Scheme of Work



Subject: KS3 Science

	Y1 TERM 1	Y1 TERM 2	Y1 TERM 3	Y1 TERM 4	Y1 TERM 5	Y1 TERM 6
Year 1 Key Stage 3	**AOs:** **AO1:** Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.	**AOs:** **AO1:** Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.	**AOs:** **AO1:** Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.	**AOs:** **AO1:** Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.	**AOs:** **AO1:** Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.	**AOs:** **AO1:** Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures. **AO2:** Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures. **AO3:** Analyse information and ideas to: interpret and evaluate; make judgments and draw conclusions; develop and improve experimental procedures.

Year 1 Key Stage 3	**B1 - Cells:** Multicellular organisms are composed of cells which are organised into tissues, organs and systems to carry out life processes. There are many types of cell. Each has a different structure or feature so it can do a specific job. NC: Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope. Use a microscope to make observations of biological specimens and produce labelled scientific drawings. Students should be able to demonstrate an understanding of the scale and size of cells Understand how microscopy techniques have developed over time. Explain functions of the cell wall, cell membrane,	**14 lessons** **P1 – Energy:** Energy is how things change and move. It's everywhere around us and takes all sorts of forms. It takes energy to cook food, to drive to school, and to jump in the air. Energy can take a number of different forms. NC: Calculation of fuel uses and costs in the domestic context Energy changes and transfers through conduction, convection or radiation; Changes in systems; comparing the starting with the final conditions of a system and describing increases and decreases in the amounts of energy Skills: Energy is measured in J and kJ.	**13 lessons** **B2- Reproduction and Variation:** The menstrual cycle prepares the female for pregnancy and stops if the egg is fertilised by a sperm. The developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances. There is variation between individuals of the same species. Some variation is inherited, some is caused by the environment and some is a combination. NC: 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,	**12 lessons** **P2 – Forces and Motion:** A force is a push or pull that causes a change in speed, direction or shape. Some forces are affected by speed, other forces are not. All forces come in pairs, no force exists by itself. Forces and their effects are all around us. They keep us firmly rooted to the ground, they make us move and they stop us slipping and sliding. Forces are vital to life and the Universe. NC: Forces as pushes or pulls, arising from the interaction between 2 objects; using force arrows in diagrams, forces associated with deforming objects; stretching and squashing – springs	**12 lessons** **B3 - Digestion and Nutrition:** The body needs a balanced diet with carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water, for its cells' energy, growth and maintenance. Organs of the digestive system are adapted to break large food molecules into small ones which can travel in the blood to cells and are used for life processes. NC: the content of a healthy human diet and why each is needed; calculations of energy requirements in a healthy daily diet; the consequences of imbalances in the diet; the tissues and organs of the human digestive system, including adaptations	**14 lessons** **P3 - Light and Space:** **Light** is a form of energy that we can see. There are many sources of light, from blazing sunlight to the tiny glow of a firefly. We see objects when they give out light, or reflect it, into our eyes. Our eyes are able to process this light and turn it into an image in our brain. Light travels as transverse waves and faster than sound. It can be reflected, refracted and dispersed. Ray diagrams show what happens to light in mirrors and lenses. Eyes and cameras detect light. NC: the similarities and differences between light waves and waves in matter; light waves travelling through a vacuum; speed of light; the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface; use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light; different frequencies of

Year 1 Key Stage 3	cytoplasm, nucleus, vacuole, mitochondria and chloroplasts Identify the similarities and differences between plant and animal cells The role of diffusion in the movement of materials in and between cells Recognise, draw and interpret diagrams that model diffusion. The structural adaptations of some unicellular organisms The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. Skills: Give examples to show how scientific methods and theories have changed over time. Recognise/draw/interpret diagrams. Plan experiments or devise procedures to make observations.	Power is the rate of using energy, and is measured in W and kW. Fuel bills show energy used in kWh, and the cost of this can be calculated. State and describe Energy Stores and Pathways, applying to real life examples. Describe the Law of Conservation of Energy. Explain ways of reducing unwanted energy transfers (lubrication and thermal insulation). Calculate the Efficiency of Energy Transfers; Be able to interpret Sankey diagrams. Explain the process of Conduction and apply to real life examples. Investigate Thermal Conductivity using the principle of the 3 variables; Independent, Dependent and Control Variables. Explain the process of	fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. Human Reproduction: Skills: Describe and explain gametes and the structure/function of the male and female reproductive systems. Identify the steps in human reproduction (Fertilisation), including the key events of fertilisation, implantation and cell division. Describe the process of gestation, including development of the foetus and risk factors involved. Understand the process of birth in humans and relate to the differences in numbers of offspring between different animals. Understand the process of puberty and the	(Newton's law); with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water Including non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets, and forces due to static electricity Skills: To recognise balanced and unbalanced forces, using arrows to represent size and direction of forces. Understand the difference between mass and weight. Investigate how area affects the speed of a parachute. Use and apply the equation for speed and interpret distance-time graphs.	to function and how the digestive system digests food (enzymes simply as biological catalysts) Skills: Interpret nutritional labels and analyse the nutritional content of an entire meal. Describe the different factors that affect our daily calorie requirements. Calculations of energy requirements in a healthy daily diet. Examine the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. Recall Carbohydrates, Fats and Proteins and how to chemically test for the presence of these nutrients in foods. Describe the organs in the Digestive system, explaining their roles	light, white light and prisms (qualitative only). Skills: Describe properties of Light waves, represent light with ray diagrams. Investigate the Law of Reflection and identify the variables involved, Recall applications of reflection (Hinterland). Describe how Refraction takes place and represent the pathways that light takes through a glass block. Recall the seven colours of the visible light spectrum. Understand how to disperse white light to see the colours that make up white light; view objects as different colours. Predict the colours of coloured objects in coloured light; Describe and explain how coloured filters change white light Describe the forces of attraction between the Earth and moon and the Earth and the Sun. Understand the properties that affect the size of gravitational forces

Year 1 Key Stage 3	Use scientific vocabulary, terminology and definitions. Use SI units, ratios, fractions and IUPAC chemical nomenclature. Interconvert units. Use of appropriate apparatus, techniques and magnification, including microscopes, to make observations of biological specimens and produce labelled scientific drawings. **C1- Particles:** Properties of solids, liquids and gases can be described in terms of particles in motion but with differences in the arrangement and movement of these same particles: closely spaced and vibrating (solid), in random motion but in contact (liquid), or in random motion and widely spaced (gas). Observations where substances change	Convection and explore real life examples of convection currents. Explain the process of Radiation, demonstrate how different surfaces impact emission and links these ideas to real life examples. Describe Insulation and applies it to everyday examples. Describes how Fossil Fuels are formed and the Advantages and Disadvantages of using these Non-Renewable energy resources. Describe different Renewable energy resources and the advantages and disadvantages of renewable energy resources.	events involved in the menstrual cycle NC: Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. Plant Reproduction: Skills: Identify the main parts of the flower and the process of pollination. Understand and investigate the mechanisms of fertilisation, seed formation and seed dispersal in plants. Variation: Skills: Define and understand inherited and environmental variation, using characteristics to explain.		in the mechanical and chemical digestion of food types; using a model gut. Describe the action of enzymes in the digestive system. **13 lessons** **C3 - Atoms and the Periodic Table:** Most substances are not pure elements, but compounds or mixtures containing atoms of different elements. They have different properties to the elements they contain. In the Periodic Table, the elements in a group all react in a similar way and sometimes show a pattern in reactivity. As you go down a group and across a period the elements show patterns in physical properties.	between different objects in the Solar system. Calculate weight, mass and gravitational field strength on Earth and other planets; change units and express answers to a given number of significant figures. Define a light year and explain why they are used; Describe the Earth's place in the universe; what a star is and why it emits light. Use secondary data to describe and explain patterns in year lengths in the solar system. Describe and explain differences in day length, position of the sun and temperatures in different seasons.

Year 1 Key Stage 3	temperature or state can be described in terms of particles gaining or losing energy. NC: The particulate nature of matter: the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure; changes of state in terms of the particle model Skills: Students should be able to recognise/draw simple diagrams to model the difference between solids, liquids and gases. Interpret observations and data, including identifying patterns and using observations, measurements, and data to draw conclusions (Conservation of Mass). Ask questions and develop a line of enquiry based on observations of the real world, alongside		Collect and interpret discrete and continuous data. Carrying out mathematical and statistical analysis. **11 lessons** **C2 - Chemical Reactions** Atoms are rearranged in a chemical reaction. No atoms are created or destroyed in a chemical reaction. This means that the total mass of the reactants is the same as the total mass of the products. We say that mass is conserved in a chemical reaction. NC: Chemical reactions as the rearrangement of atoms representing chemical reactions using formulae and using equations combustion, thermal decomposition, oxidation and		NC: a simple (Dalton) atomic model; differences between atoms, elements and compounds; chemical symbols and formulae for elements and compounds; conservation of mass changes of state and chemical reactions. Periodic table: the varying physical and chemical properties of different elements the principles underpinning the Mendeleev periodic table; the periodic table: periods and groups; metals and non-metals; how patterns in reactions can be predicted with reference to the periodic table; the properties of metals and non-metals	

Year 1 Key Stage 3	prior knowledge and experience. Identify independent, dependent, and control variables where appropriate. (Rock salt) Plan experiments or devise procedures to make observations and produce a substance. (Rock salt, distillation) Apply a knowledge of a range of techniques, apparatus and materials to select those appropriate to the experiment. Use scientific vocabulary, terminology and definitions. Use of appropriate apparatus to make and record a range of measurements accurately, including mass, time, temperature, and volume of liquids and gases Safe use of a range of equipment to purify and/or separate chemical mixtures including evaporation, filtration,		displacement reactions defining acids and alkalis in terms of neutralisation reactions the pH scale for measuring acidity/alkalinity; and indicators reactions of acids with metals to produce a salt plus hydrogen reactions of acids with alkalis to produce a salt plus water Skills: The law of conservation of mass applies to chemical reactions. Represent reactions using word equations and particle diagrams. Define an acid and an alkali, how to identify them and understand their hazards. Using the pH scale/indicator to measure the acidity or alkalinity of a solution. Explore reactions including neutralisation, reactions between		Skills: Examine atoms, how to draw atoms and begin to interpret the periodic table. Define the term property in Science, the development of the Periodic Table and the contribution of different scientists (in particular Mendeleev) to this. Name the common properties/uses of metals and non-metals. Define and describe compounds, their representation using particle diagrams, the naming of compounds, and how they are different to the elements from which they are formed. Build compound formulae based on the atoms they contain and interpret more complex chemical formulae.	

Year 1 Key Stage 3	crystallisation, chromatography and distillation Construct and interpret frequency tables and diagrams, bar charts and histograms. Understand the principles of sampling as applied to scientific data. Translate information between graphical and numeric form.		metals and acids. Apply a knowledge of a range of techniques, instruments, apparatus and materials to select those appropriate to the experiment with due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.		Know how to make a compound and produce a sequenced scientific method. Understand and make predictions based on the conservation of mass. Describe trends in Group 1, Group 7 and Group 0 elements.	

Year 1 Key Stage 3	**Threshold Concepts:** **B1 – Cells** **B2- Reproduction and Variation:** **B3 - Digestion and Nutrition:** TC1: Be familiar with, and use, technical terminology accurately; building up an extended specialist vocabulary TC2: Understand the structure-function relationship and that every structural feature helps serve a particular function within the molecular-, cellular-, tissue-, organ- and organ system- levels. TC3: Living organisms may form populations of single species, communities of many species and ecosystems, interacting with each other, with the abiotic/biotic factors of the environment TC4: Life on Earth is dependent on photosynthesis in which green plants produce organic compounds and oxygen TC5: To apply the three control, independent and dependent variables to a fair test investigation. TC6: Investigations including, making predictions, writing a method, analysing results and writing a conclusion. TC7: These organic compounds are used as fuels in cellular respiration and the manufacture of macromolecules necessary for life TC8: The chemicals in ecosystems are continually cycling through the natural world TC9: The characteristics of a living organism are influenced by its genome and its interaction with the environment TC10: Evolution occurs by a process of natural selection and accounts both for biodiversity and how organisms are all related to varying	**Threshold Concepts:** **C1 - Particles** **C2 - Chemical Reactions:** **C3 - Atoms and the Periodic Table:** TC1: Be familiar with, and use, technical terminology accurately; building up an extended specialist vocabulary TC2: To view chemistry at the molecular (sub microscopic level), observational (macroscopic) and symbolic levels. TC3: To explain the manifestations of the principle of 'electron configuration' through several chemical reactions. TC4: To symbolically describe chemical reactions using the language of redox, of word, of chemical and of ionic equations. TC5: To apply the three control, independent and dependent variables to a fair test investigation. TC6: Investigations including, making predictions, writing a method, analysing results and writing a conclusion. TC7: To understand changes of state through intermolecular forces and the strength of these forces determines the required temperature TC8: Surface area to volume ratio (SA:Vol) – governs many key processes inducing the rate of chemical reactions, heat loss, oxygen uptake, diffusion and osmosis, absorption and metabolism.	**Threshold Concepts:** **P1 – Energy** **P2 – Forces and Motion:** **P3 - Light and Space:** TC1: Be familiar with, and use, technical terminology accurately; building up an extended specialist vocabulary TC2: The use of models, as in the particle model of matter or the wave models of light and of sound TC3: The concept of cause and effect in explaining such links as those between force and acceleration, or between changes in atomic nuclei and radioactive emissions TC4: The phenomena of 'action at a distance,' and the related concept of the field as the key to analysing electrical, magnetic and gravitational effects TC5: To apply the three control, independent and dependent variables to a fair test investigation. TC6: Investigations including, making predictions, writing a method, analysing results and writing a conclusion. TC7: That differences, for example between pressures or temperatures or electrical potentials, are the drivers of change TC8: That proportionality, for example between weight and mass of an object or between force and extension in a spring, is an important aspect of many models in science.

	Y2 TERM 1	**Y2 TERM 2**	**Y2 TERM 3**	**Y2 TERM 4**	**Y2 TERM 5**	**Y2 TERM 6**
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Year 2 Key Stage 3	**12 lessons** **B4 - Ecological relationships and Classification:** Organisms in a food web (decomposers, producers and consumers) depend on each other for nutrients. So, a change in one population leads to changes in others. The population of a species is affected by the number of its predators and prey, disease, pollution and competition between individuals for limited resources such as water and nutrients. Classification: Describe what classification is, how we classify organisms using the Linnaean System and how animals are classified into the five chordate groups. NC: Relationships in an ecosystem; the interdependence of organisms in an	**14 lessons** **P4 - Electricity and Magnetism:** Electricity is described as the flow of electrons, which is named as current. Conductors are described as substances which allow electrons to flow through them. Insulators are described as substances in which electrons can't flow. NC: electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current Differences in resistance between conducting and insulating components (quantitative) Skills: Interpreting simple circuit diagrams.	**10 lessons** **B5 - Plants and Photosyhthesis:** Photosynthesis takes place inside plant cells in small objects called chloroplasts . Plants get carbon dioxide from the air through their leaves, and water from the ground through their roots. Light energy comes from the Sun. The oxygen produced is released into the air from the leaves. NC; the reactants in, and products of, photosynthesis, and a word summary for 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	**9 lessons** **P5 - Matter:** The three states of matter are solids, liquids and gases. Matter is a general term for the substance of which all physical objects are made. NC: Physical changes conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving; similarities and differences, including density differences, between solids, liquids and gases; Brownian motion in gases, diffusion in liquids and gases driven by differences in concentration. Using the particle model to support the above.	**13 lessons** **B6 - Biological Systems and Processes:** Living organisms have certain life processes in common. There are seven things that they need to do to count as being alive: **Movement** - all living things move, even plants. **Respiration** - getting energy from food. Sensitivity - detecting changes in the surroundings. **G**rowth - all living things grow. Reproduction - making more living things of the same type. Excretion - getting rid of waste. Nutrition - taking in and using food. Skills: Plan an investigation into the effects of exercise on	**9 lessons** **P6 – Forces in Action:** Students study levers and pivots in KS3 science to understand how levers can multiply force and movement, and how they can reduce the amount of work needed to turn objects. Levers can increase the effect of a force, as well as the amount of movement produced by a small amount of effort. Exploring Hooke's Law, developing a more quantitative approach. Students learn about elastic deformation because it's a fundamental concept in physics that's important for understanding how materials behave under force. It's also a key property to understand when making or repairing objects, especially for things like buildings and forms of transport. NC: moment as the turning effect of a force; forces: associated with deforming objects; stretching and

Year 2 Key Stage 3	ecosystem, including food webs and insect pollinated crops; how organisms affect, and are affected by, their environment, including the accumulation of toxic materials Skills: Represent food chains as pyramids of numbers and pyramids of biomass. Use quadrats to carry out random sampling; write a sequential method and calculate means from sampling. Complete frequency tables, calculate areas of compound shapes and estimate populations of organisms. **13 lessons** **C4 - Materials and the Earth:** The rocks are gradually recycled over millions of years. This is called the rock cycle. For example, sedimentary rocks can be	Use some models to describe electricity. Recognise and draw series/parallel circuits and describe how to make measurements of current. Measure potential difference in a series/parallel circuits. Explore the relationship between current, potential difference and resistance, and use an equation to calculate current, potential difference and resistance Identify variables in the measuring resistance practical, explaining the effect of a length of wire on resistance. Explore static electricity, how objects can become electrically charged and how the charge can produce a force between charged objects. Magnetism: NC: magnetic poles, attraction and repulsion magnetic fields by plotting with compass,	are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere Skills: Test whether photosynthesis has occurred (Benedict's Solution). Test for starch, the storage form of glucose in plants. **16 lessons** **C5 - Reactivity:** Some metals are very unreactive . This means they do not easily take part in chemical reactions. If we put the metals in order of their reactivity, from the most reactive down to the least reactive, we get a list called the reactivity series**.** In general, the more reactive a metal is: the more vigorously	Skills: Interpret heating and cooling curves. Calculate density for regular objects and make predictions of floating and sinking using knowledge of forces.	breathing rate; identify key variables. Describe the effects of cigarettes on the tissues of the lungs and on gaseous exchange. Describe and explain the impacts on the health of smokers and their unborn babies. Describe the effects of alcohol on health and the developing foetus. **12 lessons** **C6 – Rates and Energetics** NC: Chemical reactions: chemical reactions as the rearrangement of atoms, representing chemical reactions using formulae and using equations,	squashing – springs; force-extension linear relation; Hooke's Law as a special case Skills:. Mathematical skills in calculating moments. Apply variables and produce a method for investigating the extension of a spring. Plot a force extension graph of a spring, identify the term spring constant and practice Hooke's Law calculations. **9 lessons** **P7 – Sound Waves:** Sound waves are longitudinal waves which means they vibrate in the same direction as the direction of travel. They are produced by vibrating sources, such as speakers. Sound waves can only travel through a solid, liquid or gas medium. They travel fastest in solids, then liquids and slowest in gases. There are five main characteristics of sound waves: wavelength, amplitude, frequency, time period, and velocity. The

Year 2 Key Stage 3	changed into metamorphic rocks. These can be weathered, eroded, and the pieces transported away. The pieces of rock could be deposited in a lake or sea, eventually forming new sedimentary rock**.** NC: the composition of the Earth; the structure of the Earth; the rock cycle and the formation of igneous, sedimentary and metamorphic rocks	representation by field lines. Earth's magnetism, compass and navigation Skills: Plot the shape of magnetic fields that can be found around magnets and the Earth. Describe how an electromagnet can be made. Look at the key variables for an investigation into electromagnets. Explore their uses.	it reacts with other substances. NC: chemical reactions as the rearrangement of atoms; representing chemical reactions using formulae and equations; how patterns in reactions can be predicted with reference to the periodic table; reactions of acids with metals to produce a salt plus hydrogen; the order of metals and carbon in the reactivity series; the use of carbon in obtaining metals from metal oxides. Skills: Understand why atoms react and how this can lead to the formation of ions. Investigate the formation of a salt, including details about filtration and crystallisation. Examine the Reactivity Series; use the reactivity series to make predictions about reactions.		combustion, thermal decomposition 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. Energetics: energy changes on changes of state (qualitative); exothermic and endothermic chemical reactions (qualitative)	wavelength of a sound wave indicates the distance that wave travels before it repeats itself. The wavelength itself is a longitudinal wave that shows the compressions and rarefactions of the sound wave**.** NC: frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound; sound needs a medium to travel, the speed of sound in air, in water, in solids; sound produced by vibrations of objects, in loudspeakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal; the auditory range of humans and animals Skills: how to fully utilise the speed/distance/time equation. Plan a method to investigate sound proofing. Model an ear at home to consolidate knowledge.

Year 2 Key Stage 3	**TCs:** **B4 - Ecological relationships and Classification:** **B5 - Plants and Photosynthesis:** **B6 - Biological Systems and Processes:** TC1: Be familiar with, and use, technical terminology accurately; building up an extended specialist vocabulary TC2: Understand the structure-function relationship and that every structural feature helps serve a particular function within the molecular-, cellular-, tissue-, organ- and organ system- levels. TC3: Living organisms may form populations of single species, communities of many species and ecosystems, interacting with each other, with the abiotic/biotic factors of the environment TC4: Life on Earth is dependent on photosynthesis in which green plants produce organic compounds and oxygen TC5: To apply the three control, independent and dependent variables to a fair test investigation. TC6: Investigations including, making predictions, writing a method, analysing results and writing a conclusion. TC7: These organic compounds are used as fuels in cellular respiration and the manufacture of macromolecules necessary for life TC8: The chemicals in ecosystems are continually cycling through the natural world TC9: The characteristics of a living organism are influenced by its genome and its interaction with the environment TC10: Evolution occurs by a process of natural selection and accounts both for biodiversity and how organisms are all related to varying	**TCs:** **C4 - Materials and the Earth:** **C5 - Reactivity** **C6 - Energetics and Rates:** TC1: Be familiar with, and use, technical terminology accurately; building up an extended specialist vocabulary TC2: To view chemistry at the molecular (sub microscopic level), observational (macroscopic) and symbolic levels. TC3: To explain the manifestations of the principle of 'electron configuration' through several chemical reactions. TC4: To symbolically describe chemical reactions using the language of redox, of word, of chemical and of ionic equations. TC5: To apply the three control, independent and dependent variables to a fair test investigation. TC6: Investigations including, making predictions, writing a method, analysing results and writing a conclusion. TC7: To understand changes of state through intermolecular forces and the strength of these forces determines the required temperature TC8: Surface area to volume ratio (SA:Vol) – governs many key processes inducing the rate of chemical reactions, heat loss, oxygen uptake, diffusion and osmosis, absorption and metabolism.	**TCs:** **P5 - Matter:** **P6 – Forces in Action:** **P7 – Sound Waves:** TC1: Be familiar with, and use, technical terminology accurately; building up an extended specialist vocabulary TC2: The use of models, as in the particle model of matter or the wave models of light and of sound TC3: The concept of cause and effect in explaining such links as those between force and acceleration, or between changes in atomic nuclei and radioactive emissions TC4: The phenomena of 'action at a distance,' and the related concept of the field as the key to analysing electrical, magnetic and gravitational effects TC5: To apply the three control, independent and dependent variables to a fair test investigation. TC6: Investigations including, making predictions, writing a method, analysing results and writing a conclusion. TC7: That differences, for example between pressures or temperatures or electrical potentials, are the drivers of change TC8: That proportionality, for example between weight and mass of an object or between force and extension in a spring, is an important aspect of many models in science.

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