



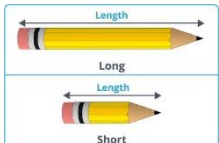

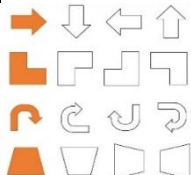

Discovery and Innovation Curriculum 2022-2023

# Alt Bridge School






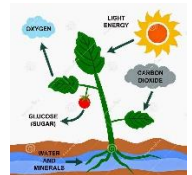


# Discovery and Innovation Cluster





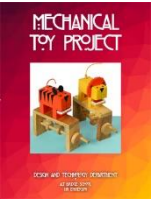
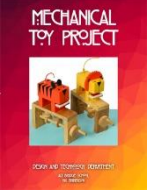
## Discovery and Innovation Curriculum 2022-2023

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Year 7 MATHS</b>  <b>Cluster Crossover linked to NC:</b>  -Mass/weight [for example, heavy/light, heavier than, lighter than]  -Capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]  -Time [for example, quicker, slower, earlier, later]  -Measure and begin to record the following: lengths and heights mass/weight  -Capacity and volume time (hours, minutes, seconds)	<b>Number: Place Value</b>    -Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number  -Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least  -Read and write numbers from 1 to 20 in numerals and words	<b>Number: Addition and Subtraction</b>    -Read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs  -Add and subtract one-digit and two-digit numbers to 20, including zero  -Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems	<b>Measurement: Length and Height</b>    -Compare, describe and solve practical problems for:  -Lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]  -Measure and begin to record the following: lengths and heights	<b>Measurement: Weight and Volume</b>    -Compare, describe and solve practical problems for: -mass/weight [for example, heavy/light, heavier than, lighter than]  -Capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]	<b>Geometry: Position and Direction</b>    -Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]  -3-D shapes [for example, cuboids (including cubes), pyramids and spheres].	<b>Measurement: Money/Time</b>    -Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value  -Find different combinations of coins that equal the same amounts of money  -Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times  -Know the number of minutes in an hour and the number of hours in a day.



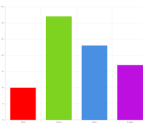
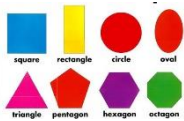
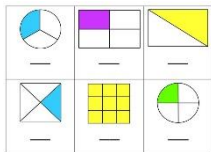



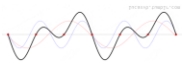
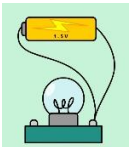
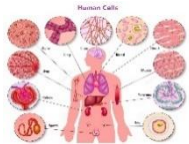

# Discovery and Innovation Curriculum 2022-2023

<p><b>Year 7 SCIENCE</b></p> <p><b>Cluster Crossover linked to NC:</b></p> <ul style="list-style-type: none"> <li>-Apply mathematical concepts and calculate results</li> <li>-Present observations and data using appropriate methods, including tables and graphs</li> <li>-Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions</li> <li>-Present reasoned explanations, including explaining data in relation to predictions and hypotheses</li> <li>-Evaluate data, showing awareness of potential sources of random and systematic error</li> <li>-Identify further questions arising from their results.</li> </ul>	<p><b>Working in a laboratory Health and Safety</b></p>  <ul style="list-style-type: none"> <li>-Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety</li> <li>-Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience</li> <li>-Make predictions using scientific knowledge and understanding</li> <li>-Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate</li> </ul>	<p><b>Working in a laboratory Health and Safety</b></p>  <ul style="list-style-type: none"> <li>-Evaluate risks.</li> <li>-Pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility</li> <li>-Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review</li> </ul>	<p><b>Working in Space Exploration</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 and the apparent movement of the sun across the sky.</li> </ul>	<p><b>Working in Space Exploration</b></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> </ul>	<p><b>Working in Ecology</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> <li>-The importance of plant reproduction through insect pollination in human food security</li> <li>-How organisms affect, and are affected by, their environment, including the accumulation of toxic materials</li> </ul>	<p><b>Working in Ecology</b></p>  <ul style="list-style-type: none"> <li>-The reactants in, and products of, photosynthesis, and a word summary for photosynthesis</li> <li>-The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere</li> <li>-The adaptations of leaves for photosynthesis.</li> </ul>
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## Discovery and Innovation Curriculum 2022-2023

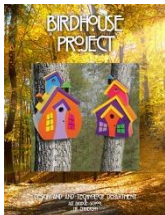
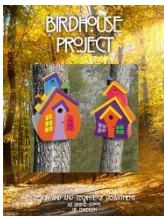




<p><b>Year 7</b></p> <p><b>DT – Resistant Materials</b></p> <p><b>Cluster Crossover linked to NC:</b></p> <ul style="list-style-type: none"> <li>-Understand and be able to convert cms to mms.</li> <li>-To be able to measure accurately, in both cms and mms.</li> <li>-To draw angles accurately and to recognise 30/45/60/90/180 and 360 degrees.</li> <li>-To be able to identify geometrical shapes such as squares, rectangle, pentagon, hexagon, circles and ellipses.</li> <li>-Be able to draw accurately, following dimensions / measurements and have a limited understanding of scale.</li> <li>-To understand and apply radius and diameter.</li> <li>-Understand the term circumference.</li> </ul>	<p><b>Health &amp; Safety Project</b></p> <p><b>Work shop and machine safety</b></p>  <ul style="list-style-type: none"> <li>-Machine Focus</li> <li>-Health and safety check on each machine using task sheets</li> <li>-Each pupil to demonstrate use to technician or teacher to achieve health safety certificate.</li> <li>-Identify the different safety measures when working with equipment.</li> <li>-Develop an understanding how to use and work with different materials.</li> <li>-Use the correct measures to produce a working product</li> </ul>	<p><b>Health &amp; Safety Project</b></p> <p><b>Practical health and safety outcome</b></p>  <ul style="list-style-type: none"> <li>-Machine Focus</li> <li>-Health and safety check on each machine using task sheets</li> <li>-Each pupil to demonstrate use to technician or teacher to achieve health safety certificate.</li> <li>-Identify the different safety measures when working with equipment.</li> <li>-Develop an understanding how to use and work with different materials.</li> <li>-Use the correct measures to produce a working product</li> </ul>	<p><b>Tangram Project</b></p>  <ul style="list-style-type: none"> <li>-Introduce Situation and Design Brief Task on History of the tangram puzzle</li> <li>-Complete card tangram puzzle Respond to a design brief through discussion.</li> <li>-Identify what a Tangram puzzle is used for. Create paper tangram.</li> <li>-Explore the different materials and equipment we will use.</li> <li>-Select the materials I will need to realise my design.</li> <li>-Produce a wooden container with accuracy</li> </ul>	<p><b>Tangram Project</b></p>  <ul style="list-style-type: none"> <li>-Introduce Situation and Design Brief Task on History of the tangram puzzle</li> <li>-Complete card tangram puzzle Respond to a design brief through discussion.</li> <li>-Identify what a Tangram puzzle is used for. Create paper tangram.</li> <li>-Explore the different materials and equipment we will use.</li> <li>-Select the materials I will need to realise my design.</li> <li>-Produce a wooden container with accuracy</li> </ul>	<p><b>Moving Toy Project</b></p>  <ul style="list-style-type: none"> <li>-Introduce Situation and Design Brief Task key words from project</li> <li>-Look at literacy mat and use in DT</li> <li>-Complete key words word search task Respond to a design brief through discussion.</li> <li>-Identify what a moving mechanism toy is and used for.</li> <li>-Identify key words in order to begin research.</li> <li>-Develop an understanding of how measurement's need to be accurate.</li> </ul>	<p><b>Moving Toy Project</b></p>  <ul style="list-style-type: none"> <li>Recognise the movement of a mechanism within a toy.</li> <li>-Be able to explain the difference between a linear and rotary motion.</li> <li>-Have an understanding of a CAM movement.</li> <li>-Produce different CAM toy designs including colour and labels</li> <li>-Identify what shape cam can be used in their design ideas Develop their own chosen design idea</li> <li>-Demonstrate knowledge of tool use in the work shop</li> <li>-Show an understanding of some different types of wood.</li> </ul>
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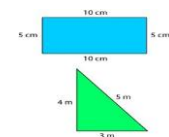


<p><b>Year 8 MATHS</b></p> <p><b>Cluster Crossover linked to NC:</b></p> <ul style="list-style-type: none"> <li>-Pupils use standard units of measurement with increasing accuracy, using their knowledge of the number system.</li> <li>-Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.</li> <li>-Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.</li> </ul>	<p><b>Number: Place Value</b></p>  <ul style="list-style-type: none"> <li>-Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures</li> <li>-Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers, adding three one-digit numbers.</li> </ul>	<p><b>Measurement: Money/Time</b></p>  <ul style="list-style-type: none"> <li>-Recognise, find, name and write fractions <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math> of a length, shape, set of objects or quantity</li> <li>-Write simple fractions for example, <math>\frac{1}{2}</math> of 6 = 3 and recognise the equivalence of <math>\frac{2}{4}</math> and <math>\frac{1}{2}</math>.</li> </ul>	<p><b>Statistics: Charts and Graphs</b></p>  <ul style="list-style-type: none"> <li>-Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.</li> <li>-Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.</li> </ul>	<p><b>Geometry: Properties of Shape</b></p>  <ul style="list-style-type: none"> <li>-Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line</li> <li>-Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]</li> <li>-Compare and sort common 2-D and 3-D shapes and everyday objects.</li> </ul>	<p><b>Number: Fractions</b></p>  <ul style="list-style-type: none"> <li>-Recognise, find, name and write fractions <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math> of a length, shape, set of objects or quantity</li> <li>-Write simple fractions for example, <math>\frac{1}{2}</math> of 6 = 3 and recognise the equivalence of <math>\frac{2}{4}</math> and <math>\frac{1}{2}</math>.</li> </ul>	<p><b>Measurement: Mass, Capacity and Temperature</b></p>  <p><b>Mass, Capacity &amp; Temperature</b></p> <ul style="list-style-type: none"> <li>-Choose and use appropriate standard units to estimate and measure length/height in any direction; mass (kg/g); temperature (<math>^{\circ}\text{C}</math>); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels</li> <li>-Compare and order lengths, mass, volume/capacity and record the results using <math>&gt;</math>, <math>&lt;</math> and <math>=</math></li> </ul>
<p><b>Year 8 SCIENCE</b></p> <p><b>Cluster Crossover linked to NC:</b></p> <ul style="list-style-type: none"> <li>-Classification/Sorting</li> <li>-Scientific Enquiry - Measurement Statistic</li> <li>-Classification/Sorting</li> <li>-Venn Diagram</li> </ul>	<p><b>Working in the chemical industry</b></p>  <ul style="list-style-type: none"> <li>-Students carry out a series of investigations into the reactivity of metals, neutralisation and</li> </ul>	<p><b>Working in the chemical industry</b></p>  <ul style="list-style-type: none"> <li>-Students study scientific theory on matter from Aristotle to Mendeleev through to modern</li> </ul>	<p><b>Working in theatre production</b></p>  <ul style="list-style-type: none"> <li>-Energy waves are investigated in this topic using models to demonstrate compressional waves and oscilloscopes to measure wavelength and</li> </ul>	<p><b>Working in theatre production</b></p>  <ul style="list-style-type: none"> <li>-Gravity and magnetism are amongst the forces explored as students carry out a series of experiments to explore motion and resistance to</li> </ul>	<p><b>Working in paediatrics</b></p>  <ul style="list-style-type: none"> <li>-Students compare plant and animal cells from</li> </ul>	<p><b>Working in paediatrics</b></p>  <ul style="list-style-type: none"> <li>-The cells, organs and systems of the human body are investigated in this topic. The human skeleton, respiratory and digestive</li> </ul>






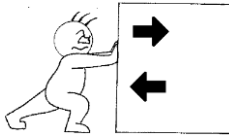


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<p>-Carroll Diagram -Decision Trees -Branching Database</p> <p>-To measure and compare; -Standard and non standard units -Table of results</p> <p>-Compare time; longer and shorter; use stop watches to whole numbers and then to two decimal places</p> <p>-Reaction times -Reliable results -Temperature -Light -Sound</p>	<p>roles acids and alkalis play in our everyday lives.</p> <p>-They become familiar with the pH scale and hazards associated with acids, bases and alkaline metals.</p> <p>-The Periodic Table is introduced to students in this topic.</p>	<p>understanding of super heavy elements.</p> <p>-They chart the development of the Periodic Table and the patterns it demonstrates.</p> <p>-Students investigate the alkaline metals of groups 1 &amp; 2 and the halogens of group 7, giving them an early insight into chemical compounds and bonding.</p>	<p>frequency. The electromagnetic spectrum is introduced, including the uses and dangers of ionising radiation.</p> <p>-The eye and ear structure and how they link to the brain are explored to help understand our perception of light and sound.</p>	<p>motion. The pushing force of propulsion is explored and students are asked to devise a way of ensuring cars and rockets travel in a straight line.</p> <p>-Comparisons are made of body weight on the Earth, Moon and Mars are linked to planet size and the gravitational force exerted.</p> <p>-The effects of forces on fluids in hydraulic systems are explored for their real world applications</p>	<p>microscope slides they prepare themselves.</p> <p>-Structure and function is explored including how different cells act together in organs.</p> <p>-From this students investigate the structure of flowering plants. They dissect a flowering plant to follow the movement of water, minerals and sugars to each cell along the vascular system.</p>	<p>systems are explored in detail.</p> <p>-Students also research ways in which we can look after our health, including the consequences of smoking, narcotics and alcohol abuse.</p> <p>-The dissection also looks for energy storage in tubas and bulbs as when as the male and female reproductive organs in the flower.</p>
<p><b>Year 8</b> <b>DT – Resistant Materials</b></p> <p><b>Cluster Crossover linked to NC:</b></p> <p>-Be able to calculate areas.</p> <p>-To total 'tally' charts, as used in questionnaires and when collecting statistics.</p> <p>-Be able to produce simple graphs from data collected during lessons.</p>	<p><b>Bird House Project</b></p>  <p>-Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]</p> <p>-Select from and use a wide range of materials and components, including construction materials, textiles and ingredients,</p>	<p><b>Bird House Project</b></p>  <p>-Explore and evaluate a range of existing products</p> <p>-Evaluate their ideas and products against design criteria</p> <p>-Build structures, exploring how they can be made stronger, stiffer and more stable</p>	<p><b>Desk top Clock Project</b></p>  <p>-Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.</p> <p>-Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at</p>	<p><b>Desk top Clock Project</b></p>  <p>-Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design</p> <p>-Select from and use a wider range of tools and equipment to perform</p>	<p><b>Packaging Project</b></p>  <p>-Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities</p> <p>-Investigate and analyse a range of existing products</p>	<p><b>Packaging Project</b></p>  <p>-Apply their understanding of how to strengthen, stiffen and reinforce more complex structures</p> <p>-Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]</p> <p>-Understand and use electrical systems in their products [for example, series circuits incorporating</p>

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<p>-Be able to draw common geometrical shapes accurately.</p> <p>-Use templates / patterns to accurately mark out and manufacture. Use a combination of measuring and marking out skills.</p>	according to their characteristics	-Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.	particular individuals or groups	practical tasks [for example, cutting, shaping, joining and finishing], accurately	-Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	switches, bulbs, buzzers and motors]
<p><b>Year 9 MATHS</b></p> <p><b>Cluster Crossover linked to NC:</b></p> <p>-Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)</p> <p>-Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints</p> <p>-Estimate volume [for example, using 1 cm<sup>3</sup> blocks to build cuboids (including cubes)] and capacity [for example, using water]</p>	<p><b>Number: Addition and Subtraction</b></p>  <p>-Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds</p> <p>-Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</p> <p>-Estimate the answer to a calculation and use inverse operations to check answers</p> <p>-Solve problems, including missing number problems, using number facts, place</p>	<p><b>Number: Multiplication and Division</b></p>  <p><b>MULTIPLICATION DIVISION</b></p> <p>-Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods</p> <p>-Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</p>	<p><b>Measurement: Money/Time</b></p>  <p>-Measure, compare, add and subtract: add and subtract amounts of money to give change, using both £ and p in practical contexts</p> <p>-Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks</p> <p>-Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight</p>	<p><b>Measurement: Length and Perimeter</b></p>  <p>-Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres</p> <p>-Find the area of rectilinear shapes by counting squares</p> <p>-Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them</p> <p>-Recognise angles as a property of shape or a description of a turn.</p>	<p><b>Geometry: Properties of Shape</b></p>  <p>-Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle</p> <p>-Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres</p> <p>-Find the area of rectilinear shapes by counting squares</p>	<p><b>Measurement: Mass and Capacity</b></p> <p><b>Mass and Capacity</b></p>  <p>-Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)</p> <p>-Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints</p> <p>-Estimate volume [for example, using 1 cm<sup>3</sup> blocks to build cuboids (including cubes)] and capacity [for example, using water]</p>

## Discovery and Innovation Curriculum 2022-2023

<p>-Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.</p>	<p>value, and more complex addition and subtraction.</p>		<p>-Know the number of seconds in a minute and the number of days in each month, year and leap year.</p>		<p>-Estimate, compare and calculate different measures</p> <p>-Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.</p>	
<p><b>Year 9 SCIENCE</b></p> <p><b>Cluster Crossover linked to NC:</b></p> <p>-Classification &amp; food webs</p> <p>-Classification in Science to classification of 2D shapes or quadrilaterals in maths.</p> <p>-Statistics built in with the science content through use of data collection with quadrants, calculating averages when investigating the food webs.</p> <p>-Connections to area as well e.g. estimating areas of different size leaves.</p>	<p><b>Working in environmental chemistry</b></p>  <p>-Matter is composed of tiny particles called atoms and there are about 100 different naturally-occurring types of atoms called elements</p> <p>-Elements show periodic relationships in their chemical and physical properties</p> <p>-These periodic properties can be explained in terms of the atomic structure of the elements</p> <p>Atoms bond either by transferring electrons from one atom to another or by sharing electrons.</p>	<p><b>Working in environmental chemistry</b></p>  <p>-The shapes of molecules (groups of atoms bonded together) and the way giant structures are arranged is of great importance in terms of the way they behave</p> <p>-Reactions can occur when molecules collide and do so at different rates due to differences in molecular collision.</p> <p>-Chemical reactions take place in only three different ways:</p> <ul style="list-style-type: none"> <li>• proton transfer/electron transfer/electron sharing</li> </ul> <p>-Energy is conserved in chemical reactions so can therefore be neither created nor destroyed.</p>	<p><b>Working in park design</b></p>  <p>-The use of models, as in the particle model of matter or the wave models of light and of sound</p> <p>-The concept of cause and effect in explaining such links as those between force and acceleration, or between changes in atomic nuclei and radioactive emissions</p> <p>-The phenomena of 'action at a distance' and the related concept of the field as the key to analysing electrical, magnetic and gravitational effects</p> <p>-That differences, for example between pressures or temperatures or electrical potentials, are the drivers of change.</p>	<p><b>Working in park design</b></p>  <p>-Energy changes in a system involving heating, doing work using forces, or doing work using an electric current: calculating the stored energies and energy changes involved</p> <p>-Power as the rate of transfer of energy</p> <p>-Conservation of energy in a closed system, dissipation</p> <p>-Calculating energy efficiency for any energy transfers</p> <p>-Renewable and non-renewable energy sources used on Earth, changes in how these are used.</p>	<p><b>Biology Cells and organisation</b></p>  <p>-Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope</p> <p>-The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts</p> <p>-The similarities and differences between plant and animal cells.</p>	<p><b>Biology</b></p>  <p>-Life processes depend on molecules whose structure is related to their function</p> <p>-The fundamental units of living organisms are cells, which may be part of highly adapted structures including tissues, organs and organ systems, enabling life processes to be performed more effectively</p> <p>-The role of diffusion in the movement of materials in and between cells</p> <p>-The structural adaptations of some unicellular organisms</p> <p>-The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</p>



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<p><b>Year 9 DT – Resistant Materials</b></p> <p><b>Cluster Crossover linked to NC:</b></p> <ul style="list-style-type: none"> <li>-Be able to calculate volumes</li> <li>-Be able to calculate percentages</li> <li>-To apply scale to drawings</li> <li>-Use ratios and percentages.</li> <li>-Understand tessellations and how efficient designs can be based on them.</li> <li>-Determine angular measures in degrees (E.G. using a protractor accurately).</li> <li>-Be able to draw and make templates / patterns to aid batch manufacture.</li> </ul>	<p><b>Wooden Box Project</b></p>  <p>-Use research and exploration, such as the study of different cultures, to identify and understand user needs</p> <p>-Identify and solve their own design problems and understand how to reformulate problems given to them</p> <p>-Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations</p>	<p><b>Wooden box Project</b></p>  <p>-Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture</p> <p>-Select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties</p>	<p><b>Pewter Keyring Project</b></p>  <p>-Analyse the work of past and present professionals and others to develop and broaden their understanding</p> <p>-Investigate new and emerging technologies</p> <p>-Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups</p>	<p><b>Pewter Keyring Project</b></p>  <p>-Understand and use the properties of materials and the performance of structural elements to achieve functioning solutions</p> <p>-Understand how more advanced mechanical systems used in their products enable changes in movement and force</p> <p>-Understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]</p>	<p><b>Steady Hand Game Project</b></p>  <p>-Understand and use the properties of materials and the performance of structural elements to achieve functioning solutions</p> <p>-Understand how more advanced mechanical systems used in their products enable changes in movement and force</p> <p>-Understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]</p>	<p><b>Steady Hand Game Project</b></p>  <p>-Apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers]</p> <p>-Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations</p> <p>-Use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses</p>
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### Maths/Science Curriculum Links KS3-KS4

These examples give some of the natural cross-over points between maths and science for students in the 11-16 year age range.

Age	Science (with reference to GCSE syllabus)	Maths (with reference to UK National Curriculum levels)
11-12	Variation (Biology)	Bar charts/line graphs (L3-6) Interpreting graphs (L4-6)
11-12	Mass & Weight, Speed, Pressure	Reading scales (L3-4) Distance/time and mass/weight graphs (L5-6) Rates of change and compound measures (L7-8, Unit 2 GCSE)
11-12	Forces :Hooke's Law, Friction, Speed. Direct proportion as a concept appearing. From a maths viewpoint links to initial use of equations and basic algebraic substitution.	
11-12	Classification & food webs -Could link the idea of classification in Science to classification of 2D shapes or quadrilaterals in maths. Statistics built in with the science content through use of data collection with quadrants, calculating averages when investigating the food webs. Possible connections to area as well e.g. estimating areas of different size leaves.	
11-12	Uses trolleys and light-gates to calculate speed. Could make a video of this the next time it happens for Ma to use to help the pupils recall this.	
11-13	Negative numbers for boiling and melting points of elements; which stay solid for largest range of temperatures? This incorporates differences between negative numbers.	
11-13	Balancing Equations (Chemistry)	Ratios Unitary method (L3-4) Simplify ratios, divide quantities into two parts (L4-5) Divide into quantities of more than two parts (L5-6, Unit 2 GCSE) Interpret ratios in a range of contexts (L6-7, Unit 2 GCSE)
12-13	Solar System (Physics) Swirling water tub with balls to demonstrate orbits. Relative sizes, distances from the sun, temperatures, orbital period	Loci (all levels) Circumference/area of a circle (L6-7, Unit 2/3 GCSE) Standard form Orbits (KS5)
12-13	Graphing, sequences from experiments such as measurement of temperature.	
12-13	Liquid soap: how watered down does soap need to be before just slipping of hands/surfaces at various angles.	Angles of elevation, ratios, rearranging, averages from repeated measurements.
13-14	Building on the clear links between the Investigation Cycle in science and the Data Handling Cycle in maths by having a joint maths/sci project.	
13-14	Dinosaurs, percentages, ratio, scales and scale drawing; timelines. There could be links to Y7 fossils in science.	
13-14	Pressures, forces & moments, formulae rearranging	

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13-14	Chemical Patterns, concentration of solutions, ratio.	
13-14	Reaction Times, Drugs & Behaviour/Quest for Intelligence data handling. Science look at the effects of caffeine on reaction times. In maths could have a data handling project where collecting reactions times provides one set of data to investigate hypotheses comparing boys' and girls' 'abilities'	
13-15	Attach data loggers to a pupil and watch as they attempt to create particular distance/time graphs. Pupils are used to seeing the x and y axes as spatial axes, which means the graph creates a picture of what we would see in real life. A distance/time graph is different, but some pupils assume it shows someone climbing a hill, for example.	
14-16	Air Quality/pollutants (GCSE Chem, 21 <sup>st</sup> Century)	Averages, range, outliers, repetition of trials (probability), reliability of results/comments and comparisons of results (Unit 1 GCSE)
14-16	Risk (IAS 5 21 <sup>st</sup> Century)	Percentages, ratio, proportionality, sampling (Unit 2 GCSE)
14-16	Parallax Error, trigonometry. Linking initial discovery into trigonometrical ratios with this. Also could be developing concept of accuracy and bounds.	
14-16	Standard Form, Astronomical distances / cell biology.	
14-16	Lens formula, focal points / telephoto lens & enlargements. Interesting area, with links to formulae, angles and transformations.	
14-16	Crystal formation, 3D coordinates, angles between bonds, 3D Geometry.	
14-16	Kinematic Equations, rearranging formulae / real-life formulae	
14-16	Samples (Health Studies 21 <sup>st</sup> Century)	Sampling (Unit 1 GCSE) [NB Sci just random, Ma includes stratified]
14-16	Electrical Circuits (P5 21 <sup>st</sup> Century)	Transposition of formulae, straight line graphs (Unit 2 GCSE)
14-16	Correlation and cause (IAS2 21 <sup>st</sup> Century)	Lines of best fit, correlation, types of graph (Unit 1 GCSE)
14-16	Energy and the Environment (all levels Chem)	Scale drawing, percentages, graph skills, budgeting, area (all levels)