Educator Guide

Science Activity 9: Sum It Up: Science Share-Out

Educator Preview

Activity Snapshot

Learners share their recommendations for the safest and most scientifically interesting Mars rover landing site.

Timing | 45 minutes

Get Ready and Team Up	5 min.
Science Share-Out	30 min.
Reflect	10 min.
Total	**45 min.**

Level Up Activities 5–30 min. each

Prep Snapshot*

Prep Time **40 min.**

(several days in advance)

Send Science Share-Out Invitations to people from the community.

**See Materials & Preparation for full info.*

21st Century Skills

Connection

- Communication

Science Practices

- Interpreting Data
- Constructing Explanations
- Communicating Information

Guiding Question

Which landing site on Mars do we recommend, and why?

Learners Will Do

Communicate Mars landing site choice to others and support the decision with evidence.

Learners Will Know

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

Connecting Across Activities

Activity 8: Choosing a Landing Site and Preparing for the Science Share-Out	Activity 9: Science Share-Out	Engineering Pathway
Last time, learners used the various kinds of data they collected–landform images, topographic maps, and spectra–to choose a landing site.	**This time**, they share their findings.	**Next time**, learners experience engineering related to this topic in the PLANETS Worlds Apart Engineering 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/.

QR Code for Activity Resources

weblink: https://hov.to/03b6987b

Materials and Preparation

Materials

For the whole group

- *Our Ideas* poster (on paper or a shared digital document) in Prep & Setup Guide (PDF) Examples | Templates
- *Science Actvity 7* Audio Files (weblink)
- Devices for listening to audio
- Optional: Tactile Science Activity 7 Mineral Fingerprints Handout (PDF)
- Optional: Tactile Science Activity 7 Mars Minerals Spectroscopy Data Packet (PDF)

For each small group

- Science Activity 7 Mineral Fingerprints Handout (PDF)
- Data Packets from Science Activities 3 (PDF), 5 (PDF), and 7 (PDF)
- Landing Site Ovals from Science Activity 3 (PDF)

For each learner

- Science Notebook (PDF)

For community members

- Science Share-Out Invitation Handouts from Activity 7, pg. 92

Activity 9 Materials Preparation (15 min.)

Ahead of Time

1. If you have not already, send out Science Share-Out Invitations to invite people from the community, including families and friends of learners, to the Science Share-Out.

2. For reference:
   - download the audio files (weblink) for each spectrum and set up a listening station center for learners to refer to as they choose. Place one copy of the Science Activity 7 Mineral Fingerprints Handout (PDF) and one copy of the Science Activity 7 Mars Minerals Spectroscopy Data Packet (PDF) at the center.
   - optional: place tactile *Mineral Fingerprints Handout* and tactile *Science Activity 7 Mars Minerals Spectroscopy Data Packet* at a center that is accessible to all learners so they can refer to these as they choose.
3. Decide what to do with learners' designs and presentation materials after the activity.

In Your Space

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

Activity Guide

Get Ready and Team Up (5 min.)

1. Ask: **If you did the last activity, what did you do and why?** (*We revisited the landform, topographic, and spectroscopy data to choose the safest and most scientifically interesting site to land a rover on Mars. We prepared to share our findings with the group and invited guests*).

Support Learner Differences

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

2. Remind learners of the Guiding Question on the *Our Ideas* poster: **Which landing site on Mars do we recommend, and why?** Say: **Today, you will present your choice to the group and invited guests.**
3. Organize learners into the same groups as the previous activity.

Science Share-Out (30 min.)

4. Remind learners of the structure they have planned for the Share-Out. Say: **The Share-Out is a chance for you to display your ideas, explain your thinking, and reflect on what you learned about remote sensing throughout the unit.**
5. Provide time for learners to make any last-minute preparations.
6. 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.
7. 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 here today and share that knowledge with learners individually or during the event as a whole.

Reflect (10 min.)

8. After all groups have shared, ask learners to reflect on the sites selected. Ask: **Did all groups agree on where the rover should land? Why or why not? Would you have made the same recommendation if you were missing some of the data from the packets? For example, how would your recommendation be different if you had no data about landforms?** *(We could not have chosen our site if we didn't know about its landforms, topography, and minerals. Using different kinds of remote sensing together gives a much more complete understanding of a site, much like how a person uses all their senses to understand the world, not just one.)*
9. Say: **Good job working as scientists today! The process you've followed is like the process NASA uses to choose landing sites.** Tell learners what really happened when scientists and engineers had to choose landing sites for prior Mars missions:
   - **NASA chose Gale Crater as the landing site for its Curiosity rover, which landed on Mars in 2012 and has been exploring ever since.**
   - **NASA chose Jezero Crater for its Perseverance rover. The rover launched in 2020 and landed in 2021.**

After the Activity

1. Clean up:
   - Collect the Science Notebooks, *Data Packets,* and *Landing Site Ovals*.
   - Decide if you want to keep the *Our Ideas* poster. Term cards can be kept for the future.
   - If you set up listening and tactile stations, collect the materials from each.
   - Reset the space in which you held the Share-Out.
   - Consider saving materials to use if you teach these activities again in the future.
2. Take time to reflect on the following educator prompt: **How did you create opportunities for interaction with community members? How can you do so in other situations in the future?**

Remote Sensing Additional Resources

QR code leads to resources available for this unit.

weblink: https://hov.to/248cf0d9

Level Up!

For more on Curiosity, share an exciting NASA video, *Curiosity's Seven Minutes of Terror*, about the challenges of landing Curiosity at Gale Crater. Learn more about the Curiosity rover and see pictures from inside Gale Crater. (30 min.)

If learners examined all four sites, add: **NASA also considered Iani Chaos and Nili Fossae as landing sites for Perseverance but ruled out both. Iani Chaos is too rough, and although both sites have water-related minerals, they lack water-related landforms.** (5 min.)

If you have time, show the image "Mars Probe Landing Ellipses," which compares landing ellipses for different Mars missions over time. (5 min.)

If your learners enjoyed this planetary science challenge, they would also enjoy the Rover Observation and Discoveries in Space (ROADS) student challenges. Show your learners the NASA National Student Challenges weblink. (10 min. to review website, 10–15 hours per challenge)