



Class/Year Group Silver Birch Year 5/6

Topic Earth and Space

Term Spring 1

Curriculum Drivers	Aspiration	Community	Key Vocabulary	
National Curriculum	<p>Pupils should be taught to:</p> <p>describe the movement of the Earth and other planets relative to the sun in the solar system</p> <p>describe the movement of the moon relative to the Earth</p> <p>describe the sun, Earth and moon as approximately spherical bodies</p> <p>use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p> <p>Pupils 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..</p>			<p>Seasons, day, night, year, month, Earth, Moon, Sun, Star, Solar system, orbit, rotate, planet, eclipse, spherical, axis, heliocentric, geocentric, Ptolemy, Copernicus, Gallileo, space, hemisphere, constellations, astronomy</p>
Intent	<p>This unit intends that 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 8 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 1 moon; Jupiter has 4 large moons and numerous smaller ones).</p> <p>Note: pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses.</p>		Cross Curricular Links and wider influences	<p>English- atmosphere information texts</p> <p>Music-Holst planets</p> <p>Art- Light and dark</p> <p>Geography- Northern and Southern hemispheres</p> <p>History- History of space travel</p>



	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.		
Curriculum Driver Links	Community- Dark sky possibilities Aspiration- aspirations of great scientists- challenging theories.	Links to prior learning	Key Stage 1 science• Observation of the apparent movement of the Sun during the day. •Changes across the four seasons. • Observation and descriptions of weather associated with the seasons and how day length varies. LKS2 Science Light and shadows.
Concept Thread	Understand the Earth's movement in space This concept involves understanding what causes seasonal changes, day and night. Work scientifically This concept involves learning the methodologies of the discipline of science	Links to future learning	Pupils do not need to be taught content they will learn in later year groups. They can be challenged by applying the content for their year group in broader contexts. Pupils in Key Stage 3 should be taught about: 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) our Sun as a star, other stars in our galaxy, other galaxies the seasons and the Earth's tilt, day length at different times of year, in different hemispheres the light year as a unit of astronomical distance.



Lesson Intent	Links to Prior Knowledge	Skills	Implementation/Intent
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<p>WALT- describe the movements of the Sun, Earth and Moon.</p> <p>Children will learn about the celestial bodies of the Sun, Moon and Earth and how they are related to one another. They will learn that each of them are a roughly spherical shape and investigate and define the word 'orbit'. They will use these scientific words in a brief description of the Sun, Earth and Moon's movements around each other.</p>	<p>Seasonal change in KS1 Light in Year 3/4</p>	<p>To describe the Sun, Earth and Moon's shape as roughly spherical</p> <p>To be able to clearly define the word orbit</p> <p>To describe the Sun, Earth and Moon's movements in relation to one another</p> <ul style="list-style-type: none"> • Use simple models to describe scientific ideas 	<p>Ask the children what they already know about space (seasons, day, night, year, month, moon, eclipse, orbit, planet, spherical, star etc.). Show the children the words Sun, Moon, and Earth. Can they explain what they are? What scientific language can they use as they explain them?</p> <p>Give the children a definition and description of the Sun, Earth and Moon, comparing their shape and size.</p> <p>Ask the children how these three celestial bodies are related to one another. How are they linked?</p> <p>Explain that they orbit each other. Can the children define 'orbit'?</p> <p>Take the children outside or to a large space.</p> <p>Have 2/3 of the class stand in the middle to be the Sun. They should slowly rotate on the spot as a group. Explain that the Sun is at the centre of Earth's orbit. Make the rest of the class (except one child) Earth. As a group have them begin slowly 'orbiting' the Sun in an anticlockwise direction.</p> <p>How long it would take for the real Earth to complete one orbit of the Sun?</p> <p>Now take the remaining child, who will represent the Moon, and ask the class what they will do. Agree that they will orbit Earth. They should do this in an anticlockwise direction. Children mimic the Sun, Earth and Moon's movements</p> <p>Ask the children how long they think it will take the Moon to orbit Earth. Will it take more or less time than Earth's orbit around the Sun?</p> <p>Children then produce a diagram and model of the movements of the Sun, Earth and Moon.</p>
<p>WALT- To explore how the rotation of Earth creates day and night.</p> <p>Children will learn that the rotation of Earth on its axis is what creates day and night. They will conduct an investigation using sundials and make observations on what they record throughout the experiment.</p> <p>Home learning - explore time zones using the internet and how, and why, locations have different time zones.</p>	<p>The movement of the Earth and sun.</p> <p>Light and shadows in Year 3/4.</p>	<p>To explain how the rotation of Earth on its axis creates day and night.</p> <p>To explain the apparent movement of the sun across the sky</p> <p>To identify how long it takes Earth to make a full rotation</p> <p>To Use simple models to describe scientific ideas</p>	<p><i>This activity requires a reasonably sunny day where children can clearly see their shadows at different points in the day. They will need to make their sundials the day before or the morning of the investigation and position them in a place which receives sunlight for most of the day.</i></p> <p>Ask the children to describe, as scientifically as they can, the difference between day and night. Pick up on any misconceptions by questioning them e.g. "The Sun goes away at night" - Where does it go? "The Moon comes out at night" Where is it during the day?</p> <ul style="list-style-type: none"> • Show the children a diagram of the Sun and Earth. What do they notice about the light and shadow on Earth? • Discuss how the portion of Earth facing the Sun is lit up, and it is therefore daytime for these places. The places in the shadow are experiencing night-time. Make sure that the children Explain how, as Earth orbits the Sun, it is also rotating on its own axis. It takes 24 hours, or 1 day to complete one full rotation. This means that the portion of Earth facing the Sun (daytime) is constantly changing. Use this video to help: https://www.bbc.co.uk/bitesize/clips/zrd9wmm



			<ul style="list-style-type: none"> This rotation is what causes it to seem like the Sun is moving across the sky during the day, when actually it is Earth's rotation. Discuss what this apparent movement of the Sun does to shadows during the day, and how sundials work based on these shadows. Again, show the children this video to illustrate this https://www.bbc.co.uk/bitesize/clips/zkynvcw. <p>Main Activity-Children create a sundial.</p>
<p>WALT- To learn about how Earth's tilt creates seasons. Children will learn about how the seasons are created because of the tilt of Earth's axis. They will learn how Earth is split into its Northern and Southern Hemispheres and how the seasons are different for the two halves of the planet. They will identify the seasons for the Northern Hemisphere based on the location of Earth in its orbit.</p> <p>Home learning - Children will investigate day length and how it changes seasonally using data and graphs.</p>	<p>Seasonal change KS1 Hemispheres of the world in Geography. Earth's orbit</p>	<p>To describe the different changes that happen between seasons To use Earth's tilted axis to explain how seasons are created To describe the differences in seasons between two locations in opposite hemispheres</p>	<p>Ask the children what time of year it is at the moment and how they know.</p> <ul style="list-style-type: none"> Discuss how the year is split up into seasons and a brief description of how they differ. How do these seasons occur? Describe how Earth's axis is tilted, so parts of the planet will be tilted towards, or away from the Sun at different points in Earth's orbit around the Sun. Show how, when the Northern Hemisphere is tilted towards the Sun we have summer. The days will be longer and warmer. What do the children think the Southern Hemisphere will be like at this point in Earth's orbit? Show Earth in a position where neither the Northern or Southern Hemisphere are tilted towards the Sun. What season could this be? Show the class some pictures of Earth in different positions in its orbit and a specified location. Can the children identify what season the location will be in? Show the children a concept cartoon of what would happen if Earth's axis had no tilt, but still orbited and rotated as it normally does. Who do the children agree with?
<p>WALT-To learn about the phases of the Moon.</p> <p>Children will be guided through the lunar month and the eight phases of the Moon that can be seen as the Moon orbits Earth. They will learn to identify the shapes of each phase and the names of these shapes, including if the phase is waxing or waning.</p>	<p>The movement of the moon in relation to the Earth</p>	<p>To name the different phases of the moon? To be able to order the phases of the moon To describe how the phases of the moon are created</p>	<p>When was the last time the children saw the Moon? Can they describe what they saw?</p> <ul style="list-style-type: none"> Show the children some pictures of the Moon in its different phases. Does the Moon actually change shape? <p>Discuss how, although the Moon is always a roughly spherical shape, we see the part that is lit up by the Sun. Depending on the Moon's position in its orbit of Earth, we see a different amount of the lit-up part.</p> <ul style="list-style-type: none"> Show the diagram on the board which shows Earth, the Sun and the Moon. If we were on Earth, looking at the Moon in this position, how much of the lit-up part would we see? (new moon) • Agree that, in this position, we wouldn't be able to see any of the lit-up side of the Moon. When the Moon is in this position, we call it a new moon. Show the Moon in the next position (waxing crescent) If we looked at the Moon in this position, what would we see? Repeat this with each of the eight positions of the Moon, naming each as they discover them.



<p>Home learning</p> <p>Create a diary of the moon</p>			<p>Children to create a model</p> <p>Show the children a diagram of the Moon's orbit, stating that the orbit isn't flat, it's slightly tilted. Most of the time, this tilt means that when the moon is positioned between the Sun and Earth, we see a new moon. However, sometimes, depending on where we are on the planet, the Moon can block out the light from the Sun as it passes between it and Earth. Look at some pictures of some solar eclipses and watch a video: https://www.nationalgeographic.com/news/2016/03/160307-watch-total-solar-eclipse-space/</p>
<p>WALT-To discover how theories about our solar system have changed Children will learn about and discuss how the ideas about the solar system developed and changed over the years until we arrived at the model we have today. The children will compare the similarities and differences between a geocentric and heliocentric model of the solar system.</p>		<p>To be able to define what a solar system is? To explain what the differences between geo and heliocentric models of the solar system are? To compare the ideas of the solar system we know now, with those held by Ptolemy and Copernicus?</p>	<p>Ask the children what our solar system is. Can they define this phrase using the words on the slides to help them?</p> <ul style="list-style-type: none"> • Discuss what the solar system is and anything that the children already know about it. • Travel back in time with your class to meet Ptolemy in Egypt. Explain his theories of the solar system and his geocentric model. • Why do the children think that this was the model he came up with? What would he be able to observe? • Discuss how society had already begun to view Earth as a spherical body. Exploration and travel had challenged the idea that Earth was flat. Aristotle had observed that the visible stars in the sky at night, in Egypt, were different to the ones observed in the sky in northern regions. • Travel forward in time to the 16th century and introduce the class to Copernicus. Show the children a diagram of his heliocentric theory of the solar system. How is this one different to Ptolemy's ideas? • Compare the two models to each other as a class <p>Children create a double page spread comparing the 2 ideas.</p> <p>Extension Give children access to the internet and have them take a look at the night sky on today's date: https://www.timeanddate.com/astronomy/night/uk/london (You can change it to your location using the 'City Name' search bar)</p> <ul style="list-style-type: none"> • Let them explore for a while, scrubbing through the 24 hours displayed using the bar at the bottom to see how the stars appear to move around the sky. • Have them set the time on the scrub bar to midnight. They can then use the search button to see where visible planets are in the sky and which phase the moon is in. • Children explore the night sky and record what they can see.
<p>WALT- To investigate the planets in the solar system. Children will conduct their own research into the planets within our solar system. They will discuss the objects in our solar system</p>	<p>Our Solar system</p>	<p>To name the eight planets in our solar system To be able to name the eight planets in order from nearest to farthest from the Sun</p>	<p>Ask the children what they already know about the solar system. What is included in the solar system? What is the difference between the solar system and a galaxy? Discuss the main objects in our solar system including asteroids, comets, planets, dwarf planets and satellites.</p> <ul style="list-style-type: none"> • Show the children a diagram of the solar system. Can the children name the planets in order?



as a class, including natural satellites, comets, asteroids (and the asteroid belt), planets and dwarf planets.		To present findings in written form, displays and other presentations To use researching skills to find relevant information on a topic	• Once you have the order, talk about some mnemonics to remember the planet's order. Can the children come up with their own? Children will work to create their own fact book or model of the solar system.