

## CURRICULUM MAP (Long term plan)

**SUBJECT : Science**

**YEAR GROUP Year 7**

	<b>Cycle 1 Autumn</b>	<b>Cycle 2 Spring</b>	<b>Cycle 3 Summer</b>
<b>Substantive knowledge –</b> Essential knowledge & conceptual understanding of the National Curriculum	7G The Particle Model 7K Forces 7A Cells, tissues, organs & systems 7F Acids & Alkalis	7E Mixtures & Separation 7L Sound 7J Current Electricity 7D Ecosystems	7I Energy 7H Atoms, elements & molecules 7B Sexual reproduction in animals 7C Muscles & Bones
<b>Disciplinary knowledge - what skills are practised?</b>	<p><b>7G</b> How scientists use language effectively to measure and compare. The concepts of hypotheses and theories in the context of scientific methods . Make predictions using scientific knowledge and understanding. Present observations and data using appropriate methods, including tables and graphs.</p> <p><b>7K</b> The need for using standard units of measurement (including the SI system, its basic units and prefixes).</p> <p><b>7A</b> use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety (using a light microscope and preparing light microscope slides).</p> <p><b>7F</b> this unit has a focus on evaluating risks.</p>	<p><b>7E</b> There is an opportunity to develop communication skills in terms of writing a method, both in presenting a clear written text and in the use of apparatus diagrams to convey information clearly. Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.</p> <p><b>7L</b> Present observations and data using appropriate methods, including tables and graphs Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions. A Working Scientifically spread looks at line graphs and scatter graphs.</p> <p><b>7J</b> using physical models to help to explain phenomena, explaining why models are used, planning a fair test. The use of tables for summarising and comparing information and for recording data.</p>	<p><b>7I</b> use ratios to compare experimental results. There is a Working Scientifically spread that introduces the idea of using ratios to compare the energy released per gram of food, and also looks at the use of percentages for making comparisons.</p> <p><b>7H</b> present observations and data using appropriate methods, including tables and graphs, understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature. This is also an opportunity for students to look at the different ways in which data is presented, depending upon the type of variables</p> <p><b>7B</b> 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,, make predictions using scientific knowledge and understanding , select, plan and carry out the most</p>

		<p><b>7D</b> present observations and data using appropriate methods, including tables and graphs interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions.</p> <p>There is also a Working Scientifically spread that looks at the different types of graphical representation for showing variation.</p>	<p>appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate.</p> <p><b>7C</b> understands 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, variation.</p>
<p><b>Key questions</b> (What is the learning about?)</p>	<p><b>7G</b> What are the different properties of solids, liquids and gases? What is Brownian motion? What is diffusion? What is gas pressure? <b>7K</b> What is the difference between mass and weight? How the extension of a spring depends on the force applied. What is friction? the effects of friction and lubrication. How friction is helpful and not helpful. What is pressure &amp; how is it calculated? The effects of balanced and unbalanced forces on moving and stationary objects. <b>7A</b> What is an organ? What makes an organism? What is a tissue? What are the differences between plant and animal cells? Can I name different organ systems? <b>7F</b> Why are dangerous chemicals kept in the home?</p>	<p><b>7E</b> How do you separate mixtures? Define solution, suspension &amp; colloid. What is the difference between solute, solvent &amp; solution? How does solubility of salts depend on temperature? How can we heat to dryness safely? What is the difference between evaporation &amp; boiling? What is paper chromatography and how is it used? What is simple distillation and how is it used? How can we use separation techniques to produce clean drinking water? <b>7L</b> How is sound produced? How can we link pitch &amp; frequency to the size of the vibrating object? How can we link volume/intensity to the amplitude of the vibrations? What is the speed of sound in different materials? How do microphones and ears detect sounds?</p>	<p><b>7I</b> How do our bodies get energy? How can energy be stored and transferred? How do we use fuels? How are fossil fuels formed? How can we use renewable energy resources? Where is the source of the earth's energy? Why is the world's climate changing? How can we reduce reliance on fossil fuels? <b>7H</b> What is the difference between physical and chemical change? Can I define atoms, molecules, elements, compounds and mixtures? Can I investigate elements and provide some examples with their symbols? What is the periodic table? Can I classify elements into metals and nonmetals? How are the properties of substances linked to their uses? <b>7B</b> What are gametes and how are they adapted? What is fertilisation?</p>

	<p>What are the hazards of acids and alkalis and how the hazard can be reduced by dilution.</p> <p>What are the meanings of some standard hazard symbols</p> <p>How can we recognise and reduce risks in the laboratory</p> <p>How can we use indicators to determine whether a liquid is an acid, an alkali or neutral?</p> <p>What is the pH scale ?</p> <p>How can word equations be used to model chemical reactions?</p> <p>What is a 'base' and what are some practical uses of neutralisation reactions.</p>	<p>What are the hearing ranges in different animals?</p> <p>How can we use sound detectors to measure noise levels?</p> <p>What are the different uses for sound e.g. sonar and echolocation?</p> <p>Can we compare sound waves with waves on water?</p> <p>What is superposition?</p> <p><b>7J</b> Can you represent components using circuit symbols?</p> <p>What is the effect of adding bulbs to series circuits?</p> <p>How can we measure current?</p> <p>What is resistance?</p> <p>How can we use different models to describe an electrical circuit?</p> <p>Which model is most effective?</p> <p>What is the difference between a series and a parallel circuit?</p> <p>How does current behave differently in these circuits?</p> <p>What is voltage and how is it measured in a circuit?</p> <p>How do we use electricity in the home safely?</p> <p><b>7D</b> What is a habitat?</p> <p>What is the difference between continuous and discontinuous variation?</p> <p>How are organisms adapted to their environment?</p> <p>How can changes in the environment affect the organisms living in a habitat? This includes discussion of daily changes, seasonal changes, migration, hibernation, evergreen and</p>	<p>Can I name and describe structures in the human reproductive system?</p> <p>How is an embryo formed?</p> <p>How does a baby develop?</p> <p>What is IVF?</p> <p>How does gestation and Birth occur?</p> <p>How does a baby develop into a child?</p> <p>What are the changes during puberty?</p> <p><b>7C</b> What is fitness?</p> <p>How do organs and organ systems work together?</p> <p>How does breathing lead to gaseous exchange?</p> <p>How does our circulatory system transport substances in the blood?</p> <p>What is the structure and function of bones?</p> <p>What are joints and how are they moved by muscles?</p> <p>How does the nervous system control movement?</p> <p>How can different drugs affect the activity of muscles &amp; the nervous system?</p>
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<b>Assessment</b>	<p>PPC mid topic, based on a scientific skill, marked and then fix it time to improve</p> <p>End of unit assessment</p>	<p>PPC mid topic, based on a scientific skill, marked and then fix it time to improve</p> <p>End of unit assessment</p>	<p>PPC mid topic, based on a scientific skill, marked and then fix it time to improve</p> <p>End of unit assessment</p>
<b>Literacy (L), Numeracy (N), Oracy (O) opportunities</b>	<p><b>7G Literacy &amp; Communication skills</b> How scientists use language to measure and compare by applying adjectives, comparatives and superlatives. <b>Maths skills</b> converting between metres and nanometres, calculating volumes using simple formulae.</p> <p><b>7K Literacy &amp; Communication skills</b> the use of conventions when communicating science taking notes from presentations and videos (including the ordering of notes). <b>Maths skills</b> the use of conventions when communicating science, the SI system.</p> <p><b>7A Literacy &amp; Communication skills</b> Use conventions in writing (such as ordered subheadings, ordered lists). <b>Maths skills</b> use symbols for units</p> <p><b>7F Literacy &amp; Communication skills</b> Identify nouns and noun phrases, identify key points in text, pictures, charts and graphs to create titles and develop titles for text, diagrams, charts and graphs in order to present ideas and opinions clearly. <b>Maths</b></p>	<p><b>7E Literacy &amp; Communication skills</b> Use flow charts to present sequences. Appreciate that the way in which scientific ideas are presented is determined by the purpose and format of the communication. Use conventions and symbols when communicating science.</p> <p><b>7L Literacy &amp; Communication skills</b> ways of recalling information <b>Maths skills</b> presenting data graphically</p> <p><b>7J Literacy &amp; Communication skills</b> presenting information in tables classifying data as qualitative or quantitative.</p> <p><b>Maths skills</b> the use of symbols when communicating science.</p> <p><b>7D Literacy &amp; Communication skills</b> information can be presented in different ways to communicate scientific ideas clearly. This includes understanding paragraph construction in order to develop logical and fluid text that communicates information clearly. There is a Literacy &amp; Communication spread that looks</p>	<p><b>7I Literacy &amp; Communication skills</b> summarising texts. There is a Literacy &amp; Communication spread looking at the use of summaries both for the abstracts of scientific papers and for more general purposes. <b>Maths skills</b> using ratios to compare experimental results.</p> <p><b>7H Literacy &amp; Communication skills:</b> the use of facts and opinions to inform and persuade. <b>Maths skills</b> qualitative and quantitative data the use of: tables; line graphs; scatter graphs; pie charts; and bar charts.</p> <p><b>7B Literacy &amp; Communication skills</b> making effective notes from text, including different ways of organising notes depending on purpose. <b>Maths skills</b> an understanding of number, size and scale and the quantitative relationship between units, using estimations and explaining when they should be used.</p> <p><b>7C Literacy &amp; Communication skills</b> information can be presented in different ways to communicate scientific ideas clearly. This includes</p>

	<p><b>skills</b> Reading and plotting line graphs, drawing bar charts.</p>	<p>at the construction of paragraphs using a hamburger model. <b>Maths skills</b> data can be presented in bar charts data can be presented in scatter graphs data can be presented in frequency diagrams.</p>	<p>understanding sentence construction in order to develop sentences that can be used as part of a fluid writing style that communicates information clearly.</p>
<p><b>Cross Curricular Opportunities</b></p>	<p><b>7G</b> 7Ga – Geography – use of land 7Ga – History – changing nature of rubbish 7Ga – English – adjectives, comparatives and superlatives 7Gb – Geography – environmental pollution 7Gd – History – funding for science research pre 19th century 7Ge – Geography – air pressure and weather forecasting <b>7K</b> - 7Jb, 7Jc – Design and technology – designing sports equipment All topics – PE – sports <b>7A</b> - 7Aa – History – Ancient Egypt 7Ab – English – conventions and ordering in scientific writing – History – Ancient Egypt 7Ac – History – Ancient Egypt/Greece/Rome – English – Shakespeare, Julius Caesar 7Ad – History – Ancient Egypt 7Ae – History – Ancient India <b>7F</b> - 7Fd – Geography (liming fields)</p>	<p><b>7E</b> 7Ee – Design and technology – design and construction of a solar still. <b>7L</b> 7La – Music – how different sounds are made on a variety of instruments – Design and technology – sound as an output of products 7Lc – Design and technology – soundproofing <b>7J</b> 7Ja, 7Jc, 7Jd, 7Je – Design and technology <b>7D</b> 7Da – Physics 7Lb – line graphs and scatter graphs 7De – Physics 7I – energy in food, energy transfers 7Dd – Art – making masks of lynx and snowshoe hares.</p>	<p><b>7I</b> geography, climate change and renewable energy resources. <b>7H</b> 7Ha – Physics – physical changes and ideas about atoms and molecules 7Hc – Physics – the physical properties of metals and non-metals 7Ha – Geography – composition of the atmosphere 7Ha – History – changes in the atmosphere natural and man-made 7Ha – Maths – data handling 7Hb – Geography – composition of the Earth, mining and the consumption of resources 7Hc – English – the use of language to inform and persuade using facts and opinions 7He – Geography – the importance of limestone 7He – History – the use of metals during the Bronze and Iron Ages. <b>7B</b> 7Be – Music – Castrati singers PSHE - puberty <b>7C</b> 7Aa – History – Ancient Egypt 7Ca – Physical education – fitness, exercises appropriate for different sports, breathing rates 7Cc – Design and technology – tubular shapes for strength, designing structures that are strong but light – Physical education – sport and the skeleton, sports injuries – Art – the importance of human anatomy, especially muscles and</p>

			bones, in art through the ages 7Cd – Art – the importance of human anatomy – Physical education – muscles and strength 7Ce – Citizenship – drugs – Physical education – sport medicines and drugs
<b>Super Curriculum</b>	Forensics Club	Forensics Club Electricity squishy circuits workshop	BEST science fair
<b>Careers</b>	<b>7G</b> <a href="#">Inspiring scientists: Being a minority in science</a> <b>7K</b> <a href="#">Inspiring scientists: Fun and importance</a> BBC bitesize : <a href="#">Careers in science - BBC Bitesize</a>	<b>7E</b> <a href="#">Inspiring scientists: Mah Hussain-Gambles' story</a> <b>7L</b> <a href="#">Inspiring scientists: Mark Richards' story</a> BBC bitesize : <a href="#">Careers in science - BBC Bitesize</a>	<b>7C</b> <a href="#">Inspiring scientists: Donald Palmer's story</a>  BBC bitesize : <a href="#">Careers in science - BBC Bitesize</a> <b>7B</b> <a href="#">How to become a community midwife: Dilan's story - BBC Bitesize</a>
<b>Equality and Diversity</b> Gender Disability Religion Race Sexuality	Diverse representation within text/ videos/website links shared. Display shows a variety scientists of different genders and from different ethnicity  <b>7G</b> <a href="#">Inspiring scientists: Being a minority in science</a> <b>7K</b> <a href="#">Inspiring scientists: Fun and importance</a>  <b>7A</b> looking at the life and contribution of Henrietta Lack’s HeLa Cells <a href="#">Honoring Henrietta Lacks   Johns Hopkins Medicine</a>	Diverse representation within text/ videos/website links shared. Display shows a variety scientists of different genders and from different ethnicity  <b>7E</b> <a href="#">Inspiring scientists: Mah Hussain-Gambles' story</a> <b>7L</b> <a href="#">Inspiring scientists: Mark Richards' story</a>	Diverse representation within text/ videos/website links shared. <b>7B</b> challenging our year 7’s perspective of families by exposing them to diverse ways of having children when studying reproduction Display shows a variety scientists of different genders and from different ethnicity <b>7C</b> <a href="#">Inspiring scientists: Donald Palmer's story</a>
<b>Local Community Links</b>	Science fair across the trust		
<b>British Values</b> <b>Democracy</b>	<b>Democracy</b> There are opportunities to debate issues where students can share their opinions and listen to the views of others. For example, the generation of electricity, the placement of quarries, the use of drugs, genetic modification, selective breeding and climate change.		

<p><b>The rule of Law</b></p>	<p>Acceptance and engagement with fundamental British values of democracy • Forces and electricity – link to British technology firms and advancement made in knowledge based on British scientists’ discoveries e.g. Faraday. Building electrical circuits requires teamwork, resilience and show respect to others. • Reproduction – inclusion and discussion of the LGBTQ community</p> <p><b>Contribute positively to life in Modern Britain</b></p> <ul style="list-style-type: none"> <li>• Discussion about microbes, e.g. Coronavirus and how we can limit the spread and help suppress the effects.</li> <li>• The science department have celebrated the influence and contribution to science by female scientists which is deployed on our corridors.</li> <li>• During acid and alkali and plant cell lessons can discuss UK farming and different soil conditions in the UK. Helen Sharman carried out agricultural experiments whilst up in space</li> <li>• Effects of extreme hot climates - can find newspaper articles when it has got hot in the UK and the advice given by the NHS and governments when it gets hot and cold. And effects on other organisms e.g. animals</li> <li>• Ecology – using different methods of increasing and sustaining biodiversity. Looking at the human impact of certain areas.</li> </ul> <p><b>The Rule of Law</b></p> <p>Laws protect everyone and no-one is above the law. We should understand the need for rules to make a happy, safe and secure environment and know the consequences when rules are not followed.</p> <p><b>What does this look like in science?</b></p> <ul style="list-style-type: none"> <li>• Students follow laboratory rules for the safety of all.</li> <li>• Students learn about the need for speed limits and seat belts.</li> <li>• There are opportunities to discuss laws relating to science, such as the use of IVF, stem cells, genetic modification and DNA databases, maintaining biodiversity, use of energy sources, fishing and farming.</li> </ul>
<p><b>Individual Liberty</b></p>	<p><b>Individual Liberty</b></p> <p>We have a freedom of choice and a right to respectfully express our views and beliefs. We can act as we choose within the law. The rights of ourselves and the others around us are protected.</p> <p><b>What does this look like in science?</b></p> <ul style="list-style-type: none"> <li>• There are opportunities for students to work independently and make choices in a safe environment when carrying out investigations.</li> <li>• There are opportunities to debate issues where students can share their opinions and listen to the views of others. For example, the generation of electricity, the placement of quarries, the use of drugs, genetic modification, selective breeding and climate change.</li> </ul>
<p><b>Mutual Respect and Tolerance of others</b></p>	<p><b>Mutual Respect and Tolerance</b></p> <p>There is equality and fairness for all, regardless of background or religious beliefs. We understand that we do not all share the same beliefs and values. We respect the values, ideas and beliefs of others and do not impose our own onto them.</p> <p><b>What does this look like in science?</b></p> <ul style="list-style-type: none"> <li>• Students work together practically in groups which encourages teamwork and respect for others.</li> <li>• There are opportunities to learn about scientific discoveries by a diverse range of people from our culture and other cultures.</li> <li>• Students learn about the continual evolution of scientific ideas which occurs through the acceptance that different people have different ideas about a concept.</li> <li>• There are opportunities to consider conflict between religious beliefs and scientific understanding with respect and acceptance of people’s values.</li> </ul>

**SMSC**  
**Character Education**

**SMSC** -pair & group working, working safely in a science laboratory.

**Character**

**Integrity** : during practical work

**Resilience**: using equations & data handling

**Confidence**: participation during classroom discussions

