Key Knowledge:

Progression of Learning – Prior Learning:

- N/A

How do we know that the Sun, Earth and moon are approximately spherical bodies?

- To know that the Sun, Earth and Moon are approximately spherical bodies.
- To know that there has been a range of scientific evidence which has been used to support this idea (including the Greek Philosopher Aristotle) but it has not always been believed.

What are the planets in our solar system?

- To know that the Sun is a star and a source of energy, light, heat – it is not a planet.
- To know that a celestial body is a natural object that exists outside the Earth's atmosphere. Examples include stars, planets, asteroids, comets, and meteoroids.
- To know that there are eight planets in the solar system, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Note that, in 2006, Pluto was classified as a dwarf planet)
- To know that the Sun, Earth and Moon are approximately spherical bodies.

How can we describe the movement of the planets relative to the Sun?

- To know that the original model of the solar system was the geocentric model which had the Earth at the centre of the solar system. This was replaced by the heliocentric model which has the Sun at the centre of the solar system.
- To know that the Earth and the planets revolve around the Sun.
- To know that the Earth takes 365 ¼ days to move around the Sun, which we call this a year. This is different on different planets.

How can we describe the movement of the moon relative to the Earth?

- To know that the moon orbits the Earth. It takes 27.7 days for one orbit
- To know that the Moon does not produce its own light. What we see is the Moon reflecting light from the Sun
- To know that the phases of the moon are caused by its orbit around the Earth.
- To know that as the moon orbits the Earth, we can see a different amount of the moon is lit by the sun from our perspective on Earth.

What causes day and night?

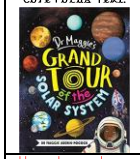
- To know that the Earth spins on its own axis. One revolution takes one day (24 hours)
- To know that we get day and night because sometimes the part of the Earth we are on is facing towards the Sun (day) and sometimes it is facing away from the Sun (night)
- To know that the sun rises in the East and sets in the West because at sunrise the Earth is rotating towards the Sun and at sunset away from the Sun
- To know that some countries may have their daytime whilst others have their night time

Progression of Learning – Future Learning:

KS3

- Gravity force, weight = mass x gravitational field strength (g), on Earth g=10 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 Sequence:

Core Focus Text:	Lesson 1A: Pre-Learning: Explore, Engage, Extend.	Lesson 1B: The Bigger Scientific Picture
	Discover what children know…' and 'what children would like to know…' Completion of pre-learning Vital Vocabulary.	Explore the name of the unit, considering the questions: 'why are we studying this unit?' and 'what are the big scientific ideas?' Explore the disciplines of Chemistry, Physics and Biology making extensive links to all areas of prior learning through retrieval opportunities, mind map creation, research and discussion. https://pstt.org.uk/resources/curriculum-materials/AS-TLM

How do we know that the Sun, Earth and moon are approximately spherical bodies?

Retrieval Activity (Revisit 'Materials and their Uses' milestones from Autumn 1. Complete application of knowledge retrieval questions to support retrieval).
Teaching (Revisit 3D shapes from Maths and focus on a sphere. Explore statements about the Earth and classify them as support or refute idea of 'spherical' bodies through a 'Debate It opportunity'. Focus on use of evidence to support ideas).
Vocabulary (spherical, Physics).
Activity (From research and reading in today's lesson, children to answer the reasons support the idea of the Earth being both flat and spherical. Children to use evidence to support their claims and state their own view today).
Scientific Enquiry (Researching using secondary sources).
Working Scientifically - Sc5/1.6 (identifying scientific evidence that has been used to support or refute ideas or arguments).

What are the planets in our solar system?

Retrieval Activity (Knowledge Organiser retrieval – peer assessment of transferable knowledge about Physics).
Teaching (Explore pages 6-7 of 'Grand Tour of the Solar System'. Use Explorify 'Odd One Out – Space Objects' to deepen understanding. Explore the role of the sun as a celestial body and how it is not a planet as a common misconception).
Vocabulary (orbit, planet, solar).
Activity (Using core focus text as a source of information, children to create information poster defining the eight planets in the solar system).
Scientific Enquiry (identifying classifying and grouping (a planet as opposed to a star).
Working Scientifically - Sc5/1.5 (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).

How can we describe the movement of the planets relative to the Sun?

Retrieval Activity (Brain Dump – what do you know about the plants in our Solar System?)
Teaching (Model, explain and show the different models through practical methods.
Vocabulary (celestial, heliocentric, geocentric, revolve).
Activity (Part 1 - Children to label and explain the heliocentric model of the solar system using Scientific research. Part 2 – Analyse, round and reach conclusion of the orbit times of different planets using a table).
Scientific Enquiry (Researching using secondary sources).
Working Scientifically - Sc5/1.3 (recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs).

How can we describe the movement of the moon relative to the Earth?

Retrieval Activity (Explorify Activity: What would happen if the sun rotated, and the Earth didn't? https://explorifyuk/en/activities/what-if/the-sun-rotated-and-the-earth-didnt).
Teaching (Show practical models to show movement of the moon).
Vocabulary (lunar, orbit).
Activity (Create Scientific diagram to represent and describe the movement of the moon and how this creates different phases).
Scientific Enquiry (pattern seeking).
Working Scientifically - Sc5/1.3 (recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs).

What causes day and night? [Outdoor Learning]

Retrieval Activity (End of topic quiz based on Milestone Knowledge).
Teaching (Discuss the cause of day and night showing BBC Bitesize video).
Vocabulary (rotate, axis).
Activity (Complete human sundial experiment outside. Children to record their findings as a line graph, to analyse the trend of time of day and shadow size).
Scientific Enquiry (comparative and fair testing - controlled investigations).
Working Scientifically: Sc5/1.1 (planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary).

Exit Task: Complete assessment questions and concept cartoon to analyse the opinions.

Common Misconceptions to Consider:

- Remember that nothing distinctive can be seen from the moon, just a glow of lights from the cities.
- Seasons exist because the Earth is tilted on its axis. As it orbits the sun, different parts of the world are more directly exposed to the sun, causing summer. The side that is tilted away from the sun has winter.
- Remember that day and night is concerned with the Earth rotating on its axis.
- Rather than there being NO gravity in space, there is actually less gravity in space than on Earth, but there is still gravity. There is (probably) no such thing as 0G.
- The moon does not emit light - the moon reflects light.
- Mercury is closest to the sun, but it is not necessarily the hottest planet. Actually, the distance from the sun has little to do with heat. Venus is the hottest because it has an atmosphere thick with CO2 and nitrogen. It is an almost constant 462 degrees, whereas mercury has a thin atmosphere and varies between -173 and 427 degrees.

Year 5 Science – Space

Our Rainbow Promises

Encourage Resilience and perseverance
Develop Articulate learners
Influence aspirations
Nurture curiosity
Instil British and Christian Values
Provide Opportunities to build upon knowledge and skills
Promote Wellbeing and Health

Local and Cross-Curricular Links

Class visit to Jodrell Bank.

Think like a Scientist by:

Sorting/ grouping / comparing / classifying / identifying, researching, modelling, recording, questioning, planning including use of equipment and measurement, communicating, recording, concluding, collaborating.

National Curriculum Coverage

- 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.

Transferrable Knowledge:

Physics (Helps us understand how objects, forces and energy all interact. Physical things).

P4: The Earth is one of eight planets that orbit the sun.

P5: The Earth is tilted and spins on its axis leading today and night, the seasons and the climate.

Scientific Enquiry:

Observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); researching using secondary sources. Pupils might work scientifically by: carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.

Vital Vocabulary

Celestial
Lunar
Heliocentric
Geocentric
Orbit
Planet
Revolve
Rotate
Solar
Spherical
Axis

R	Five strands of scientific enquiry, with child-led investigations.
A	Vital vocabulary, oracy opportunities including P4C and speak its, exit task and use of academic keystone words.
I	Visits from STEM Ambassadors. Opportunity to become Creation Champions. Study of key scientists.
N	Subject WOW. Quest approach to teaching. Five strands of scientific enquiry. Opportunities for wider scientific reading.
B	Focus on creation and endurance as our core Scientific Christian Values. Mutual respect for the ideas of other people as our core British Christian Values.
O	Knowledge and skills progressively sequenced; see planning overleaf.
W	Focus on health and wellbeing woven throughout the Curriculum, linked to Parish Spirit Curriculum. Appreciation of the natural world and sense of awe and wonder.