

# Space Exploration

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<b>Strand</b>	Interrelationships in Earth/Space Systems
<b>Topic</b>	Investigating the history and technology of space exploration
<b>Primary SOL</b>	6.8 The student will investigate and understand the organization of the solar system and the interactions among the various bodies that comprise it. Key concepts include i) the history and technology of space exploration.
<b>Related SOL</b>	6.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which j) current applications are used to reinforce science concepts.

## Background Information

The ideas of Ptolemy, Aristotle, Copernicus, and Galileo contributed to the development of our understanding of the solar system. With the development of new technology over the last half-century, our knowledge of the solar system has increased substantially.

## Materials

- Several sets of “Who Am I?” cards (attached)
- Space Exploration KWL Chart (attached)

## Vocabulary

*astronomer, robotic, satellite, telescope*

## Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

### Introduction

1. Tell the story of the study of the space, using foundational ideas of space theories from Ptolemy, Aristotle, Copernicus, and Galileo to modern day accomplishments. Pass out the “Who Am I?” cards for partners to study the scientists listed on them. Then, have students switch partners to play “Who Am I?”

### Procedure

1. Distribute copies of the attached Space Exploration KWL Chart, and have students fill in the “What I Know” column. Then, have them share comments from their lists. Next, instruct them to fill in the “What I Want to Know” column.
2. Have students work in small groups to create and interpret a timeline highlighting the advancements in solar system exploration over the past half century. This should include information on the first modern rockets, artificial satellites, orbital missions, missions to the moon, Mars robotic explorers, and exploration of the outer planets. As groups research and compile data, direct students to fill in the “What I Learned” column.
3. Have each group present two or three items from their timeline and field questions from the rest of the class.

## **Assessment**

- **Questions**
  - Before telescopes, how did people learn about space?
  - What inventions have most impacted human knowledge of space?
- **Journal/Writing Prompts**
  - Tell about each of the four astronomers from before the twentieth century.
  - Explain four major advances in space exploration
- **Other**
  - Assess the “What I Learned” information listed in students’ KWL Charts.
  - Assess students’ timelines.
  - Assess students’ participation in questions/answers from the timeline presentations.

## **Extensions and Connections (for all students)**

- Assign small groups the task of researching current astronauts and astronomers and then create their own “Who Am I?” cards.

## **Strategies for Differentiation**

- Have student partners conduct simulated interviews to introduce assigned astronomers.
- Using technology, have students take a virtual tour of a space exploration facility or show a video about space exploration.
- Have students write letters to NASA requesting information about the space program.
- Invite a local expert on space from a university or science museum to discuss the space program, including any personal experiences he/she may have had.
- Have students interview their parents/grandparents about their memories of the early days of the space program. Let students determine the questions that will be used for the interview. Allow students to share their interviews with class.

## “Who Am I?” Cards

### Who Am I?

1. I lived in Ancient Rome in the 2<sup>nd</sup> century.
2. I was a geographer (cartographer), mathematician, and astronomer.
3. I wrote a book about the location and position of the stars.

*I am Ptolemy.*

### Who Am I?

1. I lived in Poland in the 15<sup>th</sup> century.
2. I was a doctor and astronomer.
3. I published a theory that the planets rotate around the sun in a solar system.

*I am Copernicus.*

### **Who Am I?**

1. I lived in Greece during the 5<sup>th</sup> century.
2. I was a philosopher and scientist.
3. I believed the sun was larger than the earth and that stars are far away from the planets.

*I am Aristotle.*

### **Who Am I?**

1. I lived in Italy in the 16<sup>th</sup> century.
2. I was an inventor and astronomer.
3. I invented a powerful telescope that confirmed Copernicus' theory of a solar system was true.

*I am Galileo.*

# Space Exploration KWL Chart

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

<b>K</b> <b>What I <u>K</u>now</b>	<b>W</b> <b>What I <u>W</u>ant to Know</b>	<b>L</b> <b>What I <u>L</u>earned</b>