

Earth & Space

The solar system, orbits & the heliocentric model



1. What is the heliocentric model of the solar system?

The **heliocentric model** shows the sun at the centre, with planets orbiting it.

- Historically, people believed the geocentric model, with Earth at the centre.
- Scientists like Copernicus provided evidence that changed this accepted view.

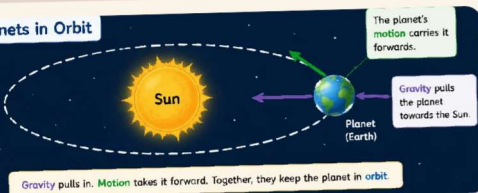
3. Why do the planets move in a circular, not straight, path?

Gravity pulls planets towards the sun, curving their path into an **orbit** rather than letting them fly off in a straight line.

- Without gravity, objects would continue moving in a straight line forever.
- The balance between gravity and motion keeps planets in orbit.

Gravity: Keeping Planets in Orbit

The Sun's gravity pulls the planets towards it. The planets are moving very fast sideways. These two forces balance out, so the planets keep moving in a curved path (orbit) around the Sun.



Gravity pulls in. Motion takes it forward. Together, they keep the planet in orbit.

5. Why do the sun, moon and stars appear to move across our sky?

Because the Earth spins, the sun, moon and stars only appear to move across the sky.

- This is why the sun seems to rise in the east and set in the west.
- A shadow-stick model helps demonstrate this apparent movement.

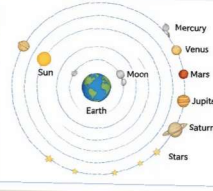
6. Greater Depth: how did evidence change the accepted model of the solar system?

Scientific ideas change when new evidence, like telescope observations, challenges old beliefs.

- For centuries, people accepted the geocentric model without strong evidence to test it.
- Careful observation and evidence eventually proved the heliocentric model correct.

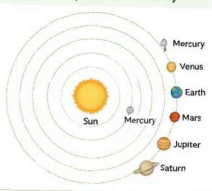
Geocentric Model (Earth-Centred)

- Earth is at the center of the universe.
- The Sun, Moon, planets and stars orbit around Earth.
- This was the view held by many ancient cultures.



Heliocentric Model (Sun-Centred)

- The Sun is at the center of the solar system.
- Earth and the other planets orbit around the Sun.
- This is the view accepted today.



2. How do the movements of the Earth, sun and moon explain day, year and month?

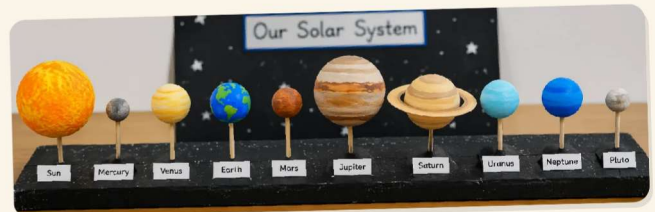
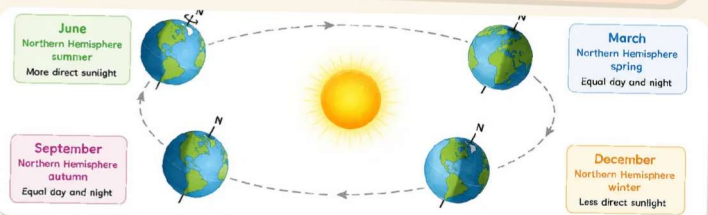
The Earth's **rotation** gives us a day; its **orbit** of the sun gives us a year; the moon's orbit of Earth gives us a month.

- Earth takes roughly 365 days to orbit the sun once.
- The moon takes roughly 28 days to orbit the Earth once.

4. Why do we have seasons?

Earth's **tilted axis**, not its distance from the sun, causes the seasons as we orbit.

- When your hemisphere tilts towards the sun, you get summer; tilted away, winter.
- This is a common misconception worth challenging using evidence.



7. TAPS: How do we write up our craters investigation?

FAIR TEST

Our TAPS task: **what affects the size of a crater when an object is dropped into sand?** It's a **fair test**, separate from our Big Question — we change one variable (like drop height) and keep the rest the same.

- Question → **prediction** → variables (independent / control / dependent).
- Materials → **method** → carry out the test → **results** → **conclusion**.

What Affects the Size of a Crater When an Object is Dropped into Sand?

Our Question

What affects the size of a crater when an object is dropped into sand?

We will change:

What we will change	How we will change it	What we will measure
1. Size of object	Use small, medium and large balls.	Measure the width of the crater (cm).

Prediction

We think bigger, heavier objects dropped from higher up will make bigger craters.

Results (example)

Test	What we changed	Crater width (cm)
1a	Size - small	4.2
1b	Size - medium	6.8
1c	Size - large	9.6

KEY VOCABULARY

heliocentric geocentric orbit rotation axis tilt gravity evidence shadow predict conclusion

SKILLS I'LL USE

- Observe & measure over time
- Model the solar system's movements
- Record results in a table
- Explain using scientific evidence
- GD: challenge misconceptions using evidence