Year 9

		HT1 Working together / Solubility	HT2 Electricity (conductors & insulators) / Classification	HT3 Rearranging atoms / Electricity (voltage)	HT4 Health & disease (drugs & alcohol) / Neutralisation reactions	HT5 How we hear/ Interdependence	HT6 Water cycle/ Speed
Composite knowledge: Pupils will be able to…		**BLO1:** Describe how different organ systems work together to keep organisms alive. **CLO2:** Describe the solubility of different materials in a solution and how to separate them	**PLO1:** Describe the effectiveness of different conductors **PLO2:** Identify insulators **BLO3:** Explain how organisms are classified	**CLO1:** Explain the properties of compounds and describe how to represent them in a chemical reaction. **PLO2:** Describe the effect of different voltages in a simple circuit.	**BLO1:** Describe the effects of drugs to our physical and mental health **CLO2:** Identify the products of chemical reactions between acids and bases, alkalis and metals.	**PLO1:** Explain how sounds are produced and heard. **BLO2:** Explain the factors affecting all ecosystems on Earth.	**CLO1:** Explain how water is recycled within our atmosphere. **PLO2:** Describe speed.
Knowledge Components	Substantive Component Knowledge:	**Know that cells are the smallest unit of life.** **Know that cells in multicellular plants and animals are arranged into tissues, organs and organ systems.** **Know that the digestive system breaks down food into tiny particles which are absorbed into the blood.** **Know that these particles provide energy for the body to grow, repair itself and remain healthy.** **Know that food that cannot be broken down is released from the body as faeces (poo).** **Know that breathing is also called 'ventilation' and is**	**Know that conductors are materials which allow electrical current to flow through them easily. Metals are generally good electrical conductors.** **Know that insulators are materials which are poor conductors and do not allow electrical current to flow through them easily.** **Know that conductivity in materials depends on its metallic bonds.** **Know that classification attempts to impose a hierarchy on the complex and dynamic variety of life on Earth by describing how different species group together and how they are related to one another or not.**	**Know that particle diagrams are used to help explain elements, compounds and mi xtures.** **Know that most chemical reactions make new chemicals.** **Know that atoms are rearranged during a chemical reaction, but the number of atoms does not change.** **Know that chemical reactions can be represented using equations.** **Know that circuit diagrams are used to show how electrical components are connected in a circuit.**	**Know that alcohol is a drug that can be found in drinks such as beer, cider and wine.** **Know that cigarettes contain lots of different things, including tobacco.** **Know that tobacco can damage your lungs and heart and increase the risk of your body developing deadly diseases like cancer. Tar is an example of a toxic chemical found in cigarettes.** **Know that the drug found in cigarettes is nicotine.** Know that nicotine is very addictive, which is why some people find it hard to stop smoking.	**Know that a sound wave is a vibration that travels through a solid, liquid or gas such as the air or water.** **Know that a loud sound has a large amplitude; a high pitched sound has a high frequency.** **Know that the vibrations in the air make the eardrum vibrate, and these vibrations are passed through the three small bones (called ossicles) to a spiral structure called the cochlea** **Know that signals are passed from the cochlea to the brain through the auditory nerve, and our brain interprets these signals as sound.**	**Know that the water vapour rises and collects in the sky as clouds.** **Know that when the water vapour cools down, it condenses, turning back into liquid, and falls back to earth as precipitation: rain, snow, hail or sleet. This water then moves across land as run-off, and ends up in rivers and streams.** **Know that speed is a measure of how fast an object is moving.** **Know that the speed equation can be rearranged to find distance travelled and time taken.**

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		the movement of gases into and out from the lungs. Know that the gas exchange system is responsible for getting oxygen into the blood and removing carbon dioxide as a person breathes. Know that the circulatory system is the heart and all the blood vessels in the body which carry cells and substances to all its parts. Know that a solution is made when a solute dissolves into a solvent. Know that if a substance can dissolve into a solvent, it is soluble. If it cannot dissolve, it is described as insoluble. Know that heating, stirring and using fine powders are all ways to speed up dissolving.	Know that 'Domain' is the highest rank and 'kingdom' is the second highest rank in the sequence of classification.	Know that resistance is a measure of how difficult it is for current to flow. Know that each component in a circuit has a resistance. Know that the amount of current flowing in a circuit is affected by the resistance of that circuit.	Know that E-cigarettes are battery-powered devices that release microscopic plastics (a kind of gas). E-cigs don't contain tobacco but does contain nicotine. Know that acids react with most metals. Know that when an acid reacts with a metal, the products are a salt and hydrogen. Know that a base is a substance that can react with acids and neutralise them	Know that the variety of life in an ecosystem depends on each other for survival. Know that the variety of life in an ecosystem depends on the cycling of organic materials such as carbon.	
	Disciplinary Component Knowledge:	Know how to use items from home to explore digestion	Know that classification groupings have evolved over time in light of new scientific findings.	Know how to write a symbol equation for a chemical reaction Know that evidence of chemical reactions includes a	Know how to categorise the harmful effects of the main chemicals present in tobacco using a table.	Know that musicians and scientists record and analyse sounds using wave traces (oscilloscope).	Know how to model the water cycle in the classroom using a kettle.

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		Know how to model ventilation using a glass lung. **Know that chromatography is a separation technique used to separate mixtures of soluble substances.** **Know how chromatograms can be used to match known pigments with those in a mixture.** **Know that on a chromatogram, one spot means that the substance is pure. An impure substance produces two or more spots.**	**Know how to identify characteristics of each group of organisms.** **Know that use classification keys.** **Know how to classify conductors and insulators** **Know how to use a bar chart to represent effectiveness of each conducting material and insulator.**	**large temperature change, bubbles, or a colour change.** **Know that resistance is measured in units called ohms (Ω).** **Know that resistance is calculated using the equation: Resistance = potential difference ÷ current** **Know that voltmeters are used to measure the potential difference across components.**	**Know that this is the general word equation for the reaction: metal + acid → salt + hydrogen** **Know how to observe an acid and metal reaction by recording visible changes in a results table e.g. formation of a salt, bubbles, temperature change**	**Know that sounds waves are measured in hertz (Hz)** **Know how to represent energy transfer within an ecosystem using a food web diagram.**	**Know that time is measured in seconds.** **Know that distance is measured in metres.** **Know how to calculate speed using the speed equation - speed = distance divided by time.** **Know how to rearrange speed equations.**
National Curriculum reference		The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms. The concept of a pure substance	Differences in resistance between conducting and insulating components (quantitative). Differences between species	Chemical reactions as the rearrangement of atoms Representing chemical reactions using formulae and using equations Combustion reaction	The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. Reactions of acids with metals to produce a salt plus hydrogen	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	Conservation of material and of mass, and reversibility, in melting, freezing, evaporation, sublimation, condensation, dissolving

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	Mixtures, including dissolving Diffusion in terms of the particle model Simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography		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).	Reactions of acids with alkalis to produce a salt plus water	oxygen and carbon dioxide in the atmosphere 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	Speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) The representation of a journey on a distance-time graph
Exemplar Composite Task(s)	**BLO1:** Label the main organ systems. **BLO1:** Explain the function of the main organ systems.	**PLO1:** Plot a bar chart showing the effectiveness of different conductors. **PLO2:** Plot a bar chart showing the effectiveness of different insulators.	**CLO1:** Observe evidence of chemical reactions. **PLO2:** Build a simple circuit to investigate the effect of different voltages and plot these in a table	**BLO1:** Create a poster describing the effects of drugs on physical and mental health of humans.	**PLO1:** Label a diagram of the ear. **PLO1:** Label the characteristics of a sound wave.	**CLO1:** Create a poster describing the water cycle in Burnley. **PLO2:** Use a motion graph to describe your journey to school.

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	CLO2: Describe how to identify an impure substance using a chromatogram.	**BLO3:** Use classification keys to classify organisms in 3 different habitats		**CLO1:** Name the products of acid-base and acid-metal reactions in a table.	**PLO1:** Create a musical instrument using basic materials. **CLO2:** Create a poster describing the carbon cycle in Burnley.	