

**Science Progression of Knowledge and Skills Earth and Space**

**Key to understanding this document: Black = National Curriculum objectives Red = Knowledge/Skills to be taught Green = Resources to be used**

*At The Discovery School we understand the importance of our children knowing more, remembering more and doing more. With this in mind, we teach the children the knowledge they require, ensuring they have opportunities for the retrieval of knowledge and the chance to apply new skills during their learning.*

| <u>Area of Learning</u> | <u>EYFS</u> | <u>Year 1</u> | <u>Year 2</u> | <u>Year 3</u> | <u>Year 4</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <u>Year 5</u> | <u>Year 6</u> |
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| <b>Earth and Space</b>  |             |               |               |               | <p><u>Working Scientifically</u><br/>                     WS1.To be able to plan a scientific enquiry to answer a question.<br/>                     ES1. To be able to describe the movement of the Earth, and other planets, relative to the Sun in the solar system. ( This will take two lessons)</p> <p>Begin by asking the children what is at the centre of the universe. Add answers on flip chart. Watch the following video<br/> <a href="http://www.bbc.co.uk/learningzone/clips/what-does-the-sun-really-look-like/8948.html">http://www.bbc.co.uk/learningzone/clips/what-does-the-sun-really-look-like/8948.html</a> this will help the children understand the placement of the sun.</p> <p>Making a model of the solar system.</p> <p>The children will research the order of the planets and then create their own poster of the planets in order giving key facts about each planet. As a class they will model how the planets move around the sun.</p> <p>Ask the children to think about how far from the Sun think Earth?<br/> <a href="http://www.bbc.co.uk/learningzone/clips/how-far-is-the-sun-from-earth-animation/13916.html">http://www.bbc.co.uk/learningzone/clips/how-far-is-the-sun-from-earth-animation/13916.html</a><br/>                     Show the above link and this will give the children an idea about the size of Earth compared to the sun.</p> |               |               |

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|  |  |  |  |  | <p>Then we are going to be creating a scaled model of the solar system. Watch the clips below:<br/> <a href="http://www.bbc.co.uk/learningzone/clips/stargazing-challenge-building-the-solar-system-from-fruit/13901.html">http://www.bbc.co.uk/learningzone/clips/stargazing-challenge-building-the-solar-system-from-fruit/13901.html</a></p> <p>Then in groups the children make models of the solar system and then take photographs of the model and place picture in books.</p> <p>Working Scientifically<br/>         To be able to plan a scientific enquiry to answer a question.<br/>         To identify scientific evidence that has been used to support or refute ideas or arguments.</p> <p>ES2 To be able to describe the Sun, Earth and Moon as approximately spherical bodies.</p> <p><b>Deep thinking time - How can we prove the shape of the Earth, Sun and Moon?</b><br/> <a href="http://www.bbc.co.uk/learningzone/clips/how-do-we-know-the-earth-is-spherical/2457.html">http://www.bbc.co.uk/learningzone/clips/how-do-we-know-the-earth-is-spherical/2457.html</a><br/>         - How do we know the Earth is spherical?</p> <p>Before watching the video above ask the children to think about what evidence they could have used over two thousand years ago to prove that the Earth was spherical.</p> <ol style="list-style-type: none"> <li>1. The disappearing ship model. Using a ball to represent the Earth, a small plasticene ship (a hull, decks and mast) and a small plasticene person, the children could try to model how the ship</li> </ol> |  |
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|  |  |  |  |  | <p>appears to the person as it moves further away from them and over the horizon.</p> <ol style="list-style-type: none"><li>2. Shadows on the Moon. Provide children with pictures of shadows of the Earth on the Moon (lunar eclipse) and ask them to explain what the shadows are and how they are evidence about the shape of the Earth.</li><li>3. Constellation pictures from different places on the Earth. Give children pictures of constellations viewed from the Northern and Southern Hemispheres. Again, ask the children how this evidence about the Earth's shape. The following website contains photos of constellations taken from the Southern Hemisphere (New Zealand):<br/><a href="http://www.starrynightphotos.com/constellations/constellations.htm">http://www.starrynightphotos.com/constellations/constellations.htm</a> . Constellation photos from the Northern Hemisphere can be found at <a href="http://www.space.com">www.space.com</a></li></ol> <p>Working Scientifically<br/>reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations</p> <p>ES2 :To be able to describe the movement of the Moon relative to the Earth.</p> <p><b>The following lessons were taken from Andrew Berry Science Scheme 2014.</b></p> <p><b>What is the Moon like?</b><br/><a href="http://www.bbc.co.uk/learningzone/clips/what-does-the-moon-look-like-and-why/8957.html">http://www.bbc.co.uk/learningzone/clips/what-does-the-moon-look-like-and-why/8957.html</a></p> |  |
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|  |  |  |  |  | <p>This video introduces the Moon. The class can come up with adjectives and sentences to describe the moon, place on working wall.</p> <p>Pictures of the whole lunar cycle for the date you are doing this unit can be found at:<br/> <a href="http://www.moonconnection.com/moon_phases_calendar.phtml">http://www.moonconnection.com/moon_phases_calendar.phtml</a></p> <p>You can look at particular areas on the Moon at NASA's website:<br/> <a href="http://moon.nasa.gov/home.cfm">http://moon.nasa.gov/home.cfm</a></p> <p><b>Deep thinking time - How does the shape of the Moon appear to change over time?</b><br/> Allow the children to discuss the following statements:</p> <ol style="list-style-type: none"> <li>1. Bits of the Moon fall off and then grow back again</li> <li>2. The Moon can only be seen at night</li> <li>3. There is Moon that is a shape of a circle, and there is another Moon that sometimes replaces it that is shaped like a crescent.</li> </ol> <p>Ask children what evidence they could produce to prove or disprove these statements.</p> <p><b>Modelling- How does the shape of the Moon appear to change over time?</b><br/> The following video shows how to model the phases of the Moon:<br/> <a href="http://www.bbc.co.uk/learningzone/clips/stargazing-challenge-the-moon-on-a-stick/13903.html">http://www.bbc.co.uk/learningzone/clips/stargazing-challenge-the-moon-on-a-stick/13903.html</a></p> <p>Sun must be an OHP/desk lamp, a white ball is the Moon, and the head of the pupil is the Earth. The white ball is mounted on a stick which the child holds up and out. The OHP or large torch is aimed at the ball. The child rotates (sitting on a swivel chair) with stick and comments on what he/she can see. (Best done away from a wall to avoid light being scattered back and thus illuminating the dark side.)</p> |  |
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|  |  |  |  |  | <p>By rotating slowly, a complete cycle of lunar phases can be observed. When the ball is between the child and the projector this is the 'New Moon'. Rotating a quarter-turn anticlockwise brings us to the 'first quarter' in which half the lit face is visible to the child (this is about 7 days into the cycle). Turning further we pass through 'waxing gibbous' to 'full Moon' when the ball is on the opposite side of the chair from the OHP and the child can see the whole of the lit face (provided the beam is not blocked by their head – a lunar eclipse). Completing the cycle, the white ball passes through 'waning gibbous' and 'third quarter' back to the 'New Moon' position.</p> <p><b>Recording</b><br/>The children can draw pictures that show how the shape of the Moon appears to change and record a video or on Pic Collage. The children can complete a phase of moon spin sheet.</p> <p><b>Optional</b><br/>At home the children can keep a diary of phases of the Moon. Check with information back in class by referring to diaries, newspapers and websites.</p> <p>Children can produce diagrams showing what part of the moon can be seen at different dates.</p> <p>To be able to plan a scientific enquiry to answer a question<br/>ES4 To be able to use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.</p> |  |
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|  |  |  |  |  | <p><b>The following lessons were taken from Andrew Berry Science Scheme 2014.</b></p> <p>Ask the children to think about how we have night and day. Begin by asking the children how they think we have day and night on our planet? You could also ask them what would need to happen so that we were stuck in day or night.</p> <p>The following video animates the rotation of the Earth:<br/><a href="http://www.bbc.co.uk/learningzone/clips/day-and-night/1874.html">http://www.bbc.co.uk/learningzone/clips/day-and-night/1874.html</a></p> <p>Show the children photos taken of a shadow over a period of time somewhere in the school grounds. Ask them how they think the shadows changed during the day.</p> <p>The first model children can try to make simply involves standing a pencil upright in some blue tac and then passing a torch over the top in an arc. This shows that either the Earth or the Sun could be moving.</p> <p>The second model involves a child sitting on a rotating chair. To begin, shine a torch at them and then move the torch all the way around them. Secondly, keep the torch still, but allow the child to move around. Ask the children which of the actions is the correct model.</p> <p>In order to avoid the misconception of the movement of the Sun creating day and night ensure the children have opportunities to try making one or more of the following models:</p> <ol style="list-style-type: none"><li>1. Plasticene person on a globe. Shine torch at the globe whilst rotating it. The 'person' will pass through day and night.</li><li>2. Make Earth by using a white polystyrene ball with a piece of wooden dowelling placed through it. Again, stick on person, shine torch and rotate the ball.</li><li>3. Just like above, but children can make a paper Mache Earth with a piece of dowelling through it.</li></ol> |  |
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|                |  |  |  |  | <p>To extend these models, pieces of string could be placed down the length of a globe to show some of the longitude lines; divide the Earth in half (at the Greenwich Meridian), then quarters, and finally eighths. There will therefore be three hours between each of the lines. Children could then work out what time it is in different places around the globe when it is a certain time in the UK.</p>                                                                                                                                                                                                                |  |
| Key Vocabulary |  |  |  |  | <p><b>Day and night</b> - Earth, axis, rotate</p> <p><b>Solar system</b> – Star = Sun, Planets = Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune (Pluto was classified as Dwarf planet in 2006)</p> <p><b>Phases of the Moon</b> - full moon, gibbous moon, half moon, crescent moon, new moon, waxing ,waning</p> <p>Moon’s orbit: 29.5 days, lunar month</p> <p>Orbit, planets, revolve, sphere</p>                                                                                                                                                                                                            |  |
| Key Resources  |  |  |  |  | <p>Posters showing the different types of scientific enquiry</p> <p>A round piece of cardboard about 30 cm across</p> <p>String</p> <p>A compass (for making circles)</p> <p>Plasticene</p> <p>Water melon, peppercorn, grapefruit, lime, strawberry, orange, lime, apple, toilet roll</p> <p>Information books on the planets in our solar system</p> <p>Pictures of shadows of Earth cast on the Moon (lunar eclipse)</p> <p>Constellation pictures taken from different places on the Earth</p> <p>Torches</p> <p>White polystyrene ball</p> <p>Length of dowelling</p> <p>Globes</p> <p>PVA glue</p> <p>A swivel chair</p> |  |

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