

Science Adventure 5: Far from Home: Hazards in Space

Educator Preview

Adventure Snapshot

Learners play a card game to learn about space hazards and their differences from hazards on Earth.



Timing | 55 minutes

Get Ready & Team Up 5 min.
Hazards in Space 40 min.
Reflect & Wrap Up 10 min.
Total 55 min.
Level Up Activities 5 min. each



Prep Snapshot*

Prep Time 50 min.
Print, cut, and assemble Card Deck E for each small group.
**See Materials & Preparation for full info.*



21st Century Skills

- Connection**
- Critical Thinking
- Science Practices**
- Analyzing and Interpreting Data



Guiding Question

How do NASA missions mitigate hazards in space?

Learners Will Do

Learn about hazards on the Moon, Mars, and asteroids.

Learners Will Know

Scientists compare hazards on Earth to hazards in space to think about ways to mitigate them.



Connecting Across Adventures

| Adventure 4: Earth Hazards | Adventure 5: Hazards in Space | Adventure 6: Mitigating Hazards for Your Mission |
|--|--|--|
| Last time , learners learned about hazards on Earth and explored ways to mitigate them. | Today , learners will learn that hazards also exist in space, some are the same as they are on Earth, and some are different. | Next time , learners will choose a NASA mission and think about the hazards, mitigation strategies, and other factors NASA should consider. |

Adventure 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-xxv](#). Access more PLANETS units, research, and pathways at <https://planets-stem.org/>.



weblink: <https://hov.to/4e74e636>

Materials and Preparation

Materials

For the educator

- Scissors or paper cutter to prepare cards
- Small bags to contain each deck of cards

For the whole group

- *Our Ideas* poster (on paper or a shared digital document)
[Examples](#) | [Templates](#)
- [Science Adventure 4 Hazards Card Game Rules Handout, pgs. 44-45](#)

For each group of 3 or 4 learners

- *Hazards Cards* [Decks B \(written or drawn cards from Adventure 3\) \(PDF\)](#), [D \(PDF\)](#), and [E \(PDF\)](#).
- [Science Adventure 4 Hazards Card Game Rules Handout, pgs. 44-45](#)
- [Playmat \(PDF\)](#) (optional)

Adventure 5 Materials Preparation (50 min.)

Ahead of Time

1. Review the “In-Use Example” in the [Prep & Setup Guide \(PDF\)](#) to help you think about what to add to the *Our Ideas* poster during the discussions in this adventure.
2. Read the [Educator Science Background \(weblink\)](#) to support your understanding of hazards in space.
3. For each group of 3 or 4 learners:
 - a. Set out *Hazards Cards* Deck B—Blank Cards, the written or drawn cards from Adventure 3 (3 cards per learner or pair).
 - b. From each Adventure 3 stack, sort out *Hazards Cards* Deck D—Earth and Space Icons (16 cards).
 - c. Print *Hazards Cards* Deck E—Space Icons (in color if possible) (20 cards).
 - d. Cut out Deck E cards by hand or with a paper cutter.
 - e. Combine Decks D and E to make stacks of 36 cards each.
 - f. Set out the *Science Adventure 4 Hazards Card Game Rules Handout*, pgs. 44-45, from Adventure 4.

In Your Space

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



Support Learner Differences



- ✦ For blind/low-vision and multilingual learners, choose the BLV Deck version of the cards to provide QR codes on the backside of each card. Each QR code is linked to a [unique webpage](#) designed to be easy to use with text-to-speech and translation technology.
 - [Accessible Version of Deck E \(PDF\)](#)
- ✦ To help orient blind/low-vision learners, place a thick sticker on the back of each card, centered along the top so that it's easy to tactically orient the cards right-side up and front-facing. This may take five additional minutes per deck.
- ✦ Add Wikki Stix or other raised lines to the playmat to help blind/low-vision learners orient to the mat. Remember to allow room between tables for all mobility equipment when setting up.
- ✦ A [limited tactile version of the card decks \(weblink\)](#) and [playmat \(weblink\)](#) also available. An estimated 5–10 minutes is required to punch holes in all the required areas per deck with a one-hole punch. In this deck, learners can match cards by site and by aligning tactile holes. Note that not all cards are included in these decks.

Adventure Guide

Get Ready & Team Up (5 min.)

1. Invite learners who did Adventure 4, Earth Hazards, to share what they did with a partner or in small groups. *(They played Earth Hazard cards and used Mitigation cards to deal with those hazards.)* As learners share, encourage them to refer back to the *Our Ideas* poster and point to the words *hazard* and *mitigate*, Earth hazards that were identified, and information about which hazards were easier or harder to mitigate. If learners shared words in their preferred languages that were captured in the poster, invite the learners to say them again in front of their peers.
2. Say: **Today you will play the card game again, adding hazards in space. Hazards exist in space, not just on Earth, and robots and people in space need to deal with those hazards.** Share the Guiding Question with learners aloud and write it on the *Our Ideas* poster (using multiple languages as needed): **How do NASA missions mitigate hazards in space?** Say: **The new cards show hazards in space and how robots and people deal with them.**
3. Organize learners into groups of 3 or 4 and distribute Science Notebooks. Have each group talk about the roles they like to play during group work. Have learners select roles (or assign them yourself).



Support Learner Differences

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



Hazards in Space (40 min.)

4. Give each group *Hazards Cards* Deck B-Blank Cards (the drawn or written cards created in Adventure 3), Deck D-Earth and Space Icons, Deck E-Space Icons, and a copy of the rules. Say: **The rules are the same; only the cards have changed.**
5. Ask learners to look at the cards in their groups and divide the cards among Hazard, Mitigation, and Chance by color or feel.
6. For learners who were present for the last two adventures, have them identify the cards they created (Deck B) that would apply in space and add these to the deck.
7. For new learners, ask them to observe the created cards (Deck B) and think of their own hazard and mitigation examples. Add any new key vocabulary on the *Our Ideas* poster under the Earth icon in the "Natural Hazards on Earth" category.



Support Learner Differences

Suggested group roles are listed on the *Science Adventure 4 Hazards Card Game Rules Handout*, pgs. 44-45. Change the role names and responsibilities to work for your group, and swap roles for each adventure. Check out the [Intentional Grouping Strategies](#), pg. xxii.



Support Thinking

Learners may disagree about which Earth hazards would also apply in space. Encourage them to discuss why particular hazards might or might not be present in space.

8. Start gameplay. Visit each group, ask which cards they want to know more about, and read them relevant information from the [Educator Science Background](#). If necessary, show the video [How to Play the Space Hazards Card Game](#) or refer to the *Science Adventure 4 Hazards Card Game Rules Handout*, pgs. 44-45.
9. As they play, have learners record the Hazards they face and mitigations they play on *Hazards in Space*, pg. 16, in their Science Notebooks.
10. After learners have finished playing, revisit the Guiding Question: **How do NASA missions mitigate hazards in space?** Have learners share hazards they encountered during the game. Record them under “Space” in the “Hazards” category on the *Our Ideas* poster and help learners understand difficult words (e.g., *radiation*, *micro-impact*) by giving examples, translating, gesturing, or acting out the words.
11. Have learners share mitigations they used during the game. Record them on the poster as well. Help learners understand difficult words (e.g., *evacuate*, *insulation*, *shielding*) by giving examples, translating, gesturing, or acting out the words.



Support Learner Differences



As necessary, pair learners so they can support each other in completing the *Hazards in Space* game.



Due to differences in human abilities, some people have more experience with mitigating hazards in their everyday life than others. For example, a blind person might be an expert at navigating in dark environments that would make their sighted (or seeing) friends feel uncomfortable. A person with food allergies may be an expert in reading food labels. Ask learners: **Can you think of some examples in your own life where something that makes you different also makes you an expert at hazard mitigation?**



Support Thinking

A lot of content learning paired with the cards is located in the [Educator Science Background \(weblink\)](#), and the [hazard videos playlist](#): *Dangerous Dust* (1:08), *Micro-Impacts and Low Gravity* (1:30), *Space Radiation* (1:27), *Extreme Temperatures in Space* (1:17), and *Volcanic Hazards* (from 0:32) and mitigation videos: *Using Local Resources (What's Around?)* (1:26) and *Robots and Space Hazards* (1:19).



Level Up!

Share information about how astronauts with various abilities have improved and continue to improve NASA's spaceflight program in “[About Mission: AstroAccess](#).” (5 min.)

Reflect & Wrap Up (10 min.)

12. Ask: **In real life, do you imagine it would be harder to mitigate Earth hazards or space hazards?**
As learners share, capture keywords they use to compare between hazards and mitigation strategies, such as *more difficult* and *easier*. Add them to the *Our Ideas* poster.
13. Say: **Next time, you will choose and plan for a NASA mission.**

After the Adventure

1. Clean up:
 - Keep the *Our Ideas* poster for use in Adventure 6.
 - Keep the *Hazards Cards* and *Playmats* for use in future adventures.
2. Plan for Science Adventure 6. See [Science Adventure 6 Preparation on pg. 54](#).
3. Take time to reflect on the following educator prompt: **How did you help learners understand the similarities and differences between this version of the card game and previous versions?**

Space Hazards Additional Resources

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



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



Support Thinking

To help learners remember the different locations, have them sort the cards by location.



Level Up!

Ask this story prompt: **What is a problem you have faced that is similar to a hazard in space?** Have learners share with a partner. Tell learners, if anyone asks them what they did today, they can tell them “We played a card game to learn about hazards in space and how to mitigate them, or make them less bad” and ask them the above story prompt. Consider returning to learners’ ideas at the start of the next adventure. (5 min.)



NASA has learned a lot about how to mitigate hazards in space from time spent by astronauts on the International Space Station. Learn more about these hazards in [5 Hazards of Human Spaceflight - NASA](#). (5 min.)