United States Department of Agriculture

National Institute of Food and Agriculture

https://nifa.usda.gov/program/4-h-positive-youth-development

National Aeronautics and Space Administration

EXPEDITIONARY SKILLS FOR LIFE

A FEDERAL PARTNERSHIP FOR **STEM** EDUCATION

LESSON PLAN: TEAMWORK ACTIVITY 3.12
ROCKET POWER CHALLENGE II

LESSON DETAILS

AGE/GRADE LEVEL
High School

LEARNER OUTCOMES
Youth will identify ways to effectively communicate with members of a team, recognize there are many different solutions to solving problems, describe the steps used to solve engineering challenge and define teamwork and team roles.

SUCCESS INDICATORS
Youth will demonstrate patience, respect, and appreciation for team members; respect team member roles and responsibilities, assign tasks, and understand workload.

LIFE SKILLS
Critical thinking and innovation, collaboration, responsibility, social skills

NATIONAL STANDARDS
CCSS.ELA-Literacy.CCRA.SL.1
Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

21st Century Learning and Innovation Skills: Learning and innovation skills increasingly are being recognized as the skills that separate students who are prepared for increasingly complex life and work environments in the 21st century, and those who are not. A focus on creativity, critical thinking, communication and collaboration is essential to prepare students for the future.

PREP TIME
15 minutes for room set up

ACTIVITY TIME
50 minutes

MATERIALS LIST
• 1 lb. dry spaghetti
• 10 oz. small marshmallows
• 20 oz. gum drops
• Yard stick or tape measure
• Countdown clock or other timing device
More supplies may be needed depending upon the size of the group

HANDOUTS
Learner Assessment Questions

SUGGESTED SPACE
Indoors, one table or other flat surface for each team

SUGGESTED GROUP SIZE
4 youth per team, any number of teams can be involved.

INTRODUCTION INFORMATION
Share after the second part of the activity has been completed. Use the introduction information as a lead in to the discussion question..

REFERENCES
Doing It Together
www.uaex.edu/publications/pdf/4HCD1.pdf

Building Your Programs 20 Minutes at a Time — Leadership and Reflection Activities You Can Use !
www.extension.umn.edu/youth/research/quality/docs/building-your-programs-book-one.pdf

5 Ways Youth Can Be Good Team Members
http://msue.anr.msu.edu/news/five_ways_youth_can_be_good_team_members

NASA Teamwork
https://science.nasa.gov/science-news/science-at-nasa/2005/10jan_teammeup

INTRODUCTION

Teamwork is a group of individuals who use the strengths of each team member to work cooperatively towards a shared goal.

Teamwork is a way of working together which cares for each person as the tasks are being accomplished. The teamwork process has two basic components: belonging and accomplishing.

• Belonging: Each person must feel welcome and important to the team.

• Accomplishing: Each person must have opportunity to contribute to the work of the team.

Belonging is the beginning of motivation for teamwork and the source of commitment to accomplish the necessary tasks. Team building begins with the open and supportive relationships among team members.

Team members share the tasks which enable them to carry out their plans. A team builds on the strengths of each of its members. Teamwork does not make fewer tasks, it redistributes tasks so that all who belong may be equally involved.

Communication is the lifeblood of the team. Communication begins with caring and continues with listening, with being sure that the concerns of each person are heard. Communication is transmitted through clear verbal and non-verbal messages and adequate well timed information. Communication is verified through feedback (by checking to be sure that what was heard was the message which was originally intended). Communication must occur for a team to achieve its goals.

ROCKET POWER CHALLENGE II, CONTINUED

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ACTIVITY INSTRUCTIONS

INTRODUCTION ACTIVITY (5 MINUTES)

Ask and discuss with youth:

1. What is the purpose of a team? What makes a good/ bad team member?

2. Explain what a "role" is. Give examples. What do roles have to do with teamwork?

3. Do the people who work at NASA have "roles" in their work? Why?

ACTIVTY PART 1: TEAM ROLES (15 MINUTES)

Explain that youth will participate in an engineering activity involves roles.

The activity is to build a rocket model and launch pad that NASA will use to lead them in creating a real rocket/ launch pad. The rocket should be built as tall as possible and has to be able to stand on its own with no hands holding it up once it is completed. The launch pad should support the rocket and touch it at a minimum of one place.

The roles will be:
- Team Leader - Gives team instructions, does not build
- Builder 1 - Builds rocket model, listens to leader
- Builder 2 - Builds rocket model, listens to leader
- Supply Manager/Timekeeper - prepares supplies, updates team on time, assists building when asked by Team Leader

Explain that the youth will be working on a team to complete a task.

1. Assign youth into teams of 4 with each team at their own table or other level surface.

2. Hand out supplies. Give each team 12 pieces of spaghetti, 10 marshmallows and 10 gumdrops. Tell the youth not to touch or eat the supplies.

3. Review the team roles. Explain each team member will get to spend about 3 minutes in each of the roles and then rotate clockwise to the next role labeled on the table.

4. Tell the youth they will have to work together and build a model of a rocket.

5. The goal is to make an improved rocket from their Challenge I Lesson that is freestanding and as tall as possible.

6. Have the youth briefly discuss and make a plan for what their rocket may look like and how to use the supplies. The Team Leader leads this and asks for help from the team.

7. Every 3 minutes have the students move clockwise to change roles. Have role name badges at the spots on the tables for easy role switching.

8. Allow the teams to begin to build. Remind them of the 12 minute timeline. Display a countdown clock or timing device for the Timekeepers to watch. As time ticks down, do not remind the youth of the amount of time remaining; let the Timekeeper for each group keep track.

9. Approximately half way through, call for a temporary pause. Allow 30 seconds for team leaders only to survey the other teams' building projects to gather ideas that might assist their team with their own construction. Allow teams to continue and finish up after this break.

10. Once time runs out, have teams stop and back away from their tables/models.

11. Allow each Team Leader to showcase their final model design. Use the yardstick to measure final rocket model height. Use class applause to celebrate all of the teams' efforts!

DISCUSSION QUESTIONS (10 MINUTES)

Allow each Team Member to answer one of the following questions. Youth share these within their groups. Allow for 30 second responses and ask the youth to be specific:

1. What went well in your role?

2. What did not go well for your role?

3. Did your group work as a team? Why or why not?

4. Did each member of your team follow their given role? Why did this or didn't this work?

ROCKET POWER CHALLENGE II, CONTINUED

DEBRIEF ACTIVITY: PUZZLE PIECES—YOU ARE AN IMPORTANT PIECE OF THE BIGGER PICTURE (10 MINUTES)

REFERENCE:
Stevenson, A., Harris, A., Piehl, B., & Skelly, C. (2010). Building Your Programs 20 Minutes at a Time — Leadership and Reflection Activities You Can Use! St. Paul, MN: University of Minnesota Extension, Youth Development

MATERIALS LIST

- Puzzle pieces that can connect with others easily

- Pens, markers, or pencils

Puzzle pieces that you can draw on are a wonderful tool for individuals, small groups and large groups. Invite participants to draw or write on their puzzle piece; use a reflection question that meets your needs (i.e. a goal you have for the group, a strength you bring, feeling about how the project has gone, etc.). Complete a brief large group discussion using the age appropriate questions below. Have participants put the puzzle together as they share their reflection with the larger group. Participants can work individually, as a pair, or in a small group. Ask members: What is your part of the puzzle? What do you contribute to the team? Then fit the pieces together like a real jigsaw puzzle. Save and mount the puzzle if the group will come together again in the future.

1. How could your team have been more effective in the building process? How do roles affect this?

2. Is strong communication important to a team? Why or why not?

3. How did the results of your rocket differ from the first trial? How did the assigning of roles affect this?

Discuss the importance of roles in the activity and how it relates to the importance of roles in the working world and family life.

APPLIED CHALLENGE: TEAMWORK SKITS/ COMIC STRIPS (15 MINUTES)

Tell the youth they will be assigned to a team to act out in a skit or develop a comic strip to present to the large group. The skit or comic strip should reflect a situation that requires teamwork. The skit or comic strip should include a role for each member of their team. Their skit or comic strip should include at least one negative teamwork strategy.

1. Assign teams (either by choice or another method).

2. Allow teams to prepare and practice.

3. Have each team present.

4. After each team presents, the large group will comment on the negative teamwork strategy. The team will then explain how they would fix the scenario with a positive teamwork strategy.

Processing: Tell the youth they have 1 minute to call out as many positive teamwork strategies as they can. Count them up and suggest they try one they have never tried before the next time they are in a team situation.

FUN FACTS

There are a number of past and current astronauts and NASA employees who were 4-H members. In addition to Peggy Whitson, who was a 4-H member in Iowa, others include Allan Shephard (New Hampshire 4-H), the first American in space, and Charles Bolden (South Carolina 4-H), former astronaut and Administrator of NASA.

DID YOU KNOW

The International Space Station is a joint effort between Canada, Japan, the Russian Federation, the United States, and the 22 Member States of the European Space Agency. As of November 2016, 226 individuals from 18 countries have visited the International Space Station.
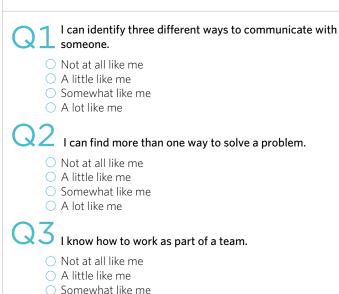
INSTRUCTOR'S NOTES

EXPEDITIONARY SKILLS FOR LIFE

ACTIVITY 3.12: LEARNER ASSESSMENT

These questions are about things you learned during this activity. Please check the circle that best describes you.
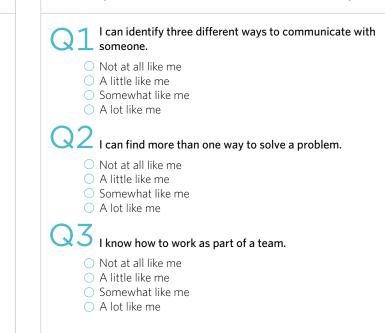
Q1 I can identify three different ways to communicate with someone.

○ Not at all like me
○ A little like me
○ Somewhat like me
○ A lot like me

Q2 I can find more than one way to solve a problem.

○ Not at all like me
○ A little like me
○ Somewhat like me
○ A lot like me

Q3 I know how to work as part of a team.

○ Not at all like me
○ A little like me
○ Somewhat like me
○ A lot like me