


**Pioneer Federation**  
**Medium term plan**  
**UKS2- Cycle 1 Term 4**  
**Science**



**NB – Health and Safety – NEVER look directly at the Sun.**

<b>Subject:</b> Science
<b>Key question:</b> What is the Solar System?
<b>Key Concept/ Theme:</b> <ul style="list-style-type: none"><li>• Describe the movement of the Earth, and other planets, relative to the sun in the solar system</li><li>• Describe the movement of the moon relative to the Earth</li><li>• Describe the sun, earth and moon as approximately spherical bodies</li><li>• Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</li><li>• Learn that the sun is a star at the centre of our solar system and that it has eight planets</li></ul>
<b>Prior Learning links:</b> <p>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.</p> <p>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</p>
<b>Working Scientifically skills:</b> <ul style="list-style-type: none"><li>• Asking questions</li><li>• Method and equipment</li><li>• Grouping and classifying</li><li>• Record results</li><li>• So what?</li></ul>
<b>Types of enquiry:</b>  <p>The diagram shows five circular icons representing different enquiry types: 1. A red circle with a scale of justice icon labeled 'Controlled experiment'. 2. A blue circle with a magnifying glass over a globe icon labeled 'Pattern seeking'. 3. A yellow circle with a network of nodes icon labeled 'Identifying, classifying &amp; grouping'. 4. A purple circle with a clock icon labeled 'Observing, measuring &amp; recording'. 5. A green circle with a book and a target icon labeled 'Research using secondary resources'.</p>
<b>Vocabulary:</b> <p><b>Day and night</b> - Earth, axis, rotate</p> <p><b>Orbit</b> – the rotation that one body in space takes around another when under gravitational influence.</p>

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**Axis** – an imaginary line going through a central body. Most bodies in space rotate around the axis.

**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

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

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

**Solar system** – Star = Sun, Planets = Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune (Pluto was classified as Dwarf planet in 2006)

**Phases of the Moon** - full moon, gibbous moon, half moon, crescent moon, new moon, waxing ,waning

Moon's orbit: 29.5 days, lunar month

1.

**Prior learning reconnection (year group, cycle & term):**

Cycle 1, LKS1, Term 1 and 3, Seasonal changes

**LO:** To be able to describe the movement of the Earth, and other planets, relative to the Sun in the solar system.

**Resources:** bits to make a solar system model

**Activity:**

The challenge for children is to learn the names of the planets within our solar system, as well as the order in which they occur (starting from our Sun), and have an idea as to how far planets are from the Sun.

**Drama/modelling - Acting out the order of the planets in our solar system**

**[What is the solar system? - BBC Bitesize](#)**

In small groups the children could try to create a mini play to remember the order of the planets; starting with the one nearest to the Sun. For example; the first child (Mercury) can be a thermometer becoming really hot (as they are so close to the Sun). This child becomes so hot that they explode and **mercury** flies out. The next child, named **Venus**, is then showered by the mercury. To escape this, this child digs into the **earth**. However, he/she soon comes across a very cross man holding a **mars** bar. The mars bar is thrown at Venus, misses, and flies off into the air where it strikes the god **Jupiter**. Falling back, Jupiter reveals his T-shirt, on which is written three letters: SUN (**Saturn, Uranus and Neptune**).

Video: [KS2 Science: The work of Nicolaus Copernicus - BBC Teach](#) - 'Copernicus and Galileo – the movement of the Earth'

This video is a humorous way for children to find out a little about the ideas from Copernicus and Galileo.

**What is at the centre of our solar system?**

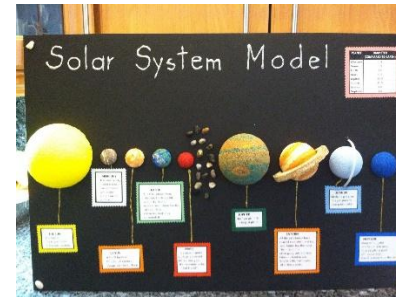
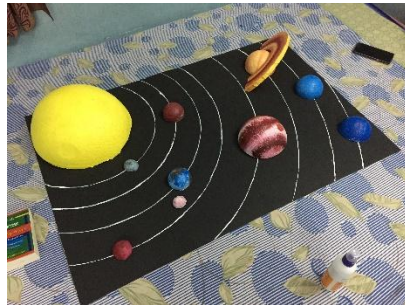
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Introduce children to the solar system.  
The following video will introduce children to the Sun.  
[Stunning photos show the Sun like never before - BBC Reel](#)

**Modelling - Make a model of the solar system**

<http://www.enchantedlearning.com/crafts/astronomy/solarsystemmodel/>  
This model will help children to learn the names and order of the planets  
[Planets of our Solar System - BBC Bitesize](#)

Making a model will help children to understand the relative size of the planets, and the distance between them. The following website will allow you to work out the size of the models for the planets and the distances from the Sun based on the size of the Sun which you can choose: [http://www.exploratorium.edu/ronh/solar\\_system/](http://www.exploratorium.edu/ronh/solar_system/)  
For example, by choosing the Sun to be 1000mm (i.e. 1 metre) the nearest planet (Mercury) will have the diameter of 3.4mm and will be over 41 metres away from the "Sun".



2. **Reconnection:** Can you name the planets in solar system?  
**LO:** To be able to describe the movement of the Earth, and other planets, relative to the Sun in the solar system.

**Enquiry skill:** Researching using secondary sources  
**Resources:** information books about the solar system

**Activity:**

**Research - What is it like on the other planets in the solar system?**

As part of finding out about the orbits of the planets in our solar system relative to our Sun, the children could find out more about what the affect their position has on the conditions on their planets.

Children can use books and the internet to find out what it is like on the other planets.

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	<p>Information about each of the planets can be found on NASA' website: <a href="http://solarsystem.nasa.gov/index.cfm">http://solarsystem.nasa.gov/index.cfm</a> <a href="http://solarsystem.nasa.gov/kids/index.cfm">http://solarsystem.nasa.gov/kids/index.cfm</a></p> <p>Click down the page to see about all of the planets in solar system: <a href="#">Planets of our Solar System - BBC Bitesize</a></p> <p>Children to make a PPT about the different planets of the solar system describing their movements and their relativity to the sun.</p>
3	<p><b>Reconnection:</b> How do the planets of the solar system move? <b>LO:</b> To be able to describe the movement of the Moon relative to the Earth. <b>Resources:</b> OHP or desks lamp, White polystyrene ball, Length of dowelling <b>Activity:</b> <b>Secondary sources - What is the Moon like?</b></p> <p>Pictures of the whole lunar cycle for the date you are doing this unit can be found at: <a href="http://www.moonconnection.com/moon_phases_calendar.phtml">http://www.moonconnection.com/moon_phases_calendar.phtml</a></p> <p>You can look at particular areas on the Moon at NASA's website: <a href="http://moon.nasa.gov/home.cfm">http://moon.nasa.gov/home.cfm</a></p> <p><b>Deep thinking time - How does the shape of the Moon appear to change over time?</b></p> <p>Allow the children to discuss the following statements:</p> <ol style="list-style-type: none"><li>1. Bits of the Moon fall off and then grow back again</li><li>2. The Moon can only be seen at night</li><li>3. There is Moon that is a shape of a circle, and there is another Moon that sometimes replaces it that is shaped like a crescent.</li></ol> <p>Ask children what evidence they could produce to prove or disprove these statements.</p> <p><b>Modelling- How does the shape of the Moon appear to change over time?</b></p> <p>The following video shows how to model the phases of the Moon: <a href="http://www.bbc.co.uk/learningzone/clips/stargazing-challenge-the-moon-on-a-stick/13903.html">http://www.bbc.co.uk/learningzone/clips/stargazing-challenge-the-moon-on-a-stick/13903.html</a></p> <p>Sun must be an OHP/desk lamp, a white ball is the Moon, and the head of the pupil is the Earth. The white ball is mounted on a stick which the child holds up and out. The OHP is aimed at the ball. The child rotates (sitting on a swivel chair) with stick and comments on what he/she can see. (Best done away from a wall to avoid light being scattered back and thus illuminating the dark side.)</p>

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	<p>By rotating slowly, a complete cycle of lunar phases can be observed. When the ball is between the child and the projector this is the 'New Moon'. Rotating a quarter-turn anticlockwise brings us to the 'first quarter' in which half the lit face is visible to the child (this is about 7 days into the cycle). Turning further we pass through 'waxing gibbous' to 'full Moon' when the ball is on the opposite side of the chair from the OHP and the child can see the whole of the lit face (provided the beam is not blocked by their head – a lunar eclipse). Completing the cycle, the white ball passes through 'waning gibbous' and 'third quarter' back to the 'New Moon' position.</p> <p><b>Recording</b></p> <p>The children can draw pictures that show how the shape of the Moon appears to change.</p> <p>The children can keep a diary of phases of the Moon. Check with information back in class by referring to diaries, newspapers and websites.</p> <p>Children can produce diagrams showing what part of the moon can be seen at different dates</p>
4	<p><b>Reconnection:</b> Does the moon always stay the same?</p> <p><b>LO:</b> To be able to 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><b>Resources:</b> Globes, Plasticene, Polystyrene balls, Wooden doweling, PVA glue, A swivel chair</p> <p><b>Activity</b></p> <p><b>Modelling – How do we have day and night on planet Earth?</b></p> <p>Begin by asking the children how they think we have day and night on our planet? You could also ask them what would need to happen so that we were stuck in day or night.</p> <p>The following video animates the rotation of the Earth:</p> <p><a href="#">Day and night - BBC Bitesize</a></p> <p>Show the children photos taken of a shadow over a period of time somewhere in the school grounds. Ask them how they think the shadows changed during the day.</p> <p>The first model children can try to make simply involves standing a pencil upright in some blue tac and then passing a torch over the top in an arc. This shows that either the Earth or the Sun could be moving.</p> <p>The second model involves a child sitting on a rotating chair. To begin, shine a torch at them and then move the torch all the way around them. Secondly, keep the torch still, but allow the child to move around. Ask the children which of the actions is the correct model.</p> <p>In order to avoid the misconception of the movement of the Sun creating day and night ensure the children have opportunities to try making one or more of the following models:</p> <ol style="list-style-type: none"><li>1. Plasticene person on a globe. Shine torch at the globe whilst rotating it. The 'person' will pass through day and night.</li></ol>

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2. Make Earth by using a white polystyrene ball with a piece of wooden dowelling placed through it. Again, stick on person, shine torch and rotate the ball.
3. Just like above, but children can make a paper Mache Earth with a piece of dowelling through it.

To extend these models, pieces of string could be placed down the length of a globe to show some of the longitude lines; divide the Earth in half (at the Greenwich Meridian), then quarters, and finally eighths. There will therefore be three hours between each of the lines. Children could then work out what time it is in different places around the globe when it is a certain time in the UK.

**Recording**

Children could draw how we have day and night on our planet.

5

**Reconnection:** How do we have day and night on Earth?

**LO:** To be able to use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.

**Resources:** Gnomon and sundial template

[https://www.bbc.co.uk/norfolk/kids/summer\\_activities/make\\_sundial.shtml](https://www.bbc.co.uk/norfolk/kids/summer_activities/make_sundial.shtml)

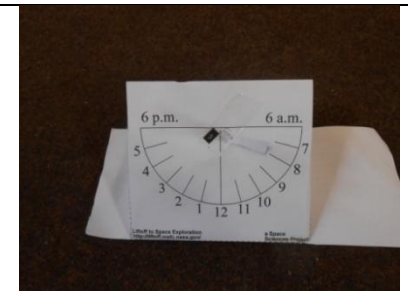
**Activity**

**Problem-solving – How can we use the Sun to tell the time?**

The children could be challenged to make a shadow clock. They could probably make one that will be reasonably accurate for a few days.

After this, they could have a go at putting together a sundial and gnomon. This will allow them to tell the time using the Sun throughout the year (as long as there is enough sunlight!). You will need to look up the latitude of where you are on Earth.

<http://er.jsc.nasa.gov/seh/sundialn.pdf>




**Quiz/assessment**

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Science End of Term Quiz UKS2 - Term 4


1 Sarah is using fruit to model the Sun, Earth and Moon.



Complete the table to show the best fruit for modelling the Sun, Earth and Moon. Think about the size and shape.

Object in space	Sun	Earth	Moon
Which fruit should be used for the model?			

2 Aditi uses a torch to represent the Sun. She points it towards a globe to show night and day.



Draw FOUR lines below to show what time it would be at each place on the globe.

A	midnight
B	midday
C	6 pm
D	3 pm

3 Aditi's class is learning about space. Write **Earth**, **Sun** or **Moon** next to each sentence to show what it is describing.

It is a light source. \_\_\_\_\_

It takes 24 hours to spin on its axis. \_\_\_\_\_

Its orbit takes 28 days. \_\_\_\_\_

**End points:**

- To know the names and positions of planets in the solar system.
- To know how the sun and moon and Earth move relative to each other and the sun in the solar system.
- To know what the sun and stars are made of and their importance.
- To know night and day is a result of rotations of the Earth.
- To describe the Sun, Earth and Moon as approximately spherical bodies.

**Future learning links:**

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 hemisphere and learn that a light year is a unit of astronomical distance