Calcot Schools Knowledge Organiser- Science

Topic: Earth & Space | **Phase: Key Stage 2 Year 5** | **Strand: Physics**

Prior knowledge from previous year groups:

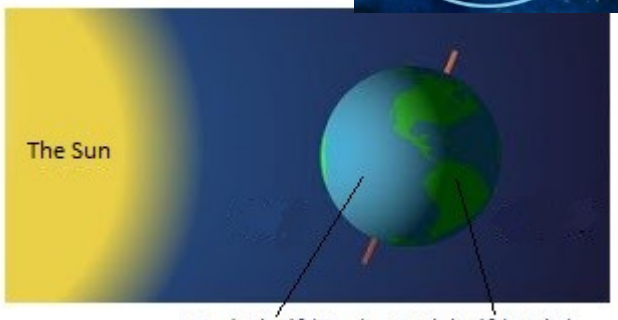
Year 1 — Know the seasons, the weather associated with the seasons and how day length varies.
Year 4—The Sun is a source of light but the Moon is not.
Know that a shadow is caused when an object blocks light from passing through it.

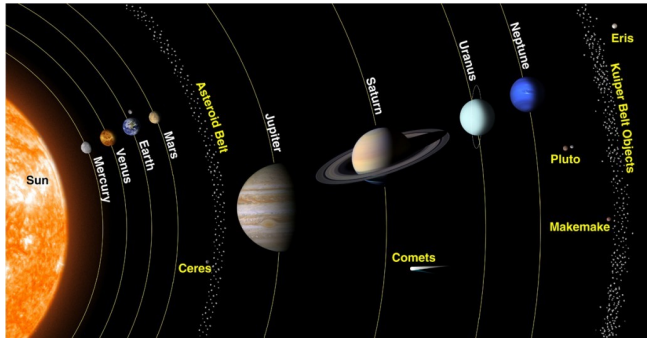
Own experiences — Movement of the sun and moon across the sky. Phases of the Moon. Celestial bodies visible in the sky.

What will the children know by the end of the unit?

The Earth's movement	To describe the movement of the Earth and other planets relative to the sun in the solar system.
Phases of the Moon	• The Moon **orbits** the Earth anticlockwise and takes approximately 28 days. • The Moon spins once on its **axis** every time it **orbits** Earth. This means that we only see one side of the Moon. • The Moon has different phases depending on where it is in its **orbit**.
Spherical celestial bodies	To describe the sun, Earth and moon as approximately spherical bodies.
Night and Day	To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. • Different parts of the Earth experience daylight at different times - this means that it is morning, afternoon and night in different places. This is also the reason why we have **time zones**. • Because of the Earth's tilt, the poles experience 24 hours of sunlight in the summer, and very few hours of sunlight in the winter.
Models of the Solar System	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.
Planets of our Solar System	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). The moon is a celestial body that orbits Earth. • The first four **planets** are relatively small and rocky, while the four outer **planets** are gas giants (Jupiter and Saturn) or ice giants (Uranus and Neptune). • There are also **asteroids**, **meteoroids** and **comets** in the **Solar System**. • The **Solar System** is in a **galaxy** called the Milky Way. • The **galaxy** is in the **universe**.

Diagrams





Opportunities for cross-curricular links.

Literacy	Class debates (see *Investigate*). Making a Prediction – what will be the outcome of an experiment. Forming a Hypothesis - Forming an opinion and justifying own views. Non-chronological report on a scientist/astronaut
Maths	Keep a diary of phases of the moon. Create tables for results.
D&T	Model of the Solar System. Space buggy/rover.
History	Research how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. Also, biographies of famous astronauts.

Vocabulary

Planets	Mercury, Venus, Earth, Mars, Jupiter, Uranus, Neptune, Saturn, Pluto
asteroid	a rock that **orbits** the Sun in a belt between Mars and Jupiter
axis	an imaginary line through the middle of something
comet	a bright object with a long tail that travels around the Sun
galaxy	an extremely large group of stars and planets. Our galaxy is called the Milky Way.
gravity	the force which causes things to drop to the ground
leap year	a year which has 366 days. The extra day is the 29th February. There is a leap year every four years
meteorite	a rock from outer space that has landed on Earth
orbit	the curved path in space that is followed by an object goinground and round a planet, moon, or star
planet	a large, round object in space that moves around a star
shadow	a dark shape on a surface that is made when something stands between a light and the surface
Solar System	the Sun and all the planets that go round it
sphere	an object that is round in shape like a ball
spin	turns quickly around a central point
star	a large ball of burning gas in space
time zones	one of the areas into which the world is divided where the time is calculated as being a particular number of hours behind or ahead of GMT (Greenwich Mean Time)
universe	the whole of space and all the stars, planets, and other forms of matter and energy in it

Investigate!

- Keep a moon phases diary.
- Comparing the time of day at different places on the Earth through internet links and online research.
- Create simple models of the solar system (link to DT and art) using scaling (maths)
- Construct simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day.
- Find out why some people think that structures such as Stonehenge might have been used as astronomical clocks.
- Discover the difference between weight and mass. Use Newton metres to measure the mass of objects and compare this to their weight. How would this differ in space?
- Investigate the theory of gravitation of Galileo and Isaac Newton - class debate; answer comprehension questions.
- What is living on the International Space Station like? Follow the videos, tweets and pictures of Tim Peake.
- Debates: How can we prove the Earth is not flat? How can we prove that the Earth rotates around the Sun? Space Travel—is it worth the investment of huge sums of money? Alien life.

Working scientifically, scientific skills and enquiry

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.

Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.