

# Curriculum map: Science



TERM	YEAR 7	YEAR 8	YEAR 9
AUTUMN 1	<p><b>WORKING SCIENTIFICALLY SKILLS</b></p> <ul style="list-style-type: none"> <li>Safety in the lab and hazard symbols</li> <li>Science apparatus</li> <li>The Bunsen Burner</li> <li>Variables, units and conversions</li> <li>Tables</li> <li>Graphs</li> <li>Planning investigations</li> <li>Practical investigations</li> <li><b>BASELINE ASSESSMENT</b></li> </ul>	<p><b>WORKING SCIENTIFICALLY SKILLS</b></p> <ul style="list-style-type: none"> <li>Planning investigations</li> <li>Practical investigations</li> <li>Tables and graphs</li> <li>Analysis of results and interpreting data</li> <li>Evaluation of practical investigations</li> </ul>	<p><b>FORCES: CONTACT FORCES &amp; PRESSURE</b></p> <ul style="list-style-type: none"> <li>Forces: contact and non-contact</li> <li>Balanced and unbalanced forces</li> <li>Stretching materials and applications of elastic materials</li> <li>Hooke's law</li> <li>Deformation and compression</li> <li>Pressure and calculating pressure</li> <li>Pressure in liquids and gases</li> <li>Sinking, floating and upthrust</li> </ul>
	<p><b>ECOSYSTEMS: INTERDEPENDENCE &amp; PLANT REPRODUCTION</b></p> <ul style="list-style-type: none"> <li>Adaptations of plants and animals</li> <li>Adaptations to feeding</li> <li>Food chains and food webs</li> <li>Effects of toxins in the environment</li> <li>Importance of insects</li> <li>Ecological balance</li> <li>Structure of flowering plants</li> <li>Insect and wind pollination – seed and fruit formation</li> <li>Fertilisation in plants</li> <li>Seed dispersal and its effectiveness</li> </ul>	<p><b>MATTER: PERIODIC TABLE &amp; ELEMENTS</b></p> <ul style="list-style-type: none"> <li>Atomic theory</li> <li>Periodic table of elements</li> <li>Metals in the periodic table</li> <li>Non-metals in the periodic table</li> <li>Analysing wider patterns within the periodic table</li> <li>Compounds and chemical formulae</li> <li>Word and symbol equations</li> <li>Polymers</li> <li>Ceramics and composites</li> </ul>	<p><b>GENES: EVOLUTION &amp; VARIATION</b></p> <ul style="list-style-type: none"> <li>Natural selection</li> <li>Biodiversity and the importance of biodiversity</li> <li>Extinction and causes of extinction</li> <li>Nature of genetic material – chromosomes, genes, DNA structure</li> <li>Genetic mutations</li> <li>Variation between organisms</li> <li>Gregor Mendel and monohybrid crosses</li> </ul>

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<b>AUTUMN 2</b>	<p><b>ENERGY: ENERGY TRANSFER &amp; ENERGY COSTS</b></p> <ul style="list-style-type: none"> <li>▪ Energy stores and the 4 transfer mechanisms</li> <li>▪ Conservation of energy</li> <li>▪ Drawing and interpreting energy transfer diagrams</li> <li>▪ Energy change (unit conversions and comparison of energy at the start and end of a system)</li> <li>▪ Drawing and interpreting Sankey diagrams and calculating efficiency (useful energy output / total energy input)</li> <li>▪ Fossil fuels and renewable energy resources, including advantages and disadvantages</li> <li>▪ Application of equations to calculate the cost of electricity</li> <li>▪ Using electricity responsibly</li> </ul> <p><b>ORGANISMS: MOVEMENT &amp; CELLS</b></p> <ul style="list-style-type: none"> <li>▪ 'MRS GREN'</li> <li>▪ Identification of different parts of animal and plant cells and their functions</li> <li>▪ Specialised cells - adaptations and functions</li> <li>▪ Microscopes and magnification (image size / object size)</li> <li>▪ Unicellular organisms</li> <li>▪ Tissues, organs and organ systems</li> <li>▪ Drugs and how they affect body systems</li> <li>▪ Human skeleton</li> <li>▪ Role of joints and muscles</li> <li>▪ Examining interacting muscles</li> <li>▪ Problems with the skeletal system</li> </ul>	<p><b>ORGANISMS: BREATHING &amp; DIGESTION</b></p> <ul style="list-style-type: none"> <li>▪ Structure and function of the lungs</li> <li>▪ Measuring breathing</li> <li>▪ Gas exchange in humans</li> <li>▪ Effects of disease and lifestyle</li> <li>▪ Identifying food groups</li> <li>▪ Describing food tests and making observations</li> <li>▪ Balanced diet and analysing nutritional content in a meal</li> <li>▪ Effects of an unbalanced diet and health risks including obesity, starvation and deficiency diseases</li> <li>▪ Parts of the digestive system and how food is digested</li> <li>▪ How food is absorbed in the small intestine and the structure of the villi</li> <li>▪ Function of enzymes</li> <li>▪ Effect of temperature and pH on enzymes</li> </ul> <p><b>ENERGY: WORK, HEATING &amp; COOLING</b></p> <ul style="list-style-type: none"> <li>▪ Work done – energy transferred</li> <li>▪ Levers and simple machines</li> <li>▪ Difference between temperature and thermal energy</li> <li>▪ Conduction</li> <li>▪ Convection</li> <li>▪ Radiation</li> <li>▪ Application to real life designs</li> <li>▪ Difference between conductors and insulators and practical applications – how insulators reduce conduction, convection and radiation</li> <li>▪ Interpreting cooling curves</li> </ul>	<p><b>REACTIONS: CHEMICAL ENERGY &amp; TYPES OF REACTIONS</b></p> <ul style="list-style-type: none"> <li>▪ Conservation of mass</li> <li>▪ Word and symbol equations</li> <li>▪ Exothermic and endothermic reactions</li> <li>▪ Comparing endothermic and exothermic changes – energy changes during a reaction</li> <li>▪ Catalysts</li> <li>▪ Combustion</li> <li>▪ Use of fuels – applications of combustion reactions</li> <li>▪ Thermal decomposition</li> <li>▪ Observing and explaining mass changes for chemical and physical reactions</li> </ul>

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<b>SPRING 1</b>	<p><b>MATTER: PARTICLE MODEL &amp; SEPARATING MIXTURES</b></p> <ul style="list-style-type: none"> <li>▪ Particles to explain matter</li> <li>▪ Properties of solids, liquids and gases</li> <li>▪ Particle model of solids, liquids and gases</li> <li>▪ Solids and alloys</li> <li>▪ Changes of states</li> <li>▪ Diffusion</li> <li>▪ Dissolving and factors effecting dissolving</li> <li>▪ Separating mixtures</li> <li>▪ Distillation</li> <li>▪ Chromatography</li> </ul> <p><b>GENES: VARIATION &amp; HUMAN REPRODUCTION</b></p> <ul style="list-style-type: none"> <li>▪ Variation: continuous / discontinuous</li> <li>▪ Causes of variation: genetic and/or environmental</li> <li>▪ Importance of variation</li> <li>▪ Human reproductive systems</li> <li>▪ Fertilisation</li> <li>▪ Menstruation cycle</li> <li>▪ Pregnancy and the role of the placenta</li> <li>▪ Fertility and contraception</li> <li>▪ Smoking in pregnancy</li> </ul>	<p><b>ECOSYSTEMS: RESPIRATION &amp; PHOTOSYNTHESIS</b></p> <ul style="list-style-type: none"> <li>▪ Aerobic respiration</li> <li>▪ Anaerobic respiration</li> <li>▪ Fermentation</li> <li>▪ Comparing aerobic and anaerobic respiration</li> <li>▪ Photosynthesis</li> <li>▪ Internal structure of a leaf and adaptations</li> <li>▪ Movement of water and minerals in plants</li> <li>▪ Importance of minerals to plants</li> </ul> <p><b>WAVES: SOUND &amp; LIGHT</b></p> <ul style="list-style-type: none"> <li>▪ Definition of sound and how it is created</li> <li>▪ Sound as a longitudinal wave</li> <li>▪ Pitch, frequency, amplitude and wavelength</li> <li>▪ Parts of the ear and how we hear</li> <li>▪ Effect of loudness on hearing</li> <li>▪ Calculating the speed of sound</li> <li>▪ Reflection and absorption of sound</li> </ul>	<p><b>ELECTROMAGNETS: MAGNETISM &amp; ELECTROMAGNETISM</b></p> <ul style="list-style-type: none"> <li>▪ Properties of magnets</li> <li>▪ Magnetic fields</li> <li>▪ Electromagnets and factors that affect the strength of an electromagnet</li> <li>▪ Applications of electromagnets</li> </ul> <p><b>WAVES: WAVE EFFECTS &amp; WAVE PROPERTIES</b></p> <ul style="list-style-type: none"> <li>▪ Sound waves</li> <li>▪ Ultrasound and practical applications of ultrasound</li> <li>▪ Sound systems – microphone loudspeaker</li> <li>▪ Light and UV light</li> <li>▪ Uses of UV light</li> <li>▪ Comparing transverse and longitudinal waves</li> <li>▪ Water waves to model behaviour – reflection and absorption</li> </ul>

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<b>SPRING 2</b>	<p><b>ELECTROMAGNETS: CURRENT, VOLTAGE &amp; RESISTANCE</b></p> <ul style="list-style-type: none"> <li>▪ Circuit symbols and electric circuits</li> <li>▪ Measuring current</li> <li>▪ Measuring potential difference (voltage)</li> <li>▪ Series and parallel circuits</li> <li>▪ Measuring resistance</li> <li>▪ Calculating resistance</li> <li>▪ Static electricity and dangers of electricity</li> <li>▪ Electric fields</li> </ul> <p><b>REACTIONS: METAL AND NON-METALS &amp; ACIDS AND ALKALIS</b></p> <ul style="list-style-type: none"> <li>▪ Metals and non-metals</li> <li>▪ Reactions of metals and acids</li> <li>▪ Displacement reactions</li> <li>▪ Oxidation reactions</li> <li>▪ Acids and sources of acids in food and drink</li> <li>▪ Alkalis</li> <li>▪ Testing for acids and alkalis, including strength</li> <li>▪ Neutralisation</li> <li>▪ Investigating neutralisation</li> <li>▪ Reactions of metal carbonates and acids</li> </ul>	<p><b>WAVES: SOUND &amp; LIGHT (CONTINUED)</b></p> <ul style="list-style-type: none"> <li>▪ Luminous and non-luminous objects</li> <li>▪ Opaque, transparent and translucent objects</li> <li>▪ Difference between scattering and specular reflection</li> <li>▪ How shadows are formed</li> <li>▪ Use of a ray diagram to explain the path of light</li> <li>▪ Reflection and mirrors</li> <li>▪ Law of reflection</li> <li>▪ Lateral inversion and virtual images</li> <li>▪ Refraction and application of refraction to lenses</li> <li>▪ Parts of the eye and their functions</li> <li>▪ Focussing of light through a convex lens</li> <li>▪ Dispersion</li> <li>▪ Primary and secondary colours</li> <li>▪ Explaining how light of different wavelengths can be split and recombined</li> <li>▪ Use of light in communication</li> </ul> <p><b>EARTH: EARTH STRUCTURE</b></p> <ul style="list-style-type: none"> <li>▪ Structure of the Earth and describing composition of each part of the Earth</li> <li>▪ How volcanoes change the Earth</li> <li>▪ Naming the three different types of rocks and how they are formed</li> <li>▪ Describing physical and chemical weathering</li> <li>▪ Rock cycle</li> </ul> <p><b>EARTH: UNIVERSE</b></p> <ul style="list-style-type: none"> <li>▪ Describing stars and galaxies</li> <li>▪ Day and night</li> <li>▪ Seasons</li> <li>▪ State that the light year is used to measure astronomical distances</li> <li>▪ Moon and causes of change to the appearance</li> <li>▪ Science models</li> </ul>	<p><b>ORGANISATION</b></p> <ul style="list-style-type: none"> <li>▪ Cell organisation</li> <li>▪ Digestive system</li> <li>▪ Food tests</li> <li>▪ Enzymes and their properties</li> <li>▪ Conditions for enzyme activity</li> <li>▪ Enzymes and digestion</li> <li>▪ The heart and the circulatory system, including pacemakers</li> <li>▪ Blood vessels</li> <li>▪ Blood</li> <li>▪ Cardiovascular diseases</li> <li>▪ Stents and statins</li> <li>▪ Artificial hearts</li> <li>▪ The structure of the lungs and the breathing system</li> <li>▪ Health and disease</li> <li>▪ Communicable and non-communicable diseases</li> <li>▪ Cancer</li> <li>▪ Plant cell organisation</li> <li>▪ Transpiration and translocation</li> <li>▪ Transpiration and stomata</li> <li>▪ Active transport</li> </ul>

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<b>SUMMER 1</b>	<p><b>FORCES: SPEED &amp; GRAVITY</b></p> <ul style="list-style-type: none"> <li>Speed and calculating speed</li> <li>Motion graphs: distance-time graphs and velocity-time graphs</li> <li>Investigating motion</li> <li>Relative motion</li> <li>Introduction to forces</li> <li>Mass and weight</li> <li>Gravity</li> <li>Calculating weight (<math>W = mg</math>)</li> </ul>	<p><b>EARTH: CLIMATE CHANGE &amp; EARTH RESOURCES</b></p> <ul style="list-style-type: none"> <li>Composition of the atmosphere</li> <li>How carbon can be recycled</li> <li>How humans affect the carbon cycle</li> <li>Global warming</li> <li>Exploring damage to the Earth's resources</li> <li>Importance of recycling</li> <li>Metal extraction</li> </ul>	<p><b>ATOMS</b></p> <ul style="list-style-type: none"> <li>Atomic structure</li> <li>Atomic theory changes</li> <li>Periodic table</li> <li>Elements and compounds</li> <li>Word and symbol equations</li> <li>Mixtures and separation techniques</li> <li>Metals and non-metals</li> <li>Group 1</li> <li>Group 0</li> <li>Group 7</li> <li>Transition metals</li> </ul>
<b>SUMMER 2</b>	<p><b>BRONZE CREST AWARD (STEM) / WORKING SCIENTIFICALLY PROJECTS</b></p> <ul style="list-style-type: none"> <li>Planning investigations independently</li> <li>Practical investigation</li> <li>Interpretation of data collected and analysis</li> <li>Evaluation</li> <li>Communication of ideas, methodology, conclusions and evaluation of projects</li> </ul>	<p><b>SILVER CREST AWARD (STEM) / WORKING SCIENTIFICALLY PROJECTS</b></p> <ul style="list-style-type: none"> <li>Planning investigations independently</li> <li>Practical investigation</li> <li>Interpretation of data collected and analysis</li> <li>Evaluation</li> <li>Communication of ideas, methodology, conclusions and evaluation of projects</li> </ul>	<p><b>MATHS IN SCIENCE SKILLS</b></p> <ul style="list-style-type: none"> <li>Units and conversions</li> <li>Standard form</li> <li>Equations and rearranging equations</li> <li>Interpreting data: tables and graphs</li> </ul>