

Artifact Immersion: Earth & Its Place in the Universe

Subjects: Science, Engineering

Grade Level(s): 5-8

Time: 60 minutes

Objectives

Students will:

- Explore artifacts on display at the Smithsonian National Air and Space Museum's National Mall Building, the Steven F. Udvar-Hazy Center, and our digital collection to learn about the tools we use to discover the Universe.
- Understand the uses and constraints of various types of instruments.
- Practice close looking skills using [The Explanation Game](#) in order to better analyze and construct meaning around why instruments are designed the way they are.

Pre-Immersion

During the Artifact Immersion, students will learn more about how we know what we know about Space. Before engaging with this activity students should consider and respond to the questions below. Use their responses to these questions to provide a framework for how they should engage with the artifact immersion.

1. What are some of the questions scientists may have about Space? Think about the following:
 - a. What are celestial objects you would want to explore in Space? What would you like to know about them?
 - b. How does distance impact studying celestial objects?
 - c. What are constraints to studying celestial objects from Earth and to launching instruments into Space?
2. Do you think all instruments designed to explore and study space are created the same way? Why or why not? What are differences you might see?
3. Design your own mission in Space. If you could learn anything, what would it be and why? Share where you would go, what would be involved (e.g. landing on another celestial body, going around a specific celestial body, human space travel, etc). At the end of the artifact immersion, you'll be selecting the instrument(s) necessary to complete your mission!

Immersion Activity

Have students collect data about the different instruments highlighted and how we use them to explore the universe using the [Earth and Its Place in the Universe Artifact Immersion](#) Activity.

Data Collection Sheet

Use this sheet to organize observations and data on each Instrument in the Artifact Immersion. For each Instrument:

- Look closely at the artifact. What do you see, or notice? Write down 3-5 observations in the Notice column.
- Based upon your observations, answer the question “Why is it that way?” For example, if you noticed that the instrument has wheels, share why you think there are wheels in the Why is it that way? column.
- Categorize the instrument in the Instrument Type Column. The different types are:
 - a. Earth-based,
 - b. Airborne and orbital telescopes
 - c. Probes and flyby spacecraft
 - d. Orbiters
 - e. Landers
 - f. Rovers
 - g. Sample Return
- Finally, read through information on the Instrument on the Google Site. What was the purpose of the instrument? What design elements helped it to accomplish its purpose?

Instrument	I notice that... Why is it that way?	Instrument Type & Purpose

Post - Immersion:

Use post-visit questions to lead a discussion with students about what data they collected.

- What is each type of tool designed uniquely to do?
- Think critically about each group. What are the constraints of each design?
- Think back to the mission you created before the Artifact Immersion. What instrument types would you need for this mission? Why? Are there any design constraints that would keep you from completing your mission? What are they?

Extensions

Have students find additional artifacts in the National Air and Space Museum Collection that fits into one of the instrument type categories. Students should research each tool and place them in chronological order. Once in chronological order, students should note the changes over time made to the design (e.g. if they select orbiters, order the orbiters chronologically and then describe changes in design over time).

Resources

- To see more instructional content published by The National Air and Space Museum visit our page on [Smithsonian Learning Labs](#) and our website at [Air and Space Learn](#).
- More information on how we explore the universe can be found on the National Air and Space Museum Explore the Universe exhibit [page](#), and more information on tools of exploration can be found on the Explore the Planets exhibit [page](#).