

Principles of Science:

Topic Overview: Earth and Space

Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). Pupils should find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.

SCIENCE

Year 5



Autumn 1

Focus scientists:

Copernicus, Galileo, Hawking,
Mary

Objectives:

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

Work scientifically by:

- Comparing the time of day at different places on the Earth through internet links and direct communication
- Creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day

Writing opportunities:

Biog of Galileo's life
Recount of Space Gallery visit
Biography of black astronaut
Research a famous physicist

Key vocabulary:

gravity star planet
hemisphere attract
attraction weight
moon orbit revolve
rotation axis equator
season winter autumn
mass solar system
geocentric heliocentric
sphere ellipse phases
shadow temperature
distance

Learning Outcomes/ Assessment

| Emerging | Secure | Exceeding |
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| <ul style="list-style-type: none"> • <i>Observe object/living things/event and comment on it</i> • <i>Notice similarities and differences in order to group and compare objects, living things and events</i> • <i>Link cause and effect; recognise patterns and relationships</i> | <ul style="list-style-type: none"> • <i>Show understanding of a concept by using scientific vocabulary correctly</i> • <i>Apply knowledge in familiar related contexts</i> | <ul style="list-style-type: none"> • <i>Create links to other curriculum areas</i> • <i>Apply knowledge in unfamiliar context</i> |
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*Write names of chn in appropriate column.

| WALT | Key Vocabulary | Organisation | Notes for future planning |
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| <p>Knowledge:</p> <p><u>Assess initial knowledge</u></p> <p>Working Scientifically area:</p> <p>Research</p> <hr/> <p>Success Criteria</p> <p><i>I can give factual information about Space</i></p> <p><i>I can ask searching/interesting questions.</i></p> <p><i>I can find factual information using websites and books.</i></p> | <p>All topic vocab given</p> | <p>Teacher input (key questions)</p> <p>What do you already know about Space? How sure are you about particular Space facts? What do you want to find out about Space?</p> <p>Activities (differentiation, self/peer assessment)</p> <p>Children complete the topic page filling knowledge/questions.</p> <p>They follow this by looking at a number of Space facts, and deciding how sure they are about them – (giving no/one/two/three stars depending on confidence). Use partner/group discussion to extend this further.</p> <p>ICT</p> <p>IN partners – (using the Homework) they make posters of facts that they know for working wall. They also compile a selection of investigation questions – again for display.</p> | <p>Chn not secure:</p> |
| <p>WALT</p> <p>Knowledge:</p> <p><u>describe the relative sizes of the earth, moon and sun</u></p> <p><u>(describe the Sun, Earth and Moon as approximately spherical bodies)</u></p> <p>Working Scientifically area:</p> <p>Exploring</p> <hr/> <p>Success Criteria</p> | <p>gravity star planet moon orbit revolve rotation solar system geocentric heliocentric</p> | <p>Teacher input (key questions)</p> <p>Is the Earth round? How do we know that?</p> <p>What size do you think the Sun, Moon and Earth are?</p> <p>How far do you think they are apart from each other?</p> <p>Activities (differentiation, self/peer assessment)</p> <p>Active Primary discussion on how we know the Earth is spherical – what evidence do we have? Review historical idea that it was flat. Evidence ways in which we can disprove this.</p> <p>Can you draw what you think the Earth, Sun and Moon look like from outer space?</p> | <p>Chn not secure:</p> |

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| <p><i>I can use my knowledge to draw the relative sizes and distance of the Earth, Moon and Sun.</i></p> <p><i>I can reflect on the reasons behind what I know/don't know.</i></p> | | <p>Whole class draw their vision of S,E,M from Space, thinking Active primary to show factual information and relative sizes.</p> <p><i>(This will be followed up on visit to IAMS when we physically try to replicate distance)</i></p> <p>Ask class to add factual information on S, E, M size and distance</p> <p>Ask children to look at this info and their drawing and write a short reflection piece on what they may have got right and wrong, and why?</p> | |
| <p>WALT</p> | <p>Key Vocabulary</p> | <p>Organisation</p> | <p>Notes for future planning</p> |
| <p>Knowledge:</p> <p><u>To understand the relationship of the earth, moon and other planets in relation to the sun</u></p> <p>Working Scientifically area:</p> <p>Research, classifying</p> | <p>gravity star planet moon orbit revolve rotation solar system geocentric heliocentric</p> | <p>Teacher input (key questions)</p> <p>Show a scaled down version of the solar system and discuss any misconceptions. Compare the sizes to real life objects and use string to stand between the E,S and M to show the difference in distance.</p> <p>Activities (differentiation, self/peer assessment)</p> <p>Class describe errors and also draw their view of the solar system.</p> <p>They also research 3 scientists who had ideas/concepts of the way our universe is ordered.</p> | <p>Chn not secure:</p> |
| <p>Success Criteria</p> | | <p>Class all write a short piece summarising the scientist ideas.</p> | |
| <p><i>I can gather facts on planets and Space,</i></p> <p><i>I can order the planets</i></p> <p><i>I can understand the relative sizes of the planets to the Sun</i></p> | | <p>Gillespie (ICT session) children in pairs create a mnemonic poem to remember the order of the planets.</p> | |
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| <p>Knowledge:</p> <p><u>To describe how the Sun appears to move across the sky during a day</u></p> <p><u>To understand how a sundial and astronomical clock work</u></p> <p>Working Scientifically area:</p> <p>Exploring, pattern seeking</p> | | <p>Teacher input (key questions)</p> <p>Start with shadow diagram as prompt for partner talk.</p> <p>Use PP to explain how shadows change over the day, and why.</p> <p>Show picture of sundial. Discuss how we can tell the time from these?</p> <p>Astronomical clocks – use AP to show picture of one at Hampton Court, and discuss what it shows (have paper copies to support this)</p> <p>Activities (differentiation, self/peer assessment)</p> <p>Children use Hamilton resources to make simple sun dial.</p> <p>They use a torch as the source of light, and compass points to orient the dials. They create shadow and read the time.</p> <p>Mixed ability partners – create own astronomical clock – what would it show?</p> | <p>Chn not secure:</p> |
| <p>Success Criteria</p> | | | |
| <p><i>I understand how to use the Sun's shadow to tell the time</i></p> <p><i>I understand what information astronomical clocks show</i></p> | | | |
| <p>WALT</p> | <p>Key Vocabulary</p> | <p>Organisation</p> | <p>Notes for future planning</p> |
| <p>Knowledge:</p> <p><u>To understand how we get seasons</u></p> <p>Working Scientifically area:</p> <p>Exploration, pattern seeking,</p> | | <p>Teacher input (key questions)</p> <p>Use AP to set a number of questions, including 'how is it sunny in Winter, but not warm?'</p> <p>Show example of Australia at Christmas.</p> <p>Watch short BBC videos on how Earth tilts away/toward Sun.</p> <p>Model example of how we can test this using a spinning Earth (maybe child?) and have rest of class in centre of carpet being Sun.</p> | <p>Chn not secure:</p> |
| <p>Success Criteria</p> | | | |

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| <p><i>I can conduct a controlled experiment</i></p> <p><i>I can give a clear explanation of how we get Summer and Winter</i></p> | | <p>Activities (differentiation, self/peer assessment)</p> <p>In groups of 3 – children explore this drawing figures on to mini w/b and tilting this away and toward the source of light.</p> <p>They then write a short explanation of their experiment, and their findings.</p> | |
| <p>WALT</p> | <p>Key Vocabulary</p> | <p>Organisation</p> | <p>Notes for future planning</p> |
| <p>Knowledge:</p> <p><u>To understand what the different phases of the Moon are</u></p> <p>Working Scientifically area:</p> <p>Research, pattern-seeking</p> <p>Success Criteria</p> <p><i>I can understand how/why the Moon changes</i></p> <p><i>I can remember the names for all the phases</i></p> | | <p>Teacher input (key questions)</p> <p>Watch LGFL Virtual experiments on Moon’s orbit in relation to the Earth.</p> <p>Show AP explaining how we view the moon. Sun light/shadow.</p> <p>Activities (differentiation, self/peer assessment)</p> <p>Use flick book activity to make and show how the moon changes</p> <p>All class draw in and label the different phases of the Moon.</p> <p>(Have word bank for LA group)</p> | <p>Chn not secure:</p> |
| <p>WALT</p> | <p>Key Vocabulary</p> | <p>Organisation</p> | <p>Notes for future planning</p> |

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| Knowledge: | | Teacher input (key questions) Final Unit Assessment. | Chn not secure: |
| Working Scientifically area: | | Activities (differentiation, self/peer assessment) Variety of activities (written and drawn) that cover the previous lessons. | |
| Success Criteria | | | |
| WALT | Key Vocabulary | Organisation | Notes for future planning |
| Knowledge: | | Teacher input (key questions) | Chn not secure: |
| Working Scientifically area: | | Activities (differentiation, self/peer assessment) | |
| Success Criteria | | | |
| WALT | Key Vocabulary | Organisation | Notes for future planning |
| Knowledge: | | Teacher input (key questions) | Chn not secure: |
| Working Scientifically area: | | Activities (differentiation, self/peer assessment) | |
| Success Criteria | | | |

