

Station D: Astronomy

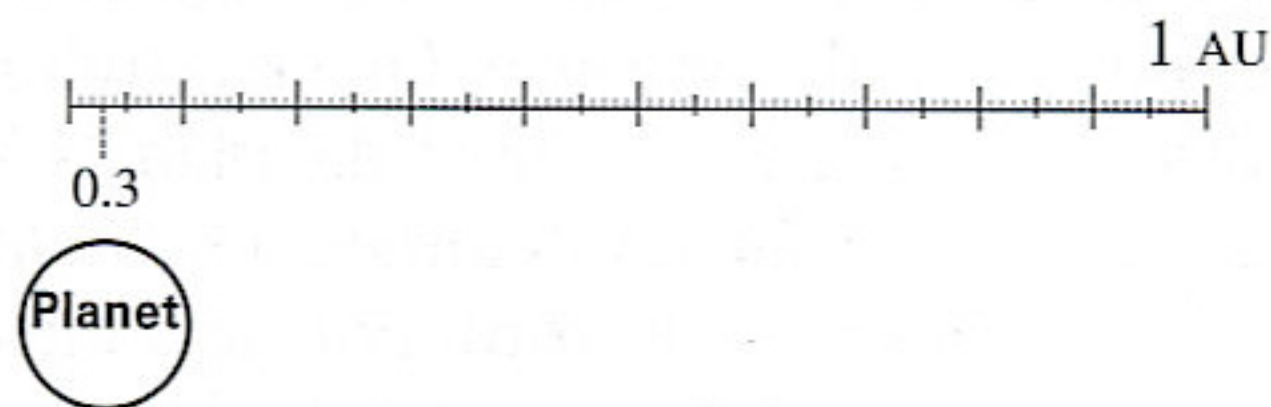
1. **Read the information about astronomy and list major achievements.** Carefully read and discuss the information below about the ancient Greeks' achievements in the field of astronomy. Then, list three major ancient Greek achievements in the field of astronomy in the Station D section of **Student Handout 4.1A**.

The ancient Greeks contributed much knowledge to the field of *astronomy*, the study of the planets, stars, and other objects in the universe. Greek astronomers mapped the positions of the stars and discovered the existence of the planets Mercury, Venus, Mars, Jupiter, and Saturn. They proposed that the Earth turned, or *rotated*, on its *axis*, an imaginary line through the Earth between the North Pole and the South Pole. Some astronomers tried to calculate the sizes of the Sun and the Moon and their distances from the Earth. The Greeks also predicted solar *eclipses*, when the Moon, moving between the Earth and the Sun, blocks out the sun's light. Greek astronomers were able to identify the spring and fall *equinoxes*, when the Sun is directly over the equator and the lengths of the day and the night are almost equal. It was also a Greek who proposed that the pull of the Moon's gravity causes ocean tides to rise and fall.

One of the most important Greek astronomers was Aristarchus (pronounced air-ih-STAR-kiss). He proposed that the Sun was the center of the solar system, and that the planets revolved around it. Scholars do not know the techniques he used to reach his conclusions, because most of his original work was lost. Most Greeks refused to accept Aristarchus's ideas. They believed the Earth was the center of the solar system. Religious people felt that the Gods certainly would place the Earth at the center of their creation. Fellow scientists argued that the stars did not change their positions in the sky, which would happen if the Earth circled the sun. It was not until the 1500s C.E.—when Nicolaus Copernicus (pronounced koh-PURN-ih-kiss) also suggested that the Sun, not the Earth, is the center of the solar system—that astronomers accepted Aristarchus's theory. Over time, astronomers have refined Aristarchus's beliefs. In addition to the planets the Greeks knew, later scientists discovered Uranus, Neptune, and Pluto. Astronomers have also determined the distances between the Sun and each planet. Often they express these distances in astronomical units (abbreviated AU). One astronomical unit equals 93 million miles, the distance from the Sun to the Earth.

2. Complete the following task and record your findings. Carefully follow the steps below to create a scale model of the solar system.

- Use the astronomical unit (AU) values listed in the chart below to arrange the planet tokens along the line segment. Note that the line segment is divided into 40 astronomical units, and that each astronomical unit is divided into 10 equal parts. So, if a planet is 0.3 astronomical unit, or 3/10ths of an astronomical unit, it would be placed at the following location on the line segment:



Planet	Relative Distance
Mercury	0.4 AU
Venus	0.7 AU
Earth	1.0 AU
Mars	1.5 AU

Planet	Relative Distance
Jupiter	5.2 AU
Saturn	9.5 AU
Uranus	19.2 AU
Neptune	30.1 AU
Pluto	39.4 AU