

# History of the solar system

## Scenario

Our understanding of the solar system and beyond has changed over the centuries and continues to change on a regular basis. You have been asked to create a presentation to be given to the whole school in World Space Week to explain how our ideas have changed over time and what evidence has helped improve our understanding of our place in the universe.

## Learning objective

To identify the scientific evidence that has been used to support or refute different ideas about the solar system.

## Key words

- Geocentric • Heliocentric • Planets • Telescope
- Models • Decelerate • Observations • Ellipse
- Orbit • Landers • Orbiters

## Equipment

- Set of research cards – changing ideas about the solar system
- Materials for making notes

## NC statutory requirements KS2

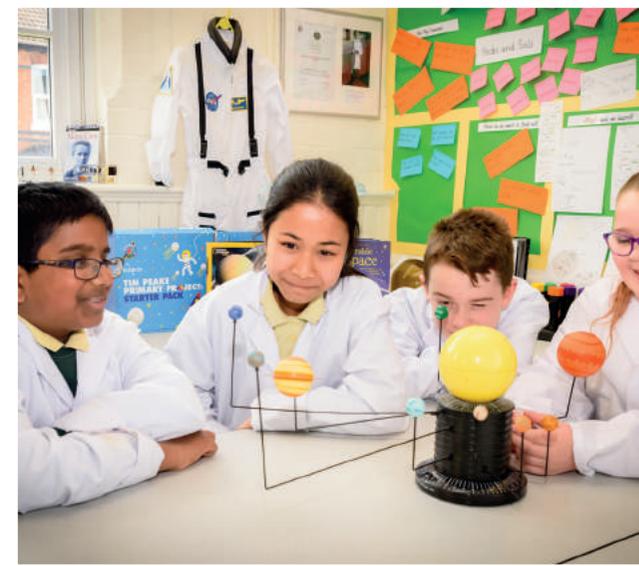
- To describe the movement of the Earth and other planets relative to the Sun in the solar system
- To describe the Sun, Earth and Moon as approximately spherical bodies

## Maths skills

- Identifying how mathematical patterns have been used to draw conclusions about how things are in the solar system
- Using shape vocabulary to describe models of the solar system

## Literacy links

- Creating a PowerPoint presentation to describe how ideas have changed over time
- Using bullet points to summarise key ideas and evidence
- Creating a script to go with the PowerPoint in preparation for sharing findings with an audience



## Working scientifically

- Researching how ideas have changed over time using secondary sources of information
- Using appropriate scientific language to communicate findings
- Presenting findings as a presentation to an audience



# History of the solar system - teaching notes



## Background science

Since the earliest times, humans have made observations of the night sky. These observations, particularly of the Earth, Moon, Sun and planets (visible to the naked eye), led to the development of models to explain the movement of these natural satellites. Ideas about the solar system have been developing for thousands of years. Our knowledge has grown as the technology has developed to give more detailed observations and measurements – from the sextant and the astrolabe, to the first telescopes; to bigger and better telescopes and then orbiters and landers that we have launched into the solar system. In this enquiry, children will consider just a few of the significant contributions to our understanding of the universe.

## Extension

- Create a timeline to show how our ideas about the solar system have changed over time
- Develop a practical aspect to this project by making working refracting telescopes, linking with learning about light

## Method

1. Each group is given a set of research cards to help them learn how ideas have changed over time. Provide a variety of materials for children to make their notes – paper, post-it notes and a variety of pens.
2. Children work in teams to make notes about each key event focusing on the 5Ws – Who? What? When? Where? Why?
3. For each idea, children should be encouraged to identify the evidence that supports it.
4. Where people have disagreed with ideas, children should identify the evidence that refutes the idea.
5. Children then work in pairs to turn their notes into a PowerPoint presentation: How ideas about the solar system have changed over time? Children can also prepare their script for what they will say when they deliver their presentation.
6. Tell the children that Copernicus is another important scientist who could appear on the Earth and space research cards. Can they make a card about him?
7. Children give their presentations to the class.

## Practical work – making a telescope

The telescope was a pivotal discovery in the development of our ideas about the solar system. It provided vital evidence to prove that the geocentric (Earth-centred) model was wrong. Simple telescopes can be constructed from a pair of convex lenses and some cardboard tubes or you can purchase low cost kits with everything you need.

## Links with everyday life

- Research new and current enquiries to find out which methods astronauts and astrophysicists are using to find out more today (Rosetta Mission, New Horizons or the James Webb Space Telescope)
- Find out about careers in the space industry – perhaps get an interesting visitor to come and talk about their work



# History of the solar system – outcomes

- 00AD — Claudius Ptolemy is born in Egypt
- Ptolemy wrote 'Almagest' and says that the Earth is in the centre of the universe with the Sun, Planets and stars orbiting it (Geocentric)
- 186AD — Ptolemy died in Alexandria
- 1473 — Nicholas Copernicus is born in Poland.
- 1543 — Copernicus dies after publishing his revised model with the Sun at the centre (Heliocentric)
- 1546 — Tycho Brahe born in Denmark
- 1564 — Galileo Galilei born in Italy
- Tycho Brahe publishes model where the Moon and Sun orbit the Earth and everything else orbits the Sun (Geocentric/Heliocentric)
- 1571 — Johannes Kepler born in Germany
- 1601 — Brahe dies suddenly
- Kepler uses Brahe's data for his work
- 1609 — Kepler publishes 'Astronomia Nova' with his laws of planetary motion he found from Brahe's data (Heliocentric)
- 1610 — Galileo builds a telescope and observes the 4 moons of Jupiter.
- 1612 — Galileo is first to observe Neptune but doesn't realise it is a planet.
- 1630 — Kepler dies
- 1642 — Galileo dies
- 1977 — Voyager 2 is launched to collect data and photos of the Gas giants.
- 1979 — Voyager 2 reaches Jupiter
- 1981 — Voyager 2 reaches Saturn
- 1986 — Voyager 2 reaches Uranus
- 1989 — Voyager 2 reaches Neptune
- 2007 — New Horizons space probe is launched to collect data and photos of Pluto and its moon Charon.
- 2015 — New Horizons arrives at Pluto.



About  
 Nicholas Copernicus was born in 1473 in the country of Poland. He was an astronomer who studied the night sky. Copernicus changed our understanding of the Solar System after it had been unchanged for 1500 years. Copernicus died in 1543.

## Nicholas Copernicus

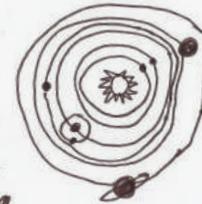
### Working Scientifically

Copernicus observed and measured the positions of objects in the night sky. He observed changes over time and came up with a new model for the universe. Copernicus made predictions about what might happen and then made observations to see if he was right. After Copernicus looked for mathematical patterns in the data he collected, Copernicus wrote a book 'On the revolutions of celestial spheres' that was published just before his death.

### Model

Copernicus thought the Sun was at the centre of the 'lunar sphere' and that the Earth and other planets orbited the Sun.

Copernicus thought there were six planets: Mercury, Venus, Earth, Mars, Jupiter and Saturn as these were the only ones you could see without a telescope.



# History of the solar system - Bloom's taxonomy question bank

## Remembering



- How many planets are there in the solar system?
- Name the planets in order.
- What is the heaviest object in the solar system?

## Analysing



- How many different ways can you group the planets?

## Understanding



- Why do planets stay in orbit?
- Why don't planets fall towards the Sun?

## Evaluating



- Who, in your opinion, played the most significant role in developing our current model of the solar system?
- Imagine you are Galileo, how would you argue your case to the Catholic Church?

## Applying



- How would you explain why Jupiter has more moons orbiting it than any other planet?
- What would happen to the Earth's orbit if it started travelling faster/slower?

## Creating



- If you had access to all the resources in the world, what would you do to find out more about the solar system?
- What 'big questions' do we still need answers to?

