Year 5 – Earth & Space



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| National Curriculum Outcomes: Knowledge   * 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 Earth’s rotation to explain day and night and the apparent movement of the Sun across the sky | | | | National Curriculum Outcomes: Working Scientifically   * 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 and to set up further comparative and fair tests * Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and 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. | | | |
| Children might 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; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks (taken from the National Curriculum) | | | |
| Links to prior learning  **Year 1:** observe and describe… how day length varies  **Year 3:** recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light form the Sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a source is blocked by an opaque object | | | | Links to future learning  **Year 6:** Recognise that light travels in straight lines. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them  **Year 8:** Gravitational forces between the Earth and Moon and between Earth and the Sun. Other stars in our galaxy, other galaxies. The seasons and the Earth’s tilt, day length at different times of year in different hemispheres | | | |
| Key Vocabulary  Earth, Sun, Moon, star, solar system, rotation, rotates, orbit, day, night, axis, planets, spherical, sphere, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, geocentric, heliocentric | | Common Misconceptions   * Children may think part of the Moon disappears when it appears to change shape. * Children often think the Moon is the reason, or part of the reason we have night and day. * Children find it quite difficult to remember that it is the rotation of the Earth that causes night and day and its orbit around the Sun that gives us a 365¼ day year. | | | | | |
| Important knowledge/facts that the children need to know   * Describe the movement of the Earth, and other planets, relative to the Sun in the solar system: the planets revolve/orbit around the Sun. It takes 365 ¼ days for the Earth to complete a full orbit. * Describe the movement of the Moon relative to the Earth: the Moon revolves/orbits around the Sun. It takes about 27 days for the Moon to complete a full orbit. * 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 Earth rotates (spins) on an axis. It takes 24 hours for the Earth to complete a full rotation | | | | | | | |
| Important Scientists  **Nicolaus Copernicus –** Polish scientist who theorised that the Sun was in the centre of the universe.  **Galileo Galilei –** Italian scientist who built telescopes to make observations of planets  **Valentina Tereshkova –** Russian astronaut who was the first female to travel to space.  **Helen Sharman –** The first British astronaut and first female astronaut to visit the Mir space station  **Dorothy Vaughn, Mary Jackson & Katherine Gobels Johnson –** African-American female mathematicians whose work was instrumental in NASAs contribution to the space race. | | | STEM Career Links  **Astronaut** (travels to space to carry out research)  **Astronautical engineer** (develops spacecraft)  **Astronomer** (studies space)  **Astrophysicist** (studies the physics of space and objects in space)  **Physicist** (studies physics) | | | Links to real life   * What can we see in the sky at night? Is this the same as our relatives/friends in other parts of the world? * What time is it on the other side of the world? Why is it different to here? * What makes Earth suitable for life? Are there any other planets we could live on if this one became uninhabitable? * Why do we have leap years? | |
| Suggested Enquiry Activities | | | | | | | |
| Identifying and Classifying | Comparative and Fair Testing | | Observation over Time   * How does the shape of a shadow change during the course of a day? * How does a sundial work? Can we make and calibrate our own sun dials? * How does the Moon’s shape appear to change over the course of a month? | | Pattern Seeking   * Do planets get bigger as they get further away from the Sun? * How does the length of a year change as planets get further away from the Sun? * Compare the times of day in different places across the world. | | Research using Secondary Sources   * What can we find out about the other planets? * What evidence was there that the Earth was spherical before we were able to observe it from space? |

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| **National Curriculum Statements** | **Outdoor Learning Activities** |
| * 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 playground provides a larger space to create models showing the movement of the Sun, Earth and Moon and the impact of this on day and night and the apparent movement of the Sun. |

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| Wow Factor Experiences   * Space Camp residential * Building a sundial * Creating a scale model of the distances/relative sizes of the planets | | |
| Maths Links   * Use an understanding of scale and measurement skills to create scale models of the solar system (this is especially fun if it is done on toilet paper!) * Use measurement skills to investigate how the length of shadows change over the course of the day then create a line graph to show this. | Literacy Links   * Create ‘Lonely Planet’ travel guides * Write, present, record and edit an information program for children explaining something such as why we have night and day, information about the different planets in the solar system or debunking common misconceptions such as the Sun moving around the Earth or the Earth being flat | Broader Curriculum Links  **ICT:** Children could create stop-motion animations showing how the Earth and Moon move in relation to the Sun  **Art:** Pastel planets can be created on black paper using stencils and smudging/shading techniques  **History:** Create a timeline showing when milestones in space travel and exploration were reached. Why do people think Stonehenge may have been used as an astronomical clock? Compare technology between the time of the first Moon landing and now (common smartphones now have more processing power than the Apollo 11 ship!)  **RE:** The planets in our solar system are named after Greek and Roman gods. What more can we find out about this belief system? How is it similar to and different from our own belief system? |
| Story Links  The Darkest Dark – Chris Hadfield Curiosity, the Story of a Mars Rover – Markus Motum  Hidden Figures – Margot Shetterly Dinosaurs and All That Rubbish – Simon Bertram  Fortunately The Milk – Neil Gaiman I Love You, Michael Collins – Lauren Baratz-Logstead | | |
| Helpful Weblinks  Assessment exemplification (could also be useful with planning ideas) – <https://www.ase.org.uk/resources/y5-earth-and-space-melissa>  Teacher CPD for this unit – <https://www.reachoutcpd.com/courses/upper-primary/earth-and-space/>  BBC Class Clips (useful videos) – <https://www.bbc.co.uk/bitesize/topics/zdrrd2p/resources/1>  Space Camp residential planning support – <http://www.spacecampuk.com/>  Chris Hadfield videos (child-friendly life in zero gravity videos from a Canadian astronaut – this is just one example but you can search YouTube for many more) – <https://www.youtube.com/watch?v=-knoQh0kB20>  STEM Learning collection of resources for planning and teaching space – <https://www.stem.org.uk/resources/community/collection/11358/space-primary-level>  Primary resources from the European Space Agency (ESA) – <https://www.esa.int/Education/Teachers_Corner/Primary_classroom_resources> | | |

**NB**: This module should be taught after children have done the Year 5 work on **Forces**. It may also be better taught in the summer term, as then children can make observations of how shadows change over the course of a day (this is often difficult due to the lack of sunlight in the rest of the year!)