

## Westhaven School Curriculum Map for SCIENCE

Valued – Inspired – Prepared

Westhaven School is a unique learning environment with high expectations for learners who experience complex barriers to learning for a range of reasons. We promote a calm environment which enables everyone to learn. The golden thread that permeates our curriculum and our conduct through every school day are the core values which shape our learners to be:

- safely independent
- confident communicators
- respectful citizens
- resilient learners
- inquisitive thinkers

The Westhaven Way is our ethos and it underpins our daily approach to behaviour and learning.

At Westhaven, English is the heart of our curriculum. We are committed to raising the standards in phonics and early reading of our learners through every curriculum subject.

At Westhaven, we follow the approach to phonics teaching as outlined in the DfE validated programme UNLOCKING LETTERS AND SOUNDS.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
KS1 Cycle A	<b>Animals inc humans</b> <ul style="list-style-type: none"> <li>• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each</li> </ul>	<b>Everyday materials</b> <ul style="list-style-type: none"> <li>• Distinguish between an object and the material from which it is made.</li> <li>• Identify and name a variety of everyday</li> </ul>	<b>Animals inc humans</b> <ul style="list-style-type: none"> <li>• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.</li> <li>• Identify and name a</li> </ul>	<b>Seasonal changes (winter – spring)</b> <ul style="list-style-type: none"> <li>• Observe changes across the four seasons.</li> <li>• Observe and describe weather</li> </ul>	<b>Plants</b> <ul style="list-style-type: none"> <li>• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</li> </ul>	<b>Animals inc humans</b> <ul style="list-style-type: none"> <li>• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and</li> </ul>

	sense.	materials, including wood, plastic, glass, metal, water, and rock. <ul style="list-style-type: none"> <li>Describe the simple physical properties of a variety of everyday materials.</li> <li>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</li> </ul>	variety of common animals that are carnivores, herbivores and omnivores.	associated with the seasons and how day length varies.	Identify and describe the basic structure of a variety of common flowering plants, including trees.	mammals, including pets).
<b>Working Scientifically</b>	<ul style="list-style-type: none"> <li>identifying and classifying</li> <li>using their observations and ideas to suggest answers to questions</li> </ul>	<ul style="list-style-type: none"> <li>observing closely, using simple equipment</li> <li>performing simple tests</li> <li>identifying and classifying</li> <li>gathering and recording data to help in answering questions</li> <li>asking simple questions and recognising that they can be answered in different ways</li> </ul>	<ul style="list-style-type: none"> <li>asking simple questions and recognising that they can be answered in different ways</li> <li>identifying and classifying</li> </ul>	<ul style="list-style-type: none"> <li>observing closely, using simple equipment</li> <li>using their observations and ideas to suggest answers to questions</li> <li>gathering and recording data to help in answering questions</li> </ul>	<ul style="list-style-type: none"> <li>observing closely, using simple equipment</li> <li>identifying and classifying</li> </ul>	<ul style="list-style-type: none"> <li>identifying and classifying</li> <li>asking simple questions and recognising that they can be answered in different ways</li> </ul>
<b>Relevant Scientists</b>	Florence Nightingale Pioneer of modern nursing in GB  Elizabeth Garrett Anderson - First British female physician and surgeon	William Addis Toothbrush Inventor  Charles Mackintosh (Waterproof coat)  John MacAdam- roads	Steve Irwin -Wildlife expert  Chris Packham-Animal Conservationist	Dr Steve Lyons (Extreme Weather)  Holly Green (Meteorologist)	Beatrix Potter Author & Botanist  Captain Cook- Botanists  Agnes Arber- Botanist	Steve Irwin -Wildlife expert  Chris Packham-Animal Conservationist

		Chester Greenwood-Earmuffs			Alan Titchmarsh- Botanist & Gardener	
KS1 Cycle B	<p><b>All living things and their habitats</b></p> <ul style="list-style-type: none"> <li>• Explore and compare the differences between things that are living, dead, and things that have never been alive.</li> <li>• Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.</li> <li>• Identify and name a variety of plants and animals in their habitats, including micro-habitats.</li> </ul>	<p><b>Seasonal changes (autumn - winter)</b></p> <ul style="list-style-type: none"> <li>• Observe changes across the four seasons.</li> <li>• Observe and describe weather associated with the seasons and how day length varies.</li> </ul>	<p><b>Uses of everyday materials</b></p> <ul style="list-style-type: none"> <li>• Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.</li> <li>• Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</li> </ul>	<p><b>Plants</b></p> <ul style="list-style-type: none"> <li>• Observe and describe how seeds and bulbs grow into mature plants.</li> <li>• Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.</li> </ul> <p>(plant seeds)</p>	<p><b>Animals inc humans</b></p> <ul style="list-style-type: none"> <li>• Notice that animals, including humans, have offspring which grow into adults.</li> <li>• Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).</li> <li>• Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</li> </ul> <p>(observe seeds / plants)</p>	<p><b>All living things and their habitats</b></p> <ul style="list-style-type: none"> <li>• Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</li> </ul> <p>(describe changes in seeds / plants)</p>
Working Scientifically	<ul style="list-style-type: none"> <li>• asking simple questions and recognising that they can be answered in different ways</li> </ul>	<ul style="list-style-type: none"> <li>• observing closely, using simple equipment</li> <li>• using their observations and ideas to suggest answers to questions</li> </ul>	<ul style="list-style-type: none"> <li>• observing closely, using simple equipment</li> <li>• performing simple tests</li> <li>• identifying and classifying</li> </ul>	<ul style="list-style-type: none"> <li>• observing closely, using simple equipment</li> <li>• identifying and classifying</li> <li>• performing simple tests</li> </ul>	<ul style="list-style-type: none"> <li>• identifying and classifying</li> <li>• using their observations and ideas to suggest answers to questions</li> </ul>	<ul style="list-style-type: none"> <li>• identifying and classifying</li> <li>• using their observations and ideas to suggest answers to questions</li> </ul>

		<ul style="list-style-type: none"> <li>gathering and recording data to help in answering questions</li> </ul>	<ul style="list-style-type: none"> <li>gathering and recording data to help in answering questions</li> <li>asking simple questions and recognising that they can be answered in different ways</li> </ul>	<ul style="list-style-type: none"> <li>gathering and recording data to help in answering questions</li> </ul>		
<b>Relevant Scientists</b>	<p>Rachel Carson- Marine Pollution</p> <p>Liz Bonnin Conservationist</p> <p>Eugenie Clark- marine biologist</p>	<p>Dr Steve Lyons (Extreme Weather)</p> <p>Holly Green (Meteorologist)</p>	<p>William Addis Toothbrush Inventor</p> <p>Charles Mackintosh (Waterproof coat)</p> <p>John MacAdam- roads</p> <p>Chester Greenwood-Earmuffs</p>	<p>Beatrix Potter Author &amp; Botanist</p> <p>Captain Cook- Botanists</p> <p>Agnes Arber- Botanist</p> <p>Alan Titchmarsh- Botanist &amp; Gardener</p>	<p>Florence Nightingale Pioneer of modern nursing in GB</p> <p>Elizabeth Garrett Anderson - First British female physician and surgeon</p> <p>Steve Irwin -Wildlife expert</p> <p>Chris Packham-Animal Conservationist</p> <p>Robert Winston- Human Scientist</p>	<p>Rachel Carson- Marine Pollution</p> <p>Liz Bonnin Conservationist</p> <p>Eugenie Clark- marine biologist</p>
KS2 Lower Cycle A	<p><b>Animals inc humans</b></p> <ul style="list-style-type: none"> <li>Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from</li> </ul>	<p><b>Forces</b></p> <ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> <li>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</li> </ul>	<p><b>Rocks</b></p> <ul style="list-style-type: none"> <li>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</li> </ul>	<p><b>Forces and magnets</b></p> <ul style="list-style-type: none"> <li>Observe how magnets attract or repel each other and attract some materials and not others describe magnets as having two poles.</li> </ul>	<p><b>Plants</b></p> <ul style="list-style-type: none"> <li>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</li> <li>Explore the requirements of</li> </ul>	<p><b>Light</b></p> <ul style="list-style-type: none"> <li>Recognise that they need light in order to see things and that dark is the absence of light.</li> <li>Notice that light is reflected from surfaces.</li> </ul>

	<p>what they eat.</p> <ul style="list-style-type: none"> <li>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</li> </ul>			<ul style="list-style-type: none"> <li>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> <li>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</li> </ul>	<p>plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.</p> <ul style="list-style-type: none"> <li>Investigate the way in which water is transported within plants.</li> <li>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</li> </ul>	<ul style="list-style-type: none"> <li>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</li> <li>Recognise that shadows are formed when the light from a light source is blocked by a solid object.</li> <li>Find patterns in the way that the size of shadows change.</li> </ul>
<p>Working Scientifically</p>	<ul style="list-style-type: none"> <li>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>identifying differences, similarities or changes related to simple scientific ideas and processes</li> </ul>	<ul style="list-style-type: none"> <li>asking relevant questions and using different types of scientific enquiries to answer them</li> <li>setting up simple practical enquiries, comparative and fair tests</li> <li>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> </ul>	<ul style="list-style-type: none"> <li>asking relevant questions and using different types of scientific enquiries to answer them</li> <li>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> <li>identifying differences, similarities or changes related to simple</li> </ul>	<ul style="list-style-type: none"> <li>asking relevant questions and using different types of scientific enquiries to answer them</li> <li>setting up simple practical enquiries, comparative and fair tests</li> <li>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> </ul>	<ul style="list-style-type: none"> <li>asking relevant questions and using different types of scientific enquiries to answer them</li> <li>setting up simple practical enquiries, comparative and fair tests</li> <li>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> </ul>	<ul style="list-style-type: none"> <li>asking relevant questions and using different types of scientific enquiries to answer them</li> <li>setting up simple practical enquiries, comparative and fair tests</li> <li>making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers</li> </ul>

		<ul style="list-style-type: none"> <li>• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• identifying differences, similarities or changes related to simple scientific ideas and processes</li> <li>• using straightforward scientific evidence to answer questions or to support their findings.</li> </ul>	<p>scientific ideas and processes</p> <ul style="list-style-type: none"> <li>• using straightforward scientific evidence to answer questions or to support their findings.</li> </ul>	<ul style="list-style-type: none"> <li>• gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> </ul>	<ul style="list-style-type: none"> <li>• gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> </ul>	<ul style="list-style-type: none"> <li>• gathering, recording, classifying and presenting data in a variety of ways to help in answering questions</li> <li>• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables</li> <li>• reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions</li> <li>• using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions</li> </ul>
<p><b>Relevant Scientists</b></p>	<p>Marie Curie- Radiation</p> <p>Wilhelm Rontgen - X rays</p> <p>Adelle Davis -Nutritionist</p>	<p>The Wright Brothers Airplanes</p> <p>Henry Ford- Cars</p>	<p>Dr Anjana Khatwa Geologist</p> <p>Ursula Marvin- Geologist</p> <p>Katia Krafft - Geologist and Volcanologist</p>	<p>Andre Marie Ampere- Electro-magnetism</p>	<p>Joseph Banks- Botanist</p> <p>Ahmed Mumin Warfa - Botanist</p> <p>Marianne North- Botanist</p>	<p>Justus Von Liebig- Mirrors</p> <p>James Clerk Maxwell- (Visible and Invisible Waves of Light)</p>

<p>KS2 Lower Cycle B</p>	<p><b>Animals inc humans</b></p> <ul style="list-style-type: none"> <li>• Describe the simple functions of the basic parts of the digestive system in humans.</li> <li>• Identify the different types of teeth in humans and their simple functions.</li> <li>• Construct and interpret a variety of food chains, identifying producers, predators and prey.</li> </ul>	<p><b>States of matter</b></p> <ul style="list-style-type: none"> <li>• Compare and group materials together, according to whether they are solids, liquids or gases.</li> <li>• Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).</li> <li>• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</li> </ul>	<p><b>Sound</b></p> <ul style="list-style-type: none"> <li>• Identify how sounds are made, associating some of them with something vibrating.</li> <li>• Recognise that vibrations from sounds travel through a medium to the ear.</li> <li>• Find patterns between the pitch of a sound and features of the object that produced it.</li> <li>• Find patterns between the volume of a sound and the strength of the vibrations that produced it.</li> <li>• Recognise that sounds get fainter as the distance from the sound source increases.</li> </ul>	<p><b>Electricity</b></p> <ul style="list-style-type: none"> <li>• Identify common appliances that run on electricity.</li> <li>• Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.</li> <li>• Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.</li> <li>• Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.</li> <li>• Recognise some common conductors and insulators, and associate metals with being good conductors.</li> </ul>	<p><b>Rocks</b></p> <ul style="list-style-type: none"> <li>• Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter</li> </ul>	<p><b>Living things and their habitats</b></p> <ul style="list-style-type: none"> <li>• Recognise that living things can be grouped in a variety of ways.</li> <li>• Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</li> <li>• Recognise that environments can change and that this can sometimes pose dangers to living things.</li> </ul>
<p>Working Scientifically</p>	<ul style="list-style-type: none"> <li>• making systematic and careful observations and, where appropriate, taking accurate measurements using</li> </ul>	<ul style="list-style-type: none"> <li>• asking relevant questions and using different types of scientific enquiries to answer them</li> <li>• setting up simple</li> </ul>	<ul style="list-style-type: none"> <li>• setting up simple practical enquiries, comparative and fair tests</li> <li>• making systematic and careful</li> </ul>	<ul style="list-style-type: none"> <li>• setting up simple practical enquiries, comparative and fair tests</li> <li>• making systematic and careful</li> </ul>	<ul style="list-style-type: none"> <li>• asking relevant questions and using different types of scientific enquiries to answer them</li> <li>• making systematic</li> </ul>	<ul style="list-style-type: none"> <li>• making systematic and careful observations and, where appropriate, taking accurate measurements using</li> </ul>

standard units, using a range of equipment, including thermometers and data loggers

- identifying differences, similarities or changes related to simple scientific ideas and processes

practical enquiries, comparative and fair tests

- making systematic observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and

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- identifying differences, similarities or changes related to simple

and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

standard units, using a range of equipment, including thermometers and data loggers

- identifying differences, similarities or changes related to simple scientific ideas and processes



		raise further questions	scientific ideas and processes	scientific ideas and processes		
<b>Relevant Scientists</b>	<p>Joseph Lister- Antiseptic</p> <p>Ivan Pavlov- Digestive System Mechanisms</p> <p>Washington &amp; Lucius Sheffield- Toothpaste in a tube</p>	<p>Joseph Priestly – Discovered oxygen</p> <p>Lord Kelvin – Absolute zero (temperature)</p> <p>Anders Celsius – Temperature Scale</p> <p>Daniel Fahrenheit- Temperature Scale / Invention of the Thermometer</p> <p>George Washington Carver- chemist</p>	<p>Alexander Graham Bell – Invented the telephone</p> <p>Aristotle – Sound Waves</p> <p>Galileo Galilei – Frequency and Pitch of Sound Waves</p>	<p>Michael Faraday- Discovered relationship between magnets and electricity</p> <p>Thomas Edison- Lightbulb</p> <p>Joseph Swan- Incandescent Light Bulb</p>	<p>Mary Anning- Fossil hunter</p> <p>William Smith Fossils strata</p> <p>Inge Lehmann – Earth’s Mantle</p> <p>Katia Krafft – Geologist and Volcanologist</p>	<p>Jacques Cousteau – Marine Biology</p> <p>Cindy Looy- Environmental Change and Extinction</p> <p>Joan Beauchamp Procter Zoologist</p>
KS2 Upper Cycle A	<p><b>Properties and changes of materials</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday</li> </ul>	<p><b>Earth and Space</b></p> <ul style="list-style-type: none"> <li>• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.</li> <li>• Describe the movement of the Moon relative to the Earth.</li> <li>• Describe the Sun, Earth and Moon as approximately spherical bodies.</li> <li>• Use the idea of the Earth’s rotation to explain day and night</li> </ul>	<p><b>Forces</b></p> <ul style="list-style-type: none"> <li>• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> <li>• Identify the effects of air resistance, water resistance and friction that act between moving surfaces.</li> <li>• Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater</li> </ul>	<p><b>Light</b></p> <ul style="list-style-type: none"> <li>• Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.</li> <li>• Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.</li> <li>• Use the idea that light travels in straight lines to explain why shadows have the</li> </ul>	<p><b>Living things and their habitats</b></p> <ul style="list-style-type: none"> <li>• Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.</li> <li>• Describe the life process of reproduction in some plants and animals.</li> </ul>	<p><b>Animals inc humans</b></p> <ul style="list-style-type: none"> <li>• Describe the changes as humans develop to old age. (puberty, time lines, gestation periods)</li> </ul>

	materials, including metals, wood and plastic.	and the apparent movement of the sun across the sky.	effect.	same shape as the objects that cast them.		
Working Scientifically	<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 a degree of trust</li> </ul>	<ul style="list-style-type: none"> <li>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>	<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 a degree of trust</li> </ul>	<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 a degree of trust</li> </ul>	<ul style="list-style-type: none"> <li>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>	<ul style="list-style-type: none"> <li>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> </ul>

	in results, in oral and written forms such as displays and other presentations		in results, in oral and written forms such as displays and other presentations	in results, in oral and written forms such as displays and other presentations		
<b>Relevant Scientists</b>	<p>Jamie Garcia (BP website)- Invention of a new plastic</p> <p>Becky Schroeder - fluorescence material</p> <p>Spencer Silver, Arthur Fry and Alan Amron - Post-It Notes</p> <p>Ruth Benerito - Wrinkle-Free Cotton</p>	<p>Dr Sian Proctor- Analog Astronaut</p> <p>Margaret Hamilton- Computer scientist (Moon Landings)</p> <p>Stephen Hawking- Black Holes</p> <p>Mae Jemison - Astronaut</p> <p>Claudius Ptolemy and Nicolaus Copernicus - Heliocentric vs Geocentric Universe</p> <p>Neil Armstrong- First man on the Moon</p> <p>Helen Sharman- GB astronaut</p> <p>Caroline Herschel- First to find a comet</p> <p>Valentina Tereshkova- Cosmonaut</p>	<p>Isaac Newton- Gravity</p> <p>Albert Einstein- The Theory Of relativity</p> <p>Galileo Galilei - Gravity and Acceleration</p> <p>Archimedes of Syracuse- Levers</p>	<p>Thomas Edison -Invented electric light bulb</p> <p>Patricia Bath (BP website)- saving sight</p> <p>Thomas Young (Wave Theory of Light)</p> <p>Ibn al-Haytham -Light and our Eyes</p> <p>Percy Shaw - The Cats Eye</p> <p>Maria Telkes- Solar energy</p>	<p>Jane Goodall- naturalist</p> <p>Sylvia Earle - Marine biologist</p> <p>Dr. Paula Kahumbu-wildlife conservationist</p> <p>Mangala Mani - Antarctic scientist</p> <p>Sir David Attenborough- Animal Behaviourist</p>	<p>Eva Crane -Reproduction in Bees</p> <p>Virginia Apgar- obstetrical anaesthesiologist</p>
KS2 Upper Cycle	<b>Properties and changes of materials</b>	<b>Animals inc humans</b>	<b>Animals inc humans</b>	<b>Electricity</b>	<b>Evolution and inheritance</b>	<b>Living things and their habitats</b>

<p>B</p>	<ul style="list-style-type: none"> <li>• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.</li> <li>• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.</li> <li>• Demonstrate that dissolving, mixing and changes of state are reversible changes.</li> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.</li> <li>• Describe the ways in which nutrients and water are transported within animals, including humans.</li> </ul>	<ul style="list-style-type: none"> <li>• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.</li> <li>• Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.</li> <li>• Use recognised symbols when representing a simple circuit in a diagram.</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.</li> <li>• Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.</li> <li>• Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.</li> </ul>	<ul style="list-style-type: none"> <li>• Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.</li> <li>• Give reasons for classifying plants and animals based on specific characteristics.</li> </ul>
<p>Working Scientifically</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> </ul>	<ul style="list-style-type: none"> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs,</li> </ul>	<ul style="list-style-type: none"> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs,</li> </ul>	<ul style="list-style-type: none"> <li>• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> </ul>	<ul style="list-style-type: none"> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs,</li> </ul>	<ul style="list-style-type: none"> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs,</li> </ul>

	<ul style="list-style-type: none"> <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 a degree of trust in results, in oral and written forms such as displays and other presentations</li> </ul>	<p>bar and line graphs</p> <ul style="list-style-type: none"> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>	<p>bar and line graphs</p> <ul style="list-style-type: none"> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments</li> <li>• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• using test results to make predictions to set up further comparative and fair tests</li> </ul>	<ul style="list-style-type: none"> <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 a degree of trust in results, in oral and written forms such as displays and other presentations</li> </ul>	<p>bar and line graphs</p> <ul style="list-style-type: none"> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>	<p>bar and line graphs</p>
<p><b>Relevant Scientists</b></p>	<p>Sir Humphrey Davy- Separating gases</p> <p>Jamie Garcia (BP website)- Invention of a new plastic</p>	<p>Leonardo Da Vinci- anatomy</p> <p>Santorio Santorio- Anatomist</p>	<p>Justus von Liebig- Theories of Nutrition and Metabolism</p> <p>Alexander Fleming- Penicillin</p>	<p>Nikola Tesla -AC electric system</p> <p>Alessandro Volta- Electrical Battery</p> <p>Nicola Tesla-</p>	<p>Hippocrates -The Father of Medicine</p> <p>Charles Darwin- Evolution</p>	<p>Carl Linneus- Classification</p> <p>Libby Hyman- Classification Invertebrates</p>

	<p>Becky Schroeder – fluorescence material</p> <p>Spencer Silver, Arthur Fry and Alan Amron – Post-It Notes</p> <p>Ruth Benerito – Wrinkle-Free Cotton</p>	<p>Dr. Katherine Dibb – Expert in Cardiovascular Sciences</p> <p>Sir Richard Doll- Linking Smoking and Health Problems</p>	<p>Louis Pasteur- Vaccination</p>	<p>Alternating Currents</p> <p>Edith Clarke –Electrical engineer</p>	<p>Alfred Russell Wallace – naturalist</p> <p>Rosalind Franklin – DNA</p> <p>Nettie Stevens – Geneticist</p> <p>Professor Alice Roberts – Evolutionary biologist</p>	
KS3 Cycle A	<p><b>Biology</b> Plants ( recap of yr 3) Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>identify and describe the functions of different parts of flowering plants: roots,</li> <li>stem/trunk, leaves and flowers</li> <li>explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant</li> <li>investigate the way in which water is transported within plants</li> </ul>	<p><b>Biology</b> Health What is a healthy lifestyle?</p> <ul style="list-style-type: none"> <li>the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.</li> <li>Gas exchange systems</li> <li>the structure and functions of the gas exchange system in humans, including</li> <li>adaptations to function</li> <li>the mechanism of breathing to move air in and out of the lungs, using a pressure model</li> </ul>	<p><b>Chemistry</b> Earth and atmosphere inc. the rock cycle the composition of the Earth</p> <ul style="list-style-type: none"> <li>the structure of the Earth</li> <li>the rock cycle and the formation of igneous, sedimentary and metamorphic rocks</li> <li>Earth as a source of limited resources and the efficacy of recycling</li> <li>the carbon cycle</li> <li>the composition of the atmosphere</li> <li>the production of carbon dioxide by human activity and the impact on climate.</li> </ul>	<p><b>Physics</b> Space physics</p> <ul style="list-style-type: none"> <li>gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg,</li> <li>different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only)</li> <li>our Sun as a star, other stars in our galaxy, other galaxies</li> <li>the seasons and the Earth’s tilt, day length at different times of year, in different hemispheres</li> </ul>	<p><b>Physics</b> Energy in matter (including energetics)</p> <ul style="list-style-type: none"> <li>changes with temperature in motion and spacing of particles</li> <li>internal energy stored in materials.</li> <li>energy changes on changes of state (qualitative)</li> <li>exothermic and endothermic chemical reactions (qualitative).</li> <li>Changes in systems</li> <li>energy as a quantity that can be quantified and calculated;</li> </ul>	<p><b>Physics</b></p> <ul style="list-style-type: none"> <li>Observed waves</li> <li>waves on water as undulations which travel through water with transverse motion;</li> <li>these waves can be reflected, and add or cancel – superposition.</li> <li>Sound waves</li> <li>frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption</li> <li>of sound</li> <li>sound needs a medium to travel, the speed of sound in air, in water, in solids</li> </ul>

	<p>Reproduction in plants</p> <ul style="list-style-type: none"> <li>including flower structure, wind and insect pollination,</li> <li>fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.</li> </ul>	<ul style="list-style-type: none"> <li>to explain the movement of gases, including simple measurements of lung volume</li> <li>the impact of exercise, asthma and smoking on the human gas exchange system</li> <li>the role of leaf stomata in gas exchange in plants.</li> </ul>		<ul style="list-style-type: none"> <li>the light year as a unit of astronomical distance.</li> <li>Energy changes and transfers</li> <li>simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged</li> <li>heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators</li> <li>other processes that involve energy transfer: changing motion,</li> </ul>	<p>the total energy has the</p> <ul style="list-style-type: none"> <li>same value before and after a change</li> <li>comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions</li> <li>using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes.</li> <li>Circulation of fuel uses and costs in the domestic context</li> <li>comparing</li> </ul>	<ul style="list-style-type: none"> <li>sound produced by vibrations of objects, in loudspeakers, detected by their effects on</li> <li>microphone diaphragm and the ear drum; sound waves are longitudinal</li> <li>auditory range of humans and animals.</li> </ul>
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				dropping an object, <ul style="list-style-type: none"> <li>• completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.</li> </ul>	energy values of different foods (from labels) (kJ) <ul style="list-style-type: none"> <li>• comparing power ratings of appliances in watts (W, kW)</li> <li>• comparing amounts of energy transferred (J, kJ, kW hour)</li> <li>• domestic fuel bills, fuel use and costs</li> <li>• fuels and energy resources.</li> </ul>
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Working Scientifically	<p>Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</p> <p>Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to</p>	<p>Using their observations and ideas to suggest answers to questions.</p> <p>Make predictions using scientific knowledge and understanding.</p> <p>Apply mathematical concepts and calculate results.</p> <p>Use and derive simple equations and carry out appropriate calculations.</p>	<p>Apply mathematical concepts and calculate results.</p> <p>Make predictions using scientific knowledge and understanding.</p>	<p>Apply mathematical concepts and calculate results.</p> <p>Make predictions using scientific knowledge and understanding.</p> <p>Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.</p> <p>Undertake basic data</p>	<p>Apply mathematical concepts and calculate results.</p> <p>Make predictions using scientific knowledge and understanding.</p> <p>Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.</p> <p>Undertake basic data analysis including</p>	<p>Make predictions using scientific knowledge and understanding.</p> <p>Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.</p> <p>Apply mathematical concepts and calculate results.</p> <p>Undertake basic data</p>
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	<p>health and safety</p> <p>Use and derive simple equations and carry out appropriate calculations.</p>			<p>analysis including simple statistical techniques.</p>	<p>simple statistical techniques.</p>	<p>analysis including simple statistical techniques.</p>
Vocabulary	<p>Xylem, Phloem, Transpiration, potential, evaporates,</p> <p>Pollination, pollinators, Anther, filament, Stigma, Sepal</p>	<p>Legal, Illegal, Painkillers, Exchange Prescription,</p>	<p>Climate, Atmosphere, Oxygen, water vapour, Methane, Ammonia, Nitrogen, Carbon dioxide, Metamorphic, Igneous, Sedimentary, Evolution, Durability, Permeability, Density, Mantle, intrusive, extrusive, compaction, reusable</p>	<p>Metabolism, Variables, Conduction, convection, Hemispheres, temperature, Jovian, terrestrial</p>	<p>Tidal, Biofuel, geothermal, Thermal, Gravitational potential, Elastic potential, Nuclear, Chemical</p>	<p>Amplitude, frequency, Transverse, longitudinal, Compression, rarefaction, wavelength, Pitch, Vibration, volume, Pinna, Cochlea, auditory, stirrup, anvil, Canal, undulations, echo, reflection, refraction</p>
KS3 Cycle B	<p><b>Biology</b></p> <ul style="list-style-type: none"> <li>The skeletal and muscular systems</li> <li>The structure and functions of the human skeleton, to include support, protection, movement and making blood cells.</li> </ul>	<p><b>Chemistry</b></p> <ul style="list-style-type: none"> <li>Atoms, elements and compounds.</li> <li>A simple Dalton atomic model.</li> <li>Differences Between atoms, elements and compounds.</li> <li>Chemical symbols</li> </ul>	<p><b>Biology</b></p> <ul style="list-style-type: none"> <li>Nutrition and Digestion.</li> <li>Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals,</li> </ul>	<p><b>Physics</b></p> <ul style="list-style-type: none"> <li>Lightwaves energy and waves</li> <li>The similarities and differences between light waves and waves in matter</li> <li>Light waves</li> </ul>	<p><b>Chemistry</b></p> <ul style="list-style-type: none"> <li>Pure and impure substances. Materials</li> <li>The concept of a pure substance</li> <li>Mixtures, including dissolving.</li> <li>Diffusion in terms</li> </ul>	<p><b>Biology</b></p> <ul style="list-style-type: none"> <li>Relationships in an ecosystem.</li> <li>The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops</li> </ul>

- Biomechanics- the interaction between skeleton and muscles, including the measurement of force exerted by different muscles.
- The function of muscles and examples of antagonistic muscle pairs. Make predictions using scientific knowledge and understanding.

- and formulae for elements and compounds.
- Conservation of mass changes of state and chemical reactions.

- dietary fibre and water, and why each is needed.
- Calculations of energy requirements in a healthy daily diet.
- The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases.
- The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)
- The importance of bacteria in the human digestive system.
- Plants make carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.

- travelling through a vacuum; speed of light.
- The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface.
- Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lenses in focusing (qualitative); the human eye.
- Light transfers energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras.
- Colours and the different frequencies of light, white light and prisms (qualitative)

- of the particle model.
- Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography.
- The identification of pure substances.

- The importance of plant reproduction through insect pollination in human food security.
- How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.

				<p>e only); differential colour effects in absorption and diffuse reflection.</p> <ul style="list-style-type: none"> <li>•</li> </ul>		
<p>Working Scientifically</p>	<p>Undertake basic data analysis including simple statistical techniques.</p> <p>Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</p>	<p>Undertake basic data analysis including simple statistical techniques.</p> <p>Use and derive simple equations and carry out appropriate calculations.</p> <p>Apply mathematical concepts and calculate results</p> <p>Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</p>	<p>Use and derive simple equations and carry out appropriate calculations.</p> <p>Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</p>	<p>Use and derive simple equations and carry out appropriate calculations.</p> <p>Undertake basic data analysis including simple statistical techniques.</p> <p>Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.</p> <p>Make predictions using scientific knowledge and understanding.</p> <p>Apply mathematical concepts and calculate results</p>	<p>Undertake basic data analysis including simple statistical techniques.</p> <p>Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.</p> <p>Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.</p> <p>Make predictions using scientific knowledge and</p>	<p>Undertake basic data analysis including simple statistical techniques.</p> <p>Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</p> <p>Present reasoned explanations, including explaining data in relation to predictions and hypotheses</p>

					<p>understanding.</p> <p>Apply mathematical concepts and calculate results</p>	
<p>KS3 Cycle C</p>	<p><b>Biology</b></p> <ul style="list-style-type: none"> <li>• Cells and organisation</li> <li>• Photosynthesis</li> <li>• Cellular respiration</li> <li>• Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope.</li> <li>• The functions of a cell wall, cell membrane, cytoplasm, nucleus, vacuole,</li> </ul>	<p><b>Biology</b></p> <ul style="list-style-type: none"> <li>• Inheritance, chromosomes, DNA and genes.</li> <li>• Reproduction</li> <li>• Heredity is the process by which genetic information is transmitted from one generation to the next.</li> <li>• A simple model of chromosomes genes and DNA in Heredity,</li> <li>• including the part played by Watson, Crick, Wilkins and</li> </ul>	<p><b>Chemistry</b></p> <ul style="list-style-type: none"> <li>• The particulate nature of matter (solids, liquids, gases)</li> <li>• Physical changes particle model</li> <li>• Chemical reactions (acids &amp; alkalis)</li> </ul>	<p><b>Chemistry</b></p> <ul style="list-style-type: none"> <li>• The periodic table</li> <li>• The varying physical and chemical properties of different elements.</li> <li>• The principles underpinning the Medeleev Periodic table.</li> <li>• The periodic table: periods &amp; groups; metals and non-metals.</li> <li>• How patterns in reactions can be</li> </ul>	<p><b>Physics</b></p> <ul style="list-style-type: none"> <li>• Current electricity</li> <li>• Magnetism</li> <li>• Static electricity.</li> <li>• electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge</li> <li>• potential difference, measured in volts, battery and bulb ratings;</li> </ul>	<p><b>Physics</b></p> <ul style="list-style-type: none"> <li>• Pressure in fluids</li> <li>• Forces and motion</li> <li>• Balanced Forces.</li> <li>• atmospheric pressure, decreases with increase of height as weight of air above decreases with height</li> <li>• pressure in liquids, increasing with depth; upthrust effects, floating, sinking.</li> <li>• pressure measured by</li> </ul>

mitochondria, and chloroplasts.

- The similarities and differences between plant and animal cells.
- The role of diffusion in the movement of materials in and between cells.
- The structural adaptations of some unicellular organisms.
- The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.
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predicted with reference to the periodic table.

- The properties of metals and non metals.
- The chemical properties of metal and non-metal oxides with respect to acidity.

resistance, measured in ohms, as the ratio of potential difference (p.d.) to current

- differences in resistance between conducting and insulating components (quantitative)
- separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects
- the idea of electric field, forces acting across the space between objects not in contact
- magnetic poles, attraction and repulsion
- magnetic fields by plotting with compass, representation by field lines
- Earth's magnetism,

ratio of force over area – acting normal to any surface

- opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface.
- forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only)
- change depending on direction of force and its size
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					compass and navigation <ul style="list-style-type: none"> <li>the magnetic effect of a current, electromagnets, DC motors (principles only)</li> </ul>	
vocabulary	Multicellular, organ, tissue, cell, membrane, cytoplasm, nucleus, vacuole, mitochondria, chloroplasts, membrane, cell wall, Variable, magnification, evaluate	Clone, gene, chromosome, genetic, information, gamete, Genetically modified, Selective breeding, Variety, breed, species, Homozygous, heterozygous,	Acid, alkali, sulfuric acid, hydrochloric acid, Sodium hydroxide, indicator, solution, solute, neutral, react reaction, antacid, equation, harmful, corrosive, caustic, hazard, risk assessment, pH, Particle, neutralisation, Carbonates, state of matter	Atoms, elements, compounds, metals, non-metals, groups, periods, properties, mendeleeev, reactivity, Series Metal oxides, electrolysis, separating, refute	Battery, cell, bulb, lamp, switch, power supply, current, resistance, fuse, circuit, voltage, ammeter, amps/amperes, Pole, magnetic field, core, solenoid, coil, steel , nickel, attract, repel	Density, upthrust, balanced, unbalanced, density, archimedes, resistance, moments, thrust, friction, resultant
Working Scientifically	<p>make predictions using scientific knowledge and understanding</p> <p>use appropriate techniques, apparatus, and materials during</p>	<p>make predictions using scientific knowledge and understanding</p> <p>select, plan and carry out the most appropriate types of scientific</p>	<p>make predictions using scientific knowledge and understanding</p> <p>select, plan and carry out the most appropriate types of scientific</p>	<p>make predictions using scientific knowledge and understanding</p> <p>use appropriate techniques, apparatus, and materials during</p>	<p>make predictions using scientific knowledge and understanding</p> <p>use appropriate techniques, apparatus, and materials during</p>	<p>make predictions using scientific knowledge and understanding</p> <p>select, plan and carry out the most appropriate types of scientific enquiries</p>

fieldwork and laboratory work, paying attention to health and safety

select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables

use and derive simple equations and carry out appropriate calculations

ask questions and develop a line of enquiry based on observations of the

enquiries to test predictions, including identifying independent, dependent and control variables

ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience

present observations and data using appropriate methods, including tables and graphs

apply sampling techniques

enquiries to test predictions, including identifying independent, dependent and control variables

apply mathematical concepts and calculate results

use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety

use and derive simple equations and carry out appropriate

fieldwork and laboratory work, paying attention to health and safety

select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables

use and derive simple equations and carry out appropriate calculations

present observations and data using appropriate

fieldwork and laboratory work, paying attention to health and safety

apply mathematical concepts and calculate results

select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables

use and derive simple equations and carry out appropriate

to test predictions, including identifying independent, dependent and control variables

use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety

apply mathematical concepts and calculate results

use and derive simple equations and carry out appropriate calculations

present

	<p>real world, alongside prior knowledge and experience</p> <p>present observations and data using appropriate methods, including tables and graphs</p> <p>apply sampling technique</p>		<p>calculations</p> <p>present observations and data using appropriate methods, including tables and graphs</p>	<p>methods, including tables and graphs</p>	<p>calculations</p> <p>present observations and data using appropriate methods, including tables and graphs</p>	<p>observations and data using appropriate methods, including tables and graphs</p>
Vocabulary						
Year 10 Entry Level	<p><b>Component 1</b> <b>Biology:</b>The Human Body</p> <ul style="list-style-type: none"> <li>• Cells are the basic building blocks of all living organisms.</li> <li>• How the human body works.</li> <li>• How the body fights disease</li> <li>• How the body is coordinated</li> <li>• Environment. Evolution and inheritance</li> <li>• What are the feeding relationships between living organisms?</li> <li>• What determines where particular</li> </ul>		<p><b>Component 3</b> <b>Chemistry:</b> chemistry: Elements, mixtures, and compounds</p> <ul style="list-style-type: none"> <li>• Atoms</li> <li>• When elements react</li> <li>• Three matters of state.</li> <li>• Diamond and Graphite different structures</li> <li>• Mixtures</li> <li>• Paper chromatography</li> <li>• Unreactive metals</li> </ul>		<p><b>Component 5</b> <b>Physics:</b> Energy, forces and the structure of matter</p> <ul style="list-style-type: none"> <li>• Energy, energy transfers and energy resources</li> <li>• Forces and work</li> <li>• Speed and stopping distances</li> <li>• Atoms and nuclear radiation</li> </ul>	



	<ul style="list-style-type: none"> <li>species live?</li> <li>How life has developed on earth.</li> </ul>	<ul style="list-style-type: none"> <li>Properties of metals.</li> <li>Alloys</li> <li>Polymers</li> </ul>	
Required Practicals ELC	Reaction time (ruler drop)	Chromatography (There's been a murder!)	Materials as insulators (insulated cups)
Year 10 GCSE	<ul style="list-style-type: none"> <li><b>Biology 1</b></li> <li>Cell structure</li> <li>Cell division</li> <li>Transport in cells</li> <li>Animal tissues, organs and organ systems</li> <li>Plant tissues, organs and organ systems</li> <li>Infection and response</li> <li>Photosynthesis</li> <li>Respiration</li> </ul>	<ul style="list-style-type: none"> <li><b>Chemistry 1</b></li> <li>Atomic structure and the periodic table</li> <li>Bonding, structure and the properties of matter</li> <li>Quantitative chemistry</li> <li>Chemical changes</li> <li>Energy changes</li> <li>Formulae and equations</li> </ul>	<ul style="list-style-type: none"> <li><b>Physics 1</b></li> <li>Energy</li> <li>Electricity</li> <li>Particle model of matter</li> <li>Atomic structure</li> </ul>
Required Practicals - GCSE	<ol style="list-style-type: none"> <li><b>Microscopy</b> - Using a light microscope to observe animal and plant cells</li> <li><b>Osmosis</b> - Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.</li> <li><b>Food tests</b> - Use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict's test for sugars, iodine test for starch and Biuret reagent for protein.</li> <li><b>Enzymes</b> - Investigate the effect of pH on the rate of reaction of amylase enzyme.</li> <li><b>Photosynthesis</b> - Investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.</li> </ol>	<p><b>8. Making salts</b> - Preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.</p> <p><b>9. Electrolysis</b> - Investigate what happens when aqueous solutions are electrolysed using inert electrodes.</p> <p><b>10. Temperature changes</b> - Investigate the variables that affect temperature change in chemical reactions eg acid plus alkali.</p>	<p><b>14. Specific heat capacity</b> - An investigation to determine the specific heat capacity of one or more materials.</p> <p><b>15. Resistance</b> - Use circuit diagrams to set up and check appropriate circuits to investigate the factors that affect the resistance of an electrical circuit.</p> <p><b>16. I-V characteristics</b> - Use circuit diagrams to construct appropriate circuits to investigate the I-V characteristics of a variety of circuit elements including a filament lamp, a resistor and a diode at constant temperature</p> <p><b>17. Density</b> - Use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids.</p>

	<p>6. <b>Reaction time</b> – Plan and carry out an investigation into the effect of a factor on human reaction time.</p>		
Year 11 Entry Level	<p><b>Component 2</b>  <b>Biology:</b> Environment, evolution and inheritance. Outcomes:</p> <ul style="list-style-type: none"> <li>• What are the feeding relationships between living organisms?</li> <li>• What determines where particular species live?</li> <li>• How life has developed on earth.</li> </ul>	<p><b>Component 4</b>  <b>Chemistry:</b> Chemistry in our world</p> <ul style="list-style-type: none"> <li>• Reactions of acids</li> <li>• Energy and rate of reaction</li> <li>• Earth's atmosphere</li> <li>• Fuels and human impacts on the atmosphere</li> <li>• Water for drinking.</li> </ul>	<p><b>Component 6</b>  <b>Physics :</b> Electricity, magnetism and waves</p> <ul style="list-style-type: none"> <li>• Electrical current</li> <li>• Domestic electricity</li> <li>• Magnetism and electromagnetism</li> <li>• Different types of waves</li> <li>• Electromagnetic waves</li> </ul>
Required Practicals – ELC	How light intensity affects rate of photosynthesis-( pondweed)	Reaction of acids on carbonates(antacids)	Energy transfer (boiling kettles)
Year 11 – GCSE	<p><b>Biology 2</b></p> <ul style="list-style-type: none"> <li>• Homeostasis and the human nervous system</li> <li>• Hormonal coordination in humans</li> <li>• Reproduction</li> <li>• Variation</li> <li>• The development of understanding of genetics and evolution</li> <li>• Classification of living organisms</li> <li>• Adaptation, interdependence and competition</li> <li>• Organisation of an ecosystem</li> <li>• Biodiversity and the effect of human interaction on ecosystems</li> </ul>	<p><b>Chemistry 2</b></p> <ul style="list-style-type: none"> <li>• The rate and extent of chemical change</li> <li>• Organic chemistry</li> <li>• Chemical analysis</li> <li>• Chemistry of the atmosphere</li> <li>• Using the earth's resources</li> </ul>	<p><b>Physics 2</b></p> <ul style="list-style-type: none"> <li>• Forces</li> <li>• Observing and recording motion</li> <li>• Waves</li> <li>• Magnetism and electromagnetism.</li> </ul>
Required Practicals – GCSE	<p><b>7. Field investigations</b> – Measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this</p>	<p><b>11. Rates of reaction</b> – Investigate how changes in concentration affect the rates of reactions by both measuring the volume of a gas produced and monitoring a change in</p>	<p><b>18. Force and extension</b> – Investigate the relationship between force and extension of a spring.  <b>19. Acceleration</b> –Investigate</p>

species.

colour or turbidity.

12. **Chromatography** - Investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate Rf values.

13. **Water purification** - Analysis and purification of water samples from different sources. To include pH measurement, removal of dissolved solids and distillation.

- the effect of varying the force on the acceleration of an object of constant mass
  - the effect of varying the mass of an object on the acceleration produced by a constant force.
- 20. Waves** - Make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves
- 21. Radiation and absorption** - Investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.