

	Year 7	Year 8	Year 9	Year 10 (B C P = triple only)	Year 11
HT1	<p>Introduction</p> <ul style="list-style-type: none"> - Hazards and Safety - Science equipment - Science investigations – variables, risk assessment, drawing a results table, drawing a line graph, writing a conclusion <p>Cells & Theories</p> <ul style="list-style-type: none"> - ‘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 <p>Particle & Models</p> <ul style="list-style-type: none"> - 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 	<p>Food, Digestion & Graphs</p> <ul style="list-style-type: none"> - 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 	<p>Sound & Numeracy</p> <ul style="list-style-type: none"> - 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 <p>Inheritance & Theories</p> <ul style="list-style-type: none"> - 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 	<p>Organisation</p> <ul style="list-style-type: none"> - Cell organisation - The digestive system - Food tests - Enzymes and their properties - Conditions for enzyme activity - Enzymes and digestion - The heart and the circulatory system including pacemakers - Blood vessels - Blood - Cardiovascular diseases - Stents and statins - Artificial hearts - The structure of the lungs and the breathing system - Health and disease - Communicable and non-communicable diseases - Cancer - Plant cell organisation - Transpiration and translocation - Transpiration and stomata - Active transport <p>Energy</p> <ul style="list-style-type: none"> - Stores and transfers - KE, GPE - Specific Heat Capacity - Work done - Power - Conservation of energy - Efficiency - Insulation - Energy resources 	<p>Rates</p> <ul style="list-style-type: none"> - Measuring rate - Collision theory - Temperature - Concentration - Pressure - Surface area - Catalysts - Reversible reactions - Le Chatelier’s - Equilibriums <p>Forces and Motion</p> <ul style="list-style-type: none"> - 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

	<ul style="list-style-type: none"> - Pressure - Diffusion - Pure or mixture - Filtration - Crystallisation - Distillation - Chromatography 				<ul style="list-style-type: none"> Stopping distances Momentum Safety features (P)
HT 2	<p>Forces & Graphs</p> <ul style="list-style-type: none"> - Introduction to forces - Floating, sinking and upthrust - Stretching materials and Hooke's law - Deformation and compression - Friction - Balanced and unbalanced forces - Calculating and measuring speed and stopping distances <p>Reproduction</p> <ul style="list-style-type: none"> - 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 	<p>Reactions</p> <ul style="list-style-type: none"> - 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 <p>Heating, Cooling & Reliability</p> <ul style="list-style-type: none"> - 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 	<p>Metals</p> <ul style="list-style-type: none"> - 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 <p>Energy & Numeracy</p> <ul style="list-style-type: none"> - Energy stores and the law of conservation - 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 	<p>Bonding</p> <ul style="list-style-type: none"> States of matter Metallic bonding Ionic bonding Covalent bonding Simple molecules Polymers Giant covalent Graphite and Graphene Nano particles (C) <p>Infection</p> <ul style="list-style-type: none"> Pathogens Culturing and bacteria numbers (B) Diseases Protista Body defences Vaccination Antibiotics Painkillers Developing drugs Monoclonal antibodies (B) Plant disease Plant defences (B) <p>Electricity</p> <ul style="list-style-type: none"> Symbols Charge Current 	<p>Homeostasis</p> <ul style="list-style-type: none"> Nervous system Reflex actions The Brain (B) Reaction times The eye (B) Endocrine system Temperature control (B) Blood glucose Water and N balance (B) ADH (B) Kidney Failure (B) Negative feedback Reproductive hormones Contraception and fertility Plant coordination (B) Tropisms (B) Plant hormones use (B) <p>Analysis</p> <ul style="list-style-type: none"> Purity Formulations Chromatography Rf values Gas tests Flame tests (C) Identifying ions (C) Carbonates (C) Halides (C) Sulphates (C) Spectroscopy (C) CSI (C)

				Resistance Ohms Law Series and Parallel LDRS and thermistors Diodes and bulbs IV graphs AC DC Plugs Safety (P) Power Work done National Grid Static (P) Electrical fields (P)	Organic Chemistry Crude oil Hydrocarbons Fractional distillation Cracking Alkenes (C) Alcohols (C) Carboxylic acids (C) Esters (C) Polymers (C) Amino acids (C) DNA (C)
HT3	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 - Testing new drugs and ethical issues with animal testing Acids	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	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 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) Elements (P) Orbits (P) Red shift (P) Big bang (P)

		<ul style="list-style-type: none"> - Acids and alkalis - pH scale - Indicators - Neutralisation - Base/alkali + acid - Metal + acid - Metal carbonate + acid <p>Earth, Space & Theories</p> <ul style="list-style-type: none"> - 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 - Different models of the solar system - The Sun, galaxies and the Universe 			
HT4	<p>Electricity & Reliability</p> <ul style="list-style-type: none"> - Circuit symbols and circuits - Measuring current - Measuring voltage 	<p>Light</p> <ul style="list-style-type: none"> - Luminous and non – luminous objects 	<p>Equations & Planning</p> <ul style="list-style-type: none"> - Conservation of mass and word equations 	<p>Quantitative Chemistry and energy</p> <ul style="list-style-type: none"> Conservation of mass Equations 	<p>Atmosphere & Resources</p> <ul style="list-style-type: none"> Atmosphere Algae Greenhouse effect

	<ul style="list-style-type: none"> - Measuring resistance - Series circuits - Parallel circuits - Fruit cells - Static Electricity - Dangers of electricity - Plugs & fuses 	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - 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 <p>Electricity & Reliability</p> <ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> Ar, Mr, Empirical formula Changes in Mass Moles 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) 	<ul style="list-style-type: none"> 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)
HT5	<p>Energy & Numeracy</p> <ul style="list-style-type: none"> - Types of energy stores and the 4 transfer mechanisms - Drawing and interpreting energy transfer diagrams 	<p>Microbes, Diseases & Patterns</p> <ul style="list-style-type: none"> - Microbes and how they are different to animal and plant cells 	<p>GCSE START: Cells</p> <ul style="list-style-type: none"> Cells Microscopy and magnification Primitive cells Specialised cells 	<p>Bioenergetics</p> <ul style="list-style-type: none"> Photosynthesis Rate of photosynthesis Limiting factors Uses of Glucose 	<p>Inheritance</p> <ul style="list-style-type: none"> DNA Structure (B) Reproduction Asexual vs Sexual (B)

	<ul style="list-style-type: none"> - 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 	<ul style="list-style-type: none"> - 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 	<p>Chromosomes</p> <p>Mitosis</p> <p>Stem cells</p> <p>Diffusion</p> <p>Osmosis</p> <p>Active transport</p>	<p>Aerobic respiration</p> <p>Anaerobic respiration</p> <p>Exercise</p> <p>Metabolism</p> <p>Radioactivity</p> <p>Atoms and Isotopes</p> <p>Development of atomic theory</p> <p>Radioactive decay</p> <p>Handling Isotopes</p> <p>Nuclear decay equations</p> <p>Half Life</p> <p>Irradiation and contamination</p> <p>Fission and Fusion (P)</p> <p>Uses (P)</p>	<p>Meiosis</p> <p>Protein synth (B)</p> <p>Inheritance</p> <p>Gender</p> <p>Genetic disorders</p> <p>Screening</p> <p>Mendel (B)</p> <p>GM</p> <p>Cloning (B)</p> <p>Variation</p> <p>Selective breeding</p> <p>Extinction</p> <p>Mutation</p> <p>Natural selection</p> <p>Speciation (B)</p> <p>Darwin (B)</p> <p>Evolutionary trees</p> <p>Fossils</p> <p>Resistant Bacteria</p> <p>Magnetism</p> <p>Magnets</p> <p>Fields</p> <p>Current</p> <p>Motor Effect</p> <p>Magnetic Flux density</p> <p>Generators (P)</p> <p>Microphones (P)</p> <p>Transformers (P)</p>
HT6	<p>Ecology, Variation & explaining patterns</p> <ul style="list-style-type: none"> - Variation between species and measuring variation - Adaptations of plants and animals 	<p>Ecology & Planning</p> <ul style="list-style-type: none"> - Photosynthesis - Limiting factors affecting photosynthesis - Animal classification - Different sampling methods 	<p>GCSE Atoms</p> <p>Atomic structure</p> <p>Atomic theory changes</p> <p>Periodic table</p> <p>Elements and compounds</p> <p>Word and symbol equations</p>	<p>Ecology</p> <p>Classification</p> <p>Communities</p> <p>Biotic and Abiotic factors</p> <p>Distribution</p>	

	<ul style="list-style-type: none"> - 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) 	<ul style="list-style-type: none"> - 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) 	<p>Mixtures and separation Metals and non-metals Group 1 Group 0 Group 7 Transition metals (C)</p>	<p>Adaptations: animals, plants, extreme. Levels of organisation Food chains Trophic levels and pyramids (B) Nutrient cycles Decomposition (B) Biodiversity Waste Management Land use and deforestation Global warming Maintaining biodiversity Impact of environmental change (B) Food security (B) Farming (B) Fisheries (B) Biotechnology (B)</p>	
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