Year 7	Year 8	Year 9	Year 10 (B C P = triple only)	Year 11
Introduction - Hazards and Safety - Science equipment - Science investigations – variables, risk assessment, drawing a results table, drawing a line graph, writing a conclusion **Cells & Theories** **- '**MRS GREN' - Identification of the different parts of animal and plant cells and their functions - Use of microscope - Specialised cells and functions -Cell division including mitosis - Single celled organisms including microbes - Tissues and organs -Names and functions of plant cells -Photosynthesis and respiration in plants **Particle & Models** - Scientific ideas that have changed over time to make new observations - Properties of solids, liquids and gases - Particle model of solids, liquids and gases - Change of state - Particle theory and change of state	**Food, Digestion & Graphs** - Identifying food groups - Describing food tests and making observations - Balanced diet and analysing nutritional content in a meal - Poor diets and health risks including obesity, starvation and deficiency diseases - Parts of the digestive system and how food is digested - How food is absorbed in the small intestine and the structure of the villi - Function of enzymes - Effect of temperature and pH on enzymes	**Inheritance & Theories** - Reproduction in humans - Genes, chromosomes and DNA structure - Variation between organisms - Gregor Mendel and monohybrid crosses - Natural selection - Biodiversity and maintaining biodiversity - Extinction and reasons why species become extinct - Sampling techniques and estimating population sizes	**Infection** Pathogens Culturing and bacteria numbers (B) Diseases Protista Body defences Vaccination Antibiotics Painkillers Developing drugs Monoclonal antibodies (B) Plant disease Plant defences (B) **Bioenergetics** Photosynthesis Rate of photosynthesis Limiting factors Uses of Glucose Aerobic respiration Anaerobic respiration Exercise Metabolism **Ecology** Classification Communities Biotic and Abiotic factors Distribution Adaptations: animals, plants, extreme. Levels of organisation Food chains	**Inheritance** DNA Structure (B) Reproduction Asexual vs Sexual (B) Meiosis Protein synth (B) Inheritance Gender Genetic disorders Screening Mendel (B) GM Cloning (B) Variation Selective breeding Extinction Mutation Natural selection Speciation (B) Darwin (B) Evolutionary trees Fossils Resistant Bacteria **Ecology** Classification Communities Biotic and Abiotic factors Distribution Adaptations: animals, plants, extreme. Levels of organisation Food chains Trophic levels and pyramids (B) Nutrient cycles

- Pressure - Diffusion - Pure or mixture - Filtration - Crystallisation - Distillation - Chromatography			Trophic levels and pyramids (B) Nutrient cycles Decomposition (B) Biodiversity Waste Management Land use and deforestation	Decomposition (B) Biodiversity Waste Management Land use and deforestation
Forces & Graphs - Introduction to forces - Floating, sinking and upthrust - Stretching materials and Hookes's law - Deformation and compression - Friction - Balanced and unbalanced forces - Calculating and measuring speed and stopping distances **Reproduction** - Structure of a flower - Insect and wind pollination – Seed and fruit formation - Seed dispersal and its effectiveness - Human reproductive systems & fertilisation - Pregnancy and the role of the placenta - Puberty in boys and girls	**Reactions** - Physical or chemical - Revision of atoms and ions - Revision of bonds and chemical formula - Word equations - Symbol equations - Balancing equations - Burning - Metal and oxygen - Exothermic and endothermic reactions - Catalysts **Heating, Cooling & Reliability** - Difference between temperature and energy - Interpreting cooling curves - Conduction - Expansion and contraction, and application to real life designs - Convection - Radiation - Change of state - Evaporation - Insulation and how insulators reduce conduction, convection and radiation - Brownian motion	**Metals** - Revision of elements and compounds - Revision of the periodic table - Properties of metals and non-metals (including ceramic, polymers, and composites) - Alloys - Nano and SI units - Revision of word and symbol equations - Reactivity series - Extraction of metals - Displacement reactions - Rusting - Thermal decomposition **Energy & Numeracy** - Energy stores and the law of conversation - Energy changes - Energy transformations (Energies at the start and end of a transformation) - Sankey diagrams and efficiency - Calculating power - Reducing heat loss in homes - Calculating payback times	Global warming Maintaining biodiversity Impact of environmental change (B) Food security (B) Farming (B) Fisheries (B) Biotechnology (B) **Chemical Change** Metal oxides Reactivity series Purifying metals OIL RIG Metal + Acid Crystallisation Making salts Neutralisation (C) Conc and weak acids Electrolysis Aluminium Brine Half equations **Quantitative Chemistry and energy** Conservation of mass Equations Ar, Mr, Empirical formula Changes in Mass Moles	**Analysis** Purity Formulations Chromatography Rf values Gas tests Flame tests (C) Identifying ions (C) Carbonates (C) Halides (C) Sulphates (C) Spectroscopy (C) CSI (C) **Organic Chemistry** Crude oil Hydrocarbons Fractional distillation Cracking Alkenes (C) Alcohols (C) Carboxylic acids (C) Esters (C) Polymers (C) Amino acids (C) DNA (C) **Atmosphere & Resources** Atmosphere Algae Greenhouse effect

			Calculating masses Moles Concentration % yield (C) Atom economy (C) Titrations (C) Gases and moles (C) Exothermic and endothermic Reaction profiles Calculating energy changes Cells and batteries (C) Fuel Cells (C)	Human impact on the environment Climate change Carbon footprints Burning fuels Polluting gases Earth's resources Water purification Sewage treatment Bioleaching and phytomining Life cycle analysis Recycling Corrosion (C) Alloys Polymers(C) Haber Process (C) Fertilisers (C)
Atoms - Structure of the atom - Atomic mass and calculating % mass - Periodic table - Elements - Electron structure - Ions - Compounds - Chemical bonds - Working out chemical formulae	**Circulation & Respiration** - Structure and function of the lungs - Gas exchange system - Naming and describing the organs in the circulatory system - The skeleton, joints and muscles - Aerobic respiration - Comparing inhaled and exhaled air - Anaerobic respiration and fermentation - Smoking and its effects - Alcohol and its effects - Measuring reaction time - Illegal drugs	**Forces, Pressure, Moments & Patterns** - Revision of forces - Balanced forces - Motion (changed direction and speed) - Calculating speed - Distance time graphs and velocity time graphs - Terminal velocity - Relative motion - Pressure and calculating pressure - Pressure in liquids and gases - Levers - Machines - Moments	**Rates** Measuring rate Collison theory Temperature Concentration Pressure Surface area Catalysts Reversible reactions Le Chatelier's Equilibriums **Particle Theory** Density Particle Model Internal energy Changing state Specific Latent Heat Gas Pressure	**Waves** Types of wave Wave calculations Measuring waves EM spec IR and surfaces Black Body (P) Refraction Radio Reflection (P) Sound (P) Ultrasound (P) Seismic waves (P) Lenses (P) Colour (P) **Space (P)** Solar System(P) Star Life cycle (P)

	- Testing new drugs and ethical issues with animal testing **Acids** - Acids and alkalis - pH scale - Indicators - Neutralisation - Base/alkali + acid - Metal + acid - Metal carbonate + acid **Earth, Space & Theories** - Naming the three different types of rocks and how they are formed - Describing physical and chemical weathering - Naming parts of the Earth and describing the composition of each part - Naming the gases in the air and explaining why the composition has changed over time - Day and night - Seasons - Differences between mass and weight - Calculating mass and weight - Explaining how distance affects orbit time		**Radioactivity** Atoms and Isotopes Development of atomic theory Radioactive decay Handling Isotopes Nuclear decay equations Half Life Irradiation and contamination Fission and Fusion (P) Uses (P) **Forces and Motion** Scalar and vectors Contact and non-contact Forces Resultant force Free Body diagrams Weight and Gravity Centre of mass Work done Joules Hooke's Law Turning force (P) Levers and Gears (P) Fluid Pressure (P) Up thrust Atmospheric pressure Displacement Speed Speed of sound Velocity D-T graphs Acceleration V-T graphs Terminal velocity Newton's laws Stopping distances	Elements (P) Orbits (P) Red shift (P) Big bang (P) **Magnetism** Magnets Fields Current Motor Effect Magnetic Flux density Generators (P) Microphones (P) Transformers (P)

	- Different models of the solar system - The Sun, galaxies and the Universe		Momentum Safety features (P)	
Electricity & Reliability - Circuit symbols and circuits - Measuring current - Measuring voltage - Measuring resistance - Series circuits - Parallel circuits - Fruit cells - Static Electricity - Dangers of electricity - Plugs & fuses	**Light** - Luminous and non – luminous objects - Opaque, transparent and translucent objects - How a shadow is formed - Use of a ray diagram to explain the path of light - Transverse waves and how waves can be super positioned - Reflection and mirrors - Law of reflection - Lateral inversion and virtual images - Refraction and application of refraction to lenses - Parts of the eye and their functions - Focussing of light through a convex lens - Formation of an object on a pinhole camera - Dispersion - Primary and secondary colours and explaining why different objects look different colours - Use of light in communication	**Equations & Planning** - Conservation of mass and word equations - Rusting and factors affecting rusting - Thermal decomposition - The reactivity series - Displacement reactions - Extraction of metals using carbon - Reaction of acids and bases - Reaction of acids and metals - Neutralisation reactions - Reaction of acids with metal carbonates - Exothermic and endothermic reactions - Energy changes during a reaction - Catalysts - Neutralisation energy changes El**ectricity & Reliability** - Properties of magnets - Magnetic fields - Electromagnets - DC Motors - Voltage - Series and parallel circuits - Resistance and calculating resistance - Renewable and non-renewable energy sources		

		- Generating electricity		
Energy & Numeracy - Types of energy stores and the 4 transfer mechanisms - Drawing and interpreting energy transfer diagrams - Energy change (Conversion of units and comparison of energy at the start and end of a system) - Interpreting and drawing Sankey diagrams and calculating efficiency - Renewable and non-renewable energy resources, including advantages and disadvantages - Application of equations to calculate the cost of electricity	**Microbes, Diseases & Patterns** - Microbes and how they are different to animal and plant cells - Categorisation of microbes using the 5 kingdom system - Estimation of the size of microbes - Uses of microbes (fermentation) - Aseptic techniques for growing bacteria - Work of Semmelweiss - Naming particular diseases and how they are spread - Role of white blood cells - Vaccination - Antibiotics - History of disease **Sound & Numeracy** - Definition of sound and how it is created - Sound as a longitudinal wave - Pitch, frequency and amplitude - Calculating the speed of sound - Echoes - Parts of the ear and how we hear - Effect of loudness on hearing - Ultrasound and ethics of the mosquito sound box	**GCSE START: Cells** Cells Microscopy and magnification Primitive cells Specialised cells Chromosomes Mitosis Stem cells Diffusion Osmosis Active transport		

Ecology, Variation & explaining patterns - Variation between species and measuring variation - Adaptations of plants and animals - Adaptations to feeding of animals - Changes to habitats - Food chains and food webs - Evidence for food webs - Classification and understanding how to interpret a key - Classification of vertebrates - Classification of invertebrates - Classification of plants - Behaviour (Innate and learned)	**Ecology & Planning** - Photosynthesis - Limiting factors affecting photosynthesis - Animal classification - Different sampling methods - Sampling using a quadrat - Pyramid of numbers and pyramid of biomass - Bioaccumulation - Physical factors which affect the environment (abiotic factors) - Living factors and populations (biotic factors)	**GCSE Atoms** Atomic structure Atomic theory changes Periodic table Elements and compounds Word and symbol equations Mixtures and separation Metals and non-metals Group 1 Group 0 Group 7 Transition metals (C)		