

Science

Earth and Space Year 5

Remember when:

Know 4 seasons. (Y1)

Sun is a source of light, but the Moon is not. (Y3)

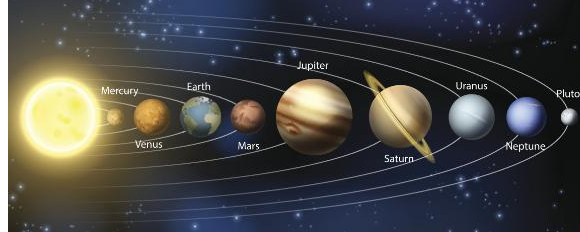
Shadows are caused when an object blocks light from passing through it. (Y3)

It is dangerous to look at the sun and we wear sunglasses for protection. (Y3)

Sticky knowledge:

There are 8 planets in our Solar System (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune).

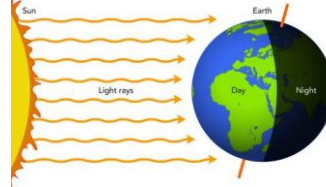
Pluto is a dwarf planet. They all orbit the Sun, which is a star.



The Sun is a star and it is at the centre of the solar system

It takes 365¼ days for Earth to orbit the Sun because of the extra quarter day, every 4 years we have a leap year (extra day).

It takes one day (24 hours) for the Earth to make a complete rotation on its own axis. This makes it appear as the Sun moves through the sky but the Earth's rotation causes day and night. Different countries have different time zones depending on the position of the Earth to the sun.



The Sun (appears to) rise in the east and set in the west (approximately).

As the Earth rotates, shadows that are formed change in size and orientation.

Earth's tilted axis causes the seasons.

The Moon orbits the Earth anticlockwise and takes approximately 27 days. It 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.

The Sun, Earth, Moon and other planets are approximately spherical.

Key vocabulary

asteroid
astronomical
axis
comet
crescent moon
eclipse
galaxy
gibbous moon
gravity
leap year
lunar
meteorite
orbit
planet
rotation
solar system
spherical
time zones
universe

National Curriculum:

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

Common Misconceptions:

Some children may think:

- the Earth is flat
- the Sun is a planet
- the Sun rotates around the Earth
- the Sun moves across the sky during the day
- the Sun rises in the morning and sets in the evening
- the Moon appears only at night
- night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.

LO and Enquiry type	Knowledge and Skills	Lesson outline
<p>Lesson 1</p> <p>LO: To understand different theories of the solar system</p> <p>Enquiry type: Research</p>	<p>SK: The Sun is a star and it is at the centre of the solar system. This is called Heliocentric theory.</p> <p>Geocentric theory suggested the Earth was the centre of the solar system.</p> <p>Skill: identifying scientific evidence that has been used to support or refute ideas or arguments</p>	<p>Introduce the geocentric and heliocentric theories about the solar system. Explain why people have thought this in the past, and why opinions have changed as we have learned more about the solar system.</p> <p>Children will interview an ancient Roman, Galileo Galilei, Nicolaus Copernicus and a Catholic Priest from 1600s. (previously prepped children/adults).</p> <p>They will then answer the interview questions in their books relating to their opinions on the different theories.</p> <p>LA – simplified questions</p> <p>ARE – interview questions given</p> <p>GD – create their own interview questions.</p>

<p>Lesson 2</p> <p>LO: To know the planets in our solar system</p> <p>Enquiry type: Research</p>	<p>SK: There are 8 planets in our Solar System (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune). Pluto is a dwarf planet. They all orbit the Sun, which is a star.</p> <p>The Sun, Earth, Moon and other planets are approximately spherical.</p> <p>Skill: recording data and results of increasing complexity using scientific diagrams and labels</p>	<p>STEM Learning: Fruit Solar System – Create the solar system on the field using different fruits to represent the planets. Ensure that the distance is measured so that the children can see the relative distance from the Sun. Children can then walk around the display and work out which fruit represents which planet.</p> <p>Introduce terms: Rock giants, Gas giants, asteroid belts. Explain what each is and how asteroid belts can impact on our solar system.</p> <p>Discuss each of the planets. Label an image of the planets in the Solar system, with scaled representations of the planets.</p> <p>Children will then research and answer “which planet?” questions in their book.</p> <p>LA – Label diagram (cut/stick), Match questions to answers.</p> <p>ARE – Answer questions</p> <p>GD – Challenge: think of your own questions for your partner to answer.</p>
<p>Lesson 3</p> <p>LO: To describe and explain the movement of the Earth and other planets in relation to the Sun.</p> <p>Enquiry type: Pattern seeking</p>	<p>SK: It takes 365¼ days for Earth to orbit the Sun because of the extra quarter day, every 4 years we have a leap year (extra day).</p> <p>The further away a planet is from the sun the longer its orbit.</p> <p>Skill: reporting and presenting findings from enquiries, including conclusions, causal</p>	<p>What is a year? Is a year the same everywhere?</p> <p>If a planet is further away from the Sun, will it take a longer time to go around (have a longer year)?</p> <p>Party on the planets (p147) – demonstrate the orbits of Mercury and Neptune, using children. Does this support the theory that if a planet is further away, it will have a longer orbit?</p> <p>Then, look at research which shows the orbits of all 8 planets. Does this support our original theory? Children to create a table comparing the orbits of the planets and their relative distance from the Sun. Children can then write the final theory in their books, now that they have found the evidence to support this.</p> <p>Explain that “the further away a planet is from the sun the longer its orbit” is a universal law. This means that it is not just the case in our solar system, but will happen across the galaxy in different star systems.</p> <p>LA – simplified measurements (rounded)</p> <p>ARE – As described</p> <p>GD – Give measurements of distance from the Sun, children make a prediction of the orbit, then write in the correct time.</p>
<p>Lesson 4</p> <p>LO: 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>Enquiry type: Pattern seeking</p>	<p>SK: It takes one day (24 hours) for the Earth to make a complete rotation on its own axis. This makes it appear as the sun moves through the sky but the Earth’s rotation causes day and night.</p> <p>Different countries have different time zones depending on the position of the Earth to the sun.</p> <p>Skill: recording data and results of increasing complexity using scientific diagrams and labels</p>	<p>Day and night occur because the Earth spins on its own axis. It takes 24 hours (1 whole day) for the earth to do one full rotation on its axis.</p> <p>In groups, use the equipment provided to demonstrate how day and night occur; 5 children, Torch, English flag, Australian flag.</p> <p>Children will use the knowledge gathered from this enquiry to explain why day and night occurs.</p> <p>Extension: link to previous learning – time zones. When it is in the UK, what time will it be in.....? questions. Why does this happen?</p> <p>LA - Match the strips to complete the sentence</p> <p>ARE – Write the sentences – time zone questions.</p> <p>GD – More complicated time zone questions. e.g If it is 12am in Los Angeles, what times will it be in London and Paris?</p>
<p>Lesson 5</p> <p>LO: To describe and explain the movement of the Moon relative to the Earth.</p> <p>Enquiry type: Pattern seeking</p>	<p>SK: The Moon orbits the Earth anticlockwise and takes approximately 27 days. It spins once on its axis every time it orbits Earth.</p> <p>This means that we only see one side of the Moon. The Moon has different phases depending on where it is in its orbit.</p> <p>Skill: recording data and results of increasing complexity using scientific diagrams and labels,</p>	<p>Fiction v Fact – Which of these previously believed theories about the moon are true? Discuss. (Clangers, Wallace and Gromit)</p> <p>Does the Moon always look the same size? Why do you think this? Look at a concept cartoon with different theories about why the Moon appears to change size and shape. Children to discuss the different theories and explain why they think each person might be correct/incorrect.</p> <p>Children will complete a short activity linked to these.</p> <p>Explain that: Waning means that the Moon is getting smaller. Waxing means that the Moon is getting bigger. The Moon appears to change shape because of the amount of light reflected on it by the Sun.</p> <p>Children will create the Moon cycle using Oreos – pictures in books. Use a blunt knife to carefully scrape the filling from the biscuit, The leftover frosting represents the area of the moon that can be seen in different phases.</p> <p>LA – True or False activity</p>



		<p>ARE – Fact or Fiction activity</p> <p>GD – Concept cartoon. Explain which child is right, explain why the other theories are incorrect.</p>	
<p>Lesson 6</p> <p>LO: To recap what we have learned about space.</p> <p>Enquiry type: Research</p>	<p>All Sticky Knowledge from this unit</p>	<p>Children will consolidate and recap what they have learned from this unit and present their findings as a mind map.</p>	
<p>Working towards</p>	<p>End of unit assessment Working at Age related expectations</p>		<p>Working at a greater depth</p>