



## Bishop Rawstone Academy – Science Curriculum Area

### Year 7 Curriculum- Knowledge and Skills

<b>Year 7 unit of work</b>	<b>NC statement -Knowledge</b>	<b>NC statement -Skills</b>
Introduction to science-working scientifically	<ul style="list-style-type: none"> <li>• Scientists can develop an idea into a question that can be investigated. Some questions can be investigated and others cannot.</li> <li>• Keeping safe in a laboratory including chemical hazard symbols.</li> <li>• Name laboratory equipment and be able to draw scientific diagrams.</li> <li>• How to light a Bunsen burner correctly and safely.</li> </ul>	<ul style="list-style-type: none"> <li>• Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.</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> <li>• Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.</li> <li>• Present observations and data using appropriate methods, including tables and graphs.</li> <li>• Evaluate data, showing awareness of potential sources of random and systematic error.</li> <li>• Evaluate the reliability of methods and suggest possible improvements.</li> </ul>
B1 Cells (Activate 1)	<ul style="list-style-type: none"> <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 the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria, and chloroplasts.</li> <li>• The similarities and differences between plant and animal cells.</li> </ul>	<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>• Present observations and data using appropriate methods, including tables and graphs.</li> <li>• Make and record observations and measurements using a range of methods for different investigations.</li> </ul>

	<ul style="list-style-type: none"> <li>• The role of diffusion in the movement of materials in and between cells.</li> <li>• Diffusion in liquids and gases driven by differences in concentration.</li> <li>• The structural adaptations of some unicellular organisms.</li> </ul>	
B2 Structure and function of body systems (Activate 1)	<ul style="list-style-type: none"> <li>• The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.</li> <li>• The structure and functions of the gas exchange system in humans, including adaptations to function</li> <li>• The mechanism of breathing to move air in and out of the lungs, using a pressure model 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 structure and functions of the human skeleton, to include support, protection, movement, and making blood cells.</li> <li>• Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles.</li> <li>• The function of muscles and examples of antagonistic muscles.</li> </ul>	<ul style="list-style-type: none"> <li>• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.</li> <li>• Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.</li> <li>• Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.</li> </ul>
B3 Reproduction (Activate 1)	<ul style="list-style-type: none"> <li>• Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems.</li> <li>• Reproduction in humans (as an example of a mammal), gametes, and fertilisation</li> <li>• Reproduction in humans (as an example of a mammal), gestation and birth, and the effect of maternal lifestyle on the fetus through the placenta.</li> <li>• Reproduction in humans (as an example of a mammal), menstrual cycle (without details of hormones).</li> </ul>	<ul style="list-style-type: none"> <li>• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.</li> <li>• Present observations and data using appropriate methods, including tables and graphs.</li> <li>• Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety.</li> <li>• Make and record observations and measurements using a range of methods for different investigations; and evaluate</li> </ul>

	<ul style="list-style-type: none"> <li>• Reproduction in plants including flower structure, wind and insect pollination, fertilisation, including quantitative investigation of some dispersal mechanisms.</li> <li>• The importance of plant reproduction through insect pollination in human food security.</li> <li>• Reproduction in plants, including flower structure, seed and fruit formation.</li> <li>• Reproduction in plants, including seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.</li> </ul>	<p>the reliability of methods and suggest possible improvements.</p> <ul style="list-style-type: none"> <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>
C1 Particles and their behaviour (Activate 1)	<ul style="list-style-type: none"> <li>• The properties of the different states of matter (solid, liquid, and gas) in terms of the particle model, including gas pressure.</li> <li>• The properties of the different states of matter (solid, liquid, and gas) in terms of the particle model, including gas pressure.</li> <li>• Similarities and differences, including density differences, between solids, liquids, and gases.</li> <li>• The differences in arrangements, in motion, and in closeness of particles explaining shape and density.</li> <li>• Changes of state in terms of the particle model.</li> <li>• Energy changes on changes of state (qualitative).</li> <li>• Reversibility in melting, freezing, evaporation, sublimation, condensation, and dissolving.</li> <li>• The differences in arrangements, in motion, and in closeness of particles explaining changes of state.</li> <li>• Diffusion in terms of the particle model.</li> <li>• Diffusion in liquids and gases driven by differences in concentration.</li> </ul>	<ul style="list-style-type: none"> <li>• Present reasoned explanations, including explaining data in relation to predictions and hypotheses</li> <li>• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.</li> <li>• Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.</li> <li>• Identify independent, dependent, and control variables where appropriate.</li> </ul>
C2 Elements, atoms and compounds	<ul style="list-style-type: none"> <li>• Differences between atoms, elements, and compounds.</li> <li>• Chemical symbols and formulae for elements and compounds.</li> </ul>	<ul style="list-style-type: none"> <li>• Present observations and data using appropriate methods, including tables and graphs.</li> </ul>

(Activate 1)	<ul style="list-style-type: none"> <li>• Differences between atoms, elements, and compounds.</li> <li>• A simple (Dalton) atomic model.</li> <li>• Atoms and molecules as particles.</li> </ul>	<ul style="list-style-type: none"> <li>• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.</li> <li>• Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature.</li> </ul>
C3 Reactions (Activate 1)	<ul style="list-style-type: none"> <li>• Chemical reactions as the rearrangement of atoms.</li> <li>• What catalysts do.</li> <li>• The difference between chemical and physical changes.</li> <li>• Chemical symbols and formulae for elements and compounds.</li> <li>• Chemical reactions as the rearrangement of atoms.</li> <li>• Representing chemical reactions using formulae and using equations.</li> <li>• Combustion, thermal decomposition, oxidation, and displacement reactions.</li> <li>• Combustion, thermal decomposition, oxidation, and displacement reactions.</li> <li>• Conservation of mass, changes of state, and chemical reactions.</li> <li>• Representing chemical reactions using formulae and using equations.</li> <li>• Combustion, thermal decomposition, oxidation, and displacement reactions.</li> <li>• Conservation of material and of mass</li> <li>• Exothermic and endothermic chemical reactions (qualitative).</li> </ul>	<ul style="list-style-type: none"> <li>• Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.</li> <li>• Present observations and data using appropriate methods, including tables and graphs.</li> <li>• Evaluate data, showing awareness of potential sources of random and systematic error.</li> <li>• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.</li> </ul>
C4 Acids and alkalis (Activate 1)	<ul style="list-style-type: none"> <li>• Defining acids and alkalis in terms of neutralisation reactions.</li> <li>• The pH scale for measuring acidity/alkalinity; and indicators.</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate risks.</li> <li>• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.</li> </ul>

	<ul style="list-style-type: none"> <li>• Reactions of acids with metals to produce a salt plus hydrogen.</li> <li>• - Reactions of acids with alkalis to produce a salt plus water.</li> </ul>	<ul style="list-style-type: none"> <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> <li>• Present observations and data using appropriate methods, including tables and graphs.</li> </ul>
P1 Forces (Activate 1)	<ul style="list-style-type: none"> <li>• Forces as pushes or pulls, arising from the interaction between two objects.</li> <li>• Using force arrows in diagrams, adding forces in one dimension.</li> <li>• Forces measured in Newtons, measurements of stretch or compression as force is changed.</li> <li>• Forces: associated with deforming objects; stretching and squashing – springs.</li> <li>• Force–extension linear relation; Hooke’s Law as a special case.</li> <li>• Opposing forces and equilibrium: weight held by a stretched spring.</li> <li>• Energy changes on deformation.</li> <li>• Forces: associated with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water</li> <li>• Non-contact forces: gravity forces acting at a distance on Earth and in space.</li> <li>• Gravity force, weight = mass × gravitational field strength (g), on Earth <math>g = 10 \text{ N/kg}</math>, different on other planets and stars.</li> <li>• Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces.</li> <li>• Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only).</li> </ul>	<ul style="list-style-type: none"> <li>• Make predictions using scientific knowledge and understanding.</li> <li>• Present observations and data using appropriate methods, including tables and graphs.</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>

	<ul style="list-style-type: none"> <li>• Force change depending on direction of force and its size.</li> <li>• Opposing forces and equilibrium: weight held by a stretched spring or supported on a compressed surface</li> </ul>	
P2 Sound (Activate 1)	<ul style="list-style-type: none"> <li>• Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition.</li> <li>• Using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about changes in systems.</li> <li>• Sound needs a medium to travel, the speed of sound in air, in water, in solids.</li> <li>• Sound produced by vibrations of objects, in loud speakers.</li> <li>• Auditory range of humans and animals.</li> <li>• Frequencies of sound waves, measured in hertz (Hz).</li> <li>• Pressure waves transferring energy; waves transferring information for conversion to electrical signals by microphone.</li> <li>• Sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum.</li> <li>• Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound.</li> <li>• Frequencies of sound waves measured in hertz (Hz); echoes, reflection, and absorption of sound.</li> </ul>	<ul style="list-style-type: none"> <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>• Make predictions using scientific knowledge and understanding.</li> <li>• Evaluate risks</li> </ul>
P4 Space (Activate 1)	<ul style="list-style-type: none"> <li>• Our Sun as a star, other stars in our galaxy, other galaxies.</li> <li>• - The light year as a unit of astronomical distance.</li> <li>• Gravity force, gravity forces between Earth and Moon, and between Earth and Sun (qualitative only).</li> <li>• The seasons and the Earth's tilt, day lengths at different times of year, in different hemispheres.</li> <li>• Use of ray model.</li> </ul>	<ul style="list-style-type: none"> <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> <li>• Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions.</li> </ul>

		<ul style="list-style-type: none"><li>• Make predictions using scientific knowledge and understanding.</li></ul>
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