Science Year 9 Curriculum Maps

Year 9	Theme	Key themes	I will be able to ...	I will also be developing my investigative skills
HT1	Cells and cell transport	Prokaryotes Eukaryotes Microscopy Mitosis Stem cells Diffusion	Know the structural differences between different types of cells. Know the function of different types of cells. Calculate magnification. Understand how cells replicate during mitosis. Know that stem cells are undifferentiated types of cells which can be used in a variety of applications. Know that diffusion is the movement of particles from an area of high concentration to an area of low concentration	Preparing microscope slides and viewing them at different magnifications. Scientific drawing of cells Investigating how the concentration affects the rate of diffusion
	Enzymes and digestion	Cells tissues organs of the digestive system Food groups Food tests Enzymes	label the main parts of a digestive system diagram and state functions of the parts. give a detailed description of the digestion of the major food types including enzyme names.	To use chemical tests to identify carbohydrate, protein, and fat. Investigate how pH affects enzyme activity.
Assessment: Cells and cell transport and Enzymes and digestion				

HT2	Atomic structure and the Periodic Table	Atoms - Atomic structure Elements Compounds Mixtures History of atomic structure Electron arrangement History of the Periodic Table Periodic Patterns	Explain different methods of separating mixtures. Describe the reaction of an unfamiliar Group 1, 7 and 0 element. Use data showing a pattern in physical properties to estimate a missing value for an element. Use observations of a pattern in chemical reactions to predict the behaviour of an element in a group.	Make and interpret a chromatogram. Investigate metal and non-metal oxides
	Reactions	Particles Collision theory Catalysts	Know how reaction rates are calculated. Know the function of a catalyst. Describe and explain how different factors affect the rate of a chemical reaction	Plan and carry out an investigation into how concentration affects the rate of a chemical reaction. Investigate how the surface area affects the rate of a chemical reaction
Assessment: Atomic structure and the Periodic Table and Reactions				

HT3	Particles	Kinetic theory Matter Changes of state Density	Explain the properties of a solid, liquid and gas in terms of the particle diagram. define melting, boiling, condensing and freezing. explain the difference between boiling and evaporation. define sublimation and give an example. compare materials in terms of density.	measure the density of regular and irregular solids in grams per centimetre cubed (g/cm3).
	Energy	Energy store Energy pathways Efficiency Energy resources	Explain conservation of energy Calculate efficiency. Name several renewable energy resources and describe the advantages and disadvantages of them.	Gather and process evidence to investigate insulation
**** Assessment: Cells and cell transport and Enzymes and digestion Atomic structure and the Periodic Table and Reactions Particles and Energy****				

HT4	Bioenergetics	Photosynthesis Respiration	State that the leaves are where photosynthesis occurs and to describe their main adaptations. Identify the internal tissues of a leaf and state their functions. describe the tests for the presence of starch in leaves and explain why glucose is built up into starch for storage. *to* explain why heart rate increases with exercise.	design an investigation and explain how environmental factors may affect the rate of photosynthesis. 'The effects of exercise' – investigate the effect of activity level on heart rate
	Evolution	Variation Inheritance Evolution	Distinguish between inherited and environmental variation. Describe genes and know that they are responsible for inherited characteristics. How their gender is decided and how particular features are inherited. Explain the inheritance of a particular feature such as hair colour, using the correct terminology.	

			Explain how the chances of inheriting a particular characteristic are calculated. Describe some of the contributions made by Charles Darwin to the theory of evolution. Explain the advantages and disadvantages of selective breeding with specific examples.	
Biology Assessment: Cells and cell transport and Enzymes and digestion Bioenergetics Evolution				

HT5	Chemical Changes	Ions Chemical formulae Balanced equations Acids and Alkalis Neutralisations	state that when a metal reacts with an acid, a metal salt and hydrogen gas are formed. recall that acids react with metal carbonates to produce a salt, water and carbon dioxide. explain, chemically, what happens during neutralisation and plan to make a salt safely.	Carry out a neutralisation reaction and to be able to make a sample of a salt.
	Copper Cycle	Reactivity series Displacement Extraction of metals Copper extraction Alloys Composites	Explain the sequence of the metals in the reactivity series. State that a more reactive metal will displace a less reactive one Know that all metals are found in and extracted from the Earth's crust. Recognise that unreactive metals are found native and explain why carbon can be used to extract iron. Explain that an alloy is a mixture of metals	Use the reactivity series to predict whether a displacement reaction will take place.
**** Year 9 assessment****				

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HT6	Forces	Forces Springs Moments	Explain whether an object in an unfamiliar situation is in equilibrium. Describe how materials behave as they are stretched or squashed. Describe what happens to the length of a spring when the force on it changes. Describe factors which affect the size of frictional and drag forces. *Know* the location of the pivot, effort force and load force on a simple lever in action. state that the turning effect of a force is called its moment *and* calculate the moment due to a force acting around a pivot. Use the principle of moments to decide if an object is balanced or in which direction it would rotate.	Investigate Hooke's Law Investigating the principle of moments
	Pressure	Pressure	Use diagrams to explain observations of fluids in terms of unequal pressure. Explain observations where the effects of forces are different because of differences in the area over which they apply.	Investigate how pressure from your foot onto the ground varies with different footwear

			Given unfamiliar situations, use the formula to calculate fluid pressure or stress on a surface.	
Physics Assessment: Forces Pressure Energy Particles				