

Year 5/6
Science
Autumn 1
Physics - Earth and Space

Previous learning

In Year 3, children learnt that light from the Sun is damaging for vision and the skin and that shadows change shape and size when the light source moves. In Year 2, the children learnt that the Earth is spherical and is covered in water and land. When it is daytime in one location, it is night time on the other side of the world. In EYFS, the children learnt that daylight hours vary throughout the year, according to the season

This project teaches children about our Solar System and its spherical celestial bodies. They describe the movements of the Earth and the other planets relative to the Sun, the Moon relative to Earth, and the Earth's rotation to explain day and night.

Substantive Knowledge in Science

The Solar System is made up of the Sun and everything that orbits around it.

The Sun's force of gravity, created by its huge mass, keeps the planets in orbit.

There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Earth orbits around the Sun and a year (365.25 days) is the length of time it takes for Earth to complete a full orbit.

Disciplinary knowledge in Science

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.

Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Use test results to make predictions to set up further comparative and fair tests.

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.

Lesson 1

The Solar System

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

Lesson 2

Geocentric vs Heliocentric

- To understand how scientific thinking has changed over time and how the geocentric model gave way to the heliocentric model.

Lesson 3

The Earth, Sun and Moon model

- To recall and describe the heliocentric model of the Solar System.

Lesson 4

Daytime and night time (including seasons and day length)

	To describe the Sun, Earth and Moon as approximately spherical bodies and use this knowledge to understand the phases of the Moon and eclipses.
Lesson 5	The phases of the Moon
	To use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
Lesson 6	Times of day around the world
	To use the idea of the Earth's rotation to explain why we have different times of day around the world.
Vocabulary	
solar system, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, orbit, rotate, daytime, night time, spherical	

Year 5/6 Science Autumn 2 Biology - Living things and their habitats	
Previous learning	
In Year 4, children learnt that flowers are important in the life cycle of flowering plants. This project teaches children that sexual reproduction involves two parents and produces offspring that are different from the parents. Asexual reproduction involves one parent and produces offspring that are identical to the parent.	
Substantive Knowledge in Science	Disciplinary knowledge in Science
Sexual reproduction involves two parents (one female and one male) and produces offspring that are different from the parents. The flower is essential for sexual reproduction. Asexual reproduction involves one parent and produces offspring that are identical to the parent. Bulbs, corms and rhizomes are some parts used in asexual reproduction in plants.	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. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. 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.

Lesson 1	Plant and animal reproduction
	To describe the life process of reproduction in some plants and animals.
Lesson 2	Sorting and classifying
	To group and sort plants by how they reproduce.
Lesson 3	Asexual reproduction in plants
	To understand bulbs, corms and rhizomes.
Lesson 4	Investigation
	To investigate how plants reproduce.
Lesson 5	Sexual reproduction in plants
	To understand that flowering plants reproduce sexually.
Lesson 6	Conclusions
	To use scientific evidence from findings to draw conclusions.
Vocabulary	
asexual, bulb, corm, rhizome, different, identical, plant, runner, seed, sexual, tuber	

Year 5/6 Science Spring 1 Physics - Properties and Changes of Materials	
Previous learning	
In Year 4, children learnt that electrical conductors allow electricity to flow through them, whereas insulators do not. They learnt that common electrical conductors are metals and that common insulators include wood, glass, plastic and rubber. In Year 3, children learnt that some materials have magnetic properties and that magnetic materials are attracted to magnets. They learnt that all magnetic materials are metals but not all metals are magnetic (iron is a magnetic metal). In Year 2, children learnt that a material's physical properties make it suitable for particular purposes and that many materials are used for more than one purpose. In Year 1, children learnt that materials have different properties. This project teaches children about the wider properties of materials and their uses. They learn about mixtures and how they can be separated using sieving, filtration and evaporation. They study reversible and irreversible changes, and use common indicators to identify irreversible changes.	
Substantive Knowledge in Science	Disciplinary knowledge in Science
Properties include hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism. Solid metals are good thermal conductors because their particles are closely packed and	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.

they have strong, lattice metallic bonds. Some materials (solutes) will dissolve in liquid (solvents) to form a solution. Some mixtures can be separated by filtering, sieving and evaporating. Reversible changes include heating, cooling, melting, dissolving and evaporating. Irreversible changes include burning, rusting, decaying and chemical reactions.		Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. 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.
Lesson 1	Testing properties	
	To use testing to compare and group everyday materials by their properties (response to magnets, hardness, solubility, transparency, conductivity, electrical and thermal).	
Lesson 2	Thermal conductivity	
	To investigate and describe thermal conductivity.	
Lesson 3	Solubility	
	To know that some materials will dissolve in liquid to form a solution.	
Lesson 4	Exploring mixtures – sieving	
	To understand how to separate mixtures using sieving.	
Lesson 5	Exploring mixtures – filtering.	
	To understand how to separate mixtures using filtering.	
Lesson 6	Exploring mixtures – evaporating	
	To describe how to recover a substance from a solution.	
Vocabulary		
separate, evaporate, filtering, sieving and evaporating, solute, solution, solvent		

Year 5/6
Science:
Spring 2
Biology - Circulatory System (1)

Previous learning

In Year 5, the children learned about human reproduction. In Year 4, the children learned that the digestive system is responsible for digesting food and absorbing nutrients and water. They learned that there are different types of teeth in humans and about their simple functions. The children learnt that for sound to reach the ear, sound waves travel through a

medium, such as air or water. In Year 3, children learned that humans have a skeleton and muscles for movement, support and protecting organs. They learned that humans need the right types and amount of nutrition, and that they cannot make their own food. In Year 2, children learned that human offspring go through different stages as they grow to become adults. They learnt that it is important that humans exercise, eat the right amounts of different types of food, and have good hygiene.

This project teaches children about the transport role of the human circulatory system, its main parts and primary functions. They learn about healthy lifestyle choices and the effects of harmful substances on the body.

Substantive Knowledge in Science		Disciplinary knowledge in Science	
The circulatory system includes the heart, blood vessels and blood. There are three types of blood vessels: arteries, veins and capillaries. They each have a different-sized hole (lumen) and walls. The heart has four chambers: the right atrium, left atrium, right ventricle and left ventricle. Blood is made up of four different components: plasma, platelets, red blood cells and white blood cells. Arteries carry blood away from the heart, providing the tissues and organs with oxygen and other nutrients.		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. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. 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.	
Lesson 1	Bodily systems		
	To describe the ways in which nutrients and water are transported within animals, including humans.		
Lesson 2	Role of the circulatory system		
	To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.		
Lesson 3	Structure and function of the heart		
	To name and describe the purpose of the circulatory system and the functions of the heart.		
Lesson 4	The function of blood		
	To describe the ways in which nutrients and water are transported within animals, including humans.		
Lesson 5	The structure and function of blood vessels		
	To describe the structure and function of each type of blood vessel.		
Lesson 6	Measuring heart rate		

	To record data in a table and calculate the beats per minute (bpm).
Vocabulary	
blood vessels, arteries, veins, capillaries, lumen, red blood cells, white blood cells, infection	

Year 5/6
Science:
Summer 1
Biology - Circulatory System (2)

Previous learning

In Year 5, the children learned about human reproduction. In Year 4, the children learned that the digestive system is responsible for digesting food and absorbing nutrients and water. They learned that there are different types of teeth in humans and about their simple functions. The children learnt that for sound to reach the ear, sound waves travel through a medium, such as air or water. In Year 3, children learned that humans have a skeleton and muscles for movement, support and protecting organs. They learned that humans need the right types and amount of nutrition, and that they cannot make their own food. In Year 2, children learned that human offspring go through different stages as they grow to become adults. They learnt that it is important that humans exercise, eat the right amounts of different types of food, and have good hygiene.

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Lesson 1	Proving a hypothesis	
	To prove or disprove a hypothesis by collecting data.	
Lesson 2	Heart rate investigation	
	To plan and carry out a range of enquiries.	

Lesson 3	Benefits of exercise
	To know the benefits of physical exercise, time outdoors, community participation, voluntary and service-based activity on mental wellbeing and happiness.
Lesson 4	Classifying foods
	To classify food using traffic light nutrition labels and prior knowledge.
Lesson 5	Healthy diet
	To know what constitutes a healthy diet (including understanding calories and other nutritional content).
Lesson 6	Poor diet and lifestyle
	To know the characteristics of a poor diet and risks associated with unhealthy eating and other behaviours (including obesity and drugs).
Vocabulary	
aerobic exercise, alcohol, balancing exercises, blood pressure, carbohydrate, cholesterol, diet, drugs, Eatwell guide, exercise, healthy, muscles, processed food, protein, saturated fat, smoking, strengthening exercises, stretching exercises, unhealthy, unsaturated fat, weight	

Year 5/6 Science Summer 2 Biology - Animals, including humans - Reproduction and Ageing	
Previous learning	
In Year 3, children learnt that animals have offspring that grow into adults and that different animals have different stages of growth. In EYFS, children learnt about the life cycle of the butterfly and frog. This project teaches children about animal life cycles, including the human life cycle. They explore human growth and development to old age, including the changes experienced during puberty and human reproduction.	
Substantive Knowledge in Science	Disciplinary knowledge in Science
A mammal is a vertebrate, which means it has a backbone. The five key mammalian characteristics of mammals are that they produce milk to feed their young, are warm blooded, give birth to live young, have fur or hair and breathe air with lungs. Reproduction is the process of producing offspring and is essential for the continued survival of a species. As humans age, many of the body's systems gradually decline, leading to the changes seen in	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. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. Report and present findings from enquiries, including conclusions,

older people.		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.
Lesson 1	Animal life cycles	
	To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.	
Lesson 2	Classifying mammals	
	To understand the five key mammalian characteristics.	
Lesson 3	Typical mammalian life cycles	
	To compare the life cycles and gestation periods of mammals.	
Lesson 4	Human life cycle	
	To understand the stages and processes of the human life cycle.	
Lesson 5	Human growth	
	To know the changes that can occur during puberty.	
Lesson 6	Human ageing	
	To know the effects of growing old.	
Vocabulary		
puberty, life-cycle, sexual reproduction, gestation, juvenile, adolescent		