

## ADVENT TERM 1

### SCIENCE – Year 5 - Medium Term Planning – PHYSICS: EARTH AND SPACE

<u>LESSON 1</u>	<u>LESSON 2</u>	<u>LESSON 3</u>
<p><b>Asking Enquiry Questions</b></p> <p><b>LEARNING INTENTION:</b> To know that the Solar System is made up of the Sun and everything that orbits around it.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Plan scientific enquiries to answer questions.</li> </ul> <p><b>Aim:</b> Develop scientific knowledge and conceptual understanding through the specific disciplines of physics.</p>	<p><b>Asking Enquiry Questions</b></p> <p><b>LEARNING INTENTION:</b> To know that the Earth, Moon and Sun are approximately spherical bodies.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Plan scientific enquiries to answer questions.</li> </ul> <p><b>Aim:</b> Develop scientific knowledge and conceptual understanding through the specific disciplines of physics.</p>	<p><b>Communicating Results</b></p> <p><b>LEARNING INTENTION:</b> To know that the Moon and the Earth orbit the Sun.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Report and present findings from enquiries, including conclusions, in oral and written forms such as displays and other presentations.</li> </ul> <p><b>Aim:</b> Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.</p>
<p><b>Key Vocabulary:</b> <b>Solar System, Sun, planets, star,</b> moon, orbit, ellipse, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune</p>	<p><b>Key Vocabulary:</b> <b>Earth, Moon, Sun,</b> heliocentric, sphere, <b>spherical, gravity, mass,</b> compress</p>	<p><b>Key Vocabulary:</b> <b>natural satellite, orbit,</b> rotate, <b>rotation, axis, month, lunar, day, year,</b> reflect</p>
<p><b>Recap &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>The Sun is a huge, hot ball of gas and is the only source of heat and light in the Solar System.</li> </ul>	<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>The Sun is a huge, hot ball of gas and is the only source of heat and light in the Solar System</li> <li>The Solar System is made up of the Sun and everything that orbits around it.</li> <li>There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.</li> </ul>	<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>The Sun is a huge, hot ball of gas and is the only source of heat and light in the Solar System</li> <li>The Solar System is made up of the Sun and everything that orbits around it.</li> <li>There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.</li> </ul>

		<ul style="list-style-type: none"> <li>The Sun, Earth, Moon and the planets in our solar system are roughly spherical.</li> </ul>
<p><b>Key Knowledge:</b></p> <p><b>Child:</b></p> <ul style="list-style-type: none"> <li>The Solar System is made up of the Sun and everything that orbits around it.</li> <li>There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.</li> <li>The Sun is a huge, hot ball of gas and is the only source of heat and light in the Solar System.</li> </ul> <p><b>Teacher:</b></p> <ul style="list-style-type: none"> <li>The Sun's force of gravity, created by its huge mass, keeps the planets in orbit.</li> <li>The planets closer to the Sun (Mercury, Venus, Earth and Mars) are made of rock.</li> <li>They are hotter and have a shorter orbit and a shorter year than the planets farther away.</li> <li>Planets farther from the Sun (Jupiter, Saturn, Uranus and Neptune) are made of gas.</li> <li>They are colder and have a larger orbit and a longer year than the closer planets.</li> </ul>	<p><b>Key Knowledge:</b></p> <p><b>Child:</b></p> <ul style="list-style-type: none"> <li>The Sun, Earth, Moon and the planets in our solar system are roughly spherical.</li> <li>All planets are spherical because their mass is so large that they have their own force of gravity.</li> </ul> <p><b>Teacher:</b></p> <ul style="list-style-type: none"> <li>This force of gravity pulls all of a planet's material towards its centre, which compresses it into the most compact shape – a sphere.</li> <li>Many ancient civilisations believed that the Earth was flat.</li> <li>Aristotle (384 BC-322 BC) observed that when a ship sailed over the horizon, the bottom part of the ship disappeared from view.</li> <li>As it sailed further away, it disappeared from view from the hull upwards, indicating that the Earth was spherical.</li> </ul>	<p><b>Key Knowledge:</b></p> <p><b>Child:</b></p> <ul style="list-style-type: none"> <li>The Moon orbits the Earth once every 27.3 days, which is around one month.</li> <li>Earth completes one rotation in 24 hours. This is equal to one day.</li> <li>It takes a year (365.25 days) for Earth to complete a full orbit of the Sun.</li> </ul> <p><b>Teacher:</b></p> <ul style="list-style-type: none"> <li>The Moon also rotates on its axis once every 27.3 days.</li> <li>This is why the same side of the Moon always faces Earth.</li> <li>The Moon is not a natural light source; it reflects the Sun's light.</li> <li>Earth rotates on its axis, an imaginary line that runs through Earth's centre from the North Pole to the South Pole.</li> <li>Earth orbits around the Sun.</li> </ul>

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### SCIENCE – Year 5 - Medium Term Planning – PHYSICS: EARTH AND SPACE

<u>LESSON 4</u>	<u>LESSON 5</u>	<u>LESSON 6</u>
<p><b>Communicating Results</b></p> <p><b>LEARNING INTENTION:</b> To know that the day and night is due to the rotation of Earth on its axis.</p> <p>To know that seasons and day lengths are due to the tilt, rotation and the Earth’s orbit.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Report and present findings from enquiries, including conclusions, in oral and written forms such as displays and other presentations.</li> </ul> <p><b>Aim:</b> Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.</p>	<p><b>Using Scientific Evidence</b></p> <p><b>LEARNING INTENTION:</b> To know that the moon has different phases each month.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Identify scientific evidence that has been used to support or disprove ideas</li> </ul> <p><b>Aim:</b> Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.</p>	<p><b>Asking Enquiry Questions</b></p> <p><b>LEARNING INTENTION:</b> To know that Katherine Johnson was an American mathematician who worked for NASA.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Plan scientific enquiries to answer questions.</li> </ul> <p><b>Aim:</b> Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.</p>
<p><b>Key Vocabulary:</b> day, night, season, tilt, axis, rotate, face, shadow, angle, shorter, longer</p>	<p><b>Key Vocabulary:</b> lunar, Moon, phase, reflect, waning, waxing, gibbeous, crescent, first quarter, last quarter</p>	<p><b>Key Vocabulary:</b> mathematician, geometry, NASA, space travel, astronaut, flight path, exploration, legacy, impact, gender</p>
<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>The Sun is a huge, hot ball of gas and is the only source of heat and light in the Solar System</li> </ul>	<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>The Sun is a huge, hot ball of gas and is the only source of heat and light in the Solar System</li> </ul>	<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>The Sun is a huge, hot ball of gas and is the only source of heat and light in the Solar System</li> </ul>

- The Solar System is made up of the Sun and everything that orbits around it.
- There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
- The Sun, Earth, Moon and the planets in our solar system are roughly spherical.
- The Moon orbits the Earth once every 27.3 days, which is around one month.
- Earth completes one rotation in 24 hours. This is equal to one day.
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- It takes a year (365.25 days) for Earth to complete a full orbit of the Sun.
- As Earth rotates, different parts of it face the Sun, which brings what we call daytime.
- The part facing away is in shadow, which is night time.
- The tilt of the Earth creates the different seasons on Earth each year as the Earth orbits the Sun.

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- As Earth rotates, different parts of it face the Sun, which brings what we call daytime.
- The part facing away is in shadow, which is night time.
- The tilt of the Earth creates the different seasons on Earth each year as the Earth orbits the Sun.
- The changing view is called the phases of the Moon.
- There are eight phases of the Moon: new Moon, waxing crescent Moon, first quarter Moon, waxing gibbous Moon, full Moon, waning gibbous Moon, last quarter Moon and waning crescent Moon.

**Key Knowledge:**

**Child:**

- The Earth rotates on its axis once every 24 hours, which is a day.
- This rotation creates daytime and night time.
- As Earth rotates, different parts of it face the Sun, which brings what we call daytime.
- The part facing away is in shadow, which is night time.

**Key Knowledge:**

**Child:**

- The changing view is called the phases of the Moon.
- There are eight phases of the Moon: new Moon, waxing crescent Moon, first quarter Moon, waxing gibbous Moon, full Moon, waning gibbous Moon, last quarter Moon and waning crescent Moon.

**Teacher:**

**Key Knowledge:**

**Child:**

- Katherine Johnson studied how to use geometry for space travel.
- She calculated the paths for the spacecraft to orbit (go around) Earth and to land on the Moon.
- She also overcame racial and gender hurdles that helped make giant leaps for humankind.
- Unlike the white male astronauts she helped launch into space, no one knew of

- The tilt of the Earth creates the different seasons on Earth each year as the Earth orbits the Sun.

**Teacher:**

- During the day, the Sun appears to move through the sky.
- However, this is due to the Earth rotating and not the Sun moving.
- The Earth's axis is tilted at an angle of 23.5°.
- Earth rotates to the east or, if viewed from above the North Pole, it rotates anti-clockwise, which means the Sun rises in the east and sets in the west.
- When the Northern Hemisphere tilts away from the Sun, it is winter.
- It gets less direct sunlight, the weather is colder, the daytime is shorter, and the night time is longer.
- The Arctic Circle gets no sunlight in winter, so it is always night time.
- At the same time, the Southern Hemisphere tilts towards the Sun, which is summer.
- It gets plenty of direct sunlight, the weather is warmer, the daytime is longer, and the night time is shorter.
- Antarctica has daylight all day, and it is never night time.
- As the Earth continues its orbit, the day lengths and the seasons in the hemispheres continually change.

- The Moon appears lit up because it reflects sunlight.
- As the Moon completes one orbit of the Earth, our view of the lit side gradually changes.
- Different amounts of the lit side can be seen from Earth during each month and are called the phases of the Moon.
- The Moon orbits the Earth in an anti-clockwise direction as viewed from the North Pole.
- It rotates on its axis once every 27.3 days, the same time it takes to complete one orbit of the Earth, so the same side of the Moon always faces the Earth.
- Waxing means to increase.
- Waning means to decrease.

**Teacher:**

- the ground-breaking work Johnson and dozens of other black women did for NASA and space exploration.
- Katherine Johnson loved maths.
  - When Katherine was 34, she heard that NACA (later called NASA) was hiring African American women to solve maths problems.
  - NASA sent astronauts into orbit around Earth.
  - These workers were called “computers.” Katherine applied for one of the jobs, but the jobs were already taken. Still, she did not give up. She applied again the next year, and this time NACA hired her.
  - She worked with a large group of women who were all computers like she was.
  - But Katherine was different from the other human computers. She asked a lot of questions. She wanted to learn more about her work and about NASA. So she started going to meetings.
  - Before Katherine, only men attended these meetings. She changed that!
  - She learned so much that she left her job as a computer.
  - She became a team member who worked on different space projects for NASA.
  - Later, her maths helped send astronauts to the Moon and back.

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|  |  | <ul style="list-style-type: none"><li>• It wasn't until the 2016 release of the movie <i>Hidden Figures</i> that these women received widespread recognition.</li></ul> |
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**Assessment**

Cumulative Quiz. Retrieval Practice.