

Science - Year 5

Earth and Space – Block 5ES

Space Presenters

Session 1

Resource pack

Prof Cox's Statements

The Earth and planets move around the Sun.

The Earth's Moon appears to change shape throughout the month.

The Earth spins on its axis.

The Sun is at the centre of our solar system.

Stars don't move around the Earth.

Day and night are the result of the Earth spinning on its axis

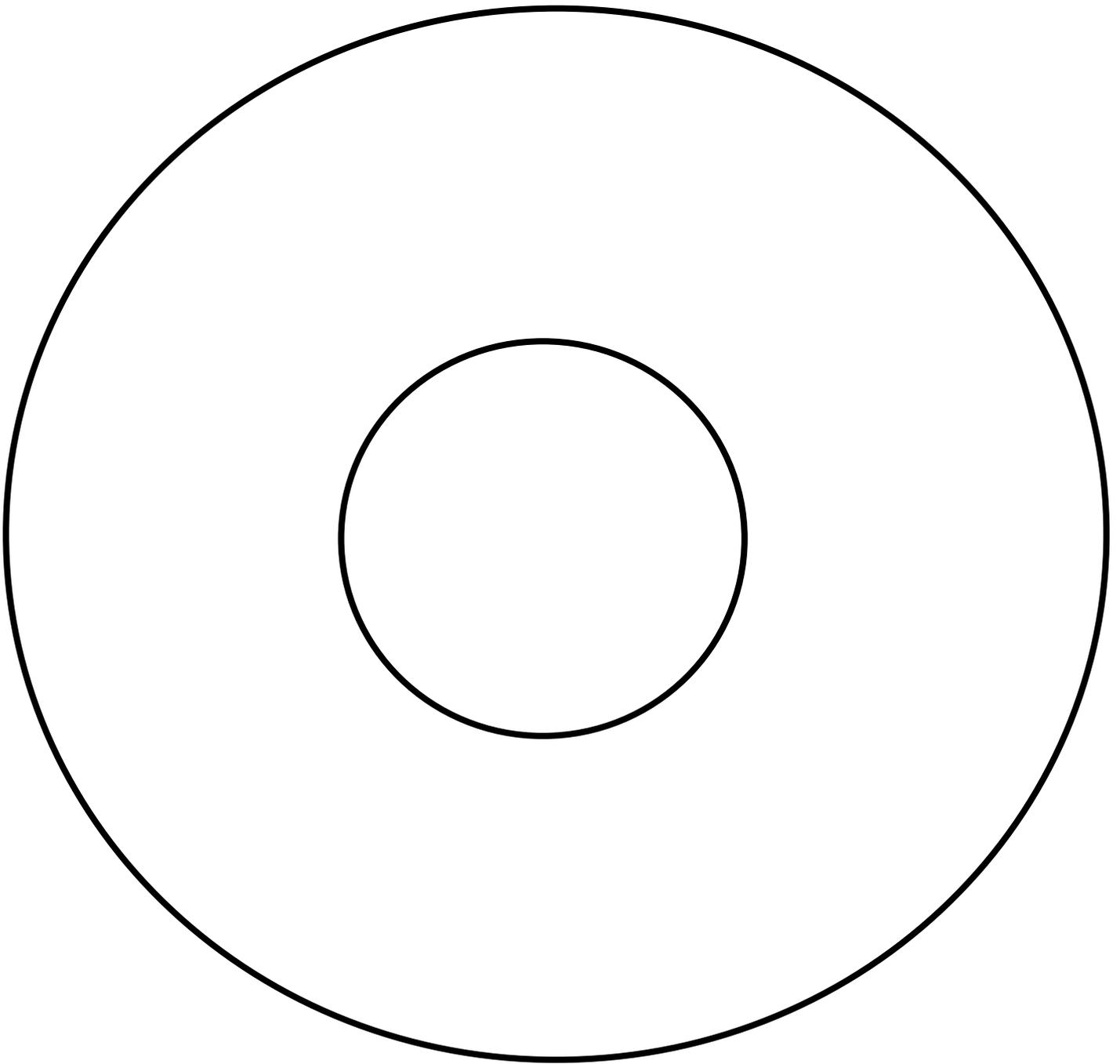
There are eight planets in our solar system, each with unique features.

The stars in the night sky are still there during the day.

All of the planets in our solar system have their own distinct characteristics.

The sun is not a planet.

Enquiry circles



Believer/doubter game

In mixed ability groups

Get children to look at the first of the statements and their 'known facts'. Ask them to come up with justifications as to why the statement is likely to be true (believers).

Now get children to challenge the statement (doubters), using logical arguments and any evidence that might go against the statement offering possible alternative views.

In pairs, children can then decide (and justify) their own view.

Example

Statement: *The Earth's Moon appears to change shape throughout the month.*

Child's opinion: *agree - it appears to change shape because the light from the sun hitting it is not always fully visible on Earth*

Initial question to investigate (during activities): *What causes the moon to appear to change shape?*

Repeat with the other statements.

Based on P4C resource

Developing useful scientific questions

Initial question <i>(what is our overarching question)</i>	Improved version <i>(is there something more specific that we are looking to do?)</i>	Best version <i>(what are the details of what and how you want to explore an overarching question?)</i>
What evidence can we find that the Earth spins?	What can we observe and measure that demonstrates the spinning of the Earth?	How can observing and measuring shadows help to demonstrate the spinning of the Earth?
How do we know there are 8 planets in our solar system, and what they are like?	What equipment/evidence has been used to identify and describe the 8 planets in our solar system?	What evidence do telescopes and probes give us that proves the existence of the 8 planets and shows us what they are like?
How do we know that it is different times of day and night across the Earth at one moment?	What might demonstrate the differing times of day and night across the Earth at one moment?	How can we use toy figures at different latitudes on a globe help to demonstrate night and day across the Earth?
How can we demonstrate that the Earth and planets orbit the sun?	What role does gravity have in the argument for a heliocentric solar system?	Can the science of gravitational force help to demonstrate the heliocentric nature of our solar system?
How do we know the Earth and planets are spherical?	What secondary sources of information provide evidence that the Earth and planets are spherical?	How do photographs help our understanding of the shape of planets?
What tells us that the moon travels around the Earth approximately every 4 weeks?	How do changes in the apparent shape of the moon support the idea that it moves around the Earth?	Can we model the phases of the moon to demonstrate its movement around the Earth?

Question making - *come up with initial questions*

Question sharing - *talk to others about your question ideas*

Question choosing - *pinpointing a 'final' question to use*

Scientific enquiry (approaches) cards

Creating
models

Creating
diagrams

Modelling

Information and
explanations
from secondary
sources

Analysing
Photos

Collecting and
analysing data

Making
detailed
observations

Problem solving:
logical arguments
from given
evidence

Noting
patterns

Taking
measurements

Suggesting
variables

Identifying
limitations

Exploring/
investigating

Ensuring a fair
test

Classification

Example of matched enquiry question to scientific approaches

Information and explanations from secondary sources

Creating diagrams

Collecting and analysing data

Making detailed observations

*Earth spinning
(day and night + shadows)*

Noting patterns

How can observing and measuring shadows help to demonstrate the spinning of the Earth?

Taking measurements

Identifying limitations

Modelling

Exploring/
investigating

Problem solving:
logical arguments from given evidence

Differentiated questions

Hard

- *Do you have any thoughts on what we might be able to do to answer this question?*
- *Can we make observations, or do we need to rely purely on other scientists work/secondary sources of information?*
- *What do you think we could observe that demonstrates this?*
- *Do you think we might be able to recreate this as a model or a demo?*
- *Are we going to have to use logic to support this argument/idea?*
- *How could you show or explain this to someone else?*

Medium/Easy

- *Would it help if we made a model?*
- *Would it help if we tracked the Earth's movement by looking at the changing position of the sun?*
- *If we explained how the seasons worked, using data and diagrams, would this help?*
- *Are there any secondary sources (e.g. photos or simulations) that would provide evidence for this?*

Possible research sites for children

<https://www.bbc.co.uk/education/topics/zkbbkqt>

<https://spaceplace.nasa.gov/>

<https://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html>

<https://www.theschoolrun.com/homework-help/solar-system>

Sample programme objectives

The planets and solar system (episode 1)

- *To model and explain how the solar system works*
- *To create and share a scaled version of the solar system*
- *To research and share key information about the planets*

Night and day (episode 2)

- *To use shadow investigations to demonstrate the movement of the Earth on its axis*
- *To investigate and share information about time zones around the Earth*
- *To track daylight time using a sundial*

The lunar month (episode 3)

- *To model and demonstrate how and why the moon appears to change shape across a lunar month*
- *To show in a diagram how the moon appears in its various phases*