

<p>Year 5 Science Autumn 1 Physics - Properties and Changes of Materials</p>	
<p>Previous learning</p> <p>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.</p> <p>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.</p>	
<p>Substantive Knowledge in Science</p> <p>Properties include hardness, solubility, transparency, conductivity (electrical and thermal) and magnetism.</p> <p>Solid metals are good thermal conductors because their particles are closely packed and they have strong, lattice metallic bonds.</p> <p>Some materials (solutes) will dissolve in liquid (solvents) to form a solution.</p> <p>Some mixtures can be separated by filtering, sieving and evaporating.</p> <p>Reversible changes include heating, cooling, melting, dissolving and evaporating. Irreversible changes include burning, rusting, decaying and chemical reactions.</p>	<p>Disciplinary knowledge in Science</p> <p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Use test results to make predictions to set up further comparative and fair tests.</p> <p>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.</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments.</p>
Lesson 1	<p>Testing properties</p> <ul style="list-style-type: none"> To use testing to compare and group everyday materials by their properties (response to magnets, hardness, solubility, transparency, conductivity, electrical and thermal).
Lesson 2	<p>Thermal conductivity</p> <ul style="list-style-type: none"> To investigate and describe thermal conductivity.
Lesson 3	<p>Solubility</p> <ul style="list-style-type: none"> To know that some materials will dissolve in liquid to form a solution.
Lesson 4	<p>Exploring mixtures - sieving</p> <ul style="list-style-type: none"> To understand how to separate mixtures using sieving.
Lesson 5	<p>Exploring mixtures - filtering.</p>

	<ul style="list-style-type: none"> To understand how to separate mixtures using filtering.
Lesson 6	Exploring mixtures - evaporating
	<ul style="list-style-type: none"> To describe how to recover a substance from a solution.
Vocabulary	
separate, evaporate, filtering, sieving and evaporating, solute, solution, solvent	

**Year 5
Science
Autumn 2
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
<p>Reversible changes include heating, cooling, melting, dissolving and evaporating.</p> <p>Irreversible changes include burning, rusting, decaying and chemical reactions.</p> <p>Irreversible changes are usually accompanied by one or more of these signs: a gas is produced; light is produced; a smell is produced or the smell changes; the colour changes; sound is produced, or the temperature changes.</p>	<p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Use test results to make predictions to set up further comparative and fair tests.</p> <p>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.</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments.</p>

Lesson 1	Reversible and irreversible changes
	<ul style="list-style-type: none"> To explain that some changes result in the formation of new materials.
Lesson 2	Reversible changes- dissolving, mixing and changes of state
	<ul style="list-style-type: none"> To explain that some materials dissolve in liquid and form a solution (including how to recover the substance).
Lesson 3	Irreversible changes
	<ul style="list-style-type: none"> To explain why some changes are not usually reversible (including changes associated with burning and the action of acid on bicarbonate of soda).

Lesson 4	Plan an investigation
	<ul style="list-style-type: none"> To plan and carry out a range of enquiries, including writing methods, identifying variables and making predictions based on prior knowledge and understanding.
Lesson 5	Carrying out the investigation
	<ul style="list-style-type: none"> To take increasingly accurate measurements in standard units, using a range of chosen equipment.
Lesson 6	Conclusion
	<ul style="list-style-type: none"> To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
Vocabulary	
separate, evaporate, filtering, sieving and evaporating, solute, solution, solvent	

Year 5 Science Spring 1 Physics - Forces and Mechanisms	
Previous learning	
<p>In Year 3, children learnt an object will not move unless a pushing or pulling force is applied and that magnetic forces do not require contact.</p> <p>This project teaches children about the forces of gravity, air resistance, water resistance and friction, with children exploring their effects. They learn about mechanisms, their uses and how they allow a smaller effort to have a greater effect.</p>	
Substantive Knowledge in Science	Disciplinary knowledge in Science
<p>Gravity is a non-contact, pulling force which attracts two objects that have mass.</p> <p>A force meter can be used to measure an object's mass in grams (g) or kilograms (kg) and its weight in newtons (N).</p> <p>Friction, air resistance and water resistance are forces that oppose motion and slow down moving objects.</p> <p>Mechanisms, such as levers, pulleys and gears, give us a mechanical advantage.</p>	<p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Use test results to make predictions to set up further comparative and fair tests.</p> <p>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.</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments.</p>
Lesson 1	Contact and non-contact forces
	<ul style="list-style-type: none"> To identify scientific evidence that has been used to support or refute ideas or arguments.
Lesson 2	Gravity
	<ul style="list-style-type: none"> To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
Lesson 3	Mass and weight

	<ul style="list-style-type: none"> To take increasingly accurate measurements in standard units, using a range of chosen equipment (force meters).
Lesson 4	Friction
	<ul style="list-style-type: none"> To identify the effects of friction that act between moving surfaces.
Lesson 5	Air resistance and water resistance
	<ul style="list-style-type: none"> To identify the effects of air resistance and water resistance, that act between moving surfaces.
Lesson 6	Levers, pulleys and gears
	<ul style="list-style-type: none"> To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
Vocabulary	
gravity, gravitational pull, machine, levers, pulley, gears, air resistance, water resistance, friction	

Year 5 Science Spring 2 Physics - Earth and Space	
Previous learning	
<p>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</p> <p>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.</p>	
Substantive Knowledge in Science	Disciplinary knowledge in Science
<p>The Solar System is made up of the Sun and everything that orbits around it.</p> <p>The Sun's force of gravity, created by its huge mass, keeps the planets in orbit.</p> <p>There are eight planets in our Solar System: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.</p> <p>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.</p>	<p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Use test results to make predictions to set up further comparative and fair tests.</p> <p>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.</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments.</p>
Lesson 1	The Solar System
	<ul style="list-style-type: none"> To describe the movement of the Earth, and other planets, relative to the Sun in the solar system.

Lesson 2	Aristotle, Galileo Galilei and Sir Isaac Newton
	<ul style="list-style-type: none"> To understand how scientific thinking has changed over time and how the geocentric model gave way to the heliocentric model we understand today.
Lesson 3	The Earth, Sun and Moon model
	<ul style="list-style-type: none"> To recall and describe the heliocentric model of the Solar System.
Lesson 4	Daytime and night time (including seasons and day length)
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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 Science Summer 1 Biology - Animals, including humans - Reproduction and Ageing	
Previous learning	
<p>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.</p> <p>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.</p>	
Substantive Knowledge in Science	Disciplinary knowledge in Science
<p>A mammal is a vertebrate, which means it has a backbone.</p> <p>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.</p> <p>Reproduction is the process of producing offspring and is essential for the continued survival of a species.</p> <p>As humans age, many of the body's systems gradually decline, leading to the changes seen in older people.</p>	<p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Use test results to make predictions to set up further comparative and fair tests.</p> <p>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.</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments.</p>
Lesson 1	Animal life cycles

	<ul style="list-style-type: none"> To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
Lesson 2	Classifying mammals
	<ul style="list-style-type: none"> To understand the five key mammalian characteristics.
Lesson 3	Typical mammalian life cycles
	<ul style="list-style-type: none"> To compare the life cycles of mammals.
Lesson 4	Human life cycle
	<ul style="list-style-type: none"> To understand the stages and processes of the human life cycle.
Lesson 5	Human growth and ageing
	<ul style="list-style-type: none"> To understand human growth and identify patterns and trends.
Lesson 6	Human sexual reproduction
	<ul style="list-style-type: none"> To describe the process of human reproduction.
Vocabulary	
puberty, life-cycle, sexual reproduction, gestation, juvenile, adolescent	

Year 5 Science Summer 2 Biology - Living things and their habitats	
Previous learning	
<p>In Year 4, children learnt that flowers are important in the life cycle of flowering plants.</p> <p>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.</p>	
Substantive Knowledge in Science	Disciplinary knowledge in Science
<p>Sexual reproduction involves two parents (one female and one male) and produces offspring that are different from the parents.</p> <p>The flower is essential for sexual reproduction.</p> <p>Asexual reproduction involves one parent and produces offspring that are identical to the parent.</p> <p>Bulbs, corms and rhizomes are some parts used in asexual reproduction in plants.</p>	<p>Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.</p> <p>Use test results to make predictions to set up further comparative and fair tests.</p> <p>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.</p> <p>Identify scientific evidence that has been used to support or refute ideas or arguments.</p>
Lesson 1	Plant and animal reproduction
	<ul style="list-style-type: none"> To describe the life process of reproduction in some plants and animals.
Lesson 2	Sorting and classifying

	<ul style="list-style-type: none"> To group and sort plants by how they reproduce.
Lesson 3	Asexual reproduction in plants
	<ul style="list-style-type: none"> To understand bulbs, corms and rhizomes.
Lesson 4	Investigation
	<ul style="list-style-type: none"> To investigate how plants reproduce.
Lesson 5	Sexual reproduction in plants
	<ul style="list-style-type: none"> To understand that flowering plants reproduce sexually.
Lesson 6	Conclusions
	<ul style="list-style-type: none"> To use scientific evidence from findings to draw conclusions.
Vocabulary	
asexual, bulb, corm, rhizome, different, identical, plant, runner, seed, sexual, tuber	