

Space Exploration Classroom Activity

The Classroom Activity introduces students to the context of a performance task, so they are not disadvantaged in demonstrating the skills the task intends to assess. Contextual elements include: an understanding of the setting or situation in which the task is placed, potentially unfamiliar concepts that are associated with the scenario, and **key terms** or vocabulary students will need to understand in order to meaningfully engage with and complete the performance task. The Classroom Activity is also intended to generate student interest in further exploration of the key idea(s). The Classroom Activity should be easy to implement with clear instructions.

Please read through the entire Classroom Activity before beginning the activity with students to ensure any classroom preparation can be completed in advance.

Throughout the activity it is permissible to pause and ask students if they have any questions.

Resources Needed:

- Chart paper, projector, whiteboard, or a chalkboard
- Markers or chalk
- One piece of paper and pencil for one student in each group. Students who need an accommodation may use their preferred tool for writing.
- Some method of displaying images and/or ancillary materials¹

Learning Goal:

- Students will understand the context of the key concepts related to the topic:
 - Earth is relatively small in the context of space
 - Scientists explore space for many different reasons
 - International scientists have achieved major accomplishments in learning how to live and work in space

Space Exploration Classroom Activity

[Purpose: The facilitator's goal is to introduce students to the reasons scientists explore space, to the concept that the universe is made up of many galaxies, and to the concept that scientists have accomplished much with regard to living and working in space.]

Facilitator says: "There have been many accomplishments in space exploration since the 1950s. In preparation for your performance task, you will first work in a small group* to gain an understanding of how small Earth is when compared to space as a whole. You will also meet with the whole class to discuss the topic further."

[*Note: The following section can be modified to accommodate various types of teacher-student interactions such as a teacher-led discussion with the entire class, teacher-student discussion with a single student, or small groups in remote locations.]

[Divide the students into small groups of 3–4 students. Assign one student to be the recorder for the group. Give this student a pencil and a sheet of blank paper. Then display **Image 1: Earth**. (Note: For students who are visually impaired, read the picture description beneath each image.)]

¹Facilitators can decide whether they want to display ancillary materials using an overhead projector or computer/Smartboard, or whether they want to produce them as a handout for students.

Facilitator says: “In your group, tell each other what you see in this picture, as well as what you already know, so that you can write down as many words as you can that describe Earth. You have 15 seconds.”

Possible class discussion answers (unscripted):

- Green
- Blue
- Mostly ocean
- Round
- 3rd planet from the Sun
- Climate change
- Environmentalism
- Beautiful
- Diverse

[After about 15 seconds, have students share some of their words with the class.]

Facilitator says: “Now that you have shared some of your words that describe Earth, how many of you would describe Earth as ‘small’?”

[Allow a few seconds for students to raise their hands, and then display **Image 2: Milky Way Galaxy**. (Note: For students who are visually impaired, read the picture description beneath each image.)]

Facilitator says: “Although Earth can seem large, when we think about it, it really depends on what you are comparing it to. Examine this image of the Milky Way Galaxy. As you can observe, the Sun is only one star out of many in our galaxy. What other objects might be found in this galaxy? In the next 30 seconds, discuss with your group and make a list of what else could be in this image.”

[After about 30 seconds, have students share items from their lists. If the answers in the list below are not mentioned by the students, the facilitator should mention them during the class discussion.]

Possible class discussion answers (unscripted):

- Stars
- Other planets
- Planets with moons
- Asteroids
- Comets

Facilitator says: “Earth is only one planet that orbits—or moves around—our Sun. The Sun is one star out of 300 billion stars in the Milky Way Galaxy, and many of those stars are also now known to have planets. The universe is made up of billions more galaxies. When thinking of Earth in the context of the whole universe, it is very small.”

[Remove **Images 1 and 2** from display.]

Facilitator says: “Outer space, or space, is the term used to describe the void—or area—between planets, including Earth. Why do you think scientists explore space? Discuss this with your group and have the recorder write down the group’s responses.”

[After about one minute, ask the students to share their responses to the question. This discussion should last about three minutes. Write the student responses on the board or chart paper. If the answers in the list below are not mentioned by the students, they should be added to the list.]

Possible class discussion answers (unscripted):

- Scientists explore space because they are curious about what is out there.
- Scientists explore space to try to understand Earth’s place in relation to its solar system, its galaxy, and the universe as a whole.
- Scientists explore space to learn how to live and work in outer space.

[Display **Image 3: Astronaut on the Moon**. (Note: For students who are visually impaired, read the picture description beneath each image.)]

Facilitator says: “Scientists have explored space for several decades, and they have accomplished a lot during that time. In your group, write down as many accomplishments in space exploration as you can in the next minute.”

[After about one minute, ask the students to share their responses to the question. This discussion should last about three minutes. Write the student responses on the board or chart paper. If the answers in the list below are not mentioned by the students, they should be added to the list.]

Possible class discussion answers (*unscripted*):

- Developing rockets to go into space
- Developing special suits to help people survive in space
- Landing a person on the moon
- People living in space (Russian Mir Space Station and the International Space Station)
- Sending satellites and telescopes to explore space
- Sending robots to explore the surface of Mars

Facilitator says: “Considering all the advancements in space exploration over the past 60 years, what do you think the future of space exploration might look like?”

[Ask students to share their responses to the question. This discussion should last about three minutes.]

Possible class discussion answers (*unscripted*):

- People visiting Mars and other planets
- Astronauts capturing and studying an asteroid
- Scientists discovering life on other planets
- Average people taking trips into space

Facilitator says: “In your performance task, you will learn more about space. Remember that scientists explore space for many reasons, that Earth is only one planet in an extremely large universe, and that scientists have accomplished much with regard to living in and exploring outer space. You are now ready to complete your performance task. Please leave your recorded notes and pencils behind to be collected.”

Ancillary Materials

Image 1

Earth



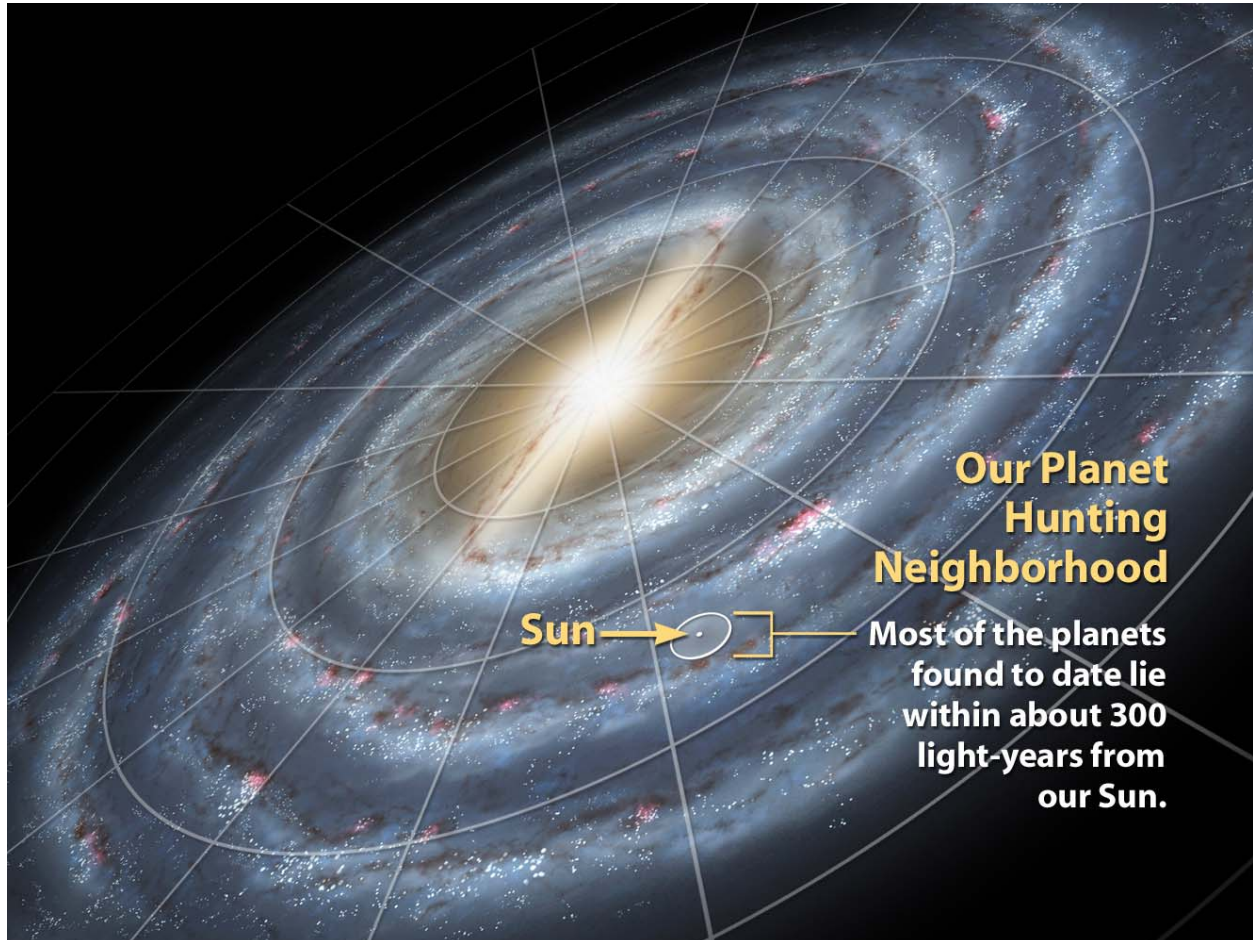
Picture Description: This is an image from NASA of Earth. Earth is round with swirls of clouds over its surface.

Image by NASA. In the public domain.

Ancillary Materials

Image 2

Milky Way Galaxy



Picture Description: This image from NASA shows the Milky Way Galaxy which is also our planet hunting neighborhood. There is an arrow pointing to the Sun, which is only one of many stars in the photograph of the Milky Way Galaxy. The Sun is in the center of a small circle and the following is written next to the Sun: “Our Planet Hunting Neighborhood—Most of the planets found to date lie within about 300 light-years from our Sun.”

Image by NASA. In the public domain.

Ancillary Materials

Image 3

Astronaut on the Moon



Picture Description: This photograph from NASA shows an astronaut standing on the Moon. He is standing next to an American flag. Behind him there is a space craft with a sign that displays an American flag and the words "United States." There is also a vehicle with wheels next to the space craft.

Photograph by NASA. In the public domain.