



Bishop Rawstone Academy – Science Curriculum Area

Year 7 Curriculum- Knowledge and Skills

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

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

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

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

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

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

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