2 3 4 5
Records major points and specific details.	1 2 3 4 5
Supports the speaker by practicing attentive listening and adapting behavior accordingly.	1 2 3 4 5
Seeks clarity of communication by rephrasing concepts and asking questions.	1 2 3 4 5
Makes use of verbal and nonverbal information.	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

RUBRIC FOR SELF-ASSESSMENT OF COMMUNICATION SKILLS

Use this instrument throughout the course to self monitor your communication skills. Note: It is fairly common to overrate your skills during the initial assessment. You may rate yourself a bit lower as you get feedback from others and discover the complexities of each attribute. By the end of the course you should see improvements in your ratings if you focus on improving the quality of your oral and written communication and interpersonal behaviors.

Objective: Communicate effectively with others in conversation.

Essential Attribute	I	II	III	IV
I maintain eye contact with the other person(s) while speaking and listening.	Seldom	Sometimes	Usually	Consistently
I use appropriate gestures and body language to communicate my interest and engagement in the conversation.	Seldom	Sometimes	Usually	Consistently
I convey constructive attitudes and beliefs to further the conversation.	Seldom	Occasionally	Often	Consistently
I speak clearly and professionally, using vocabulary appropriate to the occasion.	Seldom	Sometimes	Usually	Consistently
I listen to and respect others' points of view and positions.	Seldom	Sometimes	Usually	Consistently
I avoid interrupting others.	Seldom	Sometimes	Usually	Consistently
I pause a moment after others finish speaking.	Seldom	Sometimes	Usually	Consistently
I can briefly rephrase in my own words what others have said, as evidence that I have understood their point(s).	Seldom	Sometimes	Usually	Consistently

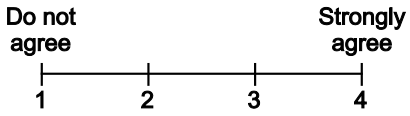
Objective: Communicate effectively with others in writing.

Essential Attribute	I	II	III	IV
I write with a clear purpose, not straying off topic.	Seldom	Sometimes	Usually	Consistently
I use a word processor, including the spell-checker and grammar-checker.	Seldom	Sometimes	Usually	Consistently
I avoid the use of jargon and unnecessarily long sentences.	Seldom	Sometimes	Usually	Consistently
I use numbering and bulleted points rather than very long paragraphs.	Seldom	Sometimes	Usually	Consistently
I observe professional business etiquette and manners in my work-related communications.	Seldom	Sometimes	Usually	Consistently
I proofread my writing before any final action to avoid obvious mistakes.	Seldom	Sometimes	Usually	Consistently

RUBRIC FOR ASSESSING INTERPERSONAL SKILLS

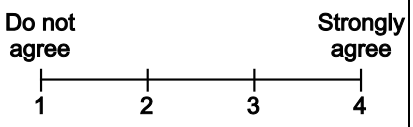
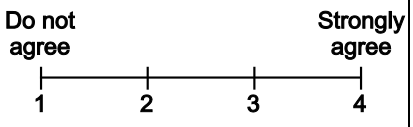
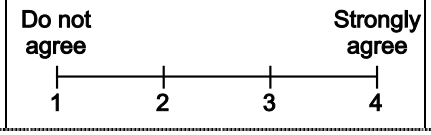
Plan for Developing Appropriate Self-Expression Skills – Demonstrate self-expression skills appropriate to a variety of situations. This includes the ability to express feelings, reactions, ideas, and opinions while also demonstrating active listening skills.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve your self-expression.
Used interpersonal skills to express your feelings, reactions, ideas, opinions, wants, and needs assertively and appropriately.	*Example:* *Peer/instructor review:* Do not agree — Strongly agree 1 2 3 4	*Steps:*
Used active listening skills as a way to show positive self-expression.	*Example:* *Peer/instructor review:* Do not agree — Strongly agree 1 2 3 4	*Steps:*
Recognized the requirements of the situation and tailored your expressions accordingly.	*Example:* *Peer/s instructor review:* Do not agree — Strongly agree 1 2 3 4	*Steps:*
Orally communicated with others in a clear and organized manner.	*Example:* *Peer/instructor review:* Do not agree — Strongly agree 1 2 3 4	*Steps:*

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve your self-expression.
Communicated information clearly in writing.	*Example:* *Peer/instructor review:*  	*Steps:*
Listened attentively to others.	*Example:* *Peer/instructor review:*  	*Steps:*

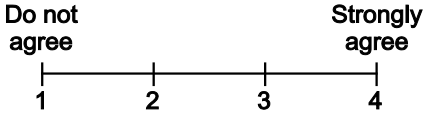
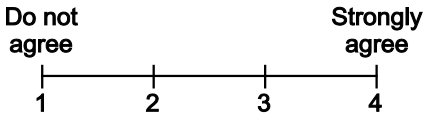
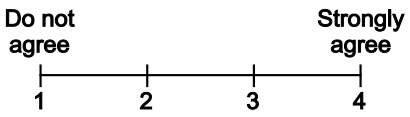
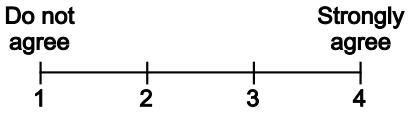
Peer comments and suggestions:
Instructor comments:

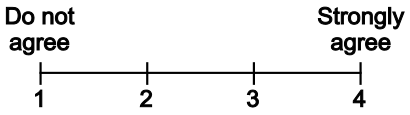
Plan for Developing Conflict Management Skills – Negotiate work and personal demands in such a way that promotes effective time and stress management techniques. Demonstrate techniques in conflict prevention and conflict resolution. This includes demonstrating communication skills that comprise negotiation, group decision-making, and consensus-building.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve your intrapersonal and interpersonal management skills.
Used your communication skills to avoid, minimize, prevent, or solve conflicts.	*Example:* *Peer/instructor review:* 	*Steps:*
Used problem-solving skills to avoid, minimize, prevent, or solve conflicts.	*Example:* *Peer/instructor review:* 	*Steps:*
Used negotiation skills to solve a conflict or problem.	*Example:* *Peer/instructor review:* 	*Steps:*
Participated in a decision process that led to a reasonable compromise and consensus.	*Example:* *Peer/instructor review:* 	*Steps:*

Peer comments and suggestions:
Instructor comments:

Plan for Adapting Interpersonal Skills – Display the ability to adjust behavior as appropriate to the dynamics of the situation, listening and responding with empathy and respect for the rights of others. This includes making judgments about the appropriate behavior in a working environment that includes customer and staff relationships. It also includes the ability to listen to colleagues, supervisors, and customers and respond appropriately and empathetically.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve your workplace interpersonal skills.
Adjusted your behavior to fit the situation.	Example: Peer/instructor review:  	Steps:
Recognized, felt, or acted with empathy for others.	Example: Peer/instructor review:  	Steps:
Recognized and evaluated the appropriateness of your behavior in the presence of a customer.	Example: Peer/instructor review:  	Steps:
Gave or received peer feedback.	Example: Peer/instructor review:  	Steps:

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve your workplace interpersonal skills.
Worked as a member of a productive team.	Example: Peer/supervisor review:  	Steps:

Peer comments and suggestions:
Instructor comments:

Videos and Weblinks

VIDEOS

The following is an annotated list of videos that are available at the links provided. You may choose to use these in class to give additional background on communication skills, as scenarios to kick off a discussion, as examples of effective or ineffective communications, and so forth.

http://youtu.be/K15ca0n0ois
10 tips for Effective Communication by Integration Training

WEBLINKS

Here are some links relevant to this module that may be useful.

http://www.mindtools.com/pages/article/newCS_99.htm
"How Good Are Your Communication Skills?" A 15-question test, immediately scored with good feedback provided.

http://www.wikihow.com/Develop-Good-Communication-Skills
A comprehensive list of tips for good communication, such as appropriate eye contact, gestures, body language, and so forth.

http://stress.about.com/od/relationships/ht/healthycomm.htm
Improving your chances for a positive outcome when conflict arises.

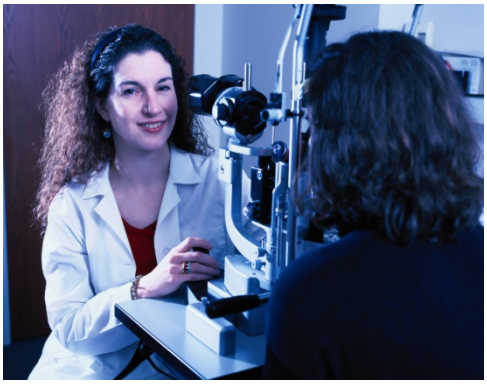
http://www.optimalthinking.com/quiz-communication-skills.php
Communication Skills Assessment Quiz

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Integrity and Professionalism

Overview



Integrity and professionalism are essential for a motivated and productive workplace. Whether aware of it or not, every person is evaluated continually. The image we project leads to judgments by others on our capabilities. Behaviors that are perceived as unprofessional or dishonest may ruin any opportunity to do business with a particular individual.

In this module we will review aspects of integrity and professionalism including:

- Developing Professionalism
- Professional Image
- Honesty and Integrity
- Giving and Receiving Feedback (constructive criticism)
- Professional Code of Ethics
- Putting It All Together

This module provides:

- **Instructor Presentation Materials**—A set of slides to help organize the topics for discussion and provide talking points to introduce the activities
- **Classroom Activities**—A set of activities from which to choose, requiring minimal material and preparations, to address facets of integrity and professionalism.
- **Assessment Tools**—Rubrics for use by both instructor and student to assist in gauging progress throughout the course
- **Videos and Links**—A collection of linked resources to help the user take advantage of the abundance of electronic media available to both instructor and student

Presentation Materials

	SLIDE	TEACHER NOTES
1		
2		• Almost everyone will agree that integrity and professionalism are positive attributes and are important for successful careers. But what exactly is professionalism? Are you born with it or is it something you must learn or cultivate? • The online article referenced in the first activity is a great starter for this discussion and this module's activities: http://www.mindtools.com/pages/article/professionalism.htm
3		• Although some careers do not require professional attire or uniforms, and some even expect you to get dirty while working, most of us would immediately question the authenticity or professionalism of any worker who presented himself dressed sloppily or uncleanly.

	SLIDE	TEACHER NOTES
4	**Professionalism on Your Dream Job** • Imagine a typical workday on your dream job. – What will you be wearing? – What is your facial expression? – How will you interact with coworkers? Customers? – What impression do you want to leave with them? • Bottom line: Your dress and behavior should enhance your professional skills and qualities, not detract from them.	• Consider browsing together as a class some of the links provided in the module activity concerning proper attire, interviewing skills, and so forth.
5	**A Professional Job Interview** • Dress professionally. Sit up straight and don't slouch while walking. • Arrive on time, and without a companion. • Be cordial to everyone you meet. • Speak clearly, firmly, with eye contact. • Answer questions confidently, mentioning your strengths and skills when possible. • Follow the interviewer's lead on topics. • Thank the interviewer. 	• These are some highlights of the complete list of Interviewing Tips included in the activity.
6	**Constructive Criticism** • In the workplace, "feedback" can – ***Redirect:*** replace poor or average behavior with improved behavior. – ***Reinforce:*** sustain or spread good behavior. • Feedback can come from – Supervisor to Employee – Employee to Employee (coworkers) – Employee up to Supervisor • Learn to receive feedback without getting defensive.	• This module activity is focused on feedback related to job or workplace performance. Try to keep the discussion about employees and the workplace, rather than relationships related to marriage, family, and friends.

	SLIDE	TEACHER NOTES
7	**DESC Feedback Technique** • **Goal:** Deliver feedback effectively, so that it will be well received. • **D**escribe the behavior • **E**xpress the impact • **S**pecify new or continued behavior • **C**ommunicate the consequence	• The activity handout nicely summarizes the DESC technique for giving others feedback, including some tips for making DESC even more effective. • Students can role play the provided scenarios to practice these techniques.
8	**Honesty and Integrity** • Difficult to teach, requires a lifetime to learn. • We eventually will agree with Ben Franklin: "Honesty is the best policy." • The alternative, "dishonesty," generally has adverse consequences, from which you may never fully recover.	• The activity on honesty and integrity will be challenging, probably because these notions have become so fluid in today's society. Although the social message clearly encourages dishonesty, or at least deception, everyone would prefer to have honest dealings, both in their business and personal lives. • Discuss deception: ▪ Misleading rather than explicitly lying ▪ Allowing others to come to the wrong conclusions, often motivated by benefit to yourself or the company ▪ Is this the same as lying? • What are the consequences of deceiving or lying to others in our personal lives? In business?

	SLIDE	TEACHER NOTES
9	**Code of Ethics** • **Values:** Beliefs in which you are emotionally invested (either *for* or *against* something). • **Ethics:** Principles of conduct (a moral code adhered to by a professional. • **Integrity:** Behaving according to moral principles or professional rules in which you believe, leading others to respect and trust you. 	• Many fields of employment will expect everyone to operate under some set of rules of acceptable behavior. Ask students: Where did those rules originate? (Suggested answer: In general, they come from the values of the company workers, the conduct that is expected of the workers (i.e., ethics), and from rules and norms of morality practiced by the community as a whole, i.e., the integrity of the workers. So, on the next slide we'll see how these ethics are often codified into documents.)
10	**Professional Codes of Ethics** • Search the web for "professional code of ethics" to find published guidelines for various groups and professions. • What groups have published such documents? Why? • Do you find a common thread? • What are the consequences for violating "the code?" 	• In many professions in each of the career clusters there is a well-known set of codes to which everyone agrees to adhere. (See the list of Example codes included with the activity.) Students should locate an example or two of those and discuss them, as directed in the module activity. • Pose the question (perhaps selecting a well-known example in your career area as an example): Why do such published codes even exist?
11	**Quotable Quotes** ***The supreme quality for leadership is unquestionably integrity. Without it, no real success is possible, no matter whether it is on a section gang, a football field, in an army, or in an office.*** Dwight D. Eisenhower	• http://www.brainyquote.com/quotes/quotes/d/dwightdei109026.html

Teaching Resources

ACTIVITIES

The following activities are examples of activities that can be completed in class to emphasize, teach, and help students practice integrity and professionalism. The activities found in this resource can be used "as-is" or they can be tailored to fit a specific course. Suggestions for adaptation precede each activity, with examples from several different subject areas/career pathways. The suggested modifications provide instructors with ideas for adapting the activity to fit content they are already teaching. Modifying the activities allows employability skills to be infused in subject area content more easily.

ACTIVITY: DEVELOPING PROFESSIONALISM

Instructor Preparation

Everyone talks about the importance of being professional in the workplace. But what exactly is professionalism? Professionalism is sometimes difficult to define because it is not one single characteristic but a blending of many. The object of this lesson is to have students describe professionalism and all that it encompasses. They will discuss what professionalism looks like in different careers and what characteristics remain the same across all careers. Students will then examine each identified characteristic of professionalism and list at least two things they can do to grow or improve in each area.

For example, all careers have the expectation that workers will be honest and have integrity. Some careers have higher requirements for confidentiality than others, such as medical professionals, lawyers, and those working in security jobs. All jobs require skill and knowledge, but some require more specialized knowledge and skills. If the class has done activities from other employability modules, this module will build upon concepts learned. For example, if the activity for goal setting from the Initiative and Dependability module was used, students might use what they learned about SMART goals to create their plan for increasing their degree of professionalism. Additionally, the good communication skills described in Interpersonal Skills and Teamwork contribute to one's image as a professional.

Objectives

Students will:

1. Describe attributes that are encompassed by the term *professionalism*.
2. Create a plan for attaining skills and knowledge in these areas.

Materials

- Computers with Internet access

Activity Guidelines

Have students do the following:

- Read the article "Professionalism: Developing This Vital Characteristic" (http://www.mindtools.com/pages/article/professionalism.htm) and list the attributes that constitute professionalism.
- Optional: Research other definitions of professionalism available on the Internet and list additional characteristics that are commonly mentioned. Add these characteristics to the list if they are not synonymous with the ones listed in the *MindTools* article.
- Have students work in small groups to create definitions for the listed characteristics of professionalism, with examples for each.

- Ask students, working individually, to rate themselves in each of the categories. Have them identify areas where they think they have the greatest strengths and weaknesses.
- Guide students in creating a plan for developing specialized knowledge, competency, honesty and integrity, accountability, self-regulation, and image.

Group Reflection Questions

- Why is it important to be professional in all aspects of your work life?
- What impression would you have if you walked into a doctor's or lawyer's office and staff were gossiping about an earlier patient or client? Would you trust them to maintain your privacy?
- If working on a job where you know you will get filthy each day, is it professional to come to work in the grubby clothes worn the day before? (Clothing has not been laundered.)

ACTIVITY: PROFESSIONAL IMAGE

Instructor Preparation

This lesson may seem elementary to the instructor and some students because it is about dressing appropriately and projecting a professional image. However, human resources staff complain that workers and job applicants show up dressed entirely inappropriately for the interview or job. Why is this? "Appropriate dress" is an ambiguous term for many, particularly since it varies from situation to situation and is influenced by social customs, geography, and propriety. Business casual on the east coast is different from business casual on the west coast. Startup casual is different from business casual. Some places require women to wear hosiery while others don't. The general rule is to err on the side of being overdressed rather than dressing too casually.

This lesson includes two parts: dress and personal appearance and making a good first impression at a job interview. Dress and personal appearance are key elements of making a good first impression, but communication skills, manners, self-control, and posture all contribute to that first impression.

Objectives

Students will:

1. Describe appropriate dress for various work environments.
2. Suggest ways to expand a limited wardrobe.
3. Discuss appropriate personal appearance and hygiene and the "first impression" it might portray to others.

Materials

- Computers with Internet connection
- Handout—Interviewing Tips
- Handout—Weblinks list

Activity Guidelines

Part 1

- Begin this activity by asking students how they would expect people in various careers to dress: a doctor, a mechanic, a tour guide, a hostess in an upscale restaurant, a rancher, a lumberjack, a pilot, and so forth. Ask if they can think of attire that portrays a brand image, for example, the brown uniforms worn by UPS delivery persons or military uniforms.
- Then ask students if they have ever been somewhere where one of the employees was wearing something that did not match the image they expected. Maybe it was a pastor with full tattoo sleeves, or an obese manager at a fitness center, or a janitor in slacks and button down shirt and loafers. What was their reaction?

- Discuss how a professional image might differ with different careers or situations. Then have students go online and research dress codes for business. (You might wish to ask business partners or advisors for your program to provide copies of the dress code for their company.) Students should focus on dressing for a future career. If students are finding it difficult to locate dress codes, they might look at clothing store catalogs catering to business attire and/or uniform catalogs for careers where workers wear uniforms. Have them select clothes that would meet the dress standards for the chosen career, but would accommodate their body type and personal sense of style. Have them print a copy that they can share with the class. If time permits, price the outfit(s) chosen. Have students look for ways to extend the wardrobe in a cost-effective manner.
- Alert students to the existence of other personal appearance regulations governing such things as exotic hair styles, tattoos, and piercings; wearing of fragrances and makeup; and use of personal electronics. Be sure they understand that even though they have the right to freedom of expression through their personal appearance, companies have the right to determine what image an employee portrays to the public during work hours.
- Optional: The instructor could come to class dressed entirely different from his/her normal dress code. Ask the students to discuss how that particular look would have impacted their reaction when they walked into class the first day. (You might choose a similar style of dress, but wear clothes that don't fit properly, are wrinkled or stained, or are otherwise inappropriate, or dress appropriately for a career outside education, or outside the career technology area in which you teach.

Part 2

- Discuss with students the idea that when they are looking for a job, it is vitally important to make a good first impression by appearing competent and professional. Ask students to describe interviews that they may have already had. In hindsight, what do they think they did well and in what areas do they think they could improve?
- Have students use Internet resources to research "first impressions at job interviews." Have them create a list of tips found in each source. Remind them to include the URL where the tips were found. Then have the class make a master list. A list of websites offering interviewing tips is included at the end of this document as is a sample.

Group Reflection Questions

Have students discuss the following:

- Think about your dream job. Describe how you would prepare for the interview to give the best professional image. Then assume you have gotten the dream job. Picture yourself at work. What will you be doing and wearing? How will you act? What kinds of people will you come in contact with on any given day? What impression will those people take away from the encounter? What can you do now to prepare for these scenarios?

- Why do you think it is so difficult to overcome a bad first impression? How many of you may have had a poor first impression of someone and after getting to know the person decided your first impression was wrong? How long did it take before you changed your mind?
- Many sites will tell you when dressing for work, stick to the classics. How would you describe classic style?
- What are the advantages and disadvantages of wearing a work uniform?
- If someone announce that a VIP is coming to your class in 10 minutes, what are three things you could do in that time to get ready to make a good first impression? What would you have worn or done differently if you had been told the day before?

Handout—Weblinks for Professional Image and Making a Good First Impression

Dress Codes

- The 10 Commandments of Dressing for Work
  http://www.cnn.com/2011/09/16/living/workplace-professional-dress-cb: This Career Builder article provides guidelines for appropriate dress for work.
- Dress Code
  http://humanresources.about.com/od/glossaryd/g/work_dress_code.htm
  Human Resources article at About.com on dress codes. There are numerous links to different dress codes such as business casual for those who interact with customers, for those who work in manufacturing, etc.
- Professional Image in the Workplace: Is it Important? Image Matters
  http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&ved=0CEIQFjAF&url=http%3A%2F%2Fwww.soa.org%2Flibrary%2Fnewsletters%2Fstepping-stone%2F2006%2Fapril%2Fssn-2006-iss22-costello.aspx&ei=pJWSUaeTMIjtqwGMtoC4DQ&usg=AFQjCNFkq9riLA-W_NrZaUi1yauNB6FE-g:
  This is an article on the importance of image in the workplace and how it might influence promotions as well as perceived usefulness to a company.
- Dress code
  http://en.wikipedia.org/wiki/Dress_code_%28Western%29
  This Wikipedia article shows the evolution of today's modern dress code. It contains an exploration of appropriate attire for different social occasions.

Managing First Impressions/Interviewing Skills

- Making a Great First Impression
  http://www.mindtools.com/CommSkll/FirstImpressions.htm This MindTools article describes how to make a good first impression.
- Interview Tips: Making an Impression
  http://www.prospects.ac.uk/interview_tips_making_an_impression.htm This article comes from the UK but has good ideas for preparing for an interview. Links in the article go deeper on the types of interviews and provide additional interview advice.
- Managing First Impressions at Interviews:
  http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/1999_03_12/nodoi.13642567244796414228
- Dress Appropriately for Interviews: http://career-advice.monster.com/job-interview/Interview-Appearance/Appropriate-Interview-Dress/article.aspx
  Career advice from Monster regarding interviews.

- Make a Great First Impression
  http://career-advice.monster.com/job-interview/interview-preparation/make-a-great-first-impression/article.aspx
  More career advice from Monster concerning interviews
- How to Conquer the First Impression
  http://advice.careerbuilder.com/?categories=Interviews
  Interviewing tips from CareerBuilder.
- What to Wear to a Job Interview
  http://jobsearch.about.com/b/2013/03/20/what-to-wear-to-a-job-interview.htm
  This article discusses how to dress for an interview. There are numerous links for specific types of job interviews.

Handout—Interviewing Tips

In a job interview, one naturally wants to do all that you can to make a good impression. Here are some important reminders:

1. Dress neatly, wearing clothing that suits the job you want.
2. Be on time. Tardiness signals to the employer that you are not really interested in the job or that you might show up late for work.
3. Arrive alone. There is no need for anyone to go with you to an interview. You must do it on your own.
4. Greet the receptionist or the person who will introduce you to the interviewer. Be pleasant. Say your name clearly, and tell this person the name of the interviewer, if you know it. Be sure to name the job for which you are applying.
5. Wait patiently if the interviewer is not ready for you. If you talk, speak clearly. You may want to sit quietly and read the materials in your personal information folder until you are called to the interview.
6. Shake hands if it seems appropriate when you meet the interviewer. Use a firm handshake but not an overpowering one. Wait for the interviewer to ask you to sit down.
7. Maintain eye contact with the interviewer. This is considered a sign of honesty and self-confidence. For this reason, do not wear sunglasses during an interview.
8. Control any nervous behavior. Tapping your foot or clicking a ballpoint pen, for example, may annoy and distract the interviewer. Never chew gum during an interview.
9. Do not smoke.
10. Choose your words carefully and avoid slang or other special expressions that the interviewer may dislike or misunderstand.
11. Sit up straight in your chair. If your posture is good, the interviewer will perceive you as alert and interested in what is happening.
12. Talk about what you do well. Often you will find that you can answer a question by mentioning certain talents, interests, or skills. Mention test scores only if you are asked to do so. If you have done poorly on a test, avoid making excuses for your performance.
13. Follow the interviewer's lead during the course of the interview. Stick to the point. The interviewer is interested in experiences and attitudes that might affect your performance on the job. There is no need to talk about details of your personal life.
14. Be calm. Try not to show disappointment or anger if you are not hired, or if the interviewer does not decide immediately. He or she may have to see other applicants before deciding.
15. Say "thank you" and arrange to call back if necessary. Even if you have not been offered the job, or if no decision has been made, tell the interviewer you are interested in the position. Ask whether you can call back at a certain time to find out about the decision.
16. After the interview, write a note thanking the interviewer for his or her time.

ACTIVITY: HONESTY AND INTEGRITY

Instructor Preparation

Honesty and integrity are difficult to teach. While we learned that we should tell the truth at an early age, the world isn't all black or white. We find ourselves justifying little white lies to protect someone's feelings or to keep us out of trouble. Once you start down the path of little white lies, it becomes easier and easier to justify stretching the truth or rationalizing our actions.

Students need to realize the consequences of dishonest behavior. Once someone has been caught in a lie or other dishonest act, the people around that person lose respect for them and may no longer trust that person in the future. It takes a long time to earn back trust and respect back. In the workplace, dishonesty can result in losing your job. Have your students discuss why employers need employees who are hones and have integrity.

What are some ways an instructor might use to teach students about honesty and integrity? Remind students of childhood stories and fables they may have heard when they were being taught to be honest. If any students want to work in education, and especially early childhood education, have them make a reading list of stories such as "The Little Boy Who Cried Wolf," "Pinocchio," and appropriate fables. Then ask them to prepare a series of lesson plans for teaching children about honesty.

Students in communications might be interested in viewing video clips on the subject of honesty and analyzing the message of each video, the manner in which it was conveyed, and whether the message could have been conveyed in a more appealing way. They could create a storyboard for shooting their own video on honesty and, if time allows, produce the video. Two videos on honesty are listed in the weblinks handout. One is a black and white teaching film from the 1950s, and the other is a more recent lecture by Frances Tuttle. These could be used as the films to be analyzed.

Provide case studies in which businesses were sued for falsely representing their products or services. There always seem to be stories in the news about people who have cheated on their taxes, used substandard materials and pocketed the savings, used public property for private gain, or accepted bribes or payoffs. Present the facts of a recent incident and have students identify the dishonest behaviors and the consequences not only for the dishonest person, but for all around him or her.

Point out that some professions have a stereotyped reputation for dishonesty—used car salesmen and cleaning staff at hotels that get blamed for stealing, for example. Discuss why we have stereotypes in the first place. Discuss whether or not the stereotypes are justified. The reverse is also true: Some professions have the reputation of being particularly honest such as doctors, preachers, and teachers. Discuss why we may be hurt or disillusioned when a person in one of these careers is found to be cheating on his spouse, embezzling money from her place of business or a community organization, or has committed some other crime or dishonest practice.

Objectives

Students will:

1. Define honesty and integrity.
2. Take an honesty quiz to see how honest they are and reflect on their results.

Materials

- Computers with Internet connection
- PowerPoint Honesty Quiz http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=45&ved=0CFQQFjAEOCg&url=http%3A%2F%2Fgactaern.org%2FUnit%2520Plan%2FComputing%2FInformation%2520Technology%2520Support%2FITS_10_How%2520Honest%2520Are%2520You-%2520Quiz%2520and%2520Discussion%2520Questions.ppt&ei=s82TUa27B4nHqQGCiICAAg&usg=AFQjCNGndJvzdgZkc_EgaOHI6OxJL-qJdw&cad=rja

Activity Guidelines

Discuss some of the questions posed in the Instructor Preparation section above.

- Ask students if they can remember their first lie and the consequences that resulted. Then ask them if they remember how they felt the first time they discovered that someone had lied to them or cheated them in some way.
- Have students take the *How Honest Are You?* quiz. Show the interpretation of the results. Ask students if they were surprised at how they ranked.
- Show the final slide that shows how the average American scored on the quiz. How did your students compare to the national average?

Activity 1

Use this activity to demonstrate how people get caught up in a tangle of lies to the point they can't distinguish the truth from a lie. It is fairly quick and gives students a chance to stand up and move around.

- Have students form a circle. If your class is large, have them form a couple of smaller circles.
- Choose a topic that everyone is familiar with and let students know what it is.
- Have the first student start a story about that topic. They are to make up two sentences. One is the truth and the other is a lie. They repeat their two sentences of the story to the circle. When they repeat the sentence that is a lie, they wink broadly for all to see (or roll their eyes, or make some other gesture) so the group knows which is the lie.
- The next student repeats the first person's story, again making the agreed upon gesture when the lie is repeated and adds two more sentences to the story, one true and the other not. They make the same gesture when they repeat the lie they are adding to the story.

- Continue to go around the circle with each student adding a true sentence and a lie to the story until students begin confusing the true statements and the lies.
- You can have your students play the game more than once to ensure everyone gets a chance to participate.
- Wrap up the activity by asking students questions to see if they had difficulty remembering which statements were the truth and which were the lies.

Note: This activity also demonstrates how gossip can be passed around the office. Lies are embellished with each telling, and situations get blown out of proportion.

(Optional) Activity 2:

This is another activity that demonstrates a point and gets students up and moving.

- Have four students stand in a circle. Have the students opposite one another and grasp right hands. Then have them grasp a different student's left hand resulting in a tangle of arms. Each pair represents a lie or dishonest act.
- Direct students to untangle themselves and form a circle without releasing another students hand if at all possible. Students may step over or duck under student linkages as needed.
- Next, add another pair of students to the mix, again grasping right hands of the person directly across from them and left hand with someone else. This new pair represents another lie or dishonest act.
- Again, have students detangle themselves to form a circle without breaking linkages if possible.
- Discuss how the deeper we become entangled in a lie, the more difficult it is to repair a situation.

Group Reflection Questions

Discuss the following questions as a class.

- What might be the problem with comparing your level of honesty with someone else's or with the national average?
- What insights into honesty and integrity in general, and your own honesty and integrity in particular, did you gain by working through this lesson?
- Give examples from current movies or TV shows that describe ethical dilemmas and where characters did or did not exhibit honesty and integrity.
- Provide the following quotes and/or others from *The Power of Truth* website at http://www.thepoweroftruth.com/truth_quotes.html and have students discuss what they mean:
  - "Oh, what a tangled web we weave when first we practice to deceive." – Sir Walter Scott
  - "No man has a good enough memory to make a successful liar." – Abraham Lincoln
  - "Integrity is doing the right thing, even if nobody is watching." – unknown author
  - "Integrity is telling myself the Truth. And Honesty is telling the Truth to other people." – Spencer Johnson

ACTIVITY: GIVING AND RECEIVING FEEDBACK (CONSTRUCTIVE CRITICISM)

Instructor Preparation

One of the most important areas of human relations is the ability of people to give and receive criticism without that criticism negatively impacting relationships and job performance. Young adults are particularly sensitive to criticism, but they are more apt to criticize without thinking of the consequences.

Discuss with students the fact that criticism is a fact of life and that just as we are continually evaluating others around us, we are being observed by others and they are evaluating us. The evaluations we make may be based on the appearance of others, their behavior, the clothes they wear, their political views, how they drive, what they drive, or many other details. (The evaluation may be fair or unfair, and may be hastily made.) While we may never verbalize our criticisms, we often express them through our actions, facial expressions, gestures, and behavior.

Point out that no employee in any business is exempt from criticism. The scenarios used for the role-plays come from the fast food industry, health care, construction, and business. Scenarios in other fields can be easily created.

Be aware that in the business world the terms *criticism* and *constructive criticism* are being replaced by the term *feedback*, which does not have strongly negative associations and can be used for both positive and negative evaluations.

In working through this activity, explain that the two main purposes of workplace feedback are to redirect and reinforce employee behaviors. In redirection, the focus is to identify poor or average behavior and change and improve it. In reinforcement, the focus is to sustain good behaviors.

It is generally thought that feedback comes from the top down in an organization, but in fact feedback can come from supervisor to employee, employee to employee, and even from employee to supervisor. In many of the most productive work environments, feedback is regularly requested from others at all position levels, and there is open dialog between giver and receiver. This environment does not happen overnight. It must be built on trust, honesty, and a sincere desire to grow and prosper in the workplace and to meet individual as well as corporate goals.

Objectives

Students will:

1. Define constructive criticism and explain how it compares to feedback.
2. Give reasons why both giving and receiving feedback (criticism) can be difficult.
3. Role-play a work-related evaluation situation.
4. Suggest ways to make feedback productive.

Materials

- Handout—The DESC Feedback Model
- Handout—Characteristics of Effective Feedback
- Handout—Receiving Feedback
- Scenarios for Role Play
- Handout—Observation Sheet for Scenario Role Play

Activity Guidelines

- Point out that this activity is focused on feedback related to job performance. Then have students discuss the following questions:
  - What are some reasons an employee might receive criticism on the job?
  - What might be the consequences of poor job performance?
  - What approaches might be used to facilitate the evaluation interview?
- After discussing approaches that might be used, give students copies of the student handouts: The DESC Feedback Model, Receiving Feedback, and Characteristics of Effective Feedback. The DESC model for giving feedback is a technique that is often taught to business executives and used for providing feedback. Receiving Feedback gives students tips for accepting feedback in an open and honest manner so they can grow from it. Characteristics of Effective Feedback provides pointers to ensure feedback is given in a positive manner that will be helpful to the receiver. Give students a chance to review each document before having them role-play the scenarios.
- Students will work in groups of three to role-play various situations involving giving and receiving feedback. The third person in the group will be the observer. There are four situations from which to choose. Each student should be given the opportunity to give, receive, and observe in at least one situation. *Note:* Use the scenarios provided or have students suggest scenarios from their work experience.

Group Reflection Questions

- How can the way you "give" and "take" feedback affect your relations with an employer? With coworkers? Friends? Family?
- Why is the evaluation interview a delicate encounter for both the supervisor and the employee?
- Not everyone is good at providing feedback. Sometimes problems occur and the first person to cross paths with the supervisor might be blamed and berated for the problem regardless of whether they were in a position to do anything about it. Sometimes managers store up little problems until they reach the one that tips the scale and then dumps everything on an employee at once. Others may have a tantrum. Still others may give vague or indecisive feedback leaving the receiver unsure if they are doing well or not. Discuss various ineffective feedback types and discuss ways of handling it.

Handout—The DESC Feedback Technique

Most people have to learn to provide effective feedback. Our natural tendencies are to either understate the issue and come across as too soft or passive, or to come on too strong and appear aggressive. Feedback should be provided in an assertive manner expressing our own observations, concerns, needs and opinions, while respecting the rights and needs of the person to whom we are providing the feedback.

The DESC technique is a used to give feedback in an assertive manner. The four steps of the DESC Feedback technique include the following. (Note: This model can be used whether the feedback is positive or negative.)

1. Describe the behavior
2. Express the impact
3. Specify new or continued behavior
4. Communicate the consequence. (Note: Step 4 is not always possible or necessary)

Think about how this technique might work in the following situation:

You observe Jerri loudly criticizing Jeff, one of the paralegals ". . . how can you be so stupid? This report has so many errors, a 12-year old could have done better. Where did get your degree anyway? A bubble gum machine?" You feel embarrassed for Jeff, and you are highly disappointed by Jerri's manner of communicating her displeasure to him.

Possible DESC Feedback might go something like this:

1. **Describe the behavior**
   "Jerri, when you criticize Jeff publicly and use words that are demeaning …"
2. **Express the impact**
   "…I feel embarrassed for him, and disappointed that you believe this approach would be helpful."
3. **Specify new or continued behavior**
   "I would like you to give critical feedback in private, not call others names, and deliver it in a constructive, professional manner."
4. **Communicate the Consequence.** (Note: Step 4 is not always possible or necessary)
   "or you may find that others will lose respect for you."

So what makes DESC Feedback more effective?

- Use "I statements" – it says "I have the problem and I want to fix it."
- Be brief–avoid repetition or "stockpiling" (you've also done this, this, and this wrong)
- Use non-judgmental descriptions of behavior ("you criticized Jeff publicly" instead of "you are rude and uncaring.")
- Avoid ascribing motives to behavior–we can't know why people act the way they do.
- Avoid absolutes and exaggerations (always, never, the absolute worst)
- Make sure your body language and voice tone support your verbal assertive message (a twist of your lip or rolling your eyes can change the message completely)

Handout—Characteristics of Effective Feedback

Before giving any feedback, make sure that it is given to improve the situation or performance. Remember that effective feedback is:

- Clearly communicated.
- Specific rather than general. It tells the person exactly what the problem is and doesn't leave them wondering what something vague such as "You need to improve your unprofessional behavior" means.
- Focused on behavior rather than the person.
- Focused on helping rather than hurting.
- Focused on behavior that the recipient can do something about.
- Focused on one or two incidents at most, not a laundry list of items. It is much easier to discuss one incident or poor performance rather than a year's worth of poor performance.
- Focused on observed behavior.
- Timely, that is, shared as soon as possible after an incident is observed and no longer than a week after the incident. If an incident is highly emotional, wait until everyone has calmed down and regained self-control so nothing might be said that will be regretted later.
- Provides opportunities for further discussion.
- Provides clear suggestions about improvement.
- Provides for redirection (identifies behaviors and performance that do not contribute to individual, group, and organizational goals and helps the receiver develop alternate strategies) and reinforcement (identifies behaviors and performance that is beneficial and contributes to individual, group, and organization goals, and encourages the receiver to repeat and develop those actions).
- Provided in private, not in front of others.
- Directed to the future.
- Goal oriented
- Multidirectional: both the provider and receiver actively listen to one another's issues and work together to solve the problem(s).
- Ongoing, not a once-a-year dump of issues.

Above all, feedback should be viewed as an opportunity to learn and improve in a way that benefits all involved.

Handout—Receiving Feedback

No one likes to be on the receiving end of criticism, even when gently given. Our first reaction is always defensive. We must train ourselves to listen carefully and actively to evaluate the feedback as we receive it and then to act on it. No matter how poorly the feedback is presented, we must try to understand why the presenter feels as they do and keep the feedback received in perspective.

Don't fall into the trap of disregarding any feedback given in an inappropriate or rude manner as not worth considering. Instead, by active listening and asking questions, help the person giving the feedback become better at it.

A four-step method[1] for receiving feedback follows:

Step 1: Ask for detailed information about the problem and for specific examples to be sure you understand the reason for the feedback, whether bad or good. It is just as difficult to interpret a "good job, keep it up" comment as it is to interpret "you are a screw-up and if you don't improve your work, you will be out of here." Both are vague and leave you with no idea of what you should keep doing, change, or improve. Ask questions to find out what you are doing that is appreciated or what specifically you did or didn't do that they want you to improve.

Step 2: Paraphrase what you think you heard. That will tell the person giving the feedback you are listening and provide them a chance to correct any misconceptions you might have about the feedback.

Step 3: Seek suggestions for future action. Never leave a feedback interview without agreeing on a future course of action. If there is not time to immediately come up with the plan, schedule a time to get back together.

Step 4: Thank the person giving the feedback. This may be particularly difficult to do when feedback was critical or poorly given, but it does show respect for the person giving the feedback and helps to end the session on a more professional note.

In addition to using the four-step process, constantly monitor your reactions to the feedback. Beware of nonverbal communication. Maintain an open posture, make eye contact with the other person, and don't roll your eyes or make gestures that someone might consider threatening or rude. Maintain control over your emotions.

You should consider the possibility that your critic may not be correct in their criticism. Ask clarifying questions to ensure you understand the problem. If you feel that the criticism is unfair, state your position in a non-argumentative manner and continue to ask questions to see if there is some other problem that hasn't been directly addressed. If the situation is emotionally charged, ask for a follow up meeting when emotions and tempers have cooled.

[1] Adapted from *Giving and Receiving Feedback Participant Guide*. http://webconceptsunlimited.com/Samples/GivingandReceivingFeedbackParticipantGuide.pdf

Scenarios

Students should work in groups of three to role play giving and receiving feedback. The third person of the group should act as an observer.

Scenario 1

Charley, the general manager of a fast food restaurant, has received feedback from online surveys that indicates that patrons are put off by the loud boisterous behavior of the workers behind the counter and especially their use of offensive language. The complaints have primarily been from patrons eating lunch and occur most frequently from 11 am to 2 pm. He has called in his shift manager, Amber, to discuss the problem. Amber is very good at running the business side of the restaurant, but tends to avoid confrontation with the employees.

Scenario 2

Rob has worked as a RN at Mercy Hospital for nearly two years and has recently changed to the day shift. He has been late to two out of the last four shift-change report meetings. He is late again today. Jennifer is the nurse supervisor for the day shift. She asks Rob to come to her office after the meeting.

Scenario 3

Rudy has been working for Bob's Roofing for a few months, but already many of his co-workers complain that they do not want to work with him on jobs. They state he is lazy and likes to cut corners and that he doesn't maintain his tools or the general worksite. Already there have been several near accidents in which he has dropped tools or materials from the roof and left scrap around, tripping another worker. Fred is the foreman of the roofers working at the site of the most recent incident. Fred calls Rudy aside.

Scenario 4

Jessica has worked as an intern in the business office of a major corporation while completing her final year of college. She is a hard worker. When Yolanda, her supervisor, had to leave unexpectedly for a family emergency, she volunteered to work additional hours to help complete a report that was due. She was able to catch a major error and get it corrected before the report was sent out to board members. Jessica is back in the office and calls Jessica into her office.

Handout—Role-Play Observation Form

This form is to be used to keep notes on your observations. Read the categories before beginning the scenario so that you can look for specific information in the role play. Write down brief, descriptive observations that you can interpret later. Mark each observation with a + or – to indicate if the comment or action was positive (useful, effective, and moving toward a solution) or negative (defensive, ineffective, moving away from a solution).

Opening – sets a positive tone to the meeting

Non-verbal messages – posture, eye contact, gestures, voice tone, etc.

Describes any concerns clearly: uses direct, specific statements or examples

Focuses on situation or behavior, not on personality or placing blame

Actively listens to other's point of view; paraphrases and asks clarifying questions

Comes to agreement on a positive change or next steps

ACTIVITY: PROFESSIONAL CODE OF ETHICS

Instructor Preparation

Integrity, values, and *ethics* are all terms that are important to individuals and in the business world. Many people have a difficult time defining and distinguishing between them. The following definitions will be used in this activity.

Integrity is the quality of always behaving according to the moral principles in which you believe, so that people respect and trust you. *Professional integrity* is the quality of behaving according to the rules and standards of your job or profession.

Values are the beliefs in which a person is emotionally invested; the moral principles and beliefs or accepted standards of a person or social group; or principles, standards, or qualities considered worthwhile or desirable.

Ethics are the principles of conduct governing an individual or a profession; the branch of philosophy that deals with values pertaining to human conduct, such as good and bad or right and wrong actions and motives; or moral codes.

In this activity students will review the codes of ethics for various organizations and then work together to create a code of ethics either for a chosen career or for the class. If time allows, they should work individually and create a personal code of ethics. A list of example professional organizations from the sixteen career clusters and the URLs for weblinks to their codes of ethics is included.

Objectives

Students will:

1. Define values and ethics and describe how they relate to one another.
2. Research the codes of ethics of various professional organizations and identify key components.
3. Create a code of ethics for professionals in their chosen career pathway.
4. Optional: Create a personal code of ethics.

Materials

- Computers with Internet access
- Handout—Example Codes of Ethics from the Sixteen Career Clusters

Activity Guidelines

- Open this activity by having students discuss good and bad values in the workplace. Examples of good values would include things like honesty, protecting property rights, confidentiality, and fairness. Bad values include things like lying to supervisors, falsifying reports and other documents, stealing, sexual harassment, abusing drugs and alcohol, and conflicts of interest. Create a list of good and bad values on the board.

- Have students define code of ethics. Ask questions such as:
  - What is a code of ethics?
  - Why would you have a code of ethics?
  - How would you use it?
  - What types of groups have codes of ethics?
  - Who has an example of a group with a code of ethics?

  If students are having trouble defining code of ethics, have them search the Internet for "professional codes of ethics" and view the codes of ethics developed by various professional organizations. A list of example professional organizations from the sixteen career clusters and the URLs for weblinks to their codes of ethics is included.
- Have students look for commonalities and differences in the codes of ethics they find. Do they differ among different career clusters? Among different occupations within the same career cluster? After each group has reviewed at least three or more codes of ethics, have them regroup to define code of ethics and identify the key components.
- Then have the groups get back together and create a code of ethics for a specific career or career pathway. If students are in introductory classes and do not have enough knowledge of a given career pathway, ask them to create a code of ethics for the class.

Group Reflection Questions

Have your students discuss the following questions.

- What elements are important to include in a code of ethics?
- What values appeared in more than one of the codes?
- How can a code help a group make decisions?
- Do you agree that everyone lives by a personal code of ethics whether it is written out or not?
- If your personal code of ethics is much different from that of the company you work for, do you think you will find long-term satisfaction on the job?

Handout—Example Codes of Ethics from the Sixteen Career Clusters

This is a sample of codes of ethics from the various career clusters. They are intended as examples so students can see a wide range of specificity. Some of the professional organizations represented may not be the most prominent in the industry. Students should be encouraged to search for codes of ethics related to their particular career interest. They will be amazed at the number of codes that are available.

Agriculture, Food & Natural Resources

- ***American Registry of Certified Professionals in Agronomy, Crops and Soils:*** http://nspss.unl.edu/downloads/ARCPACS-Ethics.pdf
- ***Ecological Society of America:*** http://www.esa.org/esa/?page_id=857
- ***Society of American Foresters:*** http://www.safnet.org/certifiedforester/standards/index.cfm
- ***US Department of Agriculture Wildlife Service:*** http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&ved=0CCsQFjAA&url=http%3A%2F%2Fwww.aphis.usda.gov%2Fwildlife_damage%2Fdirectives%2F1.301_code_of_ethics.pdf&ei=AVCSUb68NeKbygGu_IEY&usg=AFQjCNF1ixAeyASF8A4cgj-okbKl1taJqQ
- ***National Registry of Environmental Workers:*** https://www.nrep.org/ethics.php

Architecture & Construction

- ***American Institute of Architects:*** http://www.aia.org/about/ethicsandbylaws/AIAS077625?dvid=&recspec=AIAS077625 This page provides a link to the pdf of the code of ethics.
- ***American Institute of Constructors:*** http://www.professionalconstructor.org/?page=Bylaws
- ***Construction Management Association of America:*** http://cmaanet.org/code-of-ethics

Arts, A/V Technology & Communications

- ***Society of Professional Journalists:*** http://www.spj.org/ethicscode.asp The SPJ website also includes numerous ethics case studies should you want to explore these with students.
- ***National Association of Teachers of Singing:*** http://www.nats.org/code-of-ethics.html

Business Management & Administration

- ***Project Management Institute:*** www.pmi.org/en/About-Us/Ethics/~/media/PDF/Ethics/ap_pmicodeofethics.aspx Note: the link to the full document pdf opens in Internet Explorer, but not in Mozilla Firefox.
- ***Society for Human Resource Management:*** http://www.shrm.org/about/pages/code-of-ethics.aspx

Education & Training

- ***Association of American Educators:*** http://www.aaeteachers.org/index.php/about-us/aae-code-of-ethics
- ***AASA: the School Superintendents Association:*** http://www.aasa.org/content.aspx?id=1390

Finance

- ***CFA Institute:*** http://www.cfainstitute.org/ethics/codes/ethics/Pages/index.aspx
- ***Government Finance Officers Association:*** http://www.gfoa.org/about-gfoa/code-professional-ethics
- ***American Institute of CPAs:*** http://www.aicpa.org/Research/Standards/CodeofConduct/Pages/default.aspx

Government & Public Administration

- ***American Society for Public Administration:*** http://www.aspanet.org/public/ASPA/About_ASPA/Code_of_Ethics/ASPA/Resources/Code_of_Ethics/Code_of_Ethics1.aspx?hkey=222cd7a5-3997-425a-8a12-5284f81046a8
- ***Society of Government Meeting Professionals:*** http://www.sgmp.org/ethics

Health Science

- ***American Nurses Association:*** http://www.nursingworld.org/MainMenuCategories/EthicsStandards/CodeofEthicsforNurses Browsing other resources on this page takes you to some excellent resources for teaching ethics to nurses as well as a two-part document on how to apply the Code of Ethics.
- ***American Health Information Management Association:*** http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_024277.hcsp?dDocName=bok1_024277
- ***Veterinary Technicians:*** http://c.ymcdn.com/sites/www.navta.net/resource/collection/946E408F-F98E-4890-9894-D68ABF7FAAD6/navta_vt_code_of_ethics_07.pdf
- ***National Association of Emergency Medical Technicians:*** http://www.naemt.org/about_us/emtoath.aspx
- ***American Massage Therapy Association:*** http://www.amtamassage.org/About-AMTA/Core-Documents/Code-of-Ethics.html

Hospitality & Tourism

- ***The Guild of Professional Tour Guides of Washington, DC:*** http://www.washingtondctourguides.com/about-the-guild/code-of-ethics
- ***American Culinary Federation:*** https://www.google.com/url?q=http://www.acfchefs.org/download/documents/membership/code_ethical_conduct.pdf&sa=U&ei=sHySUdulMKKZyQGjoICoCQ&ved=0CA8QFjAD&client=internal-uds-cse&usg=AFQjCNFPaH-ASABPbdQWEwpuvIT5ybeVzA

Human Services

- ***National Organization for Human Services:*** http://www.nationalhumanservices.org/ethical-standards-for-hs-professionals
- ***American Association for Marriage and Family Therapy (AAMFT):*** http://www.aamft.org/imis15/content/legal_ethics/code_of_ethics.aspx
- ***National Association of Social Workers:*** http://www.socialworkers.org/practice/standards/sw_adolescents.asp Note: this is an addendum to general social work code of ethics that is specifically addressed towards those who work with adolescents.

Information Technology

- ***Institute for the Certification of Computing Professionals:*** http://iccp.org/coe
- ***Association for Computing Machinery:*** http://www.acm.org/about/code-of-ethics
- ***Association of Independent Information Professionals:*** http://www.aiip.org/About/Code-of-Ethical-Business-Practice

Law, Public Safety, Corrections & Security

- ***American Bar Association:*** http://www.americanbar.org/groups/professional_responsibility/publications/model_rules_of_professional_conduct/model_rules_of_professional_conduct_table_of_contents.html
- ***Law Enforcement Code of Ethics:*** http://www.theiacp.org/What-is-the-Law-Enforcement-Oath-of-Honor

Manufacturing

- ***Society of Manufacturing Engineers:*** http://chapters.sme.org/s147/code_of_ethics.htm
- ***Society of Quality Assurance:*** https://www.sqa.org/sqa/About_SQA/Policies___Procedures/Code_of_Ethics/sqa/About_SQA/Code_of_Ethics.aspx?hkey=75e9dd49-762d-43cc-b603-18f78d922f5f

Marketing

- ***American Marketing Association:*** http://www.marketingpower.com/aboutama/pages/statement%20of%20ethics.aspx

Science, Technology, Engineering & Mathematics

- ***ASME:*** https://community.asme.org/colorado_section/w/wiki/8080.code-of-ethics.aspx#_ga=1.226658523.754969166.1434984575
- ***American Chemical Society:*** http://www.acs.org/content/acs/en/careers/career-services/ethics.html
- ***American Mathematical Society:*** http://www.ams.org/about-us/governance/policy-statements/sec-ethics
- ***American Institute of Professional Geologists:*** http://www.aipg.org/about/ethics.htm
- ***American Society of Biochemistry and Molecular Biology:*** http://www.asbmb.org/Page.aspx?id=70&terms=code%20of%20ethics

Transportation, Distribution & Logistics

- ***Air Line Pilots Association (ALPA):*** http://www.alpa.org/Home/WhoWeAre/CodeofEthics/tabid/2262/Default.aspx
- ***SOLE The International Society of Logistics:*** http://www.sole.org/ethics.asp

ACTIVITY: PUTTING IT ALL TOGETHER

Instructor Preparation

In this activity, students have a chance to apply what they have learned about values and ethics to a variety of scenarios. Scenarios have been provided that can be used as examples for students to work through as a class. Then break the class up into small groups have them create their own scenarios. Finally, have them trade scenarios with other groups and record their recommendations for handling the situations.

Objectives

Students will:

1. Demonstrate adaptability and flexibility in work situations.
2. Apply a code of ethics and/or personal values to solving a workplace dilemma.
3. Actively listen to and value the opinions of others

Materials

- Instructor's list of "What Would You Do?" sample scenarios
- Handout—Guidelines for Preparing Scenarios
- Handout—Scenario Form

Activity Guidelines

- In groups of 3–4, have students prepare a scenario involving an ethical decision using one of the following:
  - An industry-related situation
  - A company-specific situation
  - A college-related situation
- Distribute copies of the two handouts to the groups, and briefly review the Guidelines for Preparing Scenarios. Have each group create a scenario and make two copies, one showing the team's solution to the problem.
- Once each team has finished completing their Scenario Form pages, have them pass their unsolved scenarios (copy with no solution) to the next group. Each group will then create their response to the scenario they just received.
- Each group will present the scenario they received along with their recommendations to the class. The team that created the scenario can respond with their solution and how it might have differed.

Group Reflection Questions

Discuss the activity with your students. Encourage students to identify and describe how they applied information from other activities in this module to the task at hand. Ask questions such as:

- How did the group make decisions?
- What worked? What was difficult?
- What values were identified as important for decision making?
- How were differences of opinion handled within the team?
- How did the recommendations of the group who wrote the scenario differ from the group that had to "solve it"?
- Did anyone else have different suggestions for a solution?

Weblinks for This Activity

Videos on Honesty

- http://www.francistuttle.edu/discover/multimedia/video/videoDetails.aspx?Channel=%2fChannels%2fAdmissions%2fAdmissions+Content&WorkflowItemID=a99cfc14-0afc-4b4a-b3ff-e002b943013a This is a video lecture from Francis Tuttle regarding honesty and integrity.
- http://archive.org/details/HowHones1950 This is a video on honesty from 1950.

Websites

- http://www.thepoweroftruth.com/truth_quotes.html This site provides a list of quotes about truth that can be used for prompts for journaling, for discussion, and so forth.

Sample Scenarios: What Should You Do?

Select one or two of the following scenarios to discuss with the class. Have them identify the values that apply to the situation and make recommendations for how it should be handled. Note: There are no right or wrong answers. The scenarios are intended to cause students to think about their values and how those values impact their decisions. Encourage students to think about the codes of ethics they have researched and written. Do any of them assist in making the decisions?

Situation 1:

According to the company policies, quality is the highest priority. You are working on a rush order and have cut some corners in order to meet the deadline. It would take at least another day to do a "quality" job, but then you would miss the deadline and both the customer and your boss would be unhappy. What should you do?

Situation 2:

A fellow employee is being harassed at work and is afraid to say or do anything about it for fear of losing his job. You have witnessed several instances of the harassment and you also fear retaliation from the company if you "blow the whistle." You can't afford to lose your job either. What should you do?

Situation 3:

One of your co-workers, who is also a personal friend, has been going through a number of health and personal problems and has used up all her sick time. You have tried to be a good listener and to help out when you can. Now your co-worker has asked you to punch in for her and cover for her during a medical appointment. What should you do?

Situation 4:

You have discovered an error made by your department which may result in rejects and rework at a later point in the production process. The error is small, but you can't determine what the effects on the final product might be. If you report the error, your department will look bad, and you might even lose part of your profit-sharing for the quarter. What should you do?

Handout—Guidelines for Preparing Scenarios

Your team will be responsible for preparing a scenario involving an ethical decision, using one of the following:

- An industry-related situation,
- A company-specific situation, or
- A college-related situation.

Your task is to apply the concepts used throughout this module and design a scenario which is realistic, yet challenging, for other participants in the class to solve.

To prepare your scenario,

- Select a recorder or note-taker for your team.
- Discuss possible situations with your team.
- Prepare a rough draft of your scenario.
- Write your final scenario on two copies of Scenario Form Handout, completing **only** the following:
  – List names of your team members in the “Prepared by” section.
  – Write a description of the scenario in the “Case Description” section.
- Include enough detail so others can evaluate the scenario.

When you have prepared your scenario,

- Discuss the values and ethical considerations that apply to your scenario and prepare your team’s recommendations. You may refer back to your prioritized values list, your company’s mission or values statements, or other notes from this class.
- Prepare a rough draft of your response on scrap paper.
- Record your responses on one copy of Scenario Form, completing the following additional sections:
  – List names of your team members in the “Solved by” section.
  – Complete the “Values” and “Recommendation” sections.

Handout—Scenario Form

Prepared by:
Solved by:
Case Description:
What values apply to this case?
What recommendations do you have:

Assessment Tools/Strategies

This section includes specific strategies and instruments for assessing students' knowledge, skills, and attitudes about Integrity and Professionalism.

RUBRICS

Rubrics are valuable assessment tools. Students should be provided with the rubric by which they will be assessed before an activity begins so they will understand the performance expectations. When time permits, students can contribute to the rubrics by brainstorming with the instructor about what a quality behavior or product looks like. For example, before assigning a team project to research a topic and prepare a group presentation, ask students to describe how the ideal team would handle the assignment, how they would assign roles, divide the work, create and make the presentation. Prompt students with specific components. Then have them describe a poor performance. These will be the descriptions of the characteristics for the highest and lowest ends of the Likert scale for each performance criteria. Instructors should add any required attributes to the rubric if the students do not come up with them on their own.

- The first rubric for instructor assessment of student performance lists desired attributes of Integrity and Professionalism that can be observed and includes spaces where the instructor can adapt the rubric for a specific activity, project or career field by inserting additional criteria. It should be used by the instructor or other observer assessing each student.
- The second Integrity and Professionalism rubric is a self-rating rubric intended for use by the students themselves. The students indicate the degree to which they think they are performing each attribute. They can periodically return to the rubric to reassess and determine whether they are improving those skills.
- The final rubric is the most complex. The student completes a rubric by providing examples of satisfactory or exemplary performance of the tasks/behaviors listed. Then the student meets with the instructor or peer observer and compares his/her reflections with their instructor's or peers' observations and formulates an action plan for improving attitudes, behaviors or skills.

  This type of rubric most resembles the type of assessment an employee might receive on the job. It is also the most time consuming. Ideally, this rubric would be used at least three times during a course:

  - At the beginning of the course, to get a baseline and to give students suggestions for specific actions they might take to improve their performance,
  - At the midpoint of the course, to check progress and refine the recommendations for improvement, and
  - At the end of the course, to assess the progress made over the duration of the course. Additional suggestions can be made for students' continued growth beyond the end of the course.

RUBRICS FOR INSTRUCTOR ASSESSMENT

Outcomes from Integrity and Professionalism: Demonstrate professionalism.

The student is able to:

Project a professional image.	1 2 3 4 5
Describe appropriate work attire for different work situations.	1 2 3 4 5
Give and receive feedback with a positive attitude.	1 2 3 4 5
Exhibits ethical behavior in decision making and practices as applied to dilemmas, issues, and problems.	1 2 3 4 5
Respect the views of others.	1 2 3 4 5
Maintain confidentiality.	1 2 3 4 5
Establishes a personal code of ethics to apply to a professional code of ethics.	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

RUBRIC FOR SELF-ASSESSING INTEGRITY AND PROFESSIONALISM SKILLS

Use a copy of this instrument throughout the course to self monitor your Integrity and Professionalism skills. Note: It is fairly common to overrate your skills during the initial assessment You may rate yourself a bit lower as you get feedback from others and discover the complexities of each attribute. However, by the end of the course you should see improvements in your overall ratings if you make it a point to think about how you are doing as part of a team in addition to getting the assigned group work completed.

Objective: Be a responsible, ethical, flexible individual who is able to work to accomplish goals.

Essential Attribute	I	II	III	IV
I display honesty and integrity in school and/or work situations.	Barely/rarely if ever	Partially and occasionally	Appropriately and usually	Appropriately & consistently
I accept personal accountability and responsibility for my own decisions and actions	Seldom	Occasionally	Usually	Consistently
I demonstrate adaptability and flexibility in school and/or work situations.	Never	Minimally	Generally	Appropriately
I take responsibility for and maintain an acceptable standard of conduct during team interaction.	Seldom	Sometimes	Usually	Consistently
I demonstrate ethical use of information and programs, and respect confidentiality.	Barely	Minimally	Generally	Appropriately
I demonstrate ethics in all aspects of life.	Seldom	Occasionally	Usually	Consistently
I display sound judgment in making decisions.	Seldom	Occasionally	Usually	Consistently
I display objectivity in work situations.	Seldom	Occasionally	Usually	Consistently

Objective: Be willing to take responsibility for decisions and actions, and receive and act on feedback I receive to improve job performance....

Essential Attribute	I	II	III	IV
I display a commitment to workplace values and ethics.	Seldom	Occasionally	Usually	Consistently
I accept constructive criticism and adjust my behavior to correct personal performance problems in response to feedback.	Seldom	Occasionally	Usually	Consistently
I demonstrate respect for authority and work effectively with various management styles.	Seldom	Occasionally	Usually	Consistently

RUBRIC FOR GIVING AND RECEIVING FEEDBACK

Outcome: Plan and deliver effective feedback (constructive criticism). Receive and consider feedback.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve your self-expression.
When giving or receiving feedback, I keep my emotions under control and avoid escalating a problem.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
I listen actively to what is being said to ensure I understand the problem and to maintain a good relationship with the other person	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
I provide fact-based feedback and I focus on the problem not the person.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
I work with the other person to create an action plan for correcting or improving the problem	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Peer comments and suggestions:
Instructor comments:

Videos and Weblinks

The following is an annotated list of videos that are available at the links provided.

VIDEOS

http://www.francistuttle.edu/discover/multimedia/video/videoDetails.aspx?Channel=%2fChannels%2fAdmissions%2fAdmissions+Content&WorkflowItemID=a99cfc14-0afc-4b4a-b3ff-e002b943013a
This is a video lecture from Francis Tuttle regarding honesty and integrity.

http://archive.org/details/HowHones1950
This is a video on honesty from 1950.

WEBLINKS

http://www.thepoweroftruth.com/truth_quotes.html
This site provides a list of quotes about truth that can be used for prompts for journaling or for discussion.

Codes of Ethics (by career cluster)

Agriculture, Food & Natural Resources

American Registry of Certified Professionals in Agronomy, Crops and Soils
http://nspss.unl.edu/downloads/ARCPACS-Ethics.pdf

Ecological Society of America, http://www.esa.org/esa/?page_id=857

Society of American Foresters, http://www.safnet.org/certifiedforester/standards/index.cfm

US Department of Agriculture Wildlife Service
http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&ved=0CCsQFjAA&url=http%3A%2F%2Fwww.aphis.usda.gov%2Fwildlife_damage%2Fdirectives%2F1.301_code_of_ethics.pdf&ei=AVCSUb68NeKbygGu_IEY&usg=AFQjCNF1ixAeyASF8A4cgj-okbKl1taJqQ

National Registry of Environmental Workers, https://www.nrep.org/ethics.php

Architecture and Construction

American Institute of Architects
http://www.aia.org/about/ethicsandbylaws/AIAS077625?dvid=&recspec=AIAS07762

American Institute of Constructors
http://www.professionalconstructor.org/?page=Bylaws

Construction Management Association of America, http://cmaanet.org/code-of-ethics

Arts, A/V Technology and Communications

Society of Professional Journalists, http://www.spj.org/ethicscode.asp
The SPJ website also includes numerous ethics case studies should you want to explore these with students.

National Association of Teachers of Singing, http://www.nats.org/code-of-ethics.html

Business Management and Administration

Project Management Institute
www.pmi.org/en/About-Us/Ethics/~/media/PDF/Ethics/ap_pmicodeofethics.aspx
Note: The link to the full document pdf opens in Internet Explorer, but not in Mozilla Firefox.

Society for Human Resource Management, http://www.shrm.org/about/pages/code-of-ethics.aspx

Education & Training

Association of American Educators,
http://www.aaeteachers.org/index.php/about-us/aae-code-of-ethics

AASA: the School Superintendents Association, http://www.aasa.org/content.aspx?id=1390

Finance

CFA (Chartered Financial Analyst) Institute
http://www.cfainstitute.org/ethics/codes/ethics/Pages/index.aspx

Government Finance Officers Association, http://www.gfoa.org/about-gfoa/code-professional-ethics

American Institute of CPAs
http://www.aicpa.org/Research/Standards/CodeofConduct/Pages/default.aspx

Government and Public Administration

American Society for Public Administration
http://www.aspanet.org/public/ASPA/About_ASPA/Code_of_Ethics/ASPA/Resources/Code_of_Ethics/Code_of_Ethics1.aspx?hkey=222cd7a5-3997-425a-8a12-5284f81046a8

Society of Government Meeting Professionals, http://www.sgmp.org/ethics

Health Science

American Nurses Association
http://www.nursingworld.org/MainMenuCategories/EthicsStandards/CodeofEthicsforNurses

Browsing other resources on this page takes you to some excellent resources for teaching ethics to nurses as well as a two-part document on how to apply the Code of Ethics.

American Health Information Management Association
http://library.ahima.org/xpedio/groups/public/documents/ahima/bok1_024277.hcsp?dDocName=bok1_024277

Veterinary Technicians
http://c.ymcdn.com/sites/www.navta.net/resource/collection/946E408F-F98E-4890-9894-D68ABF7FAAD6/navta_vt_code_of_ethics_07.pdf

National Association of Emergency Medical Technicians
http://www.naemt.org/about_us/emtoath.aspx

American Massage Therapy Association
http://www.amtamassage.org/About-AMTA/Core-Documents/Code-of-Ethics.html

Hospitality and Tourism

The Guild of Professional Tour Guides of Washington, DC
http://www.washingtondctourguides.com/about-the-guild/code-of-ethics

American Culinary Federation
https://www.google.com/url?q=http://www.acfchefs.org/download/documents/membership/code_ethical_conduct.pdf&sa=U&ei=sHySUdulMKKZyQGjoICoCQ&ved=0CA8QFjAD&client=internal-uds-cse&usg=AFQjCNFPaH-ASABPbdQWEwpuvIT5ybeVzA

Human Services

National Organization for Human Services
http://www.nationalhumanservices.org/ethical-standards-for-hs-professionals

American Association for Marriage and Family Therapy (AAMFT)
http://www.aamft.org/imis15/content/legal_ethics/code_of_ethics.aspx

National Association of Social Workers
http://www.socialworkers.org/practice/standards/sw_adolescents.asp
Note: This is an addendum to general social work code of ethics that is specifically addressed towards those who work with adolescents.

Information Technology

Institute for the Certification of Computing Professionals, http://iccp.org/coe

Association for Computing Machinery, http://www.acm.org/about/code-of-ethics

Association of Independent Information Professionals
http://www.aiip.org/About/Code-of-Ethical-Business-Practice

Law, Public Safety, Corrections and Security

American Bar Association
http://www.americanbar.org/groups/professional_responsibility/publications/model_rules_of_professional_conduct/model_rules_of_professional_conduct_table_of_contents.html

Law Enforcement Code of Ethics
http://www.theiacp.org/What-is-the-Law-Enforcement-Oath-of-Honor

Manufacturing

Society of Manufacturing Engineers, http://chapters.sme.org/s147/code_of_ethics.htm

Society of Quality Assurance
https://www.sqa.org/sqa/About_SQA/Policies___Procedures/Code_of_Ethics/sqa/About_SQA/Code_of_Ethics.aspx?hkey=75e9dd49-762d-43cc-b603-18f78d922f5f

Marketing

American Marketing Association
http://www.marketingpower.com/aboutama/pages/statement%20of%20ethics.aspx

Science, Technology, Engineering and Mathematics

American Society for Mechanical Engineers (ASME)
https://community.asme.org/colorado_section/w/wiki/8080.code-of-ethics.aspx#_ga=1.226658523.754969166.1434984575

American Chemical Society
http://www.acs.org/content/acs/en/careers/career-services/ethics.html

American Mathematical Society
http://www.ams.org/about-us/governance/policy-statements/sec-ethics

American Institute of Professional Geologists
http://www.aipg.org/about/ethics.htm

American Society of Biochemistry and Molecular Biology
http://www.asbmb.org/Page.aspx?id=70&terms=code%20of%20ethics

Transportation, Distribution and Logistics

Air Line Pilots Association (ALPA)
http://www.alpa.org/Home/WhoWeAre/CodeofEthics/tabid/2262/Default.aspx

The International Society of Logistics (SOLE)
http://www.sole.org/ethics.asp

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Problem Solving and Decision Making

Overview

Every day we are faced with hundreds of decisions to make and problems to solve from the time we wake up until the time we go to bed. What will I wear today? What will I eat for breakfast? There has been a major accident on the freeway I take to work; should I take an alternate route? In every workplace, decision making and problem solving can have a major impact that affects the financial success of the enterprise.

The activities in this module ask students to think formally about how decisions are made by exploring strategies for solving problems both individually and in teams.

In the first activity, Broken Squares, teams of students work together to solve a problem. Restrictions on how students are allowed to communicate reinforce the importance of teamwork and communication skills discussed in other modules in this series. The activity is fairly short, but if group members don't observe and help others, it can become frustrating.

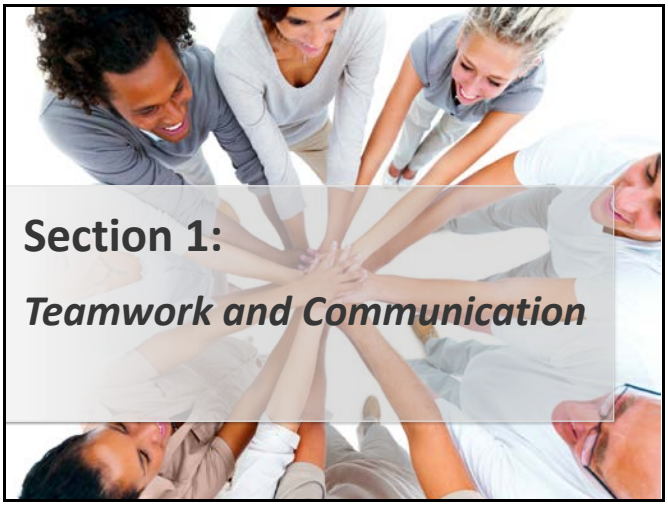
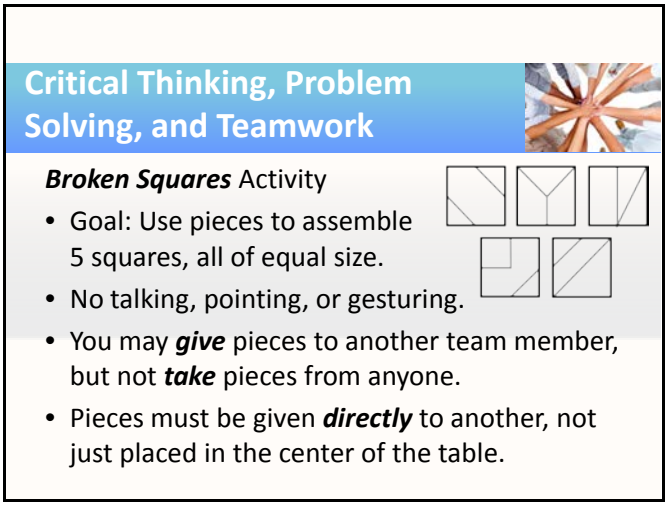
The second activity, Making Individual Decisions, emphasizes the fact that students make decisions daily. In it, students think about ways they might make decisions and in what situations these processes would be most effective. Students also discuss the idea that refusing to make a decision actually yields a decision by default.

The third activity, Make a Plan, describes strategies for tackling more complex problems. Students work through the planning method as a class or in small groups. Later they may address problems presented by the class or on the student handouts. Discussion of problem-solving strategies is encouraged throughout.

The fourth activity, Seven-Step Quality Improvement Problem-Solving Model, discusses techniques used in business and industry to solve problems.

The final activity, Tools for Preventing Problems, discusses the use of statistical tools to examine processes and identify potential problems before they become big problems. This activity contains a hands-on activity simulating a bottle-filling process. Students collect data, analyze it, and suggest changes to make their process more precise.

Presentation Materials

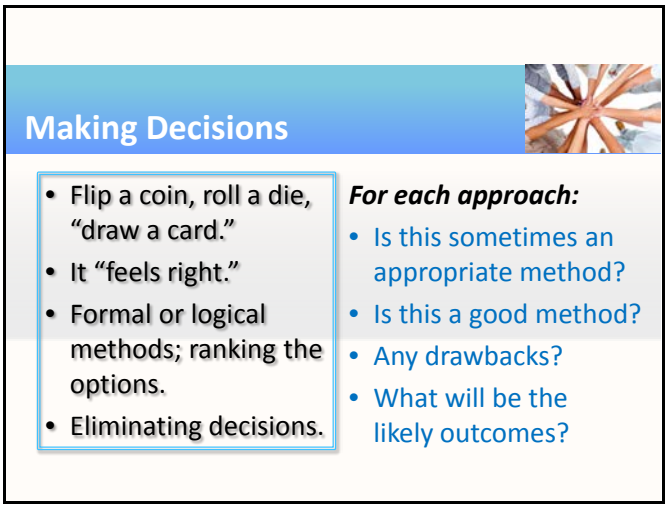
	SLIDE	TEACHER NOTES
1		
2		
3		• In the Broken Squares activity, students work together to solve a problem. Communication restrictions in the game introduce the importance of interpersonal communication within teams. • Monitor the activity and enforce the guidelines. • As teams finish, they should sit quietly and observe the remaining groups still at work.

	SLIDE	TEACHER NOTES
4	**Critical Thinking, Problem Solving, and Teamwork** ***Broken Squares*** Activity • What part of the game was the most fun? • Were some members frustrated? Why? • Did some members dominate the play? • Were some members willing to violate the rules?	• Discussion of the activity will help group members understand the teamwork processes that took place during the game. Team members should reflect on their actions and identify interpersonal skills used in problem solving during the game.
5	**Critical Thinking, Problem Solving, and Teamwork** ***Broken Squares*** Activity • How did team members interact? • Were any members always/never willing to give away their pieces? • Was there a turning point where cooperation began? • What role does communication play in solving problems?	• Discussion of the activity will help group members understand the teamwork processes that took place during the game. Team members should reflect on their actions and identify interpersonal skills used in problem solving during the game.
6	**Critical Thinking, Problem Solving, and Teamwork** ***Broken Squares*** Activity • What strategies could group members have used to make the team's outcome more successful? • What lessons did you learn from the game that could be applied in other problem-solving situations?	• Discussion of the activity will help group members understand the teamwork processes that took place during the game. Team members should reflect on their actions and identify interpersonal skills used in problem solving during the game.

	SLIDE	TEACHER NOTES
7	**Critical Thinking, Problem Solving, and Teamwork** ***Broken Squares*** Activity • Cooperation by all team members is necessary to solve team problems. • It is important that everyone understand and follow guidelines. • Everyone's efforts are important. • Recognize that ***your*** contributions are important. • Communication in many forms is vital for success.	• Here are some conclusions for this activity.
8	**Section 2:** ***Making Decisions***	
9	**Your Decision-making Skills** • How many decisions do you make in a day? • How do you make a decision? • What is a good decision? • Describe how you recently made a good decision? What was the process?	• Discuss students' typical decision-making processes. Many of them may match those found on the following slide (and described in more depth in the module content).

SLIDE

10



TEACHER NOTES

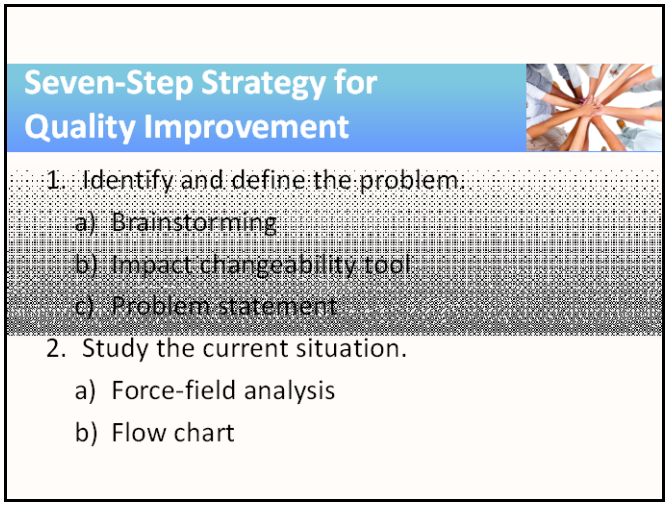
Consider the approaches listed…

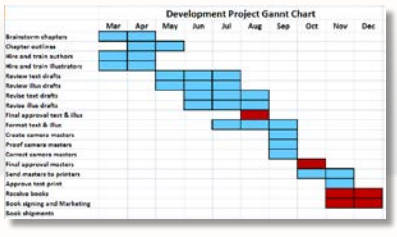
- **Flipping a coin, etc.** These random results may be appropriate for low-risk situations where any choice is acceptable. While there may be consequences, it is a quick way to make unimportant decisions. The probabilities of each outcome can be mathematically determined (e.g., coin flip means 50% chance for each outcome).
- **"Feels right."** People often decide based on emotions, but seldom consider that emotions depend on many factors, like fatigue, hunger, stress, personalities, etc. If one can stay aware of the impact of emotions, you'll probably be more satisfied with the decision—especially personal decisions.
- **Logical choice.** Making or brainstorming a list of all possible options and analyzing the consequences or relative merits of each one (mathematically, for example) generally yields an emotionally neutral, though not always pleasant, outcome. It is probably too time-consuming for everyday decisions.
- **Eliminating the options.** Some people make choices by reducing the number of options, until the list is reduced to one or two choices, which they perceive as being easier (emotionally). Example: Relying on a standard operating procedure, which means that someone else has already made the decision

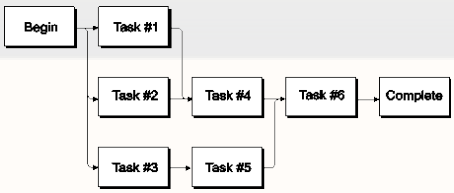
	SLIDE	TEACHER NOTES
11		• Creating a methodical problem-solving plan is often difficult for students. This section of the module presents several different strategies students can practice in the module activities.
12	**Problem-solving Strategies** ***Draw a diagram.*** • "A picture is worth a thousand words." • Are you a visual learners? • Turn an abstract problem into a concrete problem by making a sketch. • **Example:** Determine the order of the houses.	• **"Draw a diagram" example:** Five houses on the block. One is blue, one is green, two are red, and one is yellow. Both red houses are to the left of the green house. The blue house is between two red houses, and the yellow house is the first house on the block. What is the order of the houses on the block? A sketch will quickly reveal the correct pattern.
13	**Problem-solving Strategies** ***Make a list.*** • A systematic listing of options/choices can make the answer clearer. • Use a methodical approach to cover all options/choices. • **Example:** How many possible tile arrangements are there?	• **"Make a list" example:** Four colored tiles—red, yellow, blue, and green—are to be mounted side by side for a store display. How many possible color sequences are there? Simply listing the possible sequences will yield the answer without the need for a clever math formula and calculation. • On the other hand, here the power of math can be helpful. This is an application of *n!* (*n* factorial). When you have *n* different items, there are *n!* possible arrangements, if the order is significant (that is, AB is different from BA). There are 4! = 4•3•2•1 = 24 possible ways to arrange the tiles, as can be verified by listing the possible arrangements: RYGB, RYBG, RGYB, RGBY, and so forth.

	SLIDE	TEACHER NOTES
14	**Problem-solving Strategies** ***Trial and error.*** • Sometimes known as "guess and check." • Good if the cost of a wrong guess is minimal. • Good if the number of possible answers is not too large. • **Example:** The product of five consecutive integers is greater than one million. What are the smallest values that do this?	• **"Trial and error" example:** One could solve an algebraic expression (hard) or just try several sets of five consecutive values with a calculator, notice a trend, and eventually close in on the answer (14•15•16•17•18=1,028,160). • **Another example:** A radio station's high-low jackpot. Callers guess the jackpot value and are told they're high or low. Keeping track of the results will eventually yield the correct answer. Often "guess and check" is a perfectly legitimate problem-solving technique. • Many professional trade workers apply this technique. For example, a carpenter may start with an approximate length of lumber that is close to the desired amount, repeatedly check the result and trim away a little more, being careful not to trim away too much, until the result is satisfactory.
15	**Problem-solving Strategies** ***Divide and conquer.*** • Break big problems into several smaller problems that are more easily solved. • Example: How many tiles should be ordered for a countertop with complex geometry?	• **"Divide and conquer" example:** Ordering tiles for a countertop with a complex geometry is best solved by breaking the complex geometry down into manageable regions. Using the example on screen, identify rectangular regions and then subtract the area of the rectangular and circular regions. Notice that a diagram plays an important role here, too.

	SLIDE	TEACHER NOTES
16	**Problem-solving Strategies** ***Look for a pattern.*** • Often other approaches yield a ***pattern*** that suggests a possible solution. Test the solution. • **Example:** 1000 students have 1000 lockers. Starting at locker 0001, Student #1 opens every locker. Student #2 closes every other locker. Student #3 changes every 3rd locker. Student #4 changes every 4th locker. And so on, through Student #1000. What lockers will be left open?	• **"Look for a pattern" example:** We could make a table of all 1000 lockers, but if we just look at the first few lockers (25, for example) it will become evident that the lockers that will remain open are perfect squares (#1, 4, 9, 25, 49, etc.). Thus, there is no need to actually diagram all 1000 lockers. The answer is that the locker numbers that are perfect squares will be open after all 1000 students have taken their pass at open/closing the lockers. • Similarly, the Fibonacci series that occurs amazingly often in nature seems quite bizarre and unpredictable, until one detects the pattern.
17	**Problem-solving Strategies** ***Working backward* might be useful when...** • The final result is clear, but the initial conditions are not. • The beginning situation is complicated but the end is simple. • The direct approach would involve a complicated equation. • The problem involves a sequence of reversible actions. • **Example:** What was your previous month's bank balance if this month's statement shows $493.18, after checks for $17.73 and $88.10, and a deposit of $193.22 and interest of $0.26?	• **"Working backward" example:** Rather than developing a formula to calculate the previous month's balance, we can start with the current balance and ***reverse the actions*** throughout the month. So, reversing the checks means adding (rather than subtracting) those amounts. Reversing the deposits means subtracting (rather than adding) those amounts. Thus, $493.18 + $17.73 + $88.10 – $193.22 – $0.26 = $405.53, and so the previous month's statement balance was $405.53. • "Working backward" might be the best strategy when we pause to consider the problem, rather than jumping right into the typical approach. For example, few people consider starting at the finish of a maze and working backwards to reach the start. Or consider the childhood puzzle showing three fishermen with tangled fishing lines winding all over the page, one of which is connected to a big fish in the opposite corner. To answer the question "Which fisherman will catch the fish?" the best strategy is to start at the fish and follow the line back to the winning fisherman—*working backwards!*

	SLIDE	TEACHER NOTES
18		
19		• See the complete plan presented in the student handout. Many slight variations of such problem-solving plans exist. They all typically include variations of the essential four steps: 1) understand the problem, 2) develop a plan, 3) implement the plan, and 4) check the outcome. • Impact changeability tools help teams prioritize problems to address based on the degree of impact the process has on the whole system. • A force-field analysis is essentially a more complex pros/cons or risk/benefit analysis. • A flow chart is a start-to-finish graphic representation of tasks within a whole process.

	SLIDE	TEACHER NOTES
20	**Seven-Step Strategy for Quality Improvement** 3. Find the root cause. a) Asking "why" five times b) Fishbone diagram 4. Choose a solution. a) Brainstorming b) Evaluation grid	• See the complete plan presented in the student handout. Many slight variations of such problem-solving plans exist. They all typically include variations of the essential four steps: 1) understand the problem, 2) develop a plan, 3) implement the plan, and 4) check the outcome. • Asking "why" repeatedly helps determine a chain of events leading to a problem.
21	**Seven-Step Strategy for Quality Improvement** 5. Develop an action plan. – Specific and clear – Logical sequence – Comprehensive – Shared with whole team – Reviewed frequently	• See the complete plan presented in the student handout. Many slight variations of such problem-solving plans exist. They all typically include variations of the essential four steps: 1) understand the problem, 2) develop a plan, 3) implement the plan, and 4) check the outcome.
22	**A Strategy for Action: The GANTT Chart** • Communicates, in an illustrated way, the start and finish dates for sub-tasks within a project. • Shows the timing and sequence of tasks and milestones. 	• Gantt charts illustrate the start and finish dates of the many steps and milestones of a project. There are many varieties of Gannt charts, some using shapes, colors, and symbols to communicate different aspects of project progress. They all have in common the concept of precedence and dependency of multiple subtasks. Usually (but not always) progress correlates with the underlying timeline. The task flow sometimes is separated from the time/schedule flow. • Gannt charts were invented by Henry Gannt around 1910, and were considered revolutionary at the time. Today, they are common in business and project planning and presentations.

	SLIDE	TEACHER NOTES
23	**A Strategy for Action: The PERT Chart** • Project Evaluation and Review Technique (PERT) charts show the sequence and timing of tasks in a project or problem-solving process. 	• PERT charts were originally designed to simplify the planning and scheduling of large and complex military projects in the late 1950s.
24	**Seven-Step Strategy for Quality Improvement** 6. Implement the action plan. • Includes five Ws and one H – Who – What – Where – When – Why – How	• See the complete plan presented in the student handout. Many slight variations of such problem-solving plans exist. They all typically include variations of the essential four steps: 1) understand the problem, 2) develop a plan, 3) implement the plan, and 4) check the outcome. • An action plan clearly outlines Who will do What; Where; When; Why; and How.
25	**Seven-Step Strategy for Quality Improvement** 7. Check the results. a) Force-field analysis b) Brainstorming c) Evaluation grid	• See the complete plan presented in the student handout. Many slight variations of such problem-solving plans exist. They all typically include variations of the essential four steps: 1) understand the problem, 2) develop a plan, 3) implement the plan, and 4) check the outcome.

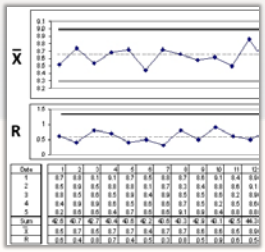
SLIDE

TEACHER NOTES

26

Avoiding Problems: Quality-Control Charting

- **X-bar** and **R**-charts try to spot problems early.
  - "X-bar" (or $\bar{X}$) is the average of sample measures.
  - "R" is the range, the maximum value minus minimum value.
- X-bar shows "drift."
- R shows variation.



- Ongoing processes (typically factory production and assembly lines) can be monitored by workers who periodically take sample measurements that are chosen as indicators of the health of the production process. While much can be analyzed in such measurements, quality control practice is to focus on two major statistics: the average (X-bar) and the range (R). The average and range of a small number of measurements (typically 4-5) are relatively easy to calculate, record, and chart, and provide good early indicators of unwanted changes in calibration and variation of the process, preventing (hopefully) greater problems down the road.

Teaching Resources

ACTIVITIES

The following activities can be completed in class to emphasize specific aspects of problem-solving and decision-making skills. The activities can be used "as is," or they can be adapted and tailored to fit a specific course. Suggestions for tailoring the activities precede each activity, with examples from several different subject areas/career pathways. The suggested modifications provide instructors with ideas for adapting the activity for integration into content they are already teaching. Modifying the activities allows infusion of employability skills with minimum impact on the time used to teach subject content.

ACTIVITY: BROKEN SQUARES—CRITICAL THINKING, PROBLEM SOLVING, AND TEAMWORK

Instructor Preparation

For this activity, students will work in groups of five. "Extra" students can serve as observers. (Give them a copy of the observer instructions.) Prepare five envelopes with puzzle pieces for each group. The directions for making the puzzles are included in the Materials section below.

Objectives

Students will:

1. Identify behaviors that may contribute to or detract from the ability of groups to solve problems.
2. Describe the importance of good communication between team members.

Materials

- Enough sets of "broken square" pieces for each student in each group to make a square. Templates are included at the end of this activity. See instructions for assembling sets of pieces.
- Work space, such as a small table, for each team
- Handout—Instructions for Observers

Directions for Making a Set of Squares

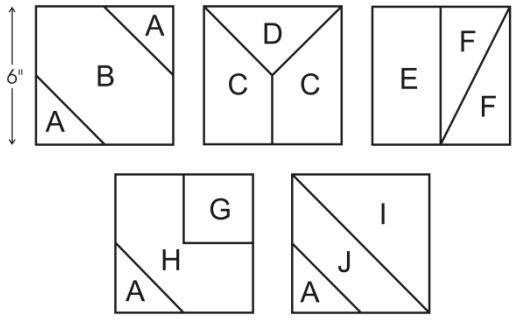
One set consists of five envelopes containing pieces of cardstock or poster board that have been precut into different patterns (template included). When properly arranged, the pieces form five squares of equal size. One set should be given to each group of five students.

Make one set of puzzle pieces by using the square templates provided. Photocopy the five pages of six-by-six square templates onto poster-board or cardstock paper. To create the pieces, carefully cut along the lines indicated. ***NOTE:*** If you photocopy the templates, white out or cover the letters on the template masters before copying them. Number five 6" X 9" clasp envelopes 1, 2, 3, 4, and 5 for each set. (Each team of five students will receive the entire set of envelopes.) The precut pieces should be placed in the numbered envelopes as follows:

Envelope Number	Pieces
1	I, H, E
2	A, A, A, C
3	A, J
4	D, F
5	G, B, F, C

The pieces in each envelope will not form a square by themselves. The purpose of this activity is for students to realize the need for teamwork to accomplish a common goal. Therefore, it is imperative that the pieces be cut and placed in the envelopes as directed above.

The completed squares are put together as shown in the following figure.



Activity Guidelines

Randomly divide students into groups of five. “Extra” students can serve as observers. (Give them a copy of the observer instructions.) Hand out one set of five envelopes to each team of five students.

Direct the teams not to begin or open the envelopes until after the instructions have been read.

Read aloud or print out the following instructions for each team:

> Each team member has been given an envelope that contains pieces of a puzzle that will form a square. When the signal has been given to begin, the team objective is to use the puzzle pieces to make five perfect squares of equal size.

Specific guidelines that must be followed:

- No talking, pointing, or gesturing
- Team members may give pieces to other team members but a team member cannot take pieces from other team members.
- Team members may not place their pieces in the center of the work area for other team members to take; pieces must be given from one team member directly to another team member.

If there are observers in the groups, their job is to enforce the above guidelines.

Once the students understand the instructions and any questions have been answered, give the signal to begin.

The instructor should facilitate the activity by monitoring the teams and enforcing the guidelines. As teams complete the task, they should be instructed to sit quietly and observe the other groups working until all groups have finished.

When all groups have finished the game, the instructor should ask the following questions to summarize the activity. If the groups had observers, ask the observers to answer the questions first. Then allow the rest of the group to reply.

- What were the different interactions between the team members?
- Were certain team members willing to give away puzzle pieces?
- Were certain team members not willing to give away puzzle pieces?
- Did certain team members seem to be frustrated? If yes, then how did it affect the group?
- Did certain team members seem to want to dominate the activity? If yes, how did it affect the group?
- How many people were actively working as a team to put the pieces together?
- Was there a specific point at which the team started to work more cooperatively?
- Did any team members attempt to violate the rules to help other members solve their puzzles?

Group Reflection Questions

Discussion of the activity helps group members understand the teamwork processes that took place during the game. Individual team members should reflect on their actions during the game and be able to apply interpersonal and teamwork skills to other problem-solving situations in the future.

Ask students the following questions:

- What part of the game was the most fun? Why?
- What part of the game was the most frustrating? Why?
- What types of strategies could group members have used to make the team's outcome more successful?
- What role does communication play in solving problems?
- What lessons can you learn from this game that would be helpful in working in other problem-solving situations?

Close this activity by reviewing key points related to problem solving as a group:

- Cooperation by all team members is necessary to reach solutions to team problems.
- It is important for all team members to understand and follow established guidelines.
- The effort of all individuals is important to successful problem solving.
- Individuals should recognize their own potential contributions.
- Communication, in various forms, is vital to success in problem solving.

Students should be encouraged to review their actions in the game and work on improving the interpersonal skills that will make them successful problem solvers.

Handout—Instructions for Observers

As an observer you should make sure that each team member is following the guidelines established by the instructor.

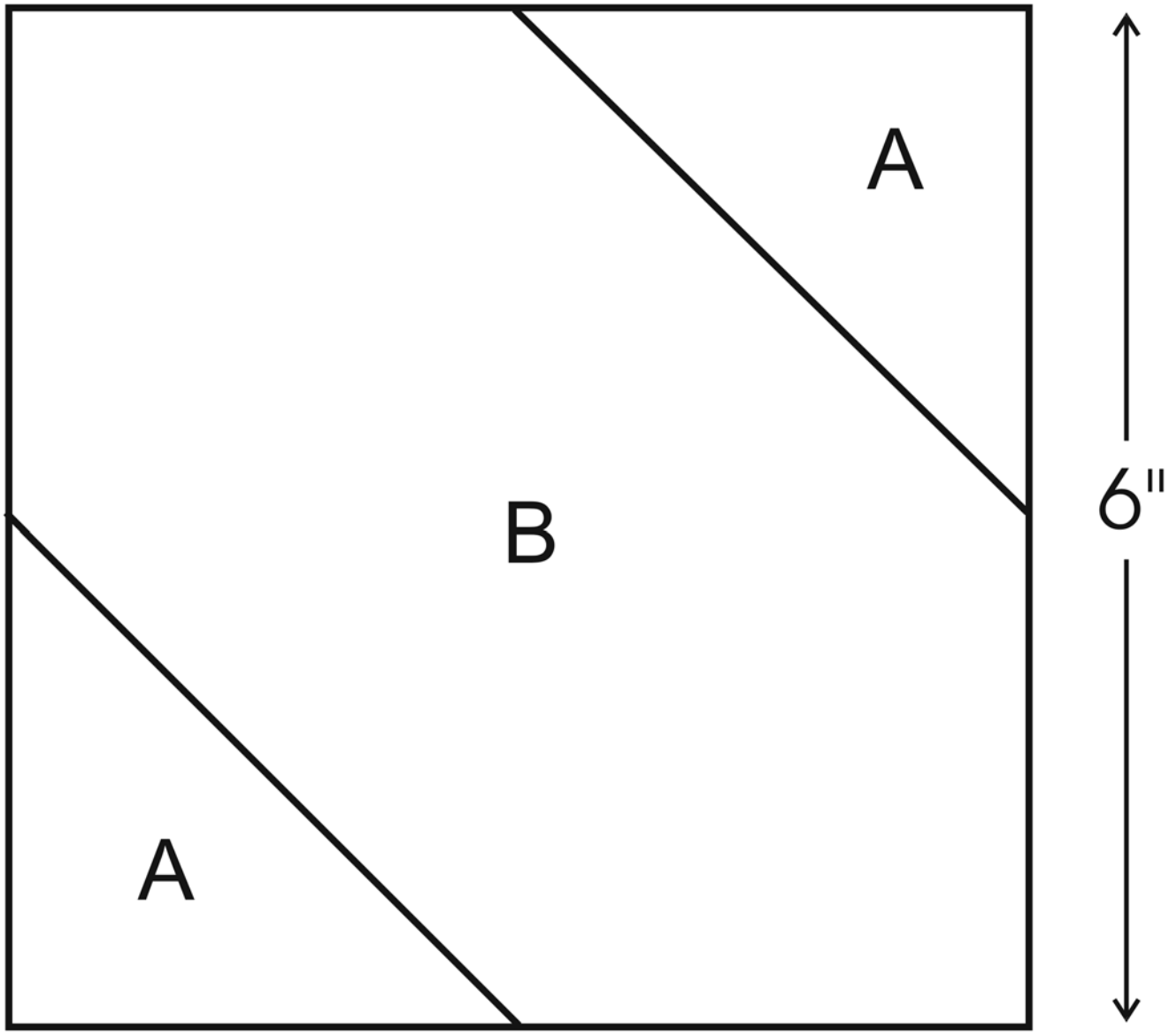
- No talking, pointing, or gesturing.
- Team members may give pieces to other team members, but team members cannot take pieces from other team members.
- Team members may not place their pieces in the center of the work area for other team members to take; pieces must be given directly to other team members.

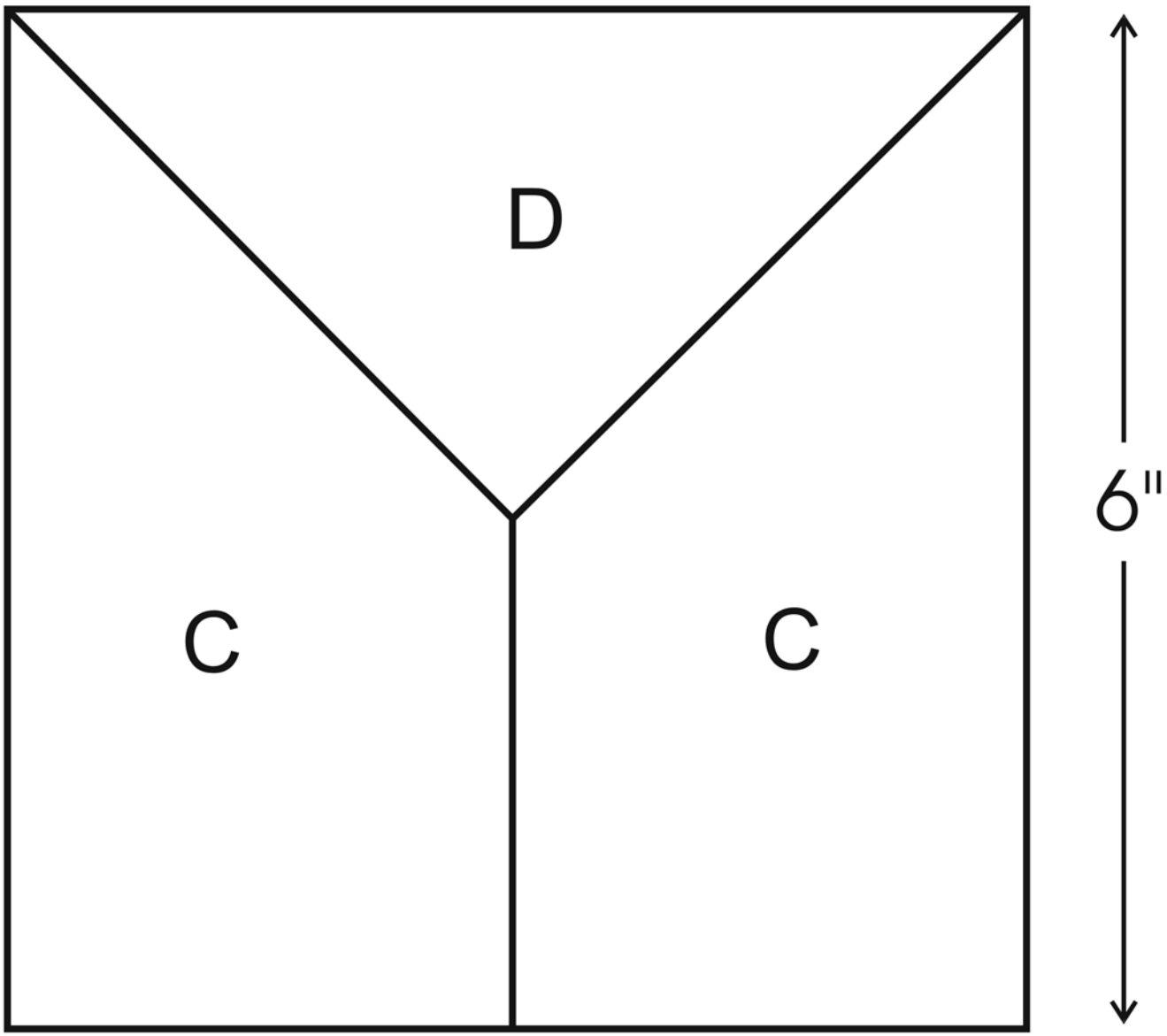
Monitor the group during the game and enforce the guidelines.

Observe the process and note the following:

- What are the different interactions between team members?
- Are certain team members willing to give away puzzle pieces?
- Are certain team members not willing to give away puzzle pieces?
- Do certain team members seem to be frustrated? If yes, how is it affecting the group?
- Do certain team members seem to want to dominate the activity? If yes, how is it affecting the group?
- How many people are actively working as a team to put the pieces together?
- Is there any specific point at which the team starts to work more cooperatively?
- Do any team members attempt to violate the rules to help other members solve their puzzles?

Templates for Broken Squares Activity

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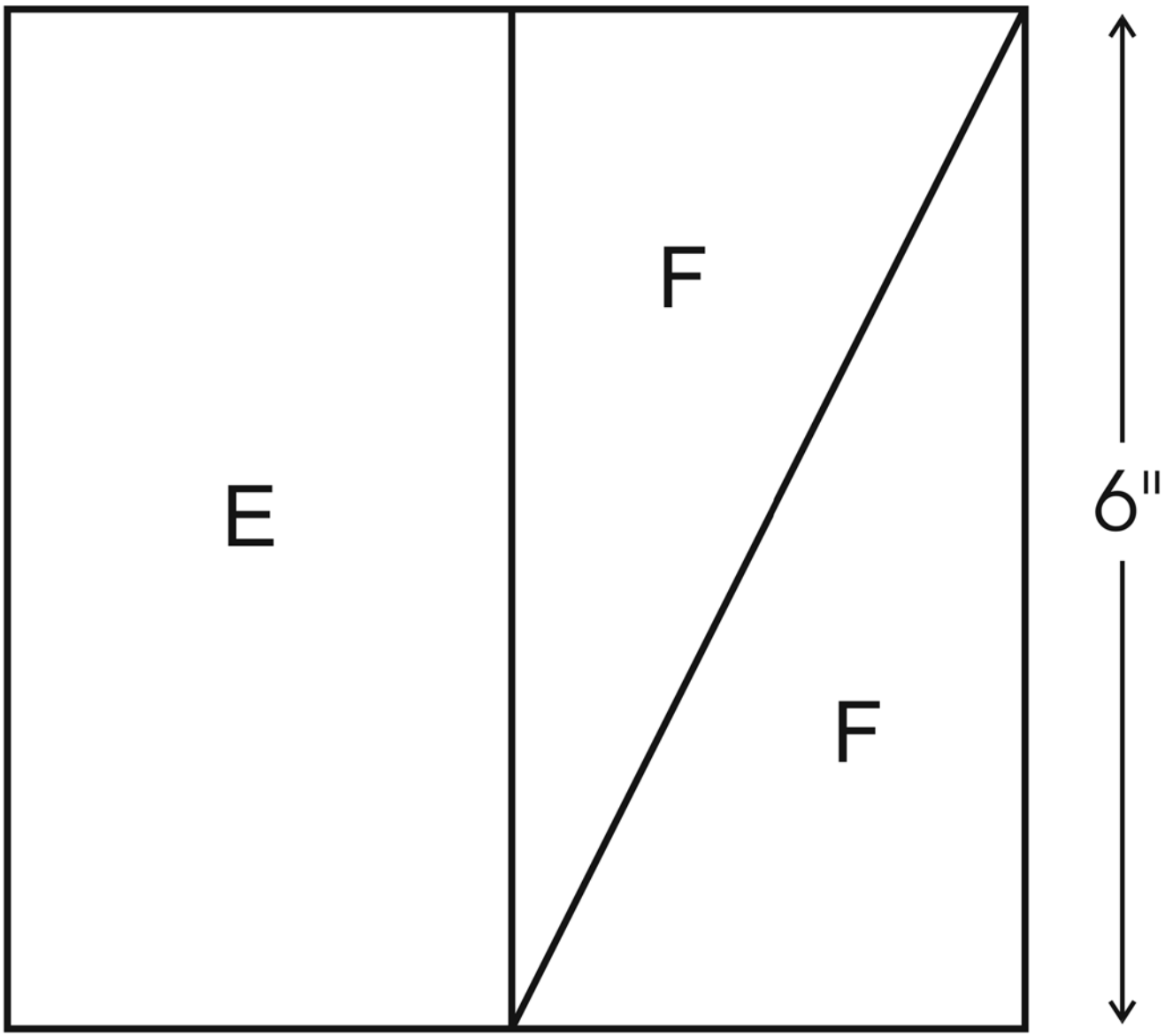
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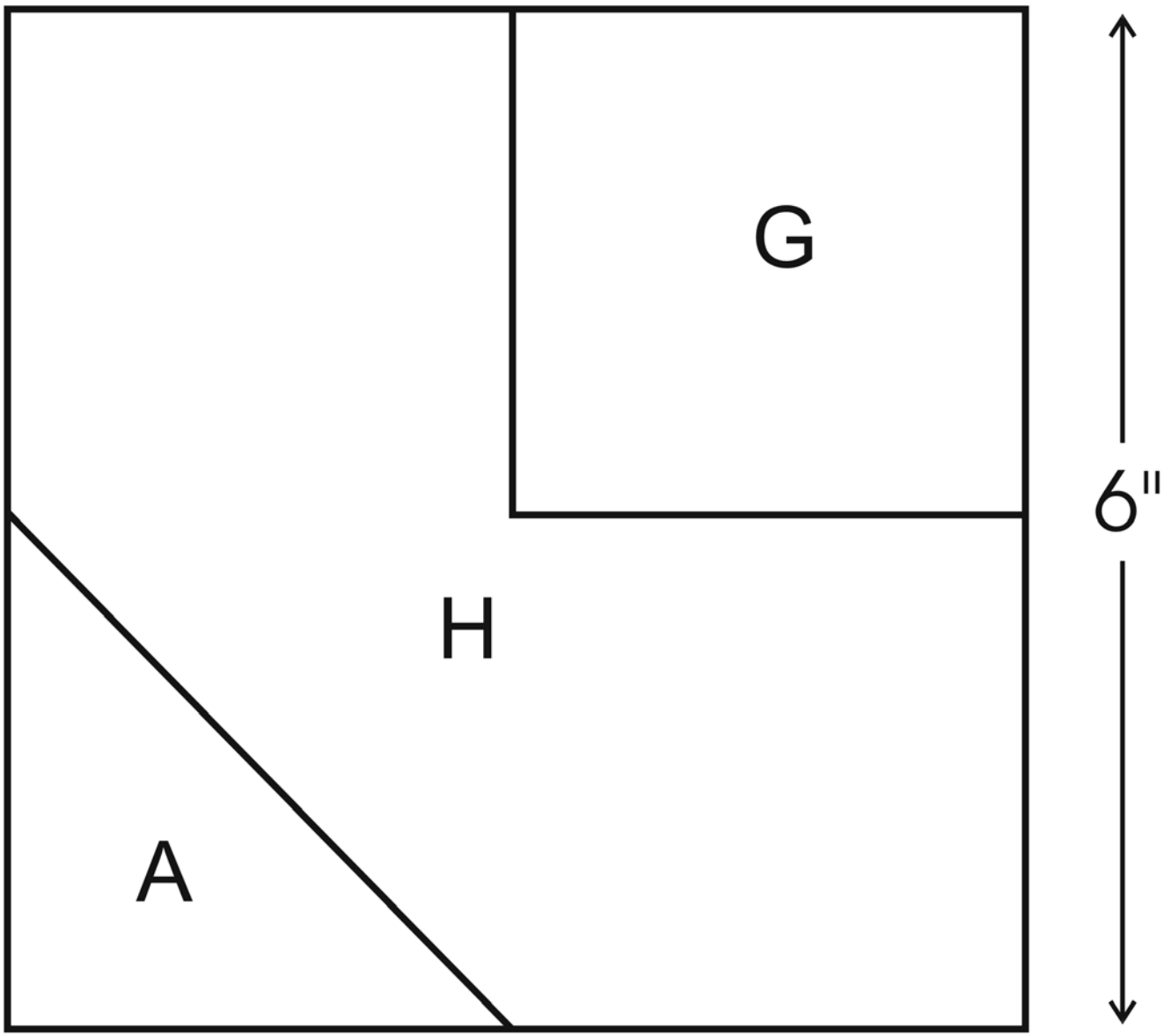
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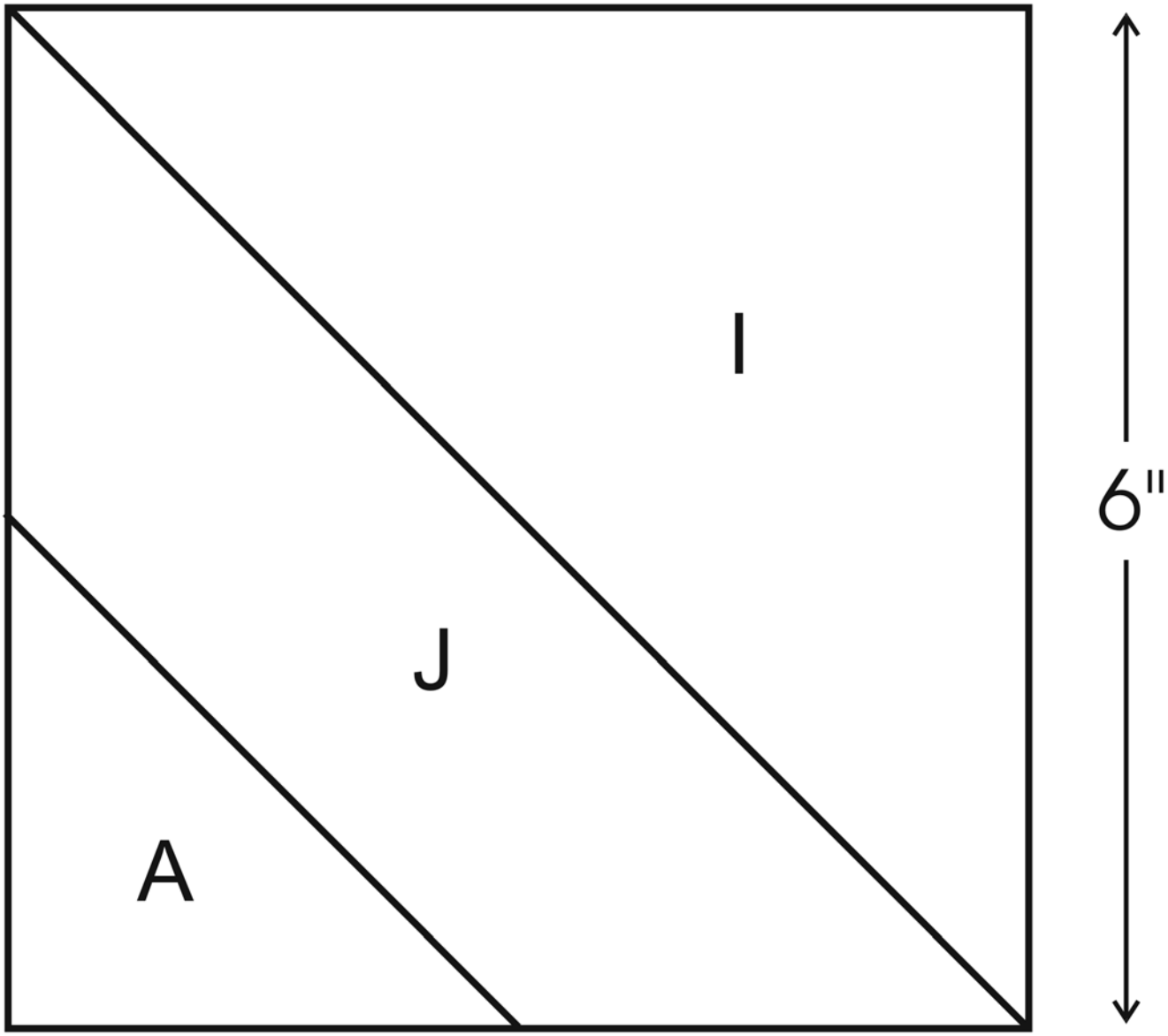
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ACTIVITY: MAKING INDIVIDUAL DECISIONS

Instructor Preparation

Decision making is sometimes considered a form of problem solving. Some people make hasty decisions based on emotional choices and regret them later. Others "overthink" simple decisions to the point of having anxiety attacks. Still others make intuitive decisions quickly and effectively with very little effort.

Most decisions are made unconsciously without a formal process. These are generally based on experience, habits, and personal preferences. They include decisions like what to eat for lunch, what to wear, or what movie to watch on TV. In these cases, the consequences of a poor decision are not devastating. On the other hand, some decisions—choosing a career, choosing a major in college, choosing a life partner, or choosing to drink alcohol—can be life changing and can affect others as well as the person making the decision. Making good decisions requires a thoughtful approach.

In this activity, students will rate how well they think they make decisions. Next, they will examine several methods for making decisions, individually or within groups.

Because the decisions we make individually are often more personal, the instructor might allow students to identify their own issues on which decisions should be made. Alternatively, the instructor may want to identify specific, course-related issues for students to consider. Below are a few suggestions to guide topic selection.

- CTE Courses: Have students make choices related to possible careers, e.g., choosing between two or more job offers or determining whether they want to work for themselves or for someone else.
- In a composition class, ask students to write a paper envisioning the impact their decision might have had on their lives ten years in the future.
- In an election year, ask students to determine who they will vote for in an upcoming election and prepare a persuasive paper to convince others that their candidate is the best choice.
- Ask students to describe the impact of someone else's choice on their lives.

Objectives

Students will:

1. Evaluate their effectiveness at making decisions.
2. Investigate several methods for making decisions.
3. Choose one of the methods to use in making a decision.

Materials

- Access to computers with Internet connection

Activity Guidelines

The instructor should engage students in a discussion about making decisions, using the following questions as a starting point:

- How many decisions do you think the average person makes in a day?
- Have you ever gotten into a car with friends to go eat and no one wants to decide where to go?
- What is a good decision?
- How do you make a decision?
- Can you think of a good/bad decision you have made recently? Describe how you went about making the decision and its results.
- Do you consider yourself a good decision maker?

Have students go online to Mind Tools[1] (http://www.mindtools.com/pages/article/newTED_79.htm) and complete the "*How Good Are Your Decision-Making Skills?"* self-evaluation tool. After students have completed the evaluation, have them meet in groups of 2–4 and discuss their results. Use the information in the accompanying article and their results from the self-evaluation to determine at which step(s) of the process they could make improvements. Afterwards have students share with the class on a voluntary basis. The instructor can promote class discussion by asking questions such as:

- Which of the steps is the most problematic for you?
- What tips would you give those who have trouble making decisions?

After a discussion of the self-evaluation, describe the following strategies for making a decision. Ask students to consider the following questions:

- When are these methods appropriate?
- What is good about the technique?
- What are potential drawbacks?
- What are the likely outcomes of the process?

Flip a Coin or Random Drawing—Flipping a coin is used for yes-no decisions or decisions requiring a choice between two options. Random drawing is used when there are more than two choices. These options are appropriate in low-risk situations where both choices are acceptable to you and the outcome of the decision in not life-altering. Examples might be: "Do I buy this candy bar or not?" "Do I go to the game or to the movies?" "Which of three movies that I want to see should I choose?" While it may be argued that all decisions have consequences and that the decision to buy a candy bar might be life-threatening for a diabetic or be symptomatic of a lifetime of bad decisions leading to obesity, for the average person these decisions have no long-term effects. This technique is good because it is a quick

[1] While Mind Tools does have a subscription section, the tools referenced in this activity are free.

way to make unimportant decisions. If a single coin flip is used for making an important decision, there is a 50% chance of making a bad choice.

It Feels Right—Emotions can play a big role in making decisions. For example, going grocery shopping when tired and hungry can lead to overbuying and making poor choices about what to buy. On the other hand, emotions must be taken into effect when weighing possible outcomes. If the possible outcome of a choice is something that might lead to a desirable result but might also lead to future regrets, that choice should be carefully weighed. One example might be making a high-risk financial investment that has the potential of making the investor extremely wealthy if it goes well or bankrupting him if it fails. Being aware of your emotional state during all phases of the decision making can help build a more reliable "gut instinct." This method influences most of our decisions, particularly personal decisions.

Formal or Logical Methods of Decision Making—When there are major decisions to make, it is wise to be more methodical or logical in making them. One method involves brainstorming and evaluating possible decision outcomes. Brainstorm possible outcomes of each of the decision choices and write them all down. Be sure to think of both short-term and long-term outcomes. Ask others for additional possible outcomes to consider. Once this decision list is compiled, mark each outcome as positive or negative by putting a plus or minus sign by the outcome or assigning a weighted value to each outcome using a scale of 1 to 5 or 1 to 10. Other weighting methods entail estimating the probability of a particular outcome occurring and using that as a multiplier for the desirability of an outcome. This method is too time-consuming for daily decisions.

Eliminating Decisions—Decision making can be time consuming. While not a method of decision making per se, it is sometimes helpful to reduce the number of decisions to be made daily by creating routines or standard operating procedures. For example, to avoid having to decide each day what to prepare for dinner, many people select their favorite recipes and enter them on the calendar. Planning ahead means that when they shop they know what they need to buy for each recipe and they also know how much preparation time is required for each meal. Ask students to think about decisions that they have to make now or in the future. Ask them to select the method(s) that they will use to make the decision. Alternatively, present the students with a list of decisions to be made and ask them to discuss the methods that would be appropriate.

Group Reflection Questions

Review the lesson with the students. Answer any questions students might still have. Have students discuss the following:

- What did you learn about decision making that was most helpful to you?
- What factors help or hinder you in making decisions?
- Do you prefer making decisions individually or as a group? Why?
- How does decision relate to problem solving?
- How is not making a decision actually a decision? Is this a good or bad thing?

ACTIVITY: MAKE A PLAN

Instructor Preparation

For many people the hardest part of problem solving is designing a plan to tackle the problem. Luckily, many different strategies can be used. Some are as simple as trial and error, while others can involve mathematical modeling of the problem. This activity will explore different strategies. Students should be encouraged to try many different strategies throughout the course. Remind them that problem solving is a skill that can be improved with practice. When discussing student work, point out problems that were solved and discuss the strategies that are being used effectively. Conversely, explain why a particular strategy might not be suited for a given problem.

This lesson focuses on the following six strategies:

- Draw a diagram
- Make a list
- Trial and error
- Divide and conquer
- Look for a pattern
- Work backward

Emphasize that these strategies may be used in combination.

Objective

1. Use a variety of strategies to solve problems.

Materials

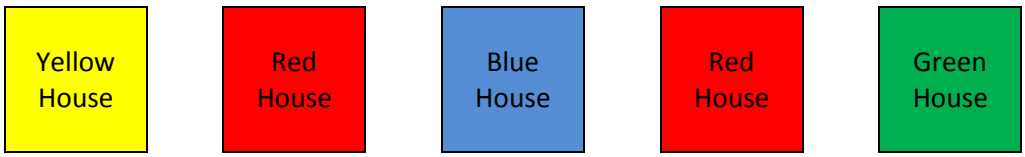
- Paper and/or graph paper
- Student Handout

Activity Guidelines

- Demonstrate each of the following strategies by working through them with your students. These strategies can be covered in one lesson or integrated into other appropriate content and applied to problems within that content.
- The student handout provides students with opportunities to practice the strategies. Have students discuss their strategies with one another or as a class. Having to describe the strategies in this way shows students that they really did use a strategy. It allows other students to learn strategies they may not have thought of, and most critically it allows the instructor to hone in on any false assumptions that students may have made that might cause problems later.

Draw a Diagram

It is said that a picture is worth a thousand words. This is especially true when it comes to solving problems. If you are able to visualize a problem and illustrate it, many times the solution will become obvious. For example, you are told that there are five houses on the block, one is blue, one is green, two are red, and one is yellow. Then you are told that both red houses are to the left of the green house; the blue house is between two red houses, and the yellow house is the first house on the block. What is the order of the houses on the block? This may be confusing at first reading, but if you draw a sketch of the block, you can quickly determine the order.



Make a List

Just as drawing a picture of a problem can often make a solution obvious, sometimes a systematic list can be used to find an answer. For example, suppose you have four different colored tiles: Red, Yellow, Blue, and Green. You are mounting them in a straight line on a display for a store. How many possible sequences are there? Creating a table of possible sequences can help you to find the solution:

RYGB	YRGB	BRYG	GRYB
RYBG	YRBG	BRGY	GRBY
RGYB	YGRB	BYRG	GYRB
RGBY	YGBR	BYGR	GYBR
RBGY	YBRG	BGRY	GBRY
RBYG	YBGR	BGYR	GBYR

Ask students to discuss how they came up with their answer. Ask them if it would work if they had 10 or 50 different tiles to mount. How many possible sequences would they have?

This example provides a good opportunity for reinforcing or introducing the *x*! as a mathematics concept. Lead students into discovering that whenever you have *x* items to arrange in order and each item can only be used once, you have *x*! possible solutions. That is, multiply the number of possible choices for the first slot by the number of choices available for the second slot, by the number of the choices for the third slot and so forth. If there is only one item, there is only 1 placement. If there are two items you have two choices for the first spot, and once that is made, you have only one choice remaining for the last spot. So $2 \times 1 = 2$. With three items for three slots you have $3 \times 2 \times 1 = 6$. For the example problem there were $4 \times 3 \times 2 \times 1 = 24$ choices, as shown by the table.

Trial and Error (also called Guess and Check)

When a solution isn't obvious at first, it is sometimes easier to try to zero in on an answer by guessing and checking the solution to see if it works. This is the method used, for example, when radio stations have high-low jackpots. The radio station picks a sum of money. Callers phone in and guess an amount.

The DJ will tell them if their guess is correct or is too high or too low. Each time another caller makes a guess (if they have been keeping track of the high and low values of others) they will be getting closer to the correct amount.

The instructor might want to play a game of high-low with his/her students. The instructor should pick a number between one and one hundred. Ask each student in turn for a guess until someone guesses the correct answer.

Divide and Conquer

This problem-solving method involves breaking a complex problem into smaller pieces that are simpler and then solving each smaller problem to find the solution to the bigger problem. Example: A store is having a new countertop put in the facility's restroom. The countertop is to be tiled with 2.25″ square tiles with 0.25″ of grout between squares for a total of 2.5″square per tile. The countertop is 11 ft long by 30 inches deep. There will be three sinks with rectangular cutouts evenly spaced in the countertop. Each sink measures 15″ × 20″. Between the sinks are two 10″ square cutouts for trash disposal. How many tiles should be ordered for the job allowing for 10% waste?

Guide students in solving the problem by breaking the problem down into simpler steps. Ask them to identify information they already have and then information they need. (This is an opportunity to introduce or reinforce the mathematics concept of known and unknown variables.) Ask students how they would break the problem down into simpler steps. They will probably devise steps such as calculating how many tiles it would take to tile the entire countertop, subtracting the tiles that aren't needed because of the sinks and waste receptacle openings, and maybe even adding 10% for breakage allowance. A diagram of the countertop may help them to understand the problem better.

Look for a Pattern

Sometimes a pattern emerges that helps solve a problem if you begin plotting data. The Fibonacci Sequence is a famous example of such a pattern. Fibonacci, an Italian mathematician, posed a problem that illustrated this sequence. Have students use Fibonacci's problem and see if they detect the pattern.

Problem: A farmer is given a pair of baby rabbits on the first of January, one male and one female. In one month, they become sexually mature and breed. The rabbits have a one-month gestation period, so they produce a litter at the beginning of the third month. Each time a pair of rabbits reproduces, the litter consists of one pair of rabbits, one male and the other female. If no harm comes to any of the rabbits, how many rabbits will the farmer have at the end of the year? (Note: This was Fibonacci's problem as he envisioned an ideal rabbit population, not based on actual rabbit reproduction abilities.)

Students might begin to solve the problem by plotting how many pairs of rabbits are born each month. After seven or eight months, naming and listing the rabbit pairs becomes very cumbersome. However, if the students look at the total pairs of rabbits, they should be able to discern a pattern. Each month the total number of pairs is equal to the sum of the previous two months. Students then should be able to complete the total pairs of rabbit column through the rest of the year.

Month	Total Pairs of Rabbits	Initial Pair	A's Litters	B_1's Litters	B_2's	B_3's	$C_{1.1}$'s	B_4's	$C_{1.2}$'s	$C_{2.1}$'s	etc	etc
1	1	A	0									
2	1	A	0									
3	2	A	B_1									
4	3	A	B_1, B_2									
5	5	A	$B_1, B_2 B_3$	$C_{1.1}$								
6	8	A	$B_1, B_2 B_3 B_4$	$C_{1.1} C_{1.2}$	$C_{2.1}$							
7	13	A	$B_1, B_2 B_3 B_4 B_5$	$C_{1.1} C_{1.2} C_{1.3}$	$C_{2.1} C_{2.2}$	$C_{3.1}$	$D_{1.1.1}$					
8		A	$B_1, B_2 B_3 B_4 B_5 B_6$	$C_{1.1} C_{1.2} C_{1.3} C_{1.4}$	$C_{2.1} C_{2.2} C_{2.3}$	$C_{3.1} C_{3.2}$	$D_{1.1.1} D_{1.1.2}$	$C_{4.1}$	$D_{1.2.1}$	$D_{2.1.1}$		
9												
10												
11												
12												

Note: Fibonacci's sequence can begin with any two numbers. His sequence has applications in nature, architecture, and many other areas. It is also related to the Golden Ratio. Ask students to research Fibonacci sequence and/or the Golden Ratio and share examples with the class.

Examples of this "look for a pattern" problem-solving method include both simple "what comes next?" problems and more complex calculations used to predict population numbers, the national debt, and so forth.

Work Backward

Many times we must work backward to find a solution to a problem. Here's an example of this kind of problem.

Josh, Jamie, and Ava each have some money. Josh has the most, so he gives each of his friends an amount equal to what they each had to start with. Jamie then has more than her friends, so she gives each of them an amount equal to what they each currently have. Finally, Ava ends up with the most money. She gives each of her friends an amount equal to what they currently have. Then Josh, Jamie, and Ava each have $32. How much money did each person begin with?

Students might want to create a table to show the money each person has at each step in the sharing process.

	Ava	Jamie	Josh
End	$32	$32	$32
	64	16	16
	32	56	8
Start	16	28	52

Working backward, start with Ava. She gave each of her friends an amount equal to what they currently had. They each had $32, so she must have given them each $16 for a total of $32. Since there is a total of $96 dollars in play, she would have had $64 dollars in the previous round. In the previous round, Jamie gave each of her friends an amount equal to what they currently had, or one half of the amount they now have. So she gave Josh $8 and Ava $32, leaving her with $56. Josh started the process by giving each of his friends an amount equal to what they had or half the current amount. So Ava had $16, Jamie had $28, and Josh had $52 at the beginning of the day.

Group Reflection Questions

Discuss the following with your students:

- How does knowing a variety of problem-solving strategies prepare you to be a better problem solver?
- What are some of the problems you have solved, for this course or another, where you have used one or more of the methods discussed?
- Is problem solving something you prefer to do alone or with others? Why?

Handout—Make a Plan

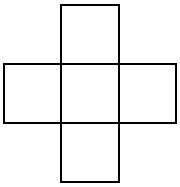
Solve the following problems. Be prepared to describe how you solved the problems.

1. Five teams compete in a bicycle relay race. Each team rides a different colored bike and wears matching colored jerseys. The top five teams were Red, Silver, Blue, Green, and Black in some order.
   - The Red team finished seven seconds before the Silver team.
   - The Black team finished six seconds after the Blue team.
   - The Green team finished eight seconds after the Blue team.
   - The Silver team finished two seconds before the Black team.

   In what order did the teams finish the relay? What strategy did you use?

2. You just installed a keyless lock on your front door. You have to choose a four-digit code on the ten-digit keypad that you will use to unlock the door.
   a. How many choices are there if you do not repeat a digit more than once?
   b. How many choices are there if you allow repeats?

3. Arrange the numbers 23, 24, 25, 26, 27 into the following diagram so that the sums of the numbers both horizontally and vertically add up to the same total.



4. What are the next three numbers in the following sequence? 1, 2, 4, 7, 11, 16, __, __, __
5. What letters come next in the following sequence? A, Z, C, X, E, V, __, __, __
6. A contractor hires five men to paint a house. At the end of the day the owner of the house pays the contractor for the work. The contractor takes $75 off the top for paint costs. He then pays each worker as follows: The first worker gets $1/6$ of the money; the second worker gets $1/5$ of the money that is left; the third worker gets $1/4$ of the money that is left; the fourth worker gets $1/3$ of the money that is left; the fifth worker gets $1/2$ of the money that is left; and the contractor keeps the remaining $45.00. How much did the homeowner pay the contractor for the job?
7. Jolene raises corn as a cash crop. On April 1, she needed some operating cash to plant her crop. She decided to sell 20,000 bushels of corn she would produce on the futures market. She received $7.10 per bushel and agreed to deliver 15,000 bushels of corn in October. She produced 30,000 bushels of corn. She received $7.70 per bushel for the 15,000 she did not sell on the futures market.
   a. What is her gross income from the corn crop?
   b. Instead of selling on the futures market, Jolene could have borrowed $106,500 at 8% simple interest with repayment due in October. (She would pay the $106,500 plus 8% of $106,500.) Would this have been a better alternative?

ACTIVITY: 7-STEP QUALITY IMPROVEMENT PROBLEM-SOLVING MODEL

Instructor Preparation

This activity features a problem-solving methodology that is used in business and industry to identify and correct issues related to quality. While the activity can be completed as a stand-alone lesson on problem solving, it could also accompany complex problems from a specific course, the college itself, or the workplace. Ideas include:

- The manufacturing faculty for the credit program wants to assign additional projects for students to complete in a supervised environment outside of class. At night the manufacturing labs are used to train workers at local companies. Students complain that they can't get enough time in the labs to complete the projects during the day when there are supervised lab times. What might be done to accommodate students who need to use the labs in the evenings? In the daytime?
- Practically all business enterprises need to improve and/or maintain customer satisfaction. How might that customer service be improved in a construction company? In a medical office? In banking? In the hospitality industry? In another career pathway?
- The class is falling behind the course syllabus schedule for reasons such as frequent student tardiness, lack of student preparation, and instructor absences. Can the class catch up? What might prevent this from happening in future semesters?
- There are traffic flow issues on and around campus at specific times of day. How can they be alleviated?
- The college wants to increase the number of students involved in service-learning projects. How might they go about it?

Instructors teaching quality management may use lab activities with problems to be solved. The following is an outline of the seven-step problem-solving model upon which the student handout is based. The instructor should walk students through the process, providing additional strategies and examples, prior to student groups using the process to solve a problem. Note that the student handout contains more detailed content and instructions.

The Seven-Step Problem-Solving Model: OVERVIEW

1. Identify and define the problem
   a. Brainstorming
   b. Impact changeability tool
   c. Problem statement stem
2. Study the current situation
   a. Force-field analysis
3. Find root cause
   a. Asking five times
   b. Fishbone diagram
4. Choose solution
   a. Brainstorming
   b. Evaluation grid
5. Develop an action plan
   a. Action plan steps
   b. GANTT chart
   c. PERT chart
6. Implement the action plan
   a. Five Ws and an H
7. Check results
   a. Force-field analysis
   b. Brainstorming
   c. Evaluation grid

Objectives

Students will:

1. Identify problems.
2. Study the current situation.
3. Determine root causes of a problem by asking "why" five times.
4. Brainstorm solutions to the problem.
5. Develop and carry out an action plan to solve the problem.
6. Check results.

Materials

- Student Handout – 7-Step Quality Improvement Problem-Solving Model (1 per student)
- Whiteboard, SmartBoard, flipchart, or other mode of creating a diagram with the whole class

Activity Guidelines

Distribute the handout and ask students to refer to it as you facilitate use of the 7-step model.

Step 1: Identify and define the problem.

Ask students to suggest problems they might face in a work environment. Brainstorm a list. Follow the directions for the impact changeability tool described in Step 1 on the student handout to identify which problem students will solve.

One way to write the problem statement is in the form of a question: "In what ways might we, the team, _____ so that _____." For example, in manufacturing the problem statement might be: "In what ways might we, the team in the production department, reduce absenteeism so that our production percentage is increased by 35 percent?"

In sales, the problem statement might relate to percentage increase in customer telephone contacts and percentage increase in subscriptions. In hospitality, it might address speed of service. In medical billing and coding, increased accuracy might be a factor.

One way of prioritizing the problems or improvement opportunities is through a tool called *impact changeability.* This helps the team prioritize problem processes based on the degree of impact some task or process has on the whole system and on how easy the change would be.

Step 2: Study the current situation.

To gather as much information as possible, ask students to create a flowchart of the process related to their problem statement. A process flow-chart, a beginning-to-end description of a task, is often useful for studying the current situation. The flowchart illustrates how things are done now.

After they have completed the process flowchart, have students answer the following questions:

- Where do the problems or errors (variances) occur?
- Where do the delays (non value-added time) occur?

- Is there obvious evidence of redundancy, rework, waste, or similar problems?
- What does the team do to obtain feedback from customers?

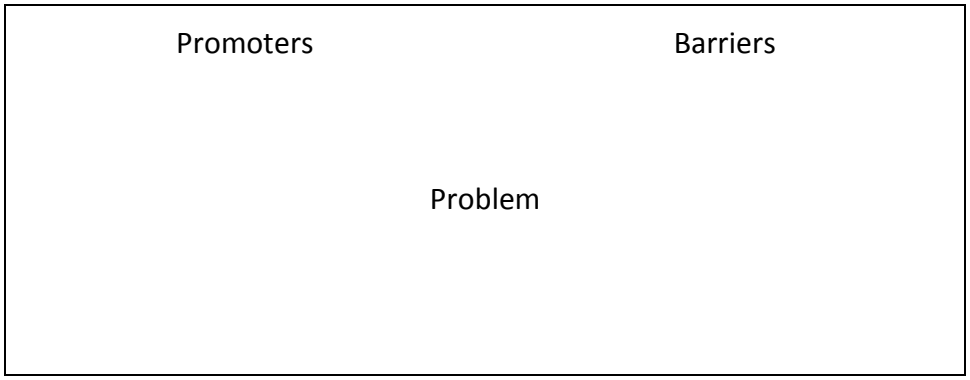
Another helpful tool for gathering information is a force-field analysis.

Force Field Analysis

Facilitate completion of the second step of the seven-step problem-solving process through the use of a tool called force field analysis. Force field analysis provides a visual way for a team to identify *barriers to* and *promoters of* a goal.

Directions

1. In the center of a piece of chart paper, write the problem to be solved, as identified and defined in Step 1. At the top of paper on the left side, write "Promoters" and on the left side write "Barriers."



2. Lead the students in thinking about possible promoters and barriers in their work environment related to the identified problem. Brainstorm a list of promoters that would support the team's goal. Then brainstorm a list of barriers that would hinder the team's goal.
3. Ask students to prioritize the ideas that would be the greatest promoters and the greatest barriers. The idea is to encourage the team to build on the promoters and minimize the barriers.

Step 3: Find root cause.

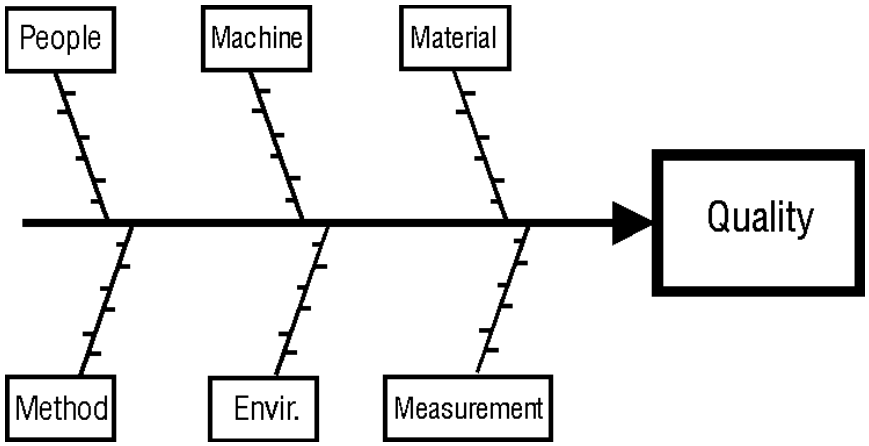
One tool for finding root cause is provided on the student handout—asking WHY five times. (See the example provided in the student handout.) After students have completed the five "whys" activity in their handout, introduce them to another helpful tool—the fishbone diagram. Draw the diagram step-by-step on a whiteboard, SmartBoard, or flip chart.

Fishbone Diagram

The third step of the seven-step problem-solving process is well facilitated with the use of a tool called a fishbone diagram. A fishbone diagram, sometimes called a cause-and-effect diagram, can help the team find the root cause of their identified problem. Explain that the name of the tool stems from its appearance.

Directions

1. Draw a box on the right side (the head of the fish) where students can see it. Write the problem statement in the box.
2. Draw a line from the box to the left side (the backbone of the fish).
3. Draw six lines on a diagonal from the straight line, three on the top and three on the bottom (the fins of the fish). Because the identified problem relates to quality control, write the broad categories of factors effecting quality on each diagonal line: People, Machines, Material, Method, Environment, and Measurement. Another way of thinking about the problem to be solved is to label the fish head *Effect* and the each of the six boxes *Cause*, which can then be broken down into their component causes for further examination. Note that fishbone diagrams can be used for many purposes including mind mapping for brainstorming or for synthesis of ideas within a larger topic.



4. Ask the students to identify all the "whys" for each category. Then ask "why" of those ideas, making subcategories of the original categories. Continue asking "why" until all causes are identified.
5. At this time, the team should note the ideas that require action for resolution of the problem.

Step 4: Choose a solution.

The student handout provides a general outline for choosing the best solution to the problem. Use the following tool.

Brainstorming and Evaluation Grid

The fourth step of the seven-step problem-solving process is well facilitated with the use of two techniques: brainstorming and an evaluation grid. Brainstorming can be done in numerous ways. We will use a method that encourages individual thinking. The evaluation grid helps to identify the best solution based on specified criteria.

Directions

1. Ask each student to write down as many alternative solutions to the problem as possible, without considering each one in too much detail. When enough time has passed, ask one student to suggest one idea. Record it on chart paper. Then ask another student to suggest a different idea. Continue in this manner until all students' ideas are on the chart paper. Allow students to pass if their ideas have already been suggested.
2. Gain consensus as to which of the top four or five ideas would most likely address the root causes. The purpose is to find ideas that, if implemented, would solve most of the root causes.
3. Next, ask the students to generate a list of criteria by which each idea will be judged. A criterion should be stated positively. For example, the solution would say the "least expensive" or "fairest to all concerned." Choose four or five criteria.
4. On chart paper, make a grid like the one below.

	Criterion	Criterion	Criterion	Criterion	Criterion	**TOTAL**
Solution 1						
Solution 2						
Solution 3						
Solution 4						
Score						

5. Start with the first criterion and rank each solution according to that criterion. Each solution should be ranked from one to five, five being the best solution according to that criterion. Continue evaluating all solutions according to each criterion. Add the rows to get a total score for each solution. The solution with the most points should be the best solution for solving the root causes. If two solutions are close in score, consider implementing both solutions.

Step 5: Develop an action plan.

Develop an action plan for putting the solution to work. Action steps should be clearly defined, volunteers requested for each step, and due dates agreed upon for completing each step.

The action plan should be:

- Specific and clear
- In a logical sequence
- Comprehensive
- Voluntary
- Shared with all of the team
- Reviewed frequently

The key steps in developing an action plan are the following:

1. Define what needs to be done.
2. Agree on when it needs to be done.
3. Agree on who will do it.
4. Develop a visual plan, a PERT or GANTT chart.
5. Review the plan periodically.

PERT and GANTT charts can be used to help develop the plan. The student handout provides examples. Use them to demonstrate how to plan the sequence and timing of tasks within the solution.

Step 6: Carry out the action plan.

The facilitation of an action plan is easily done by the use of the following tool, which builds on the PERT or GANTT chart information. With the five Ws and an H, the team decides *who* will be responsible for each step, *what* that person will do, *where* he or she will do it or get the resources necessary to do it, *when* the task should be completed, *why* it is important to complete this step, and *how* it will be completed. The following is a table for making the plans.

Five Ws and an H

Directions

1. Define the steps necessary to implement your solution.
2. Use a grid similar to that below to establish a plan. Write each step in the appropriate box across the top of the grid.
3. As a group, decide who will be responsible for each step. Describe what that person will do, where they will do it and/or where they can get resources, when the task should be completed, why it is important to complete this step, and how it will be completed.

	Step 1	Step 2	Step 3	Step 4	Step 5
Who					
What					
Where					
When					
Why					
How					

Step 7: Check the results.

Check the results of the solution's implementation by using force-field analysis. Then use brainstorming techniques to identify viable alternative solutions for overcoming any obstacles and follow-up with an evaluation grid to select the best alternatives.

Group Reflection Questions

To wrap up this lesson, you may want to discuss the following questions as a class:

- How does your personal problem-solving model compare to this model?
- How will you apply some of the principles and strategies discussed in this module?
- What will you do to focus on your customer and quality, using a systems approach?
- How does group problem solving differ from solving problems individually?

Handout—7-Step Quality Improvement Problem-Solving Model

A simple and effective problem-solving model includes the following seven steps. These seven steps should be adequate to solve most of the problems individuals or teams might face personally or on the job when addressing quality issues.

1. Identify and define the problem.

Collect existing problems or improvement opportunities, prioritize them, and select one to work on. One way of prioritizing the problems or improvement opportunities is through a tool called *impact changeability.* This helps the team prioritize problems to address based on the degree of impact the task or process has on the whole system and on how easy it would be to change that task or process.

Here's how you analyze impact and changeability. First, select a problem or process to examine.

1. Determine, by consensus, what impact the elimination of this problem/process would have.
   L—little impact
   S—some impact
   C—considerable impact

2. Determine, by consensus, how difficult it would be to change this problem/process.
   D—difficult
   M—moderate
   L—little or no effort

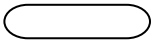
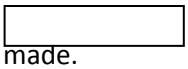
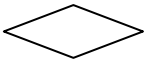
3. By consensus, agree on which problem the team is going to work on first.

The most important aspect of problem identification is to state the problem in such a way that everyone has the same understanding of it and specifically enough so that a solution can be found. It is always best, if possible, to describe the problems using data—numbers, percentages, frequencies, occurrences, and comparisons.

2. Study the current situation.

Study the problem from many points of view to gain a broad and thorough understanding of the current situation. Determine where, when, and how the problem occurs. Problem solving requires careful and systematic thinking about problems, starting with gathering as much data as possible.

A process flowchart, a beginning-to-end description of a task, broken down by sub-tasks or processes connected by arrows in a sequence, is often useful for studying the current situation.

Use this symbol  to represent the beginning and end of a task or process; this symbol  to indicate instructions or actions; and this symbol  for decisions to be made.

After creating a process flowchart, answer the following questions:

- Where do the problems or errors occur?
- Where do the delays occur?
- Is there obvious evidence of redundancy, rework, waste, or similar problems?
- What does the team do to obtain feedback from customers?

Because you will need to collect data about the current situation consider the following:

- What data is needed?
- How will we collect this data?
- Who will collect it?
- When will it be collected?

3. Find root causes.

Gather data and select the most likely root causes. A fishbone diagram (which your instructor will walk you through) is one tool for thinking about possible contributing factors. It is important that this step focus on objective causes rather than fault-finding. One way of assembling data to determine the root cause is to ask WHY five times. In the table below, the problem statement is: A puddle is found on the factory floor. The first "why" question is "Why was there water on the floor?" Answering that question generates a new one, "Why was water dripping from the ceiling?" Each answer provides ideas for a solution and the solutions, cumulatively, lead to a future actions.

For example:

A puddle is found on the factory floor.

Solution: Mop up the water

1. **Why** was there water on the floor?
   Answer: It was dripping from the ceiling
   Solution: Place a bucket under the drip.
2. **Why** was water dripping from the ceiling?
   Answer: A pane of glass was broken in the skylight.
   Solution: Replace the broken glass.
3. **Why** was the glass broken?
   Answer: A tree branch had broken the glass during a storm.
   Solution: Cut the branch away from the roof.
4. **Why** was the tree branch overhanging the roof?
   Answer: Trees had been planted too close to the sides of the building.
   Solution: Remove trees that are too close to the building.
5. **Why** were trees planted so close to the building?
   Answer: There was no policy governing their location.
   Solution: Establish standards to govern the placement of landscaping and trees.

4. Choose solutions.

Generate as many potential solutions as possible. Use consensus to select the solutions that are most likely to address the root causes. Create a grid and list the solutions. Next to each, list criteria by which the solution will be judged, for example "this is the least expensive solution" or "this is most likely to solve the problem permanently."

	Criterion	Criterion	Criterion	Criterion	Criterion	**TOTAL**
Solution 1						
Solution 2						
Solution 3						
Solution 4						
Total						

Start with the first criterion and rank each solution according to that criterion. Each solution should be ranked from one to four (total number of solutions), four being the best solution according to that criterion. Continue evaluating all solutions according to each criterion. Add the rows to get a total score for each solution. The solution with the most points should be the best solution for solving the root causes. If two solutions are close in score, consider implementing both solutions.

5. Develop an action plan.

Develop an action plan for putting the solution to work. Action steps should be clearly defined, volunteers requested for each step, and due dates agreed upon for completing each step.

The action plan should be:

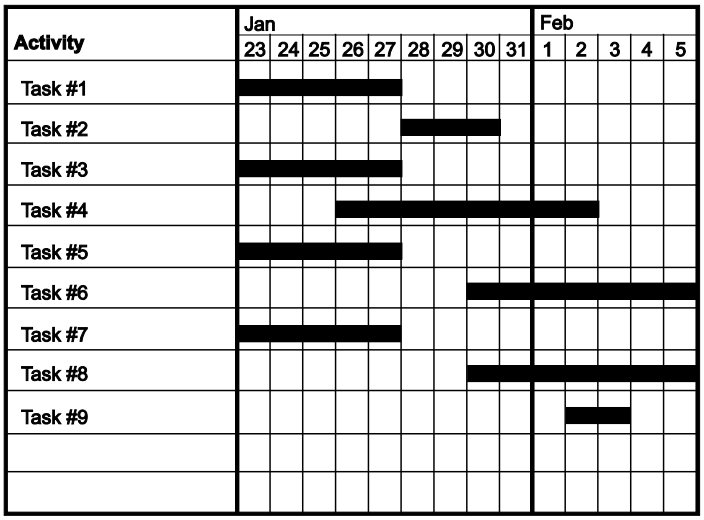
- Specific and clear
- In a logical sequence
- Comprehensive
- Voluntary
- Shared with all of the team
- Reviewed frequently

The key steps in developing an action plan are:

1. Define what needs to be done.
2. Agree on when it needs to be done.
3. Agree on who will do it.
4. Develop a visual plan—a GANTT or PERT chart.
5. Review the plan periodically.

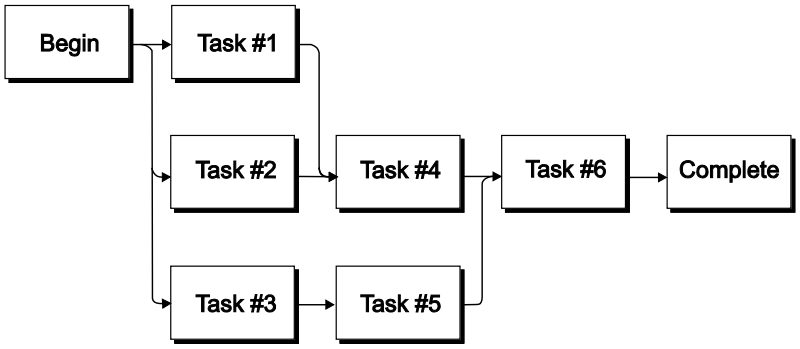
A GANTT chart illustrates the beginning and end dates of sub-tasks within a larger project.

Example GANTT Chart



A Program (or Project) Evaluation and Review (PERT) chart indicates the sequence of tasks in a project (or in solving a problem.)

Example PERT Chart



6. Carry out the action plan.

Building on the action plans created in Step 5, complete the following table as a team. Team members will then be aware of their responsibilities—what solutions they are to implement and when. Carry out the action plan with all team members contributing and involved in the process.

	Step 1	Step 2	Step 3	Step 4	Step 5
Who					
What					
Where					
When					
Why					
How					

7. Check results.

Compare the data collected before and after the action to find out whether the planned steps were accomplished and the planned results achieved.

To implement your solution you will need to

1. Accurately identify constraints or obstacles.
2. Identify viable alternative solutions for overcoming the obstacles.
3. Select and try the alternatives.
4. Support the reasoning behind the alternatives with data.

Identifying Potential Improvement Opportunities

Team problem-solving models are frequently used to make problem solving efficient; to help everyone pull together in a common direction; to help team members avoid jumping to solutions before the facts are known; and to clearly identify the problem and make recommendations for improvements.

After gathering data from your customers, you will probably have identified some potential problems—the differences between the ideal state and the existing situation. As you study process inputs and outputs, you identify opportunities to improve cycle time; eliminate quality variances; eliminate waste; or reduce time, effort, and costs.

ACTIVITY: TOOLS FOR PREVENTING PROBLEMS

Instructor Preparation

Continuous quality improvement requires identification of potential problems before they arise. Measurements are made at regular intervals and the data plotted to ensure values fall within an acceptable range. If these values are plotted over time, trends may indicate that the process is out of control or that a problem is brewing. For example, when a patient goes to the doctor and the nurse takes her blood pressure and finds that it is high, the nurse has two options. If this is the first time the patient has had a high blood pressure reading, the nurse may wait a few minutes and take it again. If it is still too high, the doctor's office may reschedule the patient to come back in a week and have it taken again. If the patient comes back and the blood pressure is lower, the high reading will probably be considered an anomaly. If after a series of visits the high readings persist, the doctor may make recommendations to try to bring the patient's blood pressure down. The doctor may also have the patient take daily readings to track blood pressure over time to get a better picture of the effectiveness of the treatments.

In manufacturing situations certain trends may indicate equipment is failing or needs calibration, or that there is something else going wrong in the system. Once a trend is determined, workers can use problem-solving methods to identify the most likely cause and fix it before it negatively affects the system's end product.

In this activity students will assume the role of a quality technician working with a team to simulate a bottle filling operation and will collect data, create control charts to identify potential problems, and determine how this data could be used to prevent problems.

The objective is to determine the ability to control the volume of product shipped in the bottles. Since water has a weight of 1 gram per ml, weight will be used to determine volume. This is important since the consumer is interested in receiving the full volume and the manufacturer is interested in controlling cost by not shipping excess volume.

Students will prepare a flowchart to show the process steps and measurement points. They will follow the flowchart and one member of the team will be assigned the job of process auditor to assure that the steps are being followed.

It is assumed that the filling station is running continuously. At half-hour intervals samples—the bottles filled by the team—are taken from the filling station for measurement. The team may use any appropriate procedure to fill the samples for measurement. The samples represent all bottles produced during the half-hour interval. One approach a team might take would be to have one member filling and two members weighing and recording. Remind students that it will also be important to recognize the variation in weight for empty bottles.

After all the data is collected, all members should work together to prepare a report including the flow chart, check sheet and histogram.

OPTIONAL EXTENSION ACTIVITY—Instructors in STEM-related or manufacturing career pathways may wish to have students prepare X-bar/R control charts using a sample size *n*=5. In this situation, each consecutive five bottles will be assumed to be the sample selected at half-hour intervals. *Note:* While the mathematics is not difficult, the number of variables (and their symbols) involved in completing control charts can appear overwhelming to some students

Objectives

Students will:

1. Perform an experiment and explore product packaging by weight.
2. Construct flowcharts, checklists, histograms (and optionally, X-bar/R charts and/or run charts).
3. Understand how control charts can be used in statistical process control to identify problems and potential problems so that they can be corrected as quickly as possible.
4. Analyze control charts to identify causes of variation and devise a method to reduce the variation.
5. Record, report, and analyze data using statistical techniques.
6. Determine if product is within acceptable limits and meets customer expectations.
7. Perform calculations to find averages, range, upper control limits (UCL), and lower control limits (LCL) using quantitative samples.
8. Identify variations within the product.

Materials

Each group will need the following:

- 100 empty 12-ounce bottles per team (*Note:* Fewer bottles can be used and then emptied and refilled, but it will slow down the filling process.) Bottles must all be the same size and shape. Any readily available size can be used.
- Self-adhesive labels (small)
- Container to transfer water from tap to bottle (Provide a variety of containers such as beakers, measuring cups, pitchers, cans, and larger bottles so forth so students can choose.)
- Funnel (optional)
- Sink deep enough to allow students to collect water in measuring cups, cans, and so forth (can be shared by multiple teams)
- Towel to wipe bottle dry before measurement
- Electronic balance capable of measuring 1 kilogram ± 0.01 gram (Two per team would speed up the activity.)
- Calculator
- Handouts 1–5

Activity Guidelines

Preparation

Students must set up the area to be like a production line. A flowchart of the process steps would help in understanding the required production line design.

- Bring empty water bottles from home, or ask students to bring empty water bottles to class.
- Instructors should introduce students to control chart calculation and usage. The level of detail can be the same as given to manufacturing equipment operators. STEM and manufacturing instructors should cover as much information as they feel is necessary for their students to understand and complete the project. Other faculty who choose to use this project should study the information provided in the *Quality Control Handout*. Provide copies of this information, check sheets, data forms, and blank charts for the students to use in class.
- Review each team's arrangement of the tables and the assembly line students need to accomplish their assignment.
- The Blank Student Forms handouts include a Check Sheet, Histogram and X-bar/R Chart.

Activity Instructions

- Open the activity by having students discuss reasons for having quality control on a production line.
- Ask students what the consequences of poor quality control on the production line might be.
- Discuss the steps of process control and, if course-appropriate, the difference in descriptive and inductive statistics.
- Discuss types of data and how to organize data.
- Discuss glossary terms.
- Discuss sources of variation.
- Hand out the example flowchart and refer to the *Quality Control Handout*. Discuss the important elements or steps. Discuss the questions that are asked in the flowchart in the handout and follow up with a discussion of the questions that relate to a bottle-filling production flowchart.
- Show examples of and explain the check sheets, charts, or graphs that you will be using.
- Explain the Student Activity Bottle Filling Project and distribute materials.
- Provide students with copies of any check sheets, charts, and blank graphs they need. The following are provided:
  - Check Sheet
  - Histogram
  - X-bar/R Chart

- Instructors may wish to hand out a sample histogram for students to review. Sample data are included for this activity in the Examples section.
- Go over the flowchart in the Quality Control Handout or give students a separate flowchart found in the Examples. Have students read the instructions on the arrangement of the tables in the Student Activity sheet. Instruct students to work in their group to create a flow-chart showing how to set up the area like a production line. Check the flowcharts to see if the students show that they have an understanding of the required line design and can accomplish the assigned task. The instructor should not make suggestions for improvement, as that is part of the student assignment. Just check to make sure they have a basic understanding

Student Instructions

1. The student will prepare a flowchart to show the process steps and measurement points. They will follow the flowchart.
2. They will assign jobs within their team such as process auditor, weight finder, data recorder, and bottle filler.
3. The process auditor will ensure that the steps are being followed.
4. Determine net weight variation from water bottle to water bottle.
5. Create histograms and X-bar/R charts.
6. Have students analyze graphs and think of a more accurate method of measuring or filling the bottles that would result in reducing the variation.
7. Have students test their ideas if time allows.
8. Discuss results and prepare a Project Report including recommendations and conclusions.

Group Reflection Questions

Make sure to point out to students that where this activity ends is where the actual problem solving begins. Once a problem or potential problem is identified, students have data and are ready to begin brainstorming possible causes of the problem.

Ask students to discuss the following:

- How did your team initially determine how much water to put in the bottles?
- Did the bottle-filler change his/her method of filling the bottle during the activity trying to improve speed, accuracy, or precision? What changes were made?
- What was the percentage of bottles that fell outside the upper control limit and the lower control limit? *Hint:* If students filled 100 bottles, each bottle would represent one percent of the total. Would that be acceptable in an actual bottling operation?
- What are other applications for this method of detecting problems?
- What is the benefit of early detection of problems?

Handout 1—Preventing Problems Activity Instructions

Background:

Quality Control uses tools such as charts and graphs to identify problems and suggest ways to continuously improve. These tools help determine if variations in measurements of a product are caused by small, normal variations that cannot be acted upon or by a larger issue that can be fixed. The type of chart used is based on the nature of the data.

Today you will be using flowcharts, histograms, and if directed, X-bar/R charts.

Scenario:

You are a quality technician working with a team at a bottle filling station in a production line of a product shipped to a consumer. For this test, the product bottled will be ordinary tap water. The objective is to determine the ability to control the volume of product shipped in the bottles. Since water has a weight of 1 gram per ml, weight will be used to determine volume. This is important because the consumer is interested in receiving the full volume and the manufacturer is interested in controlling costs by not shipping excess volume.

It is assumed that the filling station is running continuously. At half-hour intervals samples (bottles filled by the team) are taken from the filling station for measurement. The samples represent all bottles produced during the half-hour interval. The team may use any appropriate procedure to fill the samples for measurement. One possible approach would be to divide the team with one member filling and two members weighing and recording the weight of both the empty and the filled bottles.

Your team will prepare a flowchart to show the process steps and measurement points. Then you will follow the process outlined by the flowchart, with one team member acting as the process auditor to ensure t the steps are being followed.

After all the data is collected all members should work together to prepare the report. Histograms (and optional X-bar/R control charts) will be prepared using a sample size n=5. In this situation, each consecutive five bottles represent the sample selected at half-hour intervals.

Steps:

1. Read the scenario above. The instructor will assign teams of four to six students to complete the project.

2. Consider the steps that need to occur to accomplish the assignment. Bottles must be labeled and filled. The tare, gross, and net weights should be found and recorded. Data collection must be well organized.

3. You will work to create a flowchart showing how to set up the area to be like a production line. Steps of your procedure would be included within the flowchart.

4. The instructor will check the flowcharts to see if you can show that you have an understanding of the required line design, but will not make suggestions on how to improve it. Create and set up the production line.

5. Arrange table or tables, assign jobs, such as process auditor, bottle filler, weight finder, and recorder, and gather equipment.

6. Decide how far you will fill the bottles. There is no set fill line, just make sure you agree as a group. The object is to get the same amount of water in each bottle. Go to the tap water supply area, choose one of the containers to use and a funnel if necessary, and fill the empty bottles.

7. The student assigned as process auditor should make some notes about how they made sure the steps were being followed.

8. All students record the tare, gross, and subtract to get net weights on their own check sheets.

9. Use the check sheets to create a frequency distribution table and histogram. Your instructor will explain how to do this or provide you with a handout that explains how to do it.

Extension Activity (optional)

10. Use the data to prepare an X-bar and R control chart using n = 5 (five samples). In this situation, each consecutive five bottles will be assumed to be the sample selected at half-hour intervals. Every five numbers will be sample measurements recorded in the same column. The next five numbers are recorded in column 2, and so on. Follow the directions given to you by your instructor to make the X-bar and R chart.

11. Look at the chart and note the control chart limits. Are any points outside the limits? Is the spread from UCL to LCL wide? Can you think of a way to measure the water more accurately? What process change do you think would result in less variation? Can you describe these changes on a new flowchart? If a potential process change would reduce the variation, repeat the project using the revised procedure.

12. Discuss the results and prepare a report.

13. At the end of the testing, the bottles should be emptied and returned. Any excess water spilled on the floor should be wiped up. The table and floor should be wiped clean.

14. Turn in flowchart, check sheet, histogram, X-bar/R chart, and report.

Handout 2—Glossary for Quality Control

attribute data – Data that is not a measured value. It is classified as either conforming or not conforming, or the number of defects.

average – The arithmetic mean. Pertaining to a set of numbers $x_1, x_2, \ldots, x_n$, the average or arithmetic mean is usually denoted by the symbol $\bar{x}$, is the sum $x_1 + x_2 + \ldots + x_n$ divided by n.

boundaries – The upper and lower control limits that are calculated mathematically and entered on a control chart. They are used as criteria for signaling the need for action. Boundaries are set by calculating the mean, standard deviation, and range of a set of process data collected when the process is under stable operation. Then, subsequent data can be compared to this already calculated mean, standard deviation and range to determine whether the new data fall within acceptable bounds. For good process control, subsequent data collected should fall within three standard deviations of the mean.

cause-and-effect diagram – Also referred to as a fishbone problem-solving diagram. This is a simple tool for individual or group problem solving that uses a graphic description of the various elements of a process to differentiate between the root cause of the problem and symptoms of the problem.

check sheet (or tally sheet) – A simple document that is used for collecting data in real-time and at the location where the data is generated.

control chart – A graphic comparison of a measured characteristic against computed control limits. It plots variation over time. A statistical process control graph that charts data and provides a picture of how a process is performing over time.

flowchart – A schematic representation or picture of a process which includes process steps, material movement, and decision points

frequency distribution table/worksheet – A table showing the number of times a measurement is observed.

gross – The entire body or amount exclusive of deductions

histogram – A special bar graph that shows how much a certain product or product characteristic varies when we measure samples

interval – The amount of time between two specified instants, events, or states.

Lower Control Limit (LCL) – the lowest horizontal line on a control chart. Measurements that fall below that line indicate a process that is out of control. It occurs at 3 standard deviations below the average or mean value.

mean – The average, represented by the X bar

midpoint – The point halfway between the highest and lowest value in a range of numbers.

mode – The most frequent value

net weight – The weight of the contents not including any packaging, etc.

Pareto chart – A simple tool for problem solving that involves ranking all potential problem areas according to their cost. Typically, a few causes account for most of the cost, so problem-solving efforts should concentrate on these areas first.

Quality Control **(QC)** – Processes that ensure goods or services satisfy and/or exceed customers' needs and expectations.

R bar – The average of the range values for groups of data, represented as $\overline{R}$

range – The difference between maximum and minimum values

run chart – A run chart is also known as a run-sequence plot. It is a graph that displays observed data in a time sequence.

scatter diagram – The scatter diagram is one of the tools of quality. A scatter diagram is a graphical technique used to analyze the relationship between two variables.

Statistical Process Control (SPC) – The use of statistical techniques such as control charts to analyze a process or its outputs in order to take appropriate actions to achieve and maintain a state of statistical control and improved process and product.

standard deviation – A measure of the dispersion of a set of data from its mean. The greater the data spread, the higher the deviation. Standard deviation is calculated as the square root of variance. Standard deviation is represented by sigma, σ.

tare – Measure used in science, distribution, and packaging. It is the mass of the substance without any packaging or containers. Many balances include a tare button that allows you to place the container for a substance on the balance and then press the tare button which will zero the scale. When you add the substance or materials, the weight displayed is that only of the substance added after you pressed the tare button.

Total Quality Control – Application of quality management principles to all areas of business from design to delivery instead of confining them only to production activities.

Upper Control Limit (UCL) – The highest horizontal line on a control chart. Measurements that fall above that line indicate a process that is out of control. It occurs at 3 standard deviations above the average or mean value.

variable data – Data which has a measured value. Examples of variable data are the length, width and caliper of a corrugated metal sheet.

variance – The statistical value for range

X-bar – The average of the values of X, represented by $\overline{X}$

X-bar/MR Control Chart (Individual and Moving Range Charts) – Chart used when the subgroup size is one. X-bar / Moving Range charts are generally used when:

1. The cost of the product or cost of testing is very expensive.
2. The sample is from a chemical process such as the liquid in a vat.
3. The process has demonstrated a low variance and warrants reduced testing and the associated cost savings.
4. The 3 sigma limits are process capability limits so the process is generally monitored to 2 sigma limits.

X-bar/R Chart (Averages and Range) – A continuous plot of subgroup averages. The most commonly used control chart pair is the X-bar and R chart. X-bar is the average of the values in small subgroups—a measure of location; R is the range of values within each subgroup (highest minus lowest)—a measure of spread.

DEFINITIONS OF SYMBOLS USED

n = the number of samples in a subgroup

X = the measured value

$\overline{X}$ = Average of the values of X

$\overline{\overline{X}}$ = X double bar the average of X bar

k = number of sub groups

R = Range: the difference from the maximum sample to the minimum sample in the subgroup.

$\overline{R}$ = Average of range.

UCL = Upper control limit

LCL = Lower control limit

Sigma σ = Standard deviation

Handout 3—Blank Student Forms

Check Sheet

CHECK SHEET SPC APPLICATION

LOCATION _____ LINE _____

Characteristic measured _____ UNITS _____

SPL NO	TARE	GROSS	NET	SPL NO	TARE	GROSS	NET	SPL NO	TARE	GROSS	NET	SPL NO	TARE	GROSS	NET
1				26				51				76			
2				27				52				77			
3				28				53				78			
4				29				54				79			
5				30				55				80			
6				31				56				81			
7				32				57				82			
8				33				58				83			
9				34				59				84			
10				35				60				85			
11				36				61				86			
12				37				62				87			
13				38				63				88			
14				39				64				89			
15				40				65				90			
16				41				66				91			
17				42				67				92			
18				43				68				93			
19				44				69				94			
20				45				70				95			
21				46				71				96			
22				47				72				97			
23				48				73				98			
24				49				74				99			
25				50				75				100			

Technician _____ DATE _____

Histogram

HISTOGRAM

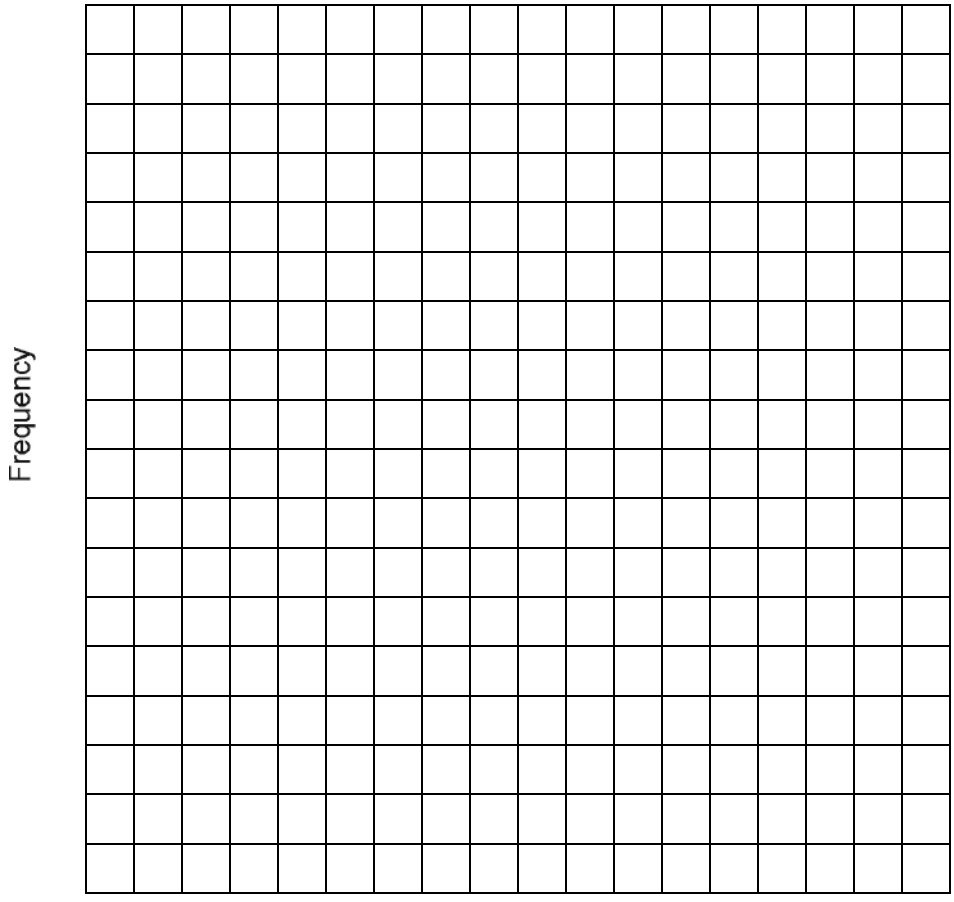
FREQUENCY DISTRIBUTION WORKSHEET

TECHNICIAN _____

TITLE _____ **DATE** _____

MIDPOINT	INTERVAL	BOUNDARIES	TALLY	FREQUENCY

TITLE

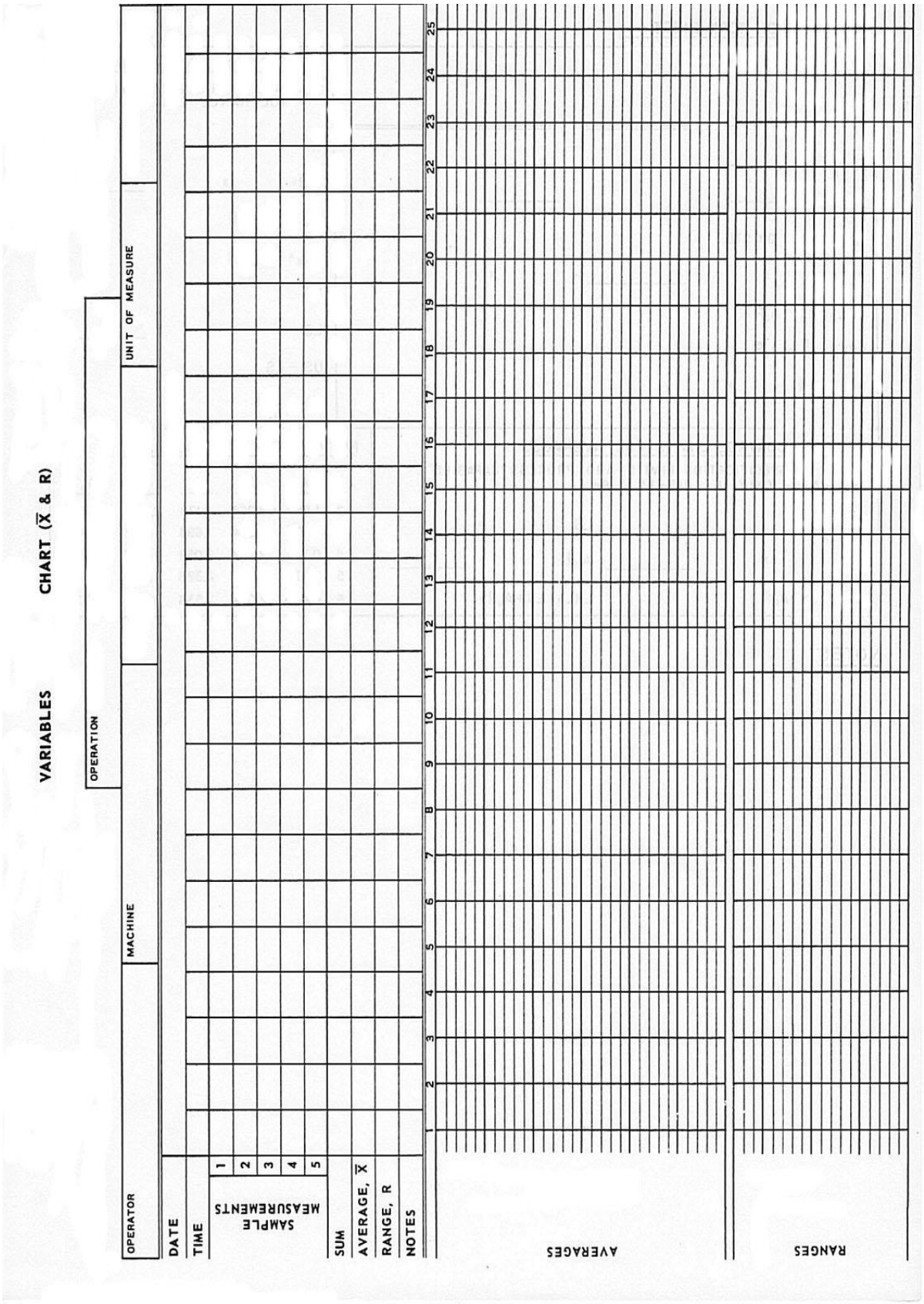


Frequency

WHO

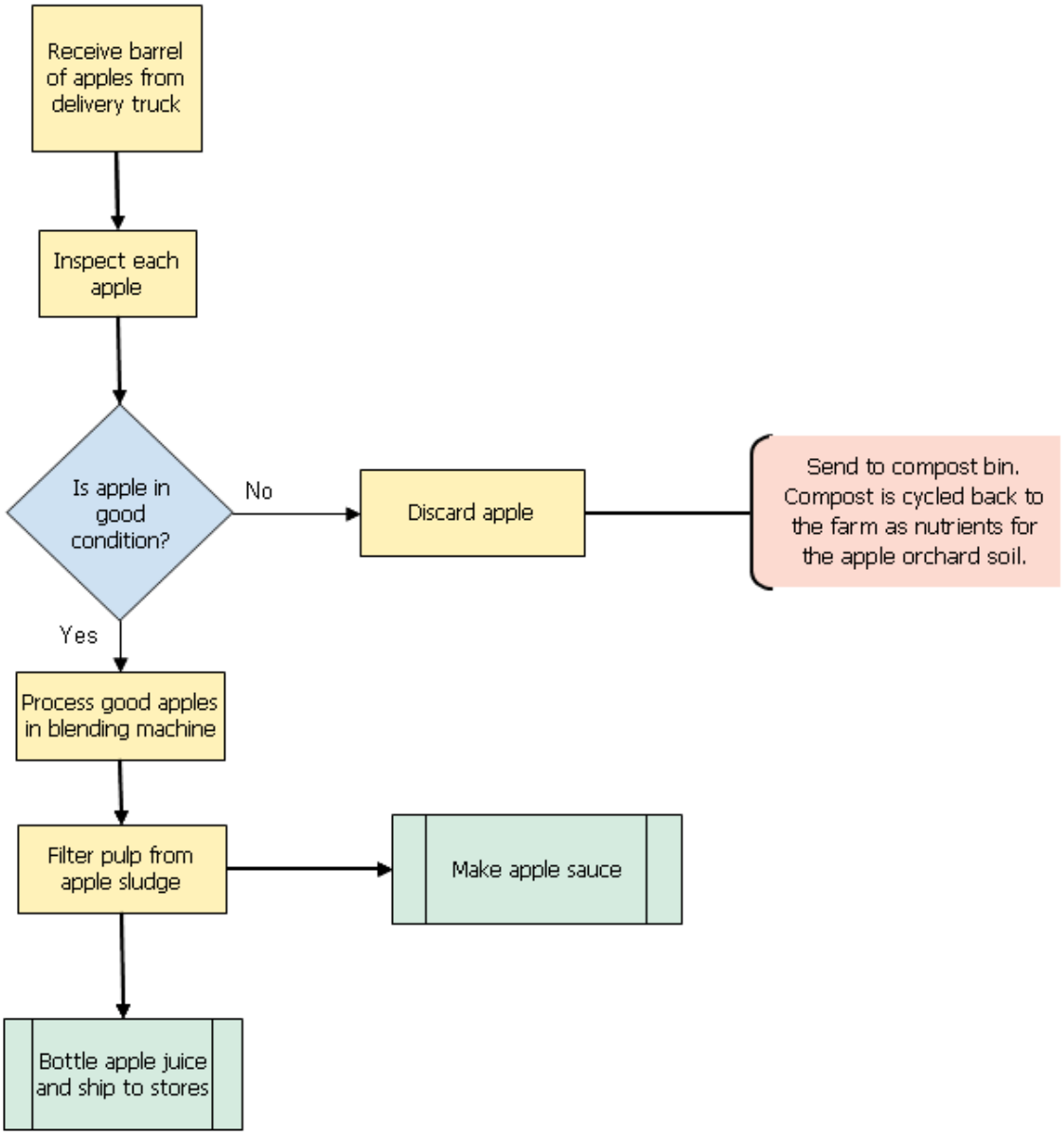
Values

X-bar/R Chart


VARIABLES CHART (X̄ & R)
OPERATION
OPERATOR
MACHINE
UNIT OF MEASURE
DATE
TIME
SAMPLE MEASUREMENTS
1
2
3
4
5
SUM
AVERAGE, X̄
RANGE, R
NOTES
AVERAGES
RANGES

Handout 4—Examples of Completed Forms

Sample Flowchart



The following website explains symbols used in flowcharts and how flowcharts are used in the workplace.
http://www.patton-patton.com/basic_flow_chart_symbols.htm

Sample Flowchart from Microsoft Corporation Excel Templates.

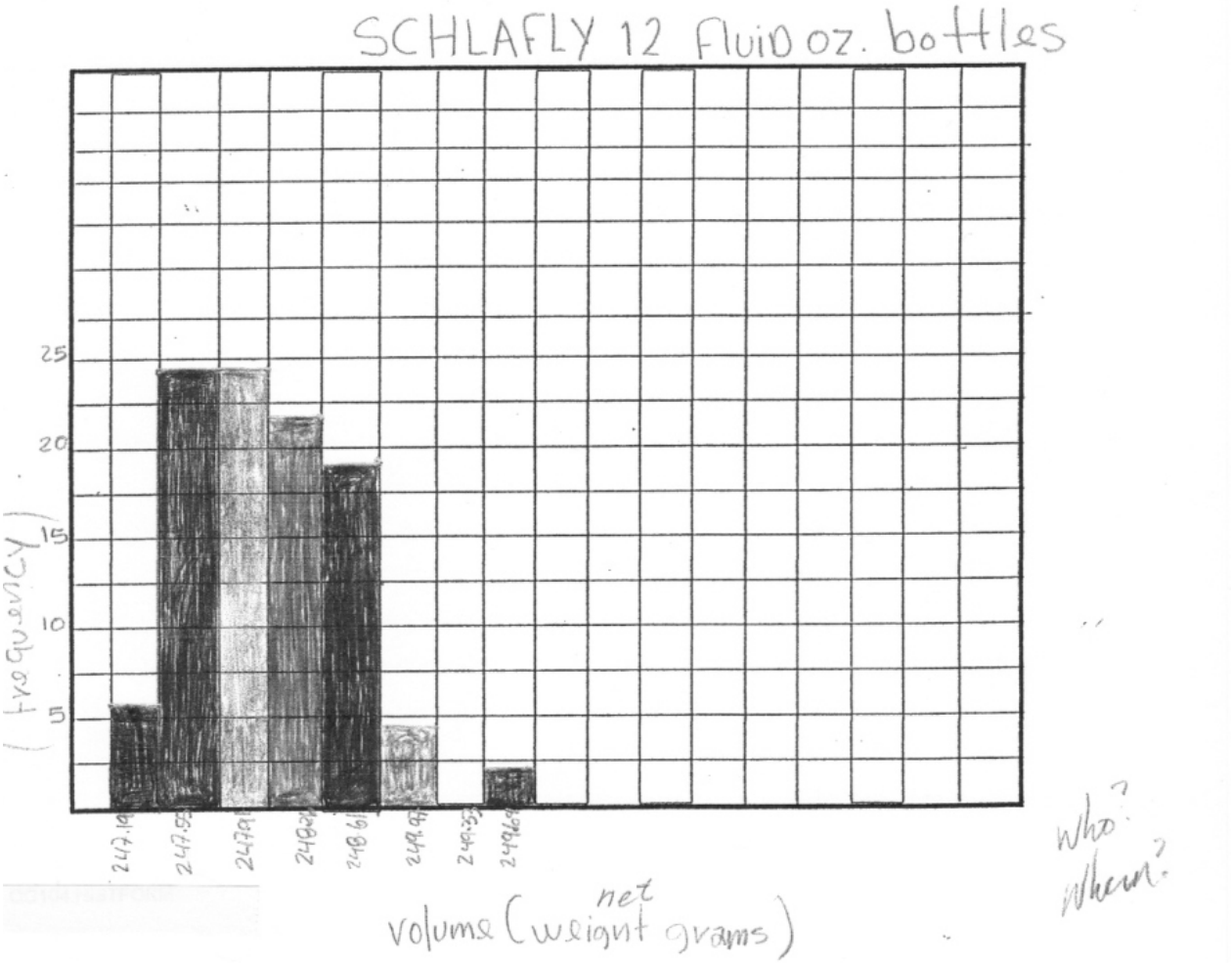
Sample Histogram

HISTOGRAM
FREQUENCY DISTRIBUTION WORK SHEET

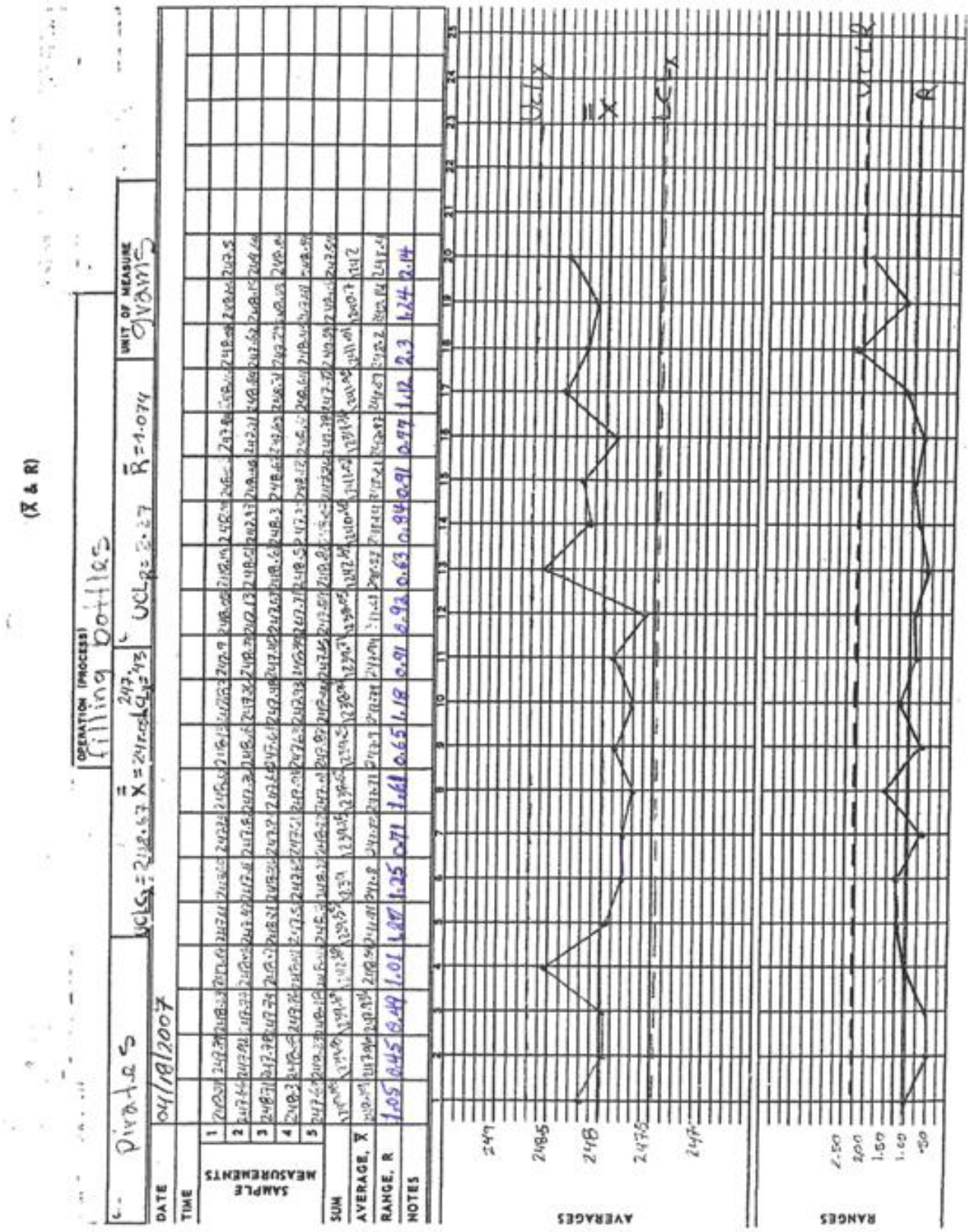
TITLE schlafly 12 fluid oz. glass bottles

By the pirates
Date 4/18/2007

Midpoint	Interval	Boundries	Tally	Tally check	Frequency
247.19	247.01-247.30	247.005 - 247.355	IIII-I		6
247.55	247.37-247.73	247.355- 247.705	IIII-IIII-IIII-IIII-IIII		24
247.91	247.73-248.09	247.705- 248.055	IIII-IIII-IIII-IIII-IIII		24
248.26	248.08-248.44	248.055-248.405	IIII-IIII-IIII-IIII-II		22
248.61	248.43-248.79	248.405-248.755	IIII-IIII-IIII-III		18
248.97	248.79-249.14	248.755-249.105	IIII		4
249.33	249.15-249.50	249.105-249.455			
249.69	249.51-249.86	249.455-249.805	II		2
					100



Sample X-Bar/R Chart



Handout 5—Quality Control

Statistical Process Control

Statistical quality control is the use of statistical methods for control of a product. Statistical process control (SPC) is the use of statistical methods for quality control of a process rather than a product. With this definition, it is clear that SPC applies to service or office jobs as well as manufacturing jobs.

The age-old way of concentrating quality control effort on inspection of finished items has been replaced with the more affordable, efficient, and effective SPC. SPC involves defining a number of processes throughout the manufacturing operation. Each process is treated as the producer of a finished product and the next step or process is treated as a customer. This approach is a prevention system because each internal customer identifies acceptable product for that process. Each step neither accepts a bad product nor passes a bad product on to the next customer/operation. This is designed to provide full customer satisfaction at each stage.

Once the process is defined, it is tested to determine its capability. Once the capability is determined, it can be compared with customer requirements. If the process is not capable or borderline, changes need to be made to bring it into a capable process. This is sometimes a very hard job, but at least we know what to expect from the process as defined.

Traditional Quality Control (QC) efforts centered on *detection* of poor quality on finished product have now been replaced by *prevention* of poor quality through a defined process. Continual improvement of the process results in better quality product, lower cost, and increased job security, leading to the survival of the business.

Total Quality Control is a discipline that uses a number of quantitative methods and tools to identify problems and suggest avenues for continuous improvement in fields such as manufacturing. Statistics is a science that deals with the collection, tabulation, analysis, interpretation, and presentation of quantitative data. There are two basic types of statistics; descriptive and inductive. Descriptive statistics is used to describe and analyze a subject or group. Inductive statistics is used to determine from a limited amount of data (sample) an important conclusion about a much larger amount of data (population). A complete body of data to be analyzed is called the population. In most cases we must be satisfied with taking a sample of the population.

Types of Sample Data

Sample data may be either attribute data or variable data.

Attribute data is not a measured value. It is classified as either conforming or not conforming. A common term is “go/no-go” when fixed gauges are used for measurement. An example of attribute data is the number of paper sheets rejected at the feeder of a printer. Attribute data can be classified by type of nonconformity as well as number of nonconforming. An example is the number of boxes rejected for poor or misaligned printing.

Variable data is data which has a measured value. Examples of variable data are the length, width, and caliper (thickness) of a corrugated sheet. For each of these there is a numerical value in inches or millimeters when measured. The data can be represented graphically as a distribution with the horizontal axis representing the variable and the vertical axis the number of occurrences.

How to Look at Data

A picture is worth a thousand words. Having a good picture of the data improves our ability to understand the information and thereby make better decisions.

Ungrouped data is not as valuable as grouped data.

For example:

UNGROUPED

Septi-Soft Concentration (grams):

141, 141, 143, 139, 141, 142, 140, 143
144, 140, 142, 142, 143, 144, 142, 142

GROUPED

Septi-Soft Concentration (grams):

Grams	Frequency
139	1
140	11
141	111
142	11111
143	111
144	11
145	
146	

The grouped data is the same data as the ungrouped data but has been arranged with the Septi-Soft Concentrate bottle weight in a vertical table and a frequency tally for each value. The arrangement in this frequency distribution gives a better picture of the data.

With a frequency distribution, we can look at the distribution characteristics of Central Tendency and Dispersion or Variability. These describe **location, spread and shape.**

Central Tendency

- Mean – average, X bar
- Mode – most frequent value
- Median – center value
- Average – For symmetrical distributions the average (or mean) provides a good description of the central tendency (or location) of the process. For very skewed distributions, the median is a much better indicator of location (or central tendency).

Dispersion or Variability

- Range – difference between maximum and minimum values
- Variance – statistical value for range
- Standard deviation – square root of variance. Denoted with the Greek symbol Sigma, (σ) the standard deviation provides an estimate of variation. In mathematical terms, it is the *second moment about the mean*. In simpler terms, you might say it is how far the observations vary from the mean.

Variation is a killer. Just because one item was okay or conformed to specification, we cannot assume that all product pieces will conform. The reason is that something is changing, and this change or variation is where we must focus our attention. The underlying cause for the difference in quality or reliability is variation.

There are two sources of variation:

Natural –inherent or common, i.e., it is process generated. This is the variation when the process is operating according to plan.

Unnatural –assignable or special, i.e., something slipped, there was not a change in the plan. In other words, unnatural variation is the variation that occurs when operation is not according to plan.

Both natural and unnatural variation can result from persons, machines, materials, methods, environments, and information.

Over many years, total quality practitioners gradually realized that a large number of quality related problems can be solved with seven basic quantitative tools, which then became known as the traditional "Seven Tools of Quality."

Seven Tools of Quality

Cause-and-effect diagram

Pareto chart

Check sheet

Control chart

Flowchart

Histogram

Scatter diagram

Creating Statistical Charts and Graphs

A chart or graph is a type of information graphic that represents tabular numeric data and/or functions. Charts are often used to make it easier to understand large quantities of data and the relationship between different parts of the data. They can usually be read more quickly than the raw data they represent. Used in a wide variety of fields, they can be created by hand on graph paper or by using a computer program. Certain types of charts are more useful for presenting a given data set than others. A histogram typically shows the quantity of points that fall within various numeric ranges. A bar graph uses bars to show frequencies or values for different categories. A **flowchart** is a schematic representation of a process. In statistical process control, the **control chart** is a tool used to determine whether a manufacturing or business process is in a state of statistical control or not. If the chart indicates that the process is currently under control then it can be used with confidence to predict the future performance of the process. If the chart indicates that the process being monitored is not in control, the pattern it reveals can help determine the source of variation to be eliminated and bring the process back into control. The X-bar/R chart is normally used for numerical data that is captured in subgroups in some logical manner. For example, three production parts measured every hour. A special cause such as a broken tool will then show up as an abnormal pattern of points on the chart.

A. Making a Flowchart

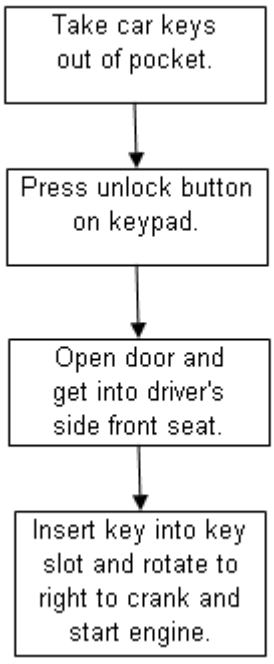
Before you try to solve a problem, you must define it. Before you try to control a process, you must understand it by determining the important elements or steps.

Flowcharts are helpful in bringing process control to both manufacturing and administrative processes. The easiest way to understand a process is to draw a picture of it— a flowchart. Flow charts show process steps, material movement, and decision points.

Questions to ask yourself when creating a flowchart include:

- What is the first thing that happens?
- What is the next thing that happens?
- Where does the material/service come from?
- What happens if it is good?
- What happens if it is not good?
- What else must be done at this point?
- Where does the product/service go?
- What tests are performed?

If you are going to drive a car you might make a flowchart with these steps.



When making a flowchart for a project, identify all the steps. Think of the above questions. You cannot include too much detail.

B. Using a Check Sheet

The **check sheet** is a simple document that is used for collecting data in real time and at the location where the data is generated. The document is typically a blank form that is designed for quickly recording information, which can be either quantitative or qualitative. When the information is quantitative, the check sheet is sometimes called a tally sheet. A defining characteristic of a check sheet is that data is recorded by making marks ("checks") on it. Quality improvement is an information-intensive activity. We need clear, useful information about problems, including who, what, when, where.

Example of a Check Sheet

Paint Job Quality Control Check Sheet

Job: 629555 101 Bear Place Date 4/14/08
Inspector: Al Johnson

Problem	Frequency
Chip	𝍸 𝍸 |||
Bubble	|||
Run	𝍸 |
Scrape or scratch	
Inadequate coverage	𝍸 𝍸 𝍸 ||
Other	

What can you determine about the quality of paint job #629555 from this check sheet?

C. Making a Run Chart

A run chart is also known as a run-sequence plot. It is a graph that displays observed data in a time sequence.

The data usually represents the performance of a business or manufacturing process. Examples could include measurements of the liquid level of bottles filled in a bottling plant, the water temperature of a dishwasher each time it is run, or the color distribution in packages of M&M's.

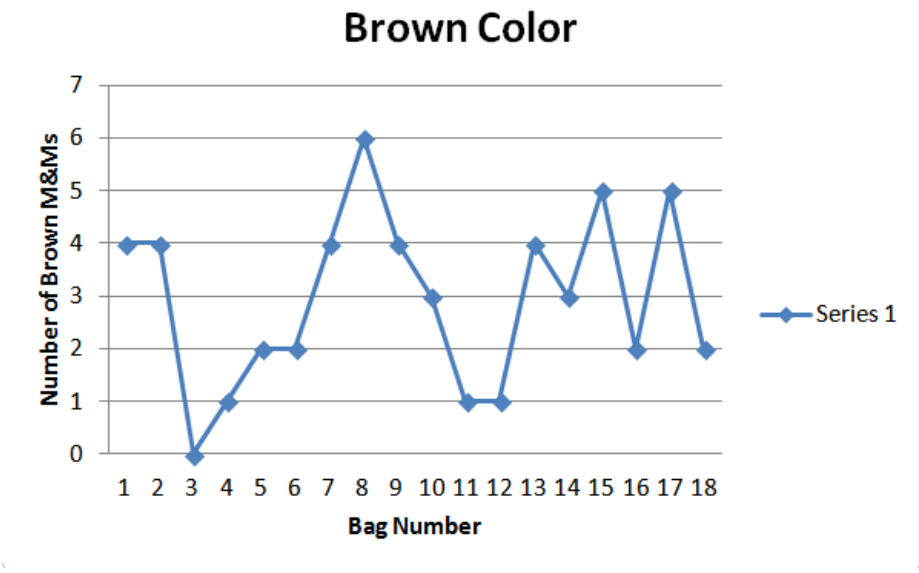
Time is generally represented on the horizontal (x) axis and the observed property on the vertical (y) axis.

Often, some measure of mean or median of the data is indicated by a horizontal reference line on the graph.

Run charts are analyzed to find anomalies in data. Long runs of data points above or below the mean or median line, or a long series of increases or decreases indicate factors that may be influencing variability. Run charts are simple to produce but only allow simple analysis.

Example of a Run Chart:

Shows the number of brown M&M's in 18 Fun Size bags.



Run charts can be done easily by recording the data in a spreadsheet in Microsoft Excel and using the program to prepare the graphs, as in the example above.

D. Histograms

What Is a Histogram?

A histogram is a special bar graph that shows how much a certain product or product characteristic *varies* when we measure samples.

- Products from the same production line will almost always vary slightly.
- Because of this variation, there will be a distribution of data points.
- A histogram is a graph made up of a series of bars that show this distribution.

Histograms display one characteristic at a time but represent many samples. A histogram should show:

- The highest and lowest values (the range).
- The average value (the mean, where the process is centered).
- The value which occurred most of the time (the mode)
- A comparison with the desired specifications.

Making a Histogram

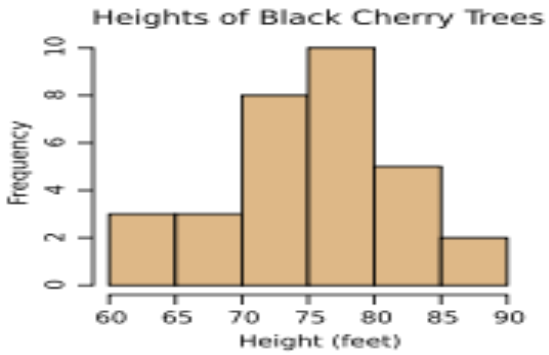
STEPS:

1. Make the table and collect the data.
   - Collect at least 50 data points.
   - Use a check sheet to record the data.
2. Find the largest and smallest values in the data table.
   - Circle the highest and the lowest and calculate the range. RANGE = Largest minus smallest
3. Determine how many columns or bars the histogram should have.
   - Pick the number of columns needed to get a good representation on the graph.
   - Use a minimum of five columns.
4. Make all the columns the same width.
5. Set the column boundaries.
   - Start from the lowest value.
6. Construct the Frequency Distribution Table.
   - Go through the data table and count how many times there was a value that fit into each column's boundaries.
7. Make the Histogram
   A. Draw the vertical and horizontal axis.
   B. On the horizontal axis use equally spaced marks to show each column's boundaries.
   C. For the vertical axis, look at the frequency distribution table and find the largest number of tally marks in a single column and make the vertical axis at least that high.
   D. Draw the bars. Make the height of each bar equal to the frequency for that interval.
8. Add a Legend
   - Who, What, Where, Date

Example Frequency Worksheet and Histogram

	Frequency	**Distribution**	**Worksheet**	
			Technician:	**Ed Jones**
Title: Heights of Black Cherry Trees			**Date: 04/08**	
Midpoint	**Interval**	**Boundaries**	**Tally**	**Frequency**
62.5	**60-64**	**59.45-64.45**	111	**3**
67.5	**65-69**	**64.45-69.45**	111	**3**
72.5	**70-74**	**69.45-74.45**	~~1111~~ 111	**8**
77.5	**75-79**	**74.45-79.45**	~~1111~~ ~~1111~~	**10**
82.5	**80-84**	**79.45-84.45**	~~1111~~	**5**
87.5	**85-89**	**84.45-89.45**	11	**2**

Histogram



E. Control Charts (Optional activities)

The goal of a process control system is to make economically sound decisions about actions affecting the process. The control chart is a vital part of any process control system. It is a graphic comparison of a measured characteristic against computed control limits. It plots variation over time. The primary use is to detect assignable causes of variation in a process. The purpose of any control chart is to help determine if variations in measurements are caused by small, normal variations that cannot be acted upon ("common causes") or by some larger "special cause" that can be acted upon or fixed. Control charts distinguish between common causes and special causes of variation through the use of control limits calculated from the laws of probability.

Two kinds of control charts—measurable vs. countable:

Variable — Contains data measured along a scale

Attribute — Contains data that is counted, such as the number of defects

Variable charts show process data in terms of both its range (piece-to-piece variability) and its location (process average). Control charts for variables are almost always prepared and analyzed in pairs—one chart for location and another for spread.

X-bar/R Control Chart (Averages and Range)

The most commonly used control chart pair is the X-bar and R chart. X-bar is the average of the values in small subgroups—a measure of location; R is the range of values within each subgroup (highest minus lowest)—a measure of spread. If rational subgroups— subgroups selected to makes each homogeneous as possible—can be formed, the X-bar charts are generally preferred, since the control limits are easily calculated using values from the table of control chart constants.

- X-bar and R charts are the most commonly used control charts and the most powerful.
- X-bar is a continuous plot of subgroup averages.
- R is a continuous plot of subgroup ranges.

X-bar/MR Control Chart (Individual and Moving Range Charts)

Used when the subgroup size is one.

X-bar / Moving Range charts are generally used when:

1. The cost of the product or cost of testing is very expensive.
2. The sample is from a chemical process such as liquid in a vat.
3. The process has demonstrated a low variance and warrants reduced testing and the associated cost savings.
4. The 3 sigma (σ) limits are process capability limits so the process is generally monitored to 2 sigma limits.

Making an X-bar/R Chart

X-bar

First, perform the calculations for the X-bar or top part of the graph.

STEPS:

1. Collect the data. (Using at least 100 samples is best.)
2. Divide the data into subgroups of four or five data points each. The number of samples is represented by the letter *n* and the number of subgroups is represented by the letter *k*.
3. Record the data on the data sheet.
4. Find the sum or total of each subgroup.
5. Using the following formula, find the mean value or X-bar $\left(\overline{X}\right)$ for each subgroup. Find the sum of each subgroup and divide by the number of sample measurements.

$$\text{(X-bar) } \overline{X} = \frac{x_1+x_2+x_3+....+x_n}{n}$$

6. Find the overall mean, or X double bar $\left(\overline{\overline{X}}\right)$. Total the mean values of X-bar for each subgroup and divide by the number of subgroups (k).

$$\text{(X double bar) } \overline{\overline{X}} = \frac{\overline{X_1} + \overline{X_2} + \overline{X_3} + ... \overline{X_n}}{\text{k (\# of subgroups)}}$$

R bar

Now, perform the calculations for R bar, or the bottom part of the graph.

Using the following formula, find the range, R, for each subgroup.

7. Range = (largest value) – (smallest value)
8. Record the range for each subgroup.
9. Compute the average value of the range, R. Add R for all the groups and divide by the number of subgroups, k.

$$\overline{R} = \frac{R_1 + R_2 + R_3 + ...R_k}{k}$$

Compute the Control Limit Lines

Use the following formulas for X-bar and R Control Charts. The coefficients for calculating the control lines are A_2, D_4, and D_3, shown below in the Control Chart Constants.

CONTROL CHART CONSTANTS

NUMBER IN SUBGROUP	A_2	d_2	D_3	D_4
2	1.88	1.113	0	3.287
3	1.023	1.693	0	2.575
4	0.729	2.059	0	2.282
5	0.577	2.326	0	2.115
6	0.483	2.534	0	2.004
7	0.419	2.704	0.076	1.924
8	0.373	2.847	0.135	1.864
9	0.337	2.97	0.184	1.816
10	0.308	3.078	0.223	1.777

10. Find Upper Control Limit (UCL) for X-bar

$$UCL_{\bar{X}} = \overline{\overline{X}} + \left(A_2 \times \overline{R}\right)$$

11. Find Lower Control Limit (LCL) for X-bar

$$LCL_{\bar{X}} = \overline{\overline{X}} - \left(A_2 \times \overline{R}\right)$$

12. Plot the Upper Control Limit (UCL) and the Lower Control Limit (LCL) on the X-bar part of the Chart.

13. Find UCL

$$UCL_R = D_4 \times \overline{R}$$

14. Find LCL

$$LCL_R = D_3 \times \overline{R}$$

15. Plot the Upper Control Limit (UCL) and the Lower Control Limit (LCL) on the R bar part of the chart.

16. Find the largest and smallest numbers that you will be plotting. Place numerical values on the lines on the Averages and Ranges part of the chart. Place numbers equidistant apart. Line values do not have to be the same for Averages and Ranges.

17. Draw X double bar ($\overline{\overline{X}}$) on the chart. This is your Central Line (CL).

18. Notice in the charts on example one and example two , the Central Line is already shown in bold black.

19. The chart you are given to fill out may already have the Central Line shown in bold black. If so, then just label the Central Line with its appropriate numerical value.

20. It is recommended that you that you use a blue or black line for the CL and a red line for the UCL and LCL. The central line is a solid line. The UCL and LCL are drawn as broken lines.
21. Draw $\overline{R}$ line on the chart.
22. 22. Plot the Upper Control Limit (UCL) and the Lower Control Limit (LCL) on the R part of the chart.
23. Construct the control chart using the handout Control Chart for Averages and Range.
24. Make sure the control lines are drawn and labeled correctly with their appropriate numerical values. Use a blue or black line for the CL and a red line for the UCL and LCL. The central line is a solid line. Plot the X-bar and R values as solid lines. The UCL and LCL are drawn as broken lines or dashed lines.
25. Plot the measurements or points on the X-bar chart for X-bar graph just below each subgroup and connect the points.
26. Plot the range for each subgroup on the range chart.
27. Look for any out-of-control conditions.
28. If there are out of control conditions attempt to find an assignable (special) cause.
29. Revise control limits as needed.

Making an X-bar/MR chart

The steps are the same until you are calculating upper and lower control limits. For the upper and lower control limits you must calculate the value of sigma and calculate the limits using a plus three values of sigma for the upper limit and a minus three values of sigma for the lower limit. **Refer to example two.**

DEFINITIONS OF SYMBOLS USED

n = the number of samples in a subgroup

X = the measured value

$\overline{X}$ = Average of the values of X

$\overline{\overline{X}}$ = X double bar the average of X bar

k = number of subgroups

R = Range: the difference from the maximum sample to the minimum sample in the subgroup

$\overline{R}$ = Average of range

UCL = Upper control limit

LCL = Lower control limit

σ (sigma)= Standard deviation

Example One:

Control Chart for Averages and Ranges (Example for n=5)

Sample number								
1	92	93	93	95	91	96	90	91
2	91	94	93	95	94	93	96	92
3	90	96	93	92	94	94	98	95
4	91	94	93	92	95	97	95	94
5	92	98	94	95	94	90	94	94
sum	456	475	466	469	468	470	473	466
Average $\overline{X}$	91.2	95	93.2	93.8	93.6	94	94.6	93.2
Max	92	98	94	95	95	97	98	95
Min	90	93	93	92	91	90	90	91
Range R	2	5	1	3	4	7	8	4
Sub Group	1	2	3	4	5	6	7	8

$$\overline{\overline{X}} = \frac{\text{sum of } \overline{X}}{k} = \frac{91.2 + 95 + 93.2 + 93.8 + 93.6 + 94 + 94.6 + 93.2}{8} = 93.575$$

$$\overline{R} = \frac{\text{sum of R}}{k} = \frac{2 + 5 + 1 + 3 + 4 + 7 + 8 + 4}{8} = 4.25$$

For a Subgroup of n=5

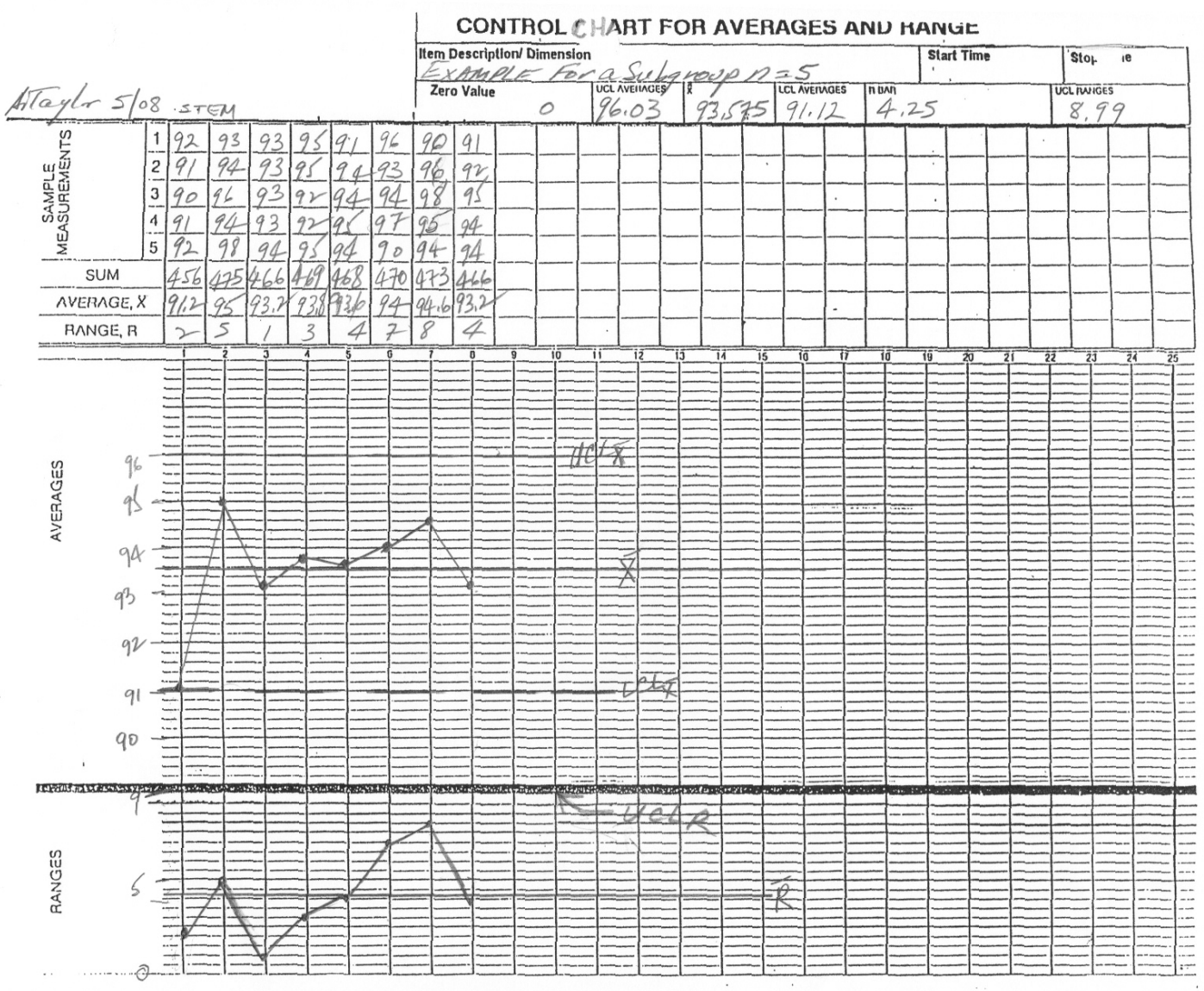
$A_2 = 0.577, \quad D_3 = 0, \quad D_4 = 2.115$

$$UCL_{\overline{X}} = \overline{\overline{X}} + \left(A_2 \times \overline{R}\right) = 93.575 + \left(0.577 \times 4.25\right) = 96.03$$

$$LCL_{\overline{X}} = \overline{\overline{X}} - \left(A_2 \times \overline{R}\right) = 93.575 - \left(0.577 \times 4.25\right) = 91.12$$

$$UCL_R = D_4 \times \overline{R} = 2.115 \times 4.25 = 8.99$$

$$LCL_R = D_3 \times \overline{R} = 0 \times 4.25 = 0$$


CONTROL CHART FOR AVERAGES AND RANGE
Item Description/ Dimension
EXAMPLE for a Subgroup n=5
Start Time
Stop Time
ATaylor 5/08 STEM
Zero Value
0
UCL AVERAGES
96.03
X
93.575
LCL AVERAGES
91.12
R BAR
4.25
UCL RANGES
8.99
SAMPLE MEASUREMENTS
1 92 93 93 95 91 96 90 91
2 91 94 93 95 94 93 96 92
3 90 96 93 92 94 94 98 95
4 91 94 93 92 95 97 95 94
5 92 98 94 95 94 90 94 94
SUM 456 475 466 469 468 470 473 466
AVERAGE, X 91.2 95 93.2 93.8 93.6 94 94.6 93.2
RANGE, R 2 5 1 3 4 7 8 4
AVERAGES
96
95
94
93
92
91
90
UCL X
X
LCL X
RANGES
5
UCL R
R

Example Two:
X-bar/MR Chart (Moving Range Chart)

For the X chart, n=1. Remember that n is the number of subgroups and for the R chart two values are involved (subgroup 1 minus subgroup 2, etc.), so from the table, $\mathbf{d_2}$ for n=2 is used.

Time	8:30	8:45	9:00	9:15	9:30
Sample 1	143	142	142	144	143
Sample 2					
Sample 3					
Sum					
Average					
Range		1	0	2	1
Sub Group	1	2	3	4	5

$$\overline{X} = \frac{143 + 142 + 142 + 144 + 143}{5} = 142.8$$

$$\overline{R} = \frac{1 + 0 + 2 + 1}{4} = 1.0$$

Look at Control Chart Constants (step 10) of this handout. For R based on a subgroup of 2:

$$d_2 = 1.128, \quad D_3 = 0, \quad D_4 = 3.267$$

For X based on individuals

$$\sigma = \frac{\overline{R}}{d_2} = \frac{1.0}{1.128} = 0.886$$

UCL and LCL for X bar

$$UCL_X = \overline{X} + 3\sigma$$

$$UCL_X = 142.8 + (3 \times 0.886) = 145.4$$

$$LCL_X = \overline{X} - 3\sigma$$

$$LCL_X = 142.8 - (3 \times 0.886) = 140.1$$

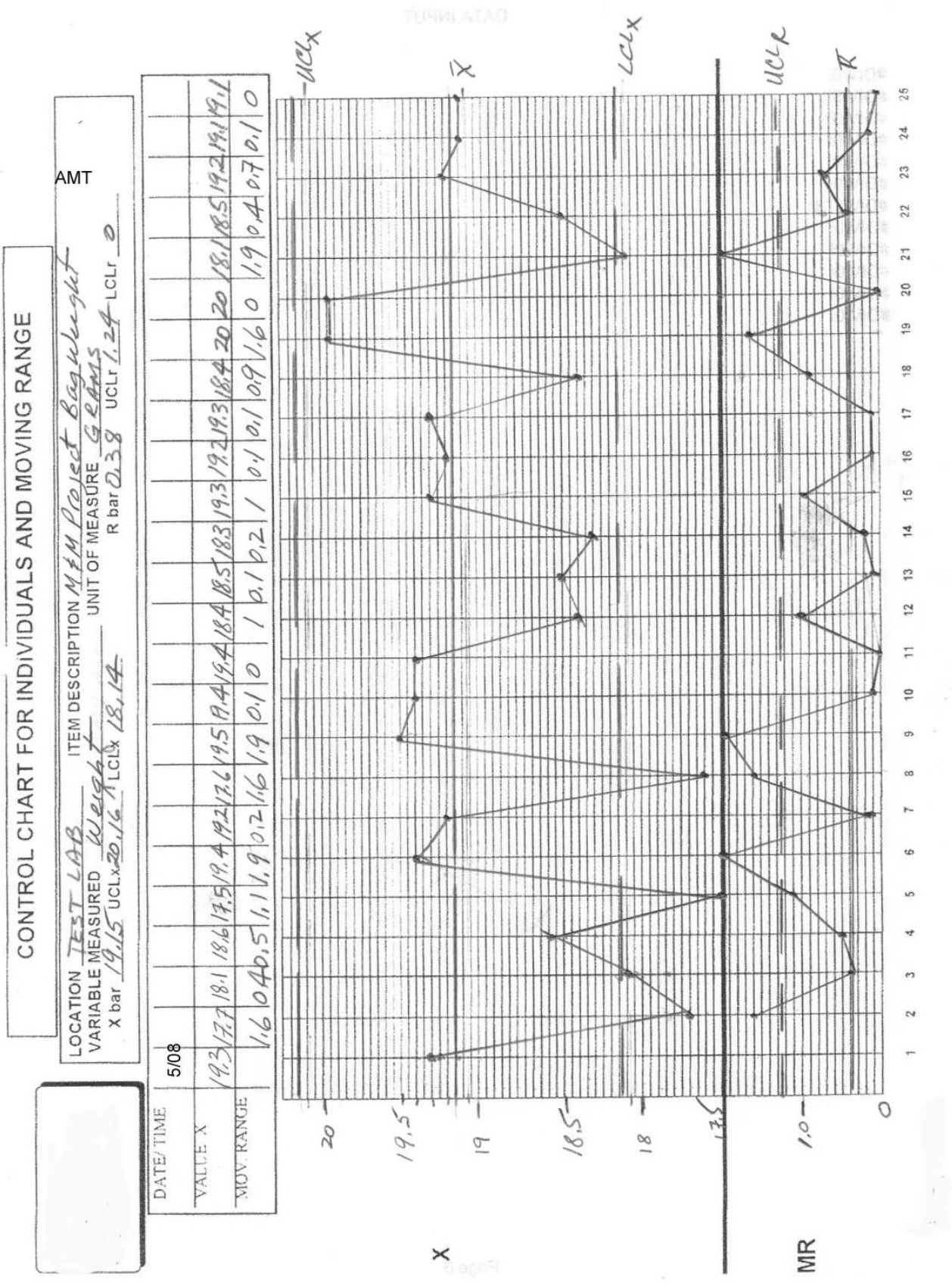
UCL and LCL for R bar

$$UCL_{MR} = D_4 \times \overline{R}$$

$$UCL_{MR} = 3.267 \times 1 = 3.267$$

$$LCL_{MR} = D_3 \times \overline{R}$$

$$LCL_{MR} = 0 \times 1.0 = 0$$


CONTROL CHART FOR INDIVIDUALS AND MOVING RANGE
LOCATION TEST LAB
ITEM DESCRIPTION M&M Project Bag weight
VARIABLE MEASURED Weight
UNIT OF MEASURE Grams
X bar 19.15 UCLx 20.16 LCLx 18.14
R bar 0.38 UCLr 1.24 LCLr 0
AMT
DATE/ TIME
VALUE X
MOV RANGE
5/08
UCLx
LCLx
X
UCLR
R
X
MR

Assessment Tools/Strategies

This section includes specific strategies and instruments for assessing students' knowledge, skills, and attitudes related to problem-solving and decision-making skills.

RUBRICS

Rubrics are valuable assessment tools. Students should be provided with the rubric by which they will be assessed before an activity begins so they will understand the performance expectations. When time permits, students can contribute to the rubrics by brainstorming with the instructor about what a quality behavior or product looks like. For example, before assigning a team problem-solving project, ask students to describe how the ideal team would handle the assignment, how they would assign roles, divide the work, implement and monitor the process. Prompt students with specific components. Then have them describe a poor performance. These will be the descriptions of the characteristics for the highest and lowest ends of the Likert scale for each performance criteria. Instructors should add any required attributes to the rubric if the students do not come up with them on their own. Several rubrics related to problem-solving and decision-making skills have been provided as examples.

- The first three rubrics were developed to be used by the instructor or other observer in assessing a student. They each list characteristics or components of skill proficiency and include spaces where the instructor can insert additional attributes to tailor the rubric to a specific project or activity. These rubrics cover observation skills, problem solving and decision making, and the use of critical thinking skills.
- The fourth rubric is a self-evaluation tool for use by the student in examining their troubleshooting abilities. The students indicate the degree to which they think they are performing each attribute. They can periodically return to the rubric to reassess and determine if they are improving those skills.
- The final rubric on problem solving is the most complex. The student is asked to reflect on their performance and provide examples of satisfactory or exemplary performance. Then the student meets with the instructor or peer observer and compares his/her reflections with their instructor's or peers' observations and formulates an action plan for improving attitudes, behaviors or skills. This type of rubric most resembles the type of assessment an employee might receive on the job. It is also the most time consuming. Ideally, this rubric would be used at least three times during a course:
  - At the beginning of the course, to get a baseline and to give students suggestions for specific actions they might take to improve their performance,
  - At the midpoint of the course, to check progress and refine the recommendations for improvement, and
  - At the end to assess the progress made over the duration of the course. Additional suggestions can be made for students' continued growth beyond the end of the course.

RUBRIC FOR ASSESSING OBSERVATION SKILLS

Outcome: Observation – Objectively observe people, situations, and circumstances. Identify and examine changes in conditions or behaviors to establish predictable patterns and relationships. Monitor and document situations according to established criteria, being alert to deviations, or discrepancies. Respond appropriately to anticipate needs, continue a process, or maintain a level of acceptability.

Demonstrates an awareness of situation being observed.	1 2 3 4 5
Identifies predictable trends.	1 2 3 4 5
Monitors multiple conditions.	1 2 3 4 5
Defines patterns and interrelationships.	1 2 3 4 5
Interprets results that lead to tentative conclusions.	1 2 3 4 5
Documents change and variations.	1 2 3 4 5
Identifies potential outcomes.	1 2 3 4 5
Connects multiple causes with effects to make meaning of the outcomes.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

RUBRIC FOR ASSESSING PROBLEM SOLVING AND DECISION MAKING

Outcome: Problem Solving and Decision Making – Understand problem-solving and decision-making processes and apply these processes to personal and business situations. Identify root causes. Understand the factors that influence solving problems and making decisions and use this understanding in formulating and implementing action plans. Monitor action plans and make adjustments as needed.

Uses problem-solving and decision-making strategies that fit the given set of circumstances and variables.	1 2 3 4 5
Analyzes the source of the problem or reason for a decision by clarifying and validating root causes.	1 2 3 4 5
Applies problem-solving and decision-making strategies in both personal and business situations.	1 2 3 4 5
Takes into account the impact of significant factors in problem solving and decision making, such as economic, sociological, ethnic, political, legal, environmental, consumer, and interpersonal relationships.	1 2 3 4 5
Uses the processes of: identifying, clarifying, and validating the problem or reason for a decision; exploring options; considering consequences; clarifying values related to consequences; and formulating action plans to follow through on the reasoned-out conclusion of the process.	1 2 3 4 5
Analyzes the progress of action plans using the problem-solving and decision-making process of checking consequences, weighing values, and reconsidering possible options in order to reevaluate action plans.	1 2 3 4 5
Checks status of action plans by monitoring progress of self and others through keeping accurate records, asking pertinent questions of self and others, verifying evidence of progress, and reflecting on relevant consequences.	1 2 3 4 5
Modifies action plans on the basis of information gathered in the problem-solving and decision-making process.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

RUBRIC FOR ASSESSING CRITICAL THINKING

Outcome: Critical Thinking – Demonstrate the use of strategic thinking, as well as the ability to analyze, synthesize and derive process-driven solutions to problems.

Demonstrate the ability to think strategically.	1 2 3 4 5
Use systematic approaches to problem solving when appropriate.	1 2 3 4 5
Identify and obtain information needed to solve problems.	1 2 3 4 5
Evaluate information and formulate possible solutions.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

RUBRIC FOR SELF-ASSESSMENT OF TROUBLESHOOTING TECHNIQUE

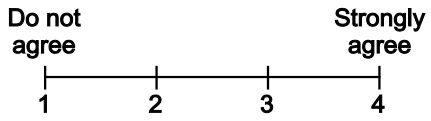
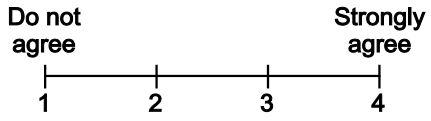
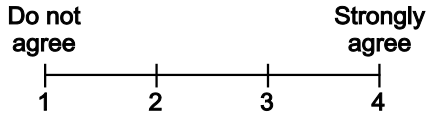
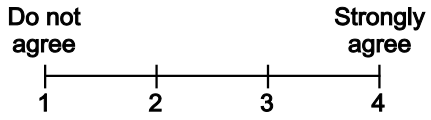
Component: Demonstrates proper troubleshooting technique.

Essential Attributes	I	II	III	IV
I identify problems and resolve them by applying appropriate problem-solving techniques.	Rarely, if ever	Occasionally	Usually	Consistently
I trace the source of any large disparity.	Rarely, if ever	Sometimes	Usually	Always
I use listening skills and assistive devices to assess signs and symptoms of malfunction.	Barely and rarely, if ever	Partially and occasionally	Generally and usually	Fully and consistently
I determine ongoing maintenance needs for equipment and machinery.	Never	Occasionally	Usually	Always
I conduct in-process inspections and use this information to adjust a process when necessary.	Never	Occasionally	Usually	Consistently
I coordinate activities with others to solve problems quickly during non-routine and/or upset conditions.	Barely	Partially	Mostly	Fully

RUBRICS FOR IMPROVING PROBLEM SOLVING

Student Plan for Assessment and Improvement of Problem Solving—Uses a logical methodology to solve problems and make decisions.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your instructor or peers, describe the steps you might take to continue or improve your problem-solving skills.
Identified a problem to be solved.	*Example:* *Peer/supervisor review:* Do not agree — Strongly agree 1 2 3 4	*Steps:*
Consulted and/or worked with others as a team to solve the problem.	*Example:* *Peer/supervisor review:* Do not agree — Strongly agree 1 2 3 4	*Steps:*
Made a major decision independently.	*Example:* *Peer/supervisor review:* Do not agree — Strongly agree 1 2 3 4	*Steps:*

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your instructor or peers, describe the steps you might take to continue or improve your problem-solving skills.
Understood the problem and identified what was known and what needed to be learned.	*Example:* *Peer/supervisor review:* 	*Steps:*
Developed a plan to solve the problem identifying the strategies that were to be used.	*Example:* *Peer/supervisor review:* 	*Steps:*
Carried out the plan.	*Example:* *Peer/supervisor review:* 	*Steps:*
Checked the results.	*Example:* *Peer/supervisor review:* 	*Steps:*

Peer comments and suggestions:

Instructor comments:

Weblinks

http://www.stemtransitions.org/mn14/overview.php – This page includes an expanded version of the Tools for Preventing Problems Activity as well as two additional similar problems. There is a one time free registration to access materials from the site.

http://pred.boun.edu.tr/ps/index.htm – This web site highlights six different problem-solving strategies and gives additional problems such as the ones found in the Make a Plan Activity.

http://www.austintown.k12.oh.us/~aust_tr/PSS.htm – This is another website that supplies additional problem-solving strategies similar to those in Make a Plan Activity with additional problems.

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Initiative and Dependability

Overview

Initiative and dependability are the cornerstones of what is commonly referred to as the work ethic.

> According to the Pew Research Center, while Americans place considerable stock in the value of college, they see character traits, not education, as the most important determinants of success in life. 96% of parents say a good work ethic is extremely or very important; 90% say the same about work skills learned on the job. Just 77% of people say that a college education is extremely or very important. - *WorkEthic.org*

Employers need employees who can be trusted to show up on time and complete their full shifts and who give their full effort to every task put before them. They need employees who show initiative and can act responsibly without constant supervision.

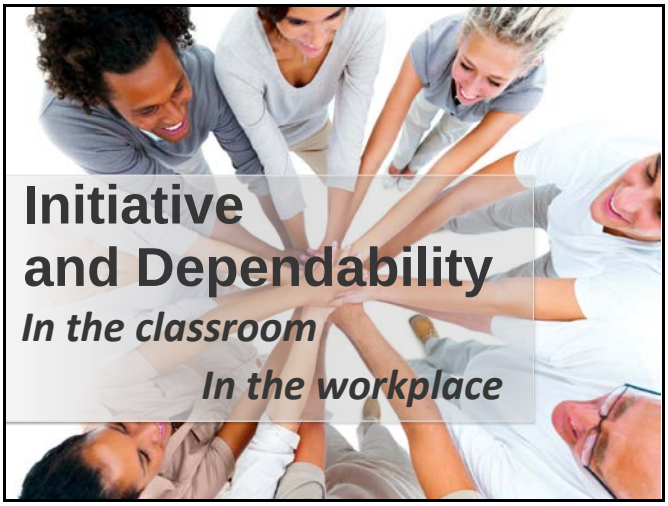
This module, like others in the series, explores characteristics that contribute to a good work ethic. It focuses specifically on time management, goal setting, taking responsibility for maintaining equipment and workspaces for safety, and learning how an organization is a system. The board game helps students recognize that every job within a business system has consequences for the organization as a whole.

A variety of rubrics are provided to help instructors evaluate aspects of work ethic throughout any course.

Presentation Materials

SLIDE **TEACHER NOTES**

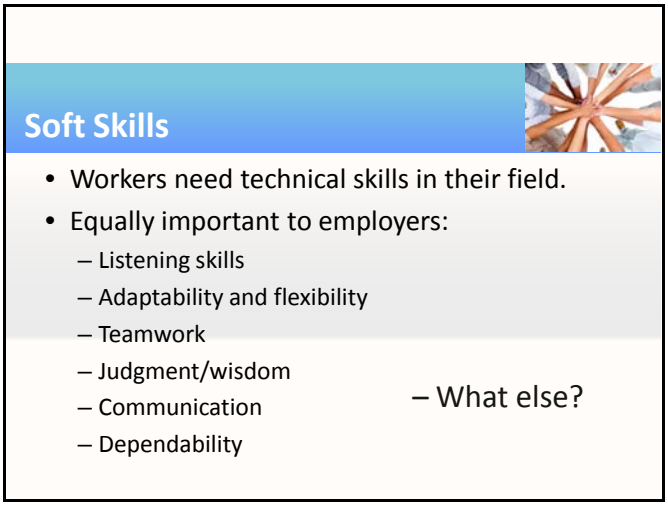
1



2

- Every employer requires certain technical skills of employees, but students should realize that many "soft skills" are essential to hiring and continued employment. Soft skills are also commonly referred to as employability skills, 21st-century skills, SCANS skills, or essential skills. They are all central to the main focus of this module: *dependability.*

3



- One of the activities in this module encourages students to brainstorm a list of good work habits and attitudes. This slide can be a starter for that activity. Some possible discussion points:
  - **Listening skills:** You must listen to be able to follow directions and learn new information that comes with any job.
  - **Adaptability and flexibility:** We live in a changing world, with changing demands and requirements. We will encounter new coworkers with whom we must get along and new work environments in which we must function.

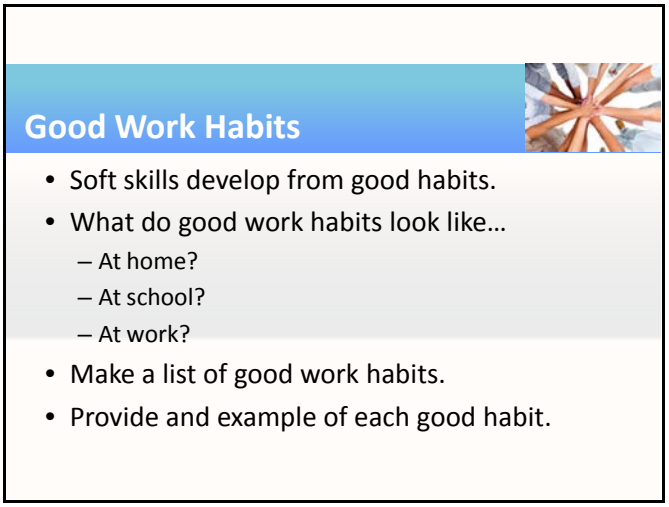
SLIDE **TEACHER NOTES**

(Notes for Slide 3 continued)

- **Teamwork:** When we hear "team," we think of sports. Most jobs require a team effort to reach the goal, just as in every team sport. As a team player, you must do your assigned tasks in order for the whole team (system) to succeed.
- **Judgment/wisdom:** Are you able to apply the fruits of past experiences to today's problems? Can you restrain your emotions and be discrete on social websites? If so, then you may have more judgment and wisdom than you think. Making sound decisions in the workplace begins with the ability to make wise, well-reasoned choices.
- **Communication:** This is probably the first soft skill on which you'll be judged during your job application and interview. In the workplace, you must be able to engage colleagues in two-way exchanges of information in person, over the phone, via email, and probably with written documents. We must practice these skills to be good communicators.
- **Dependability:** Do you do what you say you will? Show up where you promise to be? Deliver what you are asked to produce? Complete tasks on time?

What other soft skills can you (or your students) suggest that are equally important?

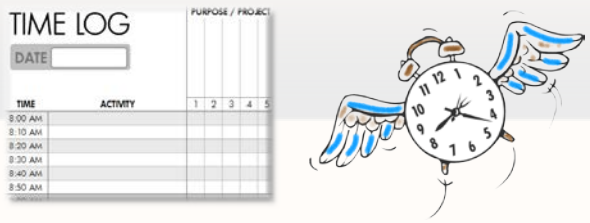
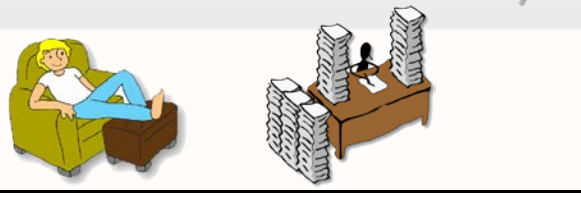
4



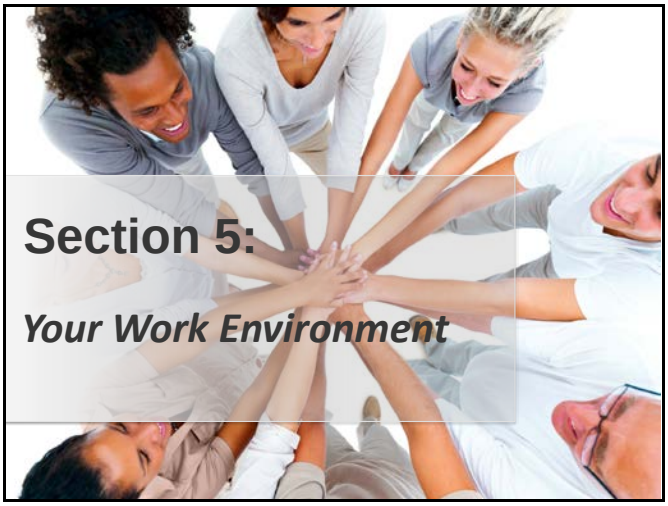
- One of the activities of this module encourages students to brainstorm to form a list of good work habits. You can move the conversation forward by seeking volunteers to describe a few good habits that are respected at home, school, and work.
- As students expand the list, seek examples. For the good work habit of being *self-directed*, for example, one might clean up a small spill, rather than expecting someone else to do it. Use this as an opportunity for students to "brag on themselves"—to use themselves as positive examples.

5

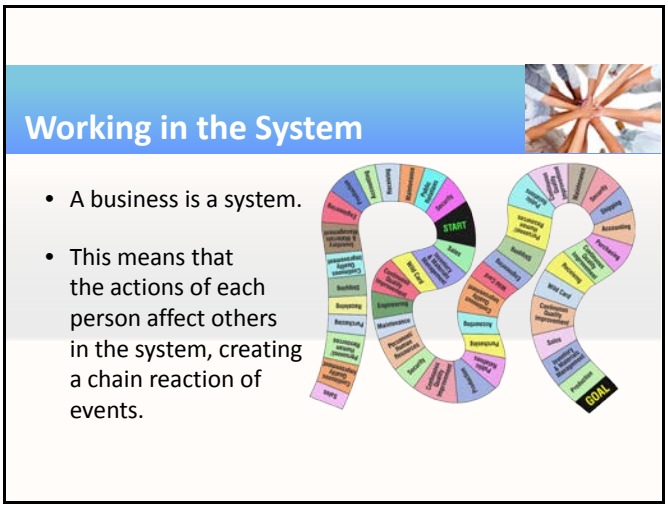
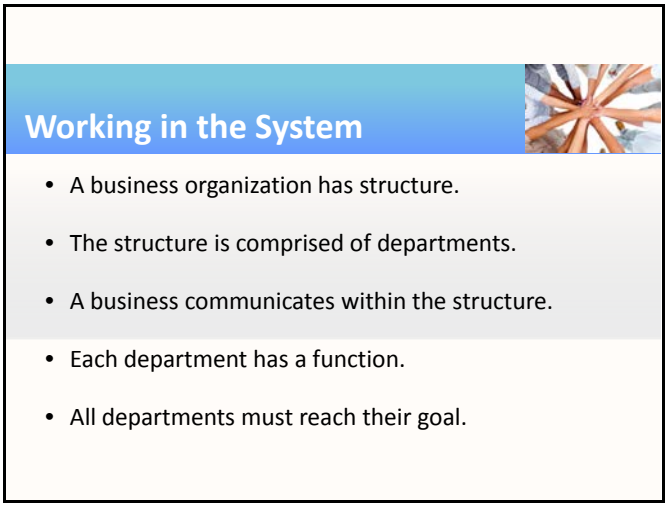
- Many people devote time and energy to inconsequential tasks and then are left with little time for accomplishing important objectives. Students need to develop a system (and follow it) for planning their effective use of time.

	SLIDE	TEACHER NOTES
6	**It's About Time…** • *You may delay, but time will not.* – Benjamin Franklin • *How did it get so late so soon?* – Dr. Seuss • *If you don't have time to do it right, when will you have time to do it over?* – John Wooden	• See Handout 1 for a list of quotable quotes, like: "Time is what we want most, but what we use worst." — William Penn "You will never find time for anything. If you want time, you must make it." —Charles Buxton
7	**Where Does the Time Go?** • Make a time log of a day in your life. 	• Most people have no idea how much time they spend on various tasks throughout a day or week. Keeping a time log can help students recognize where they are spending time and find time that could be reallocated to reaching personal and professional goals, e.g., a professional certificate or degree. • See Handout 2 for a Time Log master.
8	**Using Time Wisely** • Successful time management is balanced – Recreational time – Professional obligations – Bodily rest 	• This list is not comprehensive. Students may wish to add family time (a large component for many students) and spiritual time (e.g., church attendance, prayer, meditation).

	SLIDE	TEACHER NOTES
9	**Coping With a Busy Schedule** • Prioritize tasks • Leave time for planning • Schedule time for interruptions • Anticipate problems • Create a "to do" list • Combine tasks 	• How many students use a planner of some sort?
10	**Make a Schedule: Complete the Project On Time** • Project tasks usually have a sequence. • Identify the tasks or components of a project. • Estimate the time to complete each task. • Work backward from the target completion date to establish milestones. • Adjust milestones as needed. 	• Many project management tools and programs exist. You may be able to keep all the steps and plans in your head for a small project, like building a bird house, but when tackling a project that is too big to remember all the pieces and parts and players, it's time to sit down and "manage the project" more professionally.
11		• To succeed, students need to create realistic, reachable goals. They must be measureable (how will you know when you've accomplished this goal?) and have a timeframe or date for achievement.

	SLIDE	TEACHER NOTES
12	**Goal Setting** • The S.M.A.R.T. goal formula –Specific –Measurable –Attainable –Relevant –Time-bound • Note difference between ***Goals*** and ***Objectives.***	• The SMART goal formula has been around for many years. Here is one of the most widely accepted interpretations of the acronym. • The *goal* is the larger accomplishment; the *objectives* are the subtasks that lead to reaching the ultimate goal.
13	**Setting and Achieving Goals** • Personal goals • Financial goals • Educational goals • Career goals 	• As the old saying goes: "If you never set a goal for yourself, you're certain to never achieve it." Encourage students to set goals for themselves in all four of these areas of their lives.
14		• Maintaining a safe, orderly, and clean work environment is important. Different workplaces may have different standards for safety and cleanliness. Ask students to discuss the following workplaces and the maintenance required: – Surgery room – Hotel – Restaurant – Office – Auto repair shop – Soda bottling plant – Manufacturing facility – Construction site – Beauty salon

	SLIDE	TEACHER NOTES
15	**Maintaining Your Workspace** • Is there a relationship between…? – Cleanliness and Order – Safety and Productivity • Maintain – Workspace – Equipment – Tools • What's wrong with this picture? 	• Considering a photograph of a workplace, students can play "What's wrong with this picture?" It's fairly easy to locate "messy desk" photos on the web and, with today's phone cameras, it's not hard for students to take photos and share them.
16	**Maintaining Your Workspace** • How does your work environment affect your mood? Productivity? • How orderly is your workspace … – At home? – At school? – At your business? • How does orderliness affect customers?	• How does your bedroom appear? Your desk? Your kitchen? Your classroom? Your lab closet? Or, if you're running a business, what do the customers think about orderliness? • Ask students if they've ever visited a flea market, where the space is littered with a large assortment of "stuff." How does your attitude about the flea market display compare to the local department store with its neatly arranged goods on shelves? How could the flea market atmosphere be improved in this regard? Suppose ***your booth*** at a flea market was different (neater!) than all the others…how might this affect your success?
17	**Section 6:** ***Your Role in a System***	• Many people go through life thinking that their actions don't impact others. This is not the case. A stock picker or phone receptionist for a large company may think that his or her position isn't important, but when that job is not done or not done well, it could cost the company financially and tarnish its reputation. Students need to know that a company is an interdependent *system*. What happens in one area impacts other areas.

	SLIDE	TEACHER NOTES
18		• This slide can be used to introduce the "Working in the System" board game. This activity is a simple board game designed to demonstrate how actions and events within each department of an organization can affect the whole organization: that is, if one department drops the ball, the whole organization's mission suffers. • By playing the game, students will gain an understanding of the concepts of: working within a system, business organizational structure, and communication within a company hierarchy. • The objective of the game is for all team members to reach the goal, and the game is not over until all players reach the goal. There is no reward for reaching the goal first.
19		Key points: • Departments within a business are interdependent; nothing happens in a vacuum. • Typical departments include: sales, personnel/human resources, purchasing, receiving, shipping, inventory/materials management, production, accounting, engineering, quality assurance, public relations, maintenance, and security. Ask students to describe, based on their work experience, departments that are not mentioned in this list and also departmental functions that may have been combined in smaller businesses.

Teaching Resources

ACTIVITIES

The following activities are examples of activities that can be completed in class to emphasize specific aspects of initiative and dependability. The activities found in this resource can be used "as-is" or they can be tailored to fit a specific course. Suggestions for adaptation precede each activity, with examples from several different subject areas/career pathways. The suggested modifications provide instructors with ideas for adapting the activity to fit content they are already teaching. Modifying the activities allows employability skills to be infused into subject area content more easily.

The instructor must emphasize the importance of time management in the classroom and the workplace throughout the course. Work with local employers to find out how much absenteeism and tardiness costs them each year. Obtain copies of workplace policies that show the consequences of absenteeism and tardiness. In the syllabus, spell out all policies concerning tardiness, absenteeism, and failure to turn in work on time. Include a policy for notifying you of absences via phone, e-mail, or other means and define excused absences. But most importantly, enforce those policies. It is better not to have a policy than to have one and not enforce it. The only way students learn to meet deadlines is if instructors show that they value them.

ACTIVITY: INITIATIVE AND DEPENDABILITY AT SCHOOL OR WORK

Instructor Preparation

It is recommended that this activity be done as early as possible in the course. It is a relatively simple activity but can help students understand from the beginning the types of behaviors that are desired at school and in the workplace. Explain that while technical skills may help them *get* jobs, soft skills, i.e., good work habits and attitudes, will help them *keep* their jobs.

The instructor could ask for local business/industry representatives to either come and discuss with the class the importance of "soft skills" or send responses by email so student groups can review and discuss them.

As students work through their lists of desirable work habits and attitudes, have them discuss what those habits would look like both in class and on the job. In some cases there will be no difference, for example, punctuality. Being on time for class would look the same as being on time at work. Others may be different, such as productivity, for example. A student in class would not be expected to repair body damage on a car as fast as someone who has years of experience in collision repair. They would both be expected to do quality work, but the student might take twice as long to complete a similar job.

As each work habit or attitude is discussed, have students identify careers where that particular trait would be especially desirable. Helpfulness (the willingness to pitch in and help others), for example, might be particularly useful in a customer service position such as concierge in a hotel or at a help/information desk at an airport. Loyalty and ethical behavior would be especially prized in jobs where people work with secure information (e.g., as a medical records technician) or intellectual property that must be protected (e.g., by engineering technicians and product developers at large companies). All employers value dependability and reliability.

Discuss penalties at work and at school for failing to exhibit desired traits. For example, failure to comply with safety regulations can result in a worker getting fired. For safety issues and any other behaviors considered essential to good class performance, clearly explain the consequences up front and always enforce them. If you are trying to teach punctuality, for example, have policies that promote punctuality such as points off for late work and/or cutoffs for when you will no longer accept late work. For long-term assignments that are completed over a period of several weeks, you might give bonus points if the project is turned in early.

Objectives

Students will:

1. Identify good work habits.
2. Describe what good work habits look like in school and at work.
3. Create a work habit evaluation sheet.

Materials

- White board or flip charts and markers for recording student responses

Activity Guidelines

- Have students brainstorm aloud what a good work habit includes. Ask them to list work habits they would want to see in someone they hired to do work for them. Ask them to describe examples good and bad work habits they may have seen or experienced. At the instructor's discretion, invite guest speakers to give examples of the good work habits that their employer expects from employees, or provide articles or other sources of employer responses.
- Make a class list of good work habits and attitudes. The list should include things such as:

Assertiveness	Overcoming failure
Attendance	Perseverance
Care of equipment	Persistence
Cheerfulness	Planning and organization
Commitment	Political awareness of the workplace
Cooperativeness	Problem solving
Creativity	Productivity
Dependability	Punctuality
Efficiency	Quality of work
Enjoying challenges	Reliability
Enthusiasm	Responsibility
Ethical behavior	Risk-taking
Good judgment	Safety consciousness
Helpfulness	Self-directed
Honesty	Self-management
Initiative	Unselfishness
Interest	Willingness to follow directions
Loyalty	Willingness to learn
Mastery	Willingness to take on more responsibility
Maturity	

- Prioritize those that emphasize initiative and dependability.
- Have each student choose an accountability partner. They should work with their partners to identify ten traits in which they see room for personal improvement.
- After students have chosen the top 10 traits to work on during this course, have them describe what good behaviors and bad behaviors would look like. Have the pairs create a work habit evaluation sheet that will make it easy to observe each partner for the top 10 traits selected.
- Ask students to make notes on when they think they have exhibited good behaviors or bad behaviors.
- Students should also observe their accountability partners and make written notes on their good and bad behaviors. Remind students occasionally to be sure they are observing and making notes on their accountability partners' behaviors.
- Once or twice every month have students meet together and give each other feedback on what they have observed over that time period.

Group Reflection Questions

After the first one or two meetings between accountability partners, have a class discussion. Ask the following questions:

- Did having an accountability partner change your behavior?
- How did thinking about behaviors that produce desired results change the way you value specific work habits?
- Which was harder, observing your own behaviors or observing your partner's behaviors?
- For those who showed improvements in one or more of their behaviors, ask them to share tips on how they were able to accomplish those changes.
- Can good work habits/attitudes ever become detrimental? Let students discuss the issue and see if they can give specific examples. If students have trouble thinking of examples, ask about medical professionals who empathize so much with a patient's suffering that they act on their own as "angels of death." Also, while initiative is good, unless you have full understanding of a process and the reasons things are done according to a specific protocol, you shouldn't take it upon yourself to change the way things are done. A biotech firm had to throw out data from several weeks of experiments because the new lab tech, taking initiative to save time in cleaning glassware, decided that instead of a 15-minute distilled water rinse between washes of different solutions, he would just use one longer distilled water rinse at the end. Since he didn't check with his supervisor, the data collected using the improperly cleaned equipment had to be thrown out.
- They say "hindsight is always 20/20." In hindsight, what work habits/attitudes would you change if you were able to go back and do things over in school or on the job? *Note:* Some students may not wish to discuss this question in class, so you may want to leave them with it to think about.

ACTIVITY: WHERE DOES THE TIME GO?

Instructor Preparation

Time management is an important skill. The ability to get a task done in an allotted amount of time without falling behind in other areas is a highly prized skill to employers. Some people seem to have a natural ability to manage time well. For others, it is a skill that can be learned.

In some careers, tracking of time spent on different projects is a necessity so that various clients can be billed appropriately. Lawyers and paralegals, for example, must track how much time is spent working on each of the cases they are assigned. Sales reps must track travel time and mileage as well as the amount of time spent with each potential client. Contractors need to know how long each subcontractor spends on specific jobs so the work can be billed appropriately.

This activity will help students become aware of how they spend their time. They will keep a time log for two days and then bring them to class to analyze. Students will probably be surprised to see how their time was spent. As you wrap up this activity, lead students to examine how they could spend time differently to accomplish personal goals. The following activity, *Using Time Wisely*, provides students with tools and strategies for managing their time more effectively.

Objectives

Students will:

1. Examine some of the ways people relate to time through reading quotations from famous people.
2. Keep a time log.
3. Analyze how they spend their time.

Materials

- Handout 1—Quotes about Time
- Handout 2—Time Log Blanks (2 per student)
- Handout 3—Instructions for Completing Time Log

Activity Guidelines

- Begin the session by asking students the following questions:
  - Do you know anyone who is always late, rushes around, and regularly misses appointments, dates, or other engagements because “I just ran out of time,” or “Time just got away from me”?
  - Do you know anyone who seems to always have it together, finishes work and projects on time or even early, but still has time for volunteer work and never seems to be rushed or flustered?
  - Everyone has the same number of hours in a day. What do you think is different about how each of those people relate to time?
- Have students look at the Student Handout: Quotes about Time. Ask them to choose one or more of the quotations that resonates with the way they look at time. Have them write a short

paragraph or two describing why and/or participate in a class discussion about the quotes. There is no right or wrong answer. An Internet search of "quotes about time" will lead you to numerous sites if you wish your students to pursue this activity further.

- The next part of this activity will take place over several days. Students should be asked to keep a time log showing how they spend their allotted 24 hours a day. Ideally students would keep a log for an entire week, but that quickly becomes burdensome. Instead, have them look at their normal week and pick one weekday and one weekend day that best reflect their typical schedule. They should not pick a day when they are on vacation, sick in bed with the flu, or have some other rare event that doesn't usually recur. Students need two copies of the time log and a copy of the instructions for keeping a time log included in the handouts. Tell students they are welcome to record their time log using whatever means is most convenient for them. Some may choose to use smart phones, tablets, or other electronic devices while some may prefer a small memo pad they can carry in a pocket or purse. Others may choose to record directly on the log sheets.
- Optional: Have students estimate the percent of time they spend each day on broad categories such as sleeping, eating, travel, school work, leisure, socializing, work, family, chores, online, etc. Students can then compare their estimates to actual time spent in each category at the end of the activity.
- After the time logs have been recorded, bring the class together and ask them to come up with broad categories for how they actually spent their time such as: sleeping, eating, travel, school work, leisure, socializing, school, work, family, chores, online, etc. Then allow students to categorize each of their entries on their logs using the categories determined by the class and total the time spent in each. To make it more visual, have them create a pie chart showing how they spent each of their days.

Group Reflection Questions

Discuss the time logs and time distribution pie charts with students. Ask them the following questions:

- How many of you found yourself forgetting to log your time and then trying to reconstruct the last hour or so at one time? Did you notice how easy it was to forget some of the activities that you had just completed?
- If you estimated the amount of time you spent in each category before hand, how close were your estimates to the actual amounts of time you spent in each category.
- What was most surprising to you about the way you spend your time?
- How much time was spent on important tasks vs. unimportant tasks or routine tasks?
- How much time was spent on unimportant and non-urgent tasks?
- Did keeping the time log have any impact on how you were spending your time while you were keeping the time log?
- How do you think periodically keeping a time log might help you to become a better manager of your time?

Remind students to keep their time logs and time distribution pie charts for use in later activities.

Handout 1—Quotes about Time

“You may delay, but time will not.”
— Benjamin Franklin

“Time you enjoy wasting is not wasted time.”
— Marthe Troly-Curtin, *Phrynette Married*

“How did it get so late so soon?”
— Dr. Seuss

“Yesterday is gone. Tomorrow has not yet come. We have only today. Let us begin.”
— Mother Teresa

“Don't spend time beating on a wall, hoping to transform it into a door.”
— Coco Chanel

“Time is what we want most, but what we use worst.”
— William Penn

“There's never enough time to do all the nothing you want.”
— Bill Watterson

“Unfortunately, the clock is ticking, the hours are going by. The past increases, the future recedes. Possibilities decreasing, regrets mounting.”
— Haruki Murakami, *Dance Dance Dance*

“Time is a created thing. To say 'I don't have time,' is like saying, 'I don't want to.”
— Lao Tzu

“I don't understand people who say they need more "Me Time." What other time is there? Do these people spend part of their day in someone else's body?”
— Jarod Kintz, *This Book is Not for Sale*

“If you only had 48 hours left to live, would you spend it like you normally spend your weekends? If not, why spend 2/7th of your life wasting your free time? After all, free time isn’t free. Free time is the most expensive time you have, because nobody pays for it but you. But that also makes it the most valuable time you have, as you alone stand to reap the profits from spending it wisely.”
— Jarod Kintz, *I Should Have Renamed This*

“You will never find time for anything. If you want time, you must make it.”
— Charles Buxton

“Time is an equal opportunity employer. Each human being has exactly the same number of hours and minutes every day. Rich people can't buy more hours. Scientists can't invent new minutes. And you can't save time to spend it on another day. Even so, time is amazingly fair and forgiving. No matter how much time you've wasted in the past, you still have an entire tomorrow.”
— Denis Waitley

“It is the time you have wasted for your rose that makes your rose so important.”
— Antoine de Saint-Exupéry, *The Little Prince*

“Determine never to be idle. No person will have occasion to complain of the want of time, who never loses any. It is wonderful how much may be done, if we are always doing.”
— Thomas Jefferson

“Until you value yourself, you won't value your time. Until you value your time, you will not do anything with it. ”
— M. Scott Peck

“Everything changed the day she figured out there was exactly enough time for the important things in her life.”
— Brian Andreas

If you don't have time to do it right, when will you have time to do it over?
— John Wooden

Time is money.
— Benjamin Franklin

The quotes above were collected from the following websites:
http://www.brainyquote.com/quotes/topics/topic_time.html
http://www.goodreads.com/quotes/tag/time Additional quotes can be found on the internet by searching quotes about time.

Handout 2—Daily Time Log for (M TU W TH F SAT SUN) _____ (date)

Instructions: By each time interval record the activity(ies) you were engaged in during that interval. In the Category column mark the type of activity from the class list and/or priority of that activity. Leave the comment column blank for later analysis.

Time	Activity	Category	Comment
midnight			
12:30			
1:00			
1:30			
2:00			
2:30			
3:00			
3:30			
4:00			
4:30			
5:00			
5:30			
6:00			
6:30			
7:00			

Time	Activity	Category	Comment
7:30			
8:00			
8:30			
9:00			
9:30			
10:00			
10:30			
11:00			
11:30			
Noon			
12:30			
1:00			
1:30			
2:00			
2:30			
3:00			
3:30			

Time	Activity	Category	Comment
4:00			
4:30			
5:00			
5:30			
6:00			
6:30			
7:00			
7:30			
8:00			
8:30			
9:00			
9:30			
10:00			
10:30			
11:00			
11:30			

Handout 3—Instructions for Keeping a Time Log

Time logs are a good way to determine how you are spending your time and if you are spending it as effectively as you could. *Effective* here means different things to different people. For example, to someone who has had bypass surgery or suffers from diabetes, a 30-minute walk each day may be very important. To another person a 30-minute walk is the quickest way to get from one place to another, while to another person it is a way to enjoy socializing with friends. To someone looking in from the outside, the 30-minute walk might be perceived as a total waste of time that could have been spent doing something "productive." Since a time log is a personal tool, you get to define effective use of time by your values and goals for the day.

Keeping a time log may seem like busy work especially after the first couple of hours of recording what you are doing. However, it has been shown repeatedly that the vast majority of people have no idea of how much time they spend on different tasks on different days, and most cannot give you an accurate estimate of how much time it will take them to do any given task. It is important to see where your time goes so that you can find time that you can use to work on your goals.

For this activity you will keep a record for two days, one weekday and one weekend day. You will record what you do from the time you get up to the time you go to bed. Try to pick days where your schedule for the day is typical for that day of the week. Don't pick a day when you are on vacation, sick in bed with the flu, or have some other rare event that doesn't usual occur.

Your instructor will give you blank time log sheets to use. You are welcome to record your time log using whatever means is most convenient for you. If you constantly have a smart phone, tablet, or other electronic device with you, you may wish to record the data electronically. You might find it easier to use a small memo pad you can carry in a pocket or purse. Of course you may choose to record directly on the log sheets. Just make sure to record all of your information and bring it to class as instructed.

- The first time log column gives the starting time of each 15 minute interval.
- The second column is where you describe what you were doing during each 15 minute interval. Sometimes you may do more than one thing at a time so you should note concurrent activities. For example, eating lunch with friends to socialize would be different than eating lunch with a partner to discuss the class project you are working on together. Note: If you work or go to school don't simply block that time as work or school. Write down tasks or specific activities you are involved in at the time.
- The third column is for category and/or priority. As a class you will look at categorizing activities such as sleeping, eating, travel, school, work, etc. Once the list is completed you will determine the broad category that best describes your activity in that block of time.

Priority is a rating system that you can use to assess the value of the time spent to you and your goals. You will rate each item according to the following scale: 1=Important and Urgent, 2=Important and NOT Urgent, 3=Urgent and NOT Important, and 4=Routine. To do this you need to understand the difference in important and urgent. Important can be defined as significant, weighty, and having long-term consequences. Urgent means pressing and requiring immediate action, but probably not of long-term importance.

ACTIVITY: USING TIME WISELY

Instructor Preparation

Too many people today devote needless time and energy to inconsequential tasks only to discover they have insufficient time to devote to important matters. Students need to develop a system, compatible with their personalities and responsibilities enabling them to discharge those responsibilities in sufficient time to meet deadlines while preserving their enjoyment of the job.

Successful time management allows for recreational time as well as for professional obligations. It allows you to lead a well-balanced life, spending your time efficiently so you have time to do the things that are important to you.

This is the second of two activities on time management. In the first lesson students analyzed how they spent their time on a typical weekday and weekend day by keeping a time log. In this activity students look at ways they can use time more effectively, establish priorities, and avoid time wasters. They will explore tools such as calendars, to-do lists, and day planners. Students should be free to use printed or electronic versions of these tools based on their lifestyles.

Be sure to discuss with students that some careers require more flexibility in time management than others. For example, farmers must schedule tasks around actual and predicted weather conditions. Ranchers need to be available to deal with livestock breeding or birthing whenever it may occur. Physicians may have scheduled office hours, but they also must respond to emergencies when they are on call. Other jobs such as those in manufacturing may require workers to work rotating shifts, while other such as nurses in a hospital will have permanent shifts. Store employees may have regular hours most of the time with additional hours required for inventory or during holiday shopping seasons. Some jobs are seasonal and workers must find alternative sources of income. An example might be a lawn care business in the north. During the warmer months they may be busy mowing lawns, landscaping, and so forth, but in the winter they may need to diversify to include snow removal, hanging holiday decorations, and removing trees damaged by ice storms. They need to choose careers where they can adapt to the hours they will be required to work.

Objectives

Students will:

1. Examine strategies for more effective use of time.
2. Identify strategies that are compatible with their personalities and responsibilities.

Materials

- Calendar or calendar handout
- Things to Do This Week handout or task list app
- Plan Your Day handout
- Completed time logs from the activity Where Does the Time Go? (It is not necessary to have completed the previous activity, but it will give students a better feel for how they are currently spending time and where they might be able to prioritize the time differently to accomplish more.)

Tell students ahead of time to bring whatever calendars, assignment books, day planners (printed or electronic) they use or have tried to use to class on the day they will do this activity.

Activity Guidelines

- Ask students how they feel when they suddenly realize that they have a major project or test the next day but haven't adequately prepared. Have them discuss possible reasons people procrastinate.
- Ask students if they regularly keep a calendar, to-do list, or day planner to keep track of their time. Any student who does can be a resource to help students who have not used these tools or have not succeeded in using them.
- Distribute copies of the handouts. Let students know they can use a calendar or electronic version as long as they can keep it with them to refer to as needed. The idea is to make time management fit their personality so it becomes a habit and not just another task that takes up time in an already busy schedule.
- Have students create a to-do list for the month and use the monthly calendar to enter their individual schedules for the month. Have them list all activities (e.g., club meetings, parties, family events, sports events, choir practice) and obligations (school projects, tests, jobs, family responsibilities, and so forth) that will be occurring in the next month.
- Have students indicate which activities on their calendars are events that only require that the students be there at a certain time (a dentist appointment, for example), and which are deadlines. Deadlines are the endpoints for processes or activities. A deadline implies that time is required to complete the assignment or prepare for a test. For any deadlines, students should schedule time throughout the days prior to the event to prepare for and accomplish the task. They should indicate how much time they want to spend on the task each day.
- After students have had several minutes to create their calendar entries, ask if any of them have conflicts on any days of their schedules. Do they see particularly busy periods of times or periods of time where they don't currently have many obligations? Ask them how they might cope with busy times when they have too many things going on at the same time. How could you manage your time more effectively? Record answers on the board. Ideas should include the following:
  - Prioritize tasks (Point out that priorities will differ from person to person.)
  - Leave time for planning
  - Schedule time for interruptions
  - Anticipate problems and plan how to handle them
  - Make a daily "to do" list
  - Identify and reduce time wasters
  - Learn to say no
  - Try to combine satisfactions (study with friends, study while traveling to school, etc.)

Suggest that students avoid the illusory satisfaction of doing easy but low-priority tasks while procrastinating on larger, more demanding tasks. Remind them of a technique for attacking a large task in small sections, doing a little bit at a time.

- Finally, have students choose a particularly busy day from their calendar and create a plan to accomplish those activities during that day.
- Have students work in small groups to identify their biggest time wasters. Ask them to brainstorm ways they might control the amount of time spent on each of these. Let each group share what they discussed with the rest of the class. For example, many business managers say that one of their biggest time wasters is answering e-mail. One solution that has been used by managers is to set two or three specific times throughout the day to answer e-mail. Also, in businesses where much of the e-mail correspondence was routine, they created a library of responses for frequently asked questions that they could plug in as needed without having to recreate the answers over and over. Ask students to practice using time management tools throughout the course.

Group Reflection Questions

- Why is it important to realize that you can manage your time?
- What tool(s) do you find most useful in managing your time? Why?
- What were the hours you have worked on jobs you may have held? Were you able to adapt to those hours? Would you want to work those hours in the future?
- Can you think of reasons you might consider working a shift other than your desired shift for some time period? For example, some people might agree to start work on the night shift so that when an opening became available on a different shift they have a better chance of getting the position than someone from the outside. Or, if a couple has young children, one parent might work days and one nights so that there was always a parent available to watch the children, take them to school in the morning and pick them up in the afternoon.

Handout—Calendar

MONTH _____ **YEAR**_____

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY

Handout—This Week … Things To Do

Date _____	Completed (Check when done.)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	

Handout—Plan Your Day

Date _____

Top priorities (call, do, get, write, etc.)	Who/Where/When
6 A.M.	
7 A.M.	
8 A.M.	
9 A.M.	
10 A.M.	
11 A.M.	
12 A.M.	
1 PM	
2 PM	
3 PM	
4 PM	
5 PM	
6 PM	
7 PM	
8 PM	
9 PM	
10 PM	

ACTIVITY: CREATING SCHEDULES TO COMPLETE PROJECTS ON TIME

Instructor Preparation

Employers need workers who can manage their time wisely and complete project tasks in a timely manner. Begin by asking students if they have watched shows such as *Undercover Boss* where the president or CEO of a major company goes undercover in his own business to see how things are being run throughout the business. Generally there are segments where the boss is assigned tasks where he/she cannot keep up with the workers in doing their jobs. As a result, production or service is slowed down and quotas are not met. While the Boss may not have been trained to do a particular job, workers who are hired to do the job are expected to complete assignments in a timely manner.

Often employees are part of a team with a deadline. Managers plan how to accomplish the job by breaking the job down into smaller tasks and assigning completion dates by which tasks must be finished to keep the whole project on schedule. As part of the plan, the manager will assign the tasks to specific departments or employees. Whenever milestones are missed, the entire project is in jeopardy of falling behind. Impress on students the need for them as future employees to be able to stick to schedules to accomplish their work in a timely manner. Discuss also the need to keep their supervisors informed if they encounter problems that might cause delays. The sooner a manager knows that there is a problem, the sooner he/she can make adjustments to the plan and reallocate resources to try and maintain the schedule.

Have students list tasks that might be involved in getting a magazine published, preparing for a football game, preparing for a theatre production, and making an arrest in a crime. Who would be involved in these activities? Possible answers might include:

Publishing a magazine: Editor-in-chief would determine theme of the magazine; various other editors make assignment in their departments; reporters and feature writers would research their articles and conduct interviews; photographers would take and edit pictures; drafts would be turned in, editors would edit articles; advertising department would solicit ads and work with advertisers to design them; pages would be laid out; proofreaders would copyedit all written materials and check facts; magazine would go to press; copies would be distributed to subscribers and stores.

Preparing for a football game: Coaches would study tapes of the opposing team and plan strategies for both offense and defense; coaches would review tapes with players and explain strategies; players would practice plays; athletes would follow conditioning and dietary programs to maintain fitness levels; team and staff travel to the game; pregame practice/warm-ups; play game; make adjustments during game.

Preparing for a theatre production: Select play; determine venue; get backers; set dates; hold auditions, select cast and understudies for parts; advertise and sell tickets; create sets, obtain props and costumes; memorize lines; fit costumes; rehearse scenes; make changes to script as director indicates; prepare makeup; hold dress rehearsal; perform play. These tasks would be completed by directors, set managers, props managers, public relations, actors, makeup artists, costumers, and others.

Making an arrest: Respond to report of a crime; collect evidence; analyze evidence; canvass neighborhood for people who might have witnessed something; establish timeline; evaluate evidence; identify suspects; question suspects; check alibis; determine motive, means, and opportunity; make an arrest, read Miranda rights; take to jail; follow booking procedures, and so forth. Depending on the crime and the size of the police force you would have police officers, detectives, crime scene investigators, crime lab technicians, booking officers, and so forth.

Point out that in each of these scenarios some of the tasks are dependent on others. They cannot occur until another task is completed, while some tasks are concurrent and can occur at the same time as other tasks.

This activity is a natural follow-up to the previous activities "Where Does the Time Go?" and "Using Time Wisely." Students will look at a project, and working with all who are involved, create a schedule to complete the project on time. Ideally students will create a Gantt chart so that they can see the flow of the project. The instructor should review the key points of a Gantt chart and talk about dependent tasks, i.e., tasks that must be completed before another task begins. In the case of a field study, data must be collected and tabulated before any conclusions can be drawn.

There are free programs and templates available on the Internet that students can use to create their Gantt charts. Google Docs has numerous templates for its spreadsheet program for creating Gantt charts. A simple one that should be robust enough for student projects is *Project Plan Gantt Chart*. Another template that might be of interest to students is *Assignment Gantt Chart,* which is designed to enable students to plan how they will accomplish their assignments and prepare for exams and extracurricular events. Another site that has simple to use Gantt Chart templates is creately.com. This site actually makes charts of all different types simple to create. There is a limited free version available. It allows sharing between students.

Point out to students that this process can be revisited any time there is a project that will take more than a day or two. They can also use it to prepare for major exams or tests to avoid last-minute cram sessions. Emphasize that the more students use tools such as this, the better they will become at estimating and scheduling the time needed for accomplishing their work by its due date.

Objectives

Students will:

1. Break a project into components.
2. Estimate the time to complete each component of a project.
3. Work backward from the project due date to establish milestones in a schedule.
4. Make adjustments in a schedule as necessary to reach goal.

Materials

- Calendar and/or day planner
- Computers with Internet access

Activity Guidelines

- Discuss as a class the importance of being able to schedule time and stick to a schedule.
- Have students work in the small groups. Provide them with the due date for the project and all the details of a long-term assignment.
- Students should work together to break the project up into smaller tasks and estimate the time it will take to accomplish each task. For example, if the project is a group research project, sub-tasks might be to research the topic, create an outline, create a draft, edit the draft, format the draft, and submit a final draft. If the project also includes a class presentation with PowerPoint slides or other media there would be similar steps. Both the paper and the presentation would have the same final due date.
- Students should determine who will be working on each task of the project.
- Working backward from the final due date, students should create milestone dates by which each piece must be completed. Students may start by using their time estimates to see if they can achieve the goal in the allotted time. Students might be surprised to see they overestimated or underestimated the time required to complete a task. Have them create a Gantt chart either by hand using an app or program specifically designed for that purpose. At this point, the simpler the program or app, the better. Students shouldn't have to spend more time learning a program than it takes them to do the project.
- As students work to develop their schedule, remind them that when making assignments and setting deadlines they need to take into account each individual's schedule and the fact that this project is not the only thing that they will be working on during the given timeframe. They may need to reassign tasks or share them to complete the project by the deadline. If students are maintaining personal schedules from the previous activity, they can easily identify possible conflicts and include those in their planning.
- As students work on their projects they should remember to update the Gantt chart as they go to keep track of how they are progressing and make further adjustments as needed.

Group Reflection Questions

- How did the preplanning of your project affect the way you were able to complete the project?
- Were the individual assignments and milestones useful in meeting the project deadline?
- Was your group able to stick to its initial project plan, or did it have to be adjusted during the completion of the project? Give examples of changes made to the plan.
- How did knowing that completing your assigned task on time would affect the outcome for the entire project team help you determine the way you prioritized this project in your daily plans?
- This project took place over a relatively short time span. In business, projects are often planned out several years at a time. How important do you think Gantt charts or other project management tools are in meeting deadlines for those projects? For example, think of NASA preparing for a mission to Mars or the development and launch of the international space station.

ACTIVITY: GOAL SETTING

Instructor Preparation

There is a book by David P. Campbell titled *If You Don't Know Where You're Going, You'll Probably End Up Somewhere Else*. The premise of the book is that if you don't set goals that take into account things that interest you and things you can do well and work to reach those goals, over time you will lose the options to do those things. In this activity students will begin to look at how to set and achieve goals.

If we are to have a chance to succeed, we must be realistic in the goals we establish. The goal must be reachable and, hopefully, measurable in both the amount of time needed to achieve it and quality of the end result. For this reason we will use the S.M.A.R.T. goal formula for writing goal statements. S.M.A.R.T. goals have been around for many years and authorities differ on who was the first to use the acronym. The following seems to be one of the most widely accepted uses of the acronym:

S = Specific M = Measurable A = Attainable R = Relevant T = Time-bound

SMART goals are used in all areas of business today as well as for personal goals of all types. Some plans might substitute the word *significant* for *specific* or *trackable* for *time-bound*.

The following are examples of goals turned into SMART goals in different areas.

Education—Original goal: Every student will show evidence of one year of growth in mathematics each year in attendance. SMART goal: During the 2013–14 school year, all students will improve their math problem-solving skills as measured by a 1.0 year gain in national grade equivalent growth from the 2012–13 to the 2013–14 ITBS math problem-solving subtest.

Personal—Original goal: I want to lose weight and get into shape this year. SMART goal: I weigh 180 pounds; eat a salad every day, and exercise four times a week by Dec 2014.

Entrepreneur—Original goal: I want to start a successful business. SMART goal: I have set up a bank account for my new business, deposited 2000 dollars in sales, and generated 500 dollars profit all by Dec 2014.

Note that the last two SMART goals are written in present tense. Psychologically using the present tense makes it easier to visualize success and makes the goal seem more easily attained.

You will need to guide students through the goal setting process. Discuss the difference in a goal and an objective. Objectives are subgoals or steps that are required to reach the ultimate goal. Let students know that this is like breaking down a large task into smaller tasks. People are often taught to develop lifetime goals first, then to develop goals and objectives with shorter and shorter time frames—5-year goals, 1-year goals, monthly goals, weekly goals, and daily objectives. If time allows, have your students search the Internet for information on goal setting.

Objectives

Students will:

1. Differentiate between a "goal" and an "objective."
2. Write four SMART goals for different aspects of their lives.
3. Look at strategies for achieving goals

Materials

- Handout—Setting and Achieving Goals

Activity Guidelines

- The instructor should begin this activity by discussing the importance of goals and the consequences of not having them. Point out that even if students have not determined what exactly they want to do as a career, it is possible to set goals that will allow them to keep options open while still moving forward toward a satisfying career. If students don't do anything toward obtaining a satisfying career, they may end up in the position of taking whatever low-paying jobs they can find because they don't have skills or knowledge to qualify them for better jobs. They may have to work two or more jobs to make ends meet, leaving them no time to go to school to obtain the skills and knowledge for more satisfying careers.
- Review how to create a SMART goal with your students. The Mind Tools website (http://www.mindtools.com) has several good articles on the subject.
- Have students complete the "goal" and" reach by date" for each section of the handout, *Setting and Achieving Goals*, by writing a SMART goal for each of the four areas: Personal, Financial, Educational, and Career-related. Then pair students and have them review each other's goals to see if they are specific, measurable, achievable, relevant, and time-bound. The pair should rework each goal until it meets the criteria.
- Students should write objectives for each goal. Ask students to come up with one thing they could do in the next week that would move them closer to each goal.

Group Reflection Questions

Discuss the following questions with students. Don't call on students to discuss their personal goals, as they may not be willing to share. Instead ask about goals in the other categories.

- Why is goal setting important?
- Share one of your goals and describe how it meets the SMART requirements.
- Why is it necessary to create objectives?
- Do you think you will achieve your goal? Why? *Note:* If students don't think that they will achieve their goal, ask them if it is attainable. Open a discussion about what might hold someone back from attaining their goal.
- How difficult was it to think of something that could be done within a week that would get them closer to each goal?
- Discuss the fact that goals must be reviewed and revised periodically. Changes in circumstances may require that some goals be altered or dropped altogether. Ask students to describe when they might want to drop or change a goal.

Handout—Setting and Achieving Goals

Set one SMART goal for yourself in each of the four categories below. Indicate the date you can realistically aim to achieve the goal. Then identify the main objectives you will meet to attain the goal. Remember that SMART indicates goals that are:

S = Specific
M = Measurable
A = Attainable
R = Relevant
T = Time-bound

Personal Goal: _____

_____

Reach by date: _____

Objective: _____

Objective: _____

Objective: _____

Financial Goal: _____

_____

Reach by date: _____

Objective: _____

Objective: _____

Objective: _____

Educational Goal: _____

_____

Reach by date: _____

Objective: _____

Objective: _____

Objective: _____

Career-Related Goal: _____

_____

Reach by date: _____

Objective: _____

Objective: _____

Objective: _____

ACTIVITY: MAINTAINING YOUR WORKSPACE AND EQUIPMENT

Instructor Preparation

Maintaining a workspace and equipment are habits that should be developed throughout a course. This activity is most appropriate for courses with a laboratory, shop, or studio component.

Maintaining a clean, orderly, and safe work environment is important in all types of work, even when the work itself is a dirty or grimy operation. Begin the activity by talking about various work environments (e.g., clean rooms, surgery suites, hotels, restaurants, offices, dairy operations, manufacturing facilities, auto repair shops, construction sites, hair salons) and what the standards of cleanliness and order is for those areas. Focus on work environments students may be familiar with and in which students may someday be employed. Be sure to discuss the tools and equipment found in each type of environment. Discuss why there are requirements for order and cleanliness in each situation and how cleanliness and order impact safety and productivity.

Next have students tour the class lab or shop area and identify common areas as well as specific lab stations. Point out where and how class equipment, tools, and supplies are stored. If there are personal spaces or stations assigned to students, point those out as well. Review the lab or shop guidelines for cleanliness and order as well as safety issues that must be observed. Go over your expectations of how students will behave while working in the lab or shop and requirements for how the area should be left at the end of each class. With each new project or lab activity, remind students of any special requirements for maintaining their area and any special care of tools and equipment used for the first time.

Throughout the course, instructors should point out problems and ask students to correct them when students are not maintaining their work areas properly. For repeat offenders, instructors may want to enact penalties such as points off daily grades.

Objectives

Students will:

1. Describe the relationship between cleanliness and order and safety and productivity.
2. Maintain their work area in the lab, shop, or studio in an orderly manner according to class rules and safety regulations.
3. Maintain tools and equipment.

Materials

- Digital camera if students are to create photos of their “What’s Wrong with This Picture?” scenes

This lab requires no additional equipment and supplies other than what is required for projects and lab activities that the instructor normally does in class. If there are lab or shop rules regarding maintaining work areas and equipment, the instructor should post them prominently in the appropriate areas and provide students with personal copies of those instructions.

Activity Guidelines

- Discuss the role of a clean and orderly workplace in safety and productivity. Describe the level of cleanliness/order required in a variety of different workplaces and the reasons for different levels in those workplaces.
- Ask student to review the workspaces they use at school. What are their responsibilities in maintaining them?
- Divide students into groups of 3–4 and have them create a "What's wrong with this picture?" skit or photograph of a workplace scene that includes at least five errors. Each group should write down the errors they have included. Have the rest of the class identify the errors. Did the class identify all of your errors? If not, you should identify an error and tell why it was problematic. Did the class identify any errors that you did not write down? Have them explain why the error is problematic. The instructor will have the final say on any debatable calls.

Group Reflection Questions

- How does your work environment affect you, your mood, and your productivity?
- Do you have an area at home set aside for working on school assignments, personal finances, and/or hobbies? What are the characteristics of your workspace? Did completing this lesson give you any ideas or organizing your space?
- Are you currently employed? Describe your workspace. Describe the workspace of those around you. What level of cleanliness/orderliness is expected at your place of work?
- How does the neatness and organization of a business' workspace impact customers?
- What are your expectations as a customer of a business for cleanliness and neatness? Have you had an experience where you went to a business and were "turned-off" or repulsed by the lack of cleanliness and order? Describe the situation. Try to be as specific as possible about what gave you that feeling. Did the environment influence your dealings with the business?

ACTIVITY: FITTING INTO AN ORGANIZATION

Instructor Preparation

Many people go through life thinking that their actions don't impact others. This is not the case. A stock picker or phone receptionist for a large company may think that his or her position isn't important, but when that job is not done or not done well, it could cost the company financially and tarnish its reputation. Students should be shown that a company is a *system*. What happens in one area impacts other areas.

In this activity students will play a game, "Working in the System," to gain an understanding of the concepts of working within a system, business organizational structure, and communication within a company hierarchy. The objective of the game is for all team members to reach the goal, and the game is not over until all players reach the goal. There is no reward for reaching the goal first.

Before starting the game, review the Department Descriptions with students. Make sure they understand that in small companies several of these functions may be rolled into one department or one position (i.e., one employee). Ask them to think of which departments could logically be merged. The departments in this activity are characteristic of a manufacturing company. Discuss how they might differ in various types of businesses such as a bank, a school, a nursing home, farm, TV station, or other course-related business.

As the game is played, the instructor should ask students questions that lead them to further understanding of systems and the effects of systems on each other. Allow discussion to continue as long as a safe environment is maintained and active learning is taking place. After each move, allow time for the students to react and discuss the effects of the move. Point out the many facets of each move. Students may not immediately understand the impact of any given move, so allow time for discussion among the students

Objectives

Students will:

1. Experience organizational dynamics through playing the game.
2. Explain how changes in one part of a system affect other parts of a system.
3. Describe the functions of different departments within a business.

Materials

- Game board (4 pages to be copied, cut out on the light gray line, and taped together)
- Department placards (Duplicate on cardstock, one side only; then fold along center so that it forms a "tent" that will stand up on a flat surface and can be read from either side.)
- Game cards (Duplicate two-sided on cardstock and cut apart on lines.)
- Student handout with game instructions and department descriptions for typical departments or functions in a business
- 12 game pieces (Use small items such as coins, paperclips, stones, or whatever objects students choose to represent their departments.)
- 1 die

Activity Guidelines

This game is designed for a minimum of 6 players and a maximum of 24 players, with 12 players being optimal. If there are fewer than 12 players, some players will have to represent two departments. If there are more than 12 players some departments will have more than one player.

- Before beginning the game, give students a copy of the student handout and have them read the game instructions and department descriptions. Discuss any questions or comments made concerning the rules of the game or the department descriptions.
- Set up the game.
  - Randomly assign the departments among the players and give them their department placard(s).
  - Place the game board on the floor or on a table. Players should sit as close to the game board as possible.
  - Place the wild cards on one side of the game board and the continuous quality improvement cards on the other side.
  - Give each department their department game cards to place face down in front of their placard(s).
  - Place each department game piece on START.
- Maintenance begins the game by rolling the die and moving that many spaces forward. A card is read from the department on whose space Maintenance lands. The player representing the department landed on reads the card. The player representing Maintenance will make the moves directed by the card for all departments affected. *Note:* It is easier to make the moves as the card is being read, instead of trying to move all the pieces at once.
- When Maintenance has completed its turn, the department to the left of Maintenance will roll the die.
- If a roll results in a game piece landing on a wild card or continuous quality improvement card, the player will draw from that set of cards, read the card, and move the game pieces. Continuous quality improvement cards are always favorable for all departments. Wild cards represent management issues and acts of nature. They can be positive, negative, or a combination of both.
- Play continues until all departments have reached their goal, or the instructor calls a halt to the game. *Note:* Once a department has reached the goal they no longer need to move their playing piece according to the cards read.

Group Reflection Questions

After the game is complete or the instructor feels as if the students have a good understanding of businesses as systems, the game can be put away and the following questions should be discussed.

- What did you learn by playing this game?
- Had you ever thought about a business as a system?
- In what ways do you think this game was realistic? Why?
- In what ways do you think that this game was contrived? Why?
- Can you give examples from your personal experience where your actions or inactions ended up affecting others or vice versa? How did you feel? How did the other person(s) feel?

Handout—Working in the System Board Game

Your instructor will lead you in playing a board game designed to demonstrate how actions and events within an organization's departments affect the organization as a whole. Following are the rules of the game.

Object of the Game

All team members are to reach the goal. The game is not over until all players reach the goal. There is no reward for reaching the goal first.

Number of Players

A minimum of 6 players and a maximum of 24 are recommended. If 6 play, departments will have to double up. If 24 play, pairs will share departments.

Materials

1 game board
12 department game pieces
1 die
1 set of department cards
1 set of wild cards
1 set of continuous quality improvement cards
1 set of department placards

Setting Up the Game

Departments can be assigned randomly among the players.

The game board can be placed on the floor or on a table. Players should sit as close to the game board as possible. Set the wild cards and the continuous quality improvement cards on either side of the board.

Placards with the department titles should be placed in front of the appropriate department players. There is no particular order for the placards. The appropriate department cards are set in front of the corresponding placards.

Place each department game piece on START.

Procedure

Before beginning the game, review the "Department Descriptions" handout paying close attention to descriptions of the subsystems and duties listed for your department(s). Discuss any questions or comments you may have concerning these descriptions.

Maintenance begins the game by rolling the die and moving that many spaces forward.

A card is read from the department on whose space Maintenance lands. The player representing that department reads the card. Maintenance will make the moves directed by the card. Note: It is easier to make the moves as the card is being read, instead of trying to move all the pieces at once.

Play continues to the left of Maintenance with a roll of the die.

If a roll results in a game piece landing on a wild card or continuous quality improvement card, the player will draw from that set of cards, read the card, and move the game pieces. Continuous quality improvement cards are always favorable for all departments. Wild cards represent management issues and acts of nature. They can be positive, negative, or a combination of both.

Department Descriptions

- **Sales**

  Subsystems: Marketing • Advertising • Sales Representatives • Customer Service • Help Desk

  Duties: Provides the data and strategies for marketing the company's products • Provides advertising campaigns/catalogs to assist in the selling of products • Works with customers to sell the company's products • Answers customer questions and gathers information about customer satisfaction • Provides end user with technical and operating information

- **Personnel/Human Resources**

  Subsystems: Employee Benefits • Health and Safety • Educational Training • Hiring

  Duties: Manages the negotiations with providers and employee activities • Provides government with worker injury information and trains employees in applicable health and safety legislation • Provides all necessary company training for new and current employees, including orientation • Provides hiring managers with support in advertising, interviewing, and selection of new employees

- **Purchasing**

  Subsystems: Vendor Accounts • Forming Bids

  Duties: Locates and negotiates the purchase/rental of materials and services • Takes part in the forming of bids for determining pricing

- **Receiving**

  Subsystem: Receiving Inspection

  Duties: Inspects incoming materials and products to ensure that the correct items, quantity, and quality are received

- **Shipping**

  Subsystems: Packaging • Transport/Trucking • Final Inspection

  Duties: Responsible for correctly packaging product for delivery to customer • Arranges for the transporting of the product to the customer • Follows work instructions and procedures to ensure that final product is at given quality standard • Determines necessary inventory items and maximum and minimum levels of supply; maintains these levels at all times

- **Inventory/Materials Management**

  Subsystems: Disbursing materials/products appropriately

  Duties: Maintains ample amounts of supplies and products to meet the needs of departments and customers • Provides the mechanism for accounting for supplies and products

- **Production**

  Subsystems: Various support shops • Finishing • In Process

  Duties: Builds the finished product by using a variety of production functions such as subassembly, assembly, welding, stamping, and machining

(Department descriptions, continued)

- **Accounting**

  Subsystems: Payroll • Accountants Receivable • Accounts Payable

  Duties: Calculates employees pay and appropriate deductions and generates payroll checks • Bills customers for product/services rendered; follows-up with late payments • Makes appropriate supplier payments based on purchase orders and reports from receiving

- **Engineering**

  Subsystems: Take off/Specifications • Product Design • Process Design

  Duties: Identifies, defines, and estimates the requirements to make a product • Creates the blueprints, diagrams, and exact specifications of the product • Specifies the processes used in production

- **Quality Assurance**

  Subsystem: In Process

  Duties: Provides support in quality assurance functions to all plant operations (engineering, production, maintenance, receiving, and shipping)

- **Public Relations**

  Subsystems: Media Relations • Publicity • Advertising • Investor Relations • Public Affairs • Lobbying

  Duties: Ensures a good image of the company by the general public • Deals with controversial issues from the media • Builds and maintains relationship with publics (which include the media, policymakers, employees, union representatives, and investors)

- **Maintenance**

  Subsystems: Physical Plant • Electrical • Mechanical • Chemical • Plant Grounds • Hazardous Materials

  Duties: Ensures the cleanliness and safety of the physical plant and grounds • Ensures the longevity, good use, and safety of machinery and tools, including their electrical, mechanical, hydraulic, pneumatic operations

- **Security**

  Subsystems: Security Alarm Systems • Day Security • Night Security

  Duties: Ensures that all security systems, including fire and unwanted entrance alarms, are in good working order

NOTE:

THE GAME CARDS SHOULD BE DUPLICATED TWO-SIDED.

THE GAME BOARD PAGES SHOULD BE DUPLICATED SINGLE-SIDED,

AS THEY WILL BE TAPED TOGETHER TO CREATE THE BOARD.

THE DEPARTMENT "TABLE TENTS" SHOULD BE DUPLICATED ONE-SIDED AS WELL.

The new computerized production scheduling system is not working properly. Inventory is having trouble keeping a balance of materials. EFFECT: Production move back 3 spaces. Shipping move back 2 spaces. Inventory move back 2 spaces. Everyone else move back 1 space.	The just-in-time inventory system is working well. EFFECT: Inventory move ahead 5 spaces. Everyone else move ahead 3 spaces.
It has been decided not to keep an expensive, large part in inventory. Engineers will have to let Purchasing know at least 2 weeks ahead of time when the part is needed. EFFECT: Inventory gains space and moves ahead 4 spaces. Engineers move back 1 space to take time to put procedures in place to accommodate Purchasing. Purchasing move ahead 1 space.	A large order has come in that will require inventory to work overtime. To handle the situation, the Inventory coordinator has hired temporary help. EFFECT: Inventory move ahead 2 spaces. Everyone else move ahead 1 space.
Inventory is overstocked since Purchasing double-ordered needed material to get a good price. EFFECT: Inventory move back 3 spaces. Purchasing move ahead 3 spaces for efficient use of budget.	Maintenance did not get to the work order that requested repair of Inventory shelves. Last night the shelves gave way and destroyed several thousand dollars worth of raw materials needed for today's production. EFFECT: Maintenance move back 2 spaces. Inventory move back 3 spaces. Production and Shipping move back 4 spaces. Everyone else move back 1 space.
Accounting offers paycheck direct deposit for all employees. EFFECT: Accounting move back one space to set up the system. All others move ahead 3 spaces for a morale boost.	Accounting realizes a computation error in payroll deduction in favor of employees. EFFECT: Accounting move ahead 4 spaces for catching the mistake quickly. All others move ahead 2 spaces.

Inventory

Inventory

Inventory

Inventory

Inventory

Inventory

Accounting

Accounting

Accounting is flooded with invoices for a big order for the plant. Even though they have contracted temporary services to help with payroll, paychecks will be one day late. EFFECT: Accounting move back 4 spaces to work overtime. Everyone else move back 3 spaces due to frustration over the late paycheck.	The cost of materials for an order was recorded under the wrong job number. Both the order to which the cost should have been charged and the order to which the cost was charged have been shipped. EFFECT: Accounting move back 3 spaces to straighten out the records and explain the mistake to both customers. Sales move back 2 spaces to listen to irate customer CEO who was charged more than he expected.
Accounting has everything running smoothly. EFFECT: Everyone move ahead 2 spaces.	Due to quality control measures that began last month, all orders for the week were filled and shipped on time with no problems. EFFECT: Everyone move ahead 4 spaces.
Shipping procedures have changed for the better as a result of a companywide quality control training session. EFFECT: Everyone move ahead 3 spaces.	The head of Shipping has been replaced. EFFECT: Shipping move ahead 3 spaces due to improved morale. Everyone else move ahead 2 spaces.
Security caught a former employee in the shipping area with a box that aroused their suspicion. EFFECT: Security move ahead 3 spaces. Shipping move ahead 2 spaces for helping to apprehend the former employee. Everyone else move ahead 1 space for no disruption of work.	Three security guards resign due to changes of residence. EFFECT: Security employees work overtime for two weeks while replacements are found; move back 3 spaces. Everyone move back 1 space because the last 10 minutes of each shift are spent double-checking their own areas.

Accounting

Accounting

Shipping

Accounting

Shipping

Shipping

Security

Security

Many employees have noticed that Security is taking longer coffee breaks than other employees since Security employees are allowed to take their breaks in any of the three break areas of the plant. EFFECT: Security move back 3 spaces. Everyone else move back 2 spaces due to low morale.	When a fight breaks out among employees in the receiving area, Security quickly responds and the employees are brought under control and sent to their supervisor. EFFECT: Receiving is short-handed and must move back 2 spaces. Security move ahead 2 spaces for quick response. Everyone else move back 1 space due to disruption of materials flow.
The fire alarm sounds, causing all employees to have to vacate the building. Security quickly discovers that a wire to the alarm has been chewed in two. EFFECT: Security move ahead 2 spaces. Maintenance move back 2 spaces to repair the wire. Everyone else move back 1 space for loss of time.	Personnel did not schedule its own vacation time in an efficient manner, therefore, Personnel was closed for 3 days last week. EFFECT: Personnel move back 5 spaces for backed-up work. Everyone else move back 1 space for various problems encountered during the week.
Personnel schedules an employee meeting for the purpose of informing employees of changes in the employee handbook. EFFECT: Everyone move back 2 spaces to attend the meeting.	Personnel announces new benefits for employees at no extra cost. EFFECT: Personnel move ahead 5 spaces for innovative management of employee benefits. Everyone else move ahead 3 spaces.
Two new Personnel employees are hired. EFFECT: Personnel is now equipped to handle employee issues in a timely manner. Personnel move ahead 2 spaces. Everyone else move ahead 1 space.	The plant is being sued for faulty construction of product, and it has been discovered that Engineering specified the wrong weight of material for a major project. EFFECT: Engineering move back 6 spaces. Everyone else move back 1 space for shaky work environment.

Security	**Security**
Personnel	**Security**
Personnel	**Personnel**
Engineering	**Personnel**

An 18-wheeler backs over a drop shipment of major parts in the dock area. EFFECT: Receiving move back 2 spaces to clean up the mess. Production move back 4 spaces because the parts were damaged and are of no use. Personnel move back 1 space to look for a new truck driver.	A shipment of parts was not received. Early morning delivery was required, and the Receiving foreman overslept and was not there for the delivery. EFFECT: Production is backed up; move back 3 spaces. The plant's own truck must be sent to an adjoining state to pick up the next order instead of delivering the plant's current product to other customers. Shipping move back 3 spaces. Everyone else move back 1 space due to the expensive mistake.
Everything is running smoothly in Receiving due to quality improvements that were implemented last month. EFFECT: Receiving move ahead 3 spaces. Everyone else move ahead 1 space.	Receiving has hired 2 new employees who will help to speed their process. EFFECT: Receiving is able to quickly give raw materials to Inventory, which in turn has the materials that Production needs. Receiving move ahead 2 spaces. Everyone else move ahead 1 space.
Receiving has had no accidents all year. As a result, Inventory steadily receives all raw materials in a good flow process. EFFECT: Receiving move ahead 3 spaces. Everyone else move ahead 1 space.	Receiving accepts a delivery of some hazardous materials and does not follow the MSDS directions. A potential accident is avoided when Inventory realizes the mistake. EFFECT: Receiving move back 2 spaces. Inventory move ahead 2 spaces for "heads-up" reaction. Everyone else move ahead 1 space due to avoidance of a major industrial accident.
The Maintenance manager retires. EFFECT: Maintenance move back 3 spaces. Personnel move back 2 spaces to promote or hire a new manager. Everyone else move back 1 space to attend the retirement party.	Maintenance repairs the fire alarm wire that was chewed in two by a mouse, but they must repair the wire at least twice a week. The mouse keeps outsmarting the humans and their mousetraps. EFFECT: Employee nerves are on edge due to weekly plant evacuations. Maintenance move back 2 spaces. Everyone else move back 1 space.

Receiving

Receiving

Receiving

Receiving

Receiving

Receiving

Maintenance

Maintenance

The CEO has Maintenance build a carport over a parking area at his home. EFFECT: Maintenance move back 3 spaces. Production move back 2 spaces when they have to wait until the next day to have a machine repaired. Everyone else move back 1 space for time spent grumbling about the CEO using company time and employees for his own gain.	A reorganization of Maintenance has resulted in a plant-wide maintenance plan. EFFECT: Maintenance gains credibility; move ahead 5 spaces. Everyone else move ahead 2 spaces.
Your CEO has been arrested on charges of embezzlement. EFFECT: Trust in your company and its products is spiraling to rock bottom. The Public Relations department must work around the clock to develop a strategic plan on how to handle the situation. PR move back 3 spaces. Accounting must also work around the clock to locate the source of the problem. Accounting move back 3 spaces. Everyone else move back 2 spaces for gossiping and overall lack of productivity.	Your organization must change its name to better reflect its changing image and product line. EFFECT: The PR department is busy fielding e-mails from irate clients who hate your new name. The clients feel like they have been abandoned by your company. PR move back 4 spaces for not properly disseminating information about the name change and spending all day answering the e-mails. All divisions must redo their forms and letterhead and deal with angry clients. Everyone move back 2 spaces.
The CEO did not sign a request for special-order materials before he left for vacation. The deadline for ordering for delivery in time for production has passed. The CEO will be gone all week. EFFECT: Purchasing has to bypass company procedures and policies to order the materials without the CEO's signature. Purchasing move back 3 spaces. Receiving, Production, Inventory, and Shipping will all be behind, so move back 2 spaces. Sales must start planning how to tell the customer about the late shipment, so move back 2 spaces. Everyone else move back 1 space.	Production procedures are changed due to quality improvement training for Production employees. EFFECT: Production's efficiency increases by 10% the following month. Production move ahead 4 spaces. Everyone else move ahead 2 spaces.
Production employees participate in a training session on understanding organizational systems. They play a game called Business Follies and realize that each person is important to the success of the entire organization. EFFECT: Everyone move ahead 4 spaces.	Production handles a huge surge of work efficiently and effectively. EFFECT: Production move ahead 3 spaces. Everyone else move ahead 2 spaces.

Maintenance

Maintenance

Public Relations

Public Relations

Production

Purchasing

Production

Production

Management announces a 2% salary increase across the board due to improved bottom line figures. EFFECT: Everyone zoom ahead 4 spaces and take someone out for dinner tonight.	It has stopped raining after a week of downpours and the sun is out. EFFECT: Everyone move ahead 3 spaces.
Two division managers are each sued by 4 employees on grounds of sexual harassment. Both managers claim the charges are false. EFFECT: PR spends a day researching the problem and its legalities and deciding how to disseminate the information in the company. PR move back 3 spaces. HR is working around the clock with the employees filing the suits and the alleged harassing managers. HR move back 3 spaces. Everyone else move back 2 spaces for gossiping.	

Wild

Wild

Wild

Sales are down due to a freeze on imports. EFFECT: Production, Inventory/Materials Management, Shipping and Receiving, Accounting, and Purchasing move back 4 spaces. Sales move back 4 spaces.	Sales are up due to excellent quality control procedures. EFFECT: Everyone move ahead 1 space. Sales move ahead 2 additional spaces.
Customer Service receives a customer complaint about the shipping of an order. EFFECT: Shipping move back 3 spaces.	A fantastic marketing campaign has been launched and Sales can't keep up. EFFECT: Customers are angry that they can't contact the sales office for ordering. Orders that are taken can't be shipped on time. Sales move ahead 4 spaces, then move back 6 spaces. Shipping move back 2 spaces.
Customer service mails a customer satisfaction survey to 500 customers. The survey is five pages long and contains questions that are not applicable to all customers. EFFECT: The return rate for the survey is only 5%; thus it has been a waste of time, effort, and money, as well as an annoyance to some customers. Sales move back 2 spaces. Public Relations move back 1 space.	A sales representative brings in a huge order. Everything has been orchestrated well with the needed suppliers and production. You deliver everything on time and the customer is very impressed. EFFECT: Very profitable; customer wants to do ongoing business with you. Sales move forward 4 spaces. Purchasing, Receiving, Inventory/Materials Management, Production, Accounting, Public Relations, and Quality Assurance move ahead 3 spaces.
A sales representative promised product delivery to a customer the next week but failed to clear the promised time with Production. The order could not be delivered in the allocated time. EFFECT: The customer had to wait 2 additional weeks to receive the order and has put your company on probation and filed a complaint with Customer Service, and will scrutinize all further orders. Sales move back 4 spaces due to reduction in force. Production and Shipping move back 5 spaces. Public Relations move back 2 spaces. Personnel move back 1 space to hire new sales representative.	A new plant manager has been hired, and it will take a while for him to get into full swing. EFFECT: Personnel is busy with orienting the new plant manager to procedures and company policies so move back 3 spaces. Everyone else move back 1 space for attending the introduction meeting and back another space for time lost to gossip about the new plant manager.

Sales

Sales

Sales

Shipping

Sales

Sales

Personnel

Sales

The state government announces a 2% decrease in employee taxes. EFFECT: Profits go up and the training budget is increased. Everyone move ahead 2 spaces. Personnel move ahead 2 extra spaces.	A quality audit has been done on the company's quality management system. No cases of noncompliance were found. EFFECT: No time is spent on correcting noncompliance. Everyone move ahead 3 spaces.
An internal audit on the quality management system has discovered four cases of noncompliance: 1 in Receiving, 1 in Inventory/Materials Management, and 2 in Production. EFFECT: These noncompliances have been corrected and systems improved. Receiving and Inventory/Materials Management move ahead 2 spaces, Production move ahead 1 space. Everyone else move ahead 3 spaces.	Requested, needed materials have been ordered without at purchase order (PO). EFFECT: Purchasing move back 2 spaces. Accounting move back 3 spaces since they cannot match the invoice to a PO. Receiving move back 1 space since they cannot match the purchase request and received materials to a purchase order.
Purchasing has been able to buy a needed material in bulk, saving the company several thousand dollars. EFFECT: Purchasing move ahead 3 spaces. Inventory and Materials Management move back 3 spaces due to limited storage space.	Purchasing has issued POs for a very large order. After payout on all POs, there is not enough cash reserve to make payroll. The company's line of credit must be used at an interest rate of 12%. EFFECT: Everyone move back 3 spaces.
New technology is purchased that improves the production process. EFFECT: Profits increase and four existing production workers are trained as skilled workers to maintain the new technology. Production zoom ahead 5 spaces. Everyone else move ahead 3 spaces.	Receiving inspection has overlooked a batch of defective widgets, and half of them have been used in production. EFFECT: A partial recall of manufactured parts. Receiving move back 3 spaces. Inventory, Sales, Purchasing, Production, Accounting, and Public Relations move back 2 spaces.

Continuous Quality Improvement

Personnel

Purchasing

Continuous Quality Improvement

Purchasing

Purchasing

Receiving

Purchasing

Shipping has sent a product to a customer without final inspection. EFFECT: The customer order has been returned and no further orders have been received from this customer. Shipping move back 3 spaces. Customer Relations move back 2 spaces to reestablish relationship with customer.	Shipping has sent the wrong parts to a customer. EFFECT: Shipping has had to ship the right parts to the customer and retrieve the original parts and ship them to their intended customer. Shipping move back 3 spaces. Sales move back 2 spaces to reestablish relationship with customer.
Outgoing parts were not packaged properly and were damaged during shipping. EFFECT: New parts had to be manufactured and sent to the customer. Shipping move back 4 spaces. Production move back 3 spaces. Sales move back 2 spaces to reestablish relationship with customer..	A computerized production scheduling system is implemented. EFFECT: Production is increased by 6%. Production move ahead 3 spaces. Shipping move ahead 2 spaces. Everyone else move ahead 1 space.
Production runs out of a major component in the assembly of the product and must order it immediately. EFFECT: Production and Shipping move back 5 spaces to wait for part to be ordered and delivered. Purchasing move back 2 spaces to stop other work and order the part.	A production worker doesn't show up for shift and hasn't called in. EFFECT: The supervisor scrambles to fill the job at the last minute. Production move back 3 spaces. Shipping move back 1 space.
A machine operator is operating his machine unsafely and with little concern for quality work. Other workers refuse to work with him. EFFECT: The machine operator is removed from his work for disciplinary action, and there is a loss of production. Production move back 4 spaces. Shipping move back 1 space. Personnel/Human Resources move back 1 space. Security move ahead 2 spaces for effective handling and removal of belligerent machine operator.	An in-process inspection has turned up a moderate defect, and the supervisor, when notified, has insisted that production continue. EFFECT: During packing, Shipping finds the products to be "nonconforming," and they must be reworked. Production move back 4 spaces. Shipping move ahead 2 spaces for quality work. Personnel/Human Resources move back 3 spaces to hire new supervisor.

Shipping	**Shipping**
Inventory	**Shipping**
Production	**Production**
Production	**Production**

Power loss causes a computer problem in payroll. Some paychecks are delayed two days. EFFECT: Security, Maintenance, Public Relations, and Personnel/Human Resources move back 2 spaces for time spent grumbling about the delay. Maintenance move ahead 5 spaces for repairing the problem. Accounting move back 5 spaces to stop for manual production of paychecks.	Plant manager gets a call from the supplier who has been providing ongoing ISO consulting services. The supplier complains that an invoice is five months outstanding. The supplier has a PO but has not been able to convince Accounts Payable to pay. While this delay has caused a positive effect on cash flow, there is a negative effect from plant manager, who has to chase down payment. EFFECT: Accounting move back 2 spaces for invoice delay then move ahead 2 spaces for the positive cash flow.
Drafting did not finish plans on time. EFFECT: Security move back 1 space due to increased security to protect engineers working through the night. Engineering move back 3 spaces due to exhaustion. Production move back 2 spaces. Purchasing move ahead 5 spaces due to opportunity to reorganize vendor files while waiting for specifications on the order.	A customer requests a design change. Engineering does not get the customer's approval on the change prior to submitting it to Production. Four hundred parts are produced before the customer lets you know that the change is incorrect. EFFECT: Engineering move back 5 spaces. Everyone else move back 2 spaces.
A designer provides Manufacturing with a new design that meets the customer's needs and saves 10% in the scrap rate. EFFECT: Everyone move ahead 2 spaces. Engineering move ahead 2 extra spaces.	There is a chemical spill outside of the plant. Nobody is hurt. The local media report on the spill and the need for cleanup. EFFECT: Public Relations addresses the concern in a positive manner and move ahead 3 spaces. Maintenance assists HazMat workers in an effective manner and moves ahead 2 spaces. Receiving move back 1 space due to HazMat workers and cleanup machinery partially blocking truck bays. Production move back 1 space due to receiving backup. Security move back 2 spaces due to overtime to keep neighbors and sightseers out of the tainted area.
The budget for preventive maintenance was decreased by 25% six months ago, and much of the machinery is starting to break down. EFFECT: Maintenance move back 2 spaces. Everyone move back 1 space.	The crew responsible for preventive maintenance has received training in hydraulic and pneumatic equipment. Now the hydraulic/pneumatic machinery is performing more efficiently with fewer breakdowns. EFFECT: Everyone move ahead 3 spaces. Maintenance move ahead 2 extra spaces.

Accounting

Accounting

Engineering

Engineering

Public Relations

Engineering

Maintenance

Maintenance

An outside door was not completely shut last night, and neighborhood junkyard dogs came in and destroyed half of yesterday's product. EFFECT: Security move back 4 spaces to work a double shift due to employee termination. Sales, Shipping, and Inventory/Materials move back 3 spaces. Personnel/Human Resources move back 1 space to hire new security guard. Purchasing move back 1 space to order new materials for production. Production move back 4 spaces to clean up the mess and replace the lost product. Maintenance move back 1 space to help with repairs. Public Relations move back one space to inform customer of partial shipment.	The warehouse next door to your facility caught fire last night. Due to the quick responsiveness of your night security in turning in the alarm, firefighters were able to contain the fire to the warehouse only. EFFECT: Everyone move ahead 4 spaces. Security move ahead an extra 2 spaces for a heads-up reaction.
There was a major flood in your area last night. EFFECT: Everyone move back 5 spaces due to delay in work day.	Complaints have come from all departments on the dress of some employees, such as obscene T-shirts and jewelry creating unsafe conditions. Therefore, management has enacted a uniform policy. EFFECT: Employee morale is down since some think they are being punished for others' choices. Others are upset due to not being able to express themselves in their clothing. Everyone move back 3 spaces. Personnel/Human Resources move back 2 extra spaces for time to formulate a dress code and resolve the morale problem.
An employee gets a raise because he is the cousin of the plant owner. EFFECT: Low employee morale. Everyone move back 2 spaces.	A very important customer and members of your head office's management will tour your plant next week. Maintenance personnel are kept overtime to clean up the production area. EFFECT: Workers' morale increases when they see the results, but it decreases when they realize the reason for sprucing up the plant. Everyone stay on the same spaces.
It's a day in August, and the temperature in the plant exceeds 95 ° F. The afternoon shift is canceled. EFFECT: Production loses a shift worth of product, and sales representatives have to explain why a customer deadline can't be met. Production move back 5 spaces. Sales move forward one space for preserving customer relations.	

Security

Wild

Wild

Security

Wild

Wild

Wild

Purchasing finds a new source of a critical component at 12% lower cost. Engineering tests the part and approves the change. EFFECT: Purchasing and Engineering move ahead 3 spaces. Inventory move back 1 space. All others move ahead 1 space.	Purchasing orders a critical part from a new vendor without consulting Engineering. The part is faulty but passes incoming quality assurance and is used in a 20,000-piece production run. The performance of the company's leading product goes down 25%. EFFECT: Everyone move back 3 spaces.
Sales devises a new marketing process that increases sales by 25%. EFFECT: Sales move up 5 spaces. Everyone move ahead 2 spaces.	Engineering devises a "just-in-time" production process that reduces both raw material and finished product inventories by 80%. EFFECT: Inventory move ahead 5 spaces. Shipping and Receiving move back 2 spaces for reorganization. Engineering move ahead 5 spaces for innovation. Personnel move back 2 spaces for retraining. Everyone else move ahead 2 spaces.
The plant that produces 90% of the world's supply of a critical plastic is destroyed by fire. Engineering finds an alternate material and process 12 weeks before the competition does. EFFECT: Engineering move ahead 3 spaces. Sales move ahead 5 spaces. Production move back 2 spaces due to overload. All others move ahead 2 spaces.	The only person in Maintenance who can repair a key production machine retires. The replacement is incompetent. The rejection rate for a critical part goes up 30%. Overtime goes up 50%. EFFECT: Everyone move back 3 spaces. Maintenance and Personnel move back 2 extra spaces.
Personnel hires a machine operator who wants 30% more than the company has been paying for the job. EFFECT: Everyone move back 2 spaces. Personnel move back 2 more spaces.	The Engineering manager fired a staff member for dress code violations. The design for which the fired staff member had been responsible is now completed by an outside consultant. The design is put into production and results in a 70% rejection rate. EFFECT: Everyone move back 3 spaces. Engineering move back 3 more spaces.

Purchasing

Purchasing

Engineering

Sales

Maintenance

Engineering

Engineering

Personnel

The latest quarterly report is released by Public Relations. Stocks and company money are up. Public Relations does a great job of handling the media and gets top exposure in regional news. EFFECT: Public Relations move ahead 5 spaces. Everyone else move ahead 3 spaces due to companywide bonus.	An internal company newsletter and intranet are produced. The company's communication system improves in accuracy and speed of delivery, and employee morale goes up. EFFECT: Public Relations move ahead 4 spaces. Everyone else move ahead 3 spaces.
The Public Relations department effectively handled citizens' complaints about pollution. EFFECT: Everyone move ahead 3 spaces. Public Relations move ahead 2 extra spaces.	The Public Relations intern was rude to a media representative who wanted to promote the company's recent contribution to the community. The reporter instead wrote a negative article on pollution emitted by the company's plant. EFFECT: Public Relations move back 5 spaces. Everyone else move back 2 spaces.
The Public Relations department implements a new and improved filing system for organizing company statistics and information. Management is able to get the needed information to meet a very tight deadline for a new contract. EFFECT: Public Relations move ahead 5 spaces. Everyone else move ahead 3 spaces for benefiting from the newly awarded contract.	A continuous-quality-improvement training program for all production workers was completed about 4 months ago. Production is up 5% as a result. EFFECT: Personnel and Production move ahead 5 spaces. Everyone else move ahead 2 spaces.
Engineering successfully implements a new computer drafting program. As a result, deadlines are met that positively affect down-the-line processes. EFFECT: Engineering move ahead 5 spaces. Everyone else move ahead 3 spaces.	The external audit produced a great report. New accounting procedures implemented last year are paying off. EFFECT: Accounting move ahead 5 spaces. Everyone else move ahead 3 spaces.

Public Relations

Public Relations

Public Relations

Public Relations

Continuous Quality Improvement

Continuous Quality Improvement

Continuous Quality Improvement

Continuous Quality Improvement

New silent alarm system implemented by Security 2 years ago pays off as 4 burglars are caught over the weekend. They are caught with 2 important measurement instruments used by Production, the petty cash box from Accounting, confidential records from Personnel, and expensive tools from Maintenance. EFFECT: Security move ahead 4 spaces. Everyone else move ahead 3 spaces.	The implementation of a maintenance schedule for all departments and machinery has paid off. Many major problems are avoided. EFFECT: Maintenance move ahead 3 spaces. Everyone else move ahead 2 spaces.
The truck bays for receiving were reworked for safer handling of materials. As a result, the raw materials are not damaged as easily and employees are having fewer absences related to back trouble. EFFECT: Receiving move ahead 4 spaces. Everyone else move ahead 2 spaces.	Organizing Production into cross-functional teams is paying off. Production does not slow down when employees are absent. EFFECT: Production move ahead 4 spaces. Everyone else move ahead 2 spaces.
New labeling machine helps to get company product out of the plant in an efficient manner. EFFECT: Shipping move ahead 3 spaces. Everyone else move ahead 2 spaces.	New telephone system provides enough lines for Purchasing to make the necessary phone calls for ordering equipment and materials. EFFECT: Deadlines are met. Purchasing move ahead 3 spaces. Everyone else move ahead 2 spaces.
The new Marketing webpage is paying off. Sales are up as a direct result of on-line purchasing and help lines. EFFECT: Sales move ahead 5 spaces. Everyone else move ahead 3 spaces.	New forklifts help make picking up materials easier and faster. EFFECT: Inventory and Materials Management move ahead 3 spaces. Everyone else move ahead 2 spaces.

Continuous Quality Improvement

Continuous Quality Improvement

Continuous Quality Improvement

Continuous Quality Improvement

Continuous Quality Improvement

Continuous Quality Improvement

Continuous Quality Improvement

Use this card instead of moving backward for any one turn. You can use this card only once during each game.	Use this card instead of moving backward for any one turn. You can use this card only once during each game.
Use this card instead of moving backward for any one turn. You can use this card only once during each game.	Use this card instead of moving backward for any one turn. You can use this card only once during each game.
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Quality Assurance

Quality Assurance

Quality Assurance

Quality Assurance

Quality Assurance

Quality Assurance

Quality Assurance

Quality Assurance

Accounting

Accounting

Engineering

Inventory

Inventory

Maintenance

Personnel

Production

Production

Public Relations

Purchasing

Quality Assurance

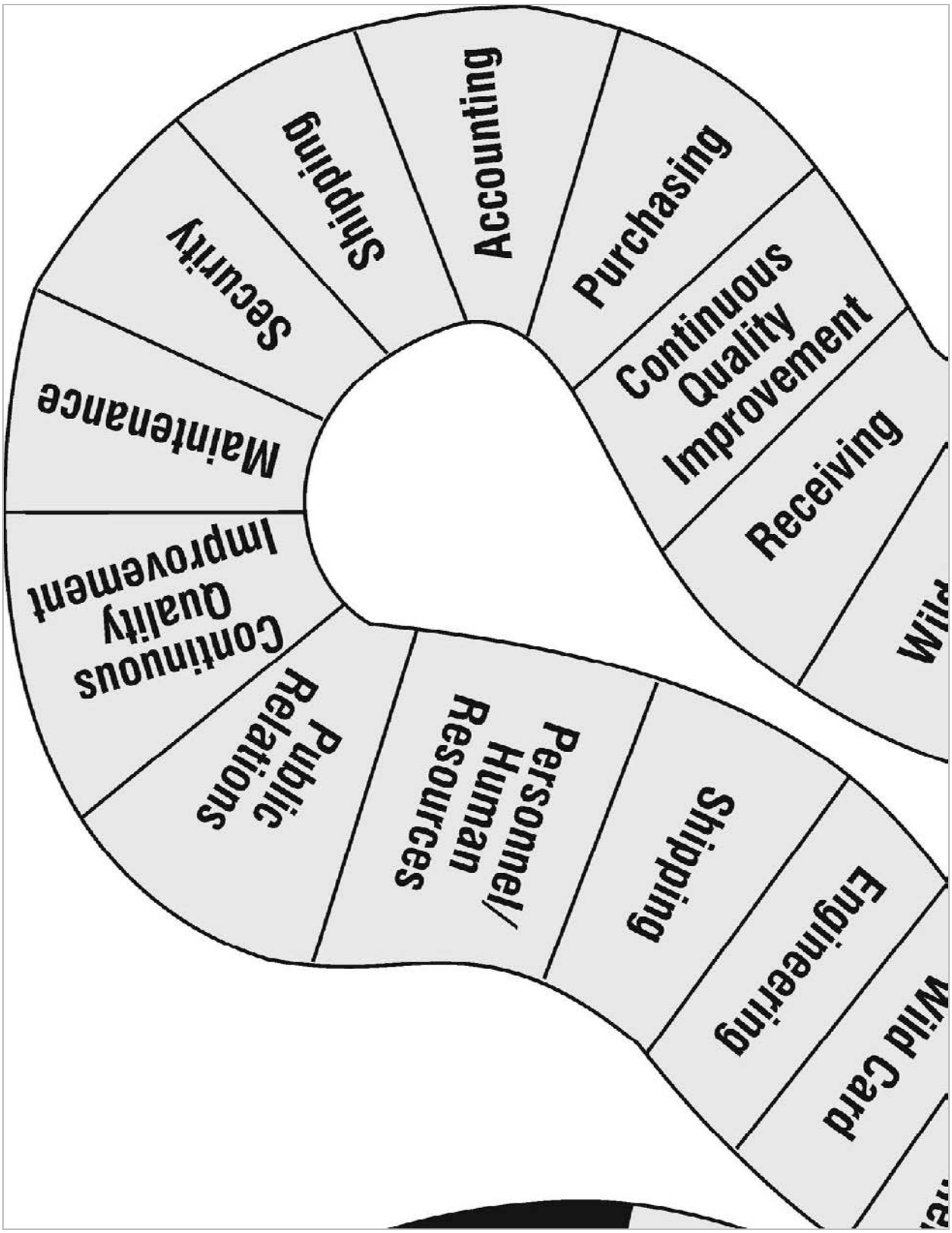
Quality Assurance

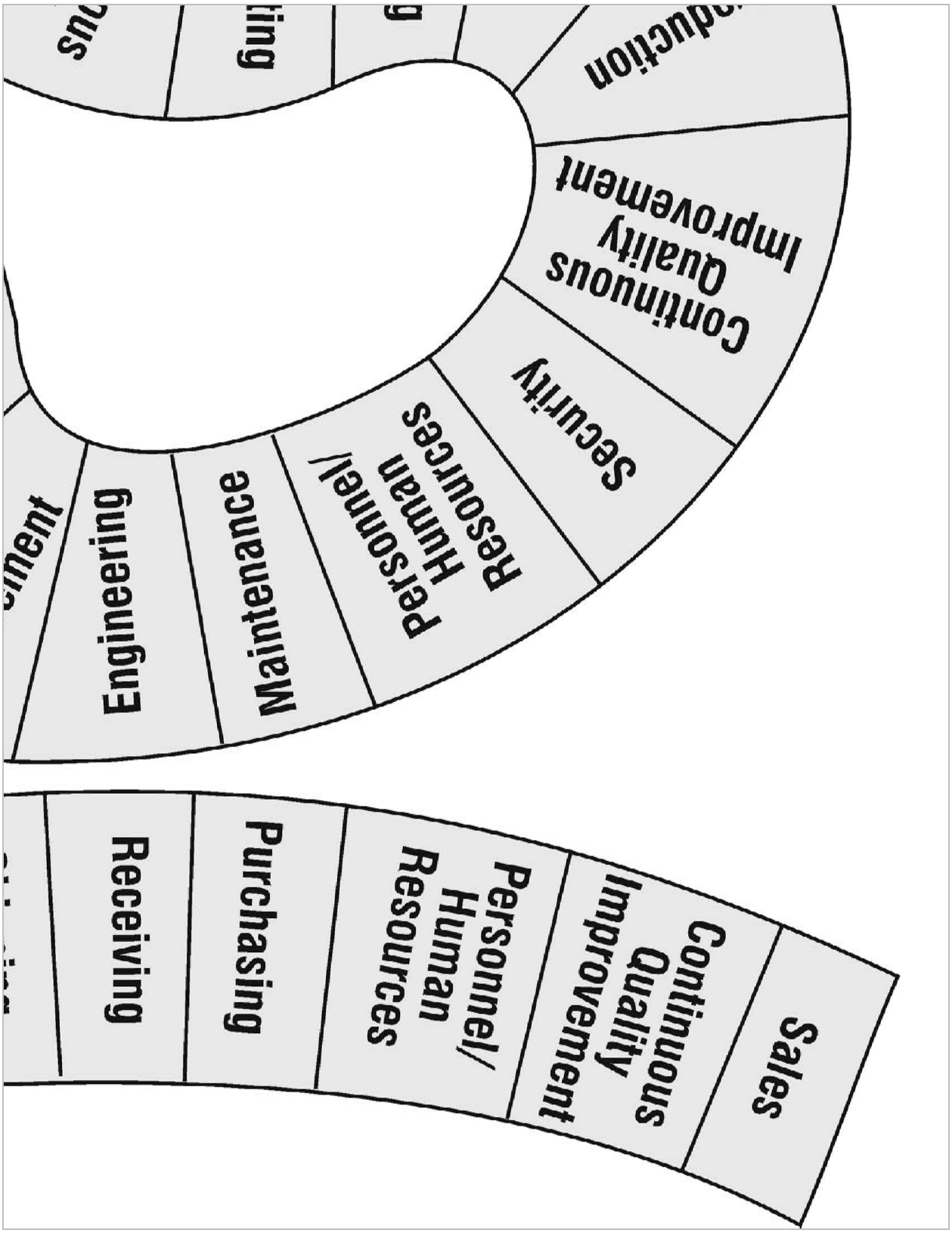
Receiving

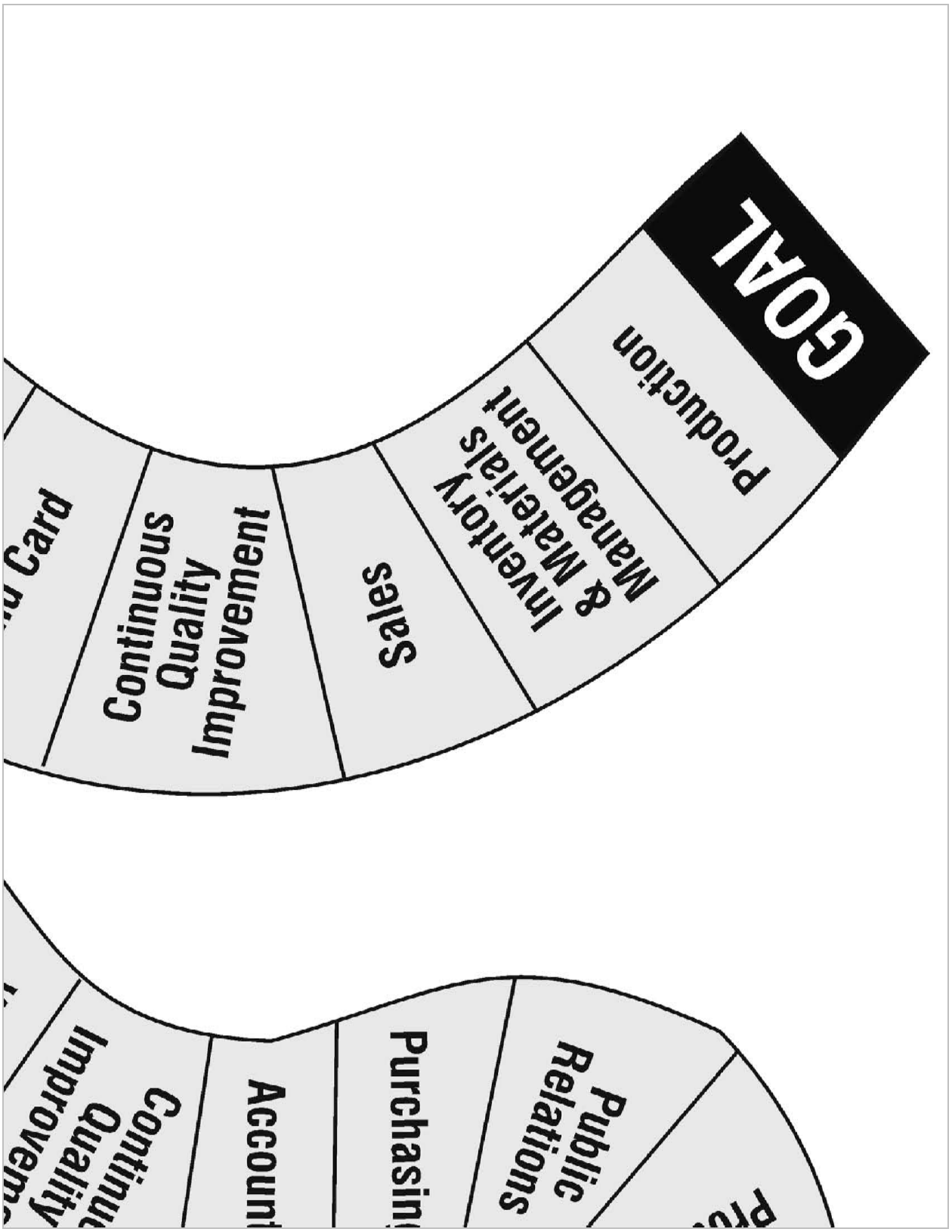
Sales

Security

Shipping


Accounting
Purchasing
Continuous Quality Improvement
Receiving
Shipping
Security
Maintenance
Continuous Quality Improvement
Public Relations
Personnel/ Human Resources
Shipping
Engineering
Wild Card


Sales
Continuous Quality Improvement
Personnel/ Human Resources
Purchasing
Receiving
Engineering
Maintenance
Personnel/ Human Resources
Security
Continuous Quality Improvement


GOAL
Production
Inventory & Materials Management
Sales
Continuous Quality Improvement
Card
Purchasing
Public Relations


START
Sales
Inventory & Materials Management
Wild Card
Continuous Quality Improve
Shipping
Continuous Quality Improvement
Inventory & Materials Management
Engineering
Production
Accounting
Receiving
Maintenance
Public Relations
Security

Assessment Tools/Strategies

This section includes specific strategies and instruments for assessing students' knowledge, skills, and attitudes in regards to initiative and dependability skills.

RUBRICS

Rubrics are valuable assessment tools. Students should be provided with the rubric by which they will be assessed before an activity begins so they will understand the performance expectations. When time permits, students can contribute to the rubrics by brainstorming with the instructor about what a quality behavior or product looks like. For example, before assigning a project, ask students to describe how the ideal should look when completed successfully. Prompt students with specific components. Then have them describe a poor performance. These will be the descriptions of the characteristics for the highest and lowest ends of the Likert scale for each performance criteria. Instructors should add any required attributes to the rubric if the students do not come up with them on their own. Several Initiative and Dependability evaluation rubrics have been provided as examples.

- The first type of rubric lists attributes that can be observed. These include spaces where the instructor can adapt the rubric for a specific project or activity by inserting additional criteria. There are two of these rubrics dealing with different aspects of initiative and dependability in this section: Scheduling and Housekeeping.

- Another type of rubric is more complex as it requires a comparison between a student's view of his/ her performance and a peer and instructor review. It is exemplified by the rubrics: Positive Attitudes Personally and Professionally; Role of Awareness of Abilities and Skills; Successful Job Performance; Job-Keeping Skills; Work Ethic; and Self-Management. The student completes a rubric by providing examples of satisfactory or exemplary performance of the tasks/behaviors listed. Then the student meets with the instructor or peer observer and compares his/her reflections with their instructor's or peers' observations and formulates an action plan for improving attitudes, behaviors or skills.

  This type of rubric most resembles the type of assessment an employee might receive on the job. It is also the most time consuming. Ideally, this rubric would be used at least three times during a course:

  - At the beginning of the course, to get a baseline and to give students suggestions for specific actions they might take to improve their performance,
  - At the midpoint of the course, to check progress and refine the recommendations for improvement, and
  - At the end of the course, to assess the progress made over the duration of the course. Additional suggestions can be made for students' continued growth beyond the end of the course.

RUBRIC FOR SCHEDULING

Outcome: Scheduling – Develop, communicate, and implement schedules, either electronically or manually; Read and follow schedules so that jobs are completed by the respective due date in accordance with user requests.

Determines when to use manual or electronic scheduling tools.	1 2 3 4 5
Selects and uses software to track and manage schedules.	1 2 3 4 5
Monitors and adjusts schedules to complete projects on time.	1 2 3 4 5
Works with others involved in the project to develop appropriate timelines and schedules.	1 2 3 4 5
Keeps everyone involved in the project informed of project progress.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

RUBRIC FOR GENERAL HOUSEKEEPING

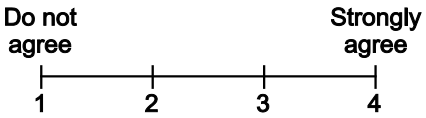
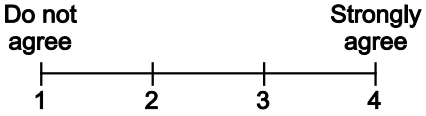
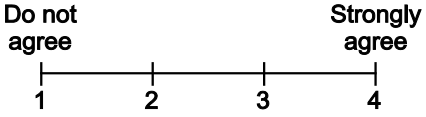
Outcome: General Housekeeping – Implement general housekeeping practices to maintain a neat and orderly work area while recognizing the connection to successful job performance.

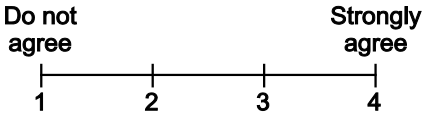
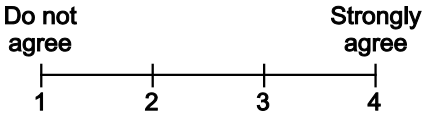
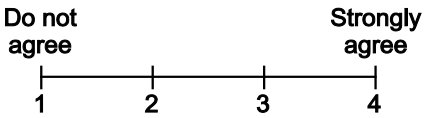
Cleans work area and equipment according to acceptable standards.	1 2 3 4 5
Uses techniques that preserve the safety of self and others.	1 2 3 4 5
Keeps work area free from clutter.	1 2 3 4 5
Properly stores equipment and supplies.	1 2 3 4 5
Exhibits a sense of pride in the work area, which is a reflection on the person, and their work.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

RUBRIC FOR POSITIVE ATTITUDES PERSONALLY AND PROFESSIONALLY

Outcome: Positive Attitudes Personally and Professionally – Model effective work attitudes and behaviors in both personal and professional settings.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your positive attitude personally and professionally.
Demonstrated a positive view of yourself.	Example: Peer/instructor review: 	Steps:
Recognized that your behavior may have a positive or negative impact on others in your group.	Example: Peer/instructor review: 	Steps:
Experienced a sense of personal pride and responsibility.	Example: Peer/instructor review: 	Steps:

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your positive attitude personally and professionally.
Recognized that your words and actions reveal what you personally value or believe.	Example: Peer/instructor review:  	Steps:
Were aware of your beliefs, feelings, and opinions that affected your attitude toward others and the task.	Example: Peer/instructor review:  	Steps:
Experienced a positive attitude toward learning something new.	Example: Peer/instructor review:  	Steps:

Peer comments and suggestions:
Instructor comments:

RUBRIC FOR ROLE OF AWARENESS OF ABILITIES AND SKILLS

Outcome: Role of Awareness of Abilities and Skills – Demonstrate an understanding of personal abilities and skills with an awareness of the impact on career development and achievement in academic and occupational skills. Discuss the impact of abilities and skills on colleagues and clients.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve awareness of your own abilities and skills in your career development.
Demonstrated an appreciation of your personal abilities and skills.	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:
Identified one of your weaknesses.	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:
Matched one of your abilities or skills with one of your educational or career goals.	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:

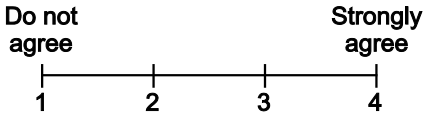
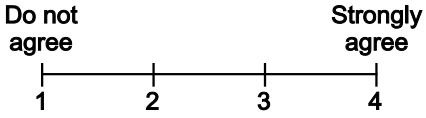
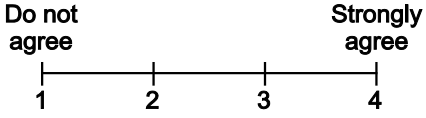
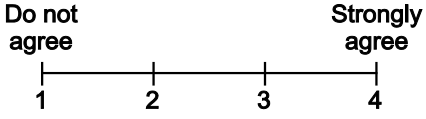
Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve awareness of your own abilities and skills in your career development.
Discovered or continued practicing techniques you use that help you accomplish a goal or task.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Recognized the influence of your abilities and skills on others.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Peer comments and suggestions:
Instructor comments:

RUBRIC FOR SUCCESSFUL JOB PERFORMANCE

Outcome: Successful Job Performance – Recognize and value effective work ethic attitudes and behaviors which support the ability to be successful in job performance, such as acceptance of the requirements of the job, a willingness to take initiative with new challenges; taking responsibility for decisions and actions; and recognizing the necessity of being prompt, accurate, and reliable in completing tasks.

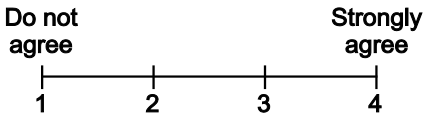
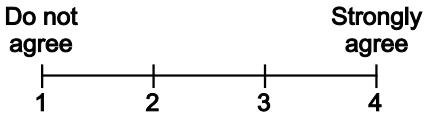
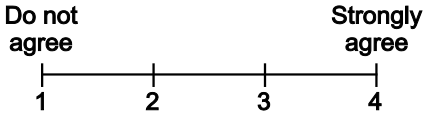
Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your attitudes and behaviors for successful job performance.
Demonstrated a positive and responsible attitude while fulfilling the requirements of the job.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Took initiative and sought new challenges.	Example: Peer/instructor review: Peer/supervisor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Took responsibility for your own decisions and actions.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

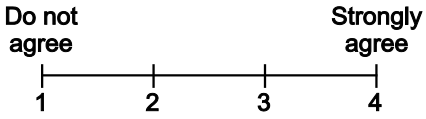
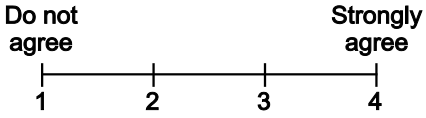
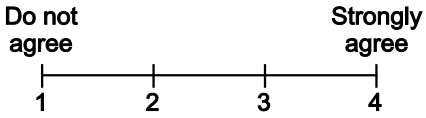
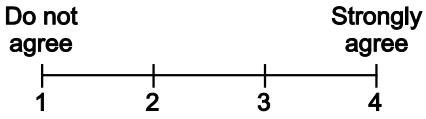
Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your attitudes and behaviors for successful job performance.
Demonstrated promptness, accuracy, and reliability in completing a task.	Example: Peer/instructor review: 	Steps:
Consistently demonstrated a good attendance record and/or demonstrated punctuality and enthusiasm in completing a task.	Example: Peer/instructor review: 	Steps:
Demonstrated pride in your work.	Example: Peer/instructor review: 	Steps:
Accepted directions, accepted constructive criticism, and/or adjusted your behavior to the situation.	Example: Peer/instructor review: 	Steps:

Peer comments and suggestions:
Instructor comments:

RUBRIC FOR JOB-KEEPING SKILLS

Outcome: Job-Keeping Skills – Recognize and implement employer expectations for maintaining a job. Basic employability skills include communication skills, thinking skills, and interpersonal skills. Recognize the importance of a personal work ethic.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your job-keeping skills.
Orally communicated with others in a clear and organized manner.	Example: Peer/supervisor review:  	Steps:
Clearly communicated information in writing.	Example: Peer/supervisor review:  	Steps:
Listened attentively to others.	Example: Peer/supervisor review:  	Steps:

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your job-keeping skills.
Used creative thinking to explore options and consider consequences.	Example: Peer/instructor review:  	Steps:
Used decision-making skills.	Example: Peer/instructor review:  	Steps:
Used reasoning skills.	Example: Peer/instructor review:  	Steps:
Used problem-solving skills.	Example: Peer/instructor review:  	Steps:

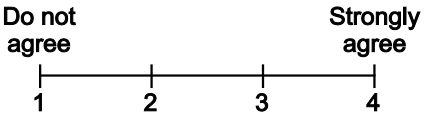
Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your job-keeping skills.
Gathered, evaluated, and organized information for successful job performance.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Prioritized work to complete the task on time and with accuracy.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Demonstrated responsibility for the safety of yourself and others.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Demonstrated effective interpersonal skills with supervisors, colleagues, and/or clients.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Peer comments and suggestions:
Instructor comments:

RUBRIC FOR WORK ETHIC

Outcome: Work Ethic – Display conscientious personal and professional work habits, seek ongoing professional development, improve performance for the benefit of self and the employer, and display a sense of personal responsibility for the welfare of the company and colleagues. Elaboration: The work force requires workers with a strong work ethic in which the worker demonstrates conscientious personal and professional work habits and behaviors. It includes a willingness to engage in professional development leading to improved performance that benefits self and the employer. The worker must display a sense of personal responsibility for the welfare of the company and colleagues.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your work ethic.
Demonstrated consistent ability to be punctual, maintained regular attendance, performed at a high level of quality meeting or exceeding job expectations, motivated self, and behaved honestly.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Participated in a professional development opportunity that resulted in improved performance and benefited both yourself and your employer.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Documented and reported professional development.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

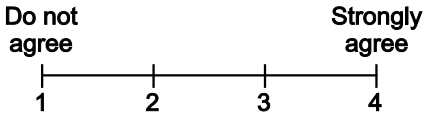
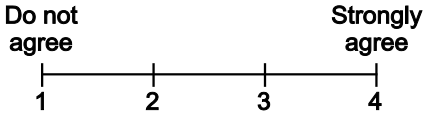
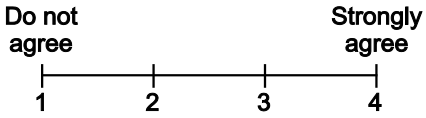
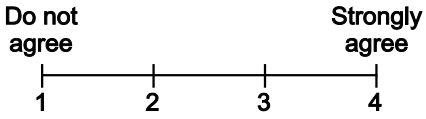
Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your work ethic.
Demonstrated personal responsibility for the welfare of the company and your colleagues.	Example: Peer/instructor review:  	Steps:

Peer comments and suggestions:
Instructor comments:

RUBRIC FOR SELF-MANAGEMENT

Outcome: Self-Management in the Workplace – Display skills of organization and time management.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your self-management skills.
Demonstrated the ability to plan workloads.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Demonstrated the ability to maintain your work area.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Used technology according to purpose.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your self-management skills.
Accomplished strategic goals.	Example: Peer/instructor review:  	Steps:
Used visual display of information such as Gantt charts.	Example: Peer/instructor review:  	Steps:
Organized resources for easy access.	Example: Peer/instructor review:  	Steps:
Managed work, family, and leisure-time demands.	Example: Peer/instructor review:  	Steps:

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peer or instructor, describe the steps you might take to continue or improve your self-management skills.
Developed a time-management plan that monitored your progress toward goals.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Developed and followed a work schedule.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Conducted a time-management analysis with an awareness of poor time management and its consequences.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Peer comments and suggestions:
Instructor comments:

Videos and Weblinks

VIDEOS

http://www.youtube.com/watch?v=blaK_tB_KQA (low res)

http://archive.org/details/GabrielRobins-TimeManagementByRandyPauschNovember2007187 (hi res)

Excellent "Time Management" lecture by the late Randy Pausch, University of Virginia, Nov 2007. (1h 26m)

http://www.youtube.com/watch?v=Ae-VJ_lauCw (part 1 of 3, 5:09)

http://www.youtube.com/watch?v=kiQV0oTyd98 (part 2 of 3, 4:22)

http://www.youtube.com/watch?v=su2UuP3aqZg (part 3 of 3, 4:45)

"Setting Goals" by Zig Ziglar, renowned motivational speaker. Lo-def video, but a high-quality message.

http://www.youtube.com/watch?v=uThBb3kGf4k

Whiteboard lecture (by Erica Olsen, Vice President of M3 Planning) about setting goals using the S.M.A.R.T. acronym, using a simple business goal as an example. (4:44)

WEBLINKS

http://creately.com/

This site allows you to develop diagrams of all types including Gantt charts. Limited free version.

http://docs.google.com/

Once students have created a free account they can use the Gantt chart templates with the spreadsheet program to create project schedules and schedule assignments and so forth.

http://www.mindtools.com/index.html

Mind Tools toolkit provides numerous free articles on various topics including time management.

http://www.rightattitudes.com/2008/10/21/log-where-time-actually-goes/

Online guide to logging one's daily time, including blank forms: 24 hours in 10-minute intervals (4 pages) and 11 hours in 15-minute intervals (1 page).

http://www.stevepavlina.com/articles/triple-your-personal-productivity.htm

Guidelines from a Time Management consultant for logging your time and eliminating waste.

http://freelanceswitch.com/productivity/free-time-tracking-apps/

Top time-tracking applications, for those who dislike paper logs.

https://www.google.com/search?q=messy%20desk&num=50&safe=on&hl=en&um=1&ie=UTF-8&tbm=isch

Google can provide hundreds of photos of “messy desks” for the activity “Maintaining Your Workspace and Equipment.”

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Information Processing

Overview

The ability to manage information is essential in today's technological workplace. Beyond the obvious exchange of emails and text messages, there is the ever-growing flow of documents, training materials, phostography and videography, and data of all types (financial, medical, legal, statistical, scientific, and so forth). While physical libraries still contain vast repositories of information and reading materials in print, more and more of our knowledge and information is being handled electronically. For example, as of this writing the world's total capacity to store information is growing exponentially, leaving behind the exabyte (10^{18} bytes) and moving into the zettabyte (10^{21} bytes). (See *Science,* 1 April 2011: Vol. 332 no. 6025 pp. 60–65). A zettabyte is about 1 million terabytes.

In today's workplace, workers in almost any career area must manage a large flow of information. This activity will equip students to process some of this information so that they will not be overwhelmed. To that end, we've broken this module into five categories and will consider each in turn:

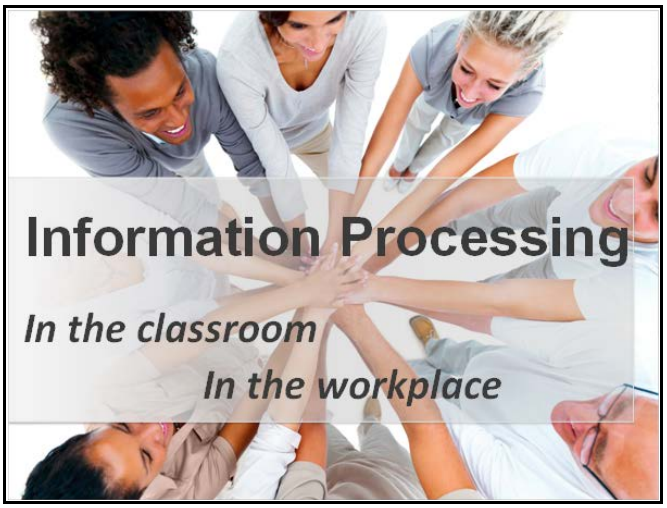
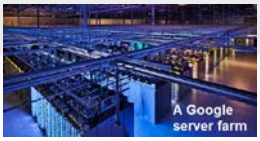
1. **Acquiring:** locating and using sources of information; assessing their validity and reliability; searching libraries and the Internet; and citing sources to avoid plagiarism and copyright infringement
2. **Evaluating:** assessing the validity of sources and data (e.g., blogs versus scientific journals) and reliability of Internet data; considering periodicals, infomercials, advertising as potential sources; and citing sources for future research
3. **Organizing:** dealing with large volumes of information; using spreadsheets and databases; and making a table of contents or an index
4. **Managing/Presenting:** processing large volumes of information; avoiding data distortions (e.g., out-of-scale graphs and incorrect data subsets); and selecting and preparing charts (e.g., pie charts, line charts)
5. **Interpreting:** using basic statistics to analyze and graph data; understanding linear vs. logarithmic scales; and making historical comparisons

Clearly, each of these topics could be expanded into an entire course. The suggested activities will serve as an introduction to the wealth of subject material available for further study and exploration—a supplement for your existing coursework.

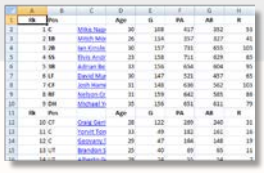
In this module we have provided

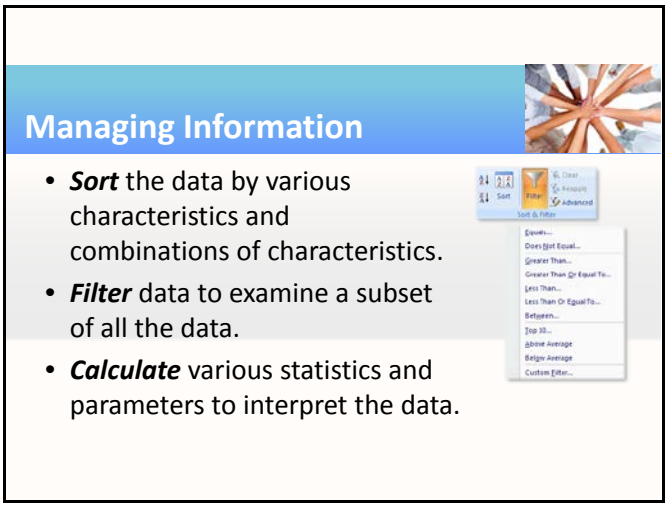
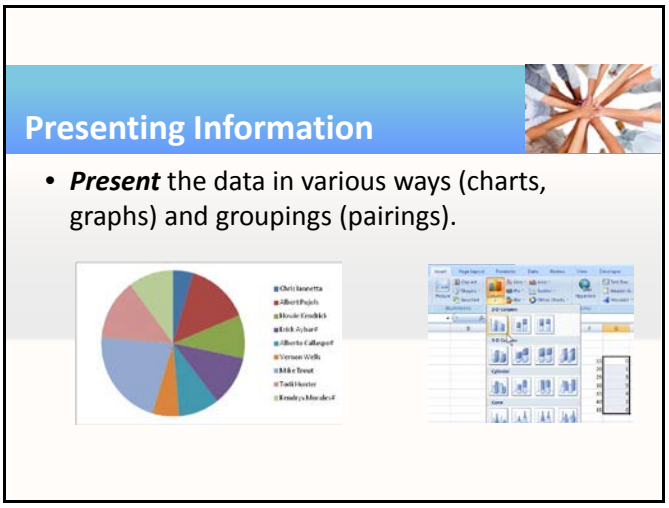
- **Instructor Presentation Materials**—A set of slides to help organize the topics for discussion, and to provide talking points that introduce the activities
- **Classroom Activities**—A set of activities requiring minimal material and preparation, addressing several facets of information processing
- **Assessment Tools**—Rubrics for use by both instructor and student to assist in gauging progress throughout the course
- **Videos and Links**—A collection of links that enable the user to take advantage of the abundance of electronic resources available

Presentation Materials

	SLIDE	TEACHER NOTES
1		
2	**Information is growing exponentially!** • New PC can be equipped with 3 TB hard drive (that's ~3,000 GB or 3,000,000 MB!). • World's estimated data capacity in 2012 was over 2.5 zettabytes. • What's a zettabyte? 	• A zettabyte is a trillion gigabytes! So, 2.5 ZB ~ 2.5 x 10^{21} bytes = 2.5 x 10^{12} GB, that is 2.5 trillion gigabytes—quite incomprehensible. • A review of those metric prefixes is on the next slide.
3	**Metric Prefixes: Powers of Ten** • 1 Bit = Binary Digit • 8 Bits = 1 Byte = 10^0 B • 1,024 Bytes = 1 Kilobyte = 10^3 B • 1,024 Kilobytes = 1 Megabyte = 10^6 B • 1,024 Megabytes = 1 Gigabyte = 10^9 B • 1,024 Gigabytes = 1 Terabyte = 10^{12} B • 1,024 Terabytes = 1 Petabyte = 10^{15} B • 1,024 Petabytes = 1 Exabyte = 10^{18} B • 1,024 Exabytes = 1 Zettabyte = 10^{21} B • 1,024 Zettabytes = 1 Yottabyte = 10^{24} B • 1,024 Yottabytes = 1 Brontobyte = 10^{27} B • 1,024 Brontobytes = 1 Geopbyte = 10^{30} B	• Here's a review of those metric prefixes. Strictly speaking, 1 kilobyte = 1,024 B, 1 megabyte = 1,024 kB, and so forth as shown on the slide here, but it's common to round the value "1,024" to just "1000" and thus say 1 megabyte = 1 thousand kilobytes = 1 million bytes, and so forth.

SLIDE	TEACHER NOTES
4 **Handling Information in a Modern World**  • **Acquiring information:** locate and cite sources, assess source validity, use search tools • **Evaluating information:** current, valid, reliable source • **Organizing:** use tables, spreadsheets, databases, index • **Managing/Presenting:** make graphs and charts, type of graph (x-y, pie chart, bar chart), don't distort scale • **Interpreting:** statistics, graphs, linear/log scales, timelines	• **Acquiring:** Locating sources of information; assessing their reliability; techniques for searching (library, web browsers); citing sources to avoid plagiarism and copyright infringement • **Evaluating:** Assessing the validity of sources and data (e.g., "Bigfoot" versus scientific); reliability of Internet data; considering periodicals, infomercials, advertising; citing sources for future research • **Organizing:** Dealing with large volumes of information; using spreadsheets and databases; making a table of contents or an index • **Managing/Presenting:** Dealing with large volumes of information; avoiding data distortions (e.g., out-of-scale graphs, data subsets); selecting and preparing charts • **Interpreting:** Using basic statistics to analyze and graph data; linear versus logarithmic; making historical comparisons and perspectives
5 **Acquiring Information: A Scavenger Hunt**  • Given a list of items: ***Search, Find,*** *and* ***Cite***. • Internet search engines are powerful. • Citation information: – **Text:** Last name, First name. Title of Book. Place of Publication: Publisher, Year of Publication. – **Web:** Page source (organization or business): Page title. Date of publication.Date of collection, URL. • A citation enables a reader to verify your find.	• The activity for "Acquiring" will be like a scavenger hunt, in which students are given a list of questions to research and answer. In addition to the answers, they must cite the sources so that a reader can verify them. • Students will likely be quite familiar with and comfortable using Internet search engines like Google, Bing, and Yahoo. • The search topics can all be found online, but a couple can also be found in a traditional reference book (e.g., CRC Handbook). Encourage students to remember that printed materials are sometimes the best sources of information. • Common citation formats are MLA, ALA, and Chicago. If you wish to teach a particular citation style, the Purdue University Online Writing Lab has an excellent resource: http://owl.english.purdue.edu/owl/section/2/.

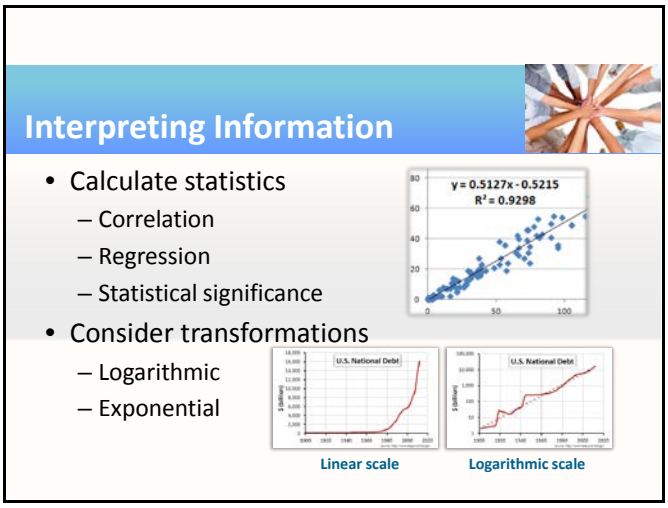
	SLIDE	TEACHER NOTES
6	**Evaluating Information** • Printed publications are edited, proofed, typeset, and printed: **usually reliable.** • Web content can go from keyboard to web page in a matter of seconds: **trustworthy?** • "Let the *Reader* beware." – Who is responsible? – What is the source? – How accurate and reliable?  	• Students who routinely surf the web quickly develop a sense about the reliability of the information presented on a website but still may be fooled by a slickly presented page that offers something that sounds too good to be true. This activity encourages students to question claims and "statements of fact" they find on the web. The handout offers sites to visit and evaluate. The instructor can add to the list. Another handout gives a checklist for assessing each website.
7	**Organizing Information: Using a Spreadsheet** • Data, data everywhere! • Copy/paste data into a spreadsheet so you can: – Reorder it – Label it – Calculate with it – Sort it • Example supply of data: sports statistics from several teams  	• In this activity students select data and work a few exercises that demonstrate how easy it can be to harvest and manipulate large amounts of data in a few minutes. • We've selected the career-neutral area of sports statistics to demonstrate the skills in this activity. But as noted (and suggested with examples) in the accompanying module, one can find sources of data in every career field. By using sports statistics, the data is current, voluminous, and reliable. Most Americans are acquainted with the basics of baseball, so much of the terminology should be understandable. • The activity will give copy/paste instructions to accurately transfer the data from the web page to a spreadsheet file.

	SLIDE	TEACHER NOTES
8		• Sorting (to find the largest or smallest, compare groupings, etc.) is one of the things computers do easily with large lists of data, but is hard for people to do manually. • This is not a lesson about filtering, but exposes students to what can be accomplished by filtering. As illustrated by the Excel dropdown captured on this slide, filtering can use any of several basic value comparisons, as well as custom filters. • Of course, every spreadsheet is equipped with a whole host of functions and presentation tools to analyze and further "crunch" the data. The activity guidelines and accompanying handouts offer some introduction to these capabilities.
9		• Just as Excel spreadsheets are good at calculating, they are also good at making graphs and charts.

SLIDE

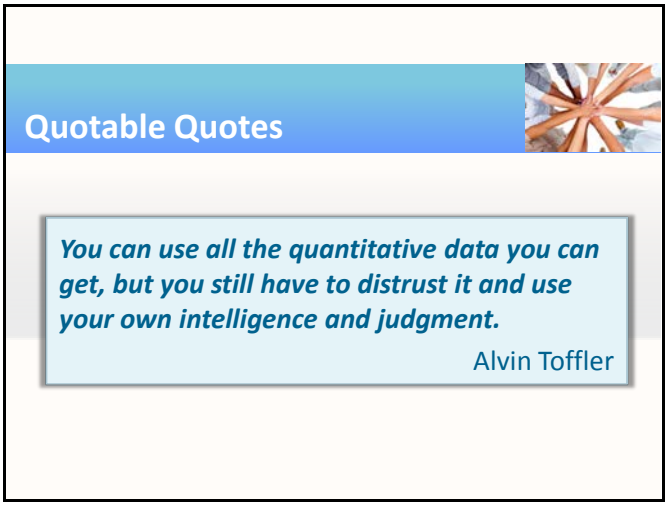
TEACHER NOTES

10



- In some ways the final activity is a continuation of the preceding activity since it involves graphing. But in this case, we are more interested in the analysis of the data, and in many cases a graph is the start of that analysis.
- Many data relationships we encounter are linear, so linear regression in which we are able to interpret the slope as a trend/rate, or a parameter in a relationship, is applied.
- The activity guidelines include a brief exposure to statistical analysis (*t*-test) using the elementary functions included in Excel. A more extensive treatment of statistical analysis would require special software and is well beyond the scope of this activity.
- Humans aren't very good at handling exponential relationships, but by applying a logarithmic scale to the graph they become linear. The final activity in this module directs students to the historical data showing the rapid growth of our national debt: is it truly "growing exponentially?"

11



- http://www.brainyquote.com/quotes/quotes/a/alvintoffl389092.html

Teaching Resources

ACTIVITIES

The following activities can be completed in class to emphasize, teach, and practice Information Processing. They can be used "as-is" or they may be tailored to fit a specific course. Suggestions for adaptation precede each activity, with examples from several different subject areas/career pathways. The suggested modifications provide instructors with ideas for adapting the activity to fit content they are already teaching. Modifying the activities allows employability skills to be infused in subject area content more easily.

ACTIVITY: ACQUIRING INFORMATION

Instructor Preparation

In any career area, information is used to make decisions. But one must know where to find that information, and how to identify helpful content and ignore the useless parts, and properly credit the source. In this activity, students receive exposure to the huge world of available information and learn to use some tools to retrieve it.

Searching for data is a lot like a scavenger hunt. In the handout for this activity, we offer a sample list of searches. You are encouraged to replace some or all these search tasks with some that resonate more with your course area. Try to list items that require a variety of information sources including some that will probably not be found on the internet. For the younger generation, finding things outside of the internet will be quite challenging, and time-consuming, yet often is the best option. While you could consider a variety of non-internet information sources, such as library indices and catalogs, old newspaper archives on microfilm, encyclopedias, volumes of legal records and government proceedings, and so forth, it will be simpler to confine the recommended sources to those generally available on the internet, and possibly one or two well-regarded reference manuals or handbooks that would be commonly found on a workplace desktop in your career area.

Objectives

Students will:

1. Find specific facts in print and electronic forms.
2. Use an internet search engine to find specific facts.
3. Cite sources of information, sufficient for future identification.

Materials

- Access to an example reference book or handbook for a career area of your choice (e.g., a shop operations manual, a medical reference book such as the Physicians' Desk Reference, etc.)
- Access to the Internet and a search engine (i.e., in a computer lab or via smartphone or other device)
- Access to a photocopier (to record reference material found in books)
- Access to a printer (to print a sample of a webpage)
- Access to electronic storage media (e.g., network hard drive or USB memory stick, to save electronic data or images)
- Optional: access to screen capture software program (e.g. Jing, Windows printscreen command)

Activity Guidelines

As suggested above, this activity can be treated as a homework assignment, a classroom activity in the computer lab, or as a scavenger hunt with student teams of two to three students competing against one another, earning points and rewards, and finally comparing/contrasting their findings for the benefit of all. The goals, the contest timing and other constraints, and the award or recognition given to

the winning team are left to your imagination. For the best result, modify the handout to customize the search items for your class and career area. Here are some ideas:

- In Manufacturing, searches could include recommended setup parameters found in a reference manual or handbook for a certain machining operation, safety regulations and MSDS literature, past and present comparisons for industrial raw material consumption, production levels, and labor input/output.
- In Health Science, searches could include results of recent research, new treatments, statistics on effectiveness of various therapies, salaries and wages, and the impacts of insurance and rising patient ages on healthcare costs.
- In Agriculture, interesting could include effectiveness of various soil treatments on crop yields, best management practices for livestock management, the effects of weather on yields, influence of water table levels, and market pricing of various foods.

The central focus of the activity—especially if competition is involved—will be the list of search items you distribute to the class. (See sample handout below.) So, spend time preparing it and be careful that the answers are not divulged prematurely. This activity will work best with your students if the list is customized to be interesting and relevant for your class/career area.

Note that for the information to qualify as being "found," a cited reference (sufficient to enable anyone to return to the sources) is required. For graphical or pictorial results, a printed copy of a graphic or screen capture of a recognizable portion of the find is required. Instruct students to print only one (or two, at most) page of each find, as that will be sufficient evidence for this activity. Later activities in this Information Processing module may reuse the resources found through this activity, and for that reason, the accurate and reliable source citation (e.g., the web address) will be very valuable. In addition, students can digitally save the entire page, file, image, etc. (e.g., to a network drive or USB memory stick) for future use. Of course, for data that is constantly changing (e.g., stock prices or sports statistics), saving the data electronically may be unproductive since the data is soon out-of-date.

The example list of search items in Handout 1 is presented in increasing order of difficulty. That is, the first few items can be easily found.

Divide the students into teams of 2-3. Announce to the students a time limit for the hunt. If students are relatively inexperienced with Internet surfing, finding a half dozen items could take one to two hours to complete. But do not allow the search to go on that long. The last two items on the list are difficult and may require locating printed reference books to find the answer. If not already available on your classroom bookshelf, that sort of background research could itself consume one hour.

Group Reflection Questions

When the allotted time has expired, bring the students back together and give them a chance to describe their searching experiences.

- Which items did you find using a one- or two-word search?
- Which items were more difficult to find?

- How did you decide which resources to use?
- Would you be able to find the same resources in the future, based on your citations?

The more difficult items in the list required more than simple word searches and also an interpretation of the resources found. The students should discuss such questions and how they applied the information, as well as report the results of their research. For students accustomed to web searches, the citation requirement probably seemed burdensome, so emphasize how results should now be easier to replicate and verify.

Check to be sure that everyone has good references for each of their finds. The references should allow you to verify students' answers.

Homework

If the searching activity proceeds too slowly, those who have internet access at home or in the school facilities after class or can complete the activity as homework. A follow-up to this activity could be to ask students to analyze assignment mistakes (misinformation) and do the research to correct them.

Handout—Sample Search List

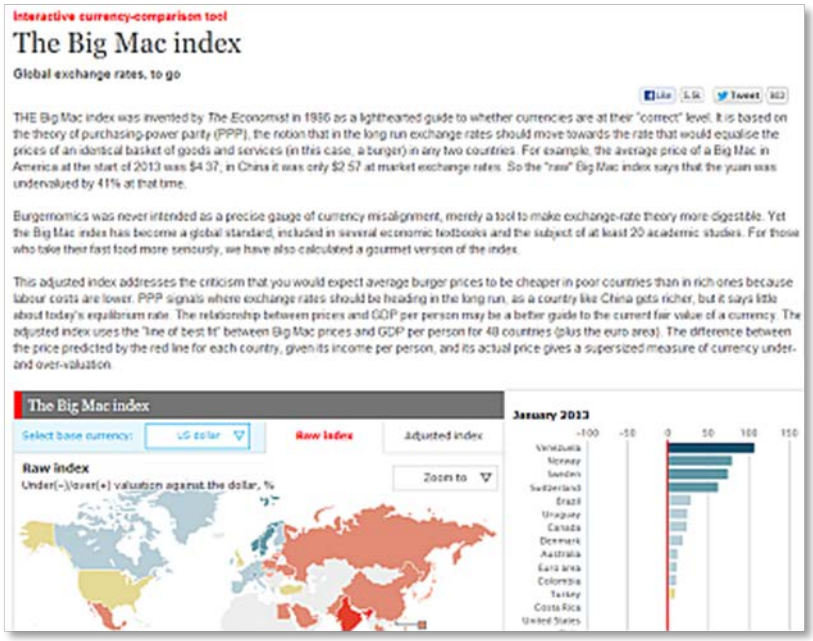
Search and Find	Citation and Location Info/ Screen Capture/Photocopy
What is the Big Mac Index? What does it show?	
What are the target dates for the United States to phase out household incandescent light bulbs? What authority (person or law) is making this happen?	
What major league baseball game had the fewest number of fans in the stands?	
What was last month's average daily high temperature in your city, compared to the same month a year ago?	
What alloys, if any, of Copper (Cu) are superconductive above 20°K?	
Value of the binomial coefficient, $\binom{45}{16}$	

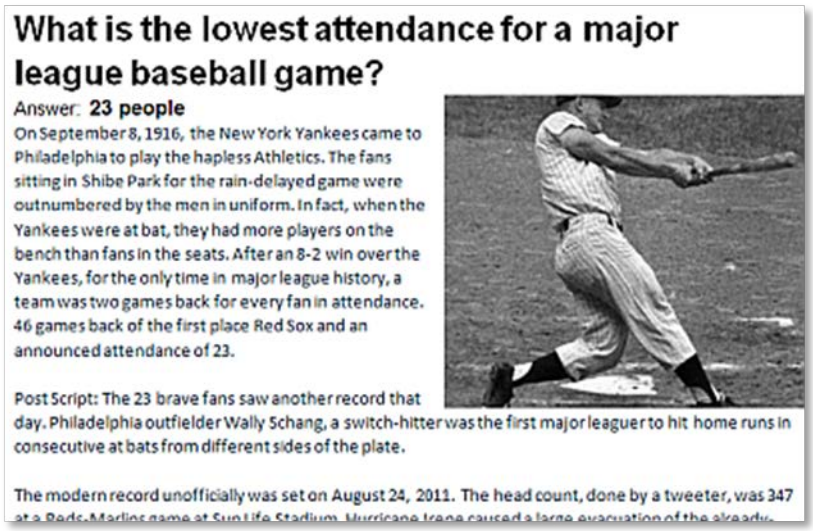
Suggestions for minimum requirements of citations:

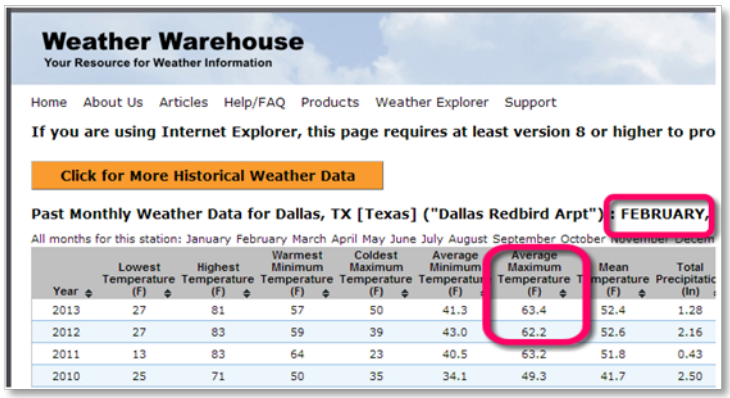
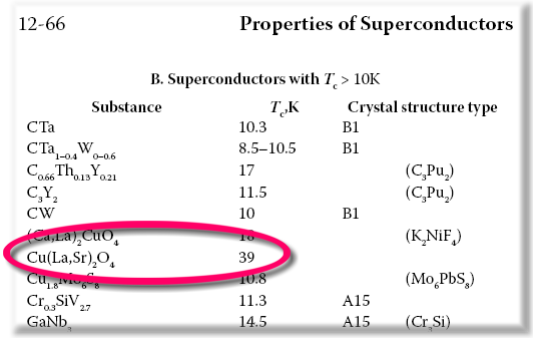
Text: Last name, First name. Title of Book. Place of Publication: Publisher, Year of Publication.
Example: Smith, James. Engineering in Metal. Chicago: Cenwich Publishers, 2010.

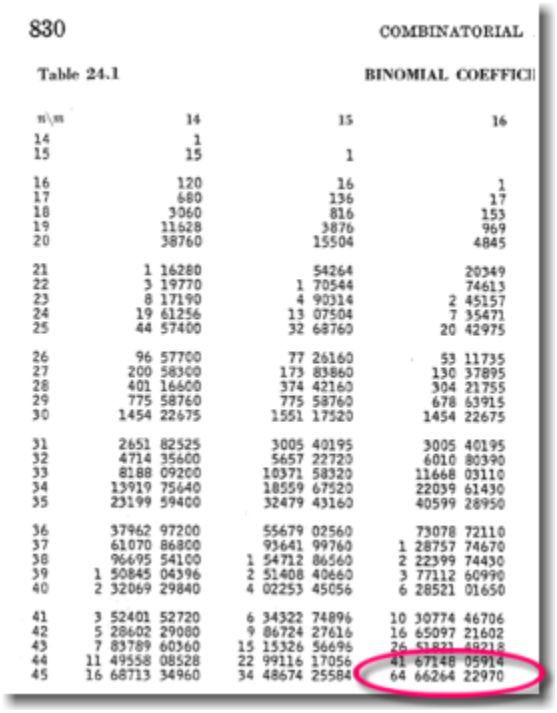
Web: Page source: Page title. Date of publication. Medium of publication. Date of collection, URL.
Example: United States Government Accountability Office. "FDA Regulation of Dietary Supplements (HRD-93-28R)", 2 Jul 1993. Web. 19 Mar 2013. <http://www.gao.gov/assets/90/83193.pdf>.

For more detailed citation guidelines, see the Purdue Online Writing Lab
http://owl.english.purdue.edu/owl/section/2/

Suggested Solutions to Sample Search List (DO NOT DISTRIBUTE THIS)	
Search and Find	**Citation and Location Info/Photo/Capture/Photocopy**
What is the Big Mac Index? What does it show?	*Interactive currency-comparison tool: The Big Mac index.* 2013. http://www.economist.com/content/big-mac-index (March 2013).  Interactive currency-comparison tool The Big Mac index Global exchange rates, to go THE Big Mac index was invented by *The Economist* in 1986 as a lighthearted guide to whether currencies are at their "correct" level. It is based on the theory of purchasing-power parity (PPP), the notion that in the long run exchange rates should move towards the rate that would equalise the prices of an identical basket of goods and services (in this case, a burger) in any two countries. For example, the average price of a Big Mac in America at the start of 2013 was $4.37, in China it was only $2.57 at market exchange rates. So the "raw" Big Mac index says that the yuan was undervalued by 41% at that time. Burgernomics was never intended as a precise gauge of currency misalignment, merely a tool to make exchange-rate theory more digestible. Yet the Big Mac index has become a global standard, included in several economic textbooks and the subject of at least 20 academic studies. For those who take their fast food more seriously, we have also calculated a gourmet version of the index. This adjusted index addresses the criticism that you would expect average burger prices to be cheaper in poor countries than in rich ones because labour costs are lower. PPP signals where exchange rates should be heading in the long run, as a country like China gets richer, but it says little about today's equilibrium rate. The relationship between prices and GDP per person may be a better guide to the current fair value of a currency. The adjusted index uses the "line of best fit" between Big Mac prices and GDP per person for 48 countries (plus the euro area). The difference between the price predicted by the red line for each country, given its income per person, and its actual price gives a supersized measure of currency under- and over-valuation. The Big Mac index Select base currency: US dollar Raw index Adjusted index Raw index Under(–)/over(+) valuation against the dollar, % Zoom to January 2013 ***Answer:*** The "Big Mac Index" is a comparison, promoted by *The Economist* magazine, of the price of a Big Mac around the world, normalized to the average price across the United States. It purports to be a comparison of world currency values using a comparable food item (a fairly standard fast-food hamburger) in different countries. A graphical interpretation quickly indicates countries with weak currencies (index > 50%), and those with strong currencies (index <50%), compared to the US Dollar.

Suggested Solutions to Sample Search List (DO NOT DISTRIBUTE THIS)	
Search and Find	**Citation and Location Info/Photo/Capture/Photocopy**
What are the target dates for the United States to phase out household incandescent light bulbs? What authority (person or law) is making this happen?	*Energy Independence and Security Act of 2007.* 13 February 2013. http://en.wikipedia.org/wiki/Energy_Independence_and_Security_Act_of_2007 (March 2013).  Create account Log in Article Talk Read Edit View history Search WIKIPEDIA The Free Encyclopedia Energy Independence and Security Act of 2007 From Wikipedia, the free encyclopedia Main page Contents Featured content Current events Random article Donate to Wikipedia Wikimedia Shop Interaction Help About Wikipedia Community portal Recent changes Contact Wikipedia Toolbox The Energy Independence and Security Act of 2007 (Pub.L. 110-140[1] originally named the Clean Energy Act of 2007) is an Act of Congress concerning the energy policy of the United States. As part of the Democratic Party's 100-Hour Plan during the 110th Congress,[2] it was introduced in the United States House of Representatives by Representative Nick Rahall of West Virginia, along with 198 cosponsors. Despite Rahall becoming 1 of only 4 Democrats to oppose the final bill,[3] it passed in the House without amendment in January 2007. When the Act was introduced in the Senate in June 2007, it was combined with Senate Bill S. 1419: *Renewable Fuels, Consumer Protection, and Energy Efficiency Act of 2007*.[4] This amended version passed the Senate on June 21, 2007.[5][6] After further Energy Independence and Security Act of 2007 Full title Energy Independence and Security Act of 2007 Enacted by the 110th United States Congress Citations Public Law Pub.L. 110-140 ***Answer:*** 100-watt bulbs in January 2012, and 40-watt bulbs in January 2014. The Energy Independence and Security Act of 2007 (Pub.L. 110-140[1] originally named the Clean Energy Act of 2007 authorized this action, as well as many other energy-saving measures.
What major league baseball game had the fewest number of fans in the stands?	*What is the lowest attendance for a major league baseball game. 2013.* http://wiki.answers.com/Q/What_is_the_lowest_attendance_for_a_major_league_baseball_game (March 2013).  What is the lowest attendance for a major league baseball game? Answer: **23 people** On September 8, 1916, the New York Yankees came to Philadelphia to play the hapless Athletics. The fans sitting in Shibe Park for the rain-delayed game were outnumbered by the men in uniform. In fact, when the Yankees were at bat, they had more players on the bench than fans in the seats. After an 8-2 win over the Yankees, for the only time in major league history, a team was two games back for every fan in attendance. 46 games back of the first place Red Sox and an announced attendance of 23. Post Script: The 23 brave fans saw another record that day. Philadelphia outfielder Wally Schang, a switch-hitter was the first major leaguer to hit home runs in consecutive at bats from different sides of the plate. The modern record unofficially was set on August 24, 2011. The head count, done by a tweeter, was 347 ***Answer:*** A probable answer: On September 8, 1916, the New York Yankees played the Philadelphia Athletics with 23 fans watching.

Suggested Solutions to Sample Search List (DO NOT DISTRIBUTE THIS)	
Search and Find	**Citation and Location Info/Photo/Capture/Photocopy**
What was last month's average daily high temperature in your city, compared to the same month a year ago?	For example, for Dallas, TX in February ("last month"): *Weather History for Dallas Texas, February.* March 2013. http://weather-warehouse.com/WeatherHistory/PastWeatherData_DallasRedbirdArpt_Dallas_TX_February.html (March 2013).  **Weather Warehouse** Your Resource for Weather Information Home About Us Articles Help/FAQ Products Weather Explorer Support If you are using Internet Explorer, this page requires at least version 8 or higher to pro Click for More Historical Weather Data Past Monthly Weather Data for Dallas, TX [Texas] ("Dallas Redbird Arpt") : FEBRUARY, All months for this station: January February March April May June July August September October Year | Lowest Temperature (F) | Highest Temperature (F) | Warmest Minimum Temperature (F) | Coldest Maximum Temperature (F) | Average Minimum Temperature (F) | Average Maximum Temperature (F) | Mean Temperature (F) | Total Precipitation (In) 2013 27 81 57 50 41.3 63.4 52.4 1.28 2012 27 83 59 39 43.0 62.2 52.6 2.16 2011 13 83 64 23 40.5 63.2 51.8 0.43 2010 25 71 50 35 34.1 49.3 41.7 2.50 ***Answer:*** 2013, 63.4 °F versus 2012, 62.2 °F
What alloys, if any, of Copper (Cu) are superconductive above 20°K?	Found in "Properties of Superconductors with T_C above 10K" in: Chemical Rubber Company. *Handbook of Chemistry and Physics 2007.* Cleveland, Ohio, 2008. (pg 12-66). (This might be discoverable online, too.)  12-66 Properties of Superconductors B. Superconductors with $T_c > 10K$ Substance | T_c,K | Crystal structure type CTa 10.3 B1 $CTa_{1-0.4}W_{0-0.6}$ 8.5–10.5 B1 $C_{0.66}Th_{0.13}Y_{0.21}$ 17 (C_3Pu_2) C_3Y_2 11.5 (C_3Pu_2) CW 10 B1 $(Ca,La)_2CuO_4$ 10 (K_2NiF_4) $Cu(La,Sr)_2O_4$ 39 $Cu_{1.8}Mo_{6-8}S_8$ 10.8 (Mo_6PbS_8) $Cr_{0.3}SiV_{2.7}$ 11.3 A15 $GaNb_3$ 14.5 A15 (Cr_3Si) ***Answer:*** Yes, $Cu(La,Sr)_2O_4$ has a critical temperature of 39K.

Suggested Solutions to Sample Search List (DO NOT DISTRIBUTE THIS)	
Search and Find	**Citation and Location Info/Photo/Capture/Photocopy**
Value of the binomial coefficient, $\binom{45}{16}$?	U.S. Department of Commerce. *Handbook of Mathematical Functions by the National Bureau of Standards.* Washington, D.C: U.S. Government Printing Office, November 1970 (Table 24.1, Pg 830). (This might be discoverable online, too.)  ***Answer:*** $\binom{45}{16} = 646,626,422,970$

830 COMBINATORIAL

Table 24.1 BINOMIAL COEFFICI

n\m	14	15	16
14	1		
15	15	1	
16	120	16	1
17	680	136	17
18	3060	816	153
19	11628	3876	969
20	38760	15504	4845
21	1 16280	54264	20349
22	3 19770	1 70544	74613
23	8 17190	4 90314	2 45157
24	19 61256	13 07504	7 35471
25	44 57400	32 68760	20 42975
26	96 57700	77 26160	53 11735
27	200 58300	173 83860	130 37895
28	401 16600	374 42160	304 21755
29	775 58760	775 58760	678 63915
30	1454 22675	1551 17520	1454 22675
31	2651 82525	3005 40195	3005 40195
32	4714 35600	5657 22720	6010 80390
33	8188 09200	10371 58320	11668 03110
34	13919 75640	18559 67520	22039 61430
35	23199 59400	32479 43160	40599 28950
36	37962 97200	55679 02560	73078 72110
37	61070 86800	93641 99760	1 28757 74670
38	96695 54100	1 54712 86560	2 22399 74430
39	1 50845 04396	2 51408 40660	3 77112 60990
40	2 32069 29840	4 02253 45056	6 28521 01650
41	3 52401 52720	6 34322 74896	10 30774 46706
42	5 28602 29080	9 86724 27616	16 65097 21602
43	7 83789 60360	15 15326 56696	26 51821 49218
44	11 49558 08528	22 99116 17056	41 67148 05914
45	16 68713 34960	34 48674 25584	64 66264 22970

ACTIVITY: EVALUATING INFORMATION

Instructor Preparation

The purpose of this activity is to encourage students to stop and think when they encounter information on the Internet. In the era of printed media, when material went through the process of editing, typesetting, proofing, and printing, it was likely that the published information was factual and trustworthy—as much as reasonably possible. So, the fruits of such research—probably from libraries and archives—were generally reliable as well. However, with the advent of the internet, hundreds of webpages are created daily, often with impressive text and graphics, made instantly available to the world, and subjected to little or no verification of veracity. In this activity, the goal is to suggest some guidelines and best practices to help students discern between fact and fiction.

Note: When searching the internet and visiting unfamiliar sites, up-to-date virus/spyware protection and caution are essential. Even legitimate websites may be supported by advertising links and unrelated imagery which should be ignored.

Objectives

Students will:

1. Consider a website's URL and assess its legitimacy or potential maliciousness.
2. Evaluate the content of a webpage to assess its reliability and trustworthiness.

Materials

- Handout 1—Evaluating Web-Based Information
- Handout 2—Sample Webpages to Review
- Handout 3—Checklist for Evaluating Website Reliability
- Computer lab with Internet access

Activity Guidelines

People who routinely surf the web quickly develop a sense about the relative reliability of a visited website. Those who are not as savvy or who need practice evaluating will benefit from this activity.

Handout 1 can be distributed and discussed. Visit a few websites as a class and discuss the sites' features. The list of suggested websites in Handout 2 can serve as a starting point. Consider adding course-specific links related to the class subject or career field. (Some examples are provided.)

If students have access to the computer lab, Handouts 2 and 3 can be used for the hands-on portion of this activity. It would be helpful to have a webpage (or electronic file) prepared with the list of links for Handout 2 so that students don't have to type in the URLs.

Have students create a reliability score assigning points to each item on the checklist on Handout 3. They can then use those criteria to evaluate the content of each URL on Handout 2.

Group Reflection Questions

Following the surfing activity, students should compare and discuss the findings (scores) and conclusions about each of the webpages or websites listed.

- Which of the criteria do you believe is most important in determining the truth and/or value of website content? Why?
- What evaluation criteria would you add to the list?
- In addition to finding misleading or false information, can you think of other reasons to be cautious about clicking on suspicious-looking URLs?

Handout 1—Evaluating Web-Based Information

Who is responsible?

- By its very nature, the Internet is a wide-open place. Nobody is responsible for the truthfulness, factuality, or reliability of any information or content..
- The success of any particular site is contingent on its acceptance and popularity, which, in turn, is generally dependent on its reliability and usefulness as a source of information, entertainment, communication, productivity, or for businesses profitability.
- Anybody can upload information to a webpage, often without accountability or responsibility.
- It is essential that reader critically evaluate the source, the possible bias, the evidence of accuracy and reliability, and the date of any information found and used.

The Source

- The *Web Address* (uniform resource locator, i.e., URL) is a generally reliable source indicator. Read it carefully to discern the host computer and domain. The directory structure and file names are necessary details for returning to the page.

- The *Publisher or Sponsor* of the website, if well known and reputable, generally lends credibility to the information found there.
- The *Author* of the webpage, if indicated, offers another indication of reliability.. Author/source contact information or a link to the author's personal webpage or email allows further verification, assurances, and permissions for using content, if needed.
- The *Point of View* or *Bias* of the source can usually be determined with the help of the above information. For example, although business sites can often be good sources of information, be wary of sites that are promoting or selling products based on that information.

Accuracy and Reliability

- Compared to books and other printed material, relatively little proofing and editing is applied to websites. Don't be surprised to find typos, erroneous information, and even deception.
- Assess the quality of a site: spelling and grammar errors, citations/references for factual information, broken and out-of-date links.
- Try to confirm information from two or more independent sources. Multiple sites which merely copy each other do not qualify as confirmation.
- Blogs and discussion boards should never be treated as sources, as they are opinion-based rather than fact-based. If a blog links to an article in an online version of a printed source (e.g. newspaper, scientific journal, etc.), follow the link to the original source and evaluate it.
- Always ask, "How current is the webpage?" Information found on the web might be a few days old, reflecting the most current knowledge, or several decades old, representing very out-of-date information.
- Most text and imagery on the web is copyrighted. Copyright laws designed for written materials also apply to electronic publications. To avoid plagiarism (using someone else's work as if it was your own), cite the source of material you use in your own works and seek permission from the owner to use it. Quality websites should do the same, as evidence that they respect copyright.

Handout 2—Sample Webpages to Review

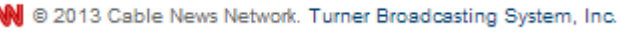
- **A Sample Webpage Demonstrating a Few HTML Features**
  http://sheldonbrown.com/web_sample1.html
  How reliable is this information?
- **Buying a telescope**
  http://www.astronomy.com/Equipment/How-To/2004/07/Buying%20a%20telescope.aspx
  Includes many historical facts and comparisons. Can these be trusted?

Health Science (Nutrition)

- **The Healthy Way Diet**
  http://www.thehealthywaydiet.com/
  Nutritionally sound and medically researched information and advice to help you live healthier, happier lives. Sounds trustworthy, right?

Handout 3—Checklist for Evaluating Website Reliability

Here is a checklist of criteria for evaluating websites to get you started. Create a reliability score based on these, assigning point values to each criterion. Use this checklist to evaluate the merits of the content at each URL on Handout 2.

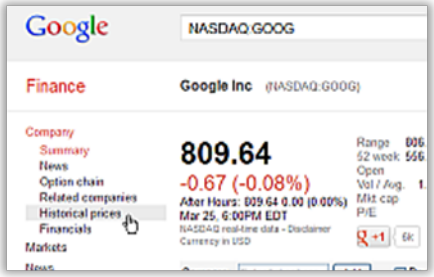
- ❑ **URL appears legitimate:** The server name is a reputable source, not merely similar to a reputable source.
  (For example, http://*cnn.com*, not http://*cnn-news.com*.)
- ❑ **Sponsoring organization is included in the URL:** The sponsoring organization is reachable by truncating the directory information from the full-length URL.
  (For example, *http://www.cnn.com/2012/12/24/holiday.html* points to *http://www.cnn.com*.)
- ❑ **Sponsor/author contact information:** Contact information is provided or can be verified; author or sponsor is well known, and/or author can be reached if further information is needed.
  (For example, the page footer shows: 
- ❑ **Author or source is reputable:** The information is from a well-known and respected source.
  (For example, "*Nearly one-third of U.S. households lack broadband service*," found on the U.S. National Bureau of Standards website).
- ❑ **Information is unbiased:** The source has no obvious reason to be biased to report dishonest information. On the other hand, commercial websites should be suspected of a bias intended to help sell their product.
  (For example, a table of recommended drill bit sizes found on a woodworking website is probably accurate information. A brand comparison of bits with links to purchase one particular brands should be investigated further, as the web author has a motive for posting promotional material—profit.)
- ❑ **Information is verifiable:** Two or more independent and reliable sources confirm the information. Search engines make it easy to find and compare multiple sources of the same information.
  (For example, use a 13/64" drill bit for a #10 screw pilot hole in hard wood, as confirmed on several hardware and woodworking websites.)
- ❑ **Information is current or up-to-date:** Information, especially about controversial topics, should be relatively current, as indicated by the reference information or copyright date.
  (For example, an article from the Lawrence Berkley Labs (http://www-als.lbl.gov) titled "Next-Generation Photovoltaic Technologies" dated Monday, 06 February 2012 describing organic solar cell technology is likely to be more current than a 20-year old article found elsewhere describing silicon solar cells.)
- ❑ **Information includes references:** Information based on research or fact-finding should have source citations that could be used for independent verification. Include such citations as part of your own work in a footnote, bibliography, references cited page.
- ❑ **Website Quality Control:** Reliable websites generally will not include errors in spelling, grammar, and formatting, or obviously incorrect information or cross-references.
- ❑ **Website ethics:** The links and advertisements contained on a website are usually a reflection of the quality of the content. Reputable websites usually link to other reputable sites.

ACTIVITY: ORGANIZING INFORMATION

Instructor Preparation

In this activity students will consider a few ways to collect and manage information gleaned from one or more websites. Collecting and managing a handful of pertinent facts and their citation information from print or electronic sources is not difficult. But when gathering hundreds or thousands of pieces of data—for sorting, analyzing, charting, or presenting—more data-handling skills are needed. This activity provides an opportunity for students to import data into a common spreadsheet (MS Excel recommended). (A similar strategy would also work for importing into a database program, although that is beyond the scope of this activity.) Rather than use contrived data to serve our purpose, this activity offers some guidelines for importing a collection of real-world sports statistics, which will interest many of your students, regardless of their career aspirations. Alternatively, you may use data sources from your own content or career area and modify the instructions to fit those sources. Here are some suggested data sources addressing specific fields:

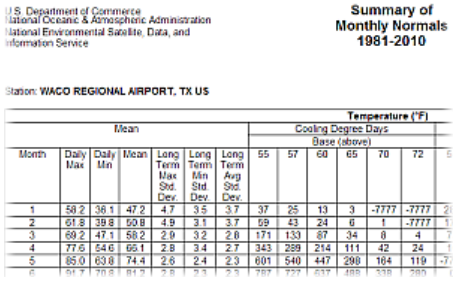
- Corporate finance and valuation data for thousands of firms can be found online from many sources. Much of this data is already saved in spreadsheet format, but there is so much data that it will be necessary to extract a subset to make it more manageable. If you wish, students can work with daily stock data using Google's historical finance pages. For example, http://www.google.com/finance/historical?q=NASDAQ%3AGOOG will provide the data for the ticker "GOOG" from the NASDAQ. Enter your desired ticker symbols, and click the link for "Historical Prices" on the left column.



- Government and public administration careers deal with large volumes of data routinely. For example, the U.S. Census Bureau makes available large amounts of data of all kinds on their website, http://www.census.gov/sdc/. Much of this is now available already saved to a spreadsheet format, making it very easy to incorporate into one's own data accumulations.

	A	B	C	D	E
1	Table 1. Educational Attainment of the Population 18 Years and Over, by A				
2	(Numbers in thousands. Civilian noninstitutionalized population [1].)				
3					
4	All Races				
5		Total	None	1st - 4th grade	5th - 6th grade
6	Both Sexes				
7	18 years and over	234,719	834	1,764	3,618
8	18 to 24 years	30,140	39	76	114
9	25 years and over	204,579	796	1,688	3,504
10	25 to 29 years	20,893	30	88	223
11	30 to 34 years	20,326	54	100	348
12	35 to 39 years	19,140	54	124	398

- Science and technology careers yield data from all sorts of research , whether it is space (http://eosweb.larc.nasa.gov/), weather (http://www.ncdc.noaa.gov/), health (http://www.cdc.gov/rdc/), or almost any area of interest. Focus on a particular area of research and data collection. The activities that follow will build on the students' imported data, so be sure they save their work (e.g., on a USB flash drive, hard drive, or other media), and save it at the end of the class.



Objectives

Students will:

1. Copy/paste tabular data from a webpage into a spreadsheet.

Materials

- An internet-connected computer, equipped with a browser and spreadsheet program (e.g., MS Excel)—computer lab time is recommended
- Storage media for spreadsheet file (e.g., network drive, USB flash drive, or similar)
- Handouts 1 and 2
- Instructor computer with projector, for demonstrating Excel functions

Activity Guidelines

Some websites will have their data already saved to a spreadsheet format. However, for this activity, students learn how to copy tabulated or listed data and save it to a tabular format in a spreadsheet. Students can practice by using a major league baseball website that posts game statistics (http://www.baseball-reference.com/) for this activity. Once there, find a favorite baseball team. Scroll down the page to find an abundance of batting, pitching, and fielding statistics. If the season has just begun, use the data from the previous season (see link to previous year). The goal is to copy the data for the team batting statistics—the first table on the page. Here's an excerpt of a typical table:

Rk	Pos		Age	G	PA	AB	R	H	2B	3B	HR	RBI	SB	CS	BB	SO	BA	OBP	SLG	OPS	OPS+	TB	GDP	HBP	SH	SF	IBB
1	C	Mike Napoli	30	108	417	352	53	80	9	2	24	56	1	0	56	125	.227	.343	.469	.812	110	165	9	7	0	2	5
2	1B	Mitch Moreland*	26	114	357	327	41	90	18	0	15	50	1	1	23	71	.275	.321	.468	.789	104	153	8	1	2	4	5
3	2B	Ian Kinsler	30	157	731	655	105	168	42	5	19	72	21	9	60	90	.256	.326	.423	.749	95	277	14	10	1	5	0
4	SS	Elvis Andrus	23	158	711	629	85	180	31	9	3	62	21	10	57	96	.286	.349	.378	.727	91	238	15	5	17	3	0
5	3B	Adrian Beltre	33	156	654	604	95	194	33	2	36	102	1	0	36	82	.321	.359	.561	.921	137	339	8	5	0	9	8
6	LF	David Murphy*	30	147	521	457	65	139	29	3	15	61	10	5	54	74	.304	.380	.479	.859	124	219	7	4	0	4	7
7	CF	Josh Hamilton*	31	148	636	562	103	160	31	2	43	128	7	4	60	162	.285	.354	.577	.930	139	324	9	5	0	9	13
8	RF	Nelson Cruz	31	159	642	585	86	152	45	0	24	90	8	4	48	140	.260	.319	.460	.779	101	269	7	5	0	4	2
9	DH	Michael Young	35	156	651	611	79	169	27	3	8	67	2	2	33	70	.277	.312	.370	.682	78	226	26	1	0	6	3
Rk	Pos		Age	G	PA	AB	R	H	2B	3B	HR	RBI	SB	CS	BB	SO	BA	OBP	SLG	OPS	OPS+	TB	GDP	HBP	SH	SF	IBB
10	CF	Craig Gentry	28	122	269	240	31	73	12	3	1	26	13	7	14	41	.304	.367	.392	.759	100	94	4	10	5	0	1
11	C	Yorvit Torrealba	33	49	182	161	16	38	8	0	3	12	1	1	14	31	.236	.302	.342	.643	69	55	2	2	3	2	0
12	C	Geovany Soto	29	47	164	148	19	29	6	0	5	25	1	0	11	41	.196	.253	.338	.591	53	50	6	1	2	2	0
13	UT	Brandon Snyder	25	40	69	65	11	18	2	0	3	9	0	0	3	26	.277	.309	.446	.755	95	29	1	0	1	0	0

This data will be used in later activities so it will be helpful to note the meanings of the column headings by hovering the mouse cursor over each column heading to find G: Games played, PA: Plate appearances, and so forth. Optional Handout 1 summarizes these descriptions. To simplify this activity we'll focus only on the batters, i.e., the top half of this batting table. Ignore the bottom half of this batting table, populated with the pitcher (Positions "Pos" denoted by "P") data.

<u>Instructor demonstration:</u>

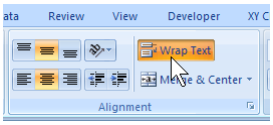
Click-and-drag with the mouse to highlight the entire row (from the top left to the far right cells) for batters (not pitchers) in the top half of the table. Release the mouse button and then use the menu (or right-mouse click) to copy the highlighted cells to the clipboard. If you have problems, click "away" and repeat this step, while clicking and dragging across slightly different locations on screen until all the batter data is obtained.

Instructor demonstration:

Now, open the spreadsheet program, and with the cursor positioned in cell A1 of a blank worksheet, Paste the contents of the clipboard, (the batting table) in to the Excel worksheet. This may be accomplished simply with "Edit, Paste," or "right-click, Paste." If you don't get the desired result, use the Undo command, and try again. The result should be that the columns of batting data values are in the corresponding columns of the spreadsheet, for example, as shown here.

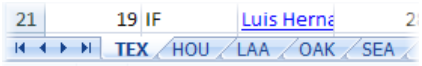
	A	B	C	D	E	F	G	H
1	Rk	Pos		Age	G	PA	AB	R
2	1	C	Mike Nap	30	108	417	352	53
3	2	1B	Mitch Mor	26	114	357	327	41
4	3	2B	Ian Kinsle	30	157	731	655	105
5	4	SS	Elvis Andr	23	158	711	629	85
6	5	3B	Adrian Be	33	156	654	604	95
7	6	LF	David Mur	30	147	521	457	65
8	7	CF	Josh Hami	31	148	636	562	103
9	8	RF	Nelson Cr	31	159	642	585	86
10	9	DH	Michael Y	35	156	651	611	79
11	Rk	Pos		Age	G	PA	AB	R
12	10	CF	Craig Gent	28	122	269	240	31
13	11	C	Yorvit Tori	33	49	182	161	16
14	12	C	Geovany S	29	47	164	148	19
15	13	UT	Brandon S	25	40	69	65	11
16	14	UT	Alberto Gi	29	24	55	54	7

If long player names wrap and fill multiple lines, causing the rows to have different sizes, try this: With the pasted cells still selected, adjust the format of the selected cells to "NOT Wrap Text." Look in the Alignment section/tab in Excel and un-check the box, or un-depress the button (as shown here). This should make the row height uniform for all rows, as shown above.



Student activity:

Since one team's batting performance is not very interesting, return to the website and repeat the above process for the remaining four teams in the division selected. Paste each team's data into a new worksheet. Identify each worksheet with the team name by renaming the worksheet tabs at the bottom of the page. (Hint: Double-click the tab name or right-click and choose Rename.) See the example tab names shown here.



When done, save the spreadsheet, using a meaningful file name. For example, save it as "Team_Batting_Stats" (or similar). This work will be used in the next activities.

Group Reflection Questions

- How long would it take to accumulate all the batting stats for the whole league? (Answer: Just a few minutes. And no typing required—just copy/paste. Pretty powerful.)
- Do all teams have the same number of batters? (Answer: No, they vary, and appear to have about 20 or so—some more, some less—depending on how many pitchers the team keeps.)
- What are some obvious advantages of using copy/paste, compared to retyping the stats from a printout? (Answer: Probably the most significant advantage is *quality control*—little or no chance for errors to creep in. Another answer is *speed*. A quick multiplication of **rows** × **columns** × **teams** will show that each student's spreadsheet, created in just a few minutes, contains almost 3000 pieces of information—for just five teams. With just a little more effort, students could easily accumulate the batting stats for the whole league—about 10,000 pieces of data!).

Handout 1—Copying and Pasting Tabular Data from a Webpage into a Spreadsheet

Some websites have their data already saved to a spreadsheet format. For this activity, however, you will learn how to copy tabulated or listed data and save it in an Excel spreadsheet. Practice by using a major league baseball website that posts game statistics (http://www.baseball-reference.com/) for this activity. Once there, find a favorite baseball team. Scroll down the page to find an abundance of batting, pitching, and fielding statistics. If the season has just begun, use the data from the previous season (see link to previous year). The goal is to copy the data for the team batting statistics—the first table on the page. Here's an excerpt of a typical table from the website:

Rk	Pos		Age	G	PA	AB	R	H	2B	3B	HR	RBI	SB	CS	BB	SO	BA	OBP	SLG	OPS	OPS+	TB	GDP	HBP	SH	SF	IBB
1	C	Mike Napoli	30	108	417	352	53	80	9	2	24	56	1	0	56	125	.227	.343	.469	.812	110	165	9	7	0	2	5
2	1B	Mitch Moreland*	26	114	357	327	41	90	18	0	15	50	1	1	23	71	.275	.321	.468	.789	104	153	8	1	2	4	5
3	2B	Ian Kinsler	30	157	731	655	105	168	42	5	19	72	21	9	60	90	.256	.326	.423	.749	95	277	14	10	1	5	0
4	SS	Elvis Andrus	23	158	711	629	85	180	31	9	3	62	21	10	57	96	.286	.349	.378	.727	91	238	15	5	17	3	0
5	3B	Adrian Beltre	33	156	654	604	95	194	33	2	36	102	1	0	36	82	.321	.359	.561	.921	137	339	8	5	0	9	8
6	LF	David Murphy*	30	147	521	457	65	139	29	3	15	61	10	5	54	74	.304	.380	.479	.859	124	219	7	4	0	4	7
7	CF	Josh Hamilton*	31	148	636	562	103	160	31	2	43	128	7	4	60	162	.285	.354	.577	.930	139	324	9	5	0	9	13
8	RF	Nelson Cruz	31	159	642	585	86	152	45	0	24	90	8	4	48	140	.260	.319	.460	.779	101	269	7	5	0	4	2
9	DH	Michael Young	35	156	651	611	79	169	27	3	8	67	2	2	33	70	.277	.312	.370	.682	78	226	26	1	0	6	3
Rk	Pos		Age	G	PA	AB	R	H	2B	3B	HR	RBI	SB	CS	BB	SO	BA	OBP	SLG	OPS	OPS+	TB	GDP	HBP	SH	SF	IBB
10	CF	Craig Gentry	28	122	269	240	31	73	12	3	1	26	13	7	14	41	.304	.367	.392	.759	100	94	4	10	5	0	1
11	C	Yorvit Torrealba	33	49	182	161	16	38	8	0	3	12	1	1	14	31	.236	.302	.342	.643	69	55	2	2	3	2	0
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This data will be used in later activities so it will be helpful to note the meanings of the column headings by hovering the mouse cursor over each column heading to find G: Games played, PA: Plate appearances, and so forth. Handout 2 summarizes these descriptions. Focus only on the batters, i.e., the top half of this batting table. Ignore the bottom half of this batting table, populated with the pitcher (Positions "Pos" denoted by "P") data.

a. Click-and-drag with the mouse to highlight the entire row (from the top left to the far right cells) for batters (not pitchers) in the top half of the table. Release the mouse button and then use the menu (or right-mouse click) to copy the highlighted cells to the clipboard. If you have problems, click away and repeat this step until all the batter data is obtained.

b. Now, open the spreadsheet program, and with the cursor positioned in cell A1 of a blank worksheet, Paste the contents of the clipboard, (the batting table) into the worksheet. This may be accomplished simply with "Edit, Paste," or "right-click, Paste." If you don't get the desired result, use the Undo command and try again. The result should be that the columns of batting data values are in the corresponding columns of the spreadsheet, for example, as shown here.

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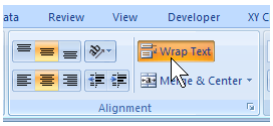

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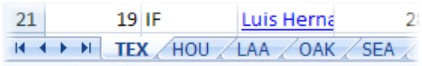
c. Since one team's batting performance is not very interesting, return to the website and repeat the above process for the remaining four teams in the division selected. Paste each team's data into a new worksheet. Identify each worksheet with the team name by renaming the worksheet tabs at the bottom of the page. (Hint: Double-click the tab name or right-click and choose Rename.) See the example tab names shown here.



d. When done, save the spreadsheet, using a meaningful file name. For example, save it as "Team_Batting_Stats" (or similar). This work will be used in the next activities.

Handout 2—Column Headings Key for Baseball Statistics

Label	Meaning
Rk	Rank. This is a count of the rows from top to bottom. It is recalculated following the sorting of a column.
Pos	Position
Age	Player's age at midnight of June 30th of that year
G	Games Played or Pitched
PA	Plate Appearances. When available, we use actual plate appearances from play-by-play game accounts. Otherwise estimated using AB + BB + HBP + SF + SH, which excludes catcher interferences. (per John)
AB	At Bats
R	Runs Scored/Allowed
H	Hits/Hits Allowed
2B	Doubles Hit/Allowed
3B	Triples Hit/Allowed
HR	Home Runs Hit/Allowed
RBI	Runs Batted In
SB	Stolen Bases
CS	Caught Stealing
BB	Bases on Balls/Walks
SO	Strikeouts
BA	Hits/At Bats. For recent years, leaders need 3.1 PA per team game played. Bold indicates highest BA using current stats. Gold means awarded title at end of year.
OBP	(H + BB + HBP)/(At Bats + BB + HBP + SF). For recent years, leaders need 3.1 PA per team game played.
SLG	Total Bases/At Bats or (1B + 2*2B + 3*3B + 4*HR)/AB. For recent years, leaders need 3.1 PA per team game played.
OPS	On-Base + Slugging Percentages For recent years, leaders need 3.1 PA per team game played.
OPS+	OPS+100*[OBP/lg OBP + SLG/lg SLG - 1]. Adjusted to the player's ballpark(s).
TB	Total Bases. Singles + 2 x Doubles + 3 x Triples + 4 x Home Runs.
GDP	Double Plays Grounded Into. Only includes standard 6-4-3, 4-3, etc. double plays. First tracked in 1933. For gamelogs only in seasons we have play-by-play, we include triple plays as well. All official seasonal totals do not include GITP's.
HBP	Times Hit by a Pitch.
SH	Sacrifice Hits (Sacrifice Bunts)
SF	Sacrifice Flies. First tracked in 1954.
IBB	Intentional Bases on Balls. First tracked in 1955.
Positions	C: Catcher, 1B: first base, 2B: second base, 3B: third base, SS: short stop, LF: left field, CF: center field, RF: right field, DH: designated hitter, P: pitcher, UT: utility, OF: outfield, IF: infield, CI: corner infield, MI: middle infield

ACTIVITY: MANAGING AND PRESENTING INFORMATION

Instructor Preparation

In this activity students will consider ways to view and manage large volumes of data and to present it in an understandable way. Some obvious things to do with data are to sort it, extract selected subsets (filter), perform some basic calculations (e.g., average), and generate graphs. These processes for presenting and interpreting large data volumes used to be tedious and time consuming, but are easy today with the modern spreadsheet, enabling calculations, charting, and analysis. MS Excel is used in this activity and instructors must have a strong working knowledge of the program's essential features.

Although we'll continue the discussion using the baseball statistics data from the previous activity, the techniques presented here will apply to any data sets that you may have optto use for your own course topic. For example:

- Education and Training data sets will permit you to sort and filter state graduation data (http://www.doe.virginia.gov/statistics_reports/graduation_completion/cohort_reports/index.shtml) or various kinds of national educational data (http://nces.ed.gov/quicktables/result.asp?SrchKeyword=&topic=Elementary%2FSecondary).
- Transportation and Distribution Logistics data presents the results of deliberate movements of millions of parcels and other material around the state, the nation, or the world. Watching for trends and patterns of disruption or smooth handling is greatly facilitated by a rapid analysis of timely data.
- Data reflecting Agriculture, Food, and Natural Resource production levels can fluctuate greatly with changes in weather, treatments, production methods, or even legislation and marketing pressures. Analyzing this data is facilitated by using spreadsheet charting features.

Objectives

Students will:

1. Sort data in a spreadsheet.
2. Filter data in a spreadsheet.
3. Perform basic calculations on data, such as average, standard deviation, and frequency counts.
4. Generate simple graphs of data.

Materials

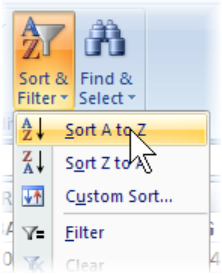
- An internet-connected computer, equipped with a browser and spreadsheet program (e.g., MS Excel)—computer lab time is recommended
- Storage media for spreadsheet file (e.g., network drive, USB flash drive, or similar)
- Handouts 1 and 2
- Instructor computer with projector, for demonstrating Excel functions

Activity Guidelines

Returning to the spreadsheet created in the previous activity, this will be a quick activity to demonstrate how easy it is to manipulate the data to reveal various interpretations. Before doing anything, point out to students the relatively random appearance of this large volume of data. In its present state, it is virtually impossible to see any useful patterns. We want them to discover how easy it is to see the same data in an entirely different light with a few simple actions. Charting in Excel is a very powerful tool with hundreds of options and ways to customize a graph's appearance. These exercises demonstrate some of the power available to manage large amounts of information more easily than might be expected.

NOTE: The baseball statistics tables may include a duplicate header row following the first nine players. It will be helpful to delete that unneeded row on each worksheet. Also, once data order is changed or moved around, it's not always simple to return to the original order. However, the original order should not be required for these activities. The header row is important however, so it should remain on row 1 (or at the top of the table).

Sorting



In any table, sorting is a natural step, and a readily applied feature in a spreadsheet. Simply place the cursor in a column, and from the *Home* tab, in the *Editing* group, click the *Sort and Filter* button, then *Sort A to Z* (i.e., Ascending) order. In the table of batting statistics for one of the teams:

Instructor demonstration:

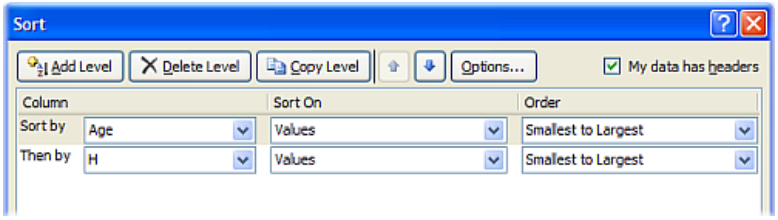
Sort the batters by Rank. Place the cursor in the Rank column (column A), and sort it in ascending order. Notice that 1) the whole table (all columns) is sorted, with the order of the rows being controlled by the Rank column; 2) the column headings may drop to the bottom of table (because the letters "Rk" are lower in the sorting order than digits).

Student activity:

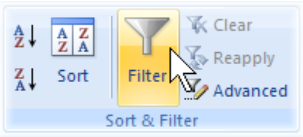
Sort the batters by Age. Place the cursor in the Age column (column D), and sort it in ascending order. Examine the span of ages, from youngest to oldest. Are you surprised? Do all teams look the same in this respect?

Student activity:

Sort the batters by both Age and Runs. Return to the spreadsheet state (Hint: "undo" the above sorts.) with the headers in row 1. Click *Custom Sort…*, and check the box for "My data has headers." Sort the data with two levels: first, sort by the Age column, and then by the H column (number of home runs), both from *Smallest to Largest*, as shown below. Do you see what this accomplishes? Does this work for all teams?

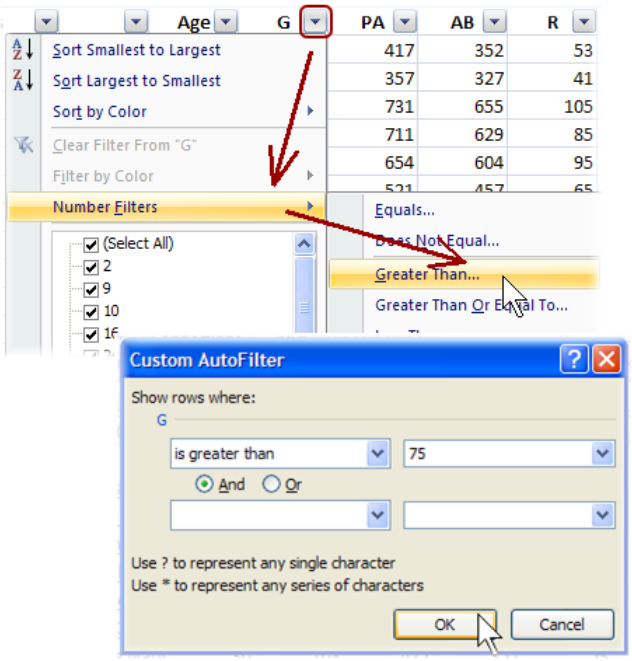


Filtering



The *Filter* feature provides a powerful, almost database-like capability. It allows you to perform simple queries to extract rows that meet certain criteria or hide rows that do not meet the criteria. The *Filter* function is available on the same *Sort and Filter* button (see above), or under the *Data* tab, in the *Sort and Filter* group, as the *Filter* button. Although we have not used it here, the *Advanced* function supports exporting the matching data to another part of the spreadsheet and/or using advanced criteria statements saved elsewhere in the spreadsheet.

Note: Place the cursor in the table of values before clicking *Filter.* If the "filter arrows" appear beside values rather than the column headings (as shown below, click and remove the *Filters*, then manually select the entire table, and click *Filter* again.



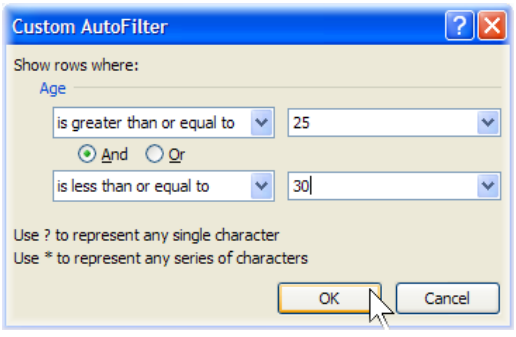
Instructor demonstration:

View batters who played more than 75 games. Click the *Filter* button (or menu choice). Notice the new functionality added to each column heading. As shown, click the down-arrow for the column headed *G* (for "Games played"), then *Number Filters*, and then *Greater Than…* In the *Custom Autofilter* dialog box, in the blank box to the right of "*G…is greater than…*" type the value "*75*", and click *OK*. Your table should now be showing only batters who played at least 76 games.

Student activity:

View batters whose age is 30 years or older. Clear any existing filter by clicking the *Filter* function *Off*, and then back *On* again. Just as you applied the games-played filter, click the "down-arrow" for the *Age*, then *Number Filters*, and then *Greater Than or Equal To…* In the blank box to the right of "Age…is greater than or equal to…" type the value "30", and click OK. Your table should be showing only the players age 30 and older.

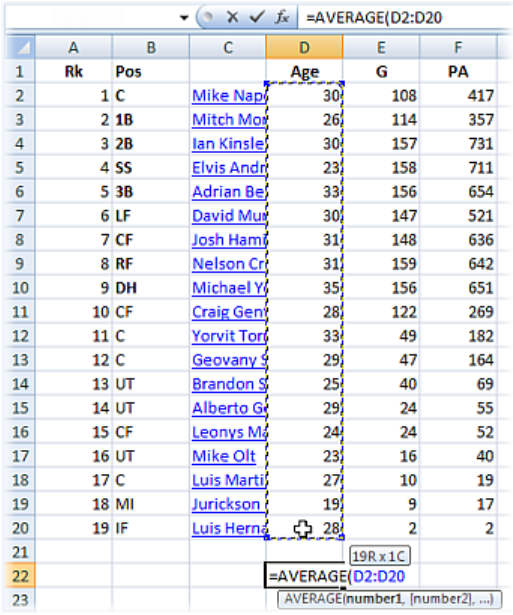
Student activity:



View batters whose age is between 25 and 30 who played more than 100 games. This filter will require several criteria that must be satisfied. Clear any existing filter, and then click the *Filter* function *On* again. Click the down-arrow for the *Age*, and specify a *Number Filters*, for *Age…is greater than or equal to…25.* Now restrict the ages. With *And* selected as shown here, click the drop-down list to choose *is less than or equal to*, enter the value 30, and click OK. Now add a Games played filter. As before, add a *Number Filter* for values of "G…is greater than…100." How many players satisfy these criteria in the division?

Calculating

Spreadsheets are very good at performing calculations on small or large quantities of data using simple or powerful functions.



Instructor demonstration:

Which is the "youngest team" in your division? Calculate the average age for each team using the *AVERAGE()* function. In a blank cell below the table, type "=AVERAGE(" without the quotes, and then use the mouse to select the entire range of age values for the team, and *Enter*. See the calculated average value. Repeat for the other teams. Which team in the division might be said to be the youngest?

Student activity:

What is the age of the oldest player on each team? The youngest player? Just as you calculated the average, use the *MAX()* and *MIN()* functions.

Student activity:

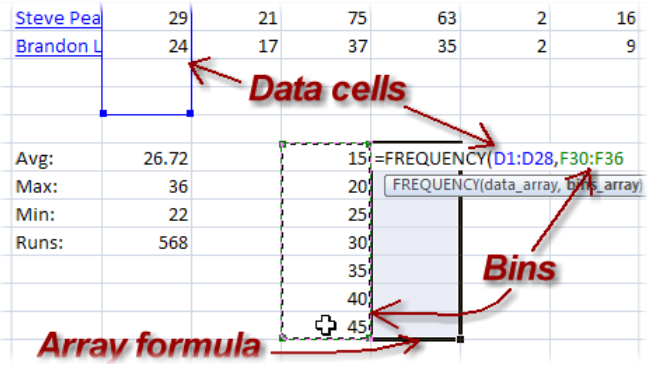
Which team scored the most runs all season? The fewest? Use the *SUM()* function on the "*R*" (runs scored) column.

Instructor demonstration plus student activity:

Create a Frequency Distribution of player ages. Use the *FREQUENCY()* function to create tallies for a histogram. Here are the steps:

Below the data, in some blank rows, create a column of ages: 15, 20, 25, 30, 35, 40, 45. These will be the "bins" for counting the number of players whose ages in each age category, e.g., up to 15 years, from 16 up to 20, from 21 up to 25, etc.

Highlight the blank cells beside the bins. You will next enter what's called an "array formula" in the highlighted cells.

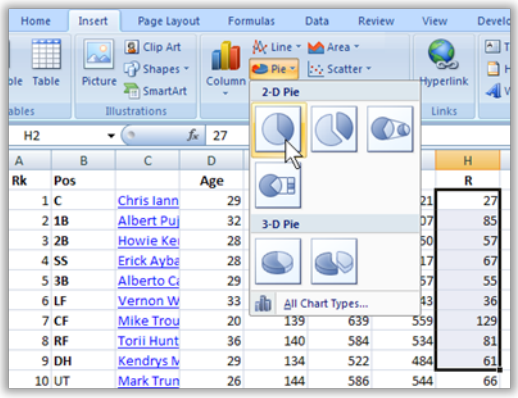


With the blank cells still highlighted, type =FREQUENCY(and then 1) use the mouse to select the entire range of age values for the team (it's OK to include the header row and blank rows),
2) type a comma,
3) use the mouse to select the range of bins, and
4) To complete array formulas, don't press *Enter*, but instead press *Ctrl+Shift+Enter*.
To edit (or delete) this array formula, again highlight all the cells in the array, make your edit, and again press *Ctrl+Shift+Enter* (or *Delete*).

The array formula and resulting frequency values will fill the selected blank cells. These frequency values will be used to create a histogram (bar chart) below.

Presenting

Just as spreadsheets are good at calculating, they are also good at making graphs and charts.



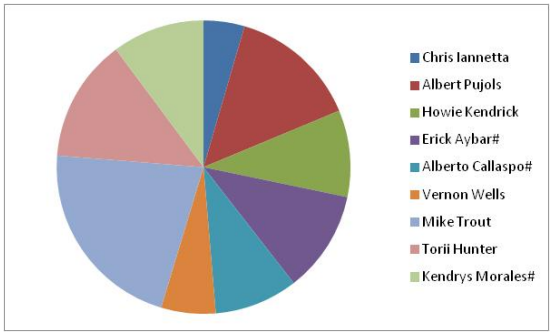
Instructor demonstration plus student activity:

Create a pie chart showing the starting players scoring performance.

Highlight the runs scored for the first 9 ranked players in the column headed by "R."

On the *Insert* tab, click *Pie* (in the *Charts* group) and choose one of the pie chart formats. Excel calculates the percentages and creates all the sections of the pie chart for you.

Right-click the pie chart that appears and choose *Select Data…* Under *Horizontal (Category) Axis Labels*, click *Edit*. Then click/drag to and highlight the player names corresponding to the first nine positions. Click *OK*, and *OK*.

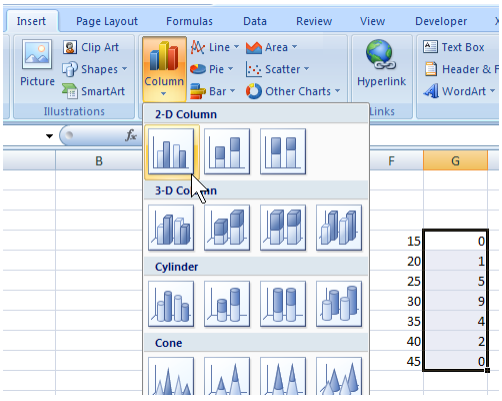


The resulting pie chart will now associate each player name with a colored section.

You can further customize the chart appearance (title, shadows, labels, colors) as you wish.

Optional activity:

Make a bar chart showing the distribution of player ages using the results of the frequency array formula calculated previously.



Just as for the pie chart, start by highlighting the data values to be charted: the column of Frequency calculations (beside the bins of age values).

On the *Insert* tab, click on *Column* (in the *Charts* group) and choose one of the formats. Excel creates the bar chart using the frequency counts.

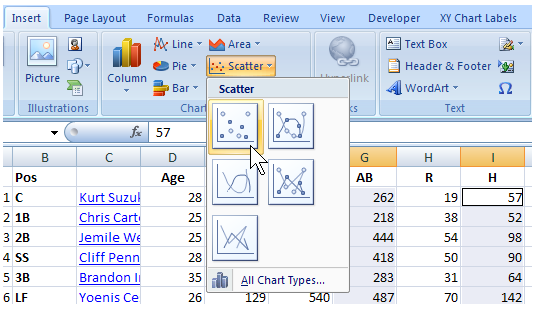
Just as for the pie chart, right-click the new bar chart and choose *Select Data…* Under *Horizontal (Category) Axis Labels*, click *Edit*. Then click/drag to highlight the bin values corresponding to the frequency values. Click OK, and OK. Excel labels the bars with the bin values.

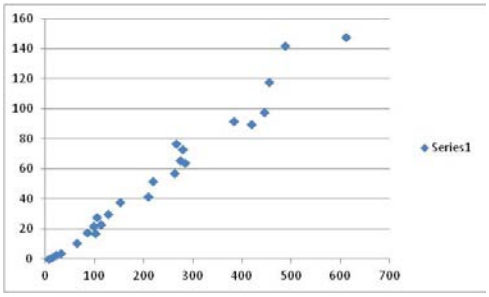
Optional activity:

Make a scatter graph of the number of times at bat versus the number of hits. You can probably anticipate the outcome here, but it will be a good check of graphing skills.

As for the other charts, start by highlighting the data values to be charted. But a scatter graph needs both *x-and y*-values. Start by dragging the mouse to highlight the *x*-values: the At Bats (headed by "AB") column of values. Then, while holding down the Ctrl-key, drag the mouse to highlight the *y*-values— the Hits (headed by "H") column of values. Release the Ctrl-key.

On the *Insert* tab, click on *Scatter* (in the *Charts* group), and choose the "Scatter with Only Markers" format.





The resulting scatter chart suggests a relationship between the number of times at bat (the horizontal axis) and the number of hits (the vertical axis).

You can further edit the characteristics of the chart's titles, labels, and legend.

Explore other relationships to the At Bats values. Click the scatter chart and notice the blocks of data values selected on the spreadsheet are outlined. Carefully position the mouse over the outline around the Hits, mouse-down and drag the outline over to another column of values and release. The chart instantly updates with the new scatter comparison. Try out several columns—especially the Batting Average (headed by "BA"). Does a player's batting average seem to improve when they have more times at bat?

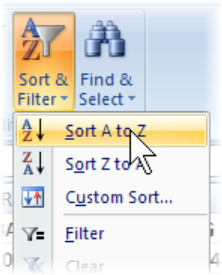
If time permits, encourage students to replicate their work for all five teams in the division (or if using a different data set, as much data as is practical) to convey the power of using the spreadsheet to manage and present their data. This may not seem like a lot of data used in this activity, but it is far more than anyone would care to handle with a handheld calculator. Even the graphing was accomplished in a matter of a few minutes.

Group Reflection Questions

- Did the quick analysis done in this activity produce any surprising discoveries?
- What are some interesting comparisons or calculations that come to mind for this data?

Handout 1—Sorting/Filtering Data, Performing Calculations, and Generating Graphs and Charts

Sorting

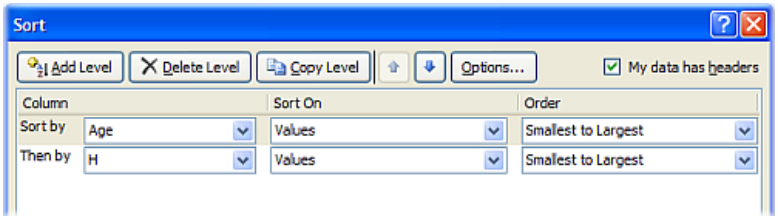


In any table, sorting is a natural step, and a readily applied feature in a spreadsheet. Simply place the cursor in a column, and from the *Home* tab, in the *Editing* group, click the *Sort and Filter* button, then *Sort A to Z* (i.e., Ascending) order. In the table of batting statistics for one of the teams:

Sort the batters by Rank. Place the cursor in the Rank column (column A), and sort it in ascending order. Notice that 1) the whole table (all columns) is sorted, with the order of the rows being controlled by the Rank column; 2) the column headings may drop to the bottom of table (because the letters "Rk" are lower in the sorting order than digits).

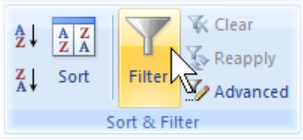
Sort the batters by Age. Place the cursor in the Age column (column D), and sort it in ascending order. Examine the span of ages, from youngest to oldest. Are you surprised? Do all teams look the same in this respect?

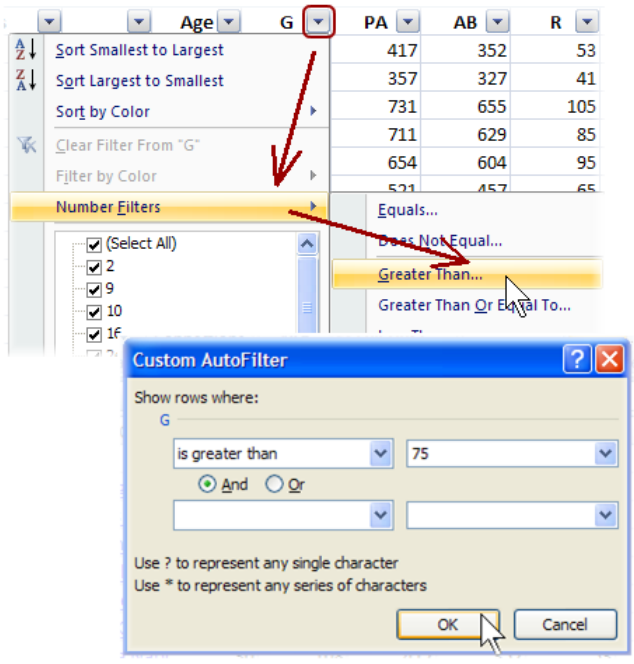
Sort the batters by both Age and Runs. Return to the spreadsheet state (Hint: "undo" the above sorts.) with the headers in row 1. Click *Custom Sort…*, and check the box for "My data has headers." Sort the data with two levels: first, sort by the Age column, and then by the H column (number of home runs), both from *Smallest to Largest*, as shown below. Do you see what this accomplishes? Does this work for all teams?



Filtering

The *Filter* feature provides a powerful, almost database-like capability. It allows you to perform simple queries to extract rows that meet certain criteria or hide rows that do not meet the criteria. The *Filter* function is available on the same *Sort and Filter* button (see above), or under the *Data* tab, in the *Sort and Filter* group, as the *Filter* button.

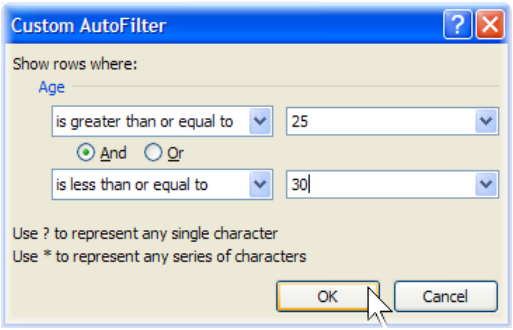




Note: Place the cursor in the table of values before clicking *Filter.* If the "filter arrows" appear beside values rather than the column headings (as shown), click and remove the *Filters*, then manually select the entire table, and click *Filter* again.

View batters who played more than 75 games. Click the *Filter* button (or menu choice). Notice the new functionality added to each column heading. As shown, click the down-arrow for the column headed *G* (for "Games played"), then *Number Filters*, and then *Greater Than…* In the *Custom Autofilter* dialog box, in the blank box to the right of "*G…is greater than…*" type the value "*75*", and click *OK*. Your table should now be showing only batters who played at least 76 games.

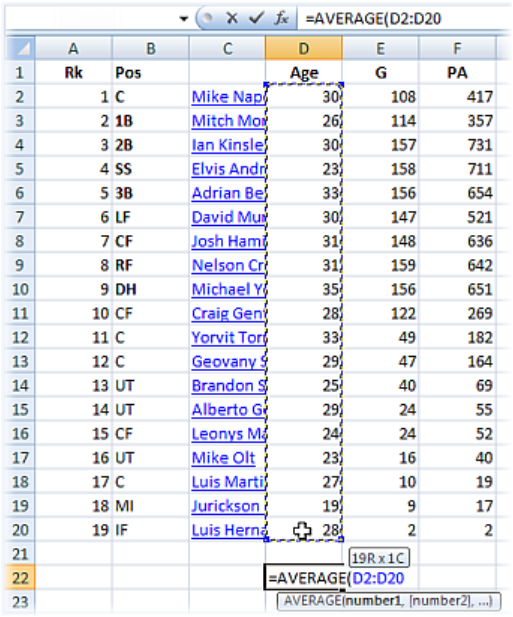
View batters whose age is 30 years or older. Clear any existing filter by clicking the *Filter* function *Off*, and then back *On* again. Just as you applied the games-played filter, click the "down-arrow" for the *Age*, then *Number Filters*, and then *Greater Than or Equal To…* In the blank box to the right of "Age…is greater than or equal to…" type the value "30", and click OK. Your table should be showing only the players age 30 and older.



View batters whose age is between 25 and 30 who played more than 100 games. This filter will require several criteria that must be satisfied. Clear any existing filter, and then click the *Filter* function *On* again. Click the down-arrow for the *Age*, and specify a *Number Filters*, for *Age…is greater than or equal to…25.* Now restrict the ages. With *And* selected as shown here, click the drop-down list to choose *is less than or equal to*, enter the value 30, and click OK. Now add a Games played filter. As before, add a *Number Filter* for values of "G…is greater than…100." How many players satisfy these criteria in the division?

Calculating

Spreadsheets are very good at performing calculations on small or large quantities of data using simple or powerful functions.



Which is the "youngest team" in your division? Calculate the average age for each team using the *AVERAGE()* function. In a blank cell below the table, type "=AVERAGE(" without the quotes, and then use the mouse to select the entire range of age values for the team, and *Enter*. See the calculated average value. Repeat for the other teams. Which team in the division might be said to be the youngest?

What is the age of the oldest player on each team? The youngest player? Just as you calculated the average, use the *MAX()* and *MIN()* functions.

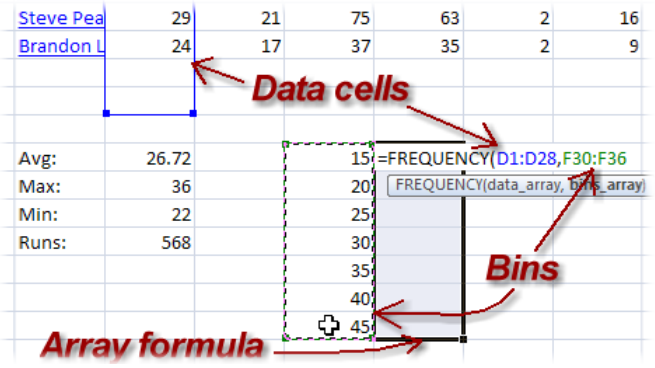
Which team scored the most runs all season? The fewest? Use the *SUM()* function on the "*R*" (runs scored) column.

Create a Frequency Distribution of player ages. Use the *FREQUENCY()* function to create tallies for a histogram. Here are the steps:

Below the data, in some blank rows, create a column of ages: 15, 20, 25, 30, 35, 40, 45. These will be the "bins" for counting the number of players whose ages in each age category, e.g., up to 15 years, from 16 up to 20, from 21 up to 25, etc.

Highlight the blank cells beside the bins. You will next enter what's called an "*array formula*" in the highlighted cells.

With the blank cells still highlighted, type =FREQUENCY(and then 1) use the mouse to select the entire range of age values for the team (it's OK to include the header row and blank rows),
2) type a comma,
3) use the mouse to select the range of bins, and
4) To complete array formulas, **don't press** *Enter*, but instead press *Ctrl+Shift+Enter*.
To edit (or delete) this array formula, again highlight all the cells in the array, make your edit, and again press *Ctrl+Shift+Enter* (or *Delete*).

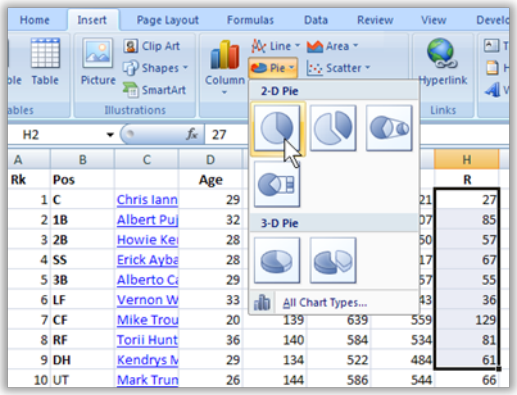


The array formula and resulting frequency values will fill the selected blank cells. These frequency values will be used to create a histogram (bar chart) below.

Presenting

Just as spreadsheets are good at calculating, they are also good at making graphs and charts.

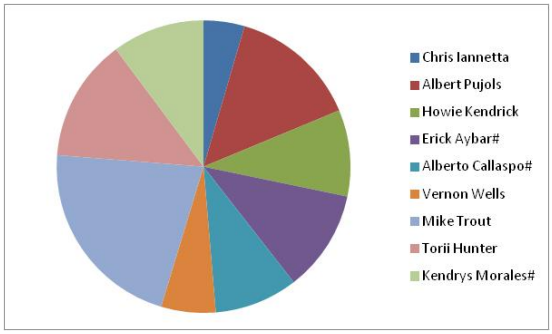
<u>Create a pie chart showing the starting players scoring performance.</u>



Highlight the runs scored for the first 9 ranked players in the column headed by "R."

On the *Insert* tab, click *Pie* (in the *Charts* group) and choose one of the pie chart formats. Excel calculates the percentages and creates all the sections of the pie chart for you.

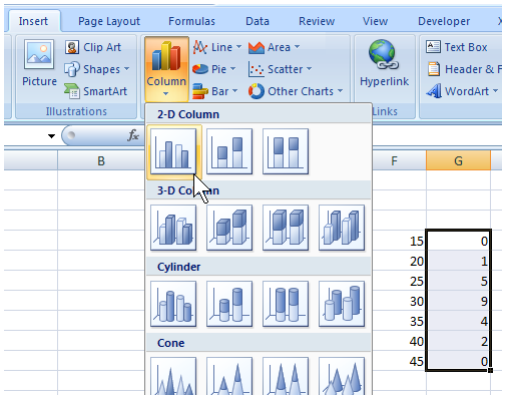
Right-click the pie chart that appears and choose *Select Data…* Under *Horizontal (Category) Axis Labels*, click *Edit*. Then click/drag to and highlight the player names corresponding to the first nine positions. Click *OK*, and *OK*. The resulting pie chart will now associate each player name with a colored section.



You can further customize the chart appearance (title, shadows, labels, colors) as you wish.

Make a bar chart showing the distribution of player ages using the results of the frequency array formula calculated previously.

Just as for the pie chart, start by highlighting the data values to be charted: the column of Frequency calculations (beside the bins of age values).



On the *Insert* tab, click on *Column* (in the *Charts* group) and choose one of the formats. Excel creates the bar chart using the frequency counts.

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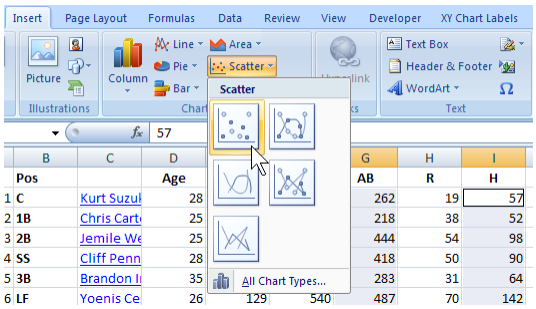
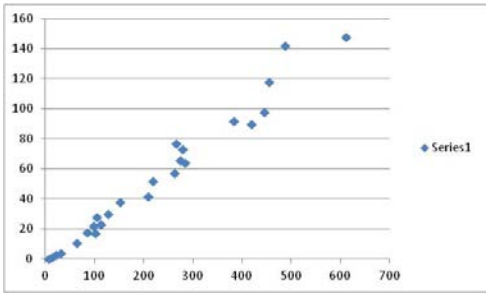
Make a scatter graph of the number of times at bat versus the number of hits. You can probably anticipate the outcome here, but it will be a good check of graphing skills.

As for the other charts, start by highlighting the data values to be charted. But a scatter graph needs both *x- and y*-values. Start by dragging the mouse to highlight the *x*-values: the At Bats (headed by "AB") column of values. Then, while holding down the Ctrl-key, drag the mouse to highlight the *y*-values— the Hits (headed by "H") column of values. Release the Ctrl-key.



On the *Insert* tab, click on *Scatter* (in the *Charts* group), and choose the "Scatter with Only Markers" format.



The resulting scatter chart suggests a relationship between the number of times at bat (the horizontal axis) and the number of hits (the vertical axis).

You can further edit the characteristics of the chart's titles, labels, and legend.

Explore other relationships to the At Bats values. Click the scatter chart and notice the blocks of data values selected on the spreadsheet are outlined. Carefully position the mouse over the outline around the Hits, mouse-down and drag the outline over to another column of values and release. The chart instantly updates with the new scatter comparison. Try out several columns—especially the Batting Average (headed by "BA"). Does a player's batting average seem to improve when they have more times at bat?

NOTE: A chart with no labels could be misinterpreted, so before sharing any of these charts add chart and axis titles and adjust the font sizes and colors.

Handout 2—Column Headings Key for Baseball Statistics

Label	Meaning
Rk	Rank. This is a count of the rows from top to bottom. It is recalculated following the sorting of a column.
Pos	Position
Age	Player's age at midnight of June 30th of that year
G	Games Played or Pitched
PA	Plate Appearances. When available, we use actual plate appearances from play-by-play game accounts. Otherwise estimated using AB + BB + HBP + SF + SH, which excludes catcher interferences. (per John)
AB	At Bats
R	Runs Scored/Allowed
H	Hits/Hits Allowed
2B	Doubles Hit/Allowed
3B	Triples Hit/Allowed
HR	Home Runs Hit/Allowed
RBI	Runs Batted In
SB	Stolen Bases
CS	Caught Stealing
BB	Bases on Balls/Walks
SO	Strikeouts
BA	Hits/At Bats. For recent years, leaders need 3.1 PA per team game played. Bold indicates highest BA using current stats. Gold means awarded title at end of year.
OBP	(H + BB + HBP)/(At Bats + BB + HBP + SF). For recent years, leaders need 3.1 PA per team game played.
SLG	Total Bases/At Bats or (1B + 2*2B + 3*3B + 4*HR)/AB. For recent years, leaders need 3.1 PA per team game played.
OPS	On-Base + Slugging Percentages For recent years, leaders need 3.1 PA per team game played.
OPS+	OPS+100*[OBP/lg OBP + SLG/lg SLG - 1]. Adjusted to the player's ballpark(s).
TB	Total Bases. Singles + 2 x Doubles + 3 x Triples + 4 x Home Runs.
GDP	Double Plays Grounded Into. Only includes standard 6-4-3, 4-3, etc. double plays. First tracked in 1933. For gamelogs only in seasons we have play-by-play, we include triple plays as well. All official seasonal totals do not include GITP's.
HBP	Times Hit by a Pitch.
SH	Sacrifice Hits (Sacrifice Bunts)
SF	Sacrifice Flies. First tracked in 1954.
IBB	Intentional Bases on Balls. First tracked in 1955.
Positions	C: Catcher, 1B: first base, 2B: second base, 3B: third base, SS: short stop, LF: left field, CF: center field, RF: right field, DH: designated hitter, P: pitcher, UT: utility, OF: outfield, IF: infield, CI: corner infield, MI: middle infield

ACTIVITY: INTERPRETING INFORMATION

Instructor Preparation

The preceding activities called for information to be collected, evaluated for integrity and trustworthiness, and placed in an organized form. The data can now be interpreted. A truly intelligent interpretation depends on an understanding of the data. In the case of the baseball statistics, for example, the manager is already aware of the many variables and interactions that affect a player's batting performance and can spot notable variations from expected values. However, we are not in such a privileged position. In this activity we will explore some more ways to analyze and interpret abundant data to make meaningful comparisons.

Clearly, the statistical functions and methods we applied to the baseball statistics can also be applied to data from any other field of interest.

- In a Law and Public safety career area, an analysis of traffic fatality data helps us explore the correlation between speeding and traffic fatalities. For this, using data available from the U.S. Census Bureau website can be used: http://www.census.gov/compendia/statab/cats/transportation/motor_vehicle_accidents_and_fatalities.html
- In an Information Technology course, a study of the growing use of personal technology could include a very interesting analysis of the changing demographics of home computers and internet access, iPads, cell phones, and so forth. For example, a wealth of data is available from the International Telecommunications Union, at: http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx
- A geology course could examine the trends in specific mineral production and use over the past several years. For example, a wide assortment of mineral summary data can be found at the USGS website: http://minerals.er.usgs.gov/minerals/pubs/commodity/

Objectives

Students will:

1. Calculate the linear correlation coefficient between two sets of data with the aid of a spreadsheet.
2. Apply and interpret curve-fitting of various types (lines, parabolas, exponential) to graphs of data pairs with the aid of a spreadsheet.
3. Use student's t-test for statistical significance testing of experimental data.
4. Use logarithmic graphs to study exponential data.

Materials

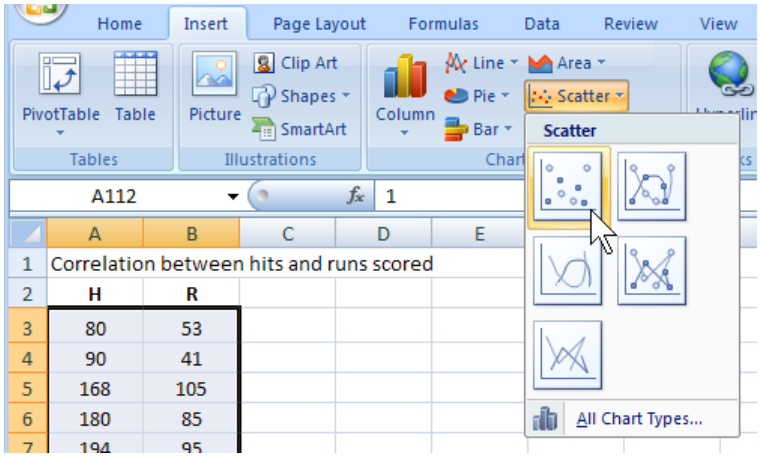
- An internet-connected computer, equipped with a browser and spreadsheet program (e.g., MS Excel)—computer lab time is recommended
- Storage media for spreadsheet file (e.g., network drive, USB flash drive, or similar)

- Handout
- Instructor computer with projector, for demonstrating Excel functions

Activity Guidelines

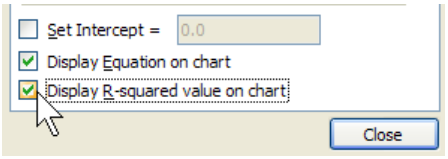
1. **Below are example calculations, graphs, and analyses that are available in Excel to assist in interpreting data. Of course, this is not an exhaustive treatise on data analysis, but is meant to whet students' appetite for further exploration.** Correlation is a common statistical measure of interest on one or more variables that one suspects of being related. One common calculation is known as the linear correlation coefficient, R^2 (ranging in values from 0 to 1 [or 0% to 100%], is the degree to which two attributes show a tendency to vary in a linear fashion. For example, considering the baseball statistics, while many factors will affect the number of base hits a player makes and the number of runs scored, we expect a relationship. A linear relationship is especially easy to see when the two variables are graphed; a numerical measure is also easy to get.

   a. **Instructor demonstration plus student activity:**
   In the baseball statistics spreadsheet, create a new worksheet. Copy the values from two columns of the team statistics to this worksheet: the Hits (H) and the Runs Scored (R). Hint: Put the *Hits* data in the first column and the *Runs Scored* data in the second column. This creates ordered pairs of (x, y) values.



   b. **Student activity:**
   Drag the mouse to highlight the two columns of data from all the divisions. On the *Insert* tab, in the *Charts* group select *Scatter*, and then *Scatter with only markers*. Observe the resulting graph. Titles to the graph and the axes can be added. Does there appear to be a relation between hits and runs? What would the graph look like if there were no correlation?

   c. **Student activity:**



   The spreadsheet can easily tell about the linear correlation. Right-click the plotted data values on the chart (if something else is selected first, press Escape), and choose *Add Trendline…* from the pop-up menu. Verify that "*Linear*" is the type selected. Near the bottom of the *Trendline Options*, check the options for *Display Equation on chart* and *Display R-squared value on chart*. Click *Close*. Notice that Excel adds to the chart: 1) a line of best fit (the "trendline"), 2) the equation of the line, and 3) the value of the correlation coefficient, R^2. The closer R^2 is to 1, the stronger the correlation. For two variables behaving randomly, R^2 will be nearly zero.

d. **Optional student activity:**
Repeat the above steps for each team in the division. Do all teams have nearly the same relationship between hits and runs scored? Do these graphs and statistics detect which team ultimately won the division?

e. **Optional student activity:**
Repeat the above steps for another pair of columns of baseball data (e.g., age vs hits, stolen bases versus caught stealing, and so forth).

2. **Curve fitting** is the process of finding the best equation parameters to fit the data. A good-fitting curve will have the smallest deviations from all the data points. The curve could be a line (like $y = mx + b$, finding the best values for *m* and *b*), a parabolic shaped curve (like $y = ax^2 + bx + c$, finding the best values for *a*, *b* and *c*), or an exponential curve (like $y = ae^{bx}$, finding the best values for *a* and *b*). In any case, the resulting equation provides some ability to predict and understand the behavior of the variables and also provides a smooth curve to help the eye see the trend of the data.

a. **Student activity:**
Follow the steps described in the correlation activity to again generate a (or return to the previously made) graph of the times at bat (AB on the *x*-axis) versus the number of hits (H) on the *y*-axis. Add a linear trendline. What do you think *the slope* of this line tells you? **Hint***:* what would be the slope if every player had a hit every time at bat?

b. **Student activity:**
Make a new graph: Follow the steps described in the correlation activity to generate a graph of the relationship between the games played (*G* on the *x*-axis) and a player's on-base percentage (*OBP* on the *y*-axis). Add a linear trendline.

c. **Student activity:**
The data probably doesn't really appear to fit a linear curve well, since players who play more will naturally tend to perform better—or maybe players who perform better will play more. Right-click the trendline, *Format Trendline…* and try other trendline equations to obtain better fitting curves. Do the choices that seem to fit better also yield larger R^2 values?

d. **Optional student activity:**
While considering the above graphs (or others) and the resulting curve-fits, apply one or more filters to the data. For example, does the slope of the curve for *At Bats* versus *Hits* change for younger players? Older players? What does this mean? *Hint:* Move the graphs down to blank rows below your table of values before applying filters, since the filtering will likely hide rows in which the graphs reside.

3. **Statistical significance testing** is the process of comparing two or more samples of data to assess the likelihood that they came from truly different sources. Manually, the process would be labor-intensive, but with the data in a spreadsheet, such computations become easy. The hardest part is interpreting the results.

One commonly used analysis, called the *t*-test, compares the average values of two samples. Here, for example, one can ask: Are the on-base-percentages (OBP) from Team 1 significantly different than the OBP values from Team 2? Gather the teams' OBP values into one worksheet and set up a table as a guide to all the possible team comparisons.

a. **Instructor demonstration:**

	Team 1	Team 2	Team 3	Team 4	Team 5
Team 1	x				
Team 2	x	x			
Team 3	x	x	x		
Team 4	x	x	x	x	
Team 5	x	x	x	x	x

Copy the columns of on-base percentages (OBP) from the five teams to a new worksheet: Team 1 in column A, Team 2 in column B, and so forth. Calculate the *t*-test for all ten possible comparisons of these five teams. Make a table, similar to that shown here, using team names. The shaded cells indicate where formulas will be entered; "x" represents redundant pairings.

b. **Instructor demonstration:**

	Team 1	Team 2	Team 3	Team 4	Team 5
Team 1	x	=TTEST(A2:A26,B2:B26,2,3			
Team 2	x	TTEST(array1, array2, tails, type)			
Team 3	x	x	x		
Team 4	x	x	x	x	
Team 5	x	x	x	x	x

Now use Excel's *t*-test function to compare the on-base percentages (OBP) of Team 1 and Team 2. With the cursor positioned in the Team 1-Team 2 cell, type: =TTEST(. Now, specify the first array (the Team 1 OBP values): click and drag to highlight the cells for *Team 1* OBP values and then type a comma. Next, specify the second array: highlight the cells for the *Team 2* OBP values and type another comma. The *t*-test function needs two more parameters. First, choose a one-tail or two-tail test. Since the test is to see if the teams are different (not whether a certain one is larger than the other), this is a *two-tail test,* so type a "2" and another comma. Lastly, choose the function for a type-1, type-2, or type-3 test. See the summary of types shown here. Since there is no reason to expect equal variation in the OBP values from team to team, specify the safest (and least sensitive) test—type-3. Test by typing the value "3" and pressing *Enter*.

t-test: Types of comparisons	
Type 1:	Two samples with paired values
Type 2:	Two Samples, expecting equal variances
Type 3:	Two samples, probably unequal variances

c. **Instructor demonstration:**

The value from the formula is known as a *p*-value. Generally, if *p* is less than 0.05, the difference between the two samples is "significant." If $0.5 \leq p \leq 1.0$, it might be slightly significant and bear further scrutiny. Otherwise, if $p > 1$ there is generally no significant difference between the samples. Did the comparison of the first two teams yield "significantly different" OBP values?

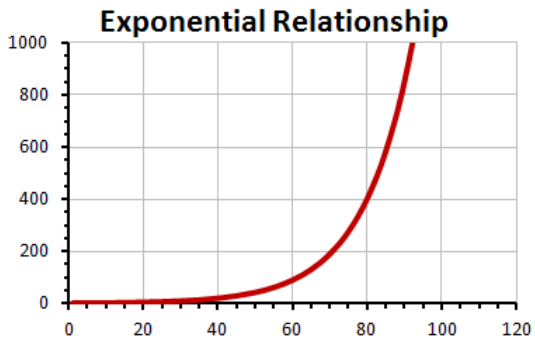
Hint: Format cells having significant *p* values with some obvious color. Advanced users: Apply conditional formatting to these cells, indicating small *p*-values with some color, for example.

d. **Student activity:**

Carefully repeat the previous steps for the remaining nine combinations of team values. Do any of pairs of Teams have significantly different OBP values?

NOTE: There are many other tests of significance that can be performed on sample data (chi-square, ANOVA, and so forth), some accessible with Excel functions. However, although *Excel* is useful for basic data handling and calculating, for more complex statistical analyses it would be best to use a true statistical analysis package.

4. **Logarithmic and Exponential processes.** Not every dependent relationship is linear. In fact, most are not. Processes that can be measured and found to depend on the amount being measured are usually reflecting exponential relationships. Since it's not likely to find exponential behavior in the baseball statistics, look to another source that might be exponential. The U.S. National Debt. Annual data is publicly available at: http://www.treasurydirect.gov/govt/reports/pd/histdebt/histdebt.htm



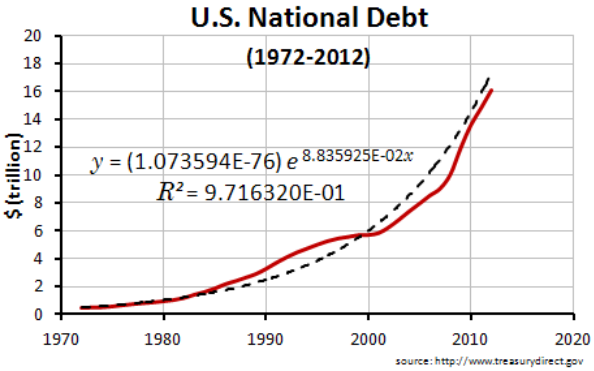
   a. **Instructor demonstration plus student activity:**
   Visit the above site and find the debt data for at least the past 40 years. Copy paste the columns of data into a blank spreadsheet. "Clean up" the data, if necessary, removing any footnotes or text.

   b. **Optional Instructor demonstration:**
   Assuming dates are in column A, and debt amounts in column B, you can translate the pasted values for easier handling. For example, add a column of just year values: in C1 enter "=YEAR(A1)." Add a fourth column to convert the debt values to trillion dollar amounts, dividing each debt amount by 10^{12} (in Excel form that is 1E12) in D1, enter "=B1/1E12." Copy these formulas down for each row of the original data.

   c. **Student activity:**
   Highlight the data (or the converted data) and create a smooth XY-graph (i.e., scatter graph).

   d. **Student activity:**
   Does the data seem to be linear? Or does it more closely resemble the exponential relationship shown above?

   e. **Student activity:**
   Right-click the curve and select "Add Trendline" to the data. Excel will default and apply a linear-fit trendline to the data. Right-click the trendline and add the R^2 value (a measure of goodness-of-fit) to the chart. Values of R^2 less than 0.9 indicate a rather weak fit to the data.



   f. **Student activity:**
   Right-click the trendline again and choose an exponential trendline. Does the new trendline seem to fit the data better and the R^2 value improve?
   Optional: Select "Display Equation on Chart" to see the exponential equation that best fits the data. Right-click the equation, choose *Format Trendline Label*, and change the *Number* format to scientific notation with 5 or 6 decimal places. (See our result above.)

g. **Student activity:**
Using this equation, predict a little bit into the future. What might the debt be expected to reach next year? (For the example above, the 2013 prediction is about $19 trillion, although the fitted curve is only suggesting the trend, not the exact amounts.)

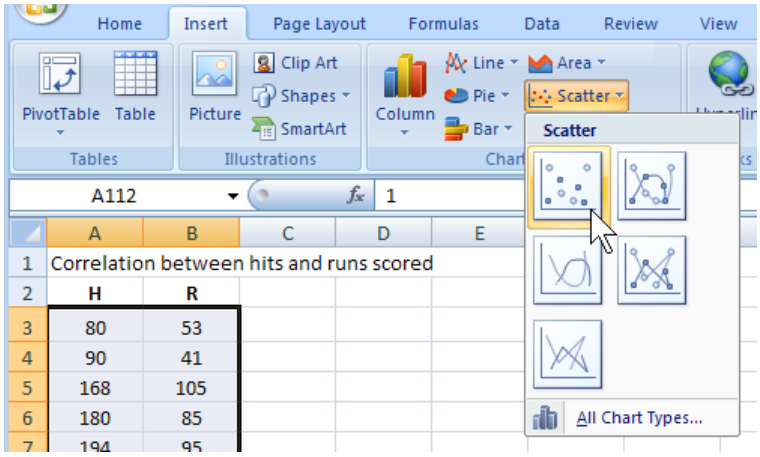
Wrap-up

Data analysis and interpretation is a career unto itself, so it is quite beyond the scope of a single activity to adequately equip or provide practice for students. However, the abundance of available data, thanks to the internet, can make presentation or persuasive case in any career area stronger based on real-world data. When comparing sports statistics, there are many, many variables that affect each player's performance. The result is an almost random variation of dozens of statistics for the players—if not for the strong effect that certain skills and talents can have on the outcomes. For baseball aficionados, therein lies the entertainment value of the sport, as they enjoy predicting the consequences of those various skills and talents. While this activity has focused on historical data, the real excitement can come from using recent data to try to predict future data. Many hours of study, analysis, and discussion can come from such pursuits.

Handout—Linear Correlations, Curve-Fitting, Statistical Significance, and Logarithmic Graphs

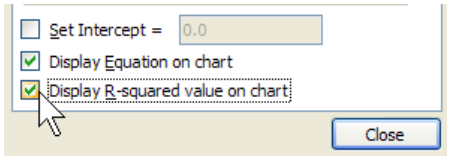
1. Correlation is a common statistical measure of interest on one or more variables that one suspects of being related. One common calculation is known as the linear correlation coefficient, R^2 (ranging in values from 0 to 1 [or 0% to 100%], is the degree to which two attributes show a tendency to vary in a linear fashion. For example, considering the baseball statistics, while many factors will affect the number of base hits a player makes and the number of runs scored, we expect a relationship. A linear relationship is especially easy to see when the two variables are graphed; a numerical measure is also easy to get.

   a. In the baseball statistics spreadsheet, create a new worksheet. Copy the values from two columns of the team statistics to this worksheet: the Hits (H) and the Runs Scored (R). Hint: Put the *Hits* data in the first column and the *Runs Scored* data in the second column. This creates ordered pairs of (x, y) values.



   b. Drag the mouse to highlight the two columns of data from all the divisions. On the *Insert* tab, in the *Charts* group select *Scatter*, and then *Scatter with only markers*. Observe the resulting graph. Titles to the graph and the axes can be added. Does there appear to be a relation between hits and runs? What would the graph look like if there were no correlation?

   c. The spreadsheet can easily tell about the linear correlation. Right-click the plotted data values on the chart (if something else is selected first, press Escape), and choose *Add Trendline…* from the pop-up menu. Verify that "*Linear*" is the type selected. Near the bottom of the *Trendline Options*, check the options for *Display Equation on chart* and *Display R-squared value on chart*. Click *Close*. Notice that Excel adds to the chart: 1) a line of best fit (the "trendline"), 2) the equation of the line, and 3) the value of the correlation coefficient, R^2. <u>The closer R^2 is to 1, the stronger the correlation. For two variables behaving randomly, R^2 will be nearly zero.</u>



   d. Repeat the above steps for each team in the division. Do all teams have nearly the same relationship between hits and runs scored? Do these graphs and statistics detect which team ultimately won the division?

   e. Repeat the above steps for another pair of columns of baseball data (e.g., age vs hits, stolen bases versus caught stealing, and so forth).

2. **Curve fitting** is the process of finding the best equation parameters to fit the data. A good-fitting curve will have the smallest deviations from all the data points. The curve could be a line (like $y = mx + b$, finding the best values for *m* and *b*), a parabolic shaped curve (like $y = ax^2 + bx + c$, finding the best values for *a*, *b* and *c*), or an exponential curve (like $y = ae^{bx}$, finding the best values for *a* and *b*). In any case, the resulting equation provides some ability to predict and understand the behavior of the variables and also provides a smooth curve to help the eye see the trend of the data.

    a. Follow the steps described in the correlation activity to again generate a (or return to the previously made) graph of the times at bat (AB on the *x*-axis) versus the number of hits (H) on the *y*-axis. Add a linear trendline. What do you think *the slope* of this line tells you? **Hint***:* what would be the slope if every player had a hit every time at bat?

    b. Make a new graph: Follow the steps described in the correlation activity to generate a graph of the relationship between the games played (*G* on the *x*-axis) and a player's on-base percentage (*OBP* on the *y*-axis). Add a linear trendline.

    c. The data probably doesn't really appear to fit a linear curve well, since players who play more will naturally tend to perform better—or maybe players who perform better will play more. Right-click the trendline, *Format Trendline…* and try other trendline equations to obtain better fitting curves. Do the choices that seem to fit better also yield larger R^2 values?

    d. While considering the above graphs (or others) and the resulting curve-fits, apply one or more filters to the data. For example, does the slope of the curve for *At Bats* versus *Hits* change for younger players? Older players? What does this mean? *Hint:* Move the graphs down to blank rows below your table of values before applying filters, since the filtering will likely hide rows in which the graphs reside.

3. **Statistical significance testing** is the process of comparing two or more samples of data to assess the likelihood that they came from truly different sources. Manually, the process would be labor-intensive, but with the data in a spreadsheet, such computations become easy. The hardest part is interpreting the results.

    One commonly used analysis, called the *t*-test, compares the average values of two samples. Here, for example, one can ask: Are the on-base-percentages (OBP) from Team 1 significantly different than the OBP values from Team 2? Gather the teams' OBP values into one worksheet and set up a table as a guide to all the possible team comparisons.

    a. Copy the columns of on-base percentages (OBP) from the five teams to a new worksheet: Team 1 in column A, Team 2 in column B, and so forth. Calculate the *t*-test for all ten possible comparisons of these five teams. Make a table, similar to that shown here, using team names. The shaded cells indicate where formulas will be entered; "x" represents redundant pairings.

	Team 1	Team 2	Team 3	Team 4	Team 5
Team 1	x				
Team 2	x	x			
Team 3	x	x	x		
Team 4	x	x	x	x	
Team 5	x	x	x	x	x

b. Now use Excel's *t*-test function to compare the on-base percentages (OBP) of Team 1 and Team 2. With the cursor positioned in the Team 1-Team 2 cell, type: =TTEST(. Now, specify the first array (the Team 1 OBP values): click and drag to highlight the cells for *Team 1* OBP values and then type a comma. Next, specify the second array: highlight the cells for the *Team 2* OBP values and type another comma. The *t*-test function needs two more parameters. First, choose a one-tail or two-tail test. Since the test is to see if the teams are different (not whether a certain one is larger than the other), this is a *two-tail test,* so type a "2" and another comma. Lastly, choose the function for a type-1, type-2, or type-3 test. See the summary of types shown here. Since there is no reason to expect equal variation in the OBP values from team to team, specify the safest (and least sensitive) test— type-3. Test by typing the value "3" and pressing *Enter*.

	Team 1	Team 2	Team 3	Team 4	Team 5
Team 1	x	=TTEST(A2:A26,B2:B26,2,3			
Team 2	x	TTEST(array1, array2, tails, type)			
Team 3	x	x	x		
Team 4	x	x	x	x	
Team 5	x	x	x	x	x

***t*-test: Types of comparisons**

Type 1: Two samples with paired values

Type 2: Two Samples, expecting equal variances

Type 3: Two samples, probably unequal variances

c. The value from the formula is known as a *p*-value. Generally, if *p* is less than 0.05, the difference between the two samples is "significant." If $0.5 \leq p \leq 1.0$, it might be slightly significant and bear further scrutiny. Otherwise, if $p > 1$ there is generally no significant difference between the samples. Did the comparison of the first two teams yield "significantly different" OBP values? Hint: Format cells having significant *p* values with some obvious color. Advanced users: Apply conditional formatting to these cells, indicating small *p*-values with some color, for example.

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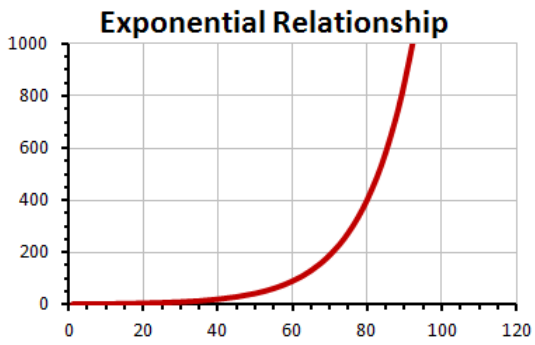

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d. Does the data seem to be linear? Or does it more closely resemble the exponential relationship shown above?

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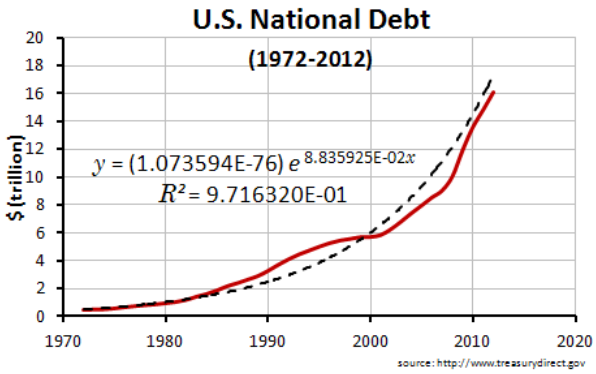

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g. Using this equation, predict a little bit into the future. What might the debt be expected to reach next year? (For the example above, the 2013 prediction is about $19 trillion, although the fitted curve is only suggesting the trend, not the exact amounts.)

Assessment Tools/Strategies

This section includes specific strategies and instruments for assessing students' knowledge, skills, and attitudes in regard to Information Processing.

RUBRICS

Rubrics are valuable assessment tools. Students should be provided with the rubric by which they will be assessed before an activity begins so they will know from the beginning what behaviors and quality of work are expected. When time permits it is useful to have students contribute to the rubrics by brainstorming with the instructor on what a quality behavior or product looks like. For example, before assigning a team project to locate, analyze, and interpret data and prepare a group presentation, ask students to describe to describe characteristics of the ideal presentation. Prompt students with specific components. Then have them describe a really poor analysis and interpretation of data and associated class presentation. These will be the descriptions of the characteristics for the highest and lowest ends of the Likert scale for each essential attribute. Instructors should add any required attributes that must be addressed to the rubric if the students do not come up with them on their own.

- The first two rubrics cover Information Gathering and Data Analysis, and include spaces where the instructor can insert additional attributes to tailor the rubric to a specific project or activity. It was developed to be used by the instructor or other observer who will be assessing a student.

- The third Information Processing rubric is a self-rating rubric that is for use by the students. The students indicate the degree to which they think they are performing each attribute. They can periodically return to the rubric to reassess and determine if they are improving those skills.

- The final type of rubric is the most complex. It is exemplified by the rubrics: Team Member Plan for Developing Interpersonal Skills and Team Member Plan for Contributing to the Team's Success. The student completes a rubric by providing examples of satisfactory or exemplary performance of the tasks/behaviors listed. Then the student meets with the instructor or peer observer and compares his/her reflections with their instructor's or peers' observations and formulates an action plan for improving attitudes, behaviors or skills.

  This type of rubric most resembles the type of assessment an employee might receive on the job. It is also the most time consuming. Ideally, this rubric would be used at least three times during a course:

  - At the beginning of the course, to get a baseline and to give students suggestions for specific actions they might take to improve their performance,
  - At the midpoint of the course, to check progress and refine the recommendations for improvement, and
  - At the end of the course, to assess the progress made over the duration of the course. Additional suggestions can be made for students' continued growth beyond the end of the course.

RUBRICS FOR INSTRUCTOR ASSESSMENT

Outcome: Information Gathering— Student demonstrates an ability to efficiently use an internet search engine, library card catalog, workshop manual index, or similar to locate a desired collection of data or facts for an assigned task. The student must persevere when the specific answer to a specific question is not directly found. Once located, the student is able to record its source and save the data for later analysis.

Uses internet search tools to locate relevant and current information, from both electronic and printed resources.	1 2 3 4 5
Avoids malicious or unreliable web sources.	1 2 3 4 5
Places value on accuracy, style, plausibility of other points of view, and appropriateness for the given situation.	1 2 3 4 5
Collects data from websites such as capturing graphics, tabular data, and text lists.	1 2 3 4 5
Saves collected data to useful and recoverable format, such as spreadsheet or database table.	1 2 3 4 5
Saves sufficient source information from captured and collected data to enable verification, updating, and citation for referencing.	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

Outcome: Data Analysis – Demonstrate the ability to manage raw data saved in a spreadsheet or database format, perform some basic analyses of the data such as count, average, standard deviation, frequency distribution, and graphical analysis to spot obvious trends and dependencies.

Performs and applies basic mathematical operations including calculations involving exponents, roots, logarithms, and powers.	1 2 3 4 5
Performs mathematical calculations with the aid of spreadsheet functions, including average, standard deviation, frequency distributions, t-test, and linear correlation.	1 2 3 4 5
Constructs and/or interprets graphs, charts, and tables to assist in solving mathematical problems or to illustrate findings, including histograms, scatter diagrams, and linear and logarithmic graphs.	1 2 3 4 5
Perform sorting and filtering of data in a spreadsheet as a means to analyze and interpret data.	1 2 3 4 5
Manipulates and names data by rows and columns, applying and copying formulas to connect cells or ranges of cells.	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5
	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
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1	Never	Poor or None

RUBRIC FOR SELF-ASSESSING INFORMATION PROCESSING SKILLS

Use this instrument throughout the course to self monitor yourinformation processing skills. Note: It is fairly common to overrate your skills during the initial assessment. You may rate yourself a bit lower as you get feedback from others and discover the complexities of each attribute. By the end of the course you should see improvements in your ratings if you focus on improving the quality of your information gathering, processing, analysis, and interpretation.

Objective: Collect data and other information from reliable sources.

Essential Attribute	I	II	III	IV
I recognize and collect appropriate and reliable data from relevant sources (to address a particular research need).	Seldom	Sometimes	Usually	Consistently
I recognize and avoid malicious or unreliable sources encountered during the process of research.	Seldom	Sometimes	Usually	Consistently
I maintain an accurate log of where information was found and collected.	Seldom	Sometimes	Usually	Consistently
I use key words with an internet search engine, library search tool, or book index to efficiently locate desired information.	Seldom	Occasionally	Often	Consistently
I use various media sources for needed data, such as internet sites, libraries, manuals, and so forth.	Seldom	Occasionally	Often	Consistently
I assemble materials with needed information into organized and easily reviewed structures.	Seldom	Sometimes	Usually	Consistently
I am able to accurately save data collected from external sources to a spreadsheet or database program.	Seldom	Sometimes	Usually	Consistently

Objective: Analyze and interpret data and collected information.

Essential Attribute	I	II	III	IV
I organize or manipulate data into manageable sets and subsets for further processing, using labeled columns, rows, pages, folders, worksheets, and so forth.	Seldom	Sometimes	Usually	Consistently
I use mathematical formula, procedures, and functions to calculate statistics and other necessary analyses or conversions of raw data.	Seldom	Sometimes	Usually	Consistently
I interpret the results of my analysis.	Seldom	Sometimes	Usually	Consistently
I calculate linear correlation between variables, perform simple curve-fitting to data, and perform basic statistical testing for significance of data.	Seldom	Sometimes	Usually	Consistently

Objective: Present data and information.

Essential Attribute	I	II	III	IV
I report the results of my data analysis using the complete and proper terminology.	Seldom	Sometimes	Usually	Consistently
I use charts, graphs, tables, and lists to convey the findings of my data analysis.	Seldom	Sometimes	Usually	Consistently
I create charts, graphs, and tables that are labeled and documented to convey the required supporting information.	Seldom	Sometimes	Usually	Consistently
I report the results of my calculations of relevant statistics with sufficient explanation.	Seldom	Sometimes	Usually	Consistently
I create and interpret line graphs, pie charts, bar charts, and scatter graphs of diverse data.	Seldom	Sometimes	Usually	Consistently

RUBRIC FOR ASSESSING INFORMATION PROCESSING SKILLS

Outcome: Spreadsheet skills – Use the power of a spreadsheet program to assimilate and analyze large amounts of data by sorting, filtering, calculating, and graphing.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve your spreadsheet skills.
Applied one of the internet search-and-import data skills learned in this activity to another class or subject of personal interest.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Applied one of the spreadsheet analysis skills learned in this activity to another class or subject of personal interest.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Enthusiastically shared one or more of the newly learned skills from this activity with a friend or relative.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Peer comments and suggestions:
Instructor comments:

Videos and Links

VIDEOS

The following is an annotated list of videos that are available at the links provided. The instructor may choose to view this list as preparation for these activities, or to use these in class to give additional Information Processing skills, or to stimulate discussion.

https://www.youtube.com/watch?v=WQCR2M6rqAc
How to copy/paste tabular data from a PDF file into a spreadsheet

https://www.youtube.com/watch?v=-aH56dxqLhg
How to exchange data between MS Excel (spreadsheet) and MS Access (database).

https://www.youtube.com/watch?v=FaLvuyeVen8
Array formula basics for MS Excel. The first few minutes are enough to learn a little about using array formulas in MS Excel for this activity.

https://www.youtube.com/watch?v=81LwaB17GTk
How to insert a trendline, and get the regression equation and R^2 value in MS Excel.

WEBLINKS

Here are some links relevant to this module that may be useful.

http://www.baseball-reference.com/
Source of current major league baseball statistics that can be used in this activity.

See **Handout 2** of **Activity: Evaluating Information**, contains a collection of contrasting web sites, including examples of sites of questionable value as examples of sites to avoid.

http://www.data.gov/
Clearinghouse website for accessing government data of all types..

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Adaptability and Lifelong Learning

Overview

Adaptability and lifelong learning are essential for a motivated and productive workplace. Workers must continue to learn to maintain skills, adapt to new equipment and processes, and acquire new skills to be able to become "promotable." Learning new skills and being cross trained in other areas helps to prevent burnout on the job and also increases the employee's worth both within the company and if the employee seeks employment elsewhere.

Employers that provide cross training to employees say the benefits include the following:

- Promotes employee well-being and prevents burnout
- Improves employees' ability to handle work overflow
- Ensures emergency coverage of all positions
- Creates succession plans for employees to move up within the organization
- Ensures proper training of all employees
- Often improves the processes as new eyes bring different perspectives

In this module students are exposed to activities that help them see the value of lifelong learning and the ability to adapt to new processes, management styles, equipment, and so forth. Activities include:

- Job exploration and the creation of career genograms
- Obtaining and maintaining credentials and the benefits of belonging to professional organizations
- Preparing for career transitions
- Learning from hobbies and other informal venues
- Adapting in video games as an object lesson on adapting in the workplace
- Managing stress both on the job and in personal life

This module provides:

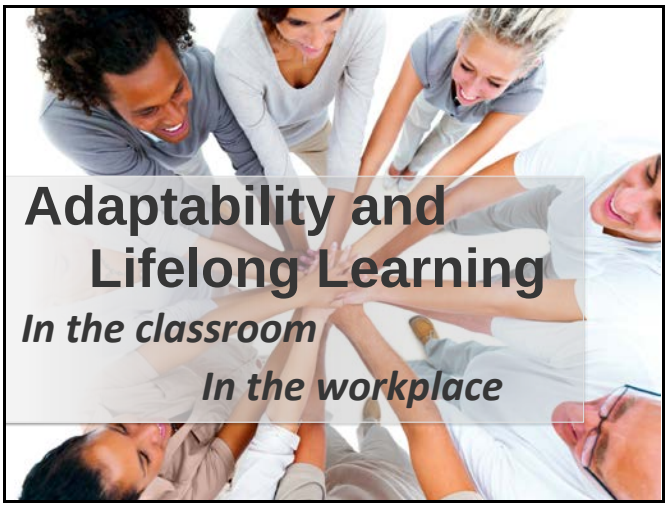
- **Instructor Presentation Materials**—A set of slides to help organize the topics for discussion and provide talking points to introduce the activities
- **Classroom Activities**—A set of activities from which to choose, requiring minimal materials and preparation, to address facets of adaptability and lifelong learning
- **Assessment Tools**—Rubrics for use by both instructor and student to assist in gauging progress throughout the course
- **Videos and Links**—A collection of links that will help both the student and instructor take advantage of the abundance of electronic resources available

Presentation Materials

SLIDE

TEACHER NOTES

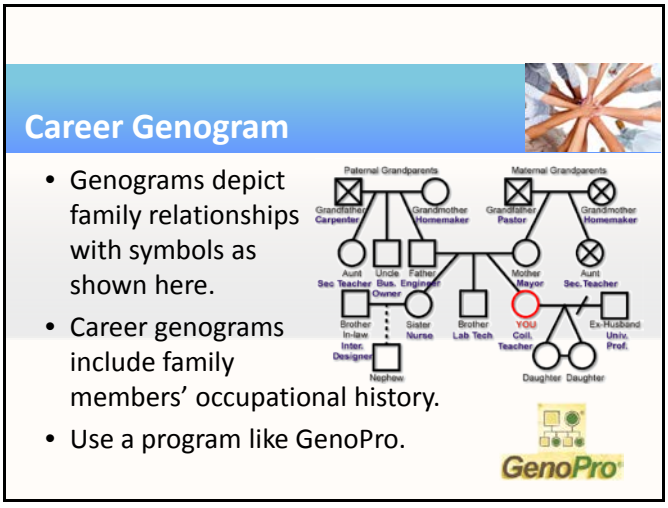
1



2

- The first activity in this module encourages students to complete one or more of the many career surveys available online, which strive to match personality traits and professional skills with the many available career areas.
- The handout available for this activity lists thousands that have profiles available at the U.S. Dept. of Labor website. Spend a few minutes with students perusing that handout or exploring the website.

3



- Ask students to interpret (guess from the context) the few symbols used in the sketch: squares are males, circles are females, "X" indicates deceased, horizontal lines indicate family members (by marriage or birth), diagonal or vertical lines indicate offspring, joined diagonal lines indicate twins (or triplets), horizontal lines joining twins indicate identical twins, dashed lines indicate adoption, crossed-out lines indicate divorce, and members at the same vertical level are in approximately the same generation. It's likely that genograms will be encountered with slightly different notations. There is a summary of genogram notations at http://en.wikipedia.org/wiki/Genogram

	SLIDE	TEACHER NOTES
		• Career genograms are interesting because they often suggest possible explanations for why you or your family members may be inclined to follow certain career paths. Might it be because, at your family gatherings, the topics of discussion are about the careers represented around the room? • We suggest using a free trial version of GenoPro for this activity.
4	**Your Career Plan** ***Identify:*** • The "cluster" for your chosen career. • The "career pathway" in your cluster. • Entry-level positions in this pathway. 	• Students may not be aware of the many career clusters other than the ones they are pursuing. You can take a moment to rattle off the names of a few others. It's a good thing that we are all different, so there are folks to fill all those important jobs that don't interest us! • So, within the chosen cluster, students should identify a career pathway from the many available ones, and then identify an entry-level position that matches their skills and ambitions. See the next slide for more ideas about this activity.
5	**Your Career Plan** ***Identify:*** • Skills and education required for these positions. • Intermediate positions (rungs on the career ladder) leading to your chosen career. • A career path timeline to achieve your goals. 	• Students should select workplace positions that match their skills and serve as a pathway to advancement to their future goals. We hope that the entry-level position is not their final ambition.

	SLIDE	TEACHER NOTES
6	**Credentials for Your Job** • A college degree is one kind of credential. • Many occupations require other credentials or certifications. Can you name some? 	• Encourage students to name examples of credentials they know about, and then fill in the blanks from the following list, or additional ones from your own career area: accountants, auditors, financial planner, architect, radio operator, broadcast television engineer, structural engineer, insurance counselor, land surveyor, tax preparer, systems engineer, psychologist, veterinary assistant, chiropractor, dental assistant, doctor or nurse or therapist (of any type), medical dispatcher, emergency medical technician, paramedic, massage therapist, social worker, hypnotherapist, acupuncturist, real estate agent, investment manager, notary public, attorney or paralegal or legal secretary (of any type), emergency manager. • Discussion questions: As a consumer, do you have more confidence in people who hold credentials? Some credentials and licenses require yearly continuing education or re-testing rather than simply a degree. Why do you think this is so?
7	**Job Opening… Credentials Required!** • In your chosen work area, what are five careers that seem attractive to you? • What are the licensing, certifications, and credentialing requirement for these jobs? 	• These questions can be used as starters for the credentialing activity in this module.

	SLIDE	TEACHER NOTES
8	**Job Opening… Credentials Required!** • What professional organizations support your careers of interest? • What benefits does one get from belonging to these organizations? • What ongoing professional development opportunities exist in these careers?	• These questions can be used as starters for the credentialing activity in this module.
9	**Moving Up the Career Ladder** • If you do your job well, will you automatically get promoted? • What skills, activities and attitudes lead to promotion? • How might a lateral move help you get the promotion? • What kinds of educational decisions make you more promotable? 	• Students probably realize that there are no automatic promotions these days. Prompt them to reflect on the questions provided. Acquiring new or advanced skills, participating in professional activities that demonstrate commitment to the career field, participating in hobbies that build skills, and demonstrating mastery of "soft skills" such as communication and dependability are the types of efforts that lead to promotion. A lateral move (e.g., to another department at the same pay grade) provides the opportunity to work in other divisions within the company and practice skills that are immediately relevant to the company.
10	**Career Transitions** • When the unexpected happens…what next? • What's the long-term plan—beyond your first job at a company? • In what ways can you build on your present skills? • What other occupations also require your skills? 	• In this activity, students should not become unduly alarmed, but they do need to consider the possibility that the unexpected could happen, and their perfect career plan might crumble. It might be unexpected catastrophe, a decision by upper management to downsize, a change in the economic situation, the unexpected arrival of a son or daughter, or maybe even retirement. Any number of things can cause our plans to change. • Links in the activity should be explored by students.

	SLIDE	TEACHER NOTES
11	**Just in Case…Planning for Career Transitions** • Maintain a current resume. • Keep a file with evidence of your achievements—educational documentation, awards, recommendation letters • Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis • Career planning websites	• Links given in the activity should be explored by students: ▪ http://www.myskillsmyfuture.org/ ▪ http://www.careerinfonet.org/skills/ ▪ http://www.onetonline.org/search/
12	**Benefits from Hobbies** • Reduce stress from other responsibilities. • Motivation for expanded education. • Discover your hidden talents. • Open new social opportunities • Improve your self-image and confidence. 	• Hobbies can improve both personal well-being and academic success and provide a balance to the stress of life's responsibilities. • Give opportunity for exploring other areas of interest, possibly leading to expanded education, training, or even a career change. • Provide incentive and opportunity to apply or even discover one's creativity and talents, without the pressure of work expectations. • Open up a new world of social opportunities with others who share an interest in similar hobby area(s). Such interactions often open doors for career moves through networking. • Boost self-image and self-confidence to help find, practice, improve at, and be recognized for "something you're good at."
13	**Consider a New Hobby** • Find three new hobbies that might interest you. • Find three hobbies related to your career area. • Identify a local group practicing at least one of these hobbies. Can you visit the group? • Identify educational opportunities related to one of the hobby areas. 	• This slide summarizes the module's hobby activity guidelines.

	SLIDE	TEACHER NOTES
14	**My Hobby and My Career** • What careers would allow you to do what you really enjoy doing? • How do you find such a job? • When does a hobby start to become "work?" • How can a hobby prepare you for work? • What role should a hobby play in a job interview?	• Prompt students to reflect on these questions and research the answers, if necessary.
15	**Adaptability: A Key To Success** • In any job, workers must be able to adapt—learn new skills, get along with new employees and supervisors, work with new equipment and follow revised procedures. • This is similar to how you must adapt to advance in video games!	• Yes, you must adapt to advance in video games. Think about it: You make it past the first few levels just fine, and then what? You must learn something new, or apply a different skill to continue to advance. So, we're going to recognize that strategy and apply it to lifelong learning.
16	**The Real Purpose Here** • Yes, we'll play some games, but… • Step back and identify areas where you must "adapt" to advance in the game. – How to score points? – New skills required to advance? – New strategies required to advance?	• So, these are the questions we'd like the students to answer for the games, and then for their job/career.

	SLIDE	TEACHER NOTES
17	**Important Enough to Repeat: Adaptability is a Key To Success!** • In any job, workers must be able to adapt—learn new skills, get along with new employees and supervisors, work with new equipment and follow revised procedures. • *How must you adapt in your workplace in order to advance?*	
18	**Managing Stress** • Stress is a normal part of life. • It occurs at home, at work, and in the classroom. • But excessive stress is ***not*** normal and ***not*** healthy. • Holmes and Rahe Stress Scale: Do you have enough stress to make you ill? • The Resiliency Quiz: Are you a "resilient survivor?"	• This activity directs students to take a couple of quick quizzes online that provide a score as an indicator of their stress level and their ability to cope. Of course, the results are 1) only as reliable as the input, and 2) generalized based on population averages (not able to reflect an individual's unusual psychological makeup or circumstances). Students should be directed not to take these results too seriously, but maybe start them to thinking about their lives. Instructors can use the results as a discussion starter about stress and resiliency. • Students may approach instructors privately with concerns following the discussion on stress. Please be prepared to give students appropriate referrals to services provided by the campus and the community.
19	**Keep Adapting, Keep Learning** ***Live as if you were to die tomorrow.*** ***Learn as if you were to live forever.*** Mahatma Gandhi	• http://www.brainyquote.com/quotes/quotes/m/mahatmagan133995.html

Teaching Resources

ACTIVITIES

The following activities are examples of activities that can be completed in class to emphasize, teach, and practice *Adaptability and Lifelong Learning*. The activities can be used as included in this resource, or they may be adapted and tailored to fit the specific courses being taught. Suggestions for tailoring the activities precede each activity with examples from several different subject areas/career pathways. The suggested modifications are provided as examples for instructors with ideas of how they might tailor the activity to fit with the content they are already teaching.

ACTIVITY: JOB EXPLORATION AND GENOGRAMS

Instructor Preparation

This activity is primarily aimed at students who have not already completed one or more career survey instruments. However, the optional career genogram may interest others.

Everyone has different preferences and different personal goals. Many career surveys exist that can help students describe themselves, identify the subjects they like and dislike, the activities in which they do well and those they do poorly. These surveys attempt to mechanically summarize the responses and reveal which career clusters might be a match for students' interests and capabilities. Even if they completed a career survey several years ago, it will be helpful for them to complete one again. It will provide insight about areas of strengths and weakness and how those align with today's career opportunities.

An optional part of this activity asks students to consider the careers in their family. We all inherit more than just genes from our parents and close family members; we are also influenced by observing their conversations, hobbies, extracurricular activities, travels, and other interests and activities. A career genogram tracing one's family tree (back to grandparents or farther, if desired) examines the careers that each family member pursued. Creating a career genogram can be personally rewarding and help students examine the competencies and strengths obtained from their family, as it might impact their own career search.

Objectives

Students will:

1. Complete one or more career-choice survey instrument.
2. Complete a career genogram (a family tree of career paths; requires some outside research information by the student about their family history).

Materials

- Internet access to career survey instruments or interest inventories.
- Internet access to career exploration websites.
- Handouts 1 and 2
- Optional: Student's own family tree information, including occupational history.

Activity Guidelines

In the first part of this activity, students should visit any one of several career planning websites (see the Web Links section of this module) to complete a survey, and then compare the results with fellow students (at instructor's discretion). It would be interesting for students to complete survey instruments from more than one site and compare those results.

When completing the surveys, it's important to answer the questions honestly. Trying to answer the questions in a contrived or anticipated way will produce confusing results.

Most of the surveys suggest career paths that align with the results and some of these suggestions surprise students. Direct them to speculate about those surprising careers.

- Why did the survey suggest ____ (an unexpected career)?
- Which of the suggested careers would require additional education, preparation, certifications, etc.?

Handout 1 provides an exhaustive list of careers, taken from the US Department of Labor sponsored web-site (http://www.careerinfonet.org), grouped by career clusters. Focusing on the cluster for the career area chosen can be very enlightening.

Once students have an indication of an interesting career choice, they can explore those careers further at the U. S. Department of Labor supported website, http://www.careerinfonet.org/Explore/. The Career and Cluster Videos link, http://www.careeronestop.org/Videos/default.aspx, provides access to over 500 videos that explore occupations across all 16 career clusters.

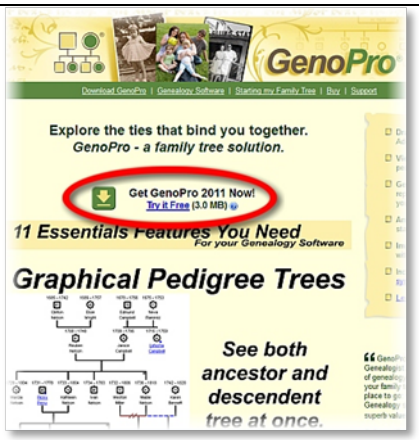
Career Genogram

For the second part of this activity, direct students to complete a career genogram— a family tree of their family's occupational history. A career genogram is designed to help students understand the educational and occupational choices made by past and present family members and to provide insight into their own perspectives on educational and career goals.

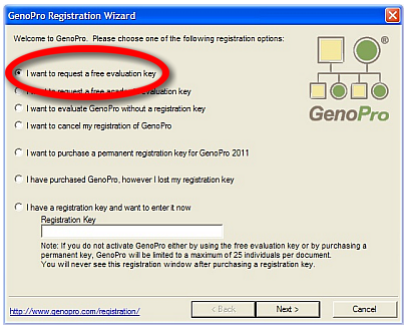
Ask students to start with the history of their grandparents. (They can go further back if family information is available.) After completing the genogram (see **Handout 2**), students should discuss it with at least one other student to gain additional insights. Then, using the suggested analysis questions on **Handout 2**, students should write a short paper (1-5 pages) summarizing the trends in their family and the influences that family members might have had on one another. The focus of this assignment should be on the student's family, not themselves.

The pictorial representations known as genograms can be created from scratch using basic shapes available through most word processors organization chart tools, basic drawing programs, or by just drawing and labeling the shapes and lines by hand. The resulting product needs to be neat and easy to read.

Get trial version at *GenoPro.com*



Click "Try It Free" link.



Request a Free Registration Key

There is a free trial genealogy program available from http:///genopro.com that can be used to make genograms quickly. Go to the GenoPro website, click the "Try it Free" button, save the download file, and install it. With the registration wizard, apply and receive a free registration key which is good for a few weeks of trial use—adequate for this activity.

Handout 1—Occupational Profiles from U.S. Department of Labor, by Cluster

Architecture and Engineering

Aerospace Engineering and Operations Technicians
Aerospace Engineers
Agricultural Engineers
Architects, Except Landscape and Naval
Architectural and Civil Drafters
Biomedical Engineers
Cartographers and Photogrammetrists
Chemical Engineers
Civil Engineering Technicians
Civil Engineers
Computer Hardware Engineers
Drafters, All Other
Electrical Engineers
Electrical and Electronics Drafters
Electrical and Electronics Engineering Technicians
Electro-Mechanical Technicians
Electronics Engineers, Except Computer
Engineering Technicians, Except Drafters, All Other
Engineers, All Other
Environmental Engineering Technicians
Environmental Engineers
Health and Safety Engineers, Except Mining Safety Engineers and Inspectors
Industrial Engineering Technicians
Industrial Engineers
Landscape Architects
Marine Engineers and Naval Architects
Materials Engineers
Mechanical Drafters
Mechanical Engineering Technicians
Mechanical Engineers
Mining and Geological Engineers, Including Mining Safety Engineers
Nuclear Engineers
Petroleum Engineers
Surveying and Mapping Technicians
Surveyors

Arts, Design, Entertainment, Sports, and Media

Actors
Art Directors
Artists and Related Workers, All Other
Athletes and Sports Competitors
Audio and Video Equipment Technicians
Broadcast News Analysts
Broadcast Technicians
Camera Operators, Television, Video, and Motion Picture
Choreographers
Coaches and Scouts
Commercial and Industrial Designers
Craft Artists
Dancers
Designers, All Other
Editors
Entertainers and Performers, Sports and Related Workers, All Other
Fashion Designers
Film and Video Editors
Fine Artists, Including Painters, Sculptors, and Illustrators
Floral Designers
Graphic Designers
Interior Designers
Interpreters and Translators
Media and Communication Equipment Workers, All Other
Media and Communication Workers, All Other
Merchandise Displayers and Window Trimmers
Multimedia Artists and Animators
Music Directors and Composers
Musicians and Singers
Photographers
Producers and Directors
Public Address System and Other Announcers
Public Relations Specialists
Radio Operators
Radio and Television Announcers
Reporters and Correspondents
Set and Exhibit Designers
Sound Engineering Technicians
Technical Writers
Umpires, Referees, and Other Sports Officials
Writers and Authors

Building and Grounds Cleaning and Maintenance

Building Cleaning Workers, All Other
First-Line Supervisors of Housekeeping and Janitorial Workers

First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers
Grounds Maintenance Workers, All Other
Janitors and Cleaners, Except Maids and Housekeeping Cleaners
Landscaping and Groundskeeping Workers
Maids and Housekeeping Cleaners
Pest Control Workers
Pesticide Handlers, Sprayers, and Applicators, Vegetation
Tree Trimmers and Pruners

Business and Financial Operations

Accountants and Auditors
Agents and Business Managers of Artists, Performers, and Athletes
Appraisers and Assessors of Real Estate
Budget Analysts
Business Operations Specialists, All Other
Buyers and Purchasing Agents, Farm Products
Claims Adjusters, Examiners, and Investigators
Compensation, Benefits, and Job Analysis Specialists
Compliance Officers
Cost Estimators
Credit Analysts
Credit Counselors
Farm Labor Contractors
Financial Analysts
Financial Examiners
Financial Specialists, All Other
Fundraisers
Human Resources Specialists
Insurance Appraisers, Auto Damage
Insurance Underwriters
Labor Relations Specialists
Loan Officers
Logisticians
Management Analysts
Market Research Analysts and Marketing Specialists
Meeting, Convention, and Event Planners
Personal Financial Advisors
Purchasing Agents, Except Wholesale, Retail, and Farm Products
Tax Examiners and Collectors, and Revenue Agents
Tax Preparers
Training and Development Specialists
Wholesale and Retail Buyers, Except Farm Products

Community and Social Service

Child, Family, and School Social Workers
Clergy
Community Health Workers
Community and Social Service Specialists, All Other
Counselors, All Other
Directors, Religious Activities and Education
Educational, Guidance, School, and Vocational Counselors
Health Educators
Healthcare Social Workers
Marriage and Family Therapists
Mental Health Counselors
Mental Health and Substance Abuse Social Workers
Probation Officers and Correctional Treatment Specialists
Rehabilitation Counselors
Religious Workers, All Other
Social Workers, All Other
Social and Human Service Assistants
Substance Abuse and Behavioral Disorder Counselors

Computer and Mathematical

Actuaries
Computer Network Architects
Computer Network Support Specialists
Computer Occupations, All Other
Computer Programmers
Computer Systems Analysts
Computer User Support Specialists
Computer and Information Research Scientists
Database Administrators
Information Security Analysts
Mathematical Science Occupations, All Other
Mathematical Technicians
Mathematicians
Network and Computer Systems Administrators
Operations Research Analysts
Software Developers, Applications
Software Developers, Systems Software
Statisticians
Web Developers

Construction and Extraction

Boilermakers
Brickmasons and Blockmasons
Carpenters
Carpet Installers
Cement Masons and Concrete Finishers
Construction Laborers
Construction and Building Inspectors
Construction and Related Workers, All Other
Continuous Mining Machine Operators
Derrick Operators, Oil and Gas
Drywall and Ceiling Tile Installers
Earth Drillers, Except Oil and Gas
Electricians
Elevator Installers and Repairers
Explosives Workers, Ordnance Handling Experts, and Blasters
Extraction Workers, All Other
Fence Erectors
First-Line Supervisors of Construction Trades and Extraction Workers
Floor Layers, Except Carpet, Wood, and Hard Tiles
Floor Sanders and Finishers
Glaziers
Hazardous Materials Removal Workers
Helpers, Construction Trades, All Other
Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters
Helpers—Carpenters
Helpers—Electricians
Helpers—Extraction Workers
Helpers—Painters, Paperhangers, Plasterers, and Stucco Masons
Helpers—Pipelayers, Plumbers, Pipefitters, and Steamfitters
Helpers—Roofers
Highway Maintenance Workers
Insulation Workers, Floor, Ceiling, and Wall
Insulation Workers, Mechanical
Mine Cutting and Channeling Machine Operators
Mining Machine Operators, All Other
Operating Engineers and Other Construction Equipment Operators
Painters, Construction and Maintenance
Paperhangers
Paving, Surfacing, and Tamping Equipment Operators
Pile-Driver Operators
Pipelayers
Plasterers and Stucco Masons
Plumbers, Pipefitters, and Steamfitters
Rail-Track Laying and Maintenance Equipment Operators
Reinforcing Iron and Rebar Workers
Rock Splitters, Quarry
Roof Bolters, Mining
Roofers
Rotary Drill Operators, Oil and Gas
Roustabouts, Oil and Gas
Segmental Pavers
Septic Tank Servicers and Sewer Pipe Cleaners
Service Unit Operators, Oil, Gas, and Mining
Sheet Metal Workers
Solar Photovoltaic Installers
Stonemasons
Structural Iron and Steel Workers
Tapers
Terrazzo Workers and Finishers
Tile and Marble Setters

Education, Training, and Library

Adult Basic and Secondary Education and Literacy Teachers and Instructors
Agricultural Sciences Teachers, Postsecondary
Anthropology and Archeology Teachers, Postsecondary
Architecture Teachers, Postsecondary
Archivists
Area, Ethnic, and Cultural Studies Teachers, Postsecondary
Art, Drama, and Music Teachers, Postsecondary
Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary
Audio-Visual and Multimedia Collections Specialists
Biological Science Teachers, Postsecondary
Business Teachers, Postsecondary
Career/Technical Education Teachers, Middle School
Career/Technical Education Teachers, Secondary School
Chemistry Teachers, Postsecondary
Communications Teachers, Postsecondary
Computer Science Teachers, Postsecondary
Criminal Justice and Law Enforcement Teachers, Postsecondary
Curators
Economics Teachers, Postsecondary
Education Teachers, Postsecondary

Education, Training, and Library Workers, All Other
Elementary School Teachers, Except Special Education
Engineering Teachers, Postsecondary
English Language and Literature Teachers, Postsecondary
Environmental Science Teachers, Postsecondary
Farm and Home Management Advisors
Foreign Language and Literature Teachers, Postsecondary
Forestry and Conservation Science Teachers, Postsecondary
Geography Teachers, Postsecondary
Graduate Teaching Assistants
Health Specialties Teachers, Postsecondary
History Teachers, Postsecondary
Home Economics Teachers, Postsecondary
Instructional Coordinators
Kindergarten Teachers, Except Special Education
Law Teachers, Postsecondary
Librarians
Library Science Teachers, Postsecondary
Library Technicians
Mathematical Science Teachers, Postsecondary
Middle School Teachers, Except Special and Career/Technical Education
Museum Technicians and Conservators
Nursing Instructors and Teachers, Postsecondary
Philosophy and Religion Teachers, Postsecondary
Physics Teachers, Postsecondary
Political Science Teachers, Postsecondary
Postsecondary Teachers, All Other
Preschool Teachers, Except Special Education
Psychology Teachers, Postsecondary
Recreation and Fitness Studies Teachers, Postsecondary
Secondary School Teachers, Except Special and Career/Technical Education
Self-Enrichment Education Teachers
Social Sciences Teachers, Postsecondary, All Other
Social Work Teachers, Postsecondary
Sociology Teachers, Postsecondary
Special Education Teachers, All Other
Special Education Teachers, Kindergarten and Elementary School
Special Education Teachers, Middle School
Special Education Teachers, Preschool
Special Education Teachers, Secondary School
Teacher Assistants
Teachers and Instructors, All Other
Vocational Education Teachers, Postsecondary

Farming, Fishing, and Forestry

Agricultural Equipment Operators
Agricultural Inspectors
Agricultural Workers, All Other
Animal Breeders
Fallers
Farmworkers and Laborers, Crop, Nursery, and Greenhouse
Farmworkers, Farm, Ranch, and Aquacultural Animals
First-Line Supervisors of Farming, Fishing, and Forestry Workers
Fishers and Related Fishing Workers
Forest and Conservation Workers
Graders and Sorters, Agricultural Products
Hunters and Trappers
Log Graders and Scalers
Logging Equipment Operators
Logging Workers, All Other

Food Preparation and Serving Related

Bartenders
Chefs and Head Cooks
Combined Food Preparation and Serving Workers, Including Fast Food
Cooks, All Other
Cooks, Fast Food
Cooks, Institution and Cafeteria
Cooks, Private Household
Cooks, Restaurant
Cooks, Short Order
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop
Dining Room and Cafeteria Attendants and Bartender Helpers
Dishwashers
First-Line Supervisors of Food Preparation and Serving Workers
Food Preparation Workers
Food Preparation and Serving Related Workers, All Other
Food Servers, Nonrestaurant
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop
Waiters and Waitresses

Healthcare Practitioners and Technical

Anesthesiologists
Athletic Trainers
Audiologists
Cardiovascular Technologists and Technicians
Chiropractors
Dental Hygienists
Dentists, All Other Specialists
Dentists, General
Diagnostic Medical Sonographers
Dietetic Technicians
Dietitians and Nutritionists
Emergency Medical Technicians and Paramedics
Exercise Physiologists
Family and General Practitioners
Genetic Counselors
Health Diagnosing and Treating Practitioners, All Other
Health Technologists and Technicians, All Other
Healthcare Practitioners and Technical Workers, All Other
Hearing Aid Specialists
Internists, General
Licensed Practical and Licensed Vocational Nurses
Magnetic Resonance Imaging Technologists
Medical Records and Health Information Technicians
Medical and Clinical Laboratory Technicians
Medical and Clinical Laboratory Technologists
Nuclear Medicine Technologists
Nurse Anesthetists
Nurse Midwives
Nurse Practitioners
Obstetricians and Gynecologists
Occupational Health and Safety Specialists
Occupational Health and Safety Technicians
Occupational Therapists
Ophthalmic Medical Technicians
Opticians, Dispensing
Optometrists
Oral and Maxillofacial Surgeons
Orthodontists
Orthotists and Prosthetists
Pediatricians, General
Pharmacists
Pharmacy Technicians
Physical Therapists
Physician Assistants
Physicians and Surgeons, All Other
Podiatrists
Prosthodontists
Psychiatric Technicians
Psychiatrists
Radiation Therapists
Radiologic Technologists
Recreational Therapists
Registered Nurses
Respiratory Therapists
Respiratory Therapy Technicians
Speech-Language Pathologists
Surgeons
Surgical Technologists
Therapists, All Other
Veterinarians
Veterinary Technologists and Technicians
Healthcare Support

Healthcare Support

Dental Assistants
Healthcare Support Workers, All Other
Home Health Aides
Massage Therapists
Medical Assistants
Medical Equipment Preparers
Medical Transcriptionists
Nursing Assistants
Occupational Therapy Aides
Occupational Therapy Assistants
Orderlies
Pharmacy Aides
Phlebotomists
Physical Therapist Aides
Physical Therapist Assistants
Psychiatric Aides
Veterinary Assistants and Laboratory Animal Caretakers

Installation, Maintenance, and Repair Legal

Aircraft Mechanics and Service Technicians
Automotive Body and Related Repairers
Automotive Glass Installers and Repairers
Automotive Service Technicians and Mechanics
Avionics Technicians
Bicycle Repairers
Bus and Truck Mechanics and Diesel Engine Specialists
Camera and Photographic Equipment Repairers
Coin, Vending, and Amusement Machine Servicers and Repairers

Commercial Divers
Computer, Automated Teller, and Office Machine Repairers
Control and Valve Installers and Repairers, Except Mechanical Door
Electric Motor, Power Tool, and Related Repairers
Electrical Power-Line Installers and Repairers
Electrical and Electronics Installers and Repairers, Transportation Equipment
Electrical and Electronics Repairers, Commercial and Industrial Equipment
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay
Electronic Equipment Installers and Repairers, Motor Vehicles
Electronic Home Entertainment Equipment Installers and Repairers
Fabric Menders, Except Garment
Farm Equipment Mechanics and Service Technicians
First-Line Supervisors of Mechanics, Installers, and Repairers
Heating, Air Conditioning, and Refrigeration Mechanics and Installers
Helpers—Installation, Maintenance, and Repair Workers
Home Appliance Repairers
Industrial Machinery Mechanics
Installation, Maintenance, and Repair Workers, All Other
Locksmiths and Safe Repairers
Maintenance Workers, Machinery
Maintenance and Repair Workers, General
Manufactured Building and Mobile Home Installers
Mechanical Door Repairers
Medical Equipment Repairers
Millwrights
Mobile Heavy Equipment Mechanics, Except Engines
Motorboat Mechanics and Service Technicians
Motorcycle Mechanics
Musical Instrument Repairers and Tuners
Outdoor Power Equipment and Other Small Engine Mechanics
Precision Instrument and Equipment Repairers, All Other
Radio, Cellular, and Tower Equipment Installers and Repairers
Rail Car Repairers
Recreational Vehicle Service Technicians
Refractory Materials Repairers, Except Brickmasons
Riggers
Security and Fire Alarm Systems Installers
Signal and Track Switch Repairers
Telecommunications Equipment Installers and Repairers, Except Line Installers
Telecommunications Line Installers and Repairers
Tire Repairers and Changers
Watch Repairers
Wind Turbine Service Technicians
Administrative Law Judges, Adjudicators, and Hearing Officers
Arbitrators, Mediators, and Conciliators
Court Reporters
Judges, Magistrate Judges, and Magistrates
Judicial Law Clerks
Lawyers
Legal Support Workers, All Other
Paralegals and Legal Assistants
Title Examiners, Abstractors, and Searchers

Life, Physical, and Social Science

Agricultural and Food Science Technicians
Animal Scientists
Anthropologists and Archeologists
Astronomers
Atmospheric and Space Scientists
Biochemists and Biophysicists
Biological Scientists, All Other
Biological Technicians
Chemical Technicians
Chemists
Clinical, Counseling, and School Psychologists
Conservation Scientists
Economists
Environmental Science and Protection Technicians, Including Health
Environmental Scientists and Specialists, Including Health
Epidemiologists
Food Scientists and Technologists
Forensic Science Technicians
Forest and Conservation Technicians
Foresters
Geographers
Geological and Petroleum Technicians
Geoscientists, Except Hydrologists and Geographers

Historians
Hydrologists
Industrial-Organizational Psychologists
Life Scientists, All Other
Life, Physical, and Social Science Technicians, All Other
Materials Scientists
Medical Scientists, Except Epidemiologists
Microbiologists
Nuclear Technicians
Physical Scientists, All Other
Physicists
Political Scientists
Psychologists, All Other
Social Science Research Assistants
Social Scientists and Related Workers, All Other
Sociologists
Soil and Plant Scientists
Survey Researchers
Urban and Regional Planners
Zoologists and Wildlife Biologists

Management

Administrative Services Managers
Advertising and Promotions Managers
Architectural and Engineering Managers
Chief Executives
Compensation and Benefits Managers
Computer and Information Systems Managers
Construction Managers
Education Administrators, All Other
Education Administrators, Elementary and Secondary School
Education Administrators, Postsecondary
Education Administrators, Preschool and Childcare Center/Program
Emergency Management Directors
Farmers, Ranchers, and Other Agricultural Managers
Financial Managers
Food Service Managers
Funeral Service Managers
Gaming Managers
General and Operations Managers
Human Resources Managers
Industrial Production Managers
Legislators
Lodging Managers
Managers, All Other
Marketing Managers
Medical and Health Services Managers
Natural Sciences Managers
Postmasters and Mail Superintendents
Property, Real Estate, and Community Association Managers
Public Relations and Fundraising Managers
Purchasing Managers
Sales Managers
Social and Community Service Managers
Training and Development Managers
Transportation, Storage, and Distribution Managers

Office and Administrative Support

Bill and Account Collectors
Billing and Posting Clerks
Bookkeeping, Accounting, and Auditing Clerks
Brokerage Clerks
Cargo and Freight Agents
Communications Equipment Operators, All Other
Computer Operators
Correspondence Clerks
Couriers and Messengers
Court, Municipal, and License Clerks
Credit Authorizers, Checkers, and Clerks
Customer Service Representatives
Data Entry Keyers
Desktop Publishers
Dispatchers, Except Police, Fire, and Ambulance
Eligibility Interviewers, Government Programs
Executive Secretaries and Executive Administrative Assistants
File Clerks
Financial Clerks, All Other
First-Line Supervisors of Office and Administrative Support Workers
Gaming Cage Workers
Hotel, Motel, and Resort Desk Clerks
Human Resources Assistants, Except Payroll and Timekeeping
Information and Record Clerks, All Other
Insurance Claims and Policy Processing Clerks
Interviewers, Except Eligibility and Loan
Legal Secretaries
Library Assistants, Clerical
Loan Interviewers and Clerks
Mail Clerks and Mail Machine Operators, Except Postal Service
Medical Secretaries
Meter Readers, Utilities

New Accounts Clerks
Office Clerks, General
Office Machine Operators, Except Computer
Office and Administrative Support Workers, All Other
Order Clerks
Payroll and Timekeeping Clerks
Police, Fire, and Ambulance Dispatchers
Postal Service Clerks
Postal Service Mail Carriers
Postal Service Mail Sorters, Processors, and Processing Machine Operators
Procurement Clerks
Production, Planning, and Expediting Clerks
Proofreaders and Copy Markers
Receptionists and Information Clerks
Reservation and Transportation Ticket Agents and Travel Clerks
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive
Shipping, Receiving, and Traffic Clerks
Statistical Assistants
Stock Clerks and Order Fillers
Switchboard Operators, Including Answering Service
Telephone Operators
Tellers
Weighers, Measurers, Checkers, and Samplers, Recordkeeping
Word Processors and Typists

Personal Care and Service

Amusement and Recreation Attendants
Animal Trainers
Baggage Porters and Bellhops
Barbers
Childcare Workers
Concierges
Costume Attendants
Embalmers
Entertainment Attendants and Related Workers, All Other
First-Line Supervisors of Personal Service Workers
Fitness Trainers and Aerobics Instructors
Funeral Attendants
Gaming Dealers
Gaming Service Workers, All Other
Gaming Supervisors
Gaming and Sports Book Writers and Runners
Hairdressers, Hairstylists, and Cosmetologists
Locker Room, Coatroom, and Dressing Room Attendants
Makeup Artists, Theatrical and Performance
Manicurists and Pedicurists
Morticians, Undertakers, and Funeral Directors
Motion Picture Projectionists
Nonfarm Animal Caretakers
Personal Care Aides
Personal Care and Service Workers, All Other
Recreation Workers
Residential Advisors
Shampooers
Skincare Specialists
Slot Supervisors
Tour Guides and Escorts
Travel Guides
Ushers, Lobby Attendants, and Ticket Takers

Production

Adhesive Bonding Machine Operators and Tenders
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers
Assemblers and Fabricators, All Other
Bakers
Butchers and Meat Cutters
Cabinetmakers and Bench Carpenters
Chemical Equipment Operators and Tenders
Chemical Plant and System Operators
Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders
Coil Winders, Tapers, and Finishers
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic
Computer-Controlled Machine Tool Operators, Metal and Plastic
Cooling and Freezing Equipment Operators and Tenders
Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders
Cutters and Trimmers, Hand
Cutting and Slicing Machine Setters, Operators, and Tenders
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic
Dental Laboratory Technicians
Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic

Electrical and Electronic Equipment Assemblers
Electromechanical Equipment Assemblers
Engine and Other Machine Assemblers
Etchers and Engravers
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic
Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders
Fabric and Apparel Patternmakers
Fiberglass Laminators and Fabricators
First-Line Supervisors of Production and Operating Workers
Food Batchmakers
Food Cooking Machine Operators and Tenders
Food Processing Workers, All Other
Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders
Forging Machine Setters, Operators, and Tenders, Metal and Plastic
Foundry Mold and Coremakers
Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders
Furniture Finishers
Gas Plant Operators
Grinding and Polishing Workers, Hand
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic
Helpers—Production Workers
Inspectors, Testers, Sorters, Samplers, and Weighers
Jewelers and Precious Stone and Metal Workers
Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Laundry and Dry-Cleaning Workers
Layout Workers, Metal and Plastic
Machinists
Meat, Poultry, and Fish Cutters and Trimmers
Medical Appliance Technicians
Metal Workers and Plastic Workers, All Other
Metal-Refining Furnace Operators and Tenders
Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic
Mixing and Blending Machine Setters, Operators, and Tenders
Model Makers, Metal and Plastic
Model Makers, Wood
Molders, Shapers, and Casters, Except Metal and Plastic
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic
Nuclear Power Reactor Operators
Ophthalmic Laboratory Technicians
Packaging and Filling Machine Operators and Tenders
Painters, Transportation Equipment
Painting, Coating, and Decorating Workers
Paper Goods Machine Setters, Operators, and Tenders
Patternmakers, Metal and Plastic
Patternmakers, Wood
Petroleum Pump System Operators, Refinery Operators, and Gaugers
Photographic Process Workers and Processing Machine Operators
Plant and System Operators, All Other
Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic
Pourers and Casters, Metal
Power Distributors and Dispatchers
Power Plant Operators
Prepress Technicians and Workers
Pressers, Textile, Garment, and Related Materials
Print Binding and Finishing Workers
Printing Press Operators
Production Workers, All Other
Rolling Machine Setters, Operators, and Tenders, Metal and Plastic
Sawing Machine Setters, Operators, and Tenders, Wood
Semiconductor Processors
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders
Sewers, Hand
Sewing Machine Operators
Shoe Machine Operators and Tenders
Shoe and Leather Workers and Repairers
Slaughterers and Meat Packers
Stationary Engineers and Boiler Operators
Structural Metal Fabricators and Fitters
Tailors, Dressmakers, and Custom Sewers
Team Assemblers

Textile Bleaching and Dyeing Machine Operators and Tenders
Textile Cutting Machine Setters, Operators, and Tenders
Textile Knitting and Weaving Machine Setters, Operators, and Tenders
Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders
Textile, Apparel, and Furnishings Workers, All Other
Timing Device Assemblers and Adjusters
Tire Builders
Tool Grinders, Filers, and Sharpeners
Tool and Die Makers
Upholsterers
Water and Wastewater Treatment Plant and System Operators
Welders, Cutters, Solderers, and Brazers
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders
Woodworkers, All Other
Woodworking Machine Setters, Operators, and Tenders, Except Sawing

Protective Service

Animal Control Workers
Bailiffs
Correctional Officers and Jailers
Crossing Guards
Detectives and Criminal Investigators
Fire Inspectors and Investigators
Firefighters
First-Line Supervisors of Correctional Officers
First-Line Supervisors of Fire Fighting and Prevention Workers
First-Line Supervisors of Police and Detectives
First-Line Supervisors of Protective Service Workers, All Other
Fish and Game Wardens
Forest Fire Inspectors and Prevention Specialists
Gaming Surveillance Officers and Gaming Investigators
Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers
Parking Enforcement Workers
Police and Sheriff's Patrol Officers
Private Detectives and Investigators
Protective Service Workers, All Other
Security Guards
Transit and Railroad Police
Transportation Security Screeners

Sales and Related

Advertising Sales Agents
Cashiers
Counter and Rental Clerks
Demonstrators and Product Promoters
Door-to-Door Sales Workers, News and Street Vendors, and Related Workers
First-Line Supervisors of Non-Retail Sales Workers
First-Line Supervisors of Retail Sales Workers
Gaming Change Persons and Booth Cashiers
Insurance Sales Agents
Models
Parts Salespersons
Real Estate Brokers
Real Estate Sales Agents
Retail Salespersons
Sales Engineers
Sales Representatives, Services, All Other
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products
Sales and Related Workers, All Other
Securities, Commodities, and Financial Services Sales Agents
Telemarketers
Travel Agents

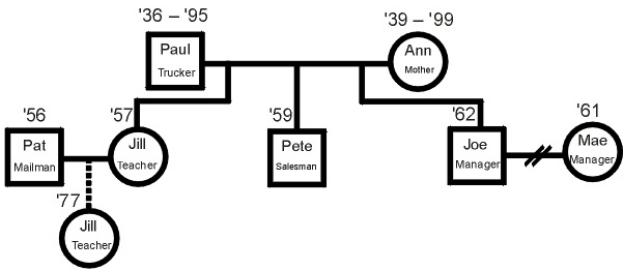
Transportation and Material Moving

Air Traffic Controllers
Aircraft Cargo Handling Supervisors
Airfield Operations Specialists
Airline Pilots, Copilots, and Flight Engineers
Ambulance Drivers and Attendants, Except Emergency Medical Technicians
Automotive and Watercraft Service Attendants
Bridge and Lock Tenders
Bus Drivers, School or Special Client
Bus Drivers, Transit and Intercity
Captains, Mates, and Pilots of Water Vessels
Cleaners of Vehicles and Equipment
Commercial Pilots
Conveyor Operators and Tenders
Crane and Tower Operators
Dredge Operators
Driver/Sales Workers

Excavating and Loading Machine and Dragline Operators
First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators
Flight Attendants
Gas Compressor and Gas Pumping Station Operators
Heavy and Tractor-Trailer Truck Drivers
Hoist and Winch Operators
Industrial Truck and Tractor Operators
Laborers and Freight, Stock, and Material Movers, Hand
Light Truck or Delivery Services Drivers
Loading Machine Operators, Underground Mining
Locomotive Engineers
Locomotive Firers
Machine Feeders and Offbearers
Material Moving Workers, All Other
Mine Shuttle Car Operators
Motor Vehicle Operators, All Other
Motorboat Operators
Packers and Packagers, Hand
Parking Lot Attendants
Pump Operators, Except Wellhead Pumpers
Rail Transportation Workers, All Other
Rail Yard Engineers, Dinkey Operators, and Hostlers
Railroad Brake, Signal, and Switch Operators
Railroad Conductors and Yardmasters
Refuse and Recyclable Material Collectors
Sailors and Marine Oilers
Ship Engineers
Subway and Streetcar Operators
Tank Car, Truck, and Ship Loaders
Taxi Drivers and Chauffeurs
Traffic Technicians
Transportation Attendants, Except Flight Attendants
Transportation Inspectors
Transportation Workers, All Other
Wellhead Pumpers

Handout 2—Genogram Analysis

Some basics of genograms:



- Circles represent women, squares represent men.
- Link marriages with horizontal lines; offspring with vertical lines; twins with diagonal lines.
- Solid lines denote direct family relationships; dashed lines indicate adoptions.
- Slashes through a line indicate a divorce.
- Subsequent marriage/partnerships are indicated by a line connected to the other side of a person.
- Deaths are shown by an "X" in the circle or square, with the death year written beside the birth year. Showing a pair of years implies the person is deceased.
- Relevant information is written in or near each individual's shape, such as:
    - Name
    - Birth year (and death year, if applicable)
    - Highest education level
    - Occupations, skills, talents
    - Optional: Vocational attitudes and values

Using the completed genogram, a student should reflect on each family member's attitudes by completing sentences like the following (or others provided by the instructor) for each person:

1. The kind of work I like to do is…
2. Money is …
3. To be successful means …
4. To be a good person means …
5. My advice to you about work is …

Finally, ask them the following questions about their genograms:

1. What was easy or difficult about this task?
2. How would you describe your family's educational experience?
3. How would you describe your family's work experience?
4. What patterns of occupations/skills/attitudes do you see?
5. What behaviors and attitudes were reinforced for males? Females?
6. How do your education/career aspirations fit in with your family history in these areas?
7. What was your family's message regarding your career choice?
8. Do any family members have unfulfilled goals, aspirations, or fantasies
9. What, if any, *should's* or *ought to's* did you find?
10. Do you see anything that helps you better understand yourself or a family member?
11. What surprises did you discover?
12. Is there a family member or close friend/mentor you most want to emulate? What draws you to that person/career?
13. If you become what these people want you to become, will you be happy?
14. What values/interests/attitudes do you seem to have "inherited" from your family?

Group Reflection Questions

This activity is designed to increase a student's career awareness. During this activity, many students will encounter new job titles and careers that they have never before considered. Encourage students to do a quick internet search of those job titles and identify the typical aptitudes of the job, educational requirements, geographic limitations, financial pros and cons, and so forth, for one or two new occupations.

- What are five new job titles in your preferred career area did you discover that you weren't familiar with before doing this activity?
- Which ones offer the most exciting opportunities?
- Which job title did you need to research to understand what it was?

If this is a student's first career genogram, they are likely to see patterns not considered before. They should learn that many attitudes, aptitudes, and even abilities can be transmitted from relatives, especially their parents.

- With how many (if any) of your past and present relatives do you share a common interest in a hobby or career?
- What is a common thread that seems to weave through past generations and have an impact on the types of careers chosen?
- How possible is it to break out of the pattern of your past family members' typical career choices? What would you have to do differently?

Encourage students to share with each other the career areas that seem to weave through their relatives and families. Be sure that students understand that career surveys and genograms should not be perceived as limiting career choices. Instead, genograms can help reveal the job characteristics they might look for in a satisfying career.

ACTIVITY: OBTAINING AND MAINTAINING CREDENTIALS

Instructor Preparation

An increasing number of jobs today require college degrees. A degree, however, isn't the only kind of credential required. Begin this activity by asking students to think about credentials that people they know might have. Examples might be: My doctor and dentist have diplomas on their office walls that show they graduated from medical or dental school and show any specialty areas and honors that they achieved. The person who cuts my hair has a framed license at his work station that shows he is licensed by the state. My uncle has a commercial license to drive semis to transport goods across the country. My friend's mom is a journeyman electrician. My brother has top level security clearance.

In this activity, students will learn about different types of credentials that may be available in their chosen career pathway and the requirements for obtaining and maintaining those professional credentials. Examinations and/or demonstration of skill competency may be required. To get a sense of the range of credentialing available, have students visit the following sites or sites that are immediately relevant to their career interests. Keep in mind that while many professional and industrial organizations offer industry certifications, actual licensure may be determined on a state-by-state basis.

- National Council of State Boards of Nursing https://www.ncsbn.org/nclex.htm
- Cisco (IT) certifications http://www.cisco.com/web/learning/certifications/index.html
- North Carolina Department of Agriculture and Consumer Services (agriculture license and permit information) http://www.ncagr.gov/htm/license.htm
- North Carolina Department of Public Instruction (teaching licenses) http://www.dpi.state.nc.us/licensure/

In career and technical education classes, students will probably have already chosen a career cluster, but students in academic classes may still be undecided. Allow students to choose a career cluster and career pathways within the cluster that interest them for this activity.

Objectives

Students will:

1. Choose a career cluster and identify three to five possible careers in that cluster.
2. Examine and list the licensing, certification, and credentialing requirements at the national, state, and local levels for obtaining and maintaining compliance with industry requirements.
3. Describe the benefits to an employee of membership in a professional organization.
4. To plan for continuing education and training, examine requirements for career advancement..
5. Research professional development opportunities needed to stay current on relevant trends and information within the cluster.

Materials

- Computers with internet access
- Handout—Sixteen Career Clusters and Their Pathways

- *North Carolina Careers: Career Clusters Guide* available at http://www.nc-net.info/NC_career_clusters_guide.php (The document is rather long so you may want to print only a few copies of each of the pathways rather than the entire guide. Another option is to allow students to view the cluster that interests them online.)

Activity Guidelines

Begin this activity by asking students what credentials are and what it means to have credentials. Discuss different types of credentials and the fact that some are required and others are voluntary.

- Have students select a career cluster and pathway(s) from the handout, Sixteen Career Clusters and Their Pathways.
- Refer them to the *North Carolina Careers: Career Clusters Guide* or to the handout, Occupational Profiles from U. S. Department of Labor by Cluster, from the previous activity in this module and ask them to identify 3-5 specific careers in the career pathway(s) selected.
- For each of the careers, have students identify:
  - the entry-level requirements for the job;
  - credentials required at the national, state, and local levels to maintain compliance with industry requirements;
  - additional voluntary certifications or specializations;
  - occupational regulatory agencies or organizations; and
  - requirements for maintaining the credentials (e.g. requirements for continuing education, acceptability of online coursework).
- For each of the careers students identified above, ask them to research and list professional organizations available for employees in that field. They should visit the website for at least one of the organizations to find the benefits of belonging to that organization.
  - Does the organization provide credentials of any type?
  - Does it publish a journal?
  - Does it offer online classes or workshops to provide training on specific topics related to the career?
  - Does it have local, state, regional, or national meetings or conferences?
  - How much does it cost to become a member of the organization?
  - What are the requirements for membership?

Group Reflection Questions

Discuss the following questions with your students:

- Do you have a credential of any kind that is necessary for a current job or that was necessary for a previous job? What is it? What were the requirements to obtain it? How often do you need to be recertified? How is that done?
- As a consumer, do credentials give you more confidence in the people who hold them?
- Many credentials and licenses require continuing education and/or retesting to maintain the credential as opposed to simply having a diploma which shows completion of a given course of study. Why do you think this is so?
- If working in a field that offers voluntary credentials, would you seek to obtain the credential? Why?

Handout—Sixteen Career Clusters and Their Pathways

A Career Cluster is a grouping of occupations and broad industries based on commonalities. The sixteen Career Clusters provide an organizing tool for schools, small learning communities, academies, and magnet schools

Agriculture, Food & Natural Resources
- Food Products and Processing Systems
- Plant Systems
- Animal Systems
- Power, Structural & Technical Systems
- Natural Resources Systems
- Environmental Service Systems
- Agribusiness Systems

Architecture and Construction
- Design/Pre-Construction
- Construction
- Maintenance/Operations

Arts, Audio/Video Technology and Communications
- Audio and Video Technology and Film
- Printing Technology
- Visual Arts
- Performing Arts
- Journalism and Broadcasting
- Telecommunications

Business Management and Administration
- General Management
- Business Information Management
- Human Resources Management
- Operations Management
- Administrative Support

Education and Training
- Administration and Administrative Support
- Professional Support Services
- Teaching/Training

Finance
- Securities and Investments
- Business Finance
- Accounting
- Insurance
- Banking Services

Government and Public Administration
- Governance
- National Security
- Foreign Service
- Planning
- Revenue and Taxation
- Regulation
- Public Management and Administration

Health Science
- Therapeutic Services
- Diagnostic Services
- Health Informatics
- Support Services
- Biotechnology Research and Development

Hospitality and Tourism
- Restaurants and Food/Beverage Services
- Lodging
- Travel and Tourism
- Recreation, Amusements and Attractions

Human Services
- Early Childhood Development and Services
- Counseling and Mental Health Services
- Family and Community Services
- Personal Care Services
- Consumer Services

Information Technology
- Network Systems
- Information Support and Services
- Web and Digital Communications
- Programming and Software Development

Law, Public Safety, Corrections and Security
- Correction Services
- Emergency and Fire Management Services
- Security and Protective Services
- Law Enforcement Services
- Legal Services

Manufacturing
- Production
- Manufacturing Production Process Development
- Maintenance, Installation and Repair
- Quality Assurance
- Logistics and Inventory Control
- Health, Safety and Environmental Assurance

Marketing
- Marketing Management
- Professional Sales
- Merchandising
- Marketing Communications
- Marketing Research

Science, Technology, Engineering and Mathematics
- Engineering and Technology
- Science and Math

Transportation, Distribution and Logistics
- Transportation Operations
- Logistics Planning and Management Services
- Warehousing and Distribution Center Operations
- Facility and Mobile Equipment Maintenance
- Transportation Systems/Infrastructure Planning, Management and Regulation
- Health, Safety and Environmental Management
- Sales and Service

ACTIVITY: PREPARING FOR CAREER TRANSITIONS

Instructor Preparation

Many times people prepare for a first job by going to school or obtaining credentials, but don't plan beyond that first job. There may have no plan for moving ahead in a career or what to do if that job ceases to be available or they are unable to work at that job. Many may think that having a job automatically leads to having more responsibility and increased wages over time. This lesson discusses the need to prepare for career transitions.

For most people an entry-level job is not the ultimate goal. In the first part of this activity students will plot a possible career path from where they are currently, whether already in the workforce or not yet working, to a first job in the chosen career cluster. They will learn to plan for advancement and will recognize characteristics noticed by managers when considering promotion of current employees. Finally, students will learn that although life sometimes throws a roadblock in the way to the chosen career, they can still find a satisfying career using skills and knowledge they already possess.

The last section of this lesson may be the most important. When an individual has worked hard preparing for his or her dream job and done everything "right," it can be difficult to deal with roadblocks and detours. Consider an athlete whose dream job is to be successful in professional sports. What will he/she do when, after a successful rookie year in the pros, he/she is severely injured in an accident and can never play that sport again? How might that athlete find a job where knowledge of the game and skills can be used? Ask students what careers might be open to that person. Perhaps it is in team management, as a sportscaster or sports reporter, or maybe even as a coach. For any of these alternate careers, the former athlete may have a knowledge or skills gap and need to look for ways to overcome that gap before transitioning to a new position.

Sometimes people are laid off when the company they work for is sold, goes out of business, or the entire industry experiences a downsizing because of economic conditions. What are some options for workers who have lost jobs?

Other times career choices change voluntarily because something else becomes more important. Perhaps an employee gets married and has a child. Her current job requires being away from home much of the year but she wants to spend more time at home. This scenario might apply to those who work for a cruise line, do research in distant countries, have dangerous jobs that put them in life-threatening situations, or work on pipelines and offshore oil derricks. Being away from home (or in danger) may put a strain on a marriage and missing out on watching a child grow up may feel like too much of a sacrifice to continue in that line of work. Where could she turn to find other satisfying work that makes use of her skills and knowledge and also allows her to work closer to home? Again, have students brainstorm alternate careers where the person could use similar skills and knowledge. For example, the person working for the cruise line might be able to find a job in the corporate offices that would allow him to continue to work in a hospitality and tourism related career while staying at a home base and traveling less often. Depending on their position on the cruise ship, he could also transition to other hospitality and tourism jobs or, if part of the crew operating the ship, into other engineering-type jobs. Workers on pipelines or oil derricks might find work at refineries, power stations, or public utilities.

Finally, some people retire from their primary career and decide they still want or need to work. Many may choose something in a totally different career cluster, is part time, or has more flexible hours. They may be motivated to give back something to their community or to help others be successful. Some may become teachers or instructors. Some may become consultants or start a small business. Discuss the benefits of remaining productive after retirement with your students.

Objectives

Students will:

1. Create a career path to a desired career.
2. Investigate what it will take to advance to that career.
3. Investigate alternative career paths for which their knowledge and skills equip them.

Materials

- Internet with computer access
- Student handout

Activity Guidelines

Distribute the student describing the assignment(s). If there is not time for students to complete all of the activities, indicate which ones they should be completed.

- Discuss the information provided in the instructor preparation section with students and describe what they will be doing in this activity.
- Have students take a closer look at their desired career goals and outline how they might achieve them. They can use whatever resources they find on the internet and/or the career pathways handout from the earlier activity in this module.
- Allow students to research what it takes to advance in a position and why simply doing a job well is not enough to earn a promotion.
- Finally, have students investigate transitioning from one career to another.

Group Reflection Questions

Discuss the following questions with students.

- Do you know of anyone who has lost a job or has changed careers for any reason? Without using names, how did they handle the situation? Do you think that they handled it well or do you think they struggled? What other alternatives might they have tried?
- Have you ever thought about what you might do if your dream job was not available to you? What are some alternate career paths you might follow?
- Why do you think that just doing excellent work in completing your job duties won't automatically win you a promotion? What other characteristics contribute to consideration for promotion?

Handout

Part 1: Create a Career Plan

Very seldom is a first job the one you want for the rest of your life. In this activity, you will identify your dream job and then create a plan for getting to that dream job. Using online career information and career cluster guides such as the North Carolina Careers: Career Cluster Guide (http://www.nc-net.info/NC_career_clusters_guide.php) outline a plan for reaching your dream job. Complete the following steps:

- Identify your desired career and identify the career cluster in which it falls.
- Identify career pathway within the cluster in which the career falls.
- Identify entry-level positions in the career clusters/pathways. What skills and education must you possess to obtain those positions? Choose one to begin your pathway. If you are already working at a job within your career pathway, list the positions that you have held leading to where you are now.
- Identify at least three intermediate jobs between the entry level and desired positions that are logical transitions. List requirements for each of these jobs. Estimate how long you will need to remain at each job to gain the experience, knowledge, and skills required to move to the next position. Also list the requirements for your dream position.
- Draw a career path time line plotting approximate dates to move to each position. On a separate page describe how to obtain the additional training, credentials, experience for the next position while still at a lower position.
- Share your plan with other students. Ask for suggestions to improve your plan or for alternative ideas. Review other students' plans to see if there is something that they may not have thought of or have left out of their plan.

Part 2: Preparing for Promotions

Promotions are not necessarily automatic. Doing an assigned job well does not necessarily mean you will move up in the company. In this part of the activity, research ways to become noticed (in a good way) that might help you progress in your organization.

- Go online and search for "earning a promotion," or similar terms, and find numerous articles on things you can do to become more "promotable" in the eyes of an employer. Read at least three articles and list the advice from each article briefly. Combine with suggestions from articles researched by others in your class to get a master list of key suggestions. Tally how many different sources suggested the same strategy. When at your job, keep those suggestions in mind to advance career goals and plans.
- Research and define lateral move and lateral promotion. What are the advantages and disadvantages of each?

Part 3: Dealing with Career Roadblocks—What do I do when life happens?

Sometimes we are faced with life situations that require changing our career goals. Examples might include:

- Changes in family situations such as marriage, divorce, meeting childrens' needs, or caring for aging or ill parents or other loved ones
- Personal health issues or disabling injuries, and certain medical conditions that preclude working in a chosen field

- Economic downturns that create widespread layoffs, company failures, and so forth, resulting in job loss

These situations may require you to change career goals or at least put them on hold until a situation changes. A sudden job loss is particularly devastating. This part of the activity will help you identify ways to deal with job transitions and/or reentry into the workplace.

Be prepared. Maintain a current resume and update it at least yearly. In addition, maintain a file with articles, letters, and other tangible evidence of achievements, commendations, and documentation of education or continuing education and other credentials. If something happens and you need to apply for a job immediately, you will have available all of the information needed to complete applications and create a portfolio.

Another action to take when you need or want to change jobs is to complete a SWOT Analysis to identify Strengths, Weaknesses, Opportunities, and Threats. These are useful in planning job transitions. Many career search tools ask for this information when trying to match your existing, knowledge, experience and skills to the requirements of available jobs.

The following activities are intended to help you identify resources that are available to help in career transitions:

- If you have never completed a SWOT analysis, read about them and use the provided template to prepare one for yourself at http://www.mindtools.com/pages/article/newTMC_05_1.htm
- Another resource is O*NET, which matches job descriptions and task lists to current occupations and identifies jobs that use similar skills. This may also identify possible gaps between your current skill set and that of other occupations. An example is found at http://www.myskillsmyfuture.org/. Choose one of the jobs from your career plan and enter into the database.. Look at the resulting list of careers that use similar skill sets. Choose one of those careers and look at the gap analysis to identify what you might need to do to close the gaps and become qualified for that position. In a class discussion, or with a partner, discuss what was appealing about the career options given and what aspects would give you the most problems.
- A more general skills profiler such as http://www.careerinfonet.org/skills/default.aspx?nodeid=20 allows searching based on skills or previous job tasks.
- Outline a plan to prepare for unexpected roadblocks in a career choice. Share with the class or in a small group. As others describe their plans, adopt some of their good ideas to incorporate into your plan.
- Identify additional ways to find out about different jobs and get career counseling, e.g. career fairs, career centers at colleges, government agencies, employment centers, headhunters, networking, classified ads, and online recruitment resources. List pros and cons of the services, whether they are fee-based or free, what services are provided, the area/region served, and any other information that might be useful to a job seeker.

ACTIVITY: LEARNING FROM HOBBIES

Instructor Preparation

Hobbies can improve both personal well-being and academic success. Few will dispute the health benefits that hobbies can impart, as they provide a balance to the stress typically coming from one's family, career, and other responsibilities of life. But potential academic and career benefits are often overlooked.

Among the many benefits from hobbies, they:

- Give opportunity for exploring other areas of interest, possibly leading to expanded education, training, or even a career change.
- Provide incentive and opportunity to apply or even discover one's creativity and talents, without the pressure of work expectations.
- Open up a new world of social opportunities with others who share an interest in similar hobby area(s). Such interactions often open doors for career moves or promotions.
- Boost self-image and self-confidence to help find, practice, improve, and be recognized for "something you're good at."

Hobbies can play an important role in almost any career area.

- In an Animal Husbandry course, for example, there would probably be a high percentage of students who are attracted to gardening and outdoor activities. They will likely be interested in occupations associated with the Agriculture, Food, and Natural resources cluster.
- Students in a Java Programming course are likely intrigued and interested in computers and electronics. They may be attracted to careers in the Information Technology or Science, Technology, Engineering, and Mathematics clusters.
- If using this activity in a Hospitality and Tourism course, the students may be attracted to careers involving geography, languages, and socially engaging occupations. They may find part-time jobs at amusement parks, summer camping grounds, local parks and recreation agencies, or cruise ships appealing.

Objectives

Students will:

1. Identify at least one extra-curricular area of interest (hobby) requiring some skill or training that is related to their identified career interest area.
2. Identify learning opportunities associated with one or more hobbies.
3. Select and research a hobby and report to the class one or more new facts or features of a hobby.

Materials

- Handout—List of Hobbies
- Computer with Internet for research

Activity Guidelines

Distribute the handout included with this activity that lists over 300 hobbies. Direct each student to scan this list (or add to it if they observe a notable omission) and perform the following tasks.

1. **New hobbies.** Find at least three hobbies that are new to you and might be of interest. For each of these new hobbies:
    a. Search the internet to learn what the hobby entails.
    b. Write a paragraph or two that describes the hobby.
    c. Find and include one or two photos, videos, or illustrations that convey the interest participants have in this hobby. You could use these in a brief presentation.
4. **Career-related hobbies.** Identify three hobbies related to your preferred career area. For each hobby selected:
    a. Identify the knowledge, skills, or training required to begin this hobby, and what skills would likely be gained by participating in it.
    b. Describe what sort of individual would typically be found practicing such a hobby. For some hobbies, this list could be very narrow; for others it might be very broad (anyone can join).
    c. Describe the benefits you might expect to gain by being involved in each of the three hobbies.
    d. Identify the type(s) of equipment required to participate in this hobby. For example, rollerblading requires a pair of rollerblades; bird-watching requires a pair of binoculars, and so forth.
    e. Estimate the entry cost and the annual cost to continue in this hobby. (An approximate range of values" is sufficient, i.e., is the start-up cost $10 or $100 or $1000?)
5. **OPTIONAL: Local interest.** For one of the three career-related hobbies chosen, find a local group practicing this hobby. If possible, meet with the group, introduce yourself to an online hobbyists' forum, or attend a regularly scheduled meeting to learn about a) the typical activities this group , b) the jobs of some of the group, and how this hobby relates to their occupations, and c) the requirements (if any) for becoming part of the group. Report your findings to the class.
6. For one of the three career-related hobbies chosen, identify two or more educational opportunities in your area that could be used to improve skills and knowledge related to that hobby. Consider such things as night courses, online courses from colleges or universities, online tutorials and videos, mentors or master teachers, classes provided by clubs or organizations, conferences, journals and training manuals, .
7. OPTIONAL: Deliver a 5- to 10-minute entertaining presentation for your fellow students about your findings for one of the hobbies you selected. Try to include the answers to the above assigned questions, but also include some photos or videos to better convey the excitement surrounding this hobby.

Handout—List of Hobbies

Acting
Agriculture show
Air sports
Aircraft spotting
Amateur astronomy
Amateur geology
Amateur radio
Amateur theatre
Animal breeding
Antique collecting
Antiquing furniture
Antiquities
Aquarium
Archery
Arrowhead collecting
Art collecting
Astrology
Astronomy
Astrophotography
Audiophilia
Automobile racing
Backpacking
Badminton
Baking
Ballet dancing
Band (music)
Barbecue and grilling
Baseball/softball
Basket weaving
Basketball
Baton twirling
Beadwork and beading
Beekeeping
Belly dancing
Billiards
Bird watching
Blacksmithing
Board sports
Body building
Bonsai
Book collecting
Book making
Bottle collecting
Bottles and can collecting
Bouldering
Bowling
Boxing
Bridge
Building circuits
Bungee jumping
Bus spotting
Business card collecting
Butterfly collecting/watching
Cake making and decorating
Calendar collecting
Camera collecting
Camping
Candle-making
Canning
Canoeing
Casting (miniatures)
CB radio
Chainmail making
Cheerleading
Chess
Classic video game collecting
Climbing
Clock collecting
Coaster collecting
Coin collecting
College football
Color guard
Coloring
Comic book collecting
Computer programming
Cooking
Creative writing
Cricket
Crochet
Currency collecting
Cycling
Dance
Darkroom
Darts
Decoupage
Dioramas
Dioramas (make)
Disc golf
Diving
Dog breeding
Dog sport
Dog training
Doll making
Dollhouses (make)
Drawing
Driving
Electronics
Element collecting
Embroidery
Enamels
Engraving
Equestrianism
Falconry
Fantasy football
Fencing
Figure skating
Film making
Fishing
Fishkeeping
Floral arranging
Fly fishing
Fly tying (for fly fishing)
Footbag
Fossil hunting/collecting
Fountain pen collecting
Four wheeling
Free running
Gaming
Gardening (flowers)
Gardening (food)
Geneaology
Geocaching
Ghosthunting
Glass blowing
Go karts
Gold panning
Golfing
Gun collecting
Gunsmithing
Gymnastics
Handball
Hang gliding
Herpetoculture
Hiking
Home automation
Home brewing
Home movies
Home theatre
Hooping
Horse riding
Hot air ballooning
Hothouse gardening
Hummel collecting
Hunting (game animals)
Hydroponics
Ice hockey
Inline skating
Insect collecting
Jewelry making
Jigsaw puzzles

Jogging
Journaling/writing
Judo
Juggling
Karaoke
Kart racing
Kayaking
Knapping
Knife collecting
Knitting
Lapidary
Leaf collecting and pressing
Leather crafting
Machining
Magic and sleight of hand
Map (make)
Martial arts
Matchbox collecting
Memorabilia collecting
Metal detecting/treasure hunting
Meteorology
Microscopy
Mineral collecting
Miniature figure collecting
Model aircraft
Model figures
Model railroads
Model rocketry
Model ships
Model train collecting
Mountain biking
Mountain climbing
Movie collecting
Music composing
Musical instrument (learn/play)
Musical instrument (make)
Musical work collecting
Nature walking
Nordic skating
Orchid raising
Organic gardening
Origami
Paintball
Painting and drawing
Paper (make)
Paper dioramas (tatebanko)
Paper models
Performing arts
Petal collecting and pressing
Photography (by kite, aircraft)
Photography (general)
Photography (nature)
Pinball
Poetry reading
Portraiture photos
Postcard collecting
Poster collecting
Pottery
Programming
Puppet theatre
Quilling
Racquetball
Radio-controlled airplanes
Radio-controlled boats
Radio-controlled cars
Radio-controlled helicopters
Radio-controlled racing
Rafting/canoeing
Reading
Record collecting
Reenactment (wars)
Restoring antiques
Robotics
Rock climbing
Rock stacking
Rocks & mineral collecting
Roller derby
Roller skating
Rugby league football
Running
Sailing
Sand castle building
Scale model collecting
Scrapbooking
Scuba diving
Sculling or rowing
Sculpting
Seaglass collecting
Seashell collecting
Sewing
Shadow boxes
Ship in a bottle (making)
Shortwave listening
Singing
Skateboarding
Skiing
Skydiving
Slot-car racing
Snorkeling
Snow globe collecting
Soapmaking
Speed skating
Spelunking
Sports card collecting
Squash
Stained glass
Stamp collecting
Stop motion animation
Storm spotting/chasing
Storytelling
Surfing
Swimming
Sword collecting
Table football
Table tennis
Tai chi
Target shooting
Taxidermy
Telescope making
Tennis
Terrariums
Tie dyeing
Tombstone rubbing
Tour skating
Toy collecting
Travel
Treasure hunting
Urban exploration
Vehicle restoration
Videophilia (home theater)
Vintage collecting
Vivariums
Volleyball
Walking sticks (making)
Walking sticks collecting
Water sports
Weaving
Wine collecting
Wine tasting
Wire jewelry making
Wood carving
Woodworking
Writing
Yoyoing

Group Reflection Questions

The goals of this activity include exposing students to the idea that career choices can and should include doing things they enjoy. What a person does in their spare time can be a good indicator of the skills and aptitudes they possess. Other activities in this module can help identify aptitudes, if students can't readily name them.

Hobbies are usually a rich opportunity for learning, primarily because they provide many motivations to learn more. For example, if you want to fly that radio-controlled airplane without crashing it, you must learn a about the aerodynamics of flight. To complete a collection of sea-glass, you must research exotic locations on the internet from which the glass originated. Or, to advance in a rodeo competition, you must learn about the care, handling, and training of horses.

Engage students in some reflection over this activity by asking questions like:

- What careers would allow you to do what you enjoy doing?
- Is it possible to have a job doing what you actually like to do? How do you find those jobs?
- When does a hobby start to become work?
- How can a hobby prepare you for work?
- What sort of role should your hobby play in a job interview with a prospective employer?

Although it's possible for some group-think to occur, causing several students to choose the same hobby from the list, it is more likely that the diversity of students will manifest itself in a refreshing way.

After choosing from the list, students need access to some research tools (i.e., the Internet or library resources). Give students the opportunity to share what they've learned from their hobby research. Encourage signs of identifying something they enjoy that will promote lifelong learning in their own lives.

Finally, it should be noted that hobbies require time. So, while this activity encourages students to research these hobbies, they should not feel guilty if there's "just not enough spare time now for a hobby." There may need to be a limit or even postpone the interest in a hobby until later in life.

ACTIVITY: ADAPTING IN VIDEO GAMES

Instructor Preparation

There is a meaningful debate about the value of video games in teaching and learning. Almost everyone has played a computer game and tried to improve his or her score. The way to improve is to learn what the game requires and *adapt* your playing style to Most players aren't aware of that neurological response occurring; they just try to get better at the game.

In this activity, students will become aware of adaptation and will examine it through two simple (and easily available) video games. The use of fun games will spark a discussion about the need to adapt to a changing world environment—more specifically, a changing workplace environment. Anyone in the workplace for more than five years will testify to the need for personal change to keep pace with the advancing technology, laws, management, and demands of the economy. Generally, those that can adapt stay ahead—in the game and in the workforce.

Adaptability is applicable to any career area. To keep the focus of this activity on careers (and not just the video games), the instructor should first introduce the concept of adaptability and return to it later during the activity wrap-up. Start by suggesting a typical career path for workers, pointing out the need for learning new skills and strategies through on-the-job training, education and certifications, and work as an apprentice under a mentor or journeyman. Another key to adaptability may include willingness to relocate.

- In most construction trade areas, the entry-level employee works under a master craftsman to learn the "tricks of the trade" while also learning good management practices. Additional engineering education and certificates may promote eventual advancement to site manager. Ambitious workers may one day own their own construction business.
- In education, a student who enjoys tutoring others may recognize his or her aptitude for teaching, complete a degree, and earn a teaching certificate. Experience, demonstrated leadership skills, and additional coursework may lead to department chair or administrative positions.
- In transportation fields, a worker may qualify, train, and earn certification to drive a truck or bus or work as a railroad engineer. Further education and experience may lead to supervisor and upper management positions.

Objectives

Students will:

1. Identify how adapting one's playing skills and strategies in a video game enables advancement.
2. Give examples of how adapting work methods in a selected career area enables greater success and advancement.

Materials

- Computer/tablet video games or smartphone apps:
  1) PacMan (or similar very simple game)
  2) Angry Birds
- Computer, tablet, or smartphone to play above games

Activity Guidelines

Admittedly, this activity will be popular with students, if only for the fact that they get to play games in class. After students have enjoyed a few minutes of each game, make it clear that there really is a goal for this activity: to identify areas where the game requires them to adapt to a new skill in order to advance to the next levels and earn greater rewards.

This activity uses two games that should be readily obtainable for either the computer/tablet (via website) or a smartphone as an app. We are not implying an endorsement of the manufacturers of any device, programs, or their content. We are simply using the games and equipment to meet the goals stated above. By following the general guidelines below, there should be little or no need for technical support.

Overall Guidelines

All games include audio. If available, everyone can use headphones or ear buds. Alternatively, players can lower the speaker volume to a reasonable level to avoid noise overload in the computer lab or classroom.

Although most students will want to be in control and play the game, students may need to work in pairs. They may take turns at two roles—player and note-taker. Expect each team to need a short orientation time (5 minutes), after which there should be a set time limit (15-20 minutes) for playing each game and making some notes, as described below. Allow at least 10 minutes for class discussion at the conclusion of the activity.

Simple Game

Start with a simple game that's been around since almost the first graphical computer: *PacMan*™. Simply search the web for "online pacman" and you'll uncover dozens of links to working versions. For our purposes, any of them will suffice.

Here are a few Flash versions:

http://www.thepcmanwebsite.com/media/pacman_flash/
http://www.learn4good.com/games/pacman/pacman.htm
http://www.webpacman.com/

The last link also includes several other vintage arcade games (e.g., *Frogger*™), and a History tab that may be interesting to some students.

For the iPad, there is a free version, *PacMan-Lite*:

https://itunes.apple.com/us/app/pac-man-lite/id293778748

Challenging Game

For a more modern and challenging game, we'll use the popular *AngryBirds*™. Many of your students may be experts at this game. That's great! After the novices are ready to give up on the entry-levels of the game, the experts can demonstrate and explain how to succeed at the advanced levels.

In a PC browser: http://www.angrybirds.com/
For the iPad: https://itunes.apple.com/us/app/angry-birds-hd-free/id409809295

The Real Activity

The game play (and competition among students to get high scores) may seem to take center stage, but the educational goal of this activity is to identify aspects of adapting that are required in the game. For either game, one can learn the basics, employing basic eye-hand coordination, and enjoy the entry-level play. But advancement to the higher scoring levels requires adapting by learning new skills and strategies. What are those new skills and strategies? On the activity handout, ask students to list at least five new skills and five new strategies that are needed to advance in each game and to prepare to briefly discuss them. Challenge students to write down items that are not obvious.

Group Reflection Questions

This activity strives to demonstrate adaptation using a couple of simple video games. The early games like *PacMan*™ required minimal adapting, so students may even struggle to complete their list of five new skills and strategies. However, modern games like *AngryBirds*™ are very intricate and well produced. They challenge gamers because they require a high level of adaptation of skills and strategies to advance and earn high scores.

In real life, there are yet many more facets of adaptation that will determine a person's success. The message to take away from this activity is that to move beyond the beginning level of any task, t successful people must adapt and learn new skills and strategies. Some players are able to adapt very readily; consequently, they will usually advance relatively quickly. Those that cannot adapt, or only with great effort, must be satisfied with the entry level of play for longer periods of time.

Discuss questions like the following with the class:

- Describe various ways you had to adapt to advance in *PacMan*™. In *AngryBirds*™. Did you find any clever tricks to use in the games?
- How is adaptability an important life skill?
- Consider an entry-level job at a fast-food restaurant. How might you be expected to adapt to advance up the ladder at that business? (Hint: contrast the job expectations of the entry-level worker with the shift supervisor.)
- Now consider an entry level job at _____ (insert an occupation linked to your course area). Again, how might you be expected to adapt to advance up the ladder in that field?
- What kinds of activities bridge the gap between entry-level employment and the next level?

Handout—"Adapting" in Video Games

Simple Game: _____ (name of game)

How to score points: _____

New skills required to advance: _____

New strategies required to advance: _____

Complex Game: _____ (name of game)

How to score points: _____

New skills required to advance: _____

New strategies required to advance: _____

ACTIVITY: MANAGING STRESS

Instructor Preparation

Some workplace stress is normal, but excessive stress can interfere with ability to focus and be productive and impact physical and mental health. In this lesson students will explore stress, its causes, its effects on the individual, methods for reducing stress, and the concept of resilience.

To begin this module, have students discuss things that cause stress in their lives. Don't discount any answers because factors affect individuals differently. Then focus the discussion on job stress. There might be generic stressors common to many jobs, such as a boss or coworker who is difficult to get along with, fear of a layoff, difficulty in meeting quotas, or a work space that is crowded, noisy, or otherwise less than satisfactory. Other jobs might be physically stressful, such as working outside and dealing with weather extremes, in dangerous environments, in enclosed spaces, on high rises, or in war zones. Discuss stress that might be career specific.

Accounting: Tax time is a very hectic time of year when an accountant is preparing numerous tax returns that benefit the customer and also must be accurate and follow the latest IRS guidelines.

Human Services: People who work with victims of abuse, whether child, spouse, or the elderly, need to be able to leave the situations they may be exposed to at work and not carry that burden when they are not at work. They need to focus on helping the client and not the terrible things that have happened to that person.

Public Safety: Emergency workers, police officers, and firefighters encounter periodic stress. Each time they are called out they may be walking into a crime in progress, a burning building that might include storage of flammable or explosive materials, a car wreck with injuries, or trapped people unable to help themselves—such as small children and babies, the elderly, or the infirm.

Wrap up the initial discussion of stress by asking students how they deal with stress or protect themselves from the effects of stress. Identify places in the community where people who are suffering from stress related conditions such as anxiety, depression, or PTSD can get professional help. Remind students that this lesson is about awareness and examines normal workday stress; it is not as a lesson on the diagnosis and treatment of stress related conditions. If anyone has deeper issues they need to seek professional help. Provide a resource list to all students.

Objectives

Students will:

1. Identify stressors in their lives.
2. Identify stressors that are job related.
3. Identify ways to reduce stress and build resiliency.

Materials

- Computers with Internet access.
- Instructor prepared list of local resources for dealing with stress-related conditions such as depression.

Activity Guidelines

Students should complete the Holmes and Rahe Stress Scale and the resiliency quiz individually to identify stress levels in their lives and determine how well they cope with stress.

- Have students take the Holmes and Rahe Stress Scale at http://www.mindtools.com/pages/article/newTCS_82.htm
- Have students take the resiliency quiz at http://www.resiliencycenter.com/resiliencyquiz.shtml.
- Have students look at various websites that discuss ways of dealing with stress. Ask them to list things that reduce stress and increase resilience. Compile a class list. Ask students to mark things they already do, choose several things that they don't do or could do better, and make a plan for incorporating at least one of those into their lives.

Group Reflection Questions

After students have had time to complete the stress and resiliency assessments individually, come together as a class and discuss the following questions.

- Scales like the Holmes and Rahe Stress Scale don't include tragedies such as 9-11 destruction, the Boston Marathon bombings, massive accidents, natural disasters, and war. How would you rate them on the scale?
- Whom do you know that is a highly resilient person? Which characteristics of that person do you think make him or her more resilient?
- Why is resilience and the ability to handle stress needed for job success and fulfillment?
- What is the effect of employees with low resilience and high stress on the workplace as a whole?
- What are some things companies might do to help reduce stress for their employees?
- What are things you can do to reduce stress in your life?

Assessment Tools/Strategies

This section includes specific strategies and instruments for assessing students' knowledge, skills, and attitudes in regard to the activities included in *Adaptability and Lifelong Learning*.

RUBRICS

Rubrics are valuable assessment tools. Students should be provided with the rubric by which they will be assessed before an activity begins so they will understand the performance expectations. When time permits, students can contribute to the rubrics by brainstorming with the instructor about what a quality behavior or product looks like. For example, before assigning a team project to research a topic and prepare a group presentation, ask students to describe what behaviors the ideal team would demonstrate as they work together to complete the assignment and what elements need to be included in it. A rubric on adaptability might ask students to assess the degree to which they have researched a stress-relief concept and put it into practice. Prompt students with specific components. Then have them describe a poor performance. These will be the descriptions of the characteristics for the highest and lowest ends of the Likert scale for each performance criteria. Instructors should add any required attributes to the rubric if the students do not come up with them on their own. Rubrics for assessing student understanding of adaptability and lifelong learning are included in this section.

- The first rubric for instructor use lists desired attributes of *Adaptability and Lifelong Learning* to be observed and includes spaces where the instructor can adapt the rubric for a specific activity, project or career field by inserting additional criteria.
- The second and third rubrics are for self-rating use by students. The students indicate the degree to which they think they are performing each attribute. They can periodically return to the rubric to reassess and determine whether they are improving those skills.
- The final rubric is the most complex. The student completes a rubric by providing examples of satisfactory or exemplary performance of the tasks/behaviors listed. Then the student meets with the instructor or peer observer and compares his/her reflections with their instructor's or peers' observations and formulates an action plan for improving attitudes, behaviors or skills

  This type of rubric most resembles the type of assessment an employee might receive on the job. It is also the most time consuming. Ideally, this rubric would be used at least three times during a course:
  - At the beginning of the course, to get a baseline and to give students suggestions for specific actions they might take to improve their performance,
  - At the midpoint of the course, to check progress and refine the recommendations for improvement, and
  - At the end of the course, to assess the progress made over the duration of the course. Additional suggestions can be made for students' continued growth beyond the end of the course.

RUBRICS FOR INSTRUCTOR ASSESSMENT

Outcomes from Adaptability and Lifelong Learning – Successful workers in any career area must be able to adapt to changing workplace environments, skill requirements, and the interpersonal communication styles of fellow employees and supervisors. Any number of events may necessitate a career change, so workers in any career area must be alert to alternative career possibilities. Below are some outcomes to consider for this module. Feel free to edit this list to reflect course-related careers. The student is able to:

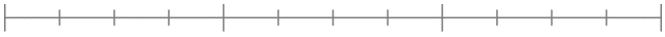
Complete a career-survey and identify at least three possible career matches.	1 2 3 4 5
Enter the data to create a career genogram depicting at least two generations.	1 2 3 4 5
Create a career path for a desired career cluster.	1 2 3 4 5
Identify the requirements to advance from entry-level to a chosen career goal.	1 2 3 4 5
List several alternative career paths that fit the student's knowledge and skills.	1 2 3 4 5
Identify several careers related to a specified career cluster.	1 2 3 4 5
Identify the credentialing requirements, both general and specific, for one career.	1 2 3 4 5
Distinguish between voluntary and mandatory credentialing requirements.	1 2 3 4 5
Identify the professional organization(s) associated with a specified career area.	1 2 3 4 5
Identify the continuing education requirements, if any, for maintaining certification or licensing in a given career.	1 2 3 4 5
Identify the key publications and websites associated with a chosen career area (for the purpose of staying current in one's field).	1 2 3 4 5
Explain the connection (not necessarily a work-skill relationship) between a student's choice of hobby and selected career area.	1 2 3 4 5
List at least three skills or aptitudes that must be learned to participate in a chosen hobby.	1 2 3 4 5
Describe or demonstrate the skills to advance past the entry-level of a computer game.	1 2 3 4 5
Identify five significant stressors common in 1) daily life and 2) the workplace.	1 2 3 4 5
List five strategies for reducing stress and building resiliency.	1 2 3 4 5
	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

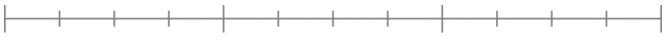
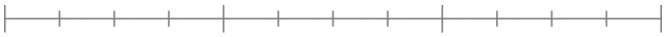
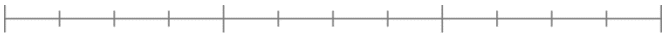
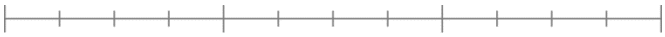
RUBRIC FOR SELF-ASSESSING ADAPTABILITY AND LIFELONG LEARNING SKILLS

Use this instrument throughout the course to self monitor your adaptability and lifelong learning knowledge and skills. Note: It is fairly common to overrate your skills during the initial assessment. You may rate yourself a bit lower as you get feedback from others and discover the complexities of each attribute. By the end of the course you should see improvements in your ratings if you focus on improving the quality and depth of your work rather than primarily on getting the assignedment completed.

Objective: Your career choices should reflect your own personal skills and abilities.

Essential Attribute	**I**	**II**	**III**	**IV**
The results of my career-survey match my personality, skills, and abilities.	Seldom	Sometimes	Usually	Consistently
				
I can see the impact of my family's history and environments on my aptitudes, attitudes, and career choices.	Seldom	Sometimes	Usually	Consistently
				
I annually check my progress toward my career goals (education, skills training, certifications).	Seldom	Sometimes	Usually	Consistently
				
	Seldom	Sometimes	Usually	Consistently
				

Objective: Your skills and abilities can change: they can deteriorate, improve, or expand.

Essential Attribute	I	II	III	IV
I am learning the skills needed to practice and be conversant in a certain hobby.	Seldom	Sometimes	Usually	Consistently
				
I am acquiring the tools and/or materials necessary for a certain hobby.	Seldom	Sometimes	Usually	Consistently
				
I am becoming more proficient and efficient in my work-related skills.	Seldom	Occasionally	Often	Consistently
				
I am applying strategies for reducing stress in my daily life and my work life.	Seldom	Sometimes	Usually	Consistently
				
I keep current in my field by reading, meetings, maintaining certifications, and supporting related organization(s).	Seldom	Sometimes	Usually	Consistently
				
	Seldom	Sometimes	Usually	Consistently
				

RUBRIC FOR ASSESSING ADAPTABILITY AND LIFELONG LEARNING SKILLS

Outcome: A worker should consider his/her abilities and aptitudes to choose and maintain a career. In an ever-changing world, that means adapting to evolving technologies and resolving many sources of stress.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your instructor or peers, describe the steps you might take to continue or improve your adaptability and lifelong learning.
Used a career survey to consider career choices.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Applied a hobby-learned skill to the workplace or job training environment.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Over time, demonstrated improvements in proficiency and efficiency with career-related skills.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Sought help in learning a new skill.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your instructor or peers, describe the steps you might take to continue or improve your adaptability and lifelong learning.
Volunteered to assist or comfort an overwhelmed coworker or supervisor.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Peer comments and suggestions:
Instructor comments:

Videos and Weblinks

VIDEOS

The following is an annotated list of videos that are available at the links provided. You may choose to use these in class to give additional background on Adapting and Lifelong Learning, as discussion starters, or as examples of effective or ineffective communications.

https://www.youtube.com/watch?v=Zy6YoyTcwUw (14:33)
Thinking Forward: Adapting to a Changing Workplace, presentation by Bill Self
Discusses adapting to address customer satisfaction

https://www.youtube.com/watch?v=EIHshx7QW44 (1:05)
Adapting To Change by Coach Ditka
A short motivational exhortation, by a charismatic coach, to be willing to change

http://www.careeronestop.org/Videos/default.aspx
U. S. Department of Labor supported website, with over 500 short videos that explore popular occupations across all 16 career clusters.

WEBLINKS

Here are some links relevant to this module that may be useful.

http://www.mapyourcareer.org/construction/construction-careers.html
Career Paths in Construction

http://www.nc-net.info/clusters_guide/career_exploration_section.pdf
Printable document that includes a career clusters survey and several valuable links for further information, as compiled by the North Carolina Department of Public Instruction (NCDPI) and the North Carolina Community College System (NCCCS).

http://www.careeronestop.org/
Career exploration website sponsored b y U. S. Department of Labor. Includes career survey instruments and short videos that explore popular careers in each of the career-clusters.

http://www.iseek.org/careers/clusterSurvey
Online career survey from Oklahoma Department of Career and Technical Education.

https://www.okcareertech.org/students/career-resources/job-seeking-resources/self-assessment-and-interest-inventories
Printable survey instrument to identify one's aptitude for a career cluster.

http://www.123test.com/career-test/
A visual-aptitude test, where one selects the most preferred and least preferred activity, based on sketches of career-related activities, derived from Dr. John Holland's theory of careers and vocational choice, known as Holland Codes.

http://www.military.com/join-armed-forces/asvab
The Armed Services Vocational Aptitude Battery (ASVAB) is a timed multi-aptitude test, given at over 14,000 schools and Military Entrance Processing Stations (MEPS) nationwide and is developed and maintained by the Department of Defense. The ASVAB can provide career information for either civilian

or military occupations, and is an indicator for success in future endeavors whether one chooses to go to college, vocational school, or a military career.

http://www.myheritage.com/
Create a family tree using this free online tool. One can use this activity to help document the careers of family members: a career genogram.

http://prezi.com/n6kuc0k2ok0v/career-genogram/
One way to present a career genogram. After the presentation loads, click the right arrow to advance.

http://online.missouri.edu/exec/data/courses/2256/public/lesson01/lesson01.aspx
Career genogram lesson from University of Missouri.

http://www.genopro.com/genogram/rules/
Illustrated Genogram rules, although this gets pretty deep into some obscure possibilities.

http://www.acinet.org/certifications_new/
Certifications are examinations that test or enhance knowledge, experience, or skills in an occupation or profession. Search for certifications by keyword, industry, or occupation.

http://www.cacareercafe.com/
Designed to assist California Community College students to plan their careers, this site provides assessments, weblinks, and other information to guide students in career planning. Much of the information is generic, but job banks and some other information is California specific.

http://www.careerbuilder.com/
Provides career advice to job seekers and tools to match the right talent with the right opportunity.

http://www.mindtools.com/index.html
Resources to help in any career. The toolkit is particularly valuable. Contains numerous free articles and quizzes to make it worth a visit.

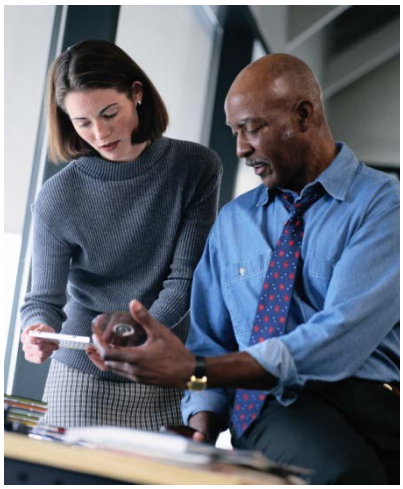
http://www.myskillsmyfuture.org/
Search for related careers using skills only or skills with job tasks.

NC-NET Employability Skills Resource Toolkit

Section 2 – Teaching Resources

Entrepreneurship

Overview



Entrepreneurship is the engine that drives a motivated and productive workplace. We get our word "entrepreneur" from the thirteenth-century French verb *entreprendre,* which means "to do something" or "to undertake." From the early use of the word in business circles, we see that entrepreneurs are people who are willing to bear personal financial risk to undertake a business venture. Sometimes the new business succeeds—making a profit, growing, employing workers, expanding to more than one location, and so forth. Other times the business may thrive for a time and then shrink and die due to lack of growth or motivation or leadership, or any number of possible distresses. In our system of capitalism, such successes and failures help to sort through the many ideas that spring forth from creative business minds to yield the vibrant, thriving economy that has made our country great. Business ideas that are efficient and profitable will flourish. But, just as important, ideas that use resources poorly and are intended only to enrich the business owners—without considering public need or demand—are quickly extinguished.

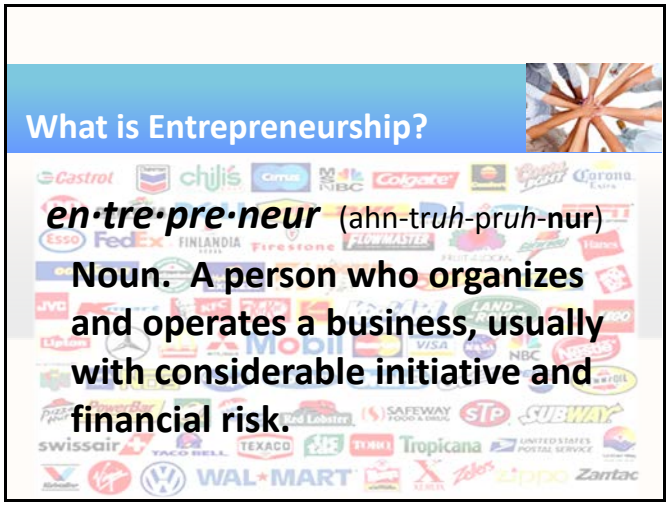
The successful businesses we see today are of the former type. Every one of them began with an idea by an individual—someone not altogether different from the students in your class. In the world of electronics, for example, both Bill Gates and Steve Jobs were willing to risk everything to promote ideas that obviously flourished, proven by the fact that we all have Microsoft and Apple products in our workplaces, schools, homes, pockets, and purses. Similarly, Sam Walton developed innovative ideas in product distribution warehouses and inventory management to create Wal-Mart, the largest retail chain in the world. Many more examples could be offered, but the point to make with students is that it all starts with an idea and the courage to take whatever risks are necessary to bring the idea to fruition. Some of your students may have what it takes to turn an idea into a real business venture. One of them might even be the next Sam Walton.

In the activities that follow, students will discover factors that have contributed to the success of new business entrepreneurs, including the process of converting an idea into a plan (specifically, a "business plan"); the importance of family, friends, and business associates in forming a network; and the need for succinctly telling people about your business ideas, in other words, advertising.

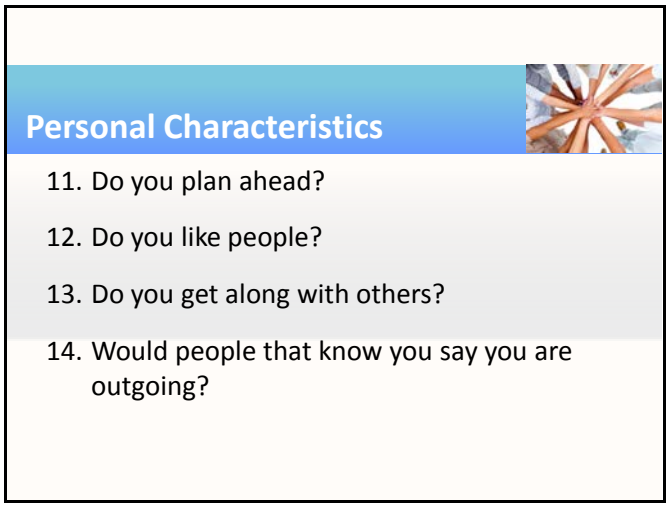
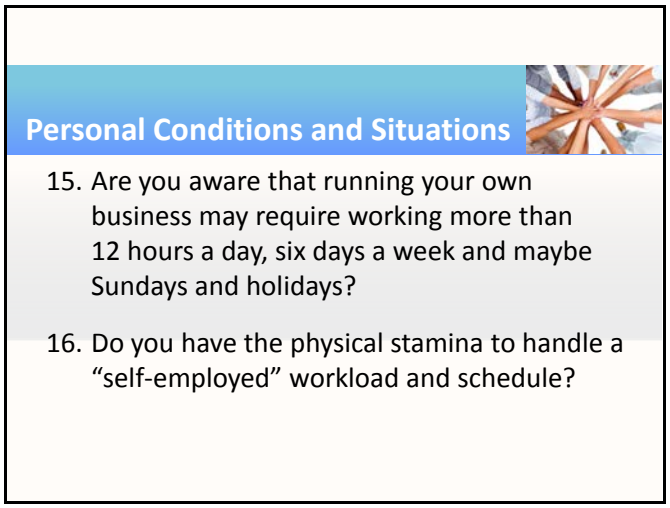
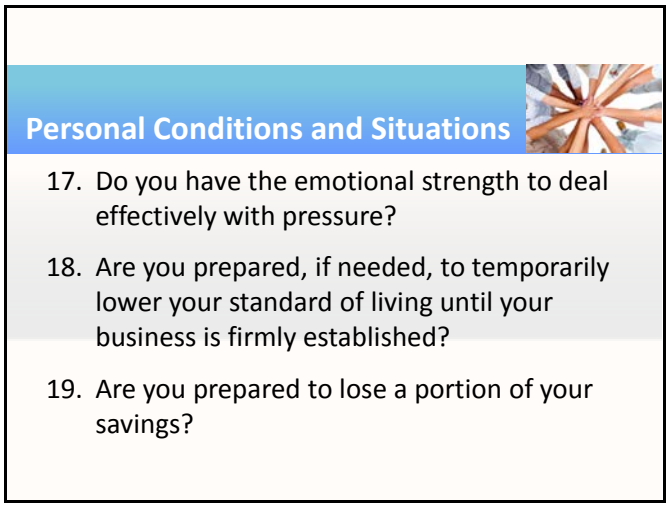
In this module we have provided:

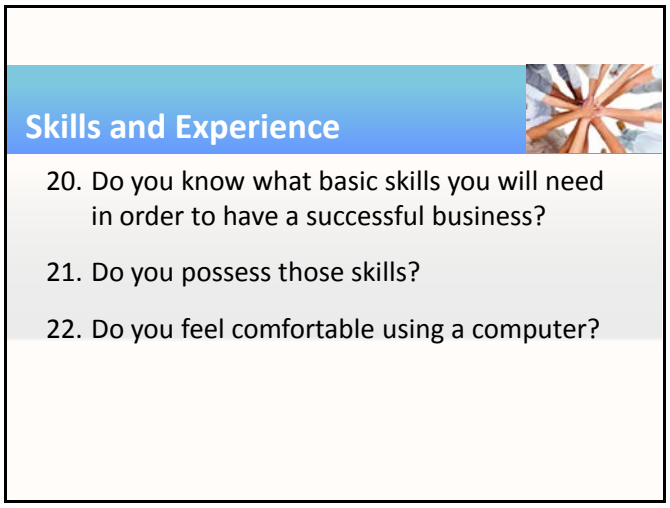
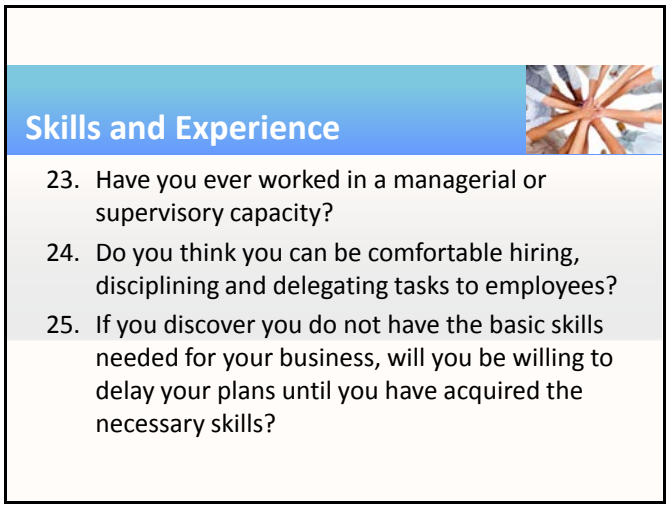
- **Presentation materials** organizing topics for discussion and introducing the activities
- **Teaching resources** consisting of activities to help students explore aspects of *entrepreneurship*
- **Assessment tools and strategies** consisting of rubrics that can be used as observation checklists or for peer or self-evaluation
- **Online resources** for further exploration of the topic

Presentation Materials

	SLIDE	TEACHER NOTES
1		
2		• We usually think of entrepreneurs as ***starting*** a business. Consider some of the businesses represented by the logos (in the background of this slide) that we all recognize. Every single one of them had a beginning! Yet, consider where they are today!
3		

	SLIDE	TEACHER NOTES
4	**Do You Have an Idea?** Before starting a new business, see if you have what it takes: Small Business Readiness Assessment 	• Click the link to go to the SBA website for the Readiness Assessment. Each student can do this on his or her own, or, for the sake of this activity, you can simply review the 25 questions (reproduced in the following slides) for their educational value and the whole class can formulate "good answers" to the questions.
5	**General Readiness** 1. Do you think you are ready to start a business? 2. Do you have support for your business from family and friends? 3. Have you ever worked in a business similar to what you are starting? 4. Would people that know you say you are entrepreneurial? 5. Have you ever taken a small business course or seminar?	• Questions are from the Small Business Administration's SBA Readiness Assessment Tool. An interactive version is available at https://eweb1.sba.gov/cams/training/business_primer/assessment.htm • You can use the questions on this and the following slides for class discussion. Ask students: Why do you think this question would be important for your consideration before starting a new business?
6	**Personal Characteristics** 6. Are you a leader? 7. Do you like to make your own decisions? 8. Do others turn to you for help in making decisions? 9. Do you enjoy competition? 10. Do you have will power and self discipline?	• Questions from SBA survey

	SLIDE	TEACHER NOTES
7		• Questions from SBA survey
8		• Questions from SBA survey.
9		• Questions from SBA survey

	SLIDE	TEACHER NOTES
10		• Questions from SBA survey
11		• Questions from SBA survey
12		

	SLIDE	TEACHER NOTES
13	**The Business Plan** • Consider your idea for a new business, then... • Watch the video: ***How to Write a Business Plan*** • Complete (as best you can) the worksheet: ***Questions to Answer Before Starting a New Business*** ☑ Executive Summary ☑ Company Overview ☐ Marketing Research ☐ Products or Services ☐ Marketing and Sales ☐ Financial Projections	• Continuing on with the new business idea, we will proceed to develop the business plan. To that end, the class (or student teams) should watch the short video, "How to Write a Business Plan." http://www.youtube.com/watch?v=SMr_uLZV-eM (2:27 min) • Then the team should use the Entrepreneurship module handout, "Questions to Answer Before Drafting a Business Plan," as a starting point for developing a business plan. Students should write the answers to these questions, as they will be used and revised repeatedly in the module activities that follow.
14	**Marketing Research** In a general way… • Describe the product and/or service you will provide. • Describe your customer (your market). • Will there be any competition? Describe it. • Identify any legal requirements you will face. ☐ Executive Summary ☐ Company Overview ☑ Marketing Research ☐ Products or Services ☐ Marketing and Sales ☐ Financial Projections	• As the students formulate a better concept for a new business, the ideas about their product, service, customers, and competition will become clearer. In the first module activity, encourage students to have a robust discussion and then conclude by trying to identify and list concrete ideas on paper. The next activity will ask student groups for much more detail about these topics.
15	**Products or Services** In a more detailed way... • Write a description of the product or service (e.g., drawings, parts list, timelines, costs, workers) • Write a description of the customer traits, numbers, buying habits, etc. • How will your product or service compare to the competition? ☐ Executive Summary ☐ Company Overview ☐ Marketing Research ☑ Products or Services ☐ Marketing and Sales ☐ Financial Projections	• This activity is different from the preceding one in that ***much more detail*** about the product or service is required. If the business product is pizza, for example, we need to know ingredients for the pizza, sizes available, varieties, pricing, inventory, number of employees needed, and so forth. • Similarly, considering the customer, students now need to have an idea about the number of customers to expect, different types of customers, and behavior at different seasons.

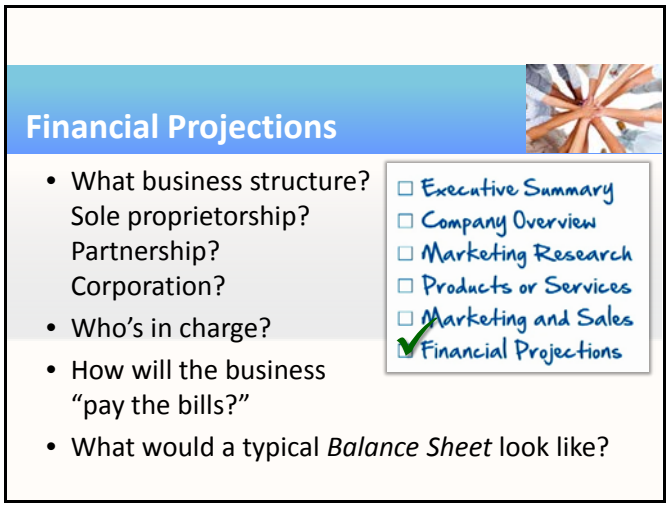
SLIDE **TEACHER NOTES**

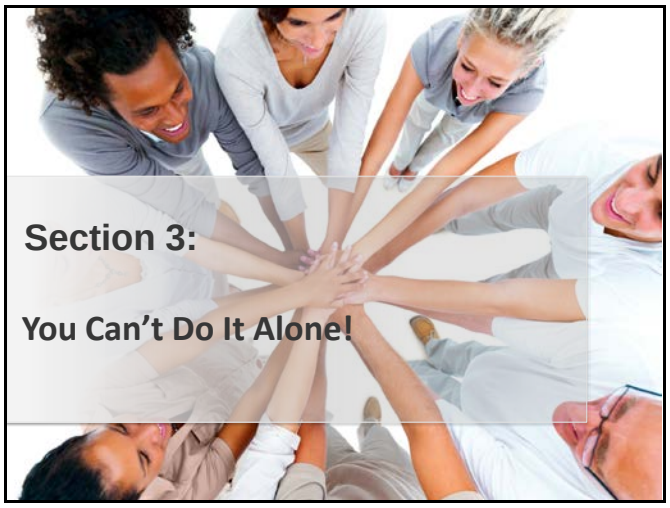
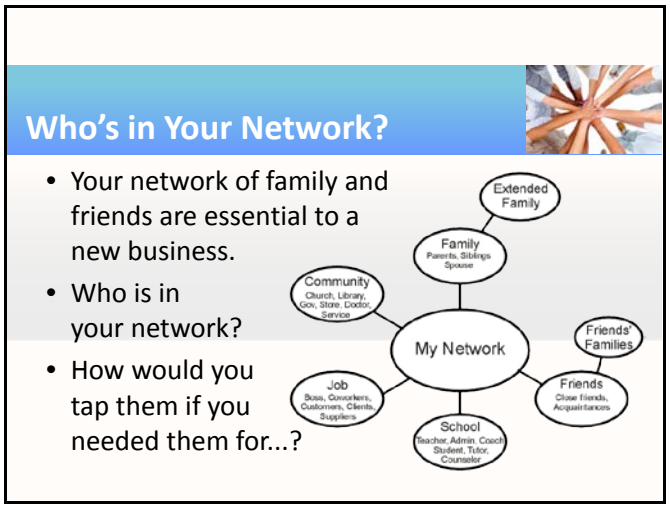
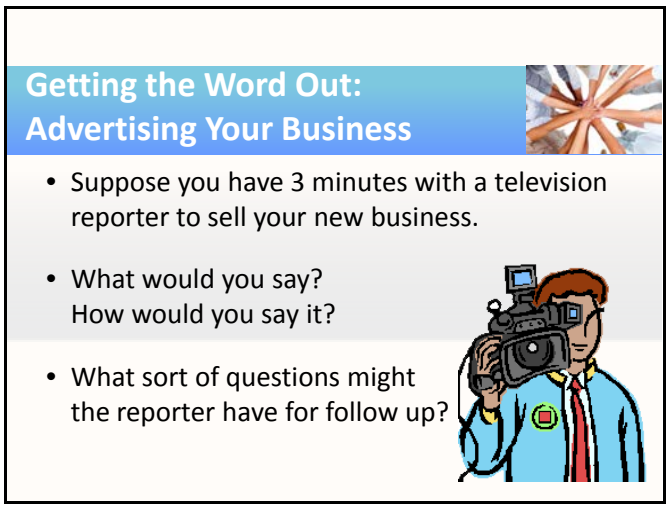
(Notes for Slide 15 continued)

- Finally, students need to create a detailed comparison with the competition. What other products or services currently fill the niche in the market?
- As before, the enthusiasm of the teams' discussions should be transcribed into written notes that will be used to compose a business plan document. The more words written in this stage, the easier it will be to produce that document.
- As noted in the activity guidelines, some teams may go so far as to actually develop a prototype product. It would also be constructive to develop a sketch of a brochure or handout describing the product or service, which could also be included in the final business plan.

16

- The four P's are a helpful way to remember these four facets of developing a marketing and sales strategy for the new business.
  - **Pricing.** Think of clever ways to price the product and make it more appealing than the competition.
  - **Packaging.** "By the box" or "by the barrel?" "By the gallon" or "by the pound?" Think of the big picture here, for the sake of potential investors.
  - **Promotion.** What marketing methods are appropriate for your type of product? Is a sign on the store front adequate or do you need flyers? Ads in newspapers and magazines, or will only online advertising bring customers in?
  - **Place.** The location and size of your store is very important. Or maybe there won't be a store at all, but only an internet store-front or mail-order catalog.

	SLIDE	TEACHER NOTES
17		• In this portion of the activity, students will need to understand some technical terms [*sole proprietorships, partnerships, corporations, asset, liability, equity, cash flow, income*].The Entrepreneurship module activity guidelines include links on the SBA.gov website that provide concise definitions for these terms. • Since the teams are (most likely) describing a fictitious business, they are free to use any business structure they like. Organizational structures are described here: http://www.sba.gov/category/navigation-structure/starting-managing-business/starting-business/choose-your-business-stru
		• Also on the SBA.gov website are sample spreadsheet templates that take into consideration the financial aspects of the business plan, such as assets, liabilities, equity, and income. • Slides 23-30 of the SBA Business Plan tutorial, http://www.sba.gov/sba-learning-center/training/how-write-business-plan-0, cover many of the financial considerations.
18		• Having created the six main parts of the business plan, students can now merge them all into a coherent document. • The executive summary is written last, after the picture of the new business has been drawn in detail. Students will likely want to revise this paragraph or two to reflect the changes that have evolved through the course of the previous activities. • Ask student teams to present their business plans to the class. Those listening should analyze the plans as though they were in the role of a loan officer being asked to invest in this business startup. What questions need to be asked in order to feel confident that this business is going to succeed and repay the start-up loan?

	SLIDE	TEACHER NOTES
19		• Mapping and managing the relations and connections in a business environment allows business owners to better understand and capitalize on the business landscape.
20		• This module activity asks students to consider their network of friends and family. Some will have very extensive networks; others minimal (an indication that they would likely struggle as an entrepreneur). • Students should view the list of life scenarios (or others provided by the instructor) and highlight the members of their network that would be involved. • The last bullet is an incomplete question…you can "fill in the blank" with just about anything! But remember: you can't start a new business all alone! You ***will*** need some help!
21		• This module activity is a twist on the "elevator speech." Students are asked to prepare for a three-minute interview. That's a great exercise that requires them to boil down the selling points of their business to the essential facts. • But then, at the last minute, just as they are wrapping up their preparations, spring on the class the fact that they will **really only have 30 seconds** with the reporter. Their pitch suddenly MUST be made VERY concise: truly, the elevator speech.

	SLIDE	TEACHER NOTES
22	**For More Information: An Online Course for Entrepreneurs** • Complete the online course available at the Small Business Association web site (sba.gov): An Essential Guide to Starting Your Own Business • Download and print the certificate at the end of the course. 	• This online course (presentation) will take about an hour to complete.
23	**Quotable Quotes** *If you want to be an entrepreneur, it's not a job, it's a lifestyle. It defines you. Forget about vacations, about going home at 6 pm —last thing at night you'll send emails, first thing in the morning you'll read emails, and you'll wake up in the middle of the night. But it's hugely rewarding as you're fulfilling something for yourself.* Niklas Zennstrom	• http://www.brainyquote.com/quotes/quotes/n/niklaszenn479716.html

Teaching Resources

ACTIVITIES

The following activities can be completed in class to emphasize, teach, and practice entrepreneurship. This subject is broader than most of the other modules in this series, so it will naturally require a bit more time to infuse into an existing curriculum. For example, writing a business plan is an essential skill for any business. It requires more than a few extra minutes to learn how to describe the many parts of a new business idea and to assemble those into a draft document. Both the U.S. Small Business Administration, http://sba.gov, and the North Carolina Community College System Small Business Center Network, https://www.ncsbc.net/images/Biz_Plan_Start_Up_Guide.pdf, provide guidance on this process.

This important entrepreneurial tool is covered in a set of connected activities, designed to be conducted in sequence. The final fruit of this effort is a real business plan for a student-proposed business, tailored to your subject areas/career pathway. A few additional subjects related to entrepreneurship (e.g., networking, advertising) are included as optional activities for students interested in starting their own business.

ACTIVITY: BUSINESS PLAN (PART 1)—THE MISSION STATEMENT

Instructor Preparation

Anyone considering starting a new business must address some basic requirements, usually presented as a set of questions to be answered. Many versions of these questions exist, but the bottom line is: Are you prepared to take the plunge? Simply making an effort to answer each thought-provoking question will clarify the true challenges presented by entrepreneurship. In this activity, students will answer those questions and begin the process of developing a business plan.

The U.S. Small Business Administration website (http://sba.gov contains a wealth of resources, including several designed to help students understand the importance of the business plan for a new business. Watch the short video entitled ***How to Write a Business Plan***, which runs about 2½ minutes:

http://www.youtube.com/watch?v=SMr_uLZV-eM

and the online tutorial, ***How To Write a Business Plan***, which runs about 30 minutes:

https://www.sba.gov/tools/sba-learning-center/training/how-write-business-plan

(A print-out of the slides are provided in the last section of this module.) The students will be watching parts of this tutorial as they construct the different parts of their business plan.

Students should work in teams (2-4 students per team). It will be helpful for the team members to share a common interest and for each member to have some experience or knowledge that they can apply to the new small business venture that will be addressed in the sequence of activities that follow. For example,

- In the **Automotive Technology** career area, a student team develops a business plan for a new auto detailing shop. All the team members own a car and are familiar with auto detailing. One of the team manages an auto-body repair shop during the summer months. Another just finished detailing his own new car with a ground-effects package. And another did part-time work for a car-wash firm that did detail cleaning for customers.
- In the **Arts, A/V Technology, and Communications** career area, a student team develops a business plan for a new video conversion business—converting still photography and video to DVD. All of the team member have experience using video production software. One team member runs a wedding videography business. Another recently converted his own family's home movies to DVD. And another student ran the sound system at his church for several years.
- In the **Transportation, Distribution, and Logistics** career area, a student team has chosen to start a bicycle courier service operating in the downtown business district. All of the students on the team are members of the local cycling club and are eager to mix their passion for cycling with a money-making business. Two of the students had newspaper routes as youngsters. One worked in advertising sales at a local radio station, and another worked as a clerk in the county courthouse for the Justice of the Peace. They plan to call their business, *Pedal Power*.

This module includes several small activities which culminate in the creation of a business plan for a new business of the team's choosingIn this first activity, students will form their teams, select a new business, answer a probing set of questions to get things started, and try drafting the business mission and vision statements. (They might even be willing to try to write the executive summary, although, as stated in the SBA tutorial, this is normally the last thing written.) This activity will address the first two items in the business plan video—the executive summary and the company overview..

Encourage students to go ahead and write something down to reflect the idea they have today for their new business, knowing they can (and probably will) revise it later. Also reassure students that there will likely be many unanswered questions in their predictions about their business. That's partially explained by the artificial nature of the activity, planning for a *fictitious* new business. If this were a real business plan, those holes would be filled with real information. So at this point they can feel free to make up realistic answers and change them as they proceed.

Objectives

Students will:

1. Select an idea for a new business, and draft an executive summary.
2. Complete the Small Business Readiness Assessment.

Materials

- Folder (for collecting the results of the next several activities)
- Handout—Small Business Plan
- Handout—Questions to Answer Before Drafting a Business Plan
- Computer with Internet enabled and projector for slides

Activity Guidelines

1. Identify student pairs or teams of three or four who share a common interest that will provide a focus for a new business plan. (See examples given at the start of this activity.)

2. Each team should identify a new business idea that appeals to their skills and interests. If students need some help, they can consult the broad (but not exhaustive) list in the handout, *Small Business Ideas.*

3. Show to the class the video ***How to Write a Business Plan*** for a high-level overview. The goal of the next several activities will be to complete the business plan for their new business idea by following the six-part outline given in this video.

4. Using the chosen new business idea, each team should complete the handout, *Questions To Answer Before Starting a New Business*. The answers to these questions will form the basis for the draft of their first business plan. Most of the answers will be "educated guesses," subject to change, but will help solidify a plan for the company vision and convey to students the type of thinking necessary to plan a new business.

5. Optional: Complete the Small Business Readiness Assessment available at the sba.gov website:
https://eweb1.sba.gov/cams/training/business_primer/assessment.htm

This assessment tool reinforces the *Questions* handout and also suggests the personality strengths required for jumping into a new small business venture.

6. Show to the class Slides 12-15 of the online SBA tutorial, *How To Write a Business Plan:*
https://www.sba.gov/tools/sba-learning-center/training/how-write-business-plan

Use the "forward button"  to advance to the desired slide, and "X" to close the presentation. This tutorial will be used several times in the next activities.

7. The students of each team should

a. Agree on a name for the new business.

b. Draft a short paragraph that describes what the new business will do, who it will serve, and how it will make money.

c. Identify where the company will be located, who (and approximately how many) will work in the company, and the key people who will own and manage the company. These facts will play a large role in the organization of the company, to be addressed in a later activity.

d. If the team has sufficient enthusiasm, they should draft an executive summary using the above information knowing that it will likely change.

e. Start a file folder to hold the developments for the new business plan, including these first pages of work.

Group Reflection Questions

Give each group an opportunity to briefly (5 minutes) present their business idea and executive summary to the class. Some may even have selected a name for their new business. Engage students in a discussion centered around the following questions:

- Which of the proposed businesses is most likely to succeed? Why?
- On which of the businesses would you like to collaborate as a class? (If the instructor plans to engage the class in a capstone business development activity, the class will need to identify at least one favorite new business idea coming from this activity that will require the combined efforts of the whole class rather than a small team).

Handout—Small Business Ideas

Air Duct Cleaning
Antique Furniture Sales
Appliance Repair
Aquarium Maintenance
Art and Printing Services
Automobile Detailing
Bakery
Basement Remodeling
Beauty Consultant
Bike Store
Blog Designing
Bookkeeping
Business Consultant
Candle Making
Candy Making
Car Wash Service
Carpenter
Catering Services
Childproofing Expert
Cleaning Services
Cloth Diaper Service
Clothing Design
Composting
Computer Repair/Maintenance
Computer Training
Construction Cleanup
Courier Service
Customer Service Professional
Data Entry Service
Daycare
Delivery Services
Desktop Publishing
Direct Mail Marketing Service
Disaster Planning/Prevention
Dog Training
Dog Waste Remover
Doula (labor coach)
eBay Seller
Energy Conservation Consultant
Event Planning/Consulting
Fitness Center
Florist
Freelance Writer
Furniture Moving
Gardening
Genealogist
Gift Wrapping Service
Grant Writing
Green Consultant
Gutter Cleaning
Hair Salon
Handmade Crafter
Handyman
Hauling Services
Holiday Decorator
Home Decorator
Home Renovations
Home Theater Designing
Home Weatherization
Hot Lunch Delivery
House Painting
Ice Cream Shop Business
Identity Theft Protection
Image Consultant
Ink Cartridge Refilling
Interior Designing
Internet Researching
IT Security Consulting
Jewelry Making
Laundry Service
Lawn & Garden Irrigation
Lawn Care Services
Life Coach
Locksmith
Marketing Copywriter
Martial Arts Training
Massage Therapist
Medical Transcriptionist
Mobile Apps Development
Mobile Phone Repair
Motivational Speaking
Nutritionist
Online Mortgage Brokers
Organic Foods
Organic Hair Care Products
Organic Lawn Care Provider
Party Planning
Patient Advocacy
Personal Chef
Personal Concierge
Personal Training
Pest Control Professional
Pet Couture Designer/Selling
Pet Farewell Services
Pet Grooming
Pet Sitting Service
Photo Restoration Service
Photography
Pizza Parlor
Pool Cleaning and Maintenance
Private Tutor
Professional Organizing
Project Management
Proofreading
Public Relations Agency
Residential Cleaning
Resume Writing
Sales Consultant
Scooter Sales and Repair
Scrapbooking
Senior Care Provider
Senior Transportation Services
SEO Consultant
Sewing and Alteration Services
Snow and Ice Removal Service
Soap Making
Social Media Consultant
Speech Writing
Tax Accountant
Translation Service Provider
Tree Farming
Used Books
Used Car Sales
Video Production/Dubbing
Virtual Assistant
Virtual Call Center
Voice-Over Professional
Website Designer
Wedding Consultant/Planning
Yoga Instructor

Handout—Questions to Answer Before Drafting a Business Plan

Synthesized from sba.gov and others

Answer these crucial questions before starting a new business:

1. How would I describe the business...in ne paragraph (your elevator speech)?
2. What products or services will my business provide?
3. Who is my competition? How will my business/product/service be different/better?
4. Who and about how many will be my customers?
5. What will it take to attract new customers and promote the business?
6. Where will/should my business be located?
7. How many employees and managers will my business need?
8. What types of supplies and suppliers do I need?
9. How long will it take for my products or services to be available?
10. What will be the legal structure of my business initially? In 3 years?
11. What will be my approximate operating costs in Year 1, Year 2, Year 3?
12. What other expenses will my business have (taxes, insurance, advertising, rent, etc.)?
13. What is my potential profit per year for Year 1, Year 2, and Year 3?
14. How will profits be handled? How will losses be covered?
15. How can the business grow in the future?
16. What advice will the new business need and who can provide it?
17. How much money will the business need to get started, until making a profit?
18. From where/whom will the startup funds come?

ACTIVITY: BUSINESS PLAN (PART 2)—MARKETING RESEARCH

Instructor Preparation

In this activity, each team will continue work on the business plan, agreeing on a preliminary description of the product or service to be provided (the next activity will address this in more detail), and describing the market for the product or service, including describing likely customers. The work here should also demonstrate an awareness of the competition and any obvious legal requirements that will impact the business planning and operation. As stated in the video ("How to Write a Business Plan," http://www.youtube.com/watch?v=SMr_uLZV-eM), this part of the business plan shows that the new business owners have done their homework.

Objectives

Students will:

1. Briefly describe the product or service for the new business.
2. List the features of the market (customers) for the new business's product or service.
3. Identify other existing or planned businesses that will compete with the new business.
4. Identify any obvious legal requirements that will limit or control the new business's activities.

Materials

- Paper or computer with word processing software.
- Folder (continued from previous activities)
- Computer with Internet enabled and projector for slides

Activity Guidelines

Show Slides 16 and 17 of the SBA Business Plan tutorial:
https://www.sba.gov/tools/sba-learning-center/training/how-write-business-plan

Then ask each team to:

1. Draft a brief description of the product or service of the new business to enable the discussion to move forward. This is a very preliminary description—subject to change—to allow students to better describe the customer for the business. Don't spend a lot of time here on the product details.

2. Identify the characteristics that define the typical customers for the business's products or services. Approximately how many customers can be expected over a given time period (e.g., per year)?

3. How can these customers effectively be reached? (e.g., website, email, mail, radio, television, or billboards) Describe the general marketing strategies here, not details. (Details will come later.)

4. Are there any existing (or planned) businesses that will be competing for the attention of these potential customers?

5. Are there legal requirements under which this new business must operate? Make a general list of those that are known at this point (specific details are not necessary for this activity).

6. Add the notes from this activity to the new business information folder.

Group Reflection Questions

Discuss the following questions with the class. The realistic answers to these questions will determine how profitable the company can expect to be in the coming months and years.

- What is the approximate size of your customer base?
- How broad (geographically) is your customer base?
- Will you be able to reach/service customers who are in another city? Out of state? Out of the country?
- Will these customers be motivated to return for more business, or is it likely a once-in-a-lifetime encounter? The realistic answers to these questions will determine how profitable the company can expect to be in the coming months and years.
- After comparing marketing ideas around the room, do you have ideas for updating your marketing plan?

ACTIVITY: BUSINESS PLAN (PART 3)—PRODUCTS OR SERVICES

Instructor Preparation

In this activity, students will describe in greater detail the products or services to be provided by the new business which will have a strong bearing on the proposed costs to be addressed in the next activity. Perhaps a quick prototype or model would be helpful to facilitate the discussion. (Don't let the creation of a prototype steal an inordinate amount of time, however.)

As students develop the product or service description, they will naturally need to consider the customers' needs. This is a good place to describe the customers who must want the product or service for the business to be successful. And since they must want it more than the competition, the plan should demonstrate an awareness of the competition. Who are the competitors? How many are there? How are they positioned in the market? How much does their product cost? Student groups need to think about how the customer will know how their product compares with the competition's product or service. To answer that, some documentation is necessary, such as a brochure, a webpage, or other advertisements.

Objectives

Students will:

1. Write a detailed description of the product or service on which the new business is based.
2. Identify the customers who will have an interest in the new product or service.
3. Compare the new business's product or service with that of the competition.
4. Create a brochure or webpage that gives relevant details about the new business's product or service.

Materials

- Computer with word processing, presentation, web publishing, and/or video editing software. (Activity can be completed on paper, if computer is unavailable.)
- Folder (continued from previous activities)

Activity Guidelines

Ask student teams to:

1. Write a detailed description (or perhaps develop a prototype or model) of the product or service to be sold by the new business. Include drawings, photographs, or even video. For service-oriented businesses, develop a simple brochure or flyer that describes the service being offered.

2. Identify the characteristics that define the typical customers for the business's product or service. Describe how customers will benefit from the product or service being offered.

3. Prepare to address the following questions in the marketing piece. How does the product or service compare to the competition? Is it “as good as” or “better”? More or less costly? More or less accessible? Of better quality? Compare as many attributes as is reasonable, as the answers to these questions will inform the marketing strategy.

4. What is it that this business offers? Develop a brochure, webpage, magazine advertisement, or video that communicates to the prospective customer exactly what it is that this business has to offer. Does the business product or service exist now, or must it be designed and perfected before being sold? If the latter, work with the team to decide what sort of timeframe is required. (Realize that any investors or financing agents will want to know this!)

Group Reflection Questions

Allow the class to display their work, then ask them to discuss the following:

- Comparing your team’s work with that of other teams, do any of their product or service ideas make you want to return and revise your proposed description?

ACTIVITY: BUSINESS PLAN (PART 4)—MARKETING AND SALES

Instructor Preparation

Equipped with a much clearer understanding of the product or service, students are now ready to think about how the new business will successfully deliver the product or service to the customer. The first step is settling on a pricing strategy and packaging method for the product or service. (Customers need to view the product as being a good value for the amount paid.) Next, the customer must be made aware of the product or service and realize that they need or want the product or service. Finally, the marketing and sales plan should how the product or service will be made available to the customer (e.g., via a traditional brick-and-mortar store, door-to-door sales, mail-order catalog, or online storefront).

Objectives

Students will:

1. Develop a strategy for promoting the new business's product or service.
2. Develop a strategy for offering and delivering the new business's product or service to the customer.
3. Develop a competitive pricing strategy for the new business's product or service.

Materials

- Computer with word processing software and Internet (optional)
- Folder (continued from previous activities)
- Optional: Projector for slides

Activity Guidelines

In this activity students will consider the four P's of marketing for the new business:

a. ***Pricing:*** How will the product or service be priced, including any discount programs?

b. ***Packaging:*** How will the product or service be sold or bundled so that customers will want it?

c. ***Promotion:*** How will the product or service be advertised or promoted?

d. ***Place:*** How will the product or service be made available or delivered to the customer?

Ask student teams to do the following:

1. Develop a strategy for ***pricing*** the new business's product or service. Consider and compare several pricing methods (e.g., bulk discounts, early-bird specials, and so forth) and even innovative schemes that might start a clever marketing trend. Decide which one(s) are applicable to your product or service,

which are efficient and manageable, and which would yield a profit. Tailor price differences to attract customer business, but avoid hard-to-defend disparities among models, brands, styles, etc.

2. Closely related to pricing, develop a strategy for ***packaging*** the new business's product or service. Consider both standard, well-understood methods (e.g., "by the dozen") as well as other clever bundling ideas (e.g., "buy eleven, get the twelfth one free"). Will this product be sold in bulk (e.g., a pound of customer selected and weighed tomatoes in a grocery store) or packaged (e.g., a shrink-wrapped carton of four tomatoes)? Will this service be sold as a one-time job or an annual contract?

3. Develop a strategy for ***promoting*** the new business's product or service. Compare several marketing methods, decide which one(s) are applicable to this product or service, which are affordable, and which would likely be effective. Ignore short-lived, clever promotional gimmicks). Instead, concentrate on just the big picture for the sake of potential investors. It might be helpful to construct a timeline indicating the implementation of different promotion methods now and in the future.

4. Develop a strategy for ***placing*** (delivering*)* the new business's product or service. Consider and compare several delivery and sales methods, deciding which one(s) are applicable to this product or service, which are affordable, and which would be most efficient. Consider all the options: a traditional brick-and-mortar store, door-to-door sales, mail-order catalog, or online storefront. It may be helpful to consider a timeline, perhaps starting with one method, and growing and expanding to include more methods at a later date.

5. Optional: View Slides 20- 22 of the SBA Business Plan tutorial: https://www.sba.gov/tools/sba-learning-center/training/how-write-business-plan

6. Add the notes from this activity to the new business information folder.

7. Optional: Visit the NCCCS Small Business Center Network's instructional page on conducting market research, https://www.ncsbc.net/DocumentMaster.aspx?doc=1011.

Group Reflection Questions

Allow the teams to present their completed "four P's"plan, then ask them to discuss the following:

- Compare your team's plan with that of other teams. Which of their pricing, packaging, promotion and placement strategies would also work for your product or service?

Note: This activity is the one most students immediately associate with the business planning, as it deals with all the tangibles: the product, the advertisements, the customer, and the profits. But students will gradually grow to appreciate the necessity of the other details, too, especially when they consider the final activity in this series, where the need for financial backing demands meticulous financial planning.

ACTIVITY: BUSINESS PLAN (PART 5)—FINANCIAL PROJECTIONS

Instructor Preparation

In this activity, students will consider the various accounting documents that must be included in a solid business plan. These will be explored in a superficial way since an in-depth treatment is beyond the scope of this short activity. The SBA tutorial covers these in slides 23-30 with sufficient detail for our purposes.

A critical decision impacting the financial projection of the company is the organizational and management structure for the new business. The structure answers the questions:

- Who's in charge?
- How will the business make money?
- Is the business organized as a sole proprietorship, limited partnership, or corporation?

Students will likely need some introduction to these economic terms, and that can be found at the sba.gov website and the tutorials available there.

The business plan must ultimately convince investors how the new business will meet its financial obligations from month to month and maintain a healthy balance sheet and cash flow. The SBA website has some powerful templates for use by real businesses to achieve this goal, but use of those tools is beyond the scope of this activity. For this activity, students should appreciate that the new business will have to follow accepted accounting standards and documentation.

Objectives

Students will:

1. Learn the major features of sole proprietorships, partnerships, and corporations, and propose the best structure for their new business.
2. Determine the management personnel for the new business.
3. Learn business vocabulary: asset, liability, equity.
4. Develop a general cash flow model for the new business.

Materials

- Templates available at the SBA website or handouts included here
- Folder (continued from previous activities)
- Optional: Computer with Internet enabled and projector for slides

Activity Guidelines

Show students Slides 23-30 from the SBA tutorial, then ask them to complete the following activities.

1. Read the six articles on the SBA website that describe the various organizational structures available to the new business, see http://www.sba.gov/category/navigation-structure/starting-managing-business/starting-business/choose-your-business-stru . Create a table in a new document that summarizes and compares the advantages and disadvantages of each structure. (Hint: copy/paste the items presented in each of the articles on the SBA website.

2. Select one of the six organizational types for your team's business and defend how the features of this choice will align with the new business.

3. Decide who will manage the business and how it will be managed. Include a short biographical sketch of relevant facts for the major players.

4. Optional: View Slides 23-30 of the SBA Business Plan tutorial: https://www.sba.gov/tools/sba-learning-center/training/how-write-business-plan

5. Consider the spreadsheet templates provided at the SBA website (and shown in the handouts below). Together, they effectively describe the financial picture of the business: its existing assets, liabilities, and equity, as well as its typical cash flow.

   a. The assets should include current assets (cash, accounts receivable, inventory, notes receivable), fixed assets (land, buildings, machinery and equipment, furniture, and improvements to leased property), intangibles (research and development rights, patents and copyrights, market research information, goodwill, and existing organization), and other assets (e.g., miscellaneous accounts, deposits, and notes).

   b. The liabilities—financial obligations such as loans, accounts payable, mortgages, deferred revenues and accrued expenses, both current (payable in less than 12 months) and non-current (more than 12 months), and possibly contingent liabilities (e.g., warranties, lawsuits)

   c. The equity or net worth is the difference between the assets and the liabilities. This will represent the owner's share in the financing of all the assets.

   d. An Income Statement shows the profits (e.g., earnings) and losses (e.g., expenses) experienced over a period of time

6. A new business must be registered with the state, and probably with the city and county taxing entities. A tax identification number is needed if selling a product or service. For the purposes of this activity, you will not actually do those things, but realize that those activities would be required for a real business start up.

7. Add the accumulated notes and artwork from this activity to the new business information folder.

As noted earlier, it is beyond the scope of this brief activity to fully develop an understanding of the financial picture necessary to plan a new business. However, the SBA tutorials and the handouts provided can convey the breadth and depth of content that is involved.

Handout

Template: Income Statement

[Your Company Name]
Income Statement
For the Year Ended [Mmmm Dd, 200X]

Revenue:		
Gross Sales		$0.00
Less: Sales Returns and Allowances		$0.00
Net Sales		$0.00
Cost of Goods Sold:		
Beginning Inventory	$0.00	
Add: Purchases	$0.00	
Freight-in	$0.00	
Direct Labor	$0.00	
Indirect Expenses	$0.00	
	$0.00	
Less: Ending Inventory	$0.00	
Cost of Goods Sold		$0.00
Gross Profit (Loss)		$0.00
Expenses:		
Advertising	$0.00	
Amortization	$0.00	
Bad Debts	$0.00	
Bank Charges	$0.00	
Charitable Contributions	$0.00	
Commissions	$0.00	
Contract Labor	$0.00	
Credit Card Fees	$0.00	
Delivery Expenses	$0.00	
Depreciation	$0.00	
Dues and Subscriptions	$0.00	
Insurance	$0.00	
Interest	$0.00	
Maintenance	$0.00	
Miscellaneous	$0.00	
Office Expenses	$0.00	
Operating Supplies	$0.00	
Payroll Taxes	$0.00	
Permits and Licenses	$0.00	
Postage	$0.00	
Professional Fees	$0.00	
Property Taxes	$0.00	
Rent	$0.00	
Repairs	$0.00	
Telephone	$0.00	
Travel	$0.00	
Utilities	$0.00	
Vehicle Expenses	$0.00	
Wages	$0.00	
Total Expenses		$0.00
Net Operating Income		$0.00
Other Income:		
Gain (Loss) on Sale of Assets	$0.00	
Interest Income	$0.00	
Total Other Income		$0.00
Net Income (Loss)		$0.00

Template: Balance Sheet

[Your Business Name]
Balance Sheet
[Mmmm Dd, 200X]

Assets

Current Assets:			
Cash		$0	
Accounts Receivable	$0		
Less: Reserve for Bad Debts	0	0	
Merchandise Inventory		0	
Prepaid Expenses		0	
Notes Receivable		0	
Total Current Assets			$0
Fixed Assets:			
Vehicles	0		
Less: Accumulated Depreciation	0	0	
Furniture and Fixtures	0		
Less: Accumulated Depreciation	0	0	
Equipment	0		
Less: Accumulated Depreciation	0	0	
Buildings	0		
Less: Accumulated Depreciation	0	0	
Land		0	
Total Fixed Assets			0
Other Assets:			
Goodwill		0	
Total Other Assets			0
Total Assets			$0

Liabilities and Capital

Current Liabilities:			
Accounts Payable		$0	
Sales Taxes Payable		0	
Payroll Taxes Payable		0	
Accrued Wages Payable		0	
Unearned Revenues		0	
Short-Term Notes Payable		0	
Short-Term Bank Loan Payable		0	
Total Current Liabilities			$0
Long-Term Liabilities:			
Long-Term Notes Payable		0	
Mortgage Payable		0	
Total Long-Term Liabilities			0
Total Liabilities			0
Capital:			
Owner's Equity		0	
Net Profit		0	
Total Capital			0
Total Liabilities and Capital			$0

Template: Cash Flow

Cash Flow Budget Worksheet

	[Month]	*[Month]*	*[Month]*	*[Month]*	*[Month]*	*[Month]*	*Total*
Beginning Cash Balance		$0	$0	$0	$0	$0	
Cash Inflows (Income):							
Accts. Rec. Collections							0
Loan Proceeds							0
Sales & Receipts							0
Other:							
							0
							0
Total Cash Inflows	$0	$0	$0	$0	$0	$0	$0
Available Cash Balance	$0	$0	$0	$0	$0	$0	
Cash Outflows (Expenses):							
Advertising							0
Bank Service Charges							0
Credit Card Fees							0
Delivery							0
Health Insurance							0
Insurance							0
Interest							0
Inventory Purchases							0
Miscellaneous							0
Office							0
Payroll							0
Payroll Taxes							0
Professional Fees							0
Rent or Lease							0
Subscriptions & Dues							0
Supplies							0
Taxes & Licenses							0
Utilities & Telephone							0
Other:							0
							0
Subtotal	$0	$0	$0	$0	$0	$0	$0
Other Cash Out Flows:							
Capital Purchases							0
Loan Principal							0
Owner's Draw							0
Other:							
							0
Subtotal	$0	$0	$0	$0	$0	$0	$0
Total Cash Outflows	$0	$0	$0	$0	$0	$0	$0
Ending Cash Balance	$0	$0	$0	$0	$0	$0	

ACTIVITY: BUSINESS PLAN (WRAP-UP)

Instructor Preparation

Now it's time to collect all the pieces, modify the Executive Summary if necessary (since it's quite likely that the big picture has changed), and assemble the whole package. There may be some additional details that can be placed in the Appendix, as suggested by the optional tutorial slide. Also note that there are several sample business plans available at the SBA website (see the link in the tutorial).

Objectives

Students will:

1. Assemble the Business Plan for the new business from the several pieces developed earlier.

Materials

- Folder containing previous activities' completed work
- Optional: Computer with Internet enabled and projector for slides

Activity Guidelines

Before asking student teams to assemble all of the pieces of the Business Plan developed over the preceding several activities, ask them to complete the following tasks.

1. Revise the draft Executive Summary to incorporate any changes that have been made during preceding activities.

2. Include any attachments and details that will assist the reader in understanding the business plan, such as brochures, list of equipment and other property of the business, photos and graphics showing the business location, important business agreements and contracts, and so forth.

3. Optional: View Slides 31- 32 of the SBA Business Plan tutorial: https://www.sba.gov/tools/sba-learning-center/training/how-write-business-plan

4. Assemble the parts of the business plan that have been accumulated in the team's folder. Develop a Table of Contents page to be inserted at the front.

5. Using your Executive Summary as a guide, present the new business idea to the class in a 3-minute presentation.

Group Reflection Questions

Ask students to present their business plan to the class. As they do so, have the class consider the following questions:

- If you were the bank's business loan officer, what additional questions would you need answered before feeling confident enough to invest in this new business?

ACTIVITY: NETWORKING

Instructor Preparation

A critical component of any business is the array of connections to key personnel with influence. Mapping and managing the relations and connections in a business environment allows business owners to better understand and capitalize on the business landscape. For example, through relationships with others ("contacts"), an owner may be able to reach those who know prospective decision makers. As a business grows, the network of relations can grow as well. A map of the key influencers will provide students with a graphic illustrating the connections between members of their network.

In this activity, students will map out the relations for a more familiar group—their own network of family and friends. Then, choosing one or more topic areas, they will use the map to propose different ways to find answers to problems.

Objectives

Students will:

1. Create a relationship map for one's own network of family, friends, acquaintances, and co-workers.
2. Apply the network map to solving a typical problem.

Materials

- Handout—My Network
- Optional: Computer with Internet enabled

Activity Guidelines

1. Distribute the handout, *My Network,* to students as a starting point for mapping their own network of friends, family, coworkers, fellow students, and others.

2. Students should make a list of family members, friends, and acquaintances (including co-workers and fellow students), and place them on their new drawings patterned after the handout, *My Network*.

3. Ask students to consider how the members of the network might know each other, too. If they do, have students show their connections, possibly with a different color.

4. Students should next choose one of the following scenarios (or others provided by the instructor) and highlight the members of the network that would be involved. Imagine that one of your family members is the focus of the effort.

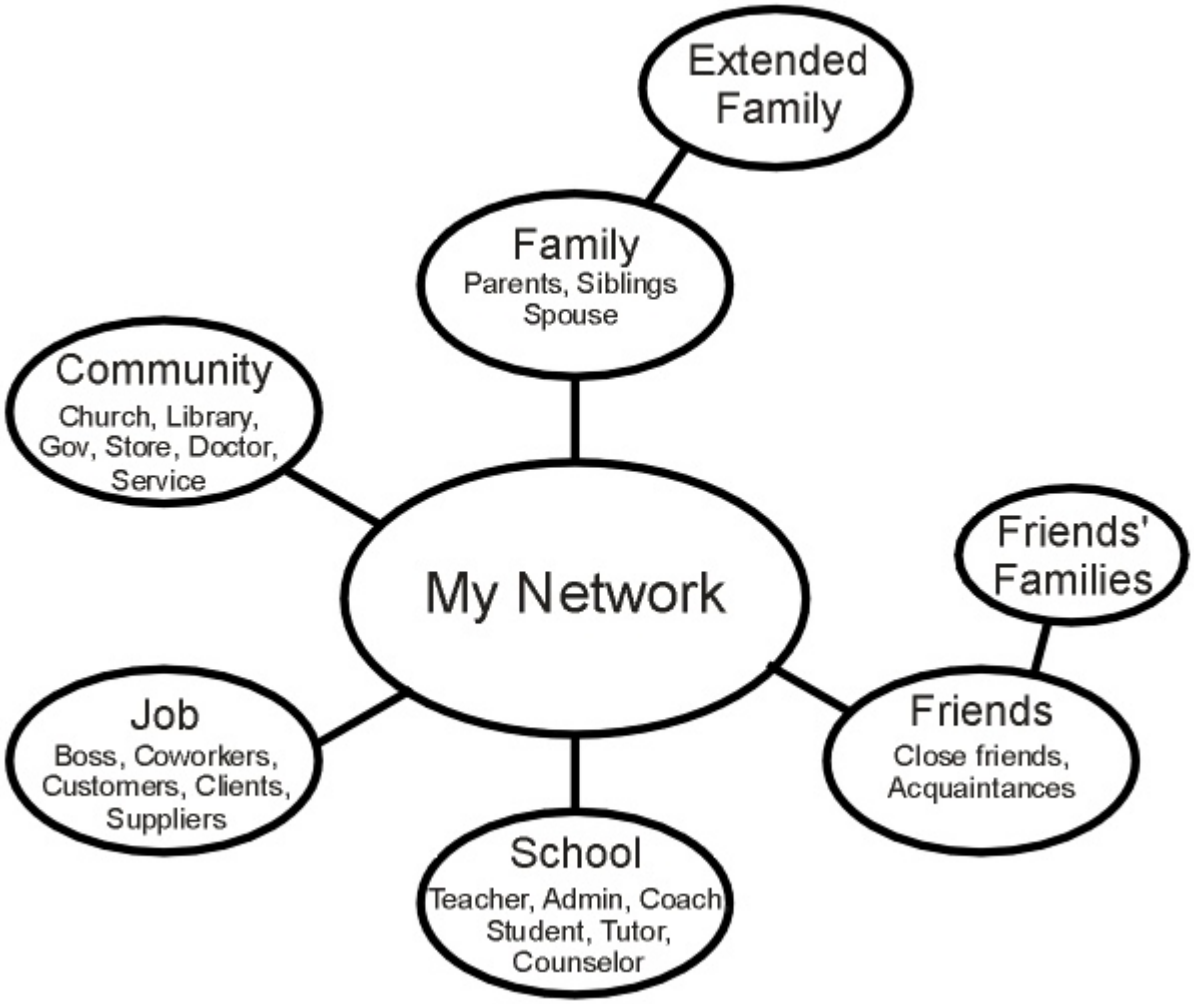
- Joining a little league baseball team
- Fighting traffic
- Adding on a room to your home
- A wedding in your family
- Planning a big vacation (e.g., a cruise or overseas trip)
- Buying a new car
- Drafting a last will and testament
- Having a major surgery (e.g., appendicitis)
- Recovering from major storm damage
- Accepting teaching role at church or club
- Graduating from college
- Winning a big prize in the lottery
- Being awarded a full university scholarship

Facilitate a discussion among students as they share their network maps with others in the class, especially with others who chose the same scenario.

Group Reflection Questions

- What relationships seem most important for the chosen scenario?
- What relationships might turn out to be surprisingly helpful?
- How many distant relationships actually are likely to be intertwined? How could you facilitate such intertwining and use that to your advantage?
- How many students in the class network electronically, via Facebook or LinkedIn? How might this lead to business development and growth?

Handout—My Network



ACTIVITY: AN ESSENTIAL GUIDE TO STARTING YOUR OWN BUSINESS

Instructor Preparation

A free online course is available from the SBA.gov website:
https://www.sba.gov/media/training/YoungEntrepreneurs/player.html

Students will need to register and then devote almost an hour to completing the self-paced course.

Objectives

Students will:

1. Complete the online course: ***An Essential Guide to Starting Your Own Business***

Materials

- Computer with Internet enabled.

Activity Guidelines

If time does not permit students to complete the activities in this module, this self-paced course can be used outside of class instead. Students should:

1. Sign up and complete the online course.

2. Download and print the certificate of completion provided at the end of the course.

ACTIVITY: ADVERTISING

Instructor Preparation

Now that students have conceptualized their new business, how can they attract customers? In this quick activity, students must prepare for a 3-minute interview with a local television reporter. After the students have composed their thoughts, the reporter will inform them that they really only have 30 seconds. In effect, they will have to create an "elevator speech."

After the recordings are completed, show them to the whole class. You can have everyone vote on the best spot and give an award to the winner.

Objectives

Students will:

1. Create an informative explanation and sales pitch (30 seconds) for their new business venture.

Materials

- Optional (a video camera on tripod with handheld microphone, for taping a news-reporter interview.

Activity Guidelines

1. Assign student teams the task of preparing for a 3-minute interview by a television news crew who will be arriving in 30 minutes.
2. After about 30 minutes of work by the teams, spring the news on everyone that you just got a call from the news team that there's been a change of plan: each interview spot must be trimmed down to 30 seconds! Each team should respond to a prompt like, "Tell our viewers about your new business."
3. If possible, invite a pair of students from the school's audio-visual department to record each team's 30-second interviews. (Another option would be for students to use their cell phone video cameras.)

Group Reflection Questions

Engage the students in a discussion of how difficult—yet productive—it was to boil down the company description and sales pitch to a 30-second elevator speech. Were all the teams able to do it? Was everyone able to describe their business and their product (or service) and extend an invitation to the public during the allotted 30 seconds?

Assessment Tools/Strategies

This section includes specific strategies and instruments for assessing students' knowledge, skills, and attitudes in regard to entrepreneurship.

RUBRICS

Rubrics are valuable assessment tools. Students should be provided with the rubric by which they will be assessed before an activity begins so they will understand the performance expectations. When time permits, students can contribute to the rubrics by brainstorming with the instructor about what a quality behavior or product looks like. For example, before assigning a team project to research a topic and prepare a group presentation, ask students to describe how the ideal team would handle the assignment, how they would assign roles, divide the work, create and make the presentation. Prompt students with specific components. Then have them describe a poor performance. These will be the descriptions of the characteristics for the highest and lowest ends of the Likert scale for each performance criteria. Instructors should add any required attributes to the rubric if the students do not come up with them on their own. Several entrepreneurship evaluation rubrics have been provided as examples.

- The first rubric for instructor assessment lists desired observable attributes of entrepreneurship and includes blanks where the instructor can adapt the rubric for a specific activity, project or career field by inserting additional criteria. These first rubrics were intended to be used by the instructor or other observer assessing each student.
- The second entrepreneurship rubric is a self-rating rubric intended for use by the students themselves. The students indicate the degree to which they think they are performing each attribute. They can periodically return to the rubric to reassess and determine whether they are improving those skills.

➢ The final rubric is the most complex. The student completes a rubric by providing examples of satisfactory or exemplary performance of the tasks/behaviors listed. Then the student meets with the instructor or peer observer and compares his/her reflections with their instructor's or peers' observations and formulates an action plan for improving attitudes, behaviors or skills.

This type of rubric most resembles the type of assessment an employee might receive on the job. It is also the most time consuming. Ideally, this rubric would be used at least three times during a course:

- At the beginning of the course, to get a baseline and to give students suggestions for specific actions they might take to improve their performance,
- At the midpoint of the course, to check progress and refine the recommendations for improvement, and
- At the end of the course, to assess the progress made over the duration of the course. Additional suggestions can be made for students' continued growth beyond the end of the course.

RUBRICS FOR INSTRUCTOR ASSESSMENT

Outcomes from Entrepreneurship: In completing this module, students are expected to appreciate the process, requirements, and value of starting a new business. To that end, the activities walk them through the typical process of developing a business plan—the first step in starting a new business. Additionally, the importance and power of networking is explored, as well as the ability to distill an informative business description down to a very brief presentation.

Relevant to a new business idea selected by the student, the student is able to:

Select a new business idea as part of a team effort.	1 2 3 4 5
Complete an executive summary for the new business, as part of a business plan.	1 2 3 4 5
Complete a description of the product or service of the new business.	1 2 3 4 5
Describe the market features (i.e., customers) for the product or service of the business.	1 2 3 4 5
Describe the current market competition for the product or service of the business.	1 2 3 4 5
Identify the prominent legal requirements for the product or service of the business.	1 2 3 4 5
Create a brochure or web page to provide an informative advertisement for the product or service of the business.	1 2 3 4 5
Develop a strategy for promoting the product or service of the business.	1 2 3 4 5
Develop a strategy for delivering to the customer the product or service of the business.	1 2 3 4 5
Develop a pricing strategy for the product or service of the business.	1 2 3 4 5
Identify and defend the choice of structure (i.e., sole proprietorship, partnership, or corporation) for the new business.	1 2 3 4 5
Describe the general cash flow expected for the new business.	1 2 3 4 5
Assemble a complete business plan for the new business.	1 2 3 4 5
Deliver an informative explanation for the new business that lasts 30 seconds or less.	1 2 3 4 5
Create a relationship map that illustrates the network of family, friends, and acquaintances.	1 2 3 4 5

5	Always	Excellent
4	Most of the Time	Good
3	Sometimes	Adequate
2	Occasionally	Fair
1	Never	Poor or None

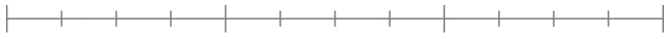
RUBRICS FOR SELF-ASSESSING ENTREPRENEURSHIP SKILLS

Use a copy of this instrument throughout the course to self monitor your entrepreneurship skills. Note: It is fairly common to overrate your skills during the initial assessment. You may rate yourself a bit lower as you get feedback from others and discover the complexities of each attribute. By the end of the course you should see improvements in your ratings if you focus on improving the quality of your work and depth of understanding in addition to getting the assigned work completed.

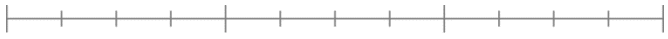
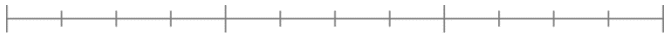
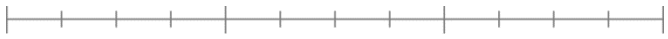
Objective: In the process of developing the idea for a new business, your understanding and confidence about the business will evolve and strengthen. This evolution will occur as a result of research and the help and advice of others.

Essential Attribute	**I**	**II**	**III**	**IV**
I am able to improve the focus of my new business idea, based on research.	Seldom	Sometimes	Usually	Consistently
I am willing to modify my ideas, based on the input of superiors (supervisors, instructors).	Seldom	Sometimes	Usually	Consistently
I am willing to modify my ideas, based on the input of colleagues (coworkers, fellow students).	Seldom	Occasionally	Often	Consistently
I am willing to share the workload of organizing and running a new business with others.	Seldom	Sometimes	Usually	Consistently
I am willing to share the profits and benefits of a new business with others.	Seldom	Sometimes	Usually	Consistently
	Seldom	Sometimes	Usually	Consistently

Objective: An entrepreneur must invest a great deal of their own time and resources, and take some risk with their own possessions, popularity, and so forth.

Essential Attribute	**I**	**II**	**III**	**IV**
I devote sufficient time to finish an assignment, even if it means sacrificing my own leisure time.	Seldom	Sometimes	Usually	Consistently
				
I contribute my resources (time, money, materials, etc.) to complete an assignment.	Seldom	Sometimes	Usually	Consistently
				
I offer my ideas during brainstorming sessions.	Seldom	Sometimes	Usually	Consistently
				
I describe and defend my new business idea when given an opportunity, such as an advertisement or interview.	Seldom	Sometimes	Usually	Consistently
				
	Seldom	Sometimes	Usually	Consistently
				

Objective: An entrepreneur must create a business plan, with all the required parts, to have a reasonable chance of obtaining the required support needed for a successful venture.

Essential Attribute	I	II	III	IV
I am not intimidated by the task of completing long or difficult assignments.	Seldom	Sometimes	Usually	Consistently
				
I chart or check-off my progress in completing long and difficult assignments.	Seldom	Sometimes	Usually	Consistently
				
I am willing to perform the research necessary to complete a difficult assignment.	Seldom	Sometimes	Usually	Consistently
				
I learn, research, compose, and assemble the parts of a plan for my new business.	Seldom	Sometimes	Usually	Consistently
				
	Seldom	Sometimes	Usually	Consistently
				

RUBRIC FOR ASSESSING ENTREPRENEURSHIP SKILLS

Outcome: An entrepreneur must be sensitive to the customer and the market, listening to and responding to feedback and critique.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve in this area.
Listen to your fellow students, and respond in a positive way.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Use the Internet to find an answer to a question.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
Make a change of my plans as a result of research finding or advice.	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:
	Example: Peer/instructor review: Do not agree — Strongly agree 1 2 3 4	Steps:

Peer comments and suggestions:
Instructor comments:

Outcome: A successful entrepreneur must be realistic in assessing situations, making wise decisions that reflect reality, not wishful thinking.

Performance Criteria		
Reflection Reflect on your actions during class or at a workplace and identify examples of when you:		**Personal Plan** Based on your examples and the feedback of your peers or instructor, describe the steps you might take to continue or improve in this area.
Make a realistic cost/sales prediction for your new business.	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:
Limit yourself or your business in the interest of achieving a higher goal, rather than immediate profit.	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:
Avoid decisions that incur excessive risk to the business or personnel.	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:
Consider the investor's position when making far-reaching decisions about the business (e.g., product addition or alteration).	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:
	Example: Peer/instructor review: Do not agree … Strongly agree 1 2 3 4	Steps:

Peer comments and suggestions:
Instructor comments:

Video and Weblinks

VIDEO

http://www.youtube.com/watch?v=SMr_uLZV-eM
Instructions on writing a business plan, from the U.S. Small Business Administration.

WEBLINKS

https://www.ncsbc.net/
The North Carolina Community College System Small Business Center Network offers a wide range of services and resources designed to encourage entrepreneurs to be involved in their local communities.

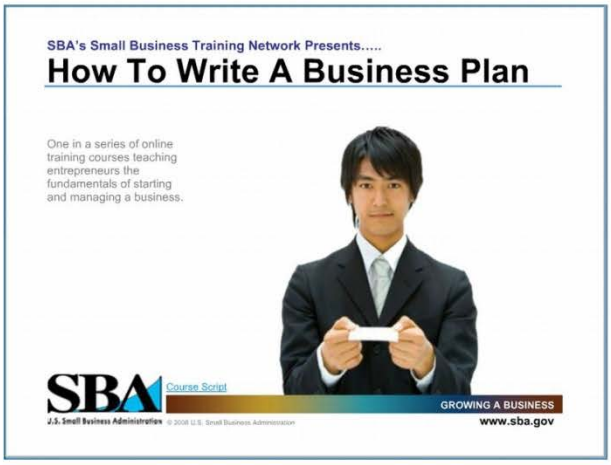
http://www.entre-ed.org/
Consortium for Entrepreneurship Education, a webpage for teachers, instructors, youth leaders, program developers and others who help students of all ages find their own entrepreneurial opportunities. Includes *National Content Standards for Entrepreneurship Education* and supporting summaries, presentations, examples, and other resources.

https://www.sba.gov/media/training/YoungEntrepreneurs/player.html
A free online course: *An Essential Guide to Starting Your Own Business* (approximately 45 minutes)

http://www.bplans.com/samples/sba.cfm
Hundreds of sample business plans.

Additional Resources

1. Screen captures from SBA.gov tutorial, *How To Write a Business Plan*



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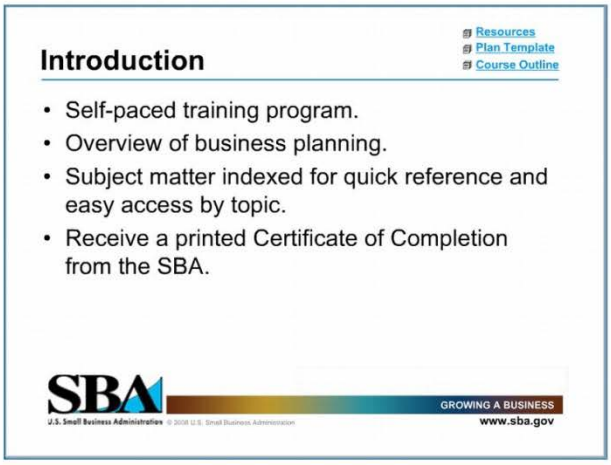

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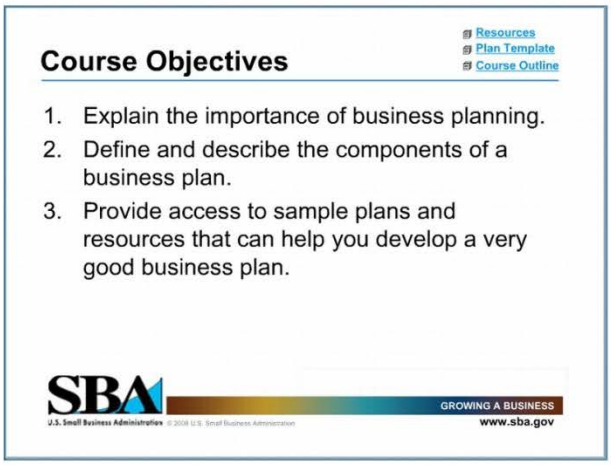

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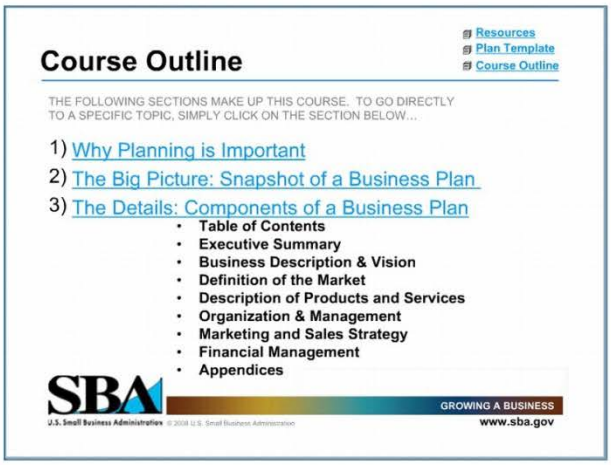

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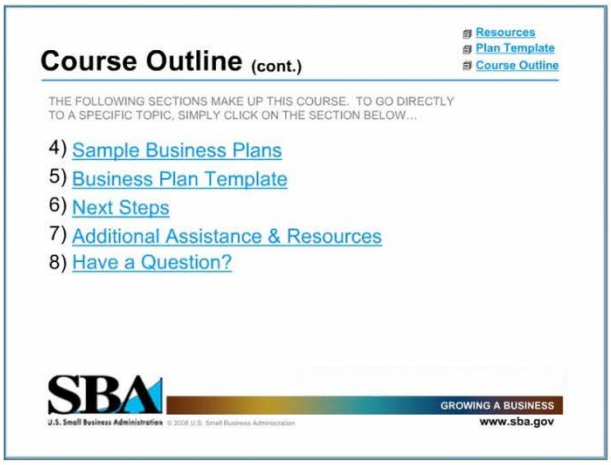

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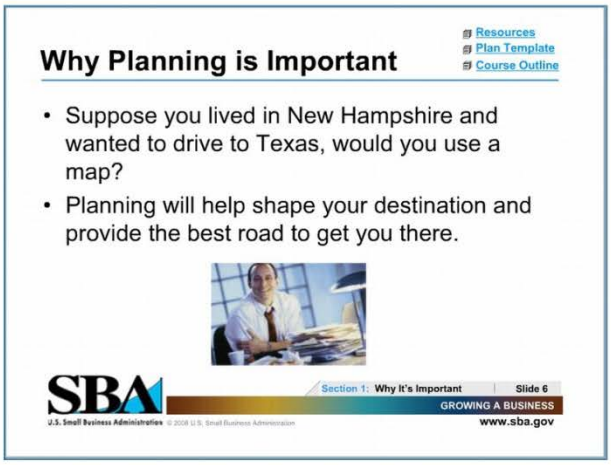

06

Why Planning is Important

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Course Outline

- Planning gives you a blueprint to follow.
- It is a communications tool for investors, suppliers, employees and others interested in your business.
- If you don't plan for the success of your business, you will likely fail.

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Why Planning is Important

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Before you begin writing your plan, consider four questions:

1. What service or product does your business provide and what needs does it fill?
2. Who are the potential customers for your product or service and why will they purchase it from you?
3. How will you reach your potential customers?
4. Where will you get the financial resources to start or run your business.

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The Big Picture

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- A good business plan is a compelling storyboard about your business.
- It explains
  - who you are,
  - why you're in business,
  - what you do, how you do it,
  - where you operate,
  - how you will generate profits,
  - who your customers are, and
  - why your business is important.

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09

Snapshot of a Business Plan

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Typical Business Plan Components

a) Table of Contents
b) Executive Summary
c) Business Description & Vision
d) Definition of the Market
e) Description of Products and Services
f) Organization & Management
g) Marketing and Sales Strategy
h) Financial Management
i) Appendices

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10

Table of Contents

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Course Outline

Components of the Business Plan

- Lists key sections of the business plan.
- Used to assist the reader in locating specific sections.
- Brings organization and structure to the plan.

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11

Executive Summary

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Components of the Business Plan

- Most important section of the plan.
- Should be written last.
- Provides an enthusiastic snapshot of your company, explaining who you are, what you do and why.
- Should be less than 2 pages.

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12

Business Description & Vision

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Components of the Business Plan

- Mission statement.
- Company vision (statement about company growth).
- Business goals and objectives.
- Brief history of the business.
- List of key company principals.

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13

Business Description & Vision

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Components of the Business Plan

The Mission Statement:

- Brief statement about who the company is and what it stands for.
- Example: Google's mission statement is: "*Organize the world's information and make it universally accessible and useful*."

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14

Business Description & Vision

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Components of the Business Plan

The Company Vision:

- Outlines what a company wants to be.
- Futuristic: memorable and engaging expression of hope and inspiration.

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Definition of the Market

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Components of the Business Plan

- Describe your business industry and outlook.
- Define specific customer needs that your business will satisfy.

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Definition of the Market

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Components of the Business Plan

- Identify targeted customers.
- Develop a customer profile.

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Description of Products

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Components of the Business Plan

- Identify and describe all products and services.
- Identify and explain product pricing.
- Describe how your products and services are competitive.
- Reference applicable graphics and brochures.

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18

Organization & Management

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Components of the Business Plan

- Description of how the company is organized.
- Legal form of ownership.
- Explanation of how things get done.
- Required licenses and permits.
- Bio description of key company managers.

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19

Marketing and Sales Strategy

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Components of the Business Plan

- Marketing is the process of creating customers.
- Research is the foundation of marketing.
  - Who are my customers and potential customers?
  - Where do they live?
  - Am I offering the kinds of goods or services they want at the best place, at the best time, and in the right amounts?
  - Are my prices consistent with what buyers view as the product's value?

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Marketing and Sales Strategy

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Components of the Business Plan

- Creating a marketing strategy.
  - Identify customer groups you can best serve.
  - Understand customer needs.
  - Always consider change.

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Marketing and Sales Strategy

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Components of the Business Plan

- A marketing strategy built with the ***marketing mix -- 4Ps***:
  - pricing
  - promotion
  - products
  - place

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Financial Management

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Components of the Business Plan

Key Financial Statements

- Balance Sheet
- Income Statement
- Cash Flow Statement

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Financial Management

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Components of the Business Plan

Balance Sheet

- Assets - Liabilities = Net Worth
- Measures business value
- Snapshot in time

Click Here

Balance Sheet Template

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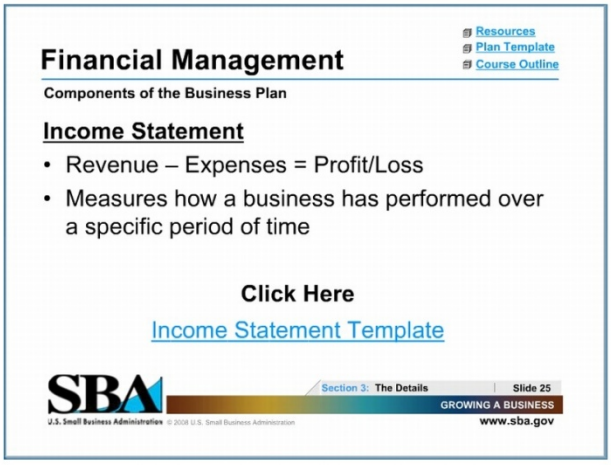
24



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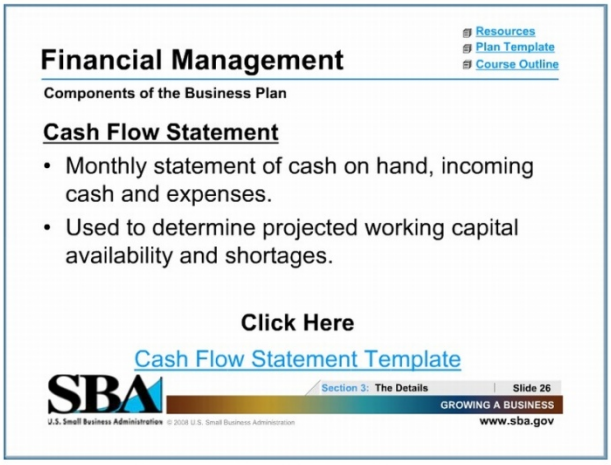

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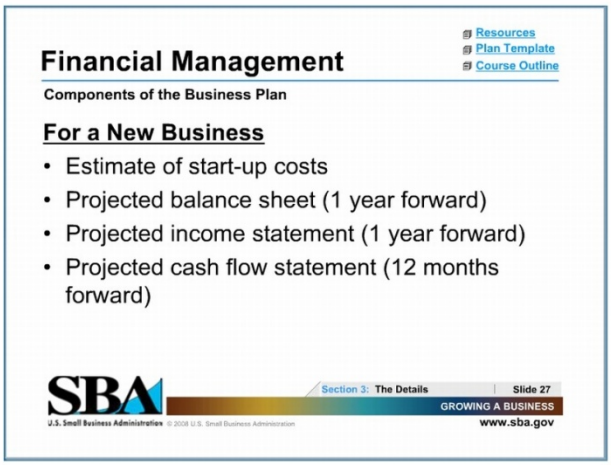

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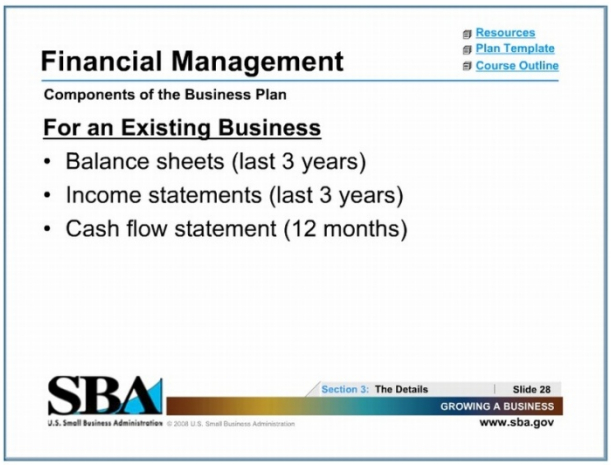

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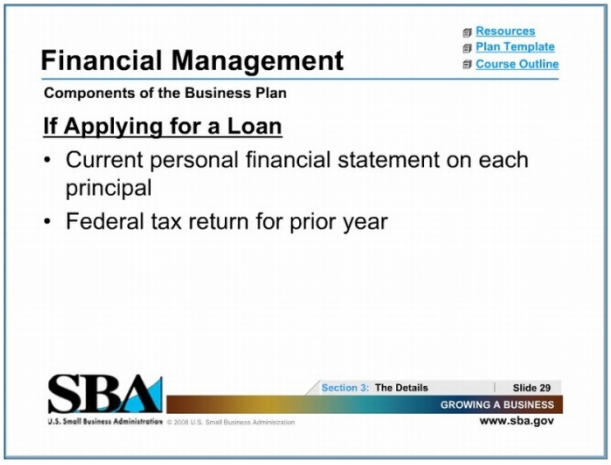

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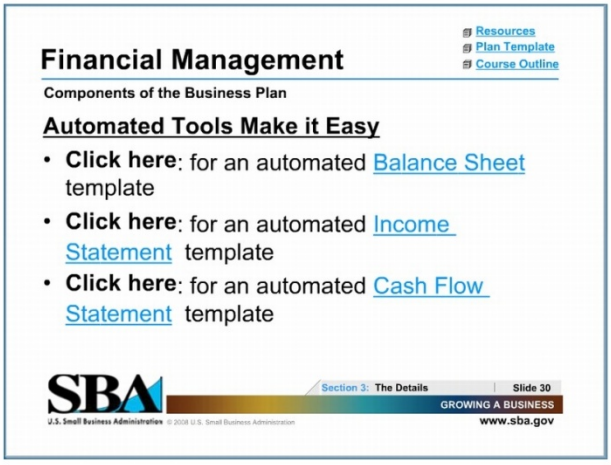

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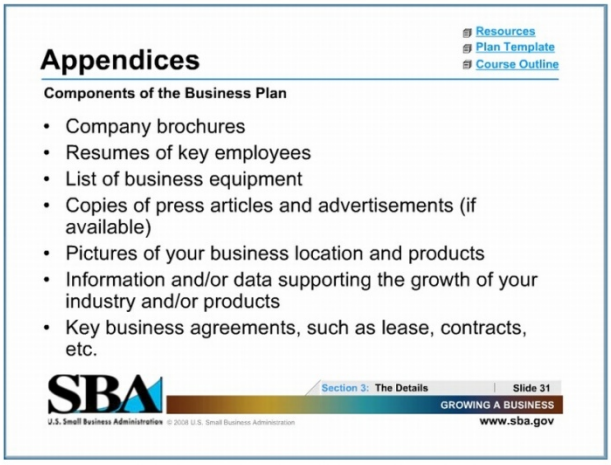

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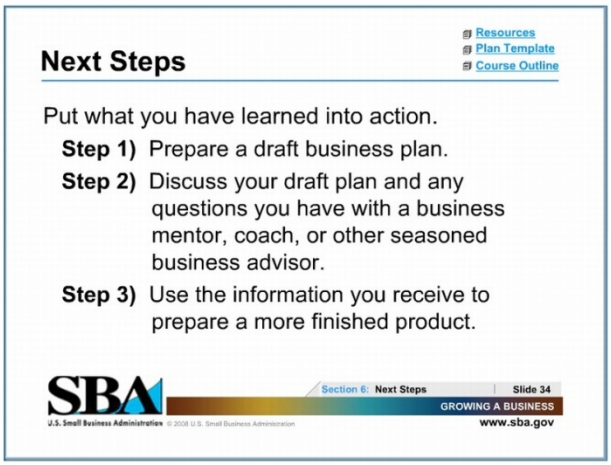

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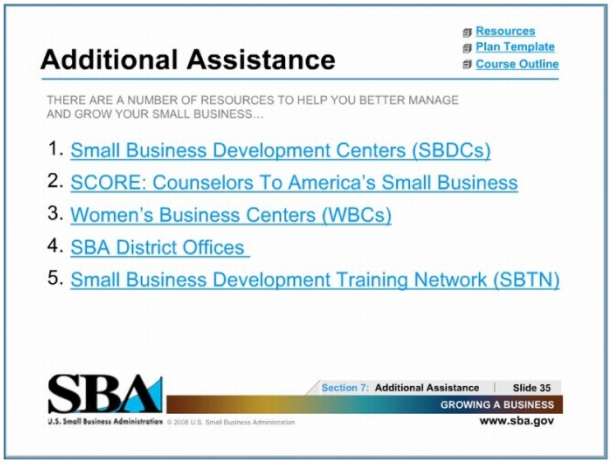

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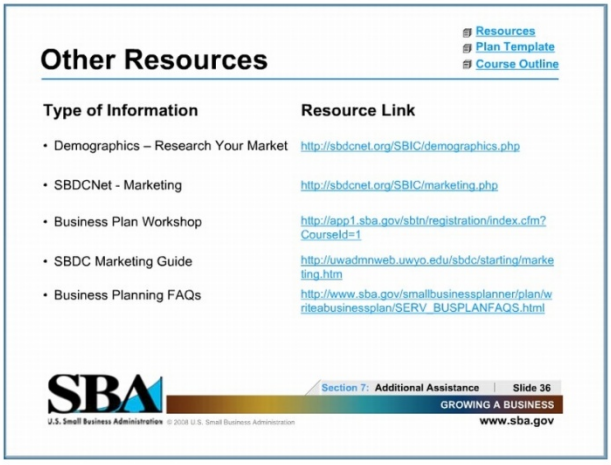

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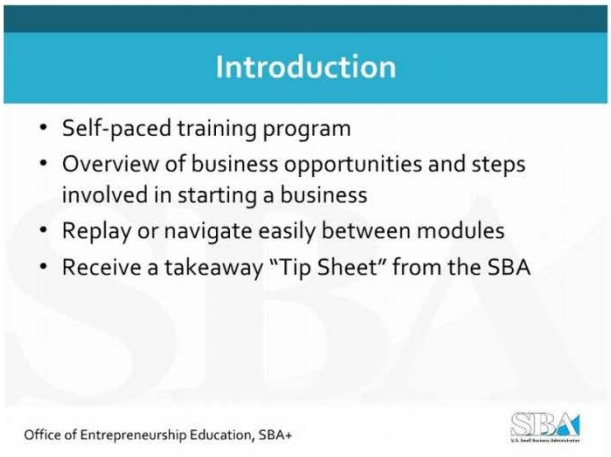
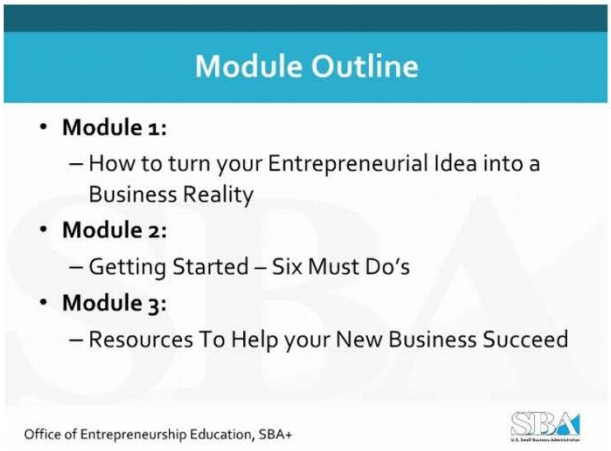
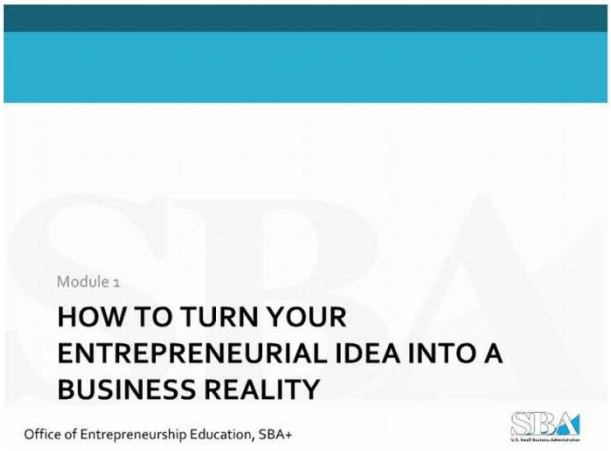
2. Screen captures from SBA.gov tutorial, *Young Entrepreneurs: An Essential Guide to Starting Your Own Business*







Is entrepreneurship right for you?

- Pros: exciting, rewarding, be your own boss!
  - *It takes planning, hard work, and an element of risk.*
- Some entrepreneurial characteristics to consider:

Creativity
Financial Smarts
Innovative
Resilience
Persistence

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07

What's your business idea? Will it work?

- What are you interested in?
- What have you got to offer?
- What do you want?
- What trends are in?
- Consider testing the waters and pursue your dream part-time?

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08

Do your research!

- Use the web to your advantage
  - *What do you offer that is unique?*
- Gauge customer opinion using online reviews
  - *Why do customers choose one business over another?*
- Get to know your competition
  - *Networking can reap rewards!*
- Don't get hung up on price
  - *Focus on value and selling that value effectively.*

Check out this SBA guide Conducting Market Research.

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09

Decide on a business model

- Could freelancing be an option?
- Want to run an online business?
- How about a home-based business?
- Could buying a franchise be for you?

– Let's explore some low risk options!

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10

Freelancing

Benefits:
- Be your own boss, doing what you enjoy
- Flexibility, start part-time, build a client base steadily, then transition to full time
- Diversity of work

Challenges:
- Can get lonely
- You do it all

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11

Home-Based Business

Benefits:
- Low cost and offers flexibility

Challenges:
- Can be hard to maintain a work/life balance
- Can look unprofessional
- Restrictions on the types of businesses that can legally operate from a home environment

Learn more about Starting a Home-Based Business

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12

Online business

Benefits:
- Low cost of entry
- Low overheads

Challenges:
- Ramp-up takes time, lack of customer interaction
- Generating site traffic and customers takes marketing savvy

Learn more about Starting an Online Business

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13

Franchising

Benefits:
- Relatively low-risk
- Business training and advisory services from franchisor
- Established brand and marketing support

Challenges:
- Franchise fees
- Lack of autonomy

Learn more about Buying a Franchise

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14

Module 2

GETTING STARTED – SIX MUST DO'S!

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15

1. Have a plan

You don't need a 100-page plan – your business plan should just help you:
- Define success
- Focus
- Understand meaningful steps
- Manage the planning process
- Break up your plan into mini-plans

For more information check out the SBA guide, **Essential Elements of a Good Business Plan**.

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16

2. Get Assistance

- You can save yourself a lot of time and effort by seeking the help of a mentor.
- Assistance online and in the community:
  - SCORE
  - Small Business Development Centers
  - Women's Business Centers
  - SBA partner locations (Veterans Centers and Export Assistance Centers)
  - SBA Direct is an easy-to-use online tool
  - SBA's Training and Counseling resources

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17

3. Finding a Mentor

- "Going at it alone" in business doesn't have to be about "going at it alone"
- How you find a mentor?
  - Utilize Government-sponsored mentor organizations like
    - SBA's Small Business Assistance and Training and Mentoring
    - SCORE mentoring services
  - Look within your own network

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18

4. Decide on a Business Model/Structure

- How will you legally structure your business?
- Common options include:
  - Sole proprietorship
  - Corporation
  - Limited liability company
- Research liability implications for personal investments.
- Understand each business type - select the one that best suits your situation and objectives.

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19

Some options you can consider

Sole-Proprietor: owned and run by one individual, no legal distinction between the owner and the business, owner receives all profits, unlimited responsibility for all losses and debts.

Read SBA's guide Self-Employed Independent Contractors to learn more.

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20

Some options you can consider con't

Partnership: two or more people share ownership and contribute to all aspects of the business, and shares in the profits and losses of the business.

Read SBA's guide to Partnership to learn more.

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Some options you can consider con't

Limited Liability Company (LLC): is a legal form of company that provides limited liability to its owners in the vast majority of US jurisdictions.

Read SBA's guide to LLC's to learn more.

- Other legal business entities include a cooperation, non-profit, cooperative. Read more about them at Registering and Incorporating Your Business

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22

5. Financing your venture

- Not all businesses need a huge injection of capital to get started.
- It is important to assess your funding needs.
- Develop and test your idea before seeking financing.

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23

Financing options

- **Bootstrapping:** funding your business on your own:
  - **Pros:** business isn't defined by the demands of external investors.
  - **Cons:** it's risky, consider consulting a financial advisor.
- **Microloans**: small, short-term loans for small businesses and certain types of not-for-profit child-care centers:
  - **Pros:** available through bank loan programs or you might be eligible for a loan that is guaranteed by SBA.
  - **Cons:** difficult to secure for someone with poor or no credit history.
- **Government Grants:** generally restricted to very specific audiences

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Keeping Costs Low and Cash Flowing

- Cash is king - you need it to start, operate, and expand your operations.
- Inaccurate cash flow statements can affect your everyday operations.
- Consider working part-time when you launch your company.
- Utilize technology and the resources around you to keep costs low.

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25

6. Registering Your Business:

1. **Registering Your "Doing Business As" Name:** required if you are selling your product or services under a fictitious name. Learn more here.
2. **Registering for State and Local Tax Purposes:** includes income tax, sales tax and unemployment insurance tax.
   - To register your business with your state tax agency and understand what you need to do based on your business type visit your state website.
   - To register your business with your city or county tax department - visit your city or county website.
   - If you plan to sell products and you are required to collect sales taxes, you'll need a Sales Tax Permit or Vendor's License from your state.

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26

Registering Your Business con't

3. **Register for Permits and Licenses**: vary by business type and location - you can easily find what you need using the Permit Me tool on SBA.gov.
4. **Register for a Tax Identification Number from the IRS**: if you have employees you'll also need to apply for an Employer Identification Number (EIN). Apply for an EIN Online.

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27

Course Re-Cap

- **Module 1:**
  - Considerations and opportunities available to help make your entrepreneurial dream a reality.
- **Module 2:**
  - Basic steps you need to start a business.
- **Module 3:**
  - Resources to help your new business succeed.

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28

Module 3

RESOURCES TO HELP YOUR NEW BUSINESS SUCCEED

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- This course is a great start to understanding what it takes to launch your own business.
- But we recommend you continue your learning process by checking out some of our great resources like our:
  - Start-Up Assessment Tool and our
  - SBA Direct tool

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30

Start-Up Assessment Tool

- Designed to help you better understand your readiness for starting a small business.
- Takes less than five minutes to complete.
  - Questions will help you evaluate your skills, characteristics and experiences
  - Responses are scored automatically
  - Score is used to develop your assessment profile
  - Based on your score you will received a statement of "Suggested Next Steps"

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31

Helpful Resources - SBA Direct

- SBA Direct is an online tool that delivers personalized and targeted resources to help you start and grow your business.
- Based on your unique profile and needs:
  - Find local resources that can help you get started
  - Explore financing programs
  - Get tips and tools to help you succeed

32

Additional Resources

- Sign-up for the SBA Community where you'll find:
  - Blogs written by business experts
  - Discussion boards
  - Idea Exchange where you can post and get feedback to some of the community's most pressing business questions.
- Visit SBA and Junior Achievements MindYourOwnBiz website.

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33

Dream Big!

- Nike, AOL, UnderArmor, Ben&Jerry's, Vera Bradley, and FedEx - What do these firms have in common?
- They all got started with assistance offered through SBA - and so can you!
- As you begin your entrepreneurial journey – rely on the SBA for support and guidance.

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34

SBA is here to help!

- We've linked to a lot of resources in this course – but there's many more available!
- Visit www.sba.gov and select the "Starting and Managing a Business" section in the top left corner.
- You'll find left and bottom center of the page there are resources organized into two sections – "Starting Your Business" and "Managing Your Business"

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35

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36

NC-NET Employability Skills Toolkit

Appendix

The following resources add to our employability skills knowledge base by showcasing work at the state and national levels as well as at community colleges around the country.

Resources from North Carolina

In 2012, the North Carolina Community College System's *Code Green Super Curriculum Improvement Project,* http://www.nccommunitycolleges.edu/programs/code-super-cip.htm, comprised of more than 200 instructors, described eight employability competencies that have been integrated into NCCCS career cluster curriculum standards:

- Interpersonal Skills and Teamwork – The ability to work effectively with others, especially to analyze situations, establish priorities, and apply resources for solving problems or accomplishing tasks.
- Communication – The ability to effectively exchange ideas and information with others through oral, written, or visual means.
- Integrity and Professionalism – Workplace behaviors that relate to ethical standards, honesty, fairness, respect, responsibility, self-control, criticism and demeanor.
- Problem Solving and Decision Making – The ability to identify problems and potential causes while developing and implementing practical action plans for solutions.
- Initiative and Dependability – Workplace behaviors that relate to seeking out new responsibilities, establishing and meeting goals, completing tasks, following directions, complying with rules, and consistent reliability.
- Information Processing – The ability to acquire, evaluate, organize, manage, and interpret information.
- Adaptability and Lifelong Learning – The ability to learn and apply new knowledge and skills and adapt to changing technologies, methods, processes, work environments, organizational structures and management practices.
- Entrepreneurship – The knowledge and skills necessary to create opportunities and develop as an employee or self-employed business owner.

Note that NCCCS Small Business Center Network, https://www.ncsbc.net/, offers a range of services and resources designed to help both new and established business owners.

The North Carolina Association of Workforce Boards' report, *Closing the Gap: 2012 Skills Survey of North Carolina Employers*, reinforces the need for including employability skills instruction in all courses.

http://www.agreatworkforce.com/documents/2012SkillsSurveyWDBFinal.pdf
Employers in every county responded to this survey and provided information on the current status of

workforce skills needs in North Carolina. Communication and interpersonal skills, critical and analytical thinking, and problem solving remain the primary gaps in workplace soft skills.

One approach to incorporating employability skills development across the curriculum is to use a rubric illustrating how those skills are demonstrated through classroom behavior and performance. The Readiness Skills Rubric from Asheville-Buncombe Technical Community College provides performance indicator criteria and rankings for evaluating students' attendance, time management, professionalism, communication, quality of work, teamwork, effort and critical thinking. Using a rubric like this allows instructors to assign point values (or grades) for soft skills. Some departments at the college have adapted the rubric to create discipline-specific evaluation tools that describe employability skills expectations throughout a program. For an example, view pp. 64-66 of A-B Tech's Associate Degree Nursing Education Handbook, http://www.abtech.edu/sites/default/files/users/kmiller/adn_handbook_5_20_13.pdf.

Resources from Federal Agencies

Employability Skills Framework
U. S. Dept. of Education, Office of Vocational and Adult Education
http://cte.ed.gov/employabilityskills/
The framework provides a federal clearinghouse with resources supporting the instruction and assessment of employability skills. The website includes an interactive framework that organizes employability skills; an online tool to inform the selection of an employability skills assessment; profiles of state, local, and employer-led employability skills initiatives; and links to related initiatives.

Workforce3one
U.S. Dept. of Labor, Education and Training Administration
https://www.workforce3one.org/
The Workforce3one website serves as a repository of federally funded curriculum, webinars, toolkits and active online communities of practice related to all aspects of the workforce investment system. The collection contains over 4,000 resources with additional material added weekly.

Work Readiness Tool for WIA Youth Programs
U.S. Dept. of Labor, Education and Training Administration
http://wdr.doleta.gov/directives/attach/TEGL/TEGL07-10a4.pdf
This rubric can be used to assess students' performance on employability skills, including attendance, punctuality, appearance, initiative, work quality, response to supervision, communication, teamwork, problem-solving and workplace safety. The tool describes performance expectations for each skill with four rating options that range from "performance improvement plan needed" to "exemplary." The rubric is easily adaptable for any career field.

Comparative Analysis of Soft Skills: What Is Important for New Graduates? (2011)
U.S. Department of Agriculture
http://www.aplu.org/document.doc?id=3414

Findings in this report examine the perspectives of employers, alumni, faculty and current students about which soft skills are most important for competitive employment in agriculture, natural resources and related career fields.

Skills to Pay the Bills: Mastering Soft Skills for Workplace Success
U.S. Dept. of Labor, Office of Disability Employment Policy
http://www.dol.gov/odep/topics/youth/softskills/softskills.pdf
The instructional activities in this publication provide an introduction to soft skills. These materials were developed with youth service professionals in mind– specifically those working with youth and young adults on career and workforce readiness skills. They were designed to be easily incorporated into current programming and established curricula.
Accompanying videos available at https://www.workforce3one.org/view/4011231355343106665

Resources from Community Colleges

Job Readiness Work Ethic Score Chart
Linn Technical State College, Linn, MO
In addition to the academic grades listed on transcripts, a job readiness work ethic score and an attendance percentage are issued for each class completed. This value-added service to students is a result of industry advisory council member input. A sample Job Readiness Work Ethic rubric can be found at https://myinfo.linnstate.edu/ics/icsfs/Job_Readiness_Chart_-_Long_Form_LETTER_Revised_200.pdf?target=e61cfad2-6ce7-45f7-9a79-923040a8e4ae.

2012 State of the St. Louis Workforce Report
St. Louis Community College
http://www.stlcc.edu/Workforce-Solutions/St-Louis-Workforce/Reports/2012-State-of-St-Louis-Workforce-Report.pdf
Workforce Solutions Group of St. Louis Community College conducted survey interviews with over 1,200 companies about the employment outlook and talent acquisition and development issues in their region. Interpersonal skills were cited as the top basic skill gap, along with customer service skills and the ability to function in a diverse workforce.

Backpack to Briefcase: Helping Students Transition to and Thrive in Today's Workplace
Coast Community College District for the California Community Colleges Governor's Career Technical Education Initiative
http://cacareerbriefs.com/wp-content/uploads/from-backpack-to-briefcase.pdf
The lessons in this booklet, designed for use with community college students, reflect the soft skills employers seek in their new hires and those they choose to promote. Each short lesson defines a specific soft skill, engages students in a collaborative active learning situation, and encourages them to take the skill to work. Lessons include instructor guides.

Research Reports

2012 Talent Shortage Survey Research Results
Manpower Group
http://www.manpowergroup.us/campaigns/talent-shortage-2012/pdf/2012_Talent_Shortage_Survey_Results_US_FINALFINAL.pdf
Employers in the U.S. and abroad are experiencing difficulty filling open positions, as few candidates possess the right combination of technical expertise and employability skills. This report provides a very interesting perspective on factors influencing hiring nationally and internationally.

The Importance of Soft Skills in Entry-Level Employment and Postsecondary Success: Perspectives from Employers and Community Colleges (2013)
Seattle Jobs Initiative
http://www.seattlejobsinitiative.com/wp-content/uploads/SJI_SoftSkillsReport_vFINAL_1.17.13.pdf
The research conducted by the non-profit Seattle Jobs Initiative explores the value employers place on soft skills by industry sector and the varying opinions of community college leaders and employers on which soft skills are most critical to student success and subsequent hiring. It also examines the potential need for a soft skills credential or curriculum for community college initiatives in the Seattle area.

Additional Resources

Common Career Technical Core
http://www.careertech.org/career-technical-education/cctc/info.html
National Association of State Directors of Career Technical Education Consortium
The Common Career Technical Core is a set of standards for each of the sixteen nationally-recognized career clusters and their corresponding career pathways. Developed by teachers, business and industry experts, administrators and researchers, the standards describe what students should know and be able to do after completing coursework in a technical program. Additionally, the document contains a broad set of Career Ready Practices comprised of employability skills that apply to all programs of study.

The Soft Skills Matter – video (2:32)
http://ecorner.stanford.edu/authorMaterialInfo.html?mid=3043
GE healthmagination CEO Sue Siegel discusses why working with and sharing credit with others, and being able to express empathy, are critical to personal and professional success.