Science Year 7						
	Term 1		**Term 2**		**Term 3**	
Topic/ Specification reference	Cells, Tissues, Organs Mixtures and Separation Energy		Sexual Reproduction in Animals Muscles and Bones		Acids and Alkalis Current Electricity	
Knowledge	**Cells, Tissues, Organs** Life processes, organs, tissues, cell structure, organ systems. **Mixtures and Separation** Separation techniques to include – filtration, evaporation, distillation, and chromatography.	Solutions. **Energy** Energy in food. Energy transfers. Energy stores. Energy resources – fossil fuels, nuclear and renewable energy sources.	**Sexual Reproduction in Animals** Principles of reproduction and fertilisation. Male and female reproductive systems. Sexual reproduction and pregnancy. Gestation and birth. Puberty and the menstrual cycle.	**Muscles and Bones** Muscles and breathing – lung ventilation. The heart and circulation. Blood. The skeleton, movement, joints, muscle action. Drugs and their effects on the body.	**Acids and Alkalis** Hazard symbols. Identifying acids and alkalis with indicators. The pH scale. Neutralisation and its uses.	**Current Electricity** Simple electric circuits. Circuit symbols. Circuit diagrams. Series and parallel circuits. Current, voltage and resistance. Electricity in the home.
Skills	Scientific modelling, microscopy, microscope slide preparation, use of SI units. Separation techniques – Evaporation/chromatography/distillation. Hazard identification. Manipulation of practical equipment.		Scientific method. Planning investigations – reaction times.		Hazard identification. Manipulation of practical equipment. Everyday applications of science. Planning investigations – neutralisation. Modelling (circuits). SI units.	
Key vocabulary	**Cells, Tissues, Organs** Cell, Uni-cellular, Multi-cellular, Tissue, Organ, Organ system, Cell membrane, Nucleus, Cytoplasm, Cell wall, Vacuole, Chloroplast. **Mixtures and Separation** Solvent, Solute, Solution, Dissolve,	Soluble/ insoluble, Solubility, Pure, Mixture, Filtration, Evaporation, Distillation, Chromatography. **Energy** Energy store, Thermal, Chemical, Kinetic, Gravitational potential, Elastic, Dissipated.	**Sexual Reproduction in Animals** Reproduction, Gamete, Ovary, Testicle, Oviduct, Uterus, Ovulation, Menstruation, Penis, Vagina, Foetus, Embryo, Gestation, Placenta, Umbilical cord, Amniotic fluid.	**Muscles and Bones** Joint, Bone marrow, Ligament, Tendon, Cartilage, Antagonistic muscles, Diaphragm, Artery, Vein, Capillary, Stimulant, Depressant.	**Acids and Alkalis** Acid, Alkali, pH, Indicator, Concentration, Neutralisation, Hazard, Weak, Strong.	**Current Electricity** Current, Voltmeter, Ammeter, Series, Parallel, Potential difference, Resistance, Conductor, Insulator.
Assessment	Quick Quizzes End of topic tests		Quick Quizzes End of topic tests Larger assessment (7A, 7B, 7E, 7I)		Quick Quizzes End of topic tests	

	Term 4	**Term 5**	**Term 6**
Topic/ Specification reference	Ecosystems	The Particle Model Sound	Atoms, Elements, Compounds Forces
Knowledge	**Ecosystems** Variation – continuous and discontinuous. Adaptations. The effects of the environment. The effects on the environment. Food chains, webs, pyramids of numbers.	T**he particle model** solids, liquids, and gases. Kinetic theory. Brownian motion. Diffusion. Air pressure. **Sound** Making sounds. Sound waves. Detecting sounds – the ear, microphone. Audible range. Ultrasound and its uses. Waves – longitudinal and transverse.	**Atoms, Elements, Compounds** Atoms and molecules. Elements. Metals and non-metals. Compounds – making and naming. Chemical reactions. **Forces** Forces – contact, non-contact. Weight and mass. Investigating springs. Friction. Pressure on surfaces. Balanced and unbalanced forces.
Skills	Data presentation – graph work. Implications of actions – bioaccumulation, food webs	SI units and scale, Scientific modelling – particle model, kinetic theory.	Scientific modelling – chemical equations. Manipulation of practical equipment. Data presentation – graph work. SI units.
Key vocabulary	**Ecosystems** Food chain/ food web, Habitat, Adaptation, Variation, Ecosystem, Environment, Population, Community, Producer, Consumer, Bioaccumulation	T**he particle model** Particle Model, Diffusion, Gas pressure, Density, Evaporate, Condense, Melt, Freeze, Sublime. **Sound** Vibration, Volume, Pitch, Amplitude, Wavelength, Frequency.	**Atoms, Elements, Compounds** Atom, Element, Molecule, Compound, Mixture, Chemical formula, Metal, Non-metal. **Forces** Newton, Resultant force, Friction, Tension, Compression, Contact force, Weight, Non-contact force, Mass, Gravity.
Assessment	Quick Quizzes End of topic tests Larger assessment (7C, 7F, 7J)	Quick Quizzes End of topic tests	Quick Quizzes End of topic tests

Science Year 8						
	Term 1		**Term 2**		**Term 3**	
Topic/ Specification reference	Food and Nutrition Combustion Fluids		Breathing and Respiration The Periodic Table		Light Plants and their Reproduction Metals and their Uses	
Knowledge	**Food and Nutrition** Major food nutrients. Testing food for the presence of starch, sugar, protein, and fat. Uses of nutrients. Balanced diet, deficiency diseases. The processes of digestion and absorption	**Combustion** Burning fuels. Oxidation. Fire safety and fire extinguishers. Air pollution - acid rain. Global warming and climate change. **Fluids** The particle model Changes of state. Pressure in fluids. Floating and sinking. Drag, friction and streamlining.	**Breathing and Respiration** Aerobic respiration. Human lungs as a gas exchange system. Oxygen transport. Gas exchange in fish and plants. Anaerobic respiration and EPOC.	**The Periodic Table** Dalton's atomic model. Chemical properties and chemical formulae. Mendeleev's periodic table. Physical and Chemical trends in the periodic table.	**Light** Properties of light. Reflection. Refraction. Camera and the eye. Colour vision and making coloured light. **Plants and their Reproduction** Classifying organisms, biodiversity. Types of reproduction. Plant reproduction – pollination, fertilisation, seed dispersal, germination, and growth.	**Metals and their Uses** Metal properties. Corrosion. The reaction of metals with water/acids. The reactivity series. Pure metals and alloys.
Skills	Planning investigation – streamlined shapes. Hazard identification. Manipulation of practical equipment. Use of SI units.		Hazard identification. Manipulation of practical equipment.		Planning investigation – seed dispersal. Hazard identification. Manipulation of practical equipment. Graphical skills	
Key vocabulary	**Food and Nutrition** Diet, constipation, nutrition, nutrients, carbohydrates, starch, sugar, lipids, protein, vitamins, minerals, fibre, fuel, kilojoules, respiration, balanced diet, malnutrition, obesity, kwashiorkor, deficiency disease, starvation, scurvy, rickets, digestive system, ingestion, digestion, egestion, absorption, salivary glands, food pipe, stomach, small intestine, large intestine, rectum, anus, soluble, insoluble, enzymes, faeces, bacteria, villi, blood plasma, diffusion, surface area, capillary **Combustion** Fuel, combustion (complete and incomplete), reactants, products, hydrocarbons, fossil fuels,		**Breathing and Respiration** Aerobic respiration, chemical reaction, inhalation, exhalation, ventilation, contracts, gas exchange, trachea, diaphragm, alveoli, air sac, bronchi, capillary, diffusion, cilia, mucus, red blood cell, tissue fluid, haemoglobin, plasma, white blood cells, heart disease, asthma, frostbite, indicator, stomata, anaerobic respiration, cytoplasm, lactic acid, EPOC **The Periodic Table** Atoms, elements, molecules, chemical symbols, pure, mixture, compounds, model, physical properties, chemical properties, chemical formula, chemical reaction, Mendeleev, Periodic Table, periods, groups, alkali metals, halogens, noble		**Light** Wave, transverse, longitudinal, transparent, opaque, translucent, pinhole camera, reflection, specular, diffuse, incident, angle, normal, refraction, focal length, focal point, density, lens, screen, shutter, aperture, sensor, retina, optic nerve, iris, pupil, cornea, rod cells, cone cells, colour filter, white light, frequency, absorb, primary colours, secondary colours **Plants** Biodiversity, classification, extinction, cellulose, fungi, chitin, endangered, protoctists, prokaryotes, binominal nomenclature, quadrat, inheritance, variation, sexual / asexual reproduction, genes, cloning, offspring, runners,	

	oxidation, Law of Conservation of Mass, phlogiston, flammable, oxidising, explosive, hazard symbol, fire triangle, fire extinguisher, fire break, exothermic, pollutants, acid rain, soot, catalytic converter, car filter, neutralisation, greenhouse gases, greenhouse effect, global warming, climate change **Fluids** States of matter, particle model, Brownian motion, density, expansion, contraction, change of state, physical change, chemical change, melting, evaporation, condensation, freezing, cooling / heating curve, fluids, atmospheric pressure, collisions, force, volume, up thrust, density, drag, friction, air resistance, water resistance, streamlined, top speed	gases, melting point, freezing point, boiling point, condensing point, trend, metal, non-metal, alkali metals, hydroxide, oxide, reactivity, pH	tubers, gametes, zygotes, hybrids, pollination (self / cross), pollen, anther, filament, carpel, stigma, style, ovary, ovule, sepal, petal, pollen tube, egestion, cell division, germination, dispersal, fruit, competition, fertilisation, embryo, respiration, interdependence, enzymes, dormant **Metals** Malleable, ductile, conductor, strong, catalyst, corrosion, rusting, chemical reaction, symbol equation, oxide, reactive, reactivity series, word equation, hydroxide, gas test, acid, salt, chloride, nitrate, sulfate, pure, solder, alloy
Assessment	Quick Quizzes End of topic tests	Quick Quizzes End of topic tests Larger assessment (8A, 8C, 8E, 8I)	Quick Quizzes End of topic tests

	Term 4		**Term 5**		**Term 6**	
Topic/ Specification reference	Energy Transfers Unicellular Organisms		Earth and Space Making Materials		Genetics and Evolution Forces and Motion	
Knowledge	**Energy Transfers** Changing temperature. Conduction, convection, and radiation. Controlling energy transfer. Power and efficiency. Paying for energy.	**Unicellular Organisms** Unicellular and multicellular organisms. Fungi and their uses. Bacteria and their uses. Protists. Decomposers and nutrient recycling.	**Earth and Space** Exploring the solar system. The 4 seasons. Magnetic earth. Gravity in space. Beyond the solar system.	**Making Materials** Ceramics. Making ceramics. Polymers. Composite materials. Problems with materials. Recycling – metals, glass, polymers, paper, and concrete.	**Genetics and Evolution** Environmental variation. Continuous and discontinuous variation. Classification. Inherited evolution. DNA, chromosomes, and genes. Extinctions, adaptations, and competition. Methods used to preserve biodiversity. Natural selection and evolution.	**Forces and Motion** Forces and movement – balanced, unbalanced, resultant forces. Energy for movement. Speed – including distance/time graphs. Turning forces (moments) and levers. Machines – pulleys, ramps, work done and conservation of energy.
Skills	Hazard identification. Manipulation of practical equipment. Use of SI units.		Hazard identification. Manipulation of practical equipment.		Hazard identification. Manipulation of practical equipment. Planning experiments – investigating pendulums.	

	Term 4	Term 5	Term 6
Key vocabulary	**Energy Transfers** Internal energy, mass, temperature, evaporation, conduction, convection, thermal images, infrared radiation, emission, absorption, reflection, medium, trapped air, insulation, heat loss, appliance, power, efficiency, Watt, Sankey diagram **Unicellular Organisms** Unicellular, multicellular, diffusion, bacteria, nucleus, protoctists, fungi, viruses, asexual reproduction, fungi, budding, aerobic / anaerobic respiration, growth curves, lactic acid, flagella, prokaryotes, enzymes, binary fission, amoebas, paramecium, cilia, pseudopods, producers, consumers, food chain, algae, photosynthesis, herbivore, carnivore, omnivore, pyramid of numbers, organic material, decomposers, compost, decay	**Space** Solar system, phases of Moon, Copernicus' model, Ptolemy's model, orbit, Kepler's model, equator, hemispheres, tilted axis, seasons, magnetic field, compass, magnet, poles, gravitational field, gravity, mass, weight, satellite, stars, galaxy, constellation, light year. **Making Materials** Ceramic, brittle, insulator, heat resistant, bonds, crystals, polymer, natural, synthetic, monomer, endothermic, exothermic, polymerisation, composite, finite, acid rain, global warming, carbon-capture, biodegradable, non-biodegradable, recycling, landfill.	**Genetics and Evolution** Resources, environment, continuous variation, discontinuous variation, classification, species, inherit, gamete, fertilisation, zygote, normal distribution, DNA, chromosomes, genes, sex chromosomes, cell division, adaptations, ecosystem, endangered, extinct, competition, biodiversity, natural selection, evolution. **Forces and Motion** Friction, balanced, unbalanced, resultant, accelerate, air resistance, drag, fluids, electricity, kinetic energy, fossil-fuel, non-renewable energy, gravitational potential energy, elastic potential energy, thermal energy, nuclear energy, sound energy, speed, displacement, lever, fulcrum, load, effort, force multiplier, distance multiplier, moment, equilibrium, ramp, pulley, machine, work done.
Assessment	Quick Quizzes End of topic tests Larger assessment (8B, 8F, 8G, 8J)	Quick Quizzes End of topic tests	Quick Quizzes End of topic tests Larger assessment (8K, 8D, 8L, 9E, 9A, 9I)

Science Year 9						
	Term 1		**Term 2**		**Term 3**	
Topic/ Specification reference	Plant Growth Force Fields and Electromagnets		Reactivity *Fame-lab Academy*		Cell Structure Cell Division	
Knowledge	**Plant Growth** Photosynthesis and aerobic respiration. Plant adaptations for photosynthesis. Plant products. Growing crops, Farming problems.	**Force Fields and Electromagnets** Force fields – magnetic fields and gravitational fields. Static electricity. Current electricity. Resistance. Electromagnets.	**Reactivity** Chemical and physical changes. Reactivity and the reactivity series. Rusting and its prevention. Energy in reactions – endothermic and exothermic.	Displacement reactions. Extraction of metals – Iron and Aluminium. **Famelab** Judging criteria – content, clarity, and charisma.	**Cell Structure** Cell structure – prokaryotes and eukaryotes. Animal and plant cells. Cell specialisation. Cell differentiation. Microscopy. **Cell Division** Chromosomes. Mitosis and the cell cycle. Stem cells	
Skills	Planning experiments – seedling growth. Hazard identification. Manipulation of practical equipment. Graphical skills.		Hazard identification. Manipulation of practical equipment. SI units. Presentation skills. Researching skills.		Use prefixes centi, milli, micro and nano. Recognise, draw and interpret images of cells. Use models and analogies to develop explanations of how cells divide.	Evaluate the practical risks and benefits, as well as social and ethical issues, of the use of stem cells in medical research and treatments.
Key vocabulary	**Plant Growth** Photosynthesis, reactants, glucose, water, carbon dioxide, oxygen, chlorophyll, chloroplast, aerobic respiration, mineral salts, root hair cell, xylem vessel, phloem, wilt, stomata, guard cells, diffusion, gas exchange, palisade cells, epidermis cells, waxy cuticle, lipids, polymer, carbohydrate, starch, cellulose, nitrates, proteins, yield, pesticide, herbicide, fungicide, crossbreeding, selective breeding, persistent, bioaccumulation, eutrophication. **Force Fields and Electromagnets** Force field, non-contact force, magnetic field, mass, gravitational field, weight, nucleus, electron, positive charge, negative charge, electric field, electric current, ammeter, amperes, voltage, voltmeter, volts, resistance, resistor, ohms, electromagnet, relay, motor effect, electric motor.		**Reactivity** Physical change, flammable, chemical reactions, word equation, particle theory, reactivity series, oxidation, rust, sacrificial protection, oxidising agent, exothermic reaction, endothermic reaction, hydrocarbon, displacement reaction, ore, reduction, electrolysis. **Famelab** Content, charisma, clarity.		**Cell Structure** Prokaryote, eukaryotes, nucleus, cell membrane, cytoplasm, mitochondria, ribosome, vacuole, cell wall, chloroplast, differentiation, specialisation, microscope, magnification, resolution **Cell Division** mitosis, meiosis, cell-cycle, chromosomes, stem cells.	
Assessment	Quick Quizzes End of topic tests	Larger assessment (9A, 9B, 9E, 9I)	Quick Quizzes End of topic tests		Multiple choice tests End of topic tests	In-class exam questions

	Term 4		Term 5		Term 6	
Topic/ Specification reference	Transport in Cells Atomic models		The Periodic Table		Energy changes in systems Conservation and dissipation of energy National and global energy resources	
Knowledge	**Transport in Cells** Diffusion. Osmosis. Active transport. Features of exchange surfaces.	**Atomic Models** Atoms, elements and compounds. Mixtures. Development of the periodic table. Relative charges of subatomic particles. Size and mass of atoms. Relative atomic mass. Electronic structure.	**The Periodic Table** The periodic table. Development of the periodic table. Metals and Non-metals. Groups 0, 1 and 7.		**Energy changes in systems** Energy stores and systems. Changes in energy. Energy changes in systems. Power	**Conservation and dissipation of energy** Energy transfers in a system. Efficiency. **National and global energy resources** Energy resources – renewable and non-renewable.
Skills	Recognise, draw and interpret diagrams that model diffusion. Use of isotonic drinks and high energy drinks in sport. Recognise, draw and interpret diagrams that model osmosis. Safe use of a range of equipment to separate chemical mixtures. This historical context provides an opportunity for students to show an understanding of why and describe how scientific methods and theories develop over time.	Use SI units and the prefix nano. Recognise expressions in standard form. Students should be able to represent the electronic structures of the first twenty elements of the periodic table in both forms. Visualise and represent 2D and 3D forms including two dimensional representations of 3D objects.	Explain how testing a prediction can support or refute a new scientific idea.		Recall and application of equations. Expressing values as a percentage or a decimal. SI units,	
Key vocabulary	**Cell Transport** Diffusion, concentration gradient, dilute, concentrated, surface area, passive, osmosis, partially permeable, active transport. **Atomic Models** Atoms, elements, compounds, mixtures, word equation, balanced symbol equation, filtration, crystallisation, simple distillation, fractional distillation, chromatography, plum-pudding, electron, nucleus, proton, nucleus, charges, atomic number, mass number, relative mass, isotopes, energy levels, shells, electronic structure.		**The Periodic Table** Groups, periods, atomic number, electron, atomic weight, ions, noble gases, boiling point, alkali metals, halogens.		**Energy changes in systems** System, energy, kinetic energy, gravitational potential energy, elastic energy, internal energy, specific heat capacity. **Conservation and dissipation of energy** Transferred, stored, dissipated, efficiency, power, thermal insulation. **National and global energy resources** Renewable, non-renewable, biofuel, wind, hydroelectricity, geothermal, tidal, solar, nuclear, fossil fuel, transferred, dissipated, conductivity.	
Assessment	Multiple choice tests	In-class exam questions End of topic tests	Multiple choice tests In-class exam questions	End of topic tests	Multiple choice tests In-class exam questions	End of topic tests

Science Year 10				
	Term 1		**Term 2**	**Term 3**
Topic/ Specification reference	Principles of organisation Animal tissues, Organs, and Organ Systems Plant tissues, Organs, and Organ systems	Atomic models* The Periodic Table* (*this year group did not complete these topics in Y9)	Communicable disease Electricity	Bonding, structure, and the properties of matter Changes of state and the particle model Internal energy and energy transfers Particle motion and pressure
Knowledge	Cells, tissues, organs, organ systems The human digestive system Enzymes and metabolism How digestion links to respiration Structure and function of heart and lungs Blood vessels Cardiovascular disease. Effects of lifestyle on non-communicable disease. Tumours and cancer. Structures and functions of plant tissues and organs.	Transpiration and translocation. Atoms, elements and compounds. Mixtures. Development of the periodic table. Relative charges of subatomic particles. Size and mass of atoms. Relative atomic mass. Electronic structure. The periodic table. Development of the periodic table. Metals and Non-metals. Groups 0, 1 and 7	How diseases are spread in animals and plants. How the spread of disease can be reduced. Human defence systems Vaccination Antibiotics and painkillers. Discovery and development of drugs. Current, potential difference, resistance. Charge and current. Series and parallel circuits. Domestic uses of electricity. Electrical safety. The National Grid.	Chemical bonds – ionic, simple covalent, giant covalent, metallic. States of matter. State symbols. Properties of compounds. Density of materials. Changes of state. Internal energy. Specific heat capacity. Specific latent heat. Particle motion in gases.
Skills	Rate calculations for chemical reactions Construct word equations Students should be able to use other models to explain enzyme action. Carry out rate calculations for blood flow Observing and drawing cells seen under a microscope.	Translate information between numerical and graphical forms. Interpret data presented in a variety of formats. Calculate means. Use a scatter diagram to identify a correlation between two variables. Explain how testing a prediction can support or refute a new scientific idea.	Recall and apply equations.	Interpret heating and cooling graphs.

	Term 1	Term 2	Term 3
Key vocabulary	**Organisation** Cells, tissues, organs, digestive system, digest, chemical digestion, mechanical digestion, enzyme, metabolism, absorb, catalyst, active site, lock and key, amylase, protease, lipase, soluble, insoluble, glycerol, fatty acids, respiration, glucose, liver, bile, gall bladder, emulsify, surface area, reagent, Benedict's, Biuret, iodine, starch, sugar, protein, heart, lungs, circulatory system, gaseous exchange, oxygen, carbon dioxide, pulmonary artery, pulmonary vein, aorta, vena cava, artrium, ventricle, coronary, trachea, bronchi, alveoli, pacemaker, capillary, artery, vein, blood flow, plasma, red blood cell, white blood cell, platelets, coronary heart disease, stent, cholesterol, valve, donor, health, disease, defect, immune system, infectious, non-communicable, communicable, virus, cancer, pathogen, asthma, depression, mental illness, epidemiological, sampling, community, national, globally, financial cost, diet, alcohol, smoking, incidence, risk, environment, causal, obesity, brain function, lung disease, unborn babies, carcionogen, ionising radiation, cell growth, cell division, abnormal, membrane, malignant, secondary, genetic, epidermal, palisade, mesophyll, spongy, xylem, phloem, meristem, shoots, roots, guard cell, root hair cell, temperature, humidity, air movement, light intensity, transpiration, water uptake, stomata, mean, surface area, volume, translocation, efficient, mineral ions, active transport, lignin, elongated, cell sap, pores **Atomic models** Atoms, elements, substance, chemical symbol, periodic table, compounds, chemical reactions, formation, energy change, chemically combined, fixed proportions, word equations, group 1, group 7, formulae, balanced chemical equations, half equations, ionic equations, mixtures, chemical properties, filtration, crystallisation, distillation, chromatography, purity, scientific models, electron, proton, neutron, shell, 'plum pudding' model, alpha particles, atomic mass, atomic number, nucleus, charged, orbit, radius, standard form, isotopes, electronic structure, groups, periods, chemical	**Electricity** Cell/battery, switch, ammeter, voltmeter, resistor, thermistor, variable resistor, LDR, fuse, diode, lamp, LED, charge, Coulomb, current, Ampere, convention, series, parallel, potential difference, voltage, resistance, Ohms, directly proportional, inversely proportional, Ohm's law, component, direct current, alternating current, frequency, oscilloscopes, trace, three-pin plug, live wire, neutral wire, earth wire, ring main, two-core cable, short circuit, power, appliance, national grid, step-up transformer, step-down transformer, pylon, power, Watts **Electricity (Triple Only)** Static electricity, friction, electric field, sparking **Communicable disease** Virus, protist, bacteria, fungi, infect, infection, microorganism, reproduce, rapidly, poisons, toxins, measles, fever, rash, fatal, complications, vaccination, droplets, sneeze, cough, HIV, flu, antiretroviral, immune, AIDS, sexual, exchange, drugs, needles, tobacco mosaic virus, mosaic, discolouration, growth, photosynthesis, salmonella, ingested, unhygienic, poultry, abdominal, cramps, vomiting, diarrhoea, secrete, discharge, gonorrhoea, vagina, penis, antibiotic, penicillin, resistant strain, barrier method, contraception, condom, rose black spot, fungal disease, fungicide, malaria, mosquito, vectors, non-specific defence system, immune system, white blood cell, phagocytosis, antibody, antitoxin, vaccination, immunising, stimulate, specific, painkiller, preclinical trial, clinical trial, extracted, foxglove, willow, mould, synthesised, toxicity, efficacy, dose, laboratory, healthy, optimum, placebo, double-blind, scrutiny, peer review,	**Particle Model of Matter** Density, mass, volume, particle model, solids, liquids, gases, Eureka can, melt, freeze, boil, evaporate, condense, sublimate, physical change, internal energy, internal kinetic energy, internal potential energy, heating, energy, system, change of state, specific heat capacity, thermal energy, specific latent heat of vaporisation, specific latent heat of fusion, Joules, heating graphs, cooling graphs, constant, pressure, Pascals, work, force **Bonding, structure** Chemical bonds, ionic, covalent, simple, giant, metallic, ions, charge, electron pairs, delocalised, alloys, non-metal, metal, electrostatic, transferred, group 6, group 7, group 0, group 1, group 2, dot and cross diagram, periodic table, structure, ball and stick model, empirical formulae, sodium chloride, polymer, diamond, silicon dioxide, ammonia, hydrogen, chlorine, oxygen, nitrogen, hydrogen chloride, methane, three-dimensional diagram, solid, liquid, gas, melting, freezing, condensing, boiling, evaporating, limitations, temperature, bulk properties, inelastic, aqueous, lattice, boiling points, melting points, dissolving, intermolecular force, conduction, silica, carbon, bent, shaped, distortion, fullerine, buckminsterfullerine, nanotubes

	Term 1		Term 2		Term 3
	properties, reactivity, metals, non-metals, physical properties, Group 0, alkali metals, oxygen, chlorine, water, halogens, displacement				
Assessment	Multiple choice tests In-class exam questions End of topic tests		Multiple choice tests In-class exam questions End of topic tests		Multiple choice tests In-class exam questions End of topic tests
	Term 4		**Term 5**		**Term 6**
Topic/ Specification reference	Quantitative chemistry Chemical changes	Atoms and isotopes Atoms and nuclear radiation	Radioactive hazards and uses Nuclear fusion and fission	Energy changes. Photosynthesis Respiration	Homeostasis Waves in air, fluids, and solids
Knowledge	Conservation of mass. Balanced chemical equations. Chemical measurements. Amount of substance. Concentration of solutions. Structure of an atom. Isotopes. Development of the model of the atom.		Photosynthesis. Rate of photosynthesis. Photosynthesis limiting factors. Aerobic respiration Anaerobic respiration. Response to exercise. Metabolism. Reactivity of metals. Extraction of metals.	Oxidation and reduction. Reactions of acids. pH scale Electrolysis. Exothermic and endothermic reactions. Radioactive decay ad nuclear radiation. Half-lives. Radioactive contamination.	Internal body conditions. Nervous responses. Chemical responses. Transverse and longitudinal waves. Wave properties.
Skills	Represent distribution of results. Make estimations of uncertainty.		Investigate factors which affect the rate of photosynthesis. Solve simple algebraic equations.		
Key vocabulary	**Atomic Structure** Atom, nucleus, protons, neutrons, electrons, charge, radius, energy levels, electron arrangements, electromagnetic radiation, emission, absorption, atomic number, mass number, ion, isotopes, mass, plum pudding model, alpha particle scattering, Bohr, Chadwick, Rutherford, nuclei, unstable, radiation, radioactive decay, activity, becquerel, count-rate, Geiger-Muller tube, alpha particle, beta particle, gamma ray, neutron, ionising power, penetrating power, nuclear equation, half-life, contamination, irradiation, hazard		**Atomic Structure (Triple Only)** Background radiation, cosmic rays, radon, radiation dose, sieverts, radioactive tracers, gamma cameras, fission, fusion, chain reaction, control rods		**Waves** Wave, transverse, longitudinal, amplitude, wavelength, frequency, period, displacement, hertz, wave speed, transmission, ripple tank, oscillation **Waves (Triple Only)** Reflection, refraction, ray diagram, absorption, vibrations, ear drum, cochlear, ultrasound, seismic waves, P-waves, S-waves, echo sounding, surface waves

	Term 4	Term 5	Term 6
	Quantitative chemistry conservation of mass, products, reactants, symbol equations, multipliers, subscript, relative formula mass, relative atomic mass, percentage by mass, gas, metal oxide, thermal decomposition, metal carbonate, oxygen, carbon dioxide, non-enclosed system, particle model, uncertainty, moles, grams, avogradro constant, atoms, molecules, ions, electrons, formulae, equations, hydrochloric acid, magnesium chloride, hydrogen gas, limiting reactant, excess, solution, concentration **Chemical changes** Metals, metal oxides, oxidation, reduction, reactivity series, ions, tendency, potassium, sodium, lithium, calcium, magnesium, zinc, iron, copper, hydrogen, carbon, displacement, dilute acid, unreactive, gold, ores, ionic equations, hydrochloric acid, neutralisation, soluble, metal hydroxide, alkali, metal oxide, nitric acid, nitrates, sulfuric acid, sulfates, deduce, insoluble, filter, excess, crystallised, pH scale, hydroxide, universal indicator, ionised, aqueous, ethanoic acid, citric acid, carbonic acid, electrolysis, molten, dissolved, electrode, anode, cathode	**Photosynthesis** Photosynthesis, equation, carbon dioxide, water, glucose, oxygen, light, uv, endothermic, energy, chloroplast, temperature, light intensity, concentration, chlorophyll, rate, interpret, limiting factor, inverse proportion, inverse square law, greenhouses, economics, profit, aquatic, organism, respiration, insoluble, starch, storage, cellulose, fat, oil, cell wall, amino acid, protein, synthesis, nitrate ions, absorbed **Respiration** Cellular respiration, exothermic reaction, continuous, aerobically, anaerobically, oxygen, relative amounts, energy, molecules, glucose, oxygen, carbon dioxide, water, chemical symbols, muscles, lactic acid, yeast, ethanol, fermentation, economic importance, bread, alcoholic drinks, exercise, heart rate, breathing rate, breath volume, oxidation, oxygen debt, fatigue, contracting, liver, accumulated, metabolism, amino acids, fatty acids, glycerol, synthesis, breakdown, carbohydrates, proteins, lipids, enzyme-controlled processes, synthesise, molecule, nitrate ions, urea, excretion **Energy changes** Conservation of energy, exothermic, endothermic, surroundings, temperature, thermal decomposition, activation energy, reaction profile, reactant, product	**Homeostasis** Internal conditions, regulation, optimum conditions, internal changes, external changes, enzyme action, blood glucose, body temperature, water levels, nervous response, chemical response, receptors, stimuli, coordination centre, brain, spinal cord, pancreas, effectors, muscle, gland
Assessment	Multiple choice tests In-class exam questions End of topic tests	Multiple choice tests In-class exam questions End of topic tests	Multiple choice tests In-class exam questions End of topic tests

Science Year 11					
	Term 1		**Term 2**		**Term 3**
Topic/ Specification reference	Rates of reaction Dynamic equilibrium Homeostasis* The nervous system Hormonal coordination in humans Electromagnetic waves (*this year group did not complete these topics in Y10)		Reproduction Variation and evolution Classification of living organisms Organic chemistry Forces and their interactions Work done and energy transfer		Forces and elasticity Moments, levers, and gears Pressure and pressure differences in fluids Newton's laws Momentum
Knowledge	Internal body conditions. Nervous responses. Chemical responses. Structure of the nervous system. Reflex arc. Human endocrine system. Glands – locations and functions. Diabetes. Human reproduction. The menstrual cycle.	Contraception. Hormonal feedback systems. Rates of reactions. Collision theory. Activation energy. Reversible reactions. Dynamic equilibrium. Properties, uses, and applications of electromagnetic waves.	Sexual and asexual reproduction. Meiosis. DNA. Genetic inheritance including sex determination. Evolution and natural selection. Selective breeding. Genetic engineering. .	Crude oil, hydrocarbons, alkanes Fractional distillation. Scalar and vector quantities. Contact and non-contact forces. Gravity. Resultant forces. Work done and energy transfer.	Forces and elasticity. Extension and compression. Rotational forces, levers, gears. Relationship between speed, distance, time. Acceleration. Newton's laws. Stopping distance and reaction times. Momentum. Conservation of momentum.
Skills	Extract and interpret data from graphs, charts, and tables. Translate information between numerical and graphical forms. .	Draw and interpret graphs Draw tangents. Calculate gradients.	Use direct proportion and simple ratios. Construct free body force diagrams and calculate resultant forces using vectors.		Construct velocity-time graphs from measurements and interpret these graphs to determine acceleration and displacement.
Key vocabulary	**Electromagnetic Waves** Electromagnetic waves, transfer, absorbs, continuous, vacuum, wavelength, radio, microwaves, infrared, visible light, ultraviolet, X-rays, gamma rays, frequency, refraction, ray diagram, wave front diagram, Leslie cube, oscillation, alternating current, hazard, radiation dose, sieverts, cancer		**Forces & Their Interaction** Scalar, vector, quantity, magnitude, direction, force, contact force, non-contact force, weight, gravity, gravitational field strength, Newton, directly proportional, newton meter, resultant force, system, component forces, resolving, vector diagrams, equilibrium, friction, tension, air resistance, normal contact force, magnetic force, electrostatic forces		**Forces & Elasticity** Stretching, bending, compressing, stationary, elastic deformation, inelastic/plastic deformation, extension, directly proportional, limit of proportionality, spring constant, Newton, Hooke's law, linear, non-linear, elastic potential energy, work done,

	Term 1	Term 2	Term 3
Key vocabulary	**Electromagnetic Waves (Triple Only)** Lens, convex, concave, principal focus, focal length, real, virtual, magnification, specular, diffuse, colour filter, transmit, transparent, translucent, opaque, black body radiation **Waves** Wave, transverse, longitudinal, amplitude, wavelength, frequency, period, displacement, hertz, wave speed, transmission, ripple tank, oscillation **Waves (Triple Only)** Reflection, refraction, ray diagram, absorption, vibrations, ear drum, cochlear, ultrasound, seismic waves, P-waves, S-waves, echo sounding, surface waves **Homeostasis** Internal conditions, regulation, optimum conditions, internal changes, external changes, enzyme action, blood glucose, body temperature, water levels, nervous response, chemical response, receptors, stimuli, coordination centre, brain, spinal cord, pancreas, effectors, muscle, gland **Nervous system** Structure, adaptation, coordinate, electrical impulse, neurone, central nervous system, stimulus, receptor, coordinator, effector, response, reflex arc, sensory neurone, synapse relay neurone, motor neurone, reflex action, autonomic, rapid, conscious, brain **Hormonal coordination** Endocrine system, glands, secrete, hormones, bloodstream, pituitary gland, stimulate, pancreas, thyroid, adrenal gland, ovary, testes, blood glucose, insulin, glycogen, diabetes, type 1, type 2, injection, carbohydrate, obesity, glucagon, glycogen, glucose, negative feedback cycle, menstrual cycle, reproduction, puberty, secondary sex characteristics, oestrogen, ovulation, eggs, testosterone, sperm, testes,	**Work Done & Energy Transfer** Work done, displacement, joules, energy transfer, friction **Inheritance, variation, evolution** Sexual, asexual, meiosis, fusion, gamete, sperm, egg, pollen, flowering plant, genetic information, gamete, clone, mitosis, chromosomes, cell division, fertilisation, embryo, DNA, genome, polymer, double-helix, gene, amino acid, human genome project, human migration patterns, gamete, allele, dominant, recessive, homozygous, heterozygous, genotype, phenotype, characteristics, colour-blind, probability, genetic cross, Punnett square, polydactyly, cystic fibrosis, embryo screening, XX,, XY, inherited, environmental, population, extensive, species, mutation, natural selection, evolution, variant, interbreed, fertile, offspring, selective breeding, artificial selection, domesticated, desired characteristic, resistance, inbreeding, genetic engineering, gene, bacterial cells, insulin, diabetes, benefits, risks, agriculture, medicine, objections, GM crops, herbicide, yield, enzymes, plasmid, vector, virus, fossils, antibiotic resistance, offspring, evidence, antibiotics, decay, rocks, minerals, burrows, footprints, rootlet traces, soft-bodied, geological activity, organisms, evolutionary tree, extinction, reproduction rate, population, resistant strain, immunity, MRSA, antibiotics, viral infection, agricultural, classification, kingdom, phylum, class, order, family, genus, species, binomial, ‘three domain system’, archea, bacteria, eukaryota, protist, fungi, plant, animal. **Organic chemistry** Crude oil hydrocarbon, alkane, alkene, bromine, finite, hydrogen, carbon, oxygen, methane, ethane, propane, butane, homologous series, fractions, petrochemical industry, solvents, lubricants, petrol, kerosene, heavy fuel oil, polymers, detergents, natural, synthetic, evaporation, condensing, fractional distillation, boiling point, viscosity, flammability, oxidised,	**Moments, Levers, Gears (Triple Only)** System, rotation, moment, perpendicular, pivot, lever, gear **Pressure (Triple Only)** Fluid, pressure, normal, area, pascals, density, gravitational field strength, depth, submerged, upthrust, resultant force, floating, sinking, atmospheric pressure, altitude, collisions **Forces & Motion** Distance, displacement, scalar, vector, magnitude, direction, speed, velocity, non-uniform, uniform, distance-time graph, acceleration, tangent, gradient, velocity-time graph, displacement-time graph, terminal velocity, stationary, Newton’s First Law, inertia, resistive forces, Newton’s Second Law, proportional, Newtons, inertial mass, Newton’s Third Law, equilibrium, stopping distance, reaction time, thinking distance, braking distance, braking force, kinetic energy, deceleration **Momentum** Momentum, conservation of momentum, collision, explosion

	Term 1		Term 2		Term 3
	follicle-stimulating hormone, luteinising hormone, progesterone, uterus, ovary, contraception, fertility, oral contraceptive, injection, implant, skin patch, condom, diaphragm, intrauterine, implantation, embryo, spermicidal, abstinence, surgical, sterilisation, IVF, ethical, microscopy, thyroxine, adrenaline, 'fight or flight', thyroid gland, metabolic rate, negative feedback. **Rates of reaction and dynamic equilibrium** Mean rate, tangent, quantity, volume, mass, moles, reactant, product, variables, temperature, catalysts, surface area, pressure, concentration, collision theory, activation energy, frequency, conditions, dynamic equilibrium, reversible reaction, exothermic, endothermic, anhydrous, hydrated, Le Chatelier's Principle, qualitative,		combustion, formulae, trends, cracking, reactive, catalytic,		
Assessment	Multiple choice tests In-class exam questions End of topic tests		Multiple choice tests In-class exam questions End of topic tests		Multiple choice tests In-class exam questions End of topic tests
	Term 4		**Term 5**		**Term 6**
Topic/ Specification reference	Chemical analysis Magnetism and electromagnetism		Adaptations, interdependence, competition Ecosystems Biodiversity		
Knowledge	Purity of substances. Chromatography. Testing and identifying gases. Permanent and induced magnetism. Magnetic forces and fields.	Electromagnetism.	Communities. Abiotic and biotic factors. Competition. Carbon cycle. Water cycle. Biodiversity.	Waste management. Land use. Deforestation. Global warming.	
Skills	Interpret chromatograms.		Extract and interpret information from charts, graphs, and tables.		

	Term 4	Term 5	Term 6
Key vocabulary	**Magnetism & Electromagnetism** Poles, magnetic force, repel, attract, non-contact force, magnetic field, permanent magnet, induced magnetism, north pole, south pole, compass, bar magnet, electromagnetism, solenoid, conducting, Fleming's left hand rule, magnetic flux density, tesla, amperes, current, electric motor, **Magnetism & Electromagnetism** Loudspeaker, headphone, pressure, induced, potential difference, generator, generator effect, ac, dynamo, dc, microphone, transformer, primary coil, secondary coil, ratio, efficiency, power, Watts, turns **Chemical analysis** Pure substance, element, compound, mixture, melting point, boiling point, formulation, complex, fuels, cleaning agents, paints, medicines, alloys, fertilisers, chromatography, stationary phase, mobile phase, solvent, separation, Rf values, chromatogram, hydrogen, splint, 'squeaky pop', test tube, oxygen, aqueous, calcium hydroxide, limewater, carbon dioxide, milky, litmus paper, bleached	**Ecology** Organisation, ecosystem, organism, interdependence, competition, factors, conditions, adaptation, interaction, biotic, abiotic, environment, survive, reproduce, surroundings, light, space, water, mineral ions, soil, food, mates, territory, shelter, pollination, seed dispersal, stable community, light intensity, temperature, moisture levels, soil pH, mineral content, wind intensity, carbon dioxide levels, oxygen levels, aquatic, predator, prey, pathogen, outcompete, sufficient, adaptation, structural, behaviourial, functional, extremophile, salt concentration, temperature, pressure, deep sea vent, photosynthesis, food chain, producer, synthesise, alga, glucose, abundance, producer, primary consumer, secondary consumer, tertiary consumer, cycle, carbon cycle, water cycle, recycling, evaporation, precipitation, mineral ions, biodiversity, ecosystem, species, waste management, chemical, sweage, fertiliser, smoke, acidic gases, landfill, toxic chemicals, building, quarrying, farming, peat bogs, compost, decay, deforestation, biofuels, global warming, carbon dioxide, methane, consensus, breeding programmes, regeneration, field margins, hedgerows, agricultural, farmers, crop, emissions, landfill.	
Assessment	Multiple choice tests In-class exam questions End of topic tests	Multiple choice tests In-class exam questions End of topic tests	Multiple choice tests In-class exam questions End of topic tests

Biology Year 12						
	Term 1		**Term 2**		**Term 3**	
Topic/ Specification reference	OCR Biology A (H420) Module 1 – Development of practical skills in biology	Module 2 – Foundations in biology	OCR Biology A (H420) Module 1 – Development of practical skills in biology	Module 2 – Foundations in biology	OCR Biology A (H420) Module 1 – Development of practical skills in biology Module 2 – Foundations in biology	Module 3 – Exchange and transport Module 4 – Biodiversity, evolution and disease
Knowledge	Basic components of living things Biological molecules		Basic components of living things Biological molecules Enzymes Plasma membranes		Enzymes Plasma membranes Cell division Exchange surfaces and breathing Classification & Evolution	
Skills	1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.		1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.		1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.	

	Term 1		Term 2		Term 3	
Key vocabulary	**Cells:** Magnification Resolution Micrometer Nanometer Light Microscope Electron microscope Scanning Electron Microscope (SEM) Transmission electron microscope (TEM) Cell fractionation Homogenation Ultracentrifugation Graticule Eukaryote Organelle Nucleus Mitochondria Chloroplast Rough endoplasmic reticulum (RER) Smooth endoplasmic reticulum (SER) Golgi Lysosome Ribosome Cell Wall Vacuole Tissue Organ Organ system Prokaryote Bacteria Plasmid Flagellum Virus Capsid Attachment Protein	**Biological Molecules:** Covalent Bond Ionic Bond Hydrogen Bond Polar Molecule Monomer Polymer Polymerisation Condensation Hydrolysis Metabolism Mole Molar (M) Solution Carbohydrate Monosaccharide Organic Molecule Disaccharide Polysaccharide Hexose sugar Glucose Reducing Sugar Benedict's reagent Glycosidic bond Non-reducing sugar Starch Hydrophobic Emulsion test Protein Amino acid Amino group Carboxyl group	R-group Peptide bond Polypeptide Primary protein structure Secondary protein structure Tertiary protein structure Specific heat capacity Latent heat of Vaporisation Cohesion Surface tension Solvent Inorganic ions Transparent	**Enzymes:** Enzyme Activation energy Active Site Substrate Enzyme-substrate complex Complimentary Specific Induced fit Lock and key Rate of reaction Kinetic Energy pH Inhibitor Competitive inhibitor Non-competitive inhibitor **Plasma Membranes:** Plasma Membrane Phospholipid Bilayer Protein Channel Carrier Protein Glycoprotein Glycolipid Cholesterol Permeability Fluid mosaic model Diffusion Facilitated diffusion Osmosis Water potential Isotonic Active transport Co-transport	**Cell division:** Mitosis Daughter cell Chromatid Centromere Interphase Prophase Metaphase Anaphase Telophase Cytokinesis Spindle fibres Centrioles Equator Binary Fission Cancer Tumour Meiosis Gamete Diploid Haploid Homologous chromosomes Crossing over Chiasmata Recombination Independent assortment Independent segregation Variation **Exchange surfaces:** Surface area: volume ratio Exchange surface Concentration gradient Tracheae Tracheoles Spiracle Gill Gill filaments Gill lamellae Counter current flow Stomata Guard cells Spongy mesophyll Xerophyte Lungs Ventilation Trachea	Bronchi Bronchioles Alveoli Inspiration Expiration Diaphragm Rib cage Intercostal muscles **Disease:** Pathogen Self Foreign (non-self) Antigen Lymphocyte Phagocyte Phagocytosis Lysosome Phagosome Antigen-presentation Cell-mediated immunity T Cells Clonal Selection TH cells (helper T cell) TC cells (cytotoxic T cells) Humoral Immunity B Cells Plasma B Cells Antibody Memory B Cells Monoclonal antibodies Primary Response Secondary response Passive immunity Active immunity Natural immunity Artificial immunity Vaccination Herd immunity Antigenic variability HIV Reverse transcriptase Retrovirus mRNA AIDS ELISA test Antibiotic

	Term 1	Term 2	Term 3
Assessment	3-week review 6-week review End of topic tests	End of topic tests In-class mock exam Modules 1,2	End of topic tests
	Term 4	**Term 5**	**Term 6**
Topic/ Specification reference	OCR Biology A (H420) Module 1 – Development of practical skills in biology Module 3 – Exchange and transport Module 4 – Biodiversity, evolution and disease	OCR Biology A (H420) Module 1 – Development of practical skills in biology Module 3 – Exchange and transport Module 4 – Biodiversity, evolution and disease	OCR Biology A (H420) Module 1 – Development of practical skills in biology Module 3 – Exchange and transport Module 4 – Biodiversity, evolution and disease
Knowledge	Exchange surfaces and breathing Transport in animals Classification & Evolution Biodiversity	Biodiversity Communicable diseases Transport in animals Transport in plants	Communicable diseases Transport in plants
Skills	1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.	1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.	1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.

	Term 4			Term 5	Term 6	
	Transport in Animals: Haemoglobins Oxygen loading Oxygen unloading High affinity Low affinity Oxygen dissociation curve Positive cooperativity Partial Pressure Bohr Shift Transport System Circulatory System Double circulatory system Heart Atria Ventricles Vena Cava Pulmonary Artery Pulmonary Vein Aorta Atrioventricular Valves Semilunar valves Coronary Artery Myocardial infarction	Diastole Atrial systole Ventricular systole Heart rate Stroke volume Cardiac output Arteries Arterioles Capillaries Veins Valves Lumen Tough fibrous outer layer Elastic Layer Muscle layer Endothelium Plasma Tissue fluid Ultrafiltration Lymphatic system **Biodiversity, Classification, Evolution:** Genetic Diversity Allele frequency Gene pool Natural Selection Directional selection Stabilising selection Polygenes Normal distribution curve Biodiversity	Species Binomial naming system Hierarchy Artificial Classification Phylogenetic Classification Analogous Characteristics Homologous Characteristics Taxon Courtship behaviour Classification Taxonomy Domain Kingdom Community Population Species diversity Ecosystem Diversity Genetic diversity Species richness Index of diversity Biomass Conservation Intercropping Habitat Random sampling Sampling bias Sample size Mean Median Mode Standard deviation	**Transport in Plants:** Xylem vessels Transpiration Stomata Cohesion Transpiration pull Cohesion-tension theory Potometer Phloem Translocation Sieve tube element Companion cell Mass-flow theory Ringing Tracer	Disease: Pathogen Self Foreign (non-self) Antigen Lymphocyte Phagocyte Phagocytosis Lysosome Phagosome Antigen-presentation Cell-mediated immunity T Cells Clonal Selection TH cells (helper T cell) TC cells (cytotoxic T cells) Humoral Immunity B Cells Plasma B Cells	Antibody Memory B Cells Monoclonal antibodies Primary Response Secondary response Passive immunity Active immunity Natural immunity Artificial immunity Vaccination Herd immunity Antigenic variability HIV Reverse transcriptase Retrovirus mRNA AIDS ELISA test Antibiotic
	End of topic tests			End of topic tests Mock exams Modules 1-4	End of topic tests	

Biology Year 13			
	Term 1	**Term 2**	**Term 3**
Topic/ Specification reference	OCR Biology A (H420) Module 1 – Development of practical skills in biology Module 5 – Communication, homeostasis and energy Module 6 – Genetics, evolution and ecosystems	OCR Biology A (H420) Module 1 – Development of practical skills in biology Module 5 – Communication, homeostasis and energy Module 6 – Genetics, evolution and ecosystems	OCR Biology A (H420) Module 1 – Development of practical skills in biology Module 5 – Communication, homeostasis and energy Module 6 – Genetics, evolution and ecosystems
Knowledge	Neural communication Hormonal communication Genetics of living systems Patterns of inheritance and variation	Hormonal communication Homeostasis Patterns of inheritance and variation Manipulating genomes Cloning and biolotechnology	Plant responses Energy for biological processes Cloning and biolotechnology Ecosystems
Skills	1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.	1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.	1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.

	Term 1		Term 2		Term 3	
Key vocabulary	**Nervous system:** CNS Peripheral nervous system Neurone Sensory neurons Motor neurons Intermediate or relay neurons Stimulus Response Receptor Effector Coordinator Reflex arc Somatic/Voluntary Nervous System Autonomic Sympathetic Parasympathetic Pacinian corpuscle Stretch-mediated Na+ channels Photoreceptors Retina Rod cells Cone cells Retinal convergence Visual acuity Visual sensitivity Fovea Blind spot Optic nerve Nerve impulse Na+ K+ Pump Resting potential Generator potential Threshold value Action potential Polarised Voltage gated channels Depolarised Hyperpolarisation Repolarisation Refractory period	Myelin sheath Synapse Cholinergic synapse Adrenergic synapse Neurotransmitter Hormonal or endocrine system Chemical mediators Acetylcholine Presynaptic neurone Postsynaptic neurone Presynaptic knob Synaptic cleft Synaptic vesicle ACh Receptors Acetylcholine esterase enzyme Excitatory synapses Inhibitory synapses Summation Spatial summation Temporal summation Neuromuscular junction Skeletal muscle Smooth muscle Cardiac muscle Sarcolemma Sarcoplasm Sarcoplasmic reticulum Multi-nucleated Myofibrils (muscle fibres) Actin Myosin Tropomyosin A Band I Band H zone Z line Sarcomere Contraction Globular heads Myosin binding site Ca2+ ATP	**Genetics:** Gene Chromosome Chromatin Autosome Genetic code Degenerate Non-overlapping Universal Histones Chromatid Locus Alleles Protein synthesis Genome Human Genome Proteome Transcription RNA Polymerase nucleotides mRNA Triplet Template strand Codon Intron Exon Splicing Translation tRNA Anti-codon Ribosome Polypeptide Gene Mutation Substitution mutation Nonsense mutation Mis-sense mutation Silent mutation Deletion mutation Mutagen (mutagenic agent) Chromosome mutation Polyploidy Non-disjunction Locus Homozygous	Callus PGRs Adult stem cells Embryonic stem cells Transcriptional factors siRNA Epigenetics Methylation Acetylation Heterochromatin Euchromatin Tumour Malignant tumour Benign tumour Metastasis Proto-oncogene Tumour suppressor gene Two-hit hypothesis **Hormonal communication:** Myogenic SAN AV Node Bundle of His Purkinje fibres Medulla oblongata Pressure receptors Chemo receptors **Homeostasis:** Homeostasis Control mechanism Ectotherm Endotherm Vasodilation Vasoconstriction Hypothalamus Second messenger model Type 1 diabetes Type 2 diabetes Gluconeogenesis Glycogenolysis Glycogenesis Negative feedback	**Plant responses:** Tropism IAA Plant growth factors Phototropism Geotropism Chemotropism Rheotropism **Energy for biological processes:** Glucose ATP Metabolism Photosynthesis Photolysis Oxidation Reduction Co-enzyme NADP NADPH Chloroplast Thylakoid Stroma Chlorophyll Light-dependent reaction Photoionisation Thylakoid membrane Proton pumps Electron carrier transfer chain Chemiosmotic theory ATP synthase Light-independent reaction Calvin cycle Ribulose bisphosphate (RuBP) Glycerate 3 phosphate (GP) Triose Phosphate (TP) Limiting factor **Genetics – Manipulating genomes:**	Terminator DNA polymerase Restriction endonuclease Gene machine Oligonucleotide Genetically modified organism (GMO) Vector Gene transfer/cloning stages Complementary DNA Palindromic sequence Sticky ends DNA ligase Transformation Marker genes Replica plating Polymerase chain reaction Primer Annealing Thermocycler GM crops (Atryn) Anti-thrombin Gene therapy Germ-line gene therapy Somatic-line gene therapy CFTR adenovirus Gene replacement Gene supplementation liposome SCID Adenosine deaminase DNA probe DNA hybridisation DNA sequencing Cycle sequencing Gel electrophoresis Restriction mapping Genetic screening Genetic counselling

	Term 1		Term 2		Term 3	
	All-or-nothing principle Dendrons Axon Cell body Schwann cells Node of Ranvier	Phosphocreatine Slow twitch Fast twitch Myoglobin Sliding filament theory	Heterozygous Dominant Recessive Co-dominant Multiple alleles Pure-breeding strain Monohybrid Dihybrid Haploid (n) Diploid (2n) Phenotype Genotype Heritable Homologous chromosomes Ratio Sex linked Autosomal linkage Autosome Epistasis Totipotent (or omnipotent) Pluripotent Multipotent Induced pluripotent stem cells (iPSCs) Explant	Positive feedback Osmoregulation Nephron Fibrous capsule Cortex Medulla Renal pelvis Ureter Renal artery Renal vein Renal (Bowman's) capsule Proximal convoluted tubule Loop of Henle Descending limb of loop of Henle Ascending limb of loop of Henle Distal convoluted tubule Collecting duct Afferent arteriole Glomerulus Efferent arteriole Blood capillaries Ultrafiltration Reabsorption of water Counter-current multiplier Osmoreceptors ADH (antidiuretic hormone)	Reverse transcriptase Retrovirus Recombinant DNA Technology (genetic engineering) Recombinant DNA Promoter	Genetic fingerprinting (genetic profiling)
Assessment	End of topic tests		End of topic tests Mock exams: Modules 5,6		End of topic tests	

	Term 4
Topic/ Specification reference	OCR Biology A (H420) Module 1 – Development of practical skills in biology Module 5 – Communication, homeostasis and energy Module 6 – Genetics, evolution and ecosystems

	Term 4			
Knowledge	Respiration Populations and sustainability			
Skills	1.1 Practical skills assessed in a written examination 1.2 Practical skills assessed in the practical endorsement **AO1** Demonstrate knowledge and understanding of scientific ideas, processes, techniques and procedures. **AO2** Apply knowledge and understanding of scientific ideas, processes, techniques and procedures: • in a theoretical context • in a practical context • when handling qualitative data • when handling quantitative data. **AO3** Analyse, interpret and evaluate scientific information, ideas and evidence, including in relation to issues, to: • make judgements and reach conclusions • develop and refine practical design and procedures.			
Key vocabulary	**Respiration:** Aerobic Anaerobic Glycolysis Phosphorylation Oxidation NAD FAD Pyruvate Link reaction Acetyl CoA Kreb's Cycle Substrate level phosphorylation Oxidative phosphorylation Electron transfer chain ATP synthase Chemiosmosis Proton pump Electron acceptor Oxidation-Reduction **Ecosystems:** Biomass Calorimetry	Producer Consumer Extracellular digestion Trophic level GPP NPP Respiratory losses Food chain Food web Pyramid of Number Pyramid of Biomass Pyramid of Energy Productivity Intensive farming Percentage Efficiency Energy Transfer Biological Control Selective Breeding **Populations:** Hardy Weinberg Principle Gene Pool Allelic frequency Discontinuous variation	Continuous variation Natural selection Directional selection Stabilising selection Disruptive selection Genetic Drift Genetic bottleneck Founder effect Speciation Species Allopatric speciation Sympatric speciation Ecosystem Population Community Habitat Niche Random Sampling Systematic Sampling Mark-Release-Recapture Abiotic Factors Biotic Factors	Interspecific Competition Intraspecific Competition Succession Pioneer Species Climax Community Conservation Ecosystem Population Community Habitat Niche Random Sampling Systematic Sampling Mark-Release-Recapture Abiotic Factors Biotic Factors Interspecific Competition Intraspecific Competition Succession Pioneer Species Climax Community Conservation

	Term 4	Term 5	Term 6
Assessment	End of topic tests Mock exam: Modules 1-6	OCR Biology A (H420) Revision and consolidation of all modules.	Study leave & external examinations

Physics Year 12						
	Term 1	**Term 2**	**Term 3**	**Term 4**	**Term 5**	**Term 6**
Topic/ Specification reference	**EDEXCEL** Unit 01 – Working as a Physicist Unit 02 – Mechanics Unit 03 – Electric Circuits	**EDEXCEL** Unit 01 – Working as a Physicist Unit 02 – Mechanics Unit 03 – Electric Circuits	**EDEXCEL** Unit 01 – Working as a Physicist Unit 04 – Materials Unit 05 – Waves and Particle Nature of Light	**EDEXCEL** Unit 01 – Working as a Physicist Unit 04 – Materials Unit 05 – Waves and Particle Nature of Light	**EDEXCEL** Unit 01 – Working as a Physicist Unit 06 – Further Mechanics Unit 07 – Electric and Magnetic Fields	**EDEXCEL** Unit 01 – Working as a Physicist Unit 06 – Further Mechanics Unit 07 – Electric and Magnetic Fields
Knowledge	**Mechanics** Rectilinear motion Momentum Forces Work and power **Circuits** Charge and current Potential difference and emf Power I-V Relationships Resistance and resistivity Internal resistance Potential dividers	**Mechanics** Rectilinear motion Momentum Forces Work and power **Circuits** Charge and current Potential difference and emf Power I-V Relationships Resistance and resistivity Internal resistance Potential dividers	**Materials** Fluids (properties, density, pressure, flotation, streamlines and laminar flow, viscosity) Solid materials (deformation, properties, Hooke's Law, Young Modulus) **Waves** Nature of Waves Transmission and Reflection of Waves Superposition of Waves Particle Nature of Light	**Materials** Fluids (properties, density, pressure, flotation, streamlines and laminar flow, viscosity) Solid materials (deformation, properties, Hooke's Law, Young Modulus) **Waves** Nature of Waves Transmission and Reflection of Waves Superposition of Waves Particle Nature of Light	**Further Mechanics** Circular Motion Momentum interactions (collisions and explosion) **Electric and Magnetic Fields** Electric fields Capacitance	**(Further Mechanics)** Circular Motion Momentum interactions (collisions and explosion) **Electric and Magnetic Fields** Electric fields Capacitance

	Term 1		Term 2		Term 3	
Skills	Trigonometric functions Pythagoras' theorem Rearranging equations Substituting Uncertainties Plotting graphs Scale drawings Recognising and using units Standard form Significant figures		Trigonometric functions Pythagoras' theorem Rearranging equations Substituting Uncertainties Plotting graphs Scale drawings Recognising and using units Standard form Significant figures		Rearranging equations Substituting Uncertainties Plotting graphs Recognising and using units Standard form Significant figures Scale drawings	
Key vocabulary	**Mechanics** Uniform Acceleration Displacement Velocity Scalar Vector Resolve Resultant Coplanar Gravity Free-body force diagram Force Terminal velocity Gravitational field strength Momentum Moment Couple Torque Centre of gravity Kinetic energy Conservation of energy Gravitational potential energy Power	Work Efficiency **Electric Circuits** Current Charge Potential difference Electromotive force Voltage Ohm's Law Resistance Kirchhoff's Laws Resistivity Ohmic Thermistor Diode Power Potential divider Light-dependent resistors Lattice Vibrations Conduction Electrons	**Mechanics** Uniform Acceleration Displacement Velocity Scalar Vector Resolve Resultant Coplanar Gravity Free-body force diagram Force Terminal velocity Gravitational field strength Momentum Moment Couple Torque Centre of gravity Kinetic energy Conservation of energy Gravitational potential energy Power	Work Efficiency **Electric Circuits** Current Charge Potential difference Electromotive force Voltage Ohm's Law Resistance Kirchhoff's Laws Resistivity Ohmic Thermistor Diode Power Potential divider Light-dependent resistors Lattice Vibrations Conduction Electrons	**Materials** Density Upthrust Stokes' Law Laminar flow Turbulent flow Viscosity Stiffness Hooke's law Tensile Compressive Stress Strain Young modulus Limit of proportionality Elastic limit Yield point Elastic deformation Breaking stress Elastic strain energy Linear Non-linear **Waves** Amplitude Frequency Period Speed Wavelength Pressure Transverse	Longitudinal Standing Stationary Oscilloscope Signal generator Wavefront Coherence Path difference Superposition Interference Phase Phase difference Tension Intensity Power Refractive index Snell's law Critical angle Total internal reflection Focal length Converging Diverging Ray diagram Pulse-echo Electromagnetic radiation Photon Absorption Emission Threshold frequency Electronvolt
Assessment	3-week review 6 week review Topic test		Topic Tests AS Paper 1 Mock		Topic Tests	

	Term 4		Term 5		Term 6	
Skills	Rearranging equations Substituting Uncertainties Plotting graphs Recognising and using units	Standard form Significant figures Scale drawings	Trigonometric functions Pythagoras' theorem Rearranging equations Substituting Uncertainties	Plotting graphs Scale drawings Recognising and using units Standard form Significant figures	Trigonometric functions Pythagoras' theorem Rearranging equations Substituting Uncertainties	Plotting graphs Scale drawings Recognising and using units Standard form Significant figures
Key vocabulary	**Materials** Density Upthrust Stokes' Law Laminar flow Turbulent flow Viscosity Stiffness Hooke's law Tensile Compressive Stress Strain Young modulus Limit of proportionality Elastic limit Yield point Elastic deformation Breaking stress Elastic strain energy Linear Non-linear **Waves** Amplitude Frequency Period Speed Wavelength Pressure Transverse	Longitudinal Standing Stationary Oscilloscope Signal generator Wavefront Coherence Path difference Superposition Interference Phase Phase difference Tension Intensity Power Refractive index Snell's law Critical angle Total internal reflection Focal length Converging Diverging Ray diagram Pulse-echo Electromagnetic radiation Photon Absorption Emission Threshold frequency Electronvolt	Inelastic Elastic Collision Explosion Impulse Radian Angular velocity Centripetal Tangetial Radius Fields	Electric Magnetic Potential Equipotential Radial Capacitor Capacitance Time constant Exponential Flux	Inelastic Elastic Collision Explosion Impulse Radian Angular velocity Centripetal Tangetial Radius Fields	Electric Magnetic Potential Equipotential Radial Capacitor Capacitance Time constant Exponential Flux
Assessment	Topic Tests		Topic Tests AS Paper 2 Mock		Topic Tests	

Physics Year 13						
	Term 1	**Term 2**	**Term 3**	**Term 4**	**Term 5**	**Term 6**
Topic/ Specification reference	**EDEXCEL** Unit 06 – Further Mechanics Unit 07 – Electric and Magnetic Fields Unit 08 – Particle physics	**EDEXCEL** Unit 10 – Space Unit 11 – Nuclear Radiation Unit 12 – Gravitational Fields	**EDEXCEL** Unit 09 - Thermodynamics Unit 13 – Oscillations	**EDEXCEL** Paper 3 Preparation Unit 01 – Working as a Physicist Appendix 5: Working scientifically Appendix 6: Mathematical skills	**EDEXCEL** Consolidation Revision Exam technique	**(N/A) Study Leave + External Exams**
Knowledge	Circular Motion Momentum interactions (collisions and explosion) Magnetic Fields Development of the Atom Rutherford scattering Particle Accelerators Energy Mass Equivalence Quark-lepton Model Conservation Laws	Luminosity Measuring astronomical distances Stellar evolution and Hertzsprung-Russell Diagrams Red shift Fate of the universe Binding Energy and Nuclear Stability Fusion and fission Types of Radiation Nuclear decay equations Nuclear decay Gravitational field strength Newton's Law of Gravitation Radial fields Orbital motion	Latent and specific heat Kinetic theory Ideal gases Gas laws Black body radiation Simple harmonic motion Resonance Forces and free oscillations Damping	Familiarity with required practicals All other course content	**(N/A)**	**(N/A) Study Leave + External Exams**

	Term 1	Term 2	Term 3	Term 4	Term 5/6
Skills	Trigonometric functions Pythagoras' theorem Rearranging equations Substituting Uncertainties Plotting graphs Scale drawings Recognising and using units Standard form Significant figures Use of hand rule to analyse motion in 3D	Trigonometric functions Pythagoras' theorem Rearranging equations Substituting Uncertainties Plotting graphs Scale drawings Recognising and using units Standard form Significant figures Exponential and logarithmic functions	Trigonometric functions Pythagoras' theorem Rearranging equations Substituting Uncertainties Plotting graphs Scale drawings Recognising and using units Standard form Significant figures Small angle approximations Calculus (A-level maths students only)	Maths skills: Trigonometric functions Pythagoras' theorem Rearranging equations Substituting Uncertainties Plotting graphs Scale drawings Recognising and using units Standard form Significant figures Practical skills: Independent thinking Use and application of scientific methods and practices Numeracy Instruments and equipment Research and referencing Practical techniques	Independent study
Key vocabulary	Magnetism Flux density Flux linkage Motor effect Flemming's left hand rule Faraday's Law Lenzes' Law Root Mean Square Peak voltage Peak current Plum pudding model Nucleon Proton number Atomic number Mass number Isotope Strong nuclear force Linear accelerator Cyclotron Synchrotron	Red Giant White dwarf Blue supergiant Luminosity Stefan-Boltzmann law Wien's law Hertzsprung-Russel diagram Main sequence Protostar Neutron star Black hole Planetary nebula Black dwarf Supernova Light year Astronomical unit Trigonometric parallax Parsec Standard candle Red shift Doppler effect	Kinetic theory Absolute zero Absolute temperature Internal energy Maxwell-Boltzmann distribution Root Mean Square Specific heat capacity Latent heat Boyle's law Charles' law Ideal gas Equations of state Oscillate Period Simple harmonic motion Free oscillation Natural frequency Forces oscillation Driving frequency Resonance	Base unit Derived unit SI Unit Estimation Measurement Quantity Limitation Error Uncertainty Random Systematic Independent variable Dependent variable Scatter Accuracy Precision Repeatability Reproducibility Resolution Significant figures Validity	**(N/A)**

	Term 1	Term 2	Term 3	Term 4	Term 5/6
	Bubble chamber Pair production Annihilation Electronvolt Standard model Quark Lepton Anti-particle Baryon Meson Piojn Kayon Hardon Exchange bosons Gravity Photon Graviton Alpha Beta plus Beta minus Neutrinos Strangeness	Hubble constant Big Bang Big Crunch Dark matter Dark energy Decay Alpha Beta Gamma Decay constant Activity Half-life Mass deficit Mass defect Fusion Fission Binding energy Thermal neutron Moderator Fuel rod Chain reaction Control rod Gravitational field Gravitational potential	Damping Critically damped	True value	

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 5/6
Assessment	Topic tests Required Practicals	Topic tests Required Practicals A2 Paper 1 Mock	Topic tests Required Practicals	Topic tests A2 paper 2 Mock Required Practicals	A2 Paper 3 Mock	**(External Examination)**

A Level Chemistry Year 12						
	Term 1		**Term 2**		**Term 3**	
Topic/ Specification reference	Module 2: Atoms, ions and compounds. Amount of substance Electrons and bonding.		Module 2: Continuing electrons and bonding. Shapes of molecules and intermolecular forces. Acids and redox. Module 3: Periodicity.		Module 3: Reactivity trends. Module 4: Basic concepts of organic chemistry. Alkanes.	
Knowledge	Foundations of chemistry.		Foundation of covalent bonding in organic chemistry.		Organic reactions and synthesis pathways.	
Skills	**Maths** Significant figures Use of constants Calculation of reacting masses, gas volumes and mole concentrations Use of stoichiometric relationships in calculations Application of synthetic routes Explanation of mechanisms		**Maths.** Significant figures Concordant results Uncertainties Application of synthetic routes Explanation of mechanisms	**Practical** Correct use of glassware Accurately reading scales The techniques and procedures used when preparing a standard solution of required concentration and carrying out acid–base titrations Writing formulae using oxidation numbers	**Practical** Variety of analytical techniques to identify unknowns Application of synthetic routes Explanation of mechanisms	
Key vocabulary	Avogadro constant. Empirical Mole Anhydrous Crystallisation Molar gas volume Ideal gas Stoichiometry Percentage yield Theoretical yield Actual yield Limiting reagent	Formulae Equations Electron structure Sub-shells Energy levels S,p,d,f – orbitals Ionic, covalent and metallic bonding Dot and cross diagrams Structures Properties	Acid Base Alkali Dissociation Neutralisation Titration Burette Pipette Volumetric flask Standard solution Oxidation Reduction Periodicity Ionisation energy Electron shielding Atomic radius Nuclear charge	Conductivity Electronegativity Shapes of molecules Linear Bent Tetrahedral Triagonal pyramidal Bonded pairs Lone pairs Intermolecular forces Hydrogen bonding London forces Permanent dipole-permanent dipole forces Melting point Boiling point Solubility	Group Period Redox Ionisation energy Properties Displacement Qualitative analysis Aliphatics	Aromatics Nomenclature Alkanes Non-polar Free radical substitution Homolytic fission Heterolytic fission
Assessment	End of topic testing 3 and 6 week reviews		End of topic testing		End of topic testing	

	Term 4		Term 5	Term 6
Topic/ Specification reference	Module 3: Enthalpy. Rates and equilibrium. Module 4: Alkenes. Alcohols. Haloalkanes		Starting A2 work – Module 5: Rates of reaction. Module 4: Organic synthesis	Module 5: Continuing rates of reaction. Module 6: Aromatic chemistry
Knowledge	Organic reactions and synthesis pathways.		Organic reactions and synthesis pathways.	Organic reactions and synthesis pathways.
Skills	**Maths.** Graph work Taking tangents Construction of enthalpy profile diagrams to show the difference in the enthalpy of reactants compared with products and associated calculations Calculations of the equilibrium constant, Kc , from provided equilibrium concentrations Application of synthetic routes Explanation of mechanisms		**Maths.** Graph work Taking tangents Deduction of the order (0, 1 or 2) with respect to a reactant from the shape of the graph Calculation of the rate constant, k, and related quantities, from a rate equation including determination of units Application of synthetic routes Explanation of mechanisms	**Maths.** Graph work Taking tangents Determination of rate constant for a first order reaction from the gradient Use of the pre-exponential factor, A and the gas constant Application of synthetic routes Explanation of mechanisms
Key vocabulary	Enthalpy Conservation of energy System Formation Combustion Ionisation energy Mole Hess's law Rate of reaction Collisions Homogeneous Heterogeneous Boltzmann distribution Le Chatelier's principle Equilibrium Equilibrium constant	Alkenes Electron density Electrophilic addition Curly arrows Polymerisation Haloalkanes Free radicals Ozone Hydrolysis Nucleophilic substitution Alcohols Primary, secondary, tertiary Oxidation Dehydration	Order of reaction Rate equation Rate constant Continuous monitoring Initial rate Half-life Rate-determining step Practical techniques Distillation Reflux Quick fit apparatus Purification Separating funnels Intermediates	Arrhenius equation Continuous monitoring Benzene Phenol Electrophilic substitution Directing groups
Assessment	End of topic testing		End of topic testing	End of topic testing. Y12 Mock – Breadth AS paper

A Level Chemistry Year 13						
	Term 1		**Term 2**		**Term 3**	
Topic/ Specification reference	Module 5:Equilibrium constants. Enthalpy. Module 6:Carbonyls and carboxylic acids. Amines, amino acids and polymers.		Module 5:Entropy. Acids, bases and pH. Organic synthesis PAG's.		Module 5:Buffers and neutralisation. Module 6:Organic synthesis Chromatography and spectroscopy.	
Knowledge	Organic reactions and synthesis pathways.		Organic reactions and synthesis pathways.		Organic reactions and synthesis pathways.	
Skills	**Maths.** Calculation of quantities present at equilibrium, given appropriate data	Application of synthetic routes Explanation of mechanisms	**Maths.** Logarithmic scales. Application of synthetic routes Explanation of mechanisms		**Maths.** Calculation of the pH of a buffer solution, from the Ka value of a weak acid and the equilibrium concentrations of the	conjugate acid–base pair; calculations of related quantities Application of synthetic routes. Explanation of mechanisms
Key vocabulary	Equilibrium constant Homogeneous equilibria Heterogeneous equilibria Mole fraction Partial pressure Enthalpy Born-Haber cycle Atomisation Lattice enthalpy Electron affinity Aldehydes Ketones	Polarity Nucleophilic substitution Oxidation Reduction Hydroxynitriles 2,4-DNP Amines Amides Amino acids Chirality Condensation polymers Diol Dicarboxylic acids Diamines Esters	Entropy Free energy Feasibility Conjugate acid-base pairs Bronsted-Lowry acids and bases Redox Monobasic, dibasic, tribasic pH	Reflux Distillation Separation Purification Filtration under reduced pressure Recrystallisation Melting point determination	Buffer solution Conjugate acid Conjugate base Titration Indicator End point C-C bond formation Nitriles	Hydroxynitriles Alkylation Acylation TLC chromatography Gas chromatography C-12 NMR Proton NMR
Assessment	End of topic testing		End of topic testing Y13 mock exams – AS Depth paper		End of topic testing	

	Term 4				**Term 5 / Term 6**
Topic/ Specification reference	Module 5: Redox and electrode potentials. Transition elements.		Module 6: Spectroscopy continued.		
Knowledge	Organic reactions and synthesis pathways.				
Skills	**Maths.** Volumetric calculations.	Uncertainty. Significant figures	**Practical** Use of volumetric glassware	Application of synthetic routes Explanation of mechanisms	
Key vocabulary	Oxidising agent Reducing agent Oxidation number	Electrode potential d-block element Transition element	Complex ions Bidentate Coordination number	Cis-trans isomerism Optical isomerism Ligand substitution	
Assessment	End of topic testing		Y13 mock exams – A2 Papers		