

Activity O

The Earth and Beyond

Introduction

A PowerPoint presentation is the key resource used in this lesson where pupils examine ideas and evidence about the Earth and the Universe.

Objectives

Pupils will learn:

- that scientific ideas need evidence to support them;
- that evidence can be interpreted in different ways to support different theories (e.g. the Sun's apparent movement around the Earth or the Earth rotating about its axis);
- to analyse information about the different ideas of the structure of the Universe and support them with evidence.

Outcomes

By the end of the lesson, pupils will be able to:

- state why objects are attracted to the Earth;
- select evidence to support particular theories about the structure of the Universe;
- justify theories about the structure of the Universe, using the evidence provided;
- recognise evidence that supports the theory that the Earth is not the centre of the Universe.

Notes for Teachers

The first 3 PowerPoint slides show an absolute 'up' and 'down' view of the world – that stones drop to 'down' and smoke floats 'up'. Pupils may not see any conflict here with *magnetism*, which sometimes appears when pupils say there is no gravity on the moon, but astronauts have magnetic (or heavy!) boots.

The evidence cards are part of the PowerPoint and should be printed out for pupils to consider at their own pace in their groups.

Possible Assessment/homework tasks

Higher attaining pupils:

- 1) What daily observations supported the ancients' view that the Earth was the centre of their universe?
- 2) In what way were the ancients adopting a scientific method?
- 3) Were the people who put forward these ideas poor scientists if we now know that they were wrong? Explain your answer.
- 4) What other evidence was used to develop the modern view that the Earth orbits the Sun?

Lower attaining pupils:

- Many ancient people thought that the Earth was the centre of the Universe. What do you think they noticed around them that made them believe this was true?

Teaching Sequence

- The starter is a PowerPoint presentation (slides 1 to 3) of evidence to support the idea that gravity, and not magnetism, is the force of attraction between objects and the Earth. Challenge the pupils into thinking about the evidence for gravity, as opposed to magnetism. Pupils can be asked to identify the correct diagram.
- The main activity is focused around 2 worksheets. For activity sheet 1 (*What is the Solar System Like?*), pupils draw a diagram of what they think the Solar System would look like according to their given theory.
- For activity sheet 2 (*Sort the Evidence*), pupils to tick a box for each of the statements, to indicate whether the statement supports, argues against or makes no difference to their given theory.
- Pupils present their findings to the rest of the group, identifying the evidence that best supports their theory.
- The plenary is a matching activity, using evidence cards. Some evidence supports the idea that the Earth is at the centre of the Universe and some support the idea that the Earth is not at the centre of the Universe. Pupils have to decide which evidence supports which idea. A PowerPoint draws the pupils' ideas together.

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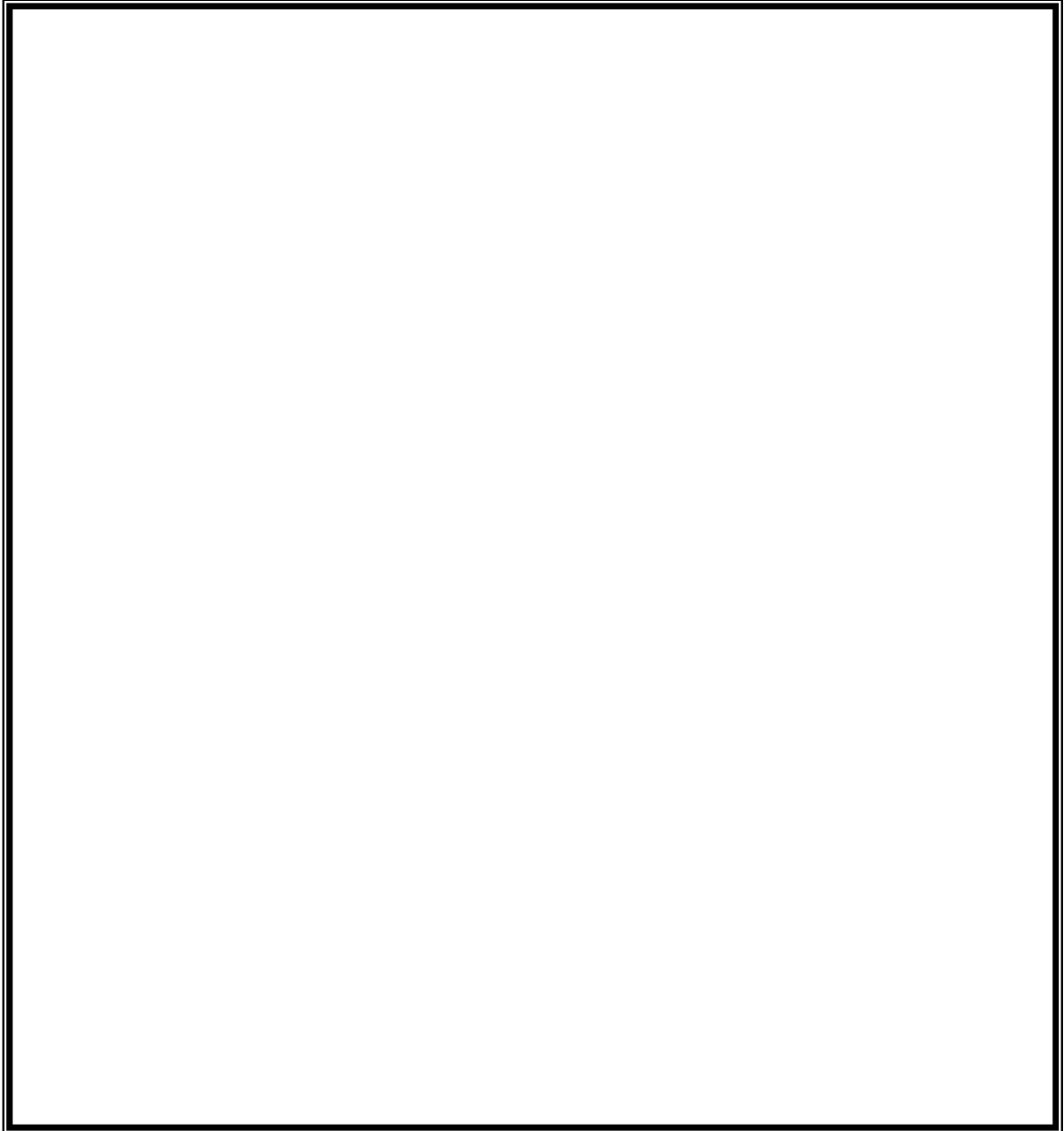
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What is the Solar System like?

Look at your theory card. In the space below draw a diagram of what you think the Solar System would look like according to your theory.



Sort the Evidence

For each statement below, tick the correct box to say if you think the statement supports your theory, refutes your theory, or neither supports or refutes your theory.

Observation	Supports	Refutes	Neither
The Sun rises in the east, moves across the sky and sets in the west.			
The Moon rises in the east, moves across the sky and sets in the west.			
Planets move in a regular, repeating pattern.			
You can't see all the planets all of the time.			
The stars move across the sky.			
The patterns that the stars make (constellations) stay the same.			
The Sun shines during the day.			
The Moon is visible at times of the day and night.			
The Sun is one of the biggest objects in the sky.			
There is no feeling of movement when you stand still on the Earth.			
The Moon looks as big as the Sun, but we can see more detail of its surface so it must be closer.			
When you move around, your view of your surroundings changes even if nothing has moved.			
The shape of the Moon changes over a month.			
The Sun, Moon and planets all follow a similar path across the sky, going through the same star patterns.			
We see the same view of the stars every 24 hours.			
Floating objects in a bath of water with the water draining out, travel in circles as they get close to the plug hole.			
Some planets seem to travel much faster than others do.			
To make an object start moving or change direction, a force has to be applied.			