



Explore Science: Earth & Space Training Games Overview

Overall training learning goals

- Become familiar with various facilitation techniques and strategies for engaging learners
- Increase players' confidence related to talking and learning about Earth and space science topics

Materials

All of the games included in this guide are designed to be played with NASA's Solar System and Beyond Trading Cards (available from solarsystem.nasa.gov). For some, you may need to print and assemble additional decks based on the number of participants, remove certain cards from the deck and/or make use of the provided blank card template. Any additional materials to gather are listed in the guide for each game.

How to use these games

The activities outlined in this packet were designed as professional development exercises for educators. We recommend playing and debriefing one or more of these games as part of a longer staff or volunteer training session.

The games serve multiple purposes:

- They work well as icebreakers, allowing facilitators to get to know one another while reflecting on their role and strengthening essential skills.
- They allow facilitators to experiment and practice with different ways of engaging activity participants, asking open-ended questions, and guiding learning.
- They help players gain content knowledge by becoming familiar with the information on NASA's Our Solar System trading cards.
- They empower educators to facilitate positive, memorable learning experiences for diverse learners.

When leading the training, you can help model strategies for successful facilitation, such as making observations, asking open-ended questions, and making connections to relevant everyday phenomena or experiences. Make sure to debrief after each game, and combine these games with additional facilitation training and Earth & space science background content to prepare for your team's use of the Explore Science: Earth and Space toolkit.

Sample training outline

1.5–2 hours

- Activity Overview Presentation
- **Training Game and debrief discussion**
 - You may choose to take a break from presentation mode to play after reviewing the contents of the toolkit. This gives trainees an interactive opportunity to brainstorm facilitation strategies, which you can then review in following slides (“Tips for Leading Hands-On Activities” and “Tips for Interacting with Young Learners”).
- After the presentation, watch Edu-Cathalon: A facilitation strategies and best practices training video, found here: <https://vimeo.com/nisenet/explore-science-earth-space/video/304241578>. You can use a quick debrief discussion as a time to refer back to and reinforce the “Tips for Leading Hands-On Activities”.
- Following the presentation and video reserve time for a quick activity exploration or walk-through. Content and activity training videos for all the Explore Science: Earth & Space toolkit activities are available here: <https://vimeo.com/nisenet/explore-science-earth-space>.

Choosing a game

Depending on your training goals and the amount of time that you have available, you may choose to play just one of the games in this packet, or play all three. For quick reference, take a look at the descriptions, time requirements and ideal numbers of participants for each. If you can’t decide which game to play, why not try all three! Note that the time it takes to complete each game varies based on players’ familiarity with the content and the depth of debrief discussions.

- **SORT IT OUT** is a simple, tried-and-true exercise that gets participants moving and interacting. Players explore non-verbal and other novel communication strategies, while learning about the order and relative size of the solar system objects. They also practice categorization—an important communication and science process skill. The game can be completed in as little as 30 minutes (including time to debrief), and works best with nine or more players.
- **SPACELEBRITY** allows participants to practice giving succinct explanations, developing shared points of reference, and using body language. Players navigate various restrictions on communication while giving clues to teammates, and build rapport along the way. The game takes at least 45 minutes to play, and requires 6 or more people.
- **GREAT MINDS THINK ALIKE** requires players to anticipate teammates’ thought processes and come up with creative content connections to succeed. The game can be adapted to various time frames, taking anywhere from 15 minutes to an hour, and plays best in groups of 4–8 players.

Reviewing science content

Although all players have likely learned about the solar system at one time or another, depth of knowledge may vary. With this in mind, you may choose to offer a brief content refresher to get everyone on the same page before playing. You can review information about the existing cards in the deck by:

- Passing the cards around informally for everyone to read, with particular attention to the order and relative size of objects on the “Our Solar System” card
- Briefly presenting each card and sharing the information on the back
- Doing the *Exploring the Solar System: Pocket Solar System* activity together
- Showing the *Solar System Size and Distance video* from NASA JPL to go over relevant solar system science content (especially for “Sort it Out”)
- Taking an interactive journey through the solar system using NASA Eyes
- Showing this *National Geographic, Science 101: The Solar System* video to go over some basic Solar System science content (especially for “Spacecelebrity” and “Great Minds Think Alike”)

Adding custom cards

To make gameplay more challenging, invite participants to create custom cards featuring solar system objects using the blank card template (this works best with Great Minds Think Alike and Spacecelebrity). Participants should each add one or two cards to the deck. Offer assistance to anyone having trouble coming up with an Earth or space object not already in the deck. Ideas for additional objects or landscape features found in our Solar System include:

- Titan (Saturn’s largest moon)
- Enceladus (Saturn’s icy ocean moon—one of the most reflective bodies in the solar system)
- Io (Jupiter’s rocky moon—the most volcanically active world in the solar system)
- Ceres (a dwarf planet, and the is the largest object in the asteroid belt between Mars and Jupiter)
- Kuiper Belt (icy disk of space debris—home to asteroids, Pluto, and the birthplace of many comets in our solar system)
- Oort Cloud (vast area of icy debris, considered the edge of our Solar System)
- Craters (bowl-shaped depressions in the surface of planets, moons and other solid bodies, produced by the impact of a meteorite, volcanic activity, or an explosion)
- Valles Marineris (the “Grand Canyon of Mars”)
- Olympus Mons (Martian shield volcano—the largest of all known volcanoes in our Solar System)

- Antarctica (Earth’s southernmost continent)
- Mediterranean Sea
- Continental Divide of the Americas (Earth’s hydrological divide—one side flows into the Pacific Ocean, the other into the Atlantic)
- Challenger Deep (oceanic trench, deepest known point in Earth’s oceans)

Creating your own training game

Most of these exercises are adapted from existing, familiar games. After trying out our examples with staff and volunteers, you may be inspired to turn your own favorite party game into an icebreaker or training opportunity! If you do try your hand at game design, be sure to consult the Gaming and the NISE Network: A Gameful Approach to STEM Learning Experiences guide available here: <https://www.nisenet.org/catalog/gaming-guide>.



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