



Key Stage Three:

By the end of key stage 3, pupils are expected to know, apply and understand the matters, skills and processes specified in the programme of study.

Pupils should be taught to	At St Gregory's Catholic High School, this is taught
Pay attention to objectivity and concern for accuracy, precision, repeatability and Reproducibility	Y8 skills unit
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	Y8 Explaining Physical Changes L2 How do we use models to represent matter Y8 Explaining Physical Changes L4 What is Brownian motion
Evaluate risks	Y7 unit 1 Mixing, dissolving and separating lesson 1 How do we work safely in science
Experimental skills and investigations	
Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience	Y9 Variation for Survival
Make predictions using scientific knowledge and understanding	Y8 Explaining Physical Changes L5 How are liquids different to solids
Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate	Y8 Explaining Physical Changes L5 How are liquids different to solids
Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety	Y8 Explaining Physical Changes L5 How are liquids different to solids Y7 Unit 1 Mixing, dissolving and separating Lesson 1 How do we work safely in science
Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest	Y7 Unit 1 Mixing, dissolving and separating – lesson 2 How do we record results in experiments

possible improvements	Y8 Explaining Physical Changes L5 How are liquids different to solids
Apply sampling techniques	Y7 Unit 1 Mixing, dissolving and separating lesson 9 to 16
Analysis and evaluation	
Apply mathematical concepts and calculate results	Y8 Explaining Physical Changes L5 How are liquids different to solids
Present observations and data using appropriate methods, including tables and Graphs	Y7 Unit 1 – Mixing, dissolving and separating lesson 2 How do we record results in experiments Y8 Explaining Physical Changes L5 How are liquids different to solids
Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions	Y8 Explaining Physical Changes L5 How are liquids different to solids
Present reasoned explanations, including explaining data in relation to predictions and hypotheses	Y8 Explaining Physical Changes L5 How are liquids different to solids
Evaluate data, showing awareness of potential sources of random and systematic Error	Y8 Explaining Physical Changes L5 How are liquids different to solids
Identify further questions arising from their results	Y8 Explaining Physical Changes L5 How are liquids different to solids
Measurement	
Understand and use SI Units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature	Y8 Explaining Physical Changes L5 How are liquids different to solids
Use and derive simple equations and carry out appropriate calculations	Year 9 Unit 6 Waves and Energy Transfer Lesson 8
Undertake basic data analysis including simple statistical techniques	Year 9 Unit 6 Waves and Energy Transfer Lesson 8
BIOLOGY	
Structure and function of living organisms	

Cells and organisation	
Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope	Y7 Unit 6 Lesson 1 and 2
The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts	Y7 Unit 6 Lesson 2
The similarities and differences between plant and animal cells	Y7 Unit 6 Lesson 2
The role of diffusion in the movement of materials in and between cells	Y7 Unit 6 Lesson 5
The structural adaptations of some unicellular organisms	Y7 Unit 6 Lesson 4
The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms	Y7 Unit 6 Lesson 6
The skeletal and muscular systems	
The structure and functions of the human skeleton, to include support, protection, movement and making blood cells	Y8 Unit 2 Lesson 1 and 2
Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles	Y8 Unit 2 Lesson 4 and 5
The function of muscles and examples of antagonistic muscles	Y8 Unit 2 Lesson 4 and 5
Nutrition and digestion	
Content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed	Y7 Unit 3 Lesson 1
Calculations of energy requirements in a healthy daily diet	Y7 Unit 3 Lesson 3
The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases	Y7 Unit 3 Lesson 4

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)	Y7 Unit 3 Lesson 5 and 6
The importance of bacteria in the human digestive system	Y7 Unit 3 Lesson 8
Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots	Y8 Unit 6 Lesson 1 to 7
Gas exchange systems	
The structure and functions of the gas exchange system in humans, including adaptations to function	Y7 Unit 3 lesson 12
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	Y7 Unit 3 lesson 12 and 13
The impact of exercise, asthma and smoking on the human gas exchange system	Y7 Unit 3 lesson 15 and 16
The role of leaf stomata in gas exchange in plants	Y8 Unit 6 Lesson 4
Reproduction	
Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta	Y7 Unit 6 cells Lesson 12
Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms	Y7 Unit 6 cells Lesson 9, 10 and 11
Health	
The effects of recreational drugs (including substance misuse) on behaviour, health and life processes	Y9 Unit 4 Lesson 1 – 5

Material cycles and energy	
Photosynthesis	
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	Y8 Unit 6 Lesson 1
The adaptations of leaves for photosynthesis	Y8 Unit 6 Lesson 3
Cellular respiration	
Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life	Y8 Unit 2 Lesson 11
A word summary for aerobic respiration	Y8 Unit 2 Lesson 11
The process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration	Y8 Unit 2 Lesson 12 and 13
The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism	Y8 Unit 2 Lesson 11 and 15
Interactions and interdependencies	
Relationships in an ecosystem	
The interdependence of organisms in an ecosystem, including food webs and insect-pollinated crops	Y8 Unit 6 Lesson 11 - 14
the importance of plant reproduction through insect pollination in human food security	Y7 Cells unit Lesson 10
How organisms affect, and are affected by, their environment, including the accumulation of toxic materials	Y8 Unit 6 Lesson 14 and 15
Genetics and evolution	

Inheritance, chromosomes, DNA and genes	Y9 Unit 1 Variation for Survival Lesson 7 how do you look different to your siblings? Lesson 8 What's inside the nucleus? Lesson 9 What is DNA? Lesson 10 what are the human chromosomes?
Heredity as the process by which genetic information is transmitted from one generation to the next	Y7 Cells unit Lesson 13
A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model	Y9 Unit 1 Lesson 8, 9 and 10 (Also Research homework task linked to lesson 8)
Differences between species	Y9 Unit 1 Lesson 1 How are we different?
The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation	Y9 Unit 1 Lesson 1 – 3 How are we different?, What is variation?, What causes variation?
The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection	Y9 Unit 1 Lesson 5 How do organisms survive?
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	Y9 Unit 1 Lesson 12 How do species become extinct?
The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material	Y9 Unit 1 Lesson 12 What is cloning? (includes concept of gene banks)
CHEMISTRY	
The particulate nature of matter	Y7 unit 1 lesson 3 – recognising materials Y8 Explaining Physical Changes
The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure	Year 8 Unit 3 Explaining Physical Changes Lesson 1 Year 8 Unit 3 Explaining Physical Changes Lesson 2 – Properties of solids

Changes of state in terms of the particle model	Y8 Explaining Physical Changes L6 changes of state
Atoms, elements and compounds	
A simple (Dalton) atomic model	Y7 Unit 4 Elements, compounds and their reactions lesson 3
Differences between atoms, elements and compounds	Y7 Unit 4 Elements compounds and their reactions lesson 3
Chemical symbols and formulae for elements and compounds	Y7 Unit 4 Elements compounds and their reactions lesson 1,2 3
Conservation of mass changes of state and chemical reactions	Y8 Explaining Physical Changes L14 Conservation of mass
Pure and impure substances	Y7 – unit 1 lesson 3 - recognising materials
The concept of a pure substance	Y7 – unit 1 lesson 3 - recognising materials
Mixtures, including dissolving	Y7 – unit 1 lesson lessons 6 and 7
Diffusion in terms of the particle model	Y8 Explaining Physical Changes L13 What is diffusion
Simple techniques for separating mixtures: filtration, evaporation, distillation and Chromatography	Y7 – unit 1 lessons 6, 7, 8, 9, 12
The identification of pure substances	Year 7 mixing dissolving and separating Lessons 14 and 17
Chemical reactions	
Chemical reactions as the rearrangement of atoms	Y7 Elements compounds and their reactions lesson 10
Representing chemical reactions using formulae and using equations	Y7 Elements compounds and their reactions lesson 10 11
Combustion, thermal decomposition, oxidation and displacement reactions	Y7 Elements compounds and their reactions lessons 11 12 13 15
Defining acids and alkalis in terms of neutralisation reactions	Y8 Unit 5 – lesson 3 &4
The pH scale for measuring acidity/alkalinity; and indicators	Y8 Unit 5 – lesson 2

Reactions of acids with metals to produce a salt plus hydrogen	Yr8 Unit 5 – lesson 6
Reactions of acids with alkalis to produce a salt plus water	Yr 8 Unit 5 – lesson 5
What catalysts do	9 Obtaining useful materials L9 What is a catalyst
Energetics	
Energy changes on changes of state (qualitative)	Year 7 Mixing, dissolving and separating lessons 6 and 7
Exothermic and endothermic chemical reactions (qualitative)	9 Obtaining useful materials L8 what are exothermic reactions.
The Periodic Table	Y7 – unit 1 lesson 3 - recognising materials
The varying physical and chemical properties of different elements	Y8 Explaining Physical Changes L15 Physical or chemical reaction
The principles underpinning the Mendeleev Periodic Table	Y7 Elements compounds and their reactions lesson 2
The Periodic Table: periods and groups; metals and non-metals	Y7 Elements compounds and their reactions lesson 2
How patterns in reactions can be predicted with reference to the Periodic Table	Y7 Elements compounds and their reactions lesson 2
The properties of metals and non-metals	Y7 Elements compounds and their reactions lesson 4
The chemical properties of metal and non-metal oxides with respect to acidity	Y7 Elements compounds and their reactions lesson 6
Materials	
The order of metals and carbon in the reactivity series	Y9 Obtaining useful materials L1 -4– How can we extract metals from ores, How can we use carbon to extract iron, what are displacement reactions.
The use of carbon in obtaining metals from metal oxides	Y9 Obtaining useful materials L1-2 – How can we extract metals from ores. How can we use carbon to extract iron.
Properties of ceramics, polymers and composites (qualitative)	Y9 Obtaining useful materials L10-11 What are polymers, what are ceramics and their properties, what are composites and their properties?
Earth and atmosphere	Y7 unit 1 – lesson 11 – what is air made of?

The composition of the Earth	Y9 unit 5 lesson 1 – Structure of the earth
The structure of the Earth	Y9 unit 5 lesson 1 – Structure of the earth
The rock cycle and the formation of igneous, sedimentary and metamorphic rocks	Y9 unit 5 lessons 2-5: What are igneous rocks and how are they formed? What are sedimentary rocks and how are they formed? What are metamorphic rocks and how are they formed? What is the rock cycle?
Earth as a source of limited resources and the efficacy of recycling	9 Obtaining useful materials L6 Why do we use and recycle materials?
The carbon cycle	Y9 Chemistry of atmosphere
The composition of the atmosphere	Y9 Chemistry of atmosphere
The production of carbon dioxide by human activity and the impact on climate	9 Obtaining useful materials L6 Reduce reuse recycle.
PHYSICS	
Energy	
Calculation of fuel uses and costs in the domestic context	
Comparing energy values of different foods (from labels) (kJ)	Y9 Unit 6 lesson 7
Comparing power ratings of appliances in watts (W, kW)	Y9 Unit 6 lesson 8
Comparing amounts of energy transferred (J, kJ, kW hour)	Y9 Unit 6 lesson 8
Domestic fuel bills, fuel use and costs	Y9 Unit 6 lesson 8
Fuels and energy resources	Y7 Unit 5 lesson 7
Energy changes and transfers	
Simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged	Y7 Unit 2 lesson 13 and 14

Heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference: use of insulators	Y7 Unit 5 lesson 6
Other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels	Y9 What is elastic potential energy
Changes in systems	
Energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change	Y7 Unit 5 lesson 2
Comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy associated with movements, temperatures, changes in positions in a field, in elastic distortions and in chemical compositions	Y7 Unit 5 lesson 1 to 6
Using physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about such changes	Year 7 unit 2 lesson 13 and 14
Motion and forces	
Describing motion	
Speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time)	Y9 Unit 3 lesson 3 , Y7 Unit 2 lesson 11
The representation of a journey on a distance-time graph	Y9 Unit 3 lesson 1
Relative motion: trains and cars passing one another	Y9 Unit 3 lesson 3
Forces	
Forces as pushes or pulls, arising from the interaction between two objects	Y9 Unit 3 lesson 4

Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces	Y9 Unit 3 lesson 4
Moment as the turning effect of a force	Y7 Unit 2 lesson 13
Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water	Y9 Unit 3 lesson 4, Y7 Unit 2 lesson 5, 6, 7, 8 and 9
Forces measured in newtons, measurements of stretch or compression as force is Changed	Y7 Unit 2 lesson 5 and 6, Y7 Unit 5 lesson 4
Force-extension linear relation; Hooke's Law as a special case	Y7 Unit 2 lesson 5 and 6, Y7 Unit 5 lesson 4
Work done and energy changes on deformation	Y7 Unit 2 lesson 5 and 6, Y7 Unit 5 lesson 4
Non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity	Y7 Unit 2 lesson 3
Pressure in fluids	
Atmospheric pressure, decreases with increase of height as weight of air above decreases with height	Y8 Unit 3 L11
Pressure in liquids, increasing with depth; upthrust effects, floating and sinking	Y8 Unit 3 L9, L10
Pressure measured by ratio of force over area – acting normal to any surface	Y8 Unit 3 L7
Balanced forces	
Opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface	Y 7 Unit 2 lesson 5 and 6
Forces and motion	
Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only)	Y7 Unit 2 lesson 4

Change depending on direction of force and its size	Y7 Unit 2 lesson 4
Waves	
Observed waves	
Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition	Year 9 Unit 6 Lesson 1 and 2
Sound waves	
Frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound	Year 9 Unit 6 Lesson 1 and 2
Sound needs a medium to travel, the speed of sound in air, in water, in solids	Year 9 Unit 6 Lesson 1 and 2
Sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the eardrum; sound waves are longitudinal	Y7 Unit 5 Lesson 9 to 15
Auditory range of humans and animals	Y7 Unit 5 Lesson 9 to 15
Energy and waves	
Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound; waves transferring information for conversion to electrical signals by microphone	Y7 Unit 5 Lesson 15
Light waves	
The similarities and differences between light waves and waves in matter	Year 9 Unit 6 Lesson 1 and 2
Light waves travelling through a vacuum; speed of light	Year 9 Unit 6 Lesson 1 and 2
The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface	Year 9 Unit 6 Lesson 1 and 2

Use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye	Year 9 Unit 6 Lesson 2b
Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras	Year 9 Unit 6 Lesson 3
Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection	Year 9 Unit 6 Lesson 3
Electricity and electromagnetism	
Current electricity	
Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge	Y8 Unit 4 L14, L15
Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current	Y8 Unit 4 L9, L11
Differences in resistance between conducting and insulating components (quantitative)	Y8 Unit 4 L10, L12
Static electricity	
Separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects	Y8 Unit 3 L3
The idea of electric field, forces acting across the space between objects not in contact	Y8 Unit 3 L4
Magnetism	
Magnetic poles, attraction and repulsion	Y8 Unit 3 L1, Unit 4 L2
Magnetic fields by plotting with compass, representation by field lines	Y8 Unit 3 L2
Earth's magnetism, compass and navigation	Y8 Unit 4 L4

The magnetic effect of a current, electromagnets, D.C. motors (principles only)	Year 7 Unit 5 lesson 5 , Y8 Unit 4 L5, L7
Matter	
Physical changes	
Conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving	Y8 Explaining Physical Changes Lesson 6,7,8
Similarities and differences, including density differences, between solids, liquids and gases	Y8 Explaining Physical Changes Lesson 10 and 11
Brownian motion in gases	Y8 Explaining Physical Changes Lesson 4 What is Brownian Motion
Diffusion in liquids and gases driven by differences in concentration	Y8 Explaining Physical Changes Lesson 13 What is diffusion
The difference between chemical and physical changes	Y8 Explaining Physical Changes Lesson 15 Physical or Chemical reaction
Particle model	
The differences in arrangements, in motion and in closeness of particles explaining changes of state, shape and density, the anomaly of ice-water transition	Y8 Explaining Physical Changes Lesson L1/3 What are solids like
Atoms and molecules as particles	Y8 Explaining Physical Changes Lesson L1/3 What are solids like
Energy in matter	
Changes with temperature in motion and spacing of particles	Y8 Explaining Physical Changes Lesson 6 How does matter change state
Internal energy stored in materials	Y8 Explaining Physical Changes Lesson 6 How does matter change state
Space physics	
Gravity force, weight = mass x gravitational field strength (g), on Earth $g=10$ N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only)	Y8 Unit 3 L6

Our Sun as a star, other stars in our galaxy, other galaxies	Y9 Unit 3 Motion and Space lessons 7 to 11
The seasons and the Earth's tilt, day length at different times of the year, in different hemispheres	Y9 Unit 3 Motion and Space lessons 7 to 11
The light year as a Unit of astronomical distance	Y9 Unit 3 Motion and Space lessons 7 to 11

Key Stage Four:

By the end of key stage 4, pupils are expected to know, apply and understand the matters, skills and processes specified in the programme of study.

Pupils should be taught to	At St Gregory's Catholic High School, this is taught
The development of scientific thinking	
The ways in which scientific methods and theories develop over time	Biology Topic 6 lesson 10, 14 and 15 Darwin's theory of evolution, Wallace. Chemistry Topic 1 lesson 3 – the stages in the discovery of the nuclei model of the atom including interpreting Rutherford's gold foil experiment. Lesson 9 Development of The Periodic table. Topic 9 lesson 1-3 - Evolution of the atmosphere and Global climate change. Physics Topic 4 lesson 1 and 2 - the stages in the discovery of the nuclei model of the atom including interpreting Rutherford's gold foil experiment. Physics Topic 8 lesson 5 - the Expanding Universe Theory. Showing how new evidence can disprove or support the Big Bang theory
Using a variety of concepts and models to develop scientific explanations and Understanding	Covered in a variety of lesson across all 3 disciplines. Chemistry Topic 1 – Model of the atom. Physics Topic 3 – Particle models to represent states of matter, Topic 4 - Model of the atom, Nuclear fission. Topic 8 Scale models of the universe
Appreciating the power and limitations of science and considering ethical issues which may arise	Biology Topic 1 lesson 9 and 10 Stem cells, Topic 6 lesson 11 and 12 Genetic engineering and Cloning. Topic 7 lesson 20 Human impact – Food security. Physics Topic 8 lesson 5 – Big Bang Theory has not been proven due to a lack of supporting evidence because we do not have the knowledge or equipment to measure what we need

<p>Explaining everyday and technological applications of science; evaluating associated personal, social, economic and environmental implications; and making decisions based on the evaluation of evidence and arguments</p>	<p>Biology Topic 7 lesson 20 Human impact – Food security. Physics Topic 1 lesson 10 and 11 – Non-renewable and renewable energy resources. Advantages and disadvantages of each. Including location and environmental issues.</p>
<p>Evaluating risks both in practical science and the wider societal context, including perception of risk</p>	<p>Biology Topic 6 lesson 14 and 15 Darwin, Wallace. Chemistry Topic 1 lesson 5 Atomic structure lesson 10 Periodic table Topic 9 lesson 2 Evolution of the atmosphere and Global climate change. Physics Topic 2 lesson 4-5 Resistance of a wire – Focus on method, health and safety, graph work and conclusion. Also includes work on relevant physics equations. Links to relevant scientific theories.</p>
<p>Recognising the importance of peer review of results and of communication of results to a range of audiences</p>	<p>Biology Topic 3 lesson 9 developing drugs</p>
<p>Experimental skills and strategies</p>	
<p>Using scientific theories and explanations to develop hypotheses</p>	<p>Biology Topic 6 lesson 9 Natural selection Physics Topic 5 lesson 6-7 Hooke’s Law – Focus on carrying out the practical with the appropriate equipment, identifying inaccuracies and improvements. Also linking mathematical terms to what students observed. Also includes work on relevant physics equations. Links to relevant scientific theories Physics -Topic 6 lesson 9 reflection and refraction – Links to Law of reflection. Focus is on practical application, record observations making measurements, conclusion and evaluation skills Chemistry Topic 4, lesson 6 Electrolysis</p>
<p>Planning experiments to make observations, test hypotheses or explore Phenomena</p>	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling. Physics Topic 1 lesson 8-9 Thermal conductivity – Focus on planning, observations and graph work. Links to relevant scientific theories. Physics Topic 3 lesson 2-3 Density - Focus on method and practical skills. Also includes work on relevant physics equations. Physics -Topic 6 lesson 9 reflection and refraction – Links to Law of reflection. Focus is on practical application, record observations making measurements, conclusion and evaluation skills. Physics -Topic 6 - lesson 2 Wave speed – Linked to wave speed equations. Focus is on observation, measurements and evaluating methods with improvements. Also includes work on relevant physics equations.</p>

	<p>Physics – Topic 5 lesson 15-16 Investigating motion – focus on recording observations, graph work and key mathematical terms. Also includes work on relevant physics equations.</p> <p>Chemistry Topic 3 lesson 11, titration.</p> <p>Chemistry Topic 4 lesson 8 Making soluble salts.</p> <p>Chemistry Topic 6 lesson 2-3 Rates of reaction</p> <p>Chemistry Topic 10, lesson 3 potable water</p>
<p>Applying a knowledge of a range of techniques, apparatus, and materials to select those appropriate both for fieldwork and for experiments</p>	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling.</p> <p>Physics Topic 5 - lesson 6-7 Hooke's Law – Focus on carrying out the practical with the appropriate equipment, identifying inaccuracies and improvements. Also linking mathematical terms to what students observed. Also includes work on relevant physics equations. Links to relevant scientific theories</p> <p>Physics Topic 3- lesson 2-3 Density - Focus on method and practical skills. Also includes work on relevant physics equations</p>
<p>Carrying out experiments appropriately, having due regard to the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations</p>	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling.</p> <p>Chemistry Topic 4 lesson 6 Electrolysis,</p> <p>Chemistry Topic 5 lesson 2-3 Neutralisation</p> <p>Chemistry Topic 6 lesson 2-3 Rates of reaction</p> <p>Physics Topic 2 lesson 4-5 Resistance of a wire – Focus on method, health and safety, graph work and conclusion. Also includes work on relevant physics equations. Links to relevant scientific theories.</p> <p>Physics -Topic 1 - lesson 6, Specific Heat Capacity – Focus on observations, measurement accuracy, health and safety. Graph work is developed as well as math skill associated with it. Also includes work on relevant physics equations.</p> <p>Physics -Topic 6 - lesson 2 Wave speed – Linked to wave speed equations. Focus is on observation, measurements and evaluating methods with improvements. Also includes work on relevant physics equations</p>
<p>Recognising when to apply a knowledge of sampling techniques to ensure any samples collected are representative</p>	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling.</p>

	<p>Physics Topic 1 lesson 6, Specific Heat Capacity – Focus on observations, measurement accuracy, health and safety. Graph work is developed as well as math skills associated with it. Also includes work on relevant physics equations</p>
<p>Making and recording observations and measurements using a range of apparatus and methods</p>	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling.</p> <p>Physics Topic 5 lesson 15-16 Investigating motion – focus on recording observations, graph work and key mathematical terms. Also includes work on relevant physics equations.</p> <p>Chemistry Topic 6 lesson 2-3 Rates of reaction Chemistry Topic 7, lesson 3-4 Chromatography</p> <p>Physics, Topic 1 lesson 6, Specific Heat Capacity – Focus on observations, measurement accuracy, health and safety. Graph work is developed as well as math skills associated with it. Also includes work on relevant physics equations.</p> <p>Physics, Topic 1 lesson 8-9 Thermal conductivity – Focus on planning,</p> <p>Physics Topic 2 - lesson 6-8 IV Graphs - Focus on observations, graph work including sketch graph. Links to relevant scientific theories it also includes work on relevant physics equations.</p> <p>Physics -Topic 6 - lesson 2 Wave speed – Linked to wave speed equations. Focus is on observation, measurements and evaluating methods with</p> <p>Physics -Topic 6 lesson 9 reflection and refraction – Links to Law of reflection. Focus is on practical application, record observations making measurements, conclusion and evaluation skills</p>
<p>Evaluating methods and suggesting possible improvements and further Investigations</p>	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling.</p> <p>Physics Topic 6 lesson 2 Wave speed – Linked to wave speed equations. Focus is on observation, measurements and evaluating methods with improvements. Also includes work on relevant physics equations.</p> <p>Physics Topic 6 lesson 9 reflection and refraction – Links to Law of reflection. Focus is on practical application, record observations making measurements, conclusions and evaluation skills.</p> <p>Chemistry Topic 5 lesson 2-3 Neutralisation Chemistry Topic 6 lesson 2-3 Rates of reaction</p>

	<p>Physics, Topic 1 lesson 6, Specific Heat Capacity – Focus on observations, measurement accuracy, health and safety. Graph work is developed as well as math skills associated with it. Also includes work on relevant physics equations.</p> <p>Physics Topic 5 - lesson 6-7 Hooke's Law – Focus on carrying out the practical with appropriate equipment's, identifying inaccuracies and improvements. Also linking mathematical terms to what students observed. Also includes work on relevant physics equations. Links to relevant scientific theories</p> <p>Physics -Topic 6 - L2 Wave speed – Linked to wave speed equations. Focus is on observation, measurements and evaluating methods with improvements. Also includes work on relevant physics equations.</p> <p>Physics -Topic 6 lesson 9 reflection and refraction – Links to Law of reflection. Focus is on practical application, record observations making measurements, conclusion and evaluation skills</p>
<p>Analysis and evaluation</p>	
<ol style="list-style-type: none"> 1. applying the cycle of collecting, presenting and analysing data, including presenting observations and other data using appropriate methods 2. Translating data from one form to another 3. Carrying out and representing mathematical and statistical analysis 4. representing distributions of results and making estimations of uncertainty 5. Interpreting observations and other data, including identifying patterns and trends, making inferences and drawing conclusions 6. Presenting reasoned explanations, including relating data to hypotheses 7. Being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error 8. Communicating the scientific rationale for investigations, including the methods used, the findings and reasoned conclusions, using paper-based and electronic reports and presentations 	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling.</p> <p>Chemistry Topic 6 lesson 2-3 Rates of reaction</p> <p>Chemistry Topic 7, lesson 3-4 Chromatography</p> <p>Chemistry lesson 9 Anion tests</p> <p>Physics, Topic 1 lesson 6, Specific Heat Capacity – Focus on observations, measurement accuracy, health and safety. Graph work is developed as well as math skills associated with it. Also includes work on relevant physics equations.</p> <p>Physics, Topic 1 lesson 8-9 Thermal conductivity – Focus on planning, observations and graph work. Links to relevant scientific theories.</p> <p>Physics Topic 2 - lesson 4-5 Resistance of a wire – Focus on method, health and safety, graph work and conclusion. Also includes work on relevant physics equations. Links to relevant scientific theories.</p> <p>Physics Topic 2 - lesson 6-8 IV Graphs - Focus on observations, graph work including sketch graph. Links to relevant scientific theories it also includes work on relevant physics equations.</p> <p>Physics Topic 3- lesson 2-3 Density - Focus on method and practical skills. Also includes work on relevant physics equations.</p> <p>Physics Topic 5 - lesson 6-7 Hooke's Law – Focus on carrying out the practical with appropriate equipment's, identifying inaccuracies and improvements. Also linking mathematical terms to what students observed. Also includes work on</p>

	<p>relevant physics equations. Links to relevant scientific theories</p> <p>Physics – Topic 5 lesson 15-16 Investigating motion – focus on recording observations, graph work and key mathematical terms. Also includes work on relevant physics equations.</p> <p>Physics -Topic 6 - lesson 2 Wave speed – Linked to wave speed equations. Focus is on observation, measurements and evaluating methods with improvements. Also includes work on relevant physics equations.</p> <p>Physics -Topic 6 lesson 5 Absorption – Linked to infrared radiation and uses. Focus is on equipment, graph work and conclusions.</p> <p>Physics -Topic 6 lesson 9 reflection and refraction – Links to Law of reflection. Focus is on practical application, record observations making measurements, conclusion and evaluation skills</p>
Vocabulary, units, symbols and nomenclature	
Developing their use of scientific vocabulary and nomenclature	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling.</p> <p>Physics covered in the majority of lessons. More focus when the lessons are maths based within topic scheme of learning.</p> <p>It is covered as starter/plenary activities for conversion, significant figures, recalling equations. When teaching the equations as a full lesson prefixes and power of ten are taught and expanded on when converting units.</p> <p>Tier 2 & 3 vocab on SOL highlights the key scientific vocab which is expanded on during the lesson.</p>
Recognising the importance of scientific quantities and understanding how they are determined	<p>Biology Topic 1 lesson 1 – 5 Microscopes.</p> <p>Physics covered in the majority of lesson. More focus when the lesson is maths based within topic scheme of learning.</p> <p>Chemistry topic 3</p> <p>Required practicals for all sciences</p> <p>It is covered as starter/plenary activities for conversion, significant figures, recalling equations. When teaching the equations as a full lesson prefixes and power of ten are taught and expanded on when converting units.</p> <p>Tier 2 & 3 vocab on the SOL highlights the key scientific vocab which is expanded on during the lesson</p>
Using SI units and IUPAC chemical nomenclature unless inappropriate	<p>Physics covered in the majority of lesson. More focus when the lesson is maths based within topic scheme of learning.</p> <p>Required practicals for all sciences</p>

	<p>It is covered as starter/plenary activities for conversion, significant figures, recalling equations. When teaching the equations as a full lesson prefixes and power of ten are taught and expanded on when converting units.</p> <p>Tier 2 & 3 vocab on SOL highlights the key scientific vocab which is expanded on during the lesson.</p>
<p>Using prefixes and powers of ten for orders of magnitude (e.g. tera, giga, mega, kilo, centi, milli, micro and nano)</p>	<p>Biology Topic 1 lesson 19 and 20 Osmosis, Topic 2 lesson 4 and 5 Enzymes, Topic 3 lesson 2 and 3 Culturing bacteria, Topic 4 lesson 3 Photosynthesis, Topic 5 lesson 2 Reaction speed, Topic 7 lesson 3 and 4 Distribution of organisms sampling.</p> <p>Biology Topic 1 lesson 1 – 5 Microscopes.</p> <p>Physics covered in the majority of lessons. More focus when the lessons are maths based within topic scheme of learning.</p> <p>It is covered as starter/plenary activities for conversion, significant figures, recalling equations. When teaching the equations as a full lesson prefixes and power of ten are taught and expanded on when converting units.</p> <p>Required practicals for all sciences</p> <p>Chemistry topic 3</p> <p>Tier 2 & 3 vocab on SOL highlights the key scientific vocab which is expanded on during the lesson</p>
<p>Interconverting units</p>	<p>Biology Topic 1 lesson 1 – 5 Microscopes.</p> <p>Physics covered in the majority of lesson. More focus when the lesson are maths based within topic scheme of learning.</p> <p>It is covered as starter/plenary activities for conversion, significant figures, recalling equations. When teaching the equations as a full lesson prefixes and power of ten are taught and expanded on when converting units.</p> <p>Chemistry topic 3</p> <p>Required practicals for all sciences</p> <p>Tier 2 & 3 vocab on SOL highlights the key scientific vocab which is expanded on during the lesson.</p>
<p>Using an appropriate number of significant figures in calculations</p>	<p>Biology Topic 1 lesson 1 – 5 Microscopes.</p> <p>Physics covered in the majority of lesson. More focus when the lesson are maths based within topic scheme of learning.</p> <p>It is covered as starter/plenary activities for conversion, significant figures, recalling equations. When teaching the equations as a full lesson prefixes and power of ten are taught and expanded on when converting units.</p> <p>Chemistry topic 3</p> <p>Required practicals for all sciences</p>

	Tier 2 & 3 vocab on SOL highlights the key scientific vocab which is expanded on during the lesson.
BIOLOGY	
Cell biology	
cells as the basic structural unit of all organisms; adaptations of cells related to their functions; the main sub-cellular structures of eukaryotic and prokaryotic cells	Topic 1 lesson 6 Eukaryotic cells lesson 7 Prokaryotic cells
Stem cells in animals and meristems in plants	Topic 1 lesson 9 and 10
Enzymes	Topic 2 lesson 3
Factors affecting the rate of enzymatic reactions	Topic 2 lesson 4, 5 and 6
The importance of cellular respiration; the processes of aerobic and anaerobic Respiration	Topic 1 lesson 6 Mitochondria and Topic 4
Carbohydrates, proteins, nucleic acids and lipids as key biological molecules	Topic 2 lesson 2 Carbohydrates, Proteins and Lipids Topic 6 lesson 3 DNA and Protein synthesis
Transport systems	
The need for transport systems in multicellular organisms, including plants	Topic 1 lesson 18
The relationship between the structure and functions of the human circulatory System	Topic 2 lesson 8 and 9
Health, disease and the development of medicines	
The relationship between health and disease	Topic 2 lesson 11 and 12
Communicable diseases including sexually transmitted infections in humans (including HIV/AIDs)	Topic 3 lesson 4
Non-communicable diseases	Topic 2 lesson 11 and 12 Topic 2 lesson 10 CHD

Bacteria, viruses and fungi as pathogens in animals and plants	Topic 3 lesson 4
Body defences against pathogens and the role of the immune system against disease	Topic 3 lesson 11 and 12
Reducing and preventing the spread of infectious diseases in animals and plants	Topic 3 lesson 1
The process of discovery and development of new medicines	Topic 3 lesson 8 and 9
The impact of lifestyle factors on the incidence of non-communicable diseases	Topic 2 lesson 11 and 12
Coordination and control	
Principles of nervous coordination and control in humans	Topic 5 lesson 1 – 5
The relationship between the structure and function of the human nervous system	Topic 5 lesson 1
The relationship between structure and function in a reflex arc	Topic 5 lesson 2
Principles of hormonal coordination and control in humans	Topic 5 lesson 6
Homeostasis	Topic 5 lesson 6
Photosynthesis	
Photosynthesis as the key process for food production and therefore biomass for Life	Topic 4 lesson 3
The process of photosynthesis	Topic 4 lesson 3
Factors affecting the rate of photosynthesis	Topic 4 lesson 4 and 5
Ecosystems	
Levels of organisation within an ecosystem	Topic 7 lesson 1
Some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community	Topic 7 lesson 2

How materials cycle through abiotic and biotic components of ecosystems	Topic 7 lesson 2
The role of microorganisms (decomposers) in the cycling of materials through an Ecosystem	Topic 7 lesson 9
Organisms are interdependent and are adapted to their environment	Topic 7 lesson 6 and 7
The importance of biodiversity	Topic 7 lesson 8
Methods of identifying species and measuring distribution, frequency and abundance of species within a habitat	Topic 7 lesson 3
Positive and negative human interactions with ecosystems	Topic 7 lesson 13 – 17
Evolution, inheritance and variation	
The genome as the entire genetic material of an organism	Topic 6 lesson 3
How the genome and its interaction with the environment, influence the development of the phenotype of an organism	Topic 6 lesson 4
The potential impact of genomics on medicine	Topic 6 lesson 3
Most phenotypic features being the result of multiple, rather than single, genes	Topic 6 lesson 4
Single gene inheritance and single gene crosses with dominant and recessive Phenotypes	Topic 6 lesson 4
Sex determination in humans	Topic 6 lesson 6
Genetic variation in populations of a species	Topic 6 lesson 8
The process of natural selection leading to evolution	Topic 6 lesson 9
The evidence for evolution	Topic 6 lesson 16 and 17

Developments in biology affecting classification	Topic 6 lesson 18
The importance of selective breeding of plants and animals in agriculture	Topic 6 lesson 10
The uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology	Topic 6 lesson 10 – 12
CHEMISTRY	
Atomic structure and the Periodic Table	
A simple model of the atom consisting of the nucleus and electrons, relative atomic mass, electronic charge and isotopes	Topic 1 lesson 5-9
The number of particles in a given mass of a substance	Topic 1 lesson 5-9
The modern Periodic Table, showing elements arranged in order of atomic number	Topic 1 lesson 10
Position of elements in the Periodic Table in relation to their atomic structure and arrangement of outer electrons	Topic 1 lesson 11-19
Properties and trends in properties of elements in the same group	Topic 1 lesson 11-19
Characteristic properties of metals and non-metals	Topic 1 lesson 11-23
Chemical reactivity of elements in relation to their position in the Periodic Table	Topic 1 lesson 10-23
Structure, bonding and the properties of matter	
Changes of state of matter in terms of particle kinetics, energy transfers and the relative strength of chemical bonds and intermolecular forces	Topic 2 lesson 1 also physics topic 3 lesson 4
Types of chemical bonding: ionic, covalent, and metallic	Topic 2 lesson 2, 5, 7, 9
Bulk properties of materials related to bonding and intermolecular forces	Topic 2 lesson 3, 5-9

Bonding of carbon leading to the vast array of natural and synthetic organic compounds that occur due to the ability of carbon to form families of similar compounds, chains and rings	Topic 2 lesson 6, 7, 8, 12
Structures, bonding and properties of diamond, graphite, fullerenes and graphene	Topic 2 lesson 7 and 8
Chemical changes	
Determination of empirical formulae from the ratio of atoms of different kinds	Topic 3 Topic 2 lesson 2-3
Balanced chemical equations, ionic equations and state symbols	Topic 1 lesson 15 Topic 4 lesson 4 Throughout topic 3
Identification of common gases	Topic 8 lesson 5
The chemistry of acids; reactions with some metals and carbonates	Topic 4 lesson 5-7
PH as a measure of hydrogen ion concentration and its numerical scale	Topic 4 lesson 9-11
Electrolysis of molten ionic liquids and aqueous ionic solutions	Topic 4 lesson 13-16
Reduction and oxidation in terms of loss or gain of oxygen	Topic 4 lesson 1, 3-4
Energy changes in chemistry	
Measurement of energy changes in chemical reactions (qualitative)	Topic 5 lesson 1-4
Bond breaking, bond making, activation energy and reaction profiles (qualitative)	Topic 5 lesson 1-4
Rate and extent of chemical change	
Factors that influence the rate of reaction: varying temperature or concentration, changing the surface area of a solid reactant or by adding a catalyst	Topic 6 lesson 1-6
Factors affecting reversible reactions	Topic 6 lesson 7-9
Chemical analysis	

Distinguishing between pure and impure substances	Topic 8 lesson 1-2
Separation techniques for mixtures of substances: filtration, crystallisation, chromatography, simple and fractional distillation	Topic 8 lesson 3 Topic 1 lesson 3-4
Quantitative interpretation of balanced equations	
Concentrations of solutions in relation to mass of solute and volume of solvent	Topic 3 lesson 4
Chemical and allied industries	
Life cycle assessment and recycling to assess environmental impacts associated with all the stages of a product's life	Topic 10 lesson 1
The viability of recycling of certain materials	Topic 10 lesson 2
Carbon compounds, both as fuels and feedstock, and the competing demands for limited resources fractional distillation of crude oil and cracking to make more useful materials	Topic 7 lesson 1-4
Extraction and purification of metals related to the position of carbon in a reactivity series	Topic 4 lesson 3 Topic 10 lesson 5
Earth and atmospheric science	
Evidence for composition and evolution of the Earth's atmosphere since its Formation	Topic 9 lesson 1-2
Evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change	Topic 9 lesson 3-4
Potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate	Topic 9 lesson 3-5
Common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates and their sources	Topic 9 lesson 5
The Earth's water resources and obtaining potable water	Topic 10 lesson 3-4

PHYSICS	
Energy	
Energy changes in a system involving heating, doing work using forces, or doing work using an electric current; calculating the stored energies and energy changes involved	Topic 1 lesson 1, 2 and 3
Power as the rate of transfer of energy	Topic 1 lesson 7
Conservation of energy in a closed system; dissipation	Topic 1 lesson 1
Calculating energy efficiency for any energy transfers	Topic 1 lesson 1
Renewable and non-renewable energy sources used on Earth; changes in how these are used	Topic 1 lesson 10 - 11
Forces	
Forces and fields: electrostatic, magnetic, gravity	Topic 2 lesson 12, 16, 17 Topic 5 lesson 1 and 2 Topic 7 lesson 1, 2, 3
Forces as vectors	Topic 5 lesson 1
Calculating work done as force x distance; elastic and inelastic stretching	Topic 5 lesson 1, 5, 6 and 7
Calculating work done as force x distance; elastic and inelastic stretching	Topic 5 lesson 22-25
Forces and motion	
Speed of sound; estimating speeds and accelerations in everyday contexts	Topic 5 lesson 9-12 Topic 6 lesson 12, 13
Interpreting quantitatively graphs of distance, time, and speed	Topic 5 lesson 9, 10
Acceleration caused by forces; Newton's First Law	Topic 5 lesson 13, 15 and 16
Acceleration caused by forces; Newton's First Law	Topic 5 lesson 1

Decelerations and braking distances involved on roads	Topic 5 lesson 17
Wave motion	
Amplitude, wavelength and frequency; relating velocity to frequency and Wavelength	Topic 6 lesson 1 and 2
Transverse and longitudinal waves	
Electromagnetic waves and their velocity in a vacuum; waves transferring energy; wavelengths and frequencies from radio to gamma-rays	Topic 6 lesson 1 and 2
Velocities differing between media: absorption, reflection, refraction effects	Topic 6 lesson 3, 4 and 11
Production and detection, by electrical circuits, or by changes in atoms and nuclei	Topic 1 lesson 8 and 9 Topic 6 lesson 6-10
Uses in the radio, microwave, infra-red, visible, ultra-violet, X-ray and gamma-ray regions, hazardous effects on bodily tissues	Topic 4 lesson 1
Electricity	
Measuring resistance using p.d. and current measurements	Topic 6 lesson 3, 4 and 11
Exploring current, resistance and voltage relationships for different circuit elements, including their graphical representations	Topic 2 lesson 1 and 2
Quantity of charge flowing as the product of current and time	Topic 2 lesson 3-10
Drawing circuit diagrams; exploring equivalent resistance for resistors in series	Topic 2 lesson 12
The domestic a.c. supply; live, neutral and earth mains wires; safety measures	Topic 2 lesson 1-10
Power transfer related to p.d. and current, or current and resistance	Topic 2 lesson 13
Magnetism and electromagnetism	

Exploring the magnetic fields of permanent and induced magnets, and the Earth's magnetic field, using a compass	Topic 7 lesson 1
Magnetic effects of currents; how solenoids enhance the effect	Topic 7 lesson 2-3
How transformers are used in the national grid and the reasons for their use	Topic 2 lesson 14 Topic 7 lesson 6-7
The structure of matter	
Relating models of arrangements and motions of the molecules in solid, liquid and gas phases to their densities	Topic 3 lesson 4 and 8
Melting, evaporation, and sublimation as reversible changes	Topic 3 lesson 6-7
Calculating energy changes involved on heating, using specific heat capacity; and those involved in changes of state, using specific latent heat	Topic 1 lesson 6, 8-9 Topic 3 lesson 6-7
Links between pressure and temperature of a gas at constant volume, related to the motion of its particles (qualitative)	Topic 3 lesson 8-9
Atomic structure	
The nuclear model and its development in the light of changing evidence	Topic 4 lesson 1-2
Masses and sizes of nuclei, atoms and small molecules	Topic 4 lesson 1-2
Differences in numbers of protons and neutrons related to masses and identities of nuclei; isotope characteristics and equations to represent changes	Topic 4 lesson 1-4
Ionisation; absorption or emission of radiation related to changes in electron orbits	Topic 4 lesson 1-2
Radioactive nuclei; emission of alpha or beta particles, neutrons, or gamma-rays, related to changes in the nuclear mass and/or charge	Topic 4 lesson 3-4
Radioactive materials, half-life, irradiation, contamination and their associated hazardous effects; waste disposal	Topic 4 lesson 5-6

Nuclear fission, nuclear fusion and our Sun's energy	Topic 4 lesson 9-10
Space physics	
The main features of the solar system	Topic 8 lesson 1 Triple only Covered in Year 9 Topic 2