



SUBJECT: SCIENCE

Year Group	YEAR 10					
Rationale	Students build on the content studied in key stage three. Pupils continue to develop their knowledge and understanding of Biology, Chemistry and Physics, tackling more challenging concepts to a greater depth than they have done previously. Students continue to develop scientific skills, directly linked to the required practicals including forming hypotheses, writing methods, using scientific equipment effectively as well as presenting and analysing results. Pupils will also continue to develop their understanding of the key scientific terms related to working scientifically. Pupils work through the units in rotation during the course of the year.					
	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Topic/Unit	Biology: Cell Biology Chemistry: Atomic Structure & the Periodic Table Physics: Energy	Biology: Organisation Chemistry: Bonding, Structure & the Properties of Matter Physics: Electricity	Biology: Infection & Response Chemistry: Quantitative Chemistry	Biology: Bioenergetics Chemistry: Chemical Changes Physics: Particle Model of Matter	Chemistry: Electrolysis & Energy changes Physics: Atomic Structure	Biology: Ecology Chemistry: The Rate & Extent of Chemical Change
Knowledge	Biology <ul style="list-style-type: none"> Animal, Plant and Bacterial Cells Cell Specialisation and Differentiation Using Microscopes Cell Division and Mitosis Stem Cells Transport in Cells Chemistry <ul style="list-style-type: none"> Atomic Structure Chemical Formula Separating Mixtures Atoms, Ions and Isotopes Development of the Atom The Periodic Table History of the Periodic Table Balancing Symbol Equations Physics <ul style="list-style-type: none"> Energy Stores Energy Transfers Conservation and Dissipation of Energy Thermal Conductivity National and Global Energy Resources 	Biology <ul style="list-style-type: none"> Animal Tissues, Organs and Organ Systems Digestive System and Enzymes Food Tests Heart and Blood Vessels Blood Heart Disease Chemistry <ul style="list-style-type: none"> States of Matter Ionic Bonding Covalent Bonding Fullerenes and Graphene Metallic Bonding Nanoparticles (Chemistry Only) Physics <ul style="list-style-type: none"> Current, Potential Difference and Resistance Series and Parallel Circuits. Ohm's Law Domestic Uses and Safety Electrical Energy Transfers. Static Electricity (Physics only). 	Biology <ul style="list-style-type: none"> Health and Non-Communicable Diseases Pathogens and Communicable Diseases Defence against Disease Treatment of Disease Cancer Developing Drugs and Drug Trials Culturing Micro-organisms (Biology Only) Plant Diseases and Defences (Biology Only) Monoclonal Antibodies (Biology Only) Chemistry <ul style="list-style-type: none"> Isotopes Conservation of Mass Relative Formula Mass Moles Limiting Reactants Concentration 	Biology <ul style="list-style-type: none"> Plant Tissues, Organs and Organ Systems Transport in Plants Photosynthesis Aerobic Respiration Anaerobic Respiration Metabolism Chemistry <ul style="list-style-type: none"> Reactivity of Metals Oxidation and Reduction Extraction of Metals Metal and Acid Reactions Acids, Alkalis and pH Scale Neutralisation Making Soluble Salts Physics <ul style="list-style-type: none"> Changes of State and the Particle Model. Density. Internal Energy. Specific Heat Capacity and Specific Latent Heat. Particle Model and Pressure. Pressure in Gases (Physics only). 	Chemistry <ul style="list-style-type: none"> Electrolysis Endothermic and Exothermic Reactions Reaction Profile Diagrams Bond Energies Chemical Cells and Batteries (Chemistry Only) Fuel Cells (Chemistry Only) Physics <ul style="list-style-type: none"> Atoms and Isotopes. Nuclear Radiation. Hazards and Uses of Radiation (Physics only). Background Radiation (Physics only). Nuclear Fission and Fusion (Physics only). 	Biology <ul style="list-style-type: none"> Ecosystems and Feeding Relationships Biotic and Abiotic Factors Plant and Animal Adaptations Using Quadrats and Transects Water and Carbon Cycle Biodiversity and Waste Management Deforestation Peat Bogs Global Warming Decomposition (Biology Only) Impact of Environmental Change (Biology Only) Trophic Levels and Pyramids of Biomass (Biology Only) Food Production (Biology Only) Chemistry <ul style="list-style-type: none"> Rate of Reaction Calculating Rate of Reaction Increasing Rate of Reaction



			<ul style="list-style-type: none"> • <i>Titration</i>s (Chemistry Only) • <i>Percentage Yield</i> (Chemistry Only) • <i>Atom Economy</i> (Chemistry Only) • <i>Volume of Gas</i> (Chemistry Only) 			<ul style="list-style-type: none"> • Reversible Reactions • Dynamic Equilibrium
Skills	Biology: Microscopy: - Pupils will use a light microscope to observe, draw and label biological specimens. Osmosis: - Pupils will investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue. Physics: Thermal insulation (Physics Only) - Pupils will investigate the effectiveness of different materials as thermal insulators and the factors that may affect the thermal insulation properties of a material.	Biology: Food Tests: - Pupils will use qualitative reagents to test for a range of carbohydrates, lipids and proteins. including: Benedict's test for sugars, iodine test for starch and Biuret reagent for protein. Enzymes: - Pupils will investigate the effect of pH on the rate of reaction of amylase enzyme. Physics: Resistance - Pupils will use circuit diagrams to set up and check appropriate circuits to investigate the factors that affect the resistance of an electrical circuit. - Pupils will use circuit diagrams to construct appropriate circuits to investigate the I-V characteristics of a variety of circuit elements including a filament lamp, a resistor and a diode at constant temperature.	Biology: Microbiology (Biology Only): - Pupils will investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition.	Biology: Photosynthesis: - Pupils will investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed. Chemistry: Making Salts - Pupils will prepare a pure, dry sample of a soluble salt from an insoluble oxide or carbonate using a Bunsen burner to heat dilute acid and a water bath to evaporate the solution. <i>Neutralisation (Chemistry Only)</i> - Pupils will determine the reacting volumes of solutions of a strong acid and a strong alkali by titration. Physics: Density - Pupils will use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. Specific Heat Capacity	Chemistry: Electrolysis - Pupils will investigate what happens when aqueous solutions are electrolysed using inert electrodes. Temperature changes - Pupils will Investigate the variables that affect temperature change in chemical reactions	Biology: Field Investigations: - Pupils will measure the population size of a common species in a habitat, using sampling techniques to investigate the effect of a factor on the distribution of this species. <i>Decay (Biology Only)</i> - Pupils will investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change. Chemistry: Rates of reaction - Pupils will investigate how changes in concentration affect the rates of reactions by both measuring the volume of a gas produced and monitoring a change in colour or turbidity.



				- Pupils will determine the specific heat capacity of one or more materials.		
Assess-ments	Biology: Cells Biology Exam Style Questions Assessment Chemistry: Atomic Structure & the Periodic Table Exam Style Questions Assessment Physics: Energy Exam Style Questions Assessment	Biology: Organisation Exam Style Questions Assessment Chemistry: Bonding, Structure & the Properties of Matter Exam Style Questions Assessment	Biology: Infection & Response Exam Style Questions Assessment Chemistry: Quantitative Chemistry Exam Style Questions Assessment Physics: Electricity Exam Style Questions Assessment	Biology: Bioenergetics Exam Style Questions Assessment Chemistry: Chemical Changes Exam Style Questions Assessment Physics: Particle Model of Matter Exam Style Questions Assessment	Chemistry: Electrolysis & Energy Changes Exam Style Questions Assessment Physics: Atomic Structure Exam Style Questions Assessment End of Year Ten Exam: Pupils will complete three exam papers, one in biology, one in chemistry and one in physics covering the GCSE paper one content.	Biology: Ecology Exam Style Questions Assessment Chemistry: The Rate & Extent of Chemical Change Exam Style Questions Assessment