

## KS2: MEDIUM TERM PLANNER

### Earth and Space Y5

Pupils should be taught to:

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth, and Moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships, and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.



'Working and thinking scientifically' is described separately at the beginning of the programme of study but must always be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell, and pronounce scientific vocabulary correctly.

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes, and skills through the teaching of the programme of study content:

planning different types of scientific enquiries to answer questions, including recognising, and controlling variables where necessary

taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar, and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships, and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations


identifying scientific evidence that has been used to support or refute ideas or arguments


#### **Prior Learning:**

- Explore the natural world around them. (Reception – Earth and space)
- Describe what they see, hear, and feel whilst outside. (Reception – Earth and space)
- Observe changes across the four seasons. (Y1 - Seasonal changes)
- Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes)

#### **Future learning:**

- Gravity force, weight = mass x gravitational field strength (g), on Earth  $g=10 \text{ N/kg}$ , different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only). (KS3)
- Our Sun as a star, other stars in our galaxy, other galaxies. (KS3)
- The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. (KS3)
- The light year as a unit of astronomical distance. (KS3)

Key Questions (show how content and concepts link) Differentiated Learning Objectives	Teaching and learning activities (linked directly to objectives)	Resources (to help pupils reach the learning objectives)	Written and non-written outcomes (assessment including homework's)
<p><b>1) What are the planets in our solar system?</b></p> <p><b>SCIENCE CAPITAL:</b> <i>How does this lesson connect with children in my class? What do we know about Planet Earth?</i></p> <p><b>Science Working scientifically Skills:</b></p>  <p><b>Science Enquiry Type Research</b></p> <p><i>The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit.</i></p>	<p><b>Science reasoning task: explorify: What's going on? <a href="#">To the Moon and beyond - Explorify</a></b></p> <p><b>Activity 1:</b> PowerPoint go through and discuss and identify what the different planets are. Discuss – can you name the planets? Do you know the order? How could you create a mnemonic to remember the order?</p> <p><b>Activity 2:</b> Show how to research google/ internet search engines to find facts about different planets.</p> <p><b>Activity 3:</b> Create a fact file of different planets either using paper-based fact file or SWAY or PowerPoint as a group.</p> <p><b>Misconception:</b> Some children may think:</p> <ul style="list-style-type: none"> <li>• The Earth is flat</li> <li>• The Sun is a planet</li> <li>• The Sun rotates around the Earth</li> <li>• The Sun moves across the sky during the day</li> <li>• The Sun rises in the morning and sets in the evening</li> <li>• The Moon appears only at night</li> <li>• Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.</li> </ul>	<p><b>Activity 1:</b> Pupils to create a mnemonic to remember the order of the planets.</p> <p><b>Activity 2:</b> Pupils use internet – websites to find out facts about different planets.</p> <p><b>Activity 3-</b> use medium of choice to use information to create fact file about different planets in the solar system.</p>	<p><b>Assessment:</b> Researching and creating fact files about different planets.</p> <p><b>Homework:</b> Researching facts about planets. Making papier Mache models of planets.</p>

<p>The Sun, Earth and Moon are approximately spherical.</p>			
<p><b>2)How do we know Earth, Sun and Moon are spherical?</b>  <b>SCIENCE CAPITAL:</b> <i>How does this lesson connect with children in my class? Where have you travelled to?</i>  <b>Science Working scientifically Skills:</b>    <b>Science Enquiry Type Research</b>  <i>The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.</i></p>	<p><b>Science reasoning task: explorify: Who is? <a href="#">Katherine Johnson?</a> - Explorify</b></p> <p><b>Activity 1:</b> PowerPoint to go through the different arguments of flat and spherical Earth.</p> <p><b>Activity 2:</b> Share ideas of both side of arguments and choose which pupils agree with. Make teams and hold a debate.</p> <p><b>Misconception:</b>  Some children may think:</p> <ul style="list-style-type: none"> <li>• The Earth is flat</li> <li>• The Sun is a planet</li> <li>• The Sun rotates around the Earth</li> <li>• The Sun moves across the sky during the day</li> <li>• The Sun rises in the morning and sets in the evening</li> <li>• The Moon appears only at night</li> <li>• Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.</li> </ul>	<p><b>Activity 1:</b> PowerPoint</p> <p><b>Activity 2:</b> Hold a debate and discuss/ conclude.</p> <p><b>Activity 3:</b> Complete differentiated closed questions of the various arguments.</p>	

**3)What are the arguments for how the planets move in our solar system?**

**SCIENCE CAPITAL:** *How does this lesson connect with children in my class? Why do you think we do not fall off the edge of the world?*

**Science Working scientifically Skills:**



**Science Enquiry Type**

**Research**

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**Science reasoning task: explorify: Zoom in and Zoom out [Far, far away - Explorify](#)**

**Activity 1:** PowerPoint go through and discuss different views historically about how the planets moved in the solar system.

**Activity 2:** Create a chronological timeline of the different Views held about how planets moved in the solar system.

**Activity 3:** Complete closed differentiated writing about the different views and own opinion about their belief.

**Misconception:**

Some children may think:

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- The Moon appears only at night
- Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.

**Activity 1:** PowerPoint go through the different views.

**Activity 2:** different views on card to sort historically.

**Activity 3:** closed differentiated worksheet.

**Assessment:** oracy debating skills

**Homework:** Researching ancient scientists and creating biographies.

4) Why might shadows become shorter or longer?

**SCIENCE CAPITAL:** *How does this lesson connect with children in my class? Are shadows helpful? When have you used them?*

Science Working scientifically Skills:



Science Enquiry Type

Pattern Seeking/  
observation over time

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**Activity 1:** PowerPoint go through and discuss how night and day occurs. Ask why would a shadow experiment explain how we have night and day?

**Activity 2:** Model planning experiment

**Activity 3:** Conclude and discuss findings.

**Misconception:**

Some children may think:

- The Earth is flat
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- The Sun rotates around the Earth
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- The Sun rises in the morning and sets in the evening
- The Moon appears only at night
- Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.

**Activity 1:** PowerPoint go through, and role play how night and day occur.

**Activity 2:** children to work in small groups to plan an experiment- post it note

**Activity 3:** Carry out experiment.

**Assessment:** Able to explain why and how night and day occurs.

5) How does the moon move and what are the phases of the moon?

**SCIENCE CAPITAL:** *How does this lesson connect with children in my class? What do you notice about the moon during the day? Night? Different days within a month?*

Science Working scientifically Skills:



Science Enquiry Type

Research/ observation over time

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Science reasoning task: explorify: Zoom in Zoom out [Weight a minute!](#) - Explorify

**Activity 1:** PowerPoint go through and discuss the different phases of the moon.

**Activity 2:** create models and show how moon orbits the Earth.

**Activity 3:** Cookie moon shapes- create the different phases of the moon using cookies.

**Misconception:**

Some children may think:

- The Earth is flat
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- The Sun rises in the morning and sets in the evening
- The Moon appears only at night
- Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.


**Activity 1:** PowerPoint identify the movement of the moon and the different phases of the moon. Complete reading comprehension about moon phases.

**Activity 2:** model templates

**Activity 3:** Cookies and moon phases cards.

**Assessment:** what do you know about the moon?

**Homework:** keeping a moon diary.

<p><b>6) How does night and day occur?</b></p> <p><b>SCIENCE CAPITAL:</b> <i>How does this lesson connect with children in my class? What do you notice about the sky during different times of day?</i></p> <p><b>Science Working scientifically Skills:</b></p>  <p><b>Science Enquiry Type Research</b></p> <p><i>The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.</i></p>	<p><b>Science reasoning task: explorify: What if? <a href="#">You worked at NASA but weren't an astronaut? - Explorify</a></b></p> <p><b>Activity 1:</b> PowerPoint go through and discuss how night and day occurs. Use models to represent this.</p> <p><b>Activity 2:</b> Rotating activity- have a list of instructions to identify when Earth is away from sun is it night and day.</p> <p><b>Activity 3:</b> Create a sundial and use it to mark the times of the day.</p> <p><b>Misconception:</b> Some children may think:</p> <ul style="list-style-type: none"> <li>• The Earth is flat</li> <li>• The Sun is a planet</li> <li>• The Sun rotates around the Earth</li> <li>• The Sun moves across the sky during the day</li> <li>• The Sun rises in the morning and sets in the evening</li> <li>• The Moon appears only at night</li> <li>• Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.</li> </ul>	<p><b>Activity 1:</b> PowerPoint go through, and role play how night and day occur.</p> <p><b>Activity 2:</b> Follow instructions in pairs.</p> <p><b>Activity 3:</b> Sundial template and apply knowledge.</p>	
<p><b>Engineering project of building rovers.</b></p>	<p><b>**Project could take up to 3 separate sessions.</b></p>	<p><b>Activity 1:</b> Planning template to be given.</p>	<p><b>Assessment:</b> Engineering skills-plan, make and evaluate.</p>

**SCIENCE CAPITAL:** *How does this lesson connect with children in my class?*

**Science Working scientifically Skills:**



**Science Enquiry Type**

**Comparative**

*The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.*

**Activity 1:** Plan and design the resources needed to make a Mars Rover.

**Activity 2:** Work in small groups and build. Use electrical components

**Activity 3:** Test out – set out comparative test of ROVER used on different surfaces.

**Misconception:**

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- The Sun rises in the morning and sets in the evening
- The Moon appears only at night
- Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.

**Activity 2:** Work in small groups and build.

**Activity 3:** planning format to test out on different surfaces (friction)