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SUBJECT: Science ***YEAR GROUP/PATHWAY: Year 10 GCSE***		
Autumn 1	**Biology – Infection and Response**	**Biology – Infection and Response**
Knowledge	Core: Communicable Diseases	Core: Non-Communicable Diseases
Knowledge & Skills	Core – students to demonstrate understanding of: - Communicable (infectious) diseases - Preventing the spread of disease - Viral diseases - Bacterial diseases - Fungal diseases - Protist diseases - Human defence systems – non-specific - Human defence systems – specific - Vaccination - Antibiotics and painkillers - Discovery and development of drugs - Medical testing	Core – students to demonstrate understanding of: - Non-communicable diseases - Coronary heart disease - Health and mental well-being - The effect of lifestyle - Cancer
Vocabulary	Infectious Disease Protists Pathogens Vaccination Viral Disease Fungal Disease Bacterial Disease Antibodies Antitoxins Vaccination Antibiotics Medicinal Testing	Non-Infectious Lifestyle Health Well-Being
Autumn 2	**Biology – Bioenergetics**	**Biology – Bioenergetics**
Knowledge	Core: Photosynthesis	Core: Respiration

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Knowledge & Skills	Core – students to demonstrate understanding of: - Photosynthetic reaction - Rate of photosynthesis (Requires Practical) - Uses of glucose from photosynthesis	Core – students to demonstrate understanding of: - Aerobic respiration - Anaerobic respiration - Fermentation - Response to exercise - Metabolism	
Vocabulary	Photosynthesis Glucose	Aerobic Respiration Fermentation Anaerobic respiration Metabolism	
Spring 1	**Chemistry – Chemical Changes**	**Chemistry – Chemical Changes**	**Chemistry – Chemical Changes**
Knowledge	Core: Reactivity of Metals	Core: Concentration & Reactions of Acids	Core: Electrolysis
Knowledge & Skills	Core – students will demonstrate understanding of: - Metals react with oxygen to produce metal oxides - The reactions are oxidation reactions because the metals gain oxygen - When metals react with other substances the metal atoms form positive ions. The reactivity of a metal is related to its tendency to form positive ions - Metals can be arranged in order of their reactivity in a reactivity series - The non-metals hydrogen and carbon are often included in the reactivity series - A more reactive metal can displace a less reactive metal from a compound - Unreactive metals such as gold are found in the Earth as the metal itself but most metals are found as compounds that require chemical reactions to extract the metal	Core – students will demonstrate understanding of: - Acids react with some metals to produce salts and hydrogen - Acids are neutralised by alkalis (eg soluble metal hydroxides) and bases (eg insoluble metal hydroxides and metal oxides) to produce salts and water, and by metal carbonates to produce salts, water and carbon dioxide - Soluble salts can be made from acids by reacting them with solid insoluble substances, such as metals, metal oxides, hydroxides or carbonates - The solid is added to the acid until it no more reacts and the excess solid is filtered off to produce a solution of the salt - Salt solutions can be crystallised to produce solid salts - Acids produce hydrogen ions (H^+) in aqueous solutions	Core – students will demonstrate understanding of: - When an ionic compound is melted or dissolved in water, the ions are free to move about within the liquid or solution - These liquids and solutions are able to conduct electricity and are called electrolytes - Passing an electric current through electrolytes causes the ions to move to the electrodes - Positively charged ions move to the negative electrode (the cathode), and negatively charged ions move to the positive electrode (the anode) - Ions are discharged at the electrodes producing elements. This process is called electrolysis. - When a simple ionic compound (eg lead bromide) is electrolysed in the molten state using inert electrodes, the metal (lead) is

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	- Metals less reactive than carbon can be extracted from their oxides by reduction with carbon - Reduction involves the loss of oxygen	- Aqueous solutions of alkalis contain hydroxide ions (OH^-) - The pH scale, from 0 to 14, is a measure of the acidity or alkalinity of a solution, and can be measured using universal indicator or a pH probe - A solution with pH 7 is neutral. Aqueous solutions of acids have pH values of less than 7 and aqueous solutions of alkalis have pH values greater than 7 - In neutralisation reactions between an acid and an alkali, hydrogen ions react with hydroxide ions to produce water - Many chemical reactions take place in solutions. The concentration of a solution can be measured in mass per given volume of solution, e.g. grams per dm^3 (g/dm^3)	produced at the cathode and the non-metal (bromine) is produced at the anode - Metals can be extracted from molten compounds using electrolysis - Electrolysis is used if the metal is too reactive to be extracted by reduction with carbon or if the metal reacts with carbon - Large amounts of energy are used in the extraction process to melt the compounds and to produce the electrical current
Vocabulary	Displacement Reaction Combustion Reaction Decomposition Reaction Oxidation Reduction	Acids Alkali Neutralisation	Electrolyte Electrolysis Extraction Electrode

Spring 2	Chemistry – The Rate and Extent of Chemical Change	Chemistry – The Rate and Extent of Chemical Change	Chemistry – Energy Changes
Knowledge	Core: Rates of Reaction	Core: Reversible Reaction and Dynamic Equilibrium	Core: Exothermic and Endothermic Reactions
Knowledge & Skills	Core – students will demonstrate understanding of: - The rate of a chemical reaction can be found by measuring the quantity of a reactant used or the quantity of product formed over time	Core – students will demonstrate understanding of: - In some chemical reactions, the products of the reaction can react to produce the original reactants	Core – students will demonstrate understanding of: - Energy is conserved in chemical reactions. The amount of energy in the universe at the end of a chemical reaction is the same as before the reaction takes place

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	- Factors which affect the rates of chemical reactions include: the concentrations of reactants in solution, the pressure of reacting gases, the surface area of solid reactants, the temperature and the presence of catalysts - Collision theory explains how various factors affect rates of reactions. According to this theory, chemical reactions can occur only when reacting particles collide with each other and with sufficient energy - The minimum amount of energy that particles must have to react is called the activation energy - Increasing the concentration of reactants in solution, the pressure of reacting gases, and the surface area of solid reactants increases the frequency of collisions and so increases the rate of reaction - Increasing the temperature increases the frequency of collisions and makes the collisions more energetic, and so increases the rate of reaction - Catalysts change the rate of chemical reactions but are not used up during the reaction. Different reactions need different catalysts - Enzymes act as catalysts in biological systems - Catalysts increase the rate of reaction by providing a different pathway for the reaction that has lower activation energy	- If a reversible reaction is exothermic in one direction, it is endothermic in the opposite direction. The same amount of energy is transferred in each case - When a reversible reaction occurs in apparatus which prevents the escape of reactants and products, equilibrium is reached when the forward and reverse reactions occur at exactly the same rate	- If a reaction transfers energy to the surroundings the product molecules must have less energy than the reactants, by the amount transferred. - An exothermic reaction is one that transfers energy to the surroundings so the temperature of the surroundings increases - Exothermic reactions include combustion, many oxidation reactions and neutralisation - An endothermic reaction is one that takes in energy from the surroundings so the temperature of the surroundings decreases - Chemical reactions can occur only when reacting particles collide with each other with sufficient energy.

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Vocabulary	Activation energy Collision Theory Catalyst	Reversible Reaction Dynamic Equilibrium	Exothermic Endothermic
Summer 1	**Physics – Electricity**	**Physics - Electricity**	**Physics - Electricity**
Knowledge	Core: Current, Potential Difference & Resistance	Core: Series & Parallel Circuits	Core: Domestic Uses & Safety / Energy Transfer
Knowledge & Skills	Core – students to demonstrate understanding of: - How to draw circuit symbols - Electric currents are the flow of charge - Equation for electric current as the rate of flow of charge should be known - The current in a series circuit - How the resistance of a component affects the current through it - How potential difference, current and resistance are linked - Equation linking potential difference, current and resistance should be known - How to find the resistance of electrical components by experiment - Ohm's law and the conditions needed for it to apply - Current-potential difference graphs for electrical components - How the resistance of electrical components changes with external condition - Current-potential difference graphs for electrical components	Core – students to demonstrate understanding of: - Series and parallel circuits - Properties of series circuits and adding resistors in series - Properties of parallel circuits including giving the upper limit of resistance when resistors are added in parallel - Resistance in series and in parallel circuits	Core – students to demonstrate understanding of: - Alternating and direct potential difference - Mains electricity supply - The name, colour and function of each wire in a three-core electrical cable - Electrical power and how it is calculated. - Equations for electrical power should be known - Energy transfers in everyday appliances - Work done when charge flows - Calculating the amount of energy transferred - Equations for energy transfer should be known - The National Grid
Vocabulary	Circuit Current Electric Current Potential Difference Voltage Ohm's Law Resistance	Series Circuit Parallel Circuit	National Grid

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Summer 2	Physics – Particle Model of Matter	Physics – Particle Model of Matter	Physics – Atomic Structure
Knowledge	Core: Changes of State and Particle Model	Core: Internal Energy and Energy Transfer	Core: Atoms, Isotopes and Nuclear Radiation
Knowledge & Skills	Core – students to demonstrate understanding of: - How to determine the density of a material - Equation for density should be known - The particle model of matter - The particle model of matter to explain density of materials - Changing the state of a substance - Chemical and physical changes - Using the particle model of matter explain motion of particles in a gas - How gases exert forces on the walls of their containers - How changing the temperature of a gas affects the pressure exerted	Core – students to demonstrate understanding of: - Internal energy of a system - Heating and temperature - Specific heat capacity - Specific latent heat	Core – students to demonstrate understanding of: - The size and structure of an atom. - Mass number, atomic number and isotopes - The development of the model of the atom - Radioactive decay and nuclear radiation - The nature of different types of nuclear radiation - The ionizing power and penetration of alpha, beta and gamma radiation through different materials - Nuclear equations - Half-lives and the random nature of radioactive decay - Radioactive contamination - The process and uses of irradiation - Safety precautions taken when dealing with radioactive sources
Vocabulary	Particle Model Density	Specific Heat Capacity Specific Latent Heat	Radiation