

Activity 6 Engineering Showcase

Educator
Preview

Overview

Youth *communicate* their knowledge of remote sensing devices and the information they gathered about the Mystery Moon at the Engineering Showcase. The Mystery Moon's model landscapes will be revealed.

Note to Educator:

The Showcase and presentation of data is an opportunity for youth to share the engineering work they have completed over the course of the unit. Invite parents, peers, and other staff members to play the roles of the scientists using the Scientist Cards, or ask questions on behalf of the scientists yourself.

Activity Timing

Introduction:	5 min
Presentation	
Preparation:	15 min
Showcase:	20 min
Reveal:	5 min
Reflect:	10 min

55 min

21st Century Skill Highlight

Communication
Collaboration

Activity 6 Materials

For the whole group

- Engineering Design Process* poster
- chart paper
- crayons and markers
- Mystery Moon Sites and Space Screens from Activity 5
- 25 sheets of construction paper
- 25 sheets of copy paper
- 50 craft sticks
- 75 pipe cleaners
- optional: 4 blindfolds

For each group of 3

- Remote sensing devices from Activity 5
- For each youth**
- Engineering Notebook

Activity 6 Materials Preparation (15 min)

1. Post the *Engineering Design Process* poster and have chart paper available.
2. Create a Materials Table with the materials remaining from Activity 5.
3. Arrange the Space Screens according to *Space Screen Assembly*, p. 50 of this guide.
4. Invite people from the community, including families and friends of youth, to the Engineering Showcase.
5. Invite parents, peers, and other staff members to play the roles of the scientists using the Scientist Cards, or ask questions on behalf of the scientists yourself.


Notebook Pages for Activity 6

Communicate, p. 22

Activity 6 Communicate

During your presentation, you will share information about the Mystery Moon with the scientists, and talk about the engineering challenge. What are some things you might want to *communicate* about engineering remote sensing devices?

Did You Know?
 NASA's spacecraft and remote sensing devices record their own notes about the data they collect. This is called "telemetry" and it helps scientists know all the details about how remote sensing data are collected.



Worlds Apart: Engineering Remote Sensing Devices 22 © Museum of Science

My Engineering Profile 2, p. 23

Activity 6

My Engineering Profile 2

Think about how you have changed as an engineer, and update your engineering profile.

<p><input type="checkbox"/> Communication</p> <ul style="list-style-type: none"> • I give valuable feedback to others • I like giving presentations <p><input type="checkbox"/> Creativity</p> <ul style="list-style-type: none"> • I imagine lots of ideas • I come up with new ways of doing something <p><input type="checkbox"/> Critical Thinking</p> <ul style="list-style-type: none"> • I solve problems • I make sense of complicated information <p><input type="checkbox"/> Leadership</p> <ul style="list-style-type: none"> • I lead teams well • I make sure everyone has a voice 	<p><input type="checkbox"/> Persistence</p> <ul style="list-style-type: none"> • I learn from failure • I keep trying until I succeed <p><input type="checkbox"/> Teamwork</p> <ul style="list-style-type: none"> • I work well in teams • I like giving and receiving feedback on my work <p><input type="checkbox"/> Technical Skills</p> <ul style="list-style-type: none"> • I make things • I like working with different materials
---	---

Which skills do you want to **use**?

Which skills do you want to **learn**?

Did You Know?
 Science and engineering work is almost always done in teams. Each project involves different types of specialized information, from flight systems to biology to communication, so a variety of people with different skills and expertise are needed for it to be successful.

Worlds Apart: Engineering Remote Sensing Devices 23 © Museum of Science

Youth will learn:

- *Communicating* with others is an important part of the Engineering Design Process.
- As engineers, they have valuable knowledge to share about the problem they have solved.

Tip

Let groups know that they will have a few minutes to finish their designs and visuals, if needed, before they start preparing for the presentation.

Introduction (5 min)

1. Gather youth in front of the *Engineering Design Process* poster and point out the *communicate* step. Remind youth that today they will *communicate* what they learned about remote sensing technologies and their engineering challenge to others. Ask:
 - **What are the important ideas you think we should present?**
 - **Do you have any ideas about how we might structure the presentation?**

Presentation Preparation (15 min)

1. Explain that the Showcase will be split into three parts.
 - First, there will be a whole-group presentation where volunteers explain what they learned about bouncing light, manipulating color, and measuring topography and why these ideas are important for remote sensing.
 - Then, they will split into groups and explain the remote sensing devices they created for their mission. Volunteers from each group will demonstrate their remote sensing technologies for the scientists and other guests and answer any questions they may have.
 - Finally, guests will have time to explore the designs, speak with groups informally, and ask questions about their remote sensing technologies.
2. The first part of the Showcase will require volunteers to talk about specific things. Write down some possible roles on chart paper for groups to review.
 - Describe and demonstrate the problem
 - Describe how remote sensing technologies can help solve the problem
 - Explain the design challenge and the Engineering Design Process
 - Describe and demonstrate how the group investigated periscopes, optical filters, and model LiDAR technologies
3. Encourage youth to add topics to this list. Have youth decide

Tip

The presentations should be a time for youth who enjoy presenting, or those who would like to work on this skill, to take a lead role. It is not necessary for all youth to present, though everyone should take part in preparing for the presentation.

Tip

If you do not have an opportunity to sufficiently brief the visitors playing the scientists before this activity, have one or more youth provide a summary of the different missions.

who would like to present and assign them roles. Tell youth that they can prepare notes for their group's presentation on *Communicate*, p. 22 in their Engineering Notebooks.

4. While volunteers are practicing their roles, give groups time to put the finishing touches on their remote sensing devices and visuals and prepare for the Showcase.
5. Rotate among the groups to provide support as needed. The process of sharing should be fun and exciting, not stressful!

Engineering Showcase (20 min)

1. When youth are ready, invite guests into the room and explain that they will see a presentation first, then have time to explore the remote sensing technologies and speak with the engineers.
2. Have the volunteers explain the engineering challenge to guests.
3. Give each group a few minutes to share their designs and the data they collected. Have volunteers demonstrate their remote sensing technologies by *testing* them on the Mystery Moon sites. As groups are *testing*, ask questions like:
 - **What are some things you *investigated* to help you solve this problem?**
 - **What did you *test* that worked really well? What did not work so well?**
 - **If you had more time, how would you *improve* your design? Are there any elements of another group's design that you would incorporate?**
 - **How did the Engineering Design Process help you reach this final design?**
4. After all groups have presented, allow guests to walk around and ask the engineers any additional questions they may have about their remote sensing devices or the data they collected.

Mystery Moon Reveal (5 min)

1. Gather youth together and explain that if they were collecting data from a real Mystery Moon and not a model, the data they collected would be extremely important since it would be the only information scientists have to make decisions about their mission. Scientists and engineers very rarely get to see the distant objects they study up close, but because youth are working with models, the Mystery Moon landscapes can now be revealed!
2. Display the model landscapes for Site A and Site B for youth and guests to see.
3. Encourage youth to think about the similarities and

differences between their data and the model landscape and how they might be able to further *improve* their remote sensing devices.

4. At the end of the Showcase, be sure to congratulate your group on doing a great job with the *communicate* step of the Engineering Design Process and on being remote sensing engineers. Have youth thank the audience members before concluding the presentation.

Reflect (10 min)

1. Encourage youth to reflect on the Engineering Design Process.
Ask:
 - **Which steps of the Engineering Design Process were most helpful to you?**
 - **Can you *imagine* other problems you might solve using the Engineering Design Process?**
2. Give youth time to complete *My Engineering Profile 2*, p. 23 in their Engineering Notebooks. Giving youth time to record their thoughts will help them reflect on and wrap up the experiences they had throughout the unit.
3. Gather youth together as a group and ask:
 - **What are you most proud of doing as part of this engineering group?**
 - **Why do you consider yourself an engineer?**
4. Congratulate groups on their excellent engineering work.

