 **UKS2 Cycle A Unit 2 Earth and Space**

**Key Question:** What is the Solar System?

**Overview Of Learning**

During this unit of work, children will learn that the Earth is part of the solar system and that the Sun is at the centre of that system. They will learn the names of the other planets (based on their distance from the Sun) and be able to describe the movement of Earth (and other planets) in relation to the Sun. Children will discover why there is day and night on Earth and relate this to time. They will plan an investigation to answer the question - what happens to the Sun during the daytime?

Children will also gain an understanding of the phases of the Moon and be able to describe the Moon’s movement in relation to the Earth.

**Previous Learning**

**KS1 –** As part of the seasonal change topic, children may have observed changes across the seasons and observed/described weather changes. They may have learnt that the Sun is a light source. Earth and Space is not taught at KS1 as a discrete topic.

**Year 3 –** Children may have learnt about the Sun as a light source (in the Light topic); they may have observed that shadows are formed when an opaque object blocks out light and that the Sun’s position in the sky appears to change through the day.

**Knowledge And Understanding Objectives**

**Pupils should be taught to:**

* 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.

**Future Learning**

**KS3 –** Children extend their knowledge of gravity as a force (learning formulae) and that gravity is different on other planets and stars. They consolidate knowledge that the Sun is a star, and that there are other stars in our galaxy and other galaxies. They will extend their knowledge of seasons and the Earth’s tilt, day length at different times of year, in different hemispheres and learn that a light year is a unit of astronomical distance.

**Key Vocabulary To Explain**

**orbit** – the rotation that one body in space takes around another when under gravitational influence

**axis** – an imaginary line going through a central body that most bodies in space rotate around

**day** – length of time the Earth takes to rotate on its axis once

**month** – the length of time the Moon takes to complete one orbit around the Earth (not exactly equal to a calendar month)

**planet** – a non-luminous body that orbits a star

**solar system** – the name given to the Sun and all the bodies orbiting around it

**year** – the period the Earth takes to complete one orbit of the Sun

**gravity** – the force of attraction between two masses

**Working Scientifically Objectives**

**Pupils in Upper Key Stage should be taught to:**

* plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
* take 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, bar and line graphs
* report and present 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.
* identify scientific evidence that has been used to support or refute ideas or arguments

**Misconceptions**

When learning about the order of the planets based on the distance from the Sun, it is important that the children understand that the planets are orbiting around the Sun (they don’t stay in a line from the Sun as often depicted) but the distance away from the Sun stays the same. When considering day and night, some children may think that the Sun disappears or goes behind a cloud. This is not true; day and night occur as the Earth is rotating on its axis. Because the Sun appears to move across the sky, it can be difficult for the children to comprehend that it is the Earth moving NOT the Sun.

Another common misconception by children is that the Moon actually changes shape (as this is what they observe from Earth) and that there is no gravity on the Moon (The Moon's mass is about 1.2% of the mass of the Earth which makes the gravity on the Moon 83.3% lower than that of the Earth). Some children may also think that the Moon ‘disappears’ in the daytime however it is still in the sky but the sunlight is too bright (much of the time) to see it. It is useful to have a globe in the classroom to reinforce the fact that the Earth is a spherical body.

**Unit Overview**

**Lesson 1 Lesson 2 Lesson 3 Lesson 4 Lesson 5 Lesson 6**

# Key question:

What are the names of the planets in the solar system?

# Learning objective:

I can describe the planets in the solar system

# Success criteria:

By the end of this lesson, children will be able to name the planets in the solar system based on their distance from the Sun. They will understand that the Sun is a star (not a planet). They will know some facts about a chosen planet.

# Key question:

How do we know the Earth is a sphere?

# Learning objective:

I can describe the Sun, Earth and Moon as approximately spherical bodies.

# Success criteria:

By the end of this lesson, children will be able to describe the Earth as a spherical body. They will understand how it was discovered that the Earth was round and not flat by the Greek philosopher Aristotle.

# Key question:

How long does it take for Earth (and other planets) to orbit the Sun once?

# Learning objective:

I can describe the movement of the Earth, and other planets, relative to the Sun in the solar system.

# Success criteria:

By the end of this lesson, children will be able to describe the movement of the Earth, and other planets relative to the Sun. They will understand that a year is the amount of time it takes for a planet to orbit the Sun once, and it is

different for each planet. They will be able to complete a maths activity that links to the time taken for each planet to orbit the sun.

# Key question:

What is the largest object that orbits the Earth?

# Learning objective:

I can describe the movement of the Moon relative to the Earth.

# Success criteria:

By the end of this lesson, children will be able to describe the movement of the Moon in relation to the Earth. They will learn that the Moon is the largest object that orbits the Earth and that we only see one side of the Moon from Earth. Children who complete the challenge activity, will research facts about the Moon.

# Key question:

Why is there day and night on Earth?

# Learning objective:

I can use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.

# Success criteria:

By the end of this lesson, children will be able to explain why there is day and night on Earth. They will work in groups to plan a fair investigation to answer the question – What happens to the Sun during the day? They will make predictions and draw conclusions using scientific knowledge gained in the lesson.

# Key question:

Does the Moon change shape?

# Learning objective:

I can describe the movement of the Moon relative to the Earth.

# Success criteria:

By the end of this lesson, children will be able explain why the Moon appears to change shape. They will be able to describe the movement of the Moon relative to Earth and name some of the phases of the Moon.

# Cumulative quiz:

Q1 - Q3

# Cumulative quiz:

Q4 - Q6

# Cumulative quiz:

Q7 - Q9

# Cumulative quiz:

Q10 - Q12

# Cumulative quiz:

Q13 - Q15

# Cumulative quiz:

Q16 - Q18

**Stretch And Challenge Ideas**

**Children could:**

* invent their own mnemonic to help them order the planets based on their distance from the Sun
* use information books or the internet to research information about the Greek philosopher and create a passport for him
* be given a partially completed table. They use the information given to work out which planet is which; order the planets; round the number of days taken for each planet to complete 1 orbit of the Sun to the nearest full Earth day and then convert that time to Earth years.
* use the internet and/or non-fiction texts to complete a fact file about the Moon
* create a line graph and plot the results of the investigation.
* predict what the Moon would have looked like on the two nights that it couldn't be seen, using John's diary and their knowledge of the phases of the Moon

**Assessment**

* The pre-unit assessment should be given before the unit to see where gaps are and what the children know. This will provide insight of the children who already know about the topic and give an opportunity for the teacher to plan activities that stretch these children and develop higher order thinking skills.
* The knowledge organiser can be used to support children. This can be on display, on the tables, sent home or used for pre-teaching key vocabulary or concepts.
* The post unit test can be used to assess the knowledge and understanding objectives that have been taught throughout the unit. This can be done independently or in small groups with a teacher.