



Cycle A	Autumn		Spring		Summer
KS1	Seasonal Changes (Autumn and Winter)	Everyday materials	Animals Including Humans (Long unit)	Seasonal Changes (Spring and Summer)	Plants
LKS2	Rocks	Animals including Humans	Light	Forces and Magnets	Plants
UKS2	Light	Animals including Humans	Evolution and Inheritance	Electricity	Living things and their habitats
Cycle B	Autumn		Spring		Summer
KS1	All living things and their habitats	Uses of Everyday Materials	Animals Including Humans		Plants
LKS2	Animals including Humans	States of Matter	Electricity	Sound	Living things and their habitats
UKS2	Earth and Space	Living things and their habitats	Properties and changes of materials	Forces	Animals, including humans

## New Science Curriculum - UKS2 - Cycle B (Y5 Objectives)

UKS2 WS Vocabulary	Working Scientifically (WS)	Ways of Working Scientifically
Physics Biology Chemistry Variable Precision Working Scientifically	<p>During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> <li>• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>• using test results to make predictions to set up further comparative and fair tests</li> <li>• reporting and presenting 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</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments.</li> </ul> <p><b>Non-Statutory</b></p> <ul style="list-style-type: none"> <li>• Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.</li> <li>• They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.</li> <li>• They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately.</li> <li>• They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.</li> </ul>	<ul style="list-style-type: none"> <li>• Observing changes over time</li> <li>• Looking for naturally occurring patterns or relationships</li> <li>• Identifying, classifying and grouping</li> <li>• Researching using secondary sources</li> <li>• Comparative and fair testing</li> <li>• <a href="#">Making things and developing systems</a></li> <li>• <a href="#">Investigating models</a></li> </ul>

- They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time.

These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.

Vocabulary	Earth and Space		WS - Investigations and Skills
<p><u>Tier 2</u> Rotation Spherical</p> <p><u>Tier 3</u> Earth Solar System Planets Moon Celestial Astronomy</p> <p><u>Additional</u> Mercury Venus Earth Mars Jupiter Saturn Uranus Neptune Orbit Axis Season Hemisphere Gravity</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> <li>I can describe the movement of the Earth, and other planets, relative to the Sun in the solar system (1 and 2)</li> <li>I can describe the movement of the Moon relative to the Earth (3)</li> <li>I can describe the Sun, Earth and Moon as approximately spherical bodies (3)</li> <li>I can use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. (4)</li> </ul> <p>Non-Statutory</p> <ul style="list-style-type: none"> <li>Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night.</li> <li>Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).</li> <li>They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).</li> <li>Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.</li> <li>Pupils should find out about the way that ideas about the solar system have developed, understanding how 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.</li> <li>Pupils might work scientifically by: comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.</li> </ul>	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <ol style="list-style-type: none"> <li><b>Name the planets in the solar system</b> Know that the Sun and Moon are not planets Know that Pluto is now classified as a dwarf planet Identify the order of the planets and describe some features of the planets Define the solar system, sun and planets</li> <li><b>Know that the Earth and other planets orbit the Sun</b> Define spherical Describe the Earth, Sun and Moon as approximately spherical bodies Know it is not safe to look at the sun</li> <li><b>Know that the Moon orbits the Earth</b> Know a moon is a celestial body that orbits a planet Earth has one moon Jupiter has 4 large moons and numerous smaller moons</li> <li><b>Understand that the Earth's rotation is why we have day and night</b> I know the sun does not move Understand rotation and orbit and the difference between the two</li> <li><b>Understand ideas about the solar system have evolved</b> Know that some societies in the past believed that the solar system was geocentric (the Earth as the centre). Understand how the geocentric model gave way to the heliocentric (the sun as the centre) model Consider work from Ptolemy, Alhazen and Copernicus Use evidence to understand why ideas changed.</li> </ol>	<ul style="list-style-type: none"> <li>Question - Ask/answer questions</li> <li>Research - secondary sources</li> <li>Investigating models - solar system/phases of the moon</li> <li>Look for patterns</li> <li>Identifying</li> <li>Compare - times of the day around the Earth</li> <li>Model - The solar system with relative sizes of planets</li> </ul> <p><b>Links to Writing</b></p> <ul style="list-style-type: none"> <li>Letter from space</li> <li>Auto/biography of an astronaut</li> <li>Poetry/mnemonics to remember the planets</li> </ul>
<p><b>Scientists</b></p> <p>-Mae Jemison -Zhang Heng -Nicolaus Copernicus -Margaret Hamilton -Neil deGrasse Tyson</p>			<p><b>Links to Maths</b></p> <ul style="list-style-type: none"> <li>Number and place value - reading number facts about planets and space</li> <li>Measurement - time and length/width/ circumference</li> <li>Shape - language related to shape e.g. spherical / rotations</li> </ul>

Vocabulary	Living Things and Their Habitats		WS - Investigations and Skills
<p><u>Tier 2</u> Habitat Survive</p> <p><u>Tier 3</u> Naturalist Behaviourist Sexual Asexual Life cycle Reproduction</p> <p><u>Additional</u> Mammal Amphibian Insect Bird Documentary Embryo</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> <li>I can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (1)</li> <li>I can describe the life process of reproduction in some plants and animals. (2 and 3)</li> </ul> <p>Non-Statutory</p> <ul style="list-style-type: none"> <li>Pupils should study and raise questions about their local environment throughout the year.</li> <li>They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment.</li> <li>They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.</li> <li>Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.</li> <li>Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences.</li> <li>They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs.</li> <li>They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.</li> </ul> <p>Note: refer to Human Development and Reproduction in the Primary Curriculum document for further guidance.</p>	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <ol style="list-style-type: none"> <li><b>Describe the life cycles of different animals</b> Know and define mammals, amphibians, insects and birds Describe the life cycle of a butterfly</li> <li><b>Describe life processes and reproduction of some animals</b> Understand the terms asexual and sexual</li> <li><b>Describe life processes and reproduction of some plants</b> Understand the terms asexual and sexual Learn about asexual reproduction Know that reproduction means to produce offspring Understand the terms 'reproduction' in plants and animals Label reproductive parts of the plant: Stigma, stoma, petals, anther, ovule, ovary, style Observe a plant growing from a cutting to demonstrate different forms of reproduction</li> <li><b>Explore the local environment</b> Observe signs of life cycles in the local environment - plants and animals. Investigate using cuttings.</li> <li><b>Know about the life and work of Sir David Attenborough</b> Know the term 'naturalist' Learn about conservation of animals</li> <li><b>Know about the life and work of Jane Goodall</b></li> </ol>	<ul style="list-style-type: none"> <li>Question - Ask/answer questions</li> <li>Classifying and Identifying - types of animals/reproduction</li> <li>Observation - life cycle changes</li> <li>Exploration - Growing plants - looking at variables</li> <li>Reporting findings</li> <li>Research - secondary sources</li> </ul> <p><b>Links to Writing</b></p> <ul style="list-style-type: none"> <li>Non-chronological report - how animals are classified</li> <li>Description</li> <li>Use picture books to look at life cycles e.g. Tadpole's Promise</li> </ul>
<p><b>Scientists</b></p>			<p><b>Links to Maths</b></p> <ul style="list-style-type: none"> <li>Sorting</li> <li>Tables and charts to record</li> <li>Diagrams</li> <li>Measurement</li> </ul>
<p>-Jane Goodall -David Attenborough -Eva Crane</p>			

Vocabulary	Properties and Changes of Materials		WS - Investigations and Skills
<p><u>Tier 2</u> Property Substance</p> <p><u>Tier 3</u> Solubility Conductivity Thermal Dissolve Solution Reversible</p> <p><u>Additional</u> Transparency Strength Absorbency Waterproof Flexibility Insulate Filter Separate Permanent</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> <li>I can compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets (1)</li> <li>I know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (2)</li> <li>I can use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (3)</li> <li>I can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (4)</li> <li>I can demonstrate that dissolving, mixing and changes of state are reversible changes (5)</li> <li>I can explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. (6 and 7)</li> </ul> <p>Non-Statutory</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>They should find out about how chemists create new materials, for example, Spencer Silver, who</li> </ul>	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <ol style="list-style-type: none"> <li><b>Learn how to compare and group everyday materials</b> Identify and name different materials Understand terms such as hardness, solubility, transparency, conductivity (electrical and thermal) and magnetic Explore how objects can be grouped in different ways Compare the properties uses of different materials</li> <li><b>Understand the process of dissolving</b> Understand the term dissolve Know we can dissolve some solids into liquids Understand the terms substance and solution Describe the process of evaporation Describe how to recover a substance from a solution</li> <li><b>Explore how to separate mixtures</b> Use knowledge of solids, liquids and gases to decide how to separate mixtures Use filtering, sieving and evaporation Understand the difference between soluble (salt and insoluble (sand)</li> <li><b>Give reasons for the uses of everyday materials</b> Explore the use of everyday materials through testing Explore metals, wood and plastic Give reasons for why items could not be used for a given purpose</li> <li><b>Demonstrate that dissolving, mixing and changes of state are reversible</b> Know a range of reversible changes (evaporation, solidifying and liquidizing water)</li> </ol>	<ul style="list-style-type: none"> <li>Question - Ask/answer questions</li> <li>Classify and Identify - materials based on properties</li> <li>Exploration/Observation and Comparative/Fair Testing - dissolving/separating/reversible and irreversible - use of Digi scope. Baking could also be included.</li> <li>Investigating questions - '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?'</li> <li>Recording and presenting data</li> <li>Research - Secondary sources</li> </ul> <p><b>Links to Writing</b></p> <ul style="list-style-type: none"> <li>News Report - Scientists find salt water can be purified/burnt items can be put back to how they were</li> <li>Explanation text of different scientific vocabulary related to properties</li> </ul> <p><b>Links to Maths</b></p> <ul style="list-style-type: none"> <li>Measurement - time and mass</li> <li>Sorting/Tables and Charts</li> </ul>
<p><b>Scientists</b></p> <p>-Robert Boyle -Daniel Fahrenheit -Anders Celsius -Stephanie Kwolek (Further scientists)</p>			

<p>referred to in planning)</p>	<p>invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.</p> <ul style="list-style-type: none"> <li>Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials.</li> <li>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?'</li> <li>They might compare materials in order to make a switch in a circuit.</li> <li>They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes.</li> <li>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.</li> </ul>	<p><b>6. Understand that some changes to materials are not reversible</b></p> <p>Some changes result in new materials          Burning is irreversible          The action of acid on bicarbonate of soda is irreversible</p> <p>Know that a new material is made when a chemical reaction happens (burnt toast, carbon monoxide)          Observe rusting metals and know that this is an irreversible change</p> <p><b>7. Know that chemists often create new materials</b></p> <p>Research the work of chemists such as Ruth Benerito, Ralph Wiley or Spencer Silver</p> <p><b>8. Explore the thermal conductivity of materials</b></p>	
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Vocabulary	Forces		WS - Investigations and Skills
<p><u>Tier 2</u> Force Surface</p> <p><u>Tier 3</u> Friction Gravity Resistance Buoyancy Machine Mechanism</p> <p><u>Additional</u> Newton Upthrust Streamlined Lever Pulley Gear Sink Float Volume Mass</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> <li>I can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object (1)</li> <li>I can identify the effects of air resistance, water resistance and friction, that act between moving surfaces (2, 3 and 4)</li> <li>I can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (5)</li> </ul> <p>Non-Statutory</p> <ul style="list-style-type: none"> <li>Pupils should explore falling objects and raise questions about the effects of air resistance.</li> <li>They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.</li> <li>They should experience forces that make things begin to move, get faster or slow down.</li> <li>Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel.</li> <li>Pupils should explore the effects of levers, pulleys and simple machines on movement.</li> <li>Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.</li> <li>Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective.</li> <li>They might explore resistance in water by making and testing boats of different shapes.</li> <li>They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.</li> </ul>	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <ol style="list-style-type: none"> <li>Explain that gravity causes unsupported objects to fall</li> </ol> <p>Describe the life and work of Sir Isaac Newton and the story of the apple. The theory of gravity. Unsupported objects fall towards the centre of gravity Moon has gravity, as does the sun and all celestial bodies in the solar system Gravity causes objects to orbit</p> <ol style="list-style-type: none"> <li>Explore the effect of air resistance</li> </ol> <p>Definition of Resistance Parachutes use air resistance to fall slower</p> <ol style="list-style-type: none"> <li>Explore the effect of water resistance</li> </ol> <p>Predict if an object will float or sink.</p> <ol style="list-style-type: none"> <li>Explore the effect of friction</li> </ol> <p>Vehicles use friction to use brakes</p> <ol style="list-style-type: none"> <li>Investigate mechanisms</li> </ol> <p>Define Lever, Pulley and Gear Understand the purpose of Levers, Pulleys and Gears Recognise how gears, levers and pulleys allow a smaller force to have a greater effect.</p> <ol style="list-style-type: none"> <li>Explore what happens when objects of different mass fall</li> </ol> <p>Use metric measurements Understand the work of Galileo Galilei</p>	<ul style="list-style-type: none"> <li>Question - Ask/answer questions</li> <li>Comparative and Fair testing - forces and their effects. Parachutes/Vessels - floating and sinking</li> <li>Exploration - levers, pulleys and gears e.g. rulers as lever to open draws, gear on a bike, pulley to lift items from the floor to the table</li> <li>Research - secondary sources</li> <li>Investigating models</li> </ul> <p><b>Links to Writing</b></p> <ul style="list-style-type: none"> <li>Balanced argument - using different mechanisms in machines</li> <li>Narrative - flashback of an invention/when something went wrong due to forces</li> </ul>
<p><b>Scientists</b></p> <p>-Archimedes -Isaac Newton -Galileo Galilei -Albert Einstein</p>			<p><b>Links to Maths</b></p> <ul style="list-style-type: none"> <li>Tables/Charts</li> <li>Measurement - time/length/height/mass</li> <li>Shape - angles</li> </ul>

Vocabulary	Animals, Including Humans		WS - Investigations and Skills
<p><u>Tier 2</u> Development Survival</p> <p><u>Tier 3</u> Puberty Gestation Hygiene Nutrition, Reproduce Offspring</p> <p><u>Additional</u> Adult Embryo Foetus Adolescence Hormone Growth Appetite Season Breeding</p>	<p>Statutory Knowledge and Understanding Objectives</p> <ul style="list-style-type: none"> <li>I can describe the changes as humans develop to old age. (1, 2, 3 and 4)</li> </ul> <p>Non-Statutory</p> <ul style="list-style-type: none"> <li>Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.</li> <li>Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.</li> </ul> <p>Note: refer to Human Development and Reproduction in the Primary Curriculum document for further guidance.</p>	<p>Sequence of Lessons and Intended Knowledge (ESSENTIAL KNOWLEDGE)</p> <ol style="list-style-type: none"> <li><b>Understand stages of human development</b> Definitions of gestation foetus, infant, child, adolescent, adult, old age Ages of 'baby' - 0-1 years Ages of infancy - 1-3 years Ages of Childhood - 4-12 years Ages of Adolescence - 12-18 Ages of Adulthood - 18-60 Ages of Old age 60-Death</li> <li><b>Draw a timeline to represent stages of development</b> Know about lifecycles</li> <li><b>Understand changes happen in adolescence</b> Definition of Puberty Visual changes in the body: Sweating, hair growth, smells, genital growth, voice changes Internal changes: menstruation, effects of testosterone and oestrogen levels changing.</li> <li><b>Describe changes as humans develop to old age</b> Effects of old age on the body: Muscle reduction, bones becoming more fragile, Wrinkles appearing, Eyesight and Hearing abilities reduced Necessary changes in diet and exercise to stay healthy Understanding that mental changes are often due to disorders like dementia but not all old aged people go through the same changes.</li> <li><b>Explore other animals' gestation periods</b> Compare to human gestation Definitions of womb, grow, baby Understand growth of a foetus in the womb</li> </ol>	<ul style="list-style-type: none"> <li>Question - Ask/answer questions</li> <li>Observation - pictures/videos of human and animal life</li> <li>Compare and Find Patterns - different gestation periods</li> <li>Research - secondary sources</li> </ul>
			<b>Links to Writing</b>
			<ul style="list-style-type: none"> <li>Narrative - story from young age to old age including a flashback.</li> </ul>
<b>Scientists</b>			<b>Links to Maths</b>
<p>-Linda Brown Buck -Leonardo da Vinci</p>			<ul style="list-style-type: none"> <li>Measurement - time and mass</li> <li>Line graph to show the growth of a baby to adulthood</li> </ul>