OUR LADY & ST JOHN CATHOLIC COLLEGE

SCIENCE

Year 7	Year 8	Year 9	Year 10	Year 11
Autumn **Introduction to Science.** • Safety in the lab • Hazard symbols • Using apparatus • Variables • Planning an investigation • Collecting, presenting, and recording data • Analysing patterns in data Assessment: Google form	Autumn **Waves- sound** • Sound waves and speed • Loudness and amplitude • Frequency and pitch • The ear and hearing **Waves- light** • Light • Reflection • Refraction • The eye and vision • Seeing colour	Autumn **Ecosystems – Respiration** • Aerobic respiration • Anaerobic respiration • Respiration in yeast **Ecosystem- Photosynthesis** • Photosynthesis • Structure of the leaf- looking at stomata. • Limiting factors • Testing a leaf for starch	Autumn **Matter: C1 Chemistry** **Bonding, structure, and properties of matter** • Chemical bonds • Ionic bonding • Ionic compounds • Covalent bonding • Metallic bonding • The three states of matter • State symbols • Properties of ionic compounds	Autumn **Reactions: C2 Chemistry** **Rates of reaction** • Calculating rates of reaction • Factors which affect the rates of chemical reactions • Required practical-: investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity. • Catalysts

Organisms: Cells • The microscope- observing cells. • Plant and animal cells • Specialised cells • Movement of substances • Unicellular organisms **Organisms: Movement** • Levels of organisation • Body systems • The skeleton • Movement: Joints • Movement: Muscles Assessment: Baseline, low stakes quizzes and formative EOU assessment.	Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Earth- Structure** • The structure of the Earth • Sedimentary, metamorphic, and igneous rocks • The rock cycles. • Ceramics **Earth –Universe** • The solar system • The Earth • The moon and changing ideas. Assessment: Baseline, low stakes quizzes and formative EOU assessment.	• Plant minerals Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Reactions: Types of reaction** • What is a chemical reaction? • Recap word equations • Factors affecting chemical reactions. • Combustion • Thermal decomposition • Conservation of mass **Reactions: Chemical energy** • Exothermic and endothermic • Energy level diagrams	• Properties of small molecules • Polymers • Giant covalent structures • Properties of metals and alloys • Structure and bonding of carbon • Graphene and fullerenes Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Matter: C1 Chemistry Quantitative chemistry** • Conservation of mass • Balancing chemical equations	• Collision theory and activation energy • Energy changes and reversible reactions - Endothermic/ exothermic reactions • The effect of changing conditions on equilibrium (HT only) Assessment: Baseline, low stakes quizzes and formative EOU assessment. C2 Chemistry Organic chemistry • Crude oil, hydrocarbons, and alkanes • Fractional distillation and petrochemicals • Properties of hydrocarbons • Cracking and alkenes Assessment: Baseline, low stakes quizzes and formative EOU assessment.

Matter: Particles • The particle models. • States of matter • Melting and freezing • Boiling • More changes of state • Diffusion • Gas pressure **Matter: Separating mixtures** • Mixtures • Solutions • Solubility • Filtrations • Evaporation and distillation • Chromatography Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Cumulative assessment**	**Electromagnets: Potential difference and resistance** • Circuit symbols and circuit diagrams • Series circuits and current • Series circuits and potential difference • Resistance • Resistance of a wire (H) • Parallel circuits and current • Parallel circuits and potential difference • Static electricity Assessment: Baseline, low stakes quizzes and	• Bond energies (H) Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Forces: Contact forces** • Friction and drag. • Squashing and stretching • Turning forces **Forces: Pressure** • Pressure in gases • Pressure in liquids • Pressure on solids Assessment: Baseline, low stakes quizzes and formative EOU assessment.	• Relative formula mass • Percentage mass • Moles (H) • Reacting masses (H) • Using moles to balance equations (H) • Concentrations of solutions **Matter: C1 Chemistry Chemical changes** • Metal oxides- oxidation and reduction • Reactivity series • Extraction of metals and reduction • Oxidation and reduction (in terms of electrons) (H)	C2 Chemistry Chemical analysis • Pure substances/formulations • Chromatography • Required practical- investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate Rf values. • Identification of common gases; chlorine, oxygen, carbon dioxide and hydrogen. Assessment: Baseline, low stakes quizzes and formative EOU assessment.

Spring **Forces: Speed** • Introduction to forces • Balanced and unbalanced forces • Speed • Motion graphs **Forces: Gravity** • Forces at a distance Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Genes: Variation** • Variation- genetic and environmental • Continuous and discontinuous • Adapting to change	formative EOU assessment. Spring **Organisms- Breathing** • Food tests – starch and sugar • Food tests – fats and protein • Unhealthy diet **Organisms- Digestion** • The digestive system • The role of the small intestine (H) • The model gut (practical) • Digestive enzymes Assessment: Baseline, low stakes quizzes and formative EOU assessment.	Spring **Waves: Wave effects** • Longitudinal waves- Sound waves • Hearing range and ultrasound • Ultrasound uses. • Transverse waves • Water waves • Electromagnetic waves **Waves: Wave properties** • Properties of waves (reflection and refraction) • Assessment: Baseline, low stakes quizzes and formative EOU assessment.	• Reaction of acids with metals • Neutralisation of acids and salt production • Soluble salts • Required practical- preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate, using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution. • The pH scale and neutralisation • Strong and weak acids (HT only) Content Key opportunities for skills	**C2 Chemistry Chemistry of the atmosphere** • The proportions of different gases in the atmosphere • The Earth's early atmosphere • Carbon dioxide and methane as greenhouse gases • Human activities which contribute to an increase in greenhouse gases in the atmosphere • Global climate change • The carbon footprint and its reduction • Common atmospheric pollutants and their sources Assessment: Baseline, low stakes quizzes and formative EOU assessment. **C2 Chemistry Using resources**

Genes: Human reproduction • Adolescence • Male and female reproductive systems • Fertilisation and implantation • Development of the foetus • The menstrual cycle Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Energy: Energy transfer** • Food and fuels • Energy resources • Energy and power **Energy: Energy costs** • Energy adds up. • Dissipation and efficiency	**Matter: Elements** • Elements • Atoms • Compounds • Chemical formulae • Polymers **Matter: Periodic table.** • The periodic table • The elements of Group • The elements of Group 7 • The elements of Group 0 Summer **Earth- climate** • Composition of the atmosphere • The carbon cycles. • The greenhouse effect.	**Earth- climate** • Composition of the atmosphere • The carbon cycles. • The greenhouse effect. • Global warming and its consequences **Earth –Earth resources** • Reactivity series • Extraction of metals • Electrolysis • Recycling Assessment: Baseline, low stakes quizzes and formative EOU assessment. Summer **B1 Biology** **Organisms: Cell Biology**	development A strong acid is completely ionised in aqueous solution. Examples of strong acid • The process of electrolysis • Electrolysis of molten ionic compounds • Using electrolysis to extract metals. • Electrolysis of aqueous solutions • Required practical- investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving	• Using the Earth's resources and obtaining potable water • Required practical- analysis and purification of water samples from different sources, including pH, dissolved solids, and distillation. • Alternative methods of extracting metals (HT only) • Life cycle assessment and recycling • Ways of reducing the • use of resources Autumn/ Spring **P2 Physics** **Forces: Forces** • Scalar and vector quantities • Contact and non-contact forces • Gravity • Resultant forces • Work done and energy transfer. • Forces and elasticity

Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Cumulative assessment** Summer **Reactions: Metals and non-metals** • Elements • Chemical reactions • Metals and non-metals • Metals and acids • Metals and oxygen • Metals and water • Metal displacement **Reactions: Acids and alkalis** • Acids and Alkalis • Indicators and pH	• Global and its consequences **Earth –Earth resources** • Reactivity series • Extraction of metals • Electrolysis • Recycling Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Energy: Work, heating, and cooling** • Work done. • Energy and temperature • Energy transfer- conduction, convection, and radiation. Assessment: Baseline, low stakes	• Microscopy • Animal and plant cell • Required practical- Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included. • Specialised cells • Mitosis and the cell cycle • Stem cells • Movement of substances- diffusion, osmosis, and active transport. • Required practical- investigate the effect of a range of concentrations of salt or sugar solutions on the	developing a hypothesis. • Representation of reactions at electrodes as half equations (HT only) Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Matter: C1 Chemistry Energy changes** • Energy transfer during exothermic and endothermic reactions • Required practical- investigate the variables that affect temperature changes in	• Distance and displacement • Speed • Velocity • The distance–time relationship • Acceleration • Newton's laws of motion • Required practical- investigate the effect of varying the force on the acceleration of an object of constant mass, and the effect of varying the mass of an object on the acceleration produced by a constant force. • Stopping distance • Momentum (HT) Assessment: Baseline, low stakes quizzes and formative EOU assessment. **P2 Physics Waves: Waves** • Transverse and longitudinal waves • Properties of waves

• Acid strength • Neutralisation • Making salts Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Ecosystems: Interdependence** • Food chains and webs • Disruption to food chains and webs • Ecosystems • Competition **Ecosystems: Plant reproduction** • Flowers and pollination • Fertilisation and germination • Seed dispersal Assessment: Baseline, low stakes quizzes and formative EOU assessment.	quizzes and formative EOU assessment. **Genes: Evolution** • Natural selection • Charles Darwin • The fossil records. • Extinction • Biodiversity • Preserving biodiversity **Genes: Inheritance** • Inheritance • DNA • Genetic and punnet squares • Genetic modification Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Cumulative assessment**	mass of plant tissue. Assessment: Baseline, low stakes quizzes and formative EOU assessment. **B1 Biology Organisms: Organisation** • Cells, tissues, and organs • The human digestive system • Required practical- Food groups: Benedict's test for sugars; iodine test for starch; and Biuret reagent for protein. • Enzymes (recap) • Enzymes of the digestive system • Required practical- investigate the	reacting solutions such as, e.g., acid plus metals, acid plus carbonates, neutralisations, displacement of metals. • Reaction profiles • Making and breaking bonds (H) Assessment: Baseline, low stakes quizzes and formative EOU assessment. Spring **P1 Physics- Energy:** • Energy stores and systems • Kinetic energy • GPE • Elastic potential	• Required practical- make observations to identify the suitability of apparatus to measure the frequency, wavelength, and speed of waves in a ripple tank and waves in a solid and take appropriate measurements. • Types of electromagnetic waves • Uses and applications of electromagnetic waves. • Reflection and refraction (HT) • Required practical-: investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface. Assessment: Baseline, low stakes quizzes and formative EOU assessment. **P2 Physics Electromagnets: Magnetism and Electromagnetism**

Cumulative assessment		effect of pH on the rate of reaction of amylase. • Components of the blood • The heart structure and function • The circulatory system • Coronary heart disease: a non-communicable disease • Health issues • The effect of lifestyle on some non-communicable diseases • Cancer • Plant tissue and organs Assessment: Baseline, low stakes quizzes and formative EOU assessment.	• Specific heat capacity • Required practical: an investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored. • Power • Energy transfers in a system • Efficiency • National and global energy resources	• Poles of a magnet • Magnetic fields • Electromagnets • The motor effect (HT) • Fleming's left-hand rule (HT only) Summer **Examinations** • **GCSE Biology** B1/B2 Trilogy exam • **GCSE Chemistry** C1/C2 Trilogy exam • **GCSE Physics** P1/P2 Trilogy exam

		B1 Biology Infection and response • Infection and response • Microorganisms and diseases caused by pathogens. • The body's first line of defence • The role of the white blood cells • Immunity • Vaccines • Antibiotics and painkillers • Discovery and development of new drugs Assessment: Baseline, low stakes quizzes and formative EOU assessment. Summer **B1 Biology Ecosystem: Bioenergetics**	**P1 Physics- Electricity:** • Standard circuit diagram symbols • Electrical charge and current • Current, resistance and potential difference. • Required practical- use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. • Resistors • Required practical- use circuit diagrams to construct	

		• Photosynthesis • Rate of photosynthesis • Uses of glucose from photosynthesis. • Aerobic respiration • Anaerobic respiration • Response to exercise • Metabolism Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Cumulative assessment**	appropriate circuits to investigate the I–V characteristics of a variety of circuit elements, including a filament lamp, a diode, and a resistor at constant temperature. • Series and parallel circuits • Direct and alternating potential difference. • Main's electricity • Power • Energy transfers in everyday appliances • The National Grid	

			P1 Physics-The particle model of matter: • Density of materials • Required practical- use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. • Changes of state • Internal energy • Temperature changes in a system and specific heat capacity • Changes of state and specific latent heat	

			• Particle motion in gases **P1 Physics-Atomic structure** • The structure of an atom • Mass number, atomic number, and isotopes • The development of the model of the atom (common content with chemistry) • Radioactive decay and nuclear radiation • Nuclear equations • Half-lives and the random nature of radioactive decay • Radioactive contamination	

			Summer **B2 Biology Genes Homeostasis and response** • Homeostasis • The human nervous system • Required practical- plan and carry out an investigation into the effect of a factor on human reaction time. • Human endocrine system • Control of blood glucose • Hormones in human reproduction • Contraception • Uses of hormones to treat fertility (HT)	

			• Feedback systems (HT) Assessment: Baseline, low stakes quizzes and formative EOU assessment. **Genes: B2 Biology Inheritance, variation, and evolution** • Sexual and asexual reproduction • Meiosis • DNA and the genome • Genetic inheritance • Genetic disorders • Sex determination • Variation • Evolution • Selective breeding	

			• Genetic engineering • Evolution • Fossils • Extinction • Resistant bacteria • Classification Assessment: Baseline, low stakes quizzes and formative EOU assessment. **B2 Biology Ecosystems: Ecology** • Abiotic and biotic factors • Adaptations • Levels of organisms- sampling techniques (quadrats and transects) • Required practical- measure the population size of a common species in a habitat. Use	

			sampling techniques to investigate the effect of a factor on the distribution of this species. • Carbon cycle • Water cycle • Biodiversity • Waste management • Land use • Deforestation • Maintaining biodiversity Assessment: Baseline, low stakes quizzes and formative EOU assessment.	