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| **Course:** Introduction to Engineering |
| **Unit:** Teamwork | **exercise:** Desert Survival | **Time Frame:** 1 - 2 Hours |
|  | Preparation: *Summary of “to do’s” that the teacher should understand and prepare before bringing this lesson to the classroom.* |
| **Resources:*** Pencil
* Desert Survival Case Study Handout
* Internet

**For the Team Organization you would need:*** Deck of playing cards
* Data sheet from the activity

**For the Desert Survival you would need:*** Pencil
* Data sheet from activity
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|  | Safety: *Summary of safety strategies in the lesson.* |
| Please use this space to describe safety procedures or highlights for this lesson.  |
|  | Desired Results:  |
| Established Goals: |  | Transfer: |
| *Problem Solving Techniques and Applications Standards:*Teachers should use the STEM Academy Standards Correlation System available in the STEM Connections area of a unit to extract specific standards and insert these standards here.  | *Students will be able to independently use their learning to…** Work in a team to solve problems
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| Meaning: |
| Understandings*Students will understand that...** The greater the problem, the greater the need for teams
* Engineers are asked to solve increasingly complex problems
* Many corporations are international in scope
* Concurrent engineering is widely employed to achieve better designs
* Project management is widely practiced in industries and government labs
* Individuals acting alone can solve simple problems, but tough problems require teams
* Most modern design problems involve many revision
* Each subsystem requires specialists acting in teams
 | Essential Questions*Students will keep considering...** Why do most modern design problems involve many individual parts and many subsystems?
* How can operations have teams who may never physically meet work together?
* Where is design and manufacturing engineering operations needed?
* What is the job of a project manager?
* What is the benefit of having project managers?
* What decision-making method is the most efficient?
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| Acquisition OF KNOWLEDGE AND SKILL: |
| *Students will know...** Attributes of team work
* Team work strategies
* Dictatorship decision making
* Majority rule decision making
* Consensus decision making
* Advantages and disadvantages of decision making
* Time to market and its factors
* Project management
* Dictatorship, majority rule, and consensus
 | *Students will be skilled at...** Articulating the advantages of teamwork
* Describing characteristics of great teams
* Reviewing team attributes
* Defining the growth stages of a team
* Explaining the modes of team action
* Classifying leader attributes and leadership styles
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|  | Evidence:  |
| Evaluative Criteria: |  | Assessment Evidence: |
| Graded rubric | *Performance Task(s):* You will be shown a scenario and given a list of items. Individually rank the items 1 to 15. Random groups will be selected and create a new item ranked list. Individual and group scores will be compared to the expert’s choices. |
| * Thoughtful, clear, thorough
* Graded on accuracy, multiple-choice questions
* Completed on time
 | *Other Evidence:* * Online end-of-unit test
* Assessment Worksheet
* Teamwork Reading Worksheet
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|  | Learning Plan: *Summary of Key Learning Events and Instruction* |
| **Pre-Assessment:** Teamwork Pre-Test**Outline:**1. **Introduce**
2. Have students listen and read along as you go over the Dessert Survival Presentation.
3. **Brainstorm**
4. Have students individually brainstorm and write down their rankings of the items in the chart (1-13, 1 most important, 13 least important).
5. Put students into groups of 3-4.
6. Have students talk about their rankings with their groups. As they listen to other teammates’ rankings, they should write down notes in the space provided.
7. **Construct**
8. Students determine a final team ranking of the items and write it down in the chart.
9. **Test**
10. Present the expert rankings while students listen and write it down in the chart.
11. Students calculate the differences between their individual and team rankings with the expert rankings and write them down in the chart.
12. **Communicate Results**

a. Students read the reflection questions and write down their answers. **Learning Experiences:**1. **<Set Induction>**Have your students define, in their own words, leadership. What roles do leaders play? Is it important for a leader to know everything about a particular project or job? What happens when a leader has too much power? Take a few minutes to discuss one or two leaders from the past that were known to abuse their power (Hitler, Nixon, ENRON, etc.)
2. Introduce the 3 major decision-making approaches. (dictatorship, majority rules, consensus). Ask students to relate examples from their experiences. Explain there are advantages and disadvantages to each. This will be discussed in evaluation section of the lesson.
3. Have students complete Teamwork Reading Worksheet.
4. Introduce Desert Survival activity. Answer questions. Ask students to individually read and rank the items in the chart. Stress students will have only 15 minutes.
5. Organize students into large groups. No more than four groups per class. Explain the team will have 15 minutes to collectively rank the items. Suggest the students’ focus on the 13 items rather than the extraneous details. They will need to decide what the important and unimportant factors are.
6. Read off the expert tallies. Ask students to write the numbers in the correct column. Ask students to tally up their points for steps 4 & 5. Explain this is a transitional activity so the point factors are for comparison and discussion.
7. Discuss team dynamics. Ask the following questions. Maintain a civil and yet lively discuss. Stress this is a discussion not a debate.
* Did a leader in the team emerge? Who and why?
* How were decisions made?
* What were the advantages/disadvantages of this decision-making process?
* Did disagreements occur?
* How were disagreements resolved?
* Did everyone contribute to discussion?
* Was there conflict or dissidence?
* How was conflict resolved?
* Did everyone agree with the resolution?
* Did everyone agree with the final decision?
1. End-of-unit test

**Activity Scenario:**1. You will be shown a scenario and given a list of items.
2. Individually rank the items 1 to 13(15 min) (1 the most important, 13 the least important).
3. Random groups will be selected and create a new item ranked list (15 min).
4. Individual and group scores will be compared to the expert’s choices.
5. You are on a plane that has crashed landed in the Sonora Desert (southwest US) about 10 a.m.
6. The plane has burned up with the pilots; the airframe remains.
7. No one in your party is injured.
8. No SOS was made before the crash; however, you were told of a mining camp 70 miles away and your plane was 65 miles off the planned course.
9. The area is flat with a few barrel and saguaro cacti.
10. The latest weather report stated air temperatures near 100º F and land temperatures nearing 130º F.
11. Everyone is wearing lightweight clothing.
12. Fifteen items were saved before the fire.
13. Assumptions: You and your teammates are the survivors, the team must stay together, and all fifteen items are in good condition.

**Progress Monitoring:**Teacher observes students and provides on-going feedback during the activity. While introducing the unit, the teacher will pause and ask for questions to make sure everyone understands.Students will complete self-assessment and brainstorm how they could improve their skills in the future. At the end of the unit, there will be a quiz to measure their overall understanding. |
|  | Differentiation: *Summary of Key Differentiation Techniques* |
| Please use this space to insert your differentiation techniques. Depending on the needs of students, various techniques might be needed in a classroom, therefore use the information below and experts in the area needed to design your plan for differentiation.The ASCD Study Guide for Integrating Differentiated Instruction and Understating by Design: Connecting Content and Kids.by Carol Ann Tomlinson, Jay McTigheIntegrating Differentiated Instruction and Understating by Design: Connecting Content and Kids.by Carol Ann Tomlinson, Jay McTigheISBN-13: 978-1416602842 ISBN-10: 1416602844Differentiating Reading Instruction*by Laura Robb.*ISBN13: 9780545022989A Teacher's Guide to Differentiating InstructionThe Center for Comprehensive School Reform and Improvement |

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|  | career Connections: *Summary of Career Opportunities Associated with this Lesson* |
| Please use this space to insert careers that might be connected to this lesson. This section will need continuous updating as new careers and emerging technologies change the opportunities available in the workforce.Good sources for career connections:Occupational Outlook Handbook<http://www.bls.gov/ooh>The National Career Clusters® Framework<http://www.careertech.org/career-clusters> |
|  | Keywords: *Please Insert Keywords from this Lesson with their Definitions* |

TEAMWORK—the combination action of a group of people, especially when effective and efficient.

CONTINUITY—the unbroken and consistent existence or operation of something over a period of time.

LEADERSHIP—the action of leading a group of people or an organization.