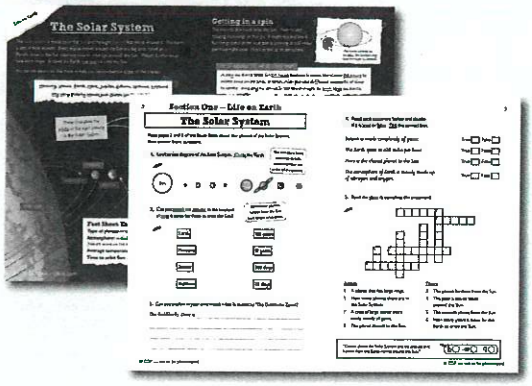
The Solar System

Study Book (pages 2-3)



Activity Book (pages 2-3)

National Curriculum Aims

- Understand the Solar System and the Earth's position in it.
- Understand that the Earth and other planets in the Solar System orbit the Sun.
- Understand that the Earth is rotating on its axis.

Introduction

This topic allows pupils to see Earth in its wider context as part of the Solar System before they begin learning about the planet itself. Although pupils may assume that they are sitting still, the Earth is spinning on its axis at 600 miles per hour while flying through space at 67,000 miles per hour around the Sun. On top of that, the Solar System itself is moving around the Milky Way at 448,000 miles per hour.

Once pupils have read pages 2 and 3 of the Study Book, discuss what they think it would be like to go into space. You could show pupils videos of astronauts living aboard the International Space Station and how they go about their daily lives. Discuss how different it would be from life on Earth. Would pupils like to live there? Why or why not?

Answers to Activity Book Questions

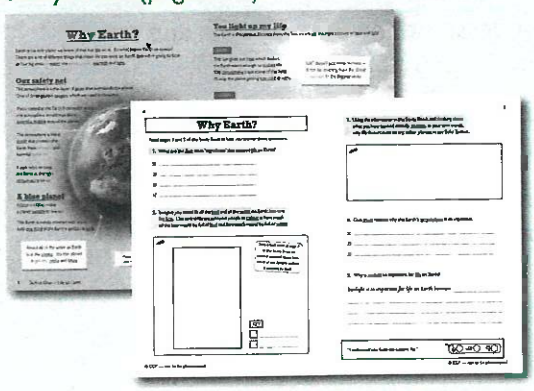
1. Pupils should have circled the third planet from the Sun.
2. Earth — 365 days, Mercury — 88 days, Jupiter — 12 years, Neptune — 165 years
3. E.g. *The Goldilocks Zone is* an area in a solar system where planets can support life because it's not too hot or too cold / it's not too close or too far from the Sun. Earth is in the Goldilocks Zone in our Solar System.
4. False — True — False — True
5. Across: 1 Saturn, 3 Eight, 7 Gas Giant, 8 Mercury
   Down: 2 Neptune, 4 Orbit, 5 Uranus, 6 One

Extra Activities

- Ask pupils to work in pairs and create their own mnemonic for remembering the names of the planets in the Solar System, e.g. 'My Very Excited Mother Just Served Us Noodles'.
- Ask pupils to make a fact book about one of the planets in the Solar System. Ask them to research and record information such as: planet type, atmosphere, average temperature, time to orbit the Sun, the length of a day, any moons the planet may have and how the planet has been observed/recorded.
- Pupils can use Styrofoam balls to represent the Sun and the planets in the Solar System. Colour or paint each ball to look like the planet (or Sun) it represents. The planets can be joined together with cord or string to make a visual representation of the planets and their position relative to the Sun. Higher level pupils could research the distances of each planet from the Sun and make the distances to scale.

Why Earth?

Study Book (pages 4-5)



Activity Book (pages 4-5)

National Curriculum Aims

- Understand the features of Earth that make the planet habitable.
- Describe and understand key aspects of human geography and natural resources, including food and water.
- Understand that day and night are a result of the Earth's rotation.

Introduction

This topic introduces pupils to the broad reasons why life exists on Earth. The combination of the atmosphere, water and Earth's distance from the Sun make it ideal for supporting life. There is also a magnetic field that surrounds the Earth, created by the molten iron at the centre of the planet. This field protects us from electromagnetic radiation from the Sun. Without any of these factors, complex life such as plants, animals and humans could not have evolved. The chances of life occurring as we know it were unimaginably small, which may explain why we haven't discovered life on any other planets yet.

Once pupils have read pages 4 and 5 of the Study Book, ask them if they think there are other planets in the universe with life on them. What might life on other planets look like? Would they look anything like humans?

Answers to Activity Book Questions

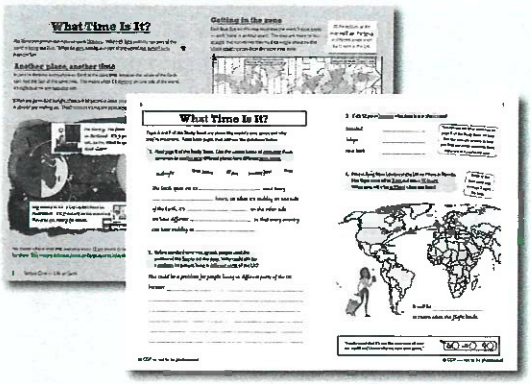
1. Water, atmosphere, warmth, light
2. Pupils should have coloured one third of the box to represent land, and two thirds to represent water.
3. E.g. Life doesn't exist on any other planets in the Solar System because they are either too hot or too cold / there isn't enough light / the atmosphere doesn't have the right gases / there isn't enough water.
4. E.g. Any three of the following: It contains the oxygen we need to breathe / It protects the Earth from meteors. / It protects the Earth from harmful radiation. / It keeps the Earth at the right temperature.
5. E.g. *Sunlight is so important for life on Earth because* plants need it to grow, and if we didn't have plants, humans and other animals would be unable to survive.

Extra Activities

- Pupils could scatter seeds on damp cotton wool and then place them in different conditions (i.e. one in light and cold, one in light and warm, one in dark and cold and one in dark and warm) to measure how well they grow depending on their conditions. Pupils could also make up their own investigations, e.g. sowing seeds in one box with a small hole to let a pin-prick of light in and in another box with a slightly larger hole, to investigate how little sunlight is necessary to allow a healthy plant to grow.
- Ask pupils to consider the idea of living on Mars. Pupils could design their own 'Martian Village'. What would it look like? What would they need to survive? How would they grow food? How would they breathe? How would they make water? They could then build their village using modelling clay or cardboard.
- Ask pupils to research what the different gases are that make up the Earth's atmosphere. They could present their findings as a diagram or pie chart.

What Time Is It?

Study Book (pages 6-7)



Activity Book (pages 6-7)

National Curriculum Aims

- Identify the position and significance of the Prime Meridian Line and Greenwich Mean Time.
- Understand the significance of time zones.
- Understand that day and night are a result of the Earth's rotation.

Introduction

Before Greenwich Mean Time was established, settlements across the UK used sundials to determine the time. Slight differences and inaccuracies across the UK meant that no two places used exactly the same time. When people began travelling by rail, these slight differences made it difficult to make an accurate timetable. In 1840, Railway time was introduced. Most railway companies used GMT as Railway time, but it wasn't until 1880 that GMT was adopted as standard time in the UK.

This topic introduces pupils to time zones and standardised time and explains why we need them. Once pupils have read pages 6 and 7 of the Study Book, ask them if they have ever been abroad on holiday. If so, can they find where they went on the world map on page 7? Is it in a different time zone? Do they remember noticing the time difference? (They might have had to put their watches forward or remember having jet lag.)

Answers to Activity Book Questions

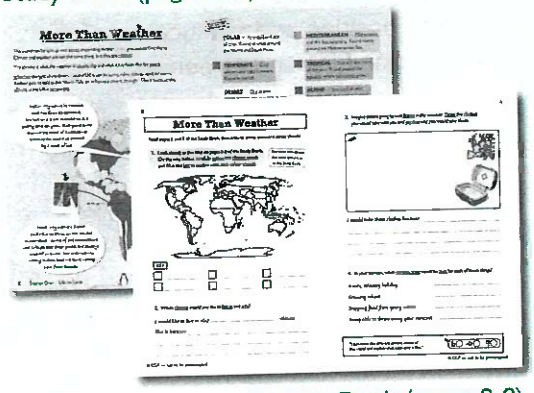
1. *The Earth spins on its* axis *once every* twenty-four *hours, so when it's midday on one side of the Earth, it's* midnight *on the other side. We have different* time zones *so that every country can have midday at* 12 pm.
2. Pupils should recognise that different places in UK will have been using slightly different times. This was a problem when people began to travel more, particularly by train, and the time wasn't the same everywhere.
3. Istanbul: 3 pm (+ 3 hours), Tokyo: 9 pm (+ 9 hours), New York: 7 am (– 5 hours)
4. *It will be* 7 pm *in Miami when the flight lands.*

Extra Activities

- Get pupils to make clocks to display in class that show what the time is in different cities or countries when it's 12 pm in London/the UK.
- Get pupils to cut out an image of the world's time zones (as on page 7 of the Study Book) and attempt to wrap it around a small ball. Alternatively, they could look at a globe with time zones marked on it. They could then see how the zones apply to the spherical nature of the Earth.
- Using a football (the Sun), a tennis ball (the Earth) and a torch (the light from the Sun), ask pupils to explain to their peers how day and night occur. Higher level pupils could attempt to explain how the Earth's tilt results in the seasons.
- Ask pupils to imagine that they are trying to set up a group video call which must include them, as well as someone living in New York, and someone in Beijing. Ask them to work out what time they should organise the call to give them the best chance of everyone being awake. If they complete this, get them to write their own questions of a similar type and use them to test each other's understanding.

More Than Weather

Study Book (pages 8-9)



Activity Book (pages 8-9)

National Curriculum Aims

- Describe and understand key aspects of physical geography, including climate zones.
- Understand geographical similarities and differences between the UK and other countries.

Introduction

Earth can be divided into a number of different climate zones, roughly determined by how far they are from the equator — with tropical climates being the closest to the equator and polar climates being the farthest away. The climate zones also have an effect on what plants and animals can live in a particular place. Pupils will investigate this in more detail in Section Three.

This topic gives pupils the opportunity to consider how other countries differ from the UK and what effects the climate might have on the way of life of people living in other countries.

Answers to Activity Book Questions

1. Map and key should be shaded in so that each area of the map matches the correct climate zone in the key.
2. Any appropriate answer. Pupils should draw on information from the Study Book. E.g. *I would like to live in a* tropical climate. *This is because* the weather is hot for most of the year and I'd like to visit the rainforest.
3. Pupils' drawings should show clothing suitable for dry, hot weather, e.g. shorts, t-shirts, dresses, skirts, sunglasses, hats, swimsuits. Pupils' explanation should show that they understand that Rome has a Mediterranean climate, and as a result will be hot and dry in the summer.
4. E.g. *A nice, relaxing holiday* — Mediterranean / tropical / temperate, *Growing wheat* — temperate / Mediterranean, *Stopping food from going rotten* — Polar / Alpine, *Being able to throw away your raincoat* — Desert / Polar

Extra Activities

- Get pupils to make a card game by writing the names of the different climate zones on one set of cards and descriptions of the climates on another set. The aim of the game is to match the climate zone to its description. If each pupil has a set of climate zone cards, one pupil could read out a description and the first pupil to put down the matching climate zone card wins. The game could also be played in the style of a game of 'snap'.
- Ask pupils to create a 'Fauna Map' of the world. Pupils can research what animals live in various climate zones, both on land and in the sea. Pupils could then stick pictures of the animals to the appropriate areas on a large world map.
- Ask pupils to consider what it might be like to live in a different country with a different climate. Have any pupils travelled abroad and experienced different climate types? Ask pupils to imagine they have a pen-pal in a country with a different climate to the UK. Get them to write a letter asking their pen-pal questions about the what the climate is like where they live and how it affects their life. E.g. 'What types of clothes do you wear?', 'What do you like about the weather where you live?', 'Are there any special precautions you have to take because of the weather where you live?'