Educator Guide

Engineering Adventure 9: Sum It Up: Engineering Share-Out

Educator Preview

Adventure Snapshot

Learners share their designs and how they used the Engineering Design Process.

Timing | 45 minutes

Get Ready & Team Up	5 min.
Engineering Share-Out	35 min.
Reflect & Wrap Up	5 min.
Total	**45 min.**

Level Up Activities 5 min. each

Prep Snapshot*

Prep Time 20 min.

- Set up Materials Table.
- Invite people to Share-Out.

*See Materials & Preparation for full info.

21st Century Skills

Connection

- Communication

Habits of Mind

- Weigh the implications of solutions.
- Communicate effectively.

Guiding Question

How can we share our space glove designs with others?

Learners Will Do

Share design recommendations for engineering space gloves.

Learners Will Know

Engineers have valuable knowledge to share about the problem they have solved.

Connecting Across Adventures

Adventure 8: Preparing for the Engineering Share-Out	Adventure 9: Engineering Share-Out	Science Pathway
Last time, learners prepared to communicate their ideas about designing space gloves in the Engineering Share-Out.	**Today**, learners communicate their ideas about designing space gloves in the Engineering Share-Out.	**Next time**, learners will experience the science of this topic in the PLANETS Space Hazards Science Pathway (optional).

Activity Resources

Access videos and digital resources using the link or QR code below. More information for teaching this curriculum is available in the Educator Guide Introduction (pgs. iii–xxvi). Access more PLANETS units, research, and pathways at https://planets-stem.org/.

weblink: https://hov.to/8a607e60

Materials and Preparation

Materials

For the whole group

- *Our Ideas* poster (on paper or a shared digital document)
  Examples | Templates
- Sharing materials prepared in Adventure 8

For each group of 4

- final gloves from Adventure 7
- previous gloves from Adventure 6 (optional)

For each learner

- Engineering Notebook (PDF)

Adventure 9 Materials Preparation (20 min.)

Ahead of Time

1. Invite people from the community, including families and friends of learners, to the Engineering Share-Out.
2. Decide what to do with learners' designs and presentation materials after the adventure.

In Your Space

3. Place the *Our Ideas* poster in a visible place in your learning setting or prepare to share it digitally.

Support Learner Differences

To ensure the Share-Out is accessible as possible, provide tactile, audio, and video resources from throughout the pathway to attendees as appropriate.

Adventure Guide

Get Ready & Team Up (5 min.)

1. **If you did the last activity, what did you do and why?** *(We made a plan to share our recommendations for designing space gloves.)*

Support Learner Differences

If new learners are joining you, lead an inclusion activity (pgs. xx-xxi) and use other engagement strategies as necessary (pgs. viii–xviii).

2. Say: **You'll be sharing your space gloves, and the story of how you used an engineering design process to make them, with others.** Share the Guiding Question with learners aloud and write it on the *Our Ideas* poster (using multiple languages as needed): **How can we share our space glove designs with others?** Explain that first, everyone needs to prepare for this Share-Out.
3. Have learners join up with their space glove work groups from Adventures 6–8 and distribute Engineering Notebooks.
4. Give learners five minutes to set up for the Share-Out so they can present in the ways that they have planned.

Engineering Share-Out (35 min.)

5. When learners are ready, invite guests into the room and explain how the Share-Out will proceed. Carry out the steps of the Share-Out as the group has planned.
6. As they experience the Share-Out, invite families and other guests to think about their family, cultural, or other knowledge related to what they observe and share that knowledge with learners individually or the event as a whole. Ask: **Can you tell me a story about a time when you shared with others something you built or created, and how it worked? What did you learn about space hazards and materials engineering? What have you learned that you can now use to help your family and the communities you belong to?**
7. Ask or encourage attendees to ask the following questions: **What is your mission? What are the hazards? Which materials did you use? Why? Where did you place the materials? Why? Which phases of your engineering design process did you use? What suggestions do you have for other people designing space gloves?**
8. At the end of the Share-Out, congratulate your group on doing a great job being materials engineers and protecting astronauts from space hazards. Thank any guests who came to the Share-Out..

Reflect and Wrap Up (5 min.)

9. Congratulate learners on their great work engineering space gloves. Choose a way to recognize their accomplishments in hazard mitigation, such as by shaking their hands or providing them with badges.
10. Either collect materials or use a fair method to decide who can take home the space gloves, if more than one learner in each group is interested.

After the Adventure

1. Clean up:
   - Collect the Engineering Notebooks.
   - Decide if you want to keep the *Our Ideas* poster.
   - Reset the space in which you held the Share-Out.
2. Take time to reflect on the following educator prompt. **What methods did learners choose to share their designs? What did you learn from the methods they chose?**
3. If time permits, read *Space Hazards: Preparing for a NASA Mission* and consider implementing it so that learners can extend their understanding of space hazards and the relationships between scientists and engineers.

Space Hazards Additional Resources

Resources include All Downloads, All Videos, Family Connections, and more.

weblink: https://hov.to/940428f7

Level Up!

- Refer to the Engineering Design Process poster (PDF). Ask: **What phases of the Engineering Design Process did you use today?** *(Responses will vary. We shared our engineering work from all the phases of the EDP with the community.)* (5 min.)
- Encourage learners and their families to try out the PLANETS At Home (weblink) activities and those at yes.mos.org/families, which include more challenges to do together. (5+ min.)
- If your learners enjoyed this planetary engineering design challenge, they would also enjoy the Rover Observation and Discoveries in Space (ROADS) student challenges. Show your learners the NASA National Student Challenges (weblink). (15 min. to review; 10–15 hours per challenge)