Curriculum Map

Subject: Combined Science

Year:10

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Content Knowledge	**C6 - Electrolysis** What is electrolysis Extraction of aluminium Electrolysis of Solutions **C6 Knowledge:** Know how electrolysis works Understand why electrolysis only works with ionic compounds What happens to ions during electrolysis How does water affect the products of electrolysis How to extract aluminium Products from the electrolysis of brine **Required Practical** Investigating the electrolysis of different solutions **C7 - Energy Changes** Exo and Endothermic reactions Reaction Profiles Bond Energy Calculations **C7 Knowledge:** How to distinguish between exo and endothermic reactions Where exo and	**P5: Electricity in the home** Alternating current Cables and Plugs Electrical power and potential difference Electrical current and energy transfer Appliances and energy efficiency **B8 - Bioenergetics: Photosynthesis** Plant cells and chloroplast Rate of photosynthesis Glucose Optimising photosynthesis **Chapter B8 Knowledge:** Recognise the need for photosynthesis in plants and the role that plant cells and their chloroplasts play. Describe the process of photosynthesis identifying the reactants and products. Describe factors that affect the rate of photosynthesis. Describe how plants use the glucose produced in photosynthesis. **Required Practical:** Light intensity and the rate of photosynthesis	**P6: Molecules and Matter:** Density States of Matter Internal Energy Specific Latent Heat Gas Pressure and Temperature **Required Practical:** Calculating Densities of objects (solids and liquids) **P7 Radioactivity:** Atoms and Radiation Discovery of the Nucleus Alpha, Beta and Gamma Radiation Activity and Half-life **Chapter B10 Knowledge:** Identify why it is important for the body to maintain an internal balance. Describe how the body maintains homeostasis. Recall parts of the central nervous system. Explain how a reflex occurs and the role of synapses. **Required Practical:** Measuring reaction times	**C8 - Rates and Equilibrium** Rates of Reactions Collision Theory Factors affecting collision theory Reversible Reactions Dynamic Equilibrium **C8 Knowledge:** Different ways of measuring rates of reactions Know the factors that affect the rate of reaction Explain how different factors affecting collision theory affect the rate of reaction Know what a reversible reaction is and how to represent them What happens in the energy transfers in reversible reactions **Required Practical** Investigating how concentration and mass can affect the rate of reaction.	**C9 - Crude Oil and Fuels** Content: Hydrocarbons Fractional Distillation Burning fuels Cracking **C9 Knowledge:** Know the composition of crude oil Naming and representing alkanes Process of fractional distillation Identify the different types of combustion Know why we need to crack long chain hydrocarbons **P8 Forces in Balance:** Vectors and Scalars Resultant Forces Centre of Mass Resolution of Forces	**B15 - Adaptations, interdependence, and competition:** Competition in animals and plants Adaptations in animals and plants **Chapter B15 Knowledge:** Know what animals and plants compete for. List different adaptations plants and animals have and describe how these adaptations aid in their survival. **P9 Motion:** Speed and Distance-Time Graphs Velocity and acceleration Analysing Motion Graphs **P10 Force and Motion:** Force and acceleration Weight and terminal velocity Forces and breaking **Required Practicals:** Investigating the relationship between force and acceleration Investigating the relationship between force and the extension of a spring

	endothermic reactions are used in everyday life How to draw simple reaction profiles Calculating the over energy change of a reaction **Required Practical** Investigating temperature changes of different reactions **B4 Organising Animals and Plants** The blood Blood vessels **Chapter B4 Knowledge:** Describe the components of the blood and how it travels around the body. Describe structural differences in arteries, veins, and capillaries.	**B9 - Bioenergetics: Respiration** Aerobic vs. Anaerobic respiration Exercise and the body Oxygen debt Fermentation **Chapter B9 Knowledge:** Explain the difference between aerobic and anaerobic respiration. Explain what is meant by an oxygen debt. Know that anaerobic respiration takes place in different organisms and how it differs in each.				
Skills	Representing the reactions occurring at each electrode as a half equation Predicting the products of the electrolysis of aqueous solutions Recording information from a practical Identifying the risks and hazards of a practical Plan an investigation on identifying temperature change for different solutions. Evaluate the uses and applications of exo and endothermic reactions	Writing word and chemical equation for photosynthesis Quantitatively test the rate of photosynthesis Qualitatively test exercise affects pulse Learning how to wire a plug Calculating power, charge, energy transferred and efficiency	Qualitatively test reaction times Interpret data from tables and graph To be able to construct and complete radioactivity decay equations correctly Calculating density using calculations and practical method. Manipulating equations for latent heat of fusion and vaporization	Calculating the rate of a reaction at a specific time. Planning a practical Interpreting graphs Linking the changes in condition with the composition of a reaction Evaluating the uses of catalysts	Drawing and representing chemicals Writing balanced equations for complete and incomplete combustion To be able to use and manipulate f = ma equation	To recall and identify correct scientific knowledge Interpret data from tables and graph To be able to use stopwatch accurately

	when given appropriate information Identify reaction profiles for exo and endothermic reactions Calculate the overall energy change for a reaction To recall and identify correct scientific knowledge To be able to draw and analyse graphs correctly					
Key Questions	How can we decompose ionic compounds to get useful products? Why do chemical reactions always involve energy transfers? What is blood? How does blood travels around the body and what does it carry?	How do plants use the glucose they make during photosynthesis? How does exercise affect breathing and heart rate? What type of current supplies our homes? How can we tell if our appliances are efficient? How can we calculate the power of an appliance? What is charge? Which fuse do we use for different appliances?	What were the key discoveries that led to the development of the model of the nuclear model of the atom? How does the nervous system help with survival? What factors affect reaction times? What is homeostasis and why is it so important? How can a liquid become a solid or gas? Why are objects lighter than others?	How are reaction rates affected by changing conditions? How can you work out the acceleration of an object from a speed-time graph?	How is a range of useful products obtained from crude oil?	What is adaptation and why is it so important? Why do falling objects not constantly speed up?
Assessment	Diagnostics Test End of Chapter Test ReAct Task	Diagnostics Test End of Chapter Test ReAct Task Joint chapter assessment	Diagnostics Test End of Chapter Test ReAct Task	Diagnostics Test End of Chapter Test ReAct Task	Diagnostics Test End of Chapter Test ReAct Task Mock exams	Diagnostics Test End of Chapter Test ReAct Task

Literacy/numeracy/SMSC/Character	**Numeracy:** Balancing Equations Recording data in a table. Interpreting mass and atomic number notation in radioactive decay equations **Chemistry Keywords:** electrolyte, anode, cathode, inert, brine **Numeracy:** Recording data Calculating energy changes, calculating resultant force and moments and order of magnitude Interpreting and analysing graphs correctly and calculating gradients and tangents **Biology Key words:** division, differentiation, somatic, meristem, cloning, tissue, organ, organ system, organism, carbohydrate, lipid, protein, digestion, platelets, plasma, arteries, veins, capillaries **Chemistry Keywords:** exothermic, endothermic, activation energy, bond energy. **SMSC:** Is electrolysis the most environmentally friendly way to extract aluminium? Working together to collect data.	**Biology Key words:** metabolism, respiration, oxygen debt, **Physics Key words:** Current, Voltage, Charge, Potential Difference, Resistance. Power, efficiency, direct and alternate current, fuse	**Numeracy:** Interpreting data and graphs, calculating mean **Biology Key words:** homeostasis, reflex, synapse **Physics Key words:** Alpha, Beta, Gamma Radiation, Atomic Number, Mass Number, Isotopes, Ionisation, Irradiation, Activity, Count Rate, Chain Reaction. **Key words:** Density, Physical Changes, Changing State, Melting Point, Boiling Point, Freezing Point, Internal Energy, Specific Latent Heat of Fusion, Specific Latent Heat of Vaporisation **Numeracy:** Calculating specific latent heat and order of magnitude **Numeracy:** Interpreting data and graphs, calculating percentage, drawing graphs	**Numeracy:** Calculating Tangents Recording Data in a table **Chemistry Keywords**: Rate, collision theory, activation energy, gradient, tangent, catalysts, reversible reactions, hydrated, anhydrous, equilibrium **Physics Key words:** Displacement, Vector, Scalar, Magnitude, Newton's 1st and 3rd Law, Friction, Resultant Force, Moment, Gradient, acceleration, deceleration, tangent, **SMSC:** How can moments help to lift heavy object	**Numeracy:** Rearranging equations Calculating the formulae of common functional groups Balancing equations **Chemistry Keywords**: mixture, hydrocarbons, fractions, alkanes, saturated, flammable, fractional distillation, oxidise, cracking, unsaturated. **Physics Key words:** Newton's 2nd Law, Weight, Mass, Terminal Velocity, upthrust, air resistance, Gravitational field strength. **SMSC:** - Working together to carry out a practical. - Evaluating the uses of catalysts in Is crude oil good for our environment or should we use alternative sources?	**Key words:** adaptation, surface area: volume, photosynthesis, respiration, combustion, precipitation, decomposer, scavenger, producer, consumer, predator, prey **Numeracy:** Interpreting data and graphs, calculating surface area:volume Calculating momentum and order of magnitude **Physics Key words:** Newton's 2nd Law, Weight, Mass, Terminal Velocity, Gravitational field strength.

	Working together to plan an investigation					
Enrichment opportunities and futures	STEM Club Visiting the Science Museum Watching the Royal institution on Youtube Visiting the Summer Fayre at the Royal Society of Chemistry Researching the uses of Crude Oil Visiting the Science Museum in Central London Investigate how radiation is used in hospitals (ie. CT scanners, PET scanners etc) Visiting Body World's exhibition in Leicester square- Get up close to real bodies and examine their organs and systems					