



St George's School
SCIENCE Department
Year 8 Curriculum Map

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>THE BIG IDEAS & KNOWLEDGE</p> <p><i>Overview of topics or key questions</i></p>	<p>Electricity & magnetism:</p> <p>Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects.</p> <p>Non-contact forces due to static electricity.</p> <p>Electric current, measured in Amperes in circuits, current as a flow of charge.</p> <p>Potential difference, measured in Volts.</p> <p>Series and parallel circuits, currents add where branches meet.</p> <p>Resistance, measured in Ohms, as the ratio of potential difference (p.d.) to current.</p> <p>The differences in resistance, between conducting components and insulating components.</p> <p>Magnetic poles, attraction and repulsion.</p> <p>Drawing magnetic fields using a plotting compass, representation by field lines.</p> <p>The Earth's magnetism;</p>	<p>Periodic table</p> <p>The Periodic Table: periods and groups.</p> <p>The principles underpinning the Mendeleev Periodic Table.</p> <p>The varying physical and chemical properties of different elements.</p> <p>How patterns in reactions can be predicted with reference to the Periodic Table.</p> <p>Separation techniques</p> <p>The concept of a pure substance.</p> <p>Mixtures, including dissolving.</p> <p>The identification of pure substances.</p> <p>Mixtures, including dissolving.</p> <p>The identification of pure substances.</p> <p>Mixtures, including dissolving.</p> <p>Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography.</p>	<p>Energy</p> <p>Comparing energy values of different foods (from labels) (kJ).</p> <p>Fuels and energy resources.</p> <p>Energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change.</p> <p>Processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.</p> <p>Energy changes on deformation.</p> <p>Heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) and radiation.</p> <p>Domestic fuel bills, fuel use, and costs.</p> <p>Fuels and energy resources.</p> <p>Comparing power</p>	<p>Metals & acids</p> <p>The order of metals and carbon in the reactivity series.</p> <p>Combustion, thermal decomposition, oxidation, and displacement reactions.</p> <p>The order of metals and carbon in the reactivity series.</p> <p>The use of carbon in obtaining metals from metal oxides.</p> <p>Properties of ceramics, polymers and composites.</p>	<p>Motion & pressure</p> <p>Speed and the quantitative relationship between average speed, distance, and time (speed = distance ÷ time).</p> <p>Relative motion: trains and cars passing one another.</p> <p>The representation of a journey on a distance–time graph.</p> <p>Atmospheric pressure decreases with increase of height as weight of air above decreases with height.</p> <p>Pressure in liquids, increasing with depth; upthrust effects, floating and sinking.</p> <p>Pressure measured by ratio of force over area – acting normal to any surface.</p> <p>Moment as the turning effect of a force.</p> <p>Adaptation & inheritance</p> <p>The variation between species and between individuals of the same species means some organisms compete more successfully,</p>	<p>The Earth</p> <p>The formation of sedimentary, igneous and metamorphic rocks.</p> <p>The rock cycle and carbon cycle.</p> <p>The production of carbon dioxide by human activity and the impact on climate.</p> <p>Earth as a source of limited resources and the efficacy of recycling.</p>

	<p>compasses and navigation.</p> <p>Non-contact forces: forces between magnets.</p> <p>The magnetic effect of current, electromagnets and D.C. motors</p> <p>Health & lifestyle</p> <p>Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre, and water, and why each is needed.</p> <p>Simple food tests for starch, sugars, protein and lipids.</p> <p>Calculations of energy requirements in a healthy daily diet.</p> <p>The consequences of imbalances in the diet, including obesity, starvation, and deficiency diseases.</p> <p>The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts).</p> <p>The importance of bacteria in the human digestive system.</p>		<p>ratings of appliances in watts (W, kW).</p> <p>Comparing amounts of energy transferred (J, kJ, kWh).</p> <p>Work done, examples of processes that cause change with forces (work = force × distance) levers and gears.</p> <p>Ecosystem processes</p> <p>The reactants in, and products of, photosynthesis, and a word summary for photosynthesis.</p> <p>The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere.</p> <p>The adaptations of leaves for photosynthesis.</p> <p>The role of leaf stomata in gas exchange in plants.</p> <p>Plants making carbohydrates in their leaves by photosynthesis and gaining minerals, nutrients, and water from the soil via their</p>		<p>which can drive natural selection.</p> <p>Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction.</p> <p>The differences between species.</p>	
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roots.
Chemosynthesis in bacteria and other organisms.
Aerobic and Anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life.
The process of anaerobic respiration in humans and microorganisms, including fermentation, and a word summary for anaerobic respiration.
The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed, and the implications for the organism.
The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops.
How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.
The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops.

<p>SKILLS & STRATEGIES <i>Procedural knowledge, literacy and numeracy skills</i></p>	<p>Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Use appropriate techniques, apparatus, paying attention to health and safety. Select, plan, and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate. Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements. Make predictions using scientific knowledge and understanding.</p>	<p>Apply mathematical concepts and calculate results. Make and record observations and measurements using a range of methods for different investigations. Evaluate risks. 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. Select, plan, and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate.</p>	<p>Present reasoned explanations, including explaining data in relation to predictions and hypotheses. Make and record observations and measurements using a range of methods for different investigations. 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. Evaluate risks. Make predictions using scientific knowledge and understanding. Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety. Undertake basic data analysis including simple statistical techniques. Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas. Select, plan, and carry out the most</p>	<p>Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Select, plan, and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate. Make predictions using scientific knowledge and understanding. Present observations and data using appropriate methods, including tables and graphs.</p>	<p>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. Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Make predictions using scientific knowledge and understanding. Identify further questions arising from their results.</p>	<p>Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions. Make predictions using scientific knowledge and understanding. Apply mathematical concepts and calculate results</p>
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			<p>appropriate types of scientific enquiries to test predictions, including identifying independent, dependent, and control variables, where appropriate.</p> <p>Present observations and data using appropriate methods, including tables and graphs.</p> <p>Apply sampling techniques.</p>			
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FEEDBACK <i>Noteworthy tasks and assessments</i>	End of topic test. Assessed homework.	End of topic test. Assessed homework.	End of topic test. Assessed homework.	End of topic test. Assessed homework.	End of topic test. Assessed homework.	End of topic test. Assessed homework.
BREADTH <i>Opportunities, trips, wider reading, cultural capital</i>	Watch TV programs about healthy diets. Eg 'You are what you eat'.	Properties of metals – uses around the home and why they are used as pans or hot water pipes. Cooking pasta; linked with food tech. Purification of salty water for drinking water in desert regions in the world.	View current TV series presented by David Attenborough about climate change; the green planet. Plant a series of seeds, experiment with the conditions to see how these affect the seedlings growth. Conditions you could; change/adapt amount light, growing medium, amount of water.	Project on climate change and pollution causing acid rain; corrosion of metals by acid rain in the environment and the implication for structures such as bridges.		View current TV series presented by David Attenborough about climate change; 'The green planet'.
KEY VOCABULARY <i>Important words and phrases</i>	Electricity & magnetism: ammeter amps atom attract battery cell conductor core current electric charge electrical field electromagnet electron insulator lightning magnetic field magnetic field lines	Periodic table acid rain chemical property density displace displacement reaction group Group 0 Group 1 Group 7 halogen metal metalloid noble gases non-metal period physical property reactive unreactive	Energy chemical store conduction conductor convection convection current dissipated elastic store energy energy resources energy store equilibrium fossil fuel gear gravitational potential store infrared radiation insulator joules	Metals & acids carbon fibre ceramic composite displace displacement reaction metal natural polymer ore polymer reactive reactivity series state symbol synthetic polymer thermite reaction	Motion & pressure acceleration atmospheric pressure average speed centre of gravity centre of mass compressed density distance-time graph gas pressure incompressible instantaneous speed law of moments liquid pressure metres per second moment newton metres newtons per metre squared	The Earth atmosphere biological weathering carbon cycle carbon store cementation chemical weathering climate change combustion compaction crust deforestation deposition durable erosion freeze-thaw global warming greenhouse effect greenhouse gas

	<p>magnetic material magnetise motor negative neutral neutron north pole ohms parallel positive potential difference proton rating relay repel resistance series south pole switch voltage voltmeter Volts</p> <p>Health and lifestyle anus balanced diet bile carbohydrase carbohydrate catalyst deficiency digestion digestive system drug enzyme ethanol fibre food test gullet hypothesis large intestine lipase lipids malnourishment</p>	<p>Separation techniques chromatogram chromatography dissolve distillation filtering filtrate filtration impure insoluble mixture pure residue saturated solution solubility solute solution solvent</p>	<p>kilojoules kilowatt hours kilowatts kinetic store law of conservation of energy lever non-renewable power rating radiation renewable simple machine temperature thermal imaging camera thermal power station thermal store thermometer watt work</p> <p>Ecosystem processes aerobic respiration algae anaerobic respiration bioaccumulation chemosynthesis chlorophyll co-exist community consumer deficiency ecosystem fermentation fertiliser food chain food web habitat haemoglobin interdependence magnesium niche nitrates oxygen debt phosphates</p>		<p>pivot pressure relative motion speed</p> <p>Adaptation & inheritance adaptation chromosome competition continuous variation discontinuous variation DNA evolution extinct fossil gene gene bank interdependence natural selection species variation</p>	<p>igneous inner core lava magma mantle metamorphic outer core photosynthesis physical weathering porous radiation recycling respiration rock cycle sediment sedimentary transport troposphere uplift weathering</p>
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mineral
nutrient
obese
protease
protein
rectum
small intestine
starvation
stimulant
stomach
villi
vitamin

photosynthesis
plasma
population
potassium
predator
prey
producer
stomata