

The solar system

Outstanding Science Year 5 - Earth and space - OS5D001



National Curriculum Statutory Requirements

5D1 - describe the movement of the Earth, and other planets, relative to the Sun in the solar system

Learning Objective



I can explain how the Earth and other planets in the solar system move.

Me:   

Teacher:   

The **solar system** is what we call the Sun and all of the objects near to it in space, including the planet Earth. Today, we have a good understanding of the solar system. However, ancient astronomers had a different idea of how it worked.

How did the Sun appear to ancient astronomers?

Ancient astronomers noticed that the Sun appeared to move across the sky, rising in the east and setting in the west. They observed that the Sun appeared higher in the sky during the summer, and lower during winter. They observed that this cycle repeated itself about once every 365 days.

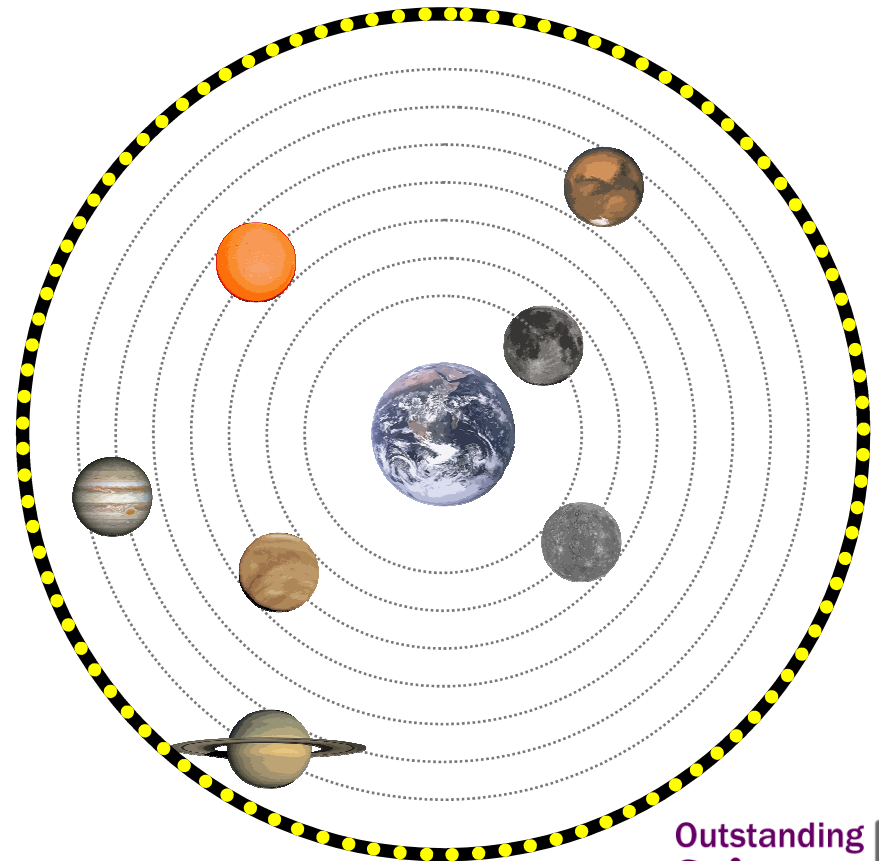
How did the night sky appear to ancient astronomers?

They observed that the Moon appeared to move across the sky and change its appearance, and that this happened in a pattern which repeated every 30 days. They also noticed that at night, there were thousands of stars in the sky which appeared as points of light. The stars appeared to move across the sky together, as if they were all attached to a moving surface. Ancient astronomers also noticed some stars which did not move with the others, but appeared to 'wander' on their own. They called these objects 'wandering stars'.

Based on what they could observe, ancient astronomers thought that the Earth was the centre of the universe, and that everything else moved around it in circles. We call this the **geocentric model** (geo- is an Ancient Greek word meaning Earth).

The Geocentric Model

In this model, the Earth is at the centre of the universe and is circled by the Moon, Mercury, Venus, the Sun, Mars, Jupiter, Saturn and a sphere of fixed stars. **This model is incorrect.**

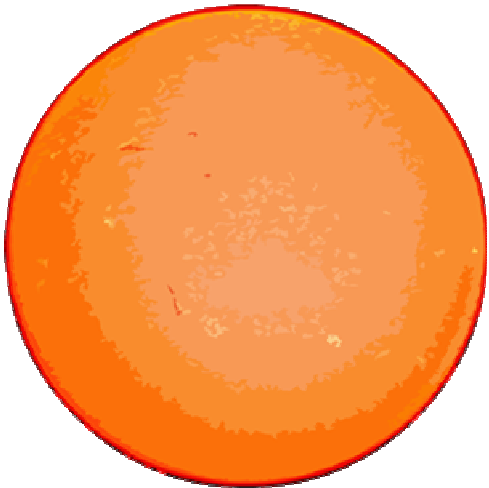


The heliocentric model

As astronomers became better at making detailed observations, they noticed that objects did not move as they should if the Earth were the centre of the universe. At first, they tried to change the existing theory by adding 'epi-cycles' to the movement of the Sun, Moon and planets.

Some astronomers came up with a better theory - better because it was a closer match to their observations. In this model, the Sun is at the centre of the universe and the planets move in circles (orbits) around it. This is called the **heliocentric** model (helios is the Ancient Greek word for 'Sun').

As time passed, scientists have made more detailed observations and improvements to the heliocentric model. We have discovered several more large and small planets. We know that the Moon directly orbits the Earth, and that other planets have moons orbiting them. We know that the Sun is a star, and that the other stars appear tiny because they are extremely far away.



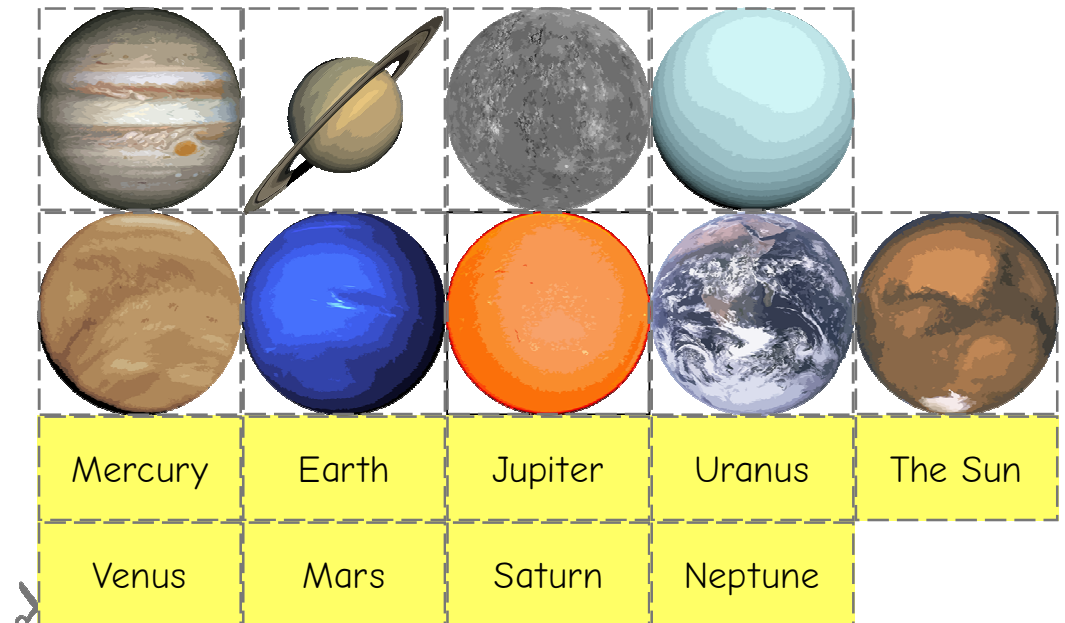
The Heliocentric Model

In this model, the Sun is the centre of the solar system. The planets orbit the Sun. The heliocentric model is better than the geocentric model because it agrees more closely with observations.

The reason that people have adopted the heliocentric model over the geocentric model is because it matches more closely to our observations.

Activity

Carefully cut out these pictures of the Sun and the eight major planets in our solar system. Use them to complete the diagram on the next page.



Discussion

Can you explain the geocentric model?

Can you explain the heliocentric model?

Can you explain why we accept the heliocentric model and reject the geocentric model?

Can you name the 8 major planets in order of distance from the Sun, closest first?

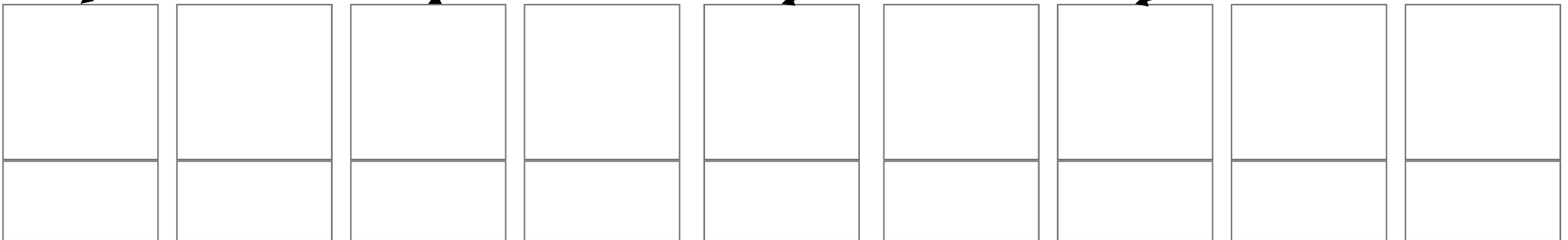
The main bodies in the Solar System
Sizes and distances are not to scale.

This star is at the centre of the solar system. It is a gigantic ball of gas which gives off heat and light through nuclear reactions.

This planet is named after the Roman goddess of love. It is almost the same size as the Earth. Its surface is extremely hot.

This planet is nicknamed 'The Red Planet'. Scientists have recently found evidence of liquid water flowing on its surface.

This planet is easily recognised because of its rings. The rings are made up of many lumps of ice but appear solid from far away.



This small planet is the closest to the centre of the solar system. It is named after the Roman messenger of the gods. It is very hot.

This planet is the only one known to have life on its surface. Two-thirds of its surface is covered in liquid water oceans.

This gas giant is the largest planet in the Solar System. Its surface has a great red spot and it has many moons.

This planet is named after the Greek and Roman god of the sky. Its discoverer wanted to call it 'George's Star'.