

Year 9 Curriculum Plan

Science



	Autumn / Spring	Spring / Summer
PRIOR LEARNING	The stuff of life: functions and structural differences in plant and animal cells. Diffusion, structural adaptations in unicellular organisms, and hierarchical organisation in multicellular organisms. The small stuff: Properties of solids, liquids, and gases. State changes, including melting, freezing, condensation, and evaporation. Watt is power?: different forms of energy, energy content in food, the cost of energy for homes. Energy as work, heating and cooling, and evaluating different energy resources.	How my body works: names and functions of major organs in plants and animals. Common life processes: movement, growth, reproduction, and nutrition. The importance of a varied diet for health and energy. All together now: Atoms can join together during reactions to form molecules and compounds. Different atom arrangements lead to distinct physical and chemical properties. Shocking Stuff! Associate lamp brightness or buzzer volume with the number and voltage of cells in a circuit. Use recognised symbols when depicting a simple circuit in a diagram.
KNOWING WHAT...	The stuff of life: cells, including eukaryotic vs. prokaryotic cells, specialised cells, microscopy, cell differentiation, stem cells, the cell cycle, and mitosis. Two practical activities: microscopy and osmosis. The small stuff: Atoms, elements, compounds and mixtures. Atomic structure, separation techniques, history of the atom, electronic structure, isotopes, periodic table development, reactivity patterns, and properties of transition metals. Watt is power: Energy stores, work done, power, conservation, dissipation, efficiency, and national/global energy resources. Specific heat capacity.	How my body works: organism organisation, plant and animal tissues, organs, and systems, the heart, blood vessels, lifestyle impact on health, digestive system, enzymes, circulatory system, blood vessels, heart, and plant transport. All together now: Chemical bonding. Ionic bonding diagrams, properties of ionic compounds. Covalent dot and cross diagrams, properties of simple and giant covalent substances, structure of diamond, graphite, fullerenes, polymers and alloys. Metallic bonding. Changes of state. Shocking Stuff! Electric charge, circuits, and power covering circuit symbols, current, potential difference, resistance, properties in series and parallel circuits. The UK mains plug and national grid.
KNOWING HOW...	The stuff of life: Prepare microscope slides of animal and plant cells and view them using a light microscope. Investigate osmosis through plant tissue. Writing methods and identifying variables. Ethical debate on the use of stem cells. The small stuff: Using filtration, evaporation, distillation and chromatography to separate mixtures. Record observations for the reactions of Group 1 and Group 7 elements. Writing methods for separation techniques, using standard form, relating properties to structure, interpreting practical observations and extracting data from tables/graphs. Watt is power?: calculate elastic potential and/or kinetic energy of a given object. Determine specific heat capacity of one or more materials. Investigate materials as effective insulators. Using and rearranging equations, using prefixes, identifying units of measurement, evaluating energy resources and explaining trends in data.	How my body works: Tests for protein, lipids, glucose and carbohydrates. Investigate the effect of pH on enzymes. Size and scale, calculating rates. Evaluating risks of blood products and/or treatments of CHD. All together now: Ionic and covalent reactions. Investigating ionic compounds. Properties of alloys. Changes in states of matter. The use of 2D and 3D diagrams to represent atoms, balancing equations, making predictions and using state symbols. Shocking Stuff! Using circuits diagrams to create functioning series and parallel circuits. Draw circuit diagrams from images of electric circuits. Use a range of mathematical formulae to calculate and explain energy transfers in electrical circuits, including efficiency calculations. Produce a full scientific investigation into a factor that affects resistance in a wire, including a method, identifying variables, collection and analysis of data, plotting a line graph from results and using these to form a valid conclusion.
ASSESSMENT	The stuff of life: cell organelles; magnification calculations; osmosis investigation; diffusion. The small stuff: atomic structure; periodic table; symbols equations; alkali metals Watt is power?: the Law of Conservation of Energy; SI units; energy calculations; friction and heat dissipation.	How my body works: Enzymes; circulatory system; using data to evaluate transplants. All together now: writing formulae of compounds; dot and cross diagrams of simple covalent molecules; ionic bonds; allotropes of carbon. Shocking Stuff! UK mains plug; drawing circuits; Ohm's law investigation; electricity calculations.