Our Lady Queen of Peace
Catholic High School

Curriculum Overview

YEAR 11 SCIENCE

Careers		
Local Market Information	**Skills**	**Jobs**
Local science becomes specialist pathways and apprenticeships. Biology links to genetics, inheritance and diagnostics through NHS laboratory science. Chemistry links to analytical chemistry, organic chemistry and industrial processes through employers such as P&G, Pilkington/NSG, Victrex and Westinghouse Springfields. Physics links to waves, magnetism and energy with links to the buzzing nuclear and clean-energy careers e.g. Westinghouse Springfields and URENCO.	**Resilience** **Strong Work Ethic** **Commitment**	Biomedical scientist; genetics laboratory assistant; analytical technician; nuclear/process apprentice; materials scientist

	Knowledge & Understanding			**Subject Specific Literacy Development**	**Cultural Capital / Enrichment Opportunities**
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Key Vocabulary**	
Half Term 1	C6: Rates & Equilibrium	Rates of Reactions, Factors Affecting Rates of Reactions, Measuring Rates of Reactions (RQP), Rates of Reactions from Graphs, Reversible Reactions, Le Chatelier Principle and Equilibrium (Higher and Separates Only)	Recall particles, chemical reactions, energy changes and collision ideas from previous chemistry topics.	Rate of reaction Collision theory Gradient Dynamic equilibrium Le Chatelier's Principle	Opportunities to help lead the STEM club

	Knowledge & Understanding			Subject Specific Literacy Development	Cultural Capital / Enrichment Opportunities
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Key Vocabulary**	
	P5: Forces	Scalar and Vector & Contact and Non-contact Forces, Weight, mass and gravity, Resultant Forces and Newton's First Law, Forces and Work Done, Forces and Elasticity, Investigating Springs RQP, Moments (Separates Only), Pressure (Separately Only), Atmospheric Pressure (Separately Only), Speed, Distance Time Graphs, Velocity Time Graphs, Acceleration and Newton's Second	Recall motion, energy transfers and everyday examples of pushes, pulls and gravity.	Vector - Scalar Weight - Mass Resultant force Work done Hooke's law Moment Pressure - Atmospheric pressure Directly proportional Acceleration Terminal velocity Inertia	Historical development of key concepts and discoveries; students will become familiar with influential scientists, experiments, and milestones, e.g. Newtons Laws Career spotlights for each topic STEM careers lesson (e.g. internation science week) Visits to local colleges and universities.
	B5: Homeostasis	Principles of Homeostasis, Nervous System, Synapse and reflex, Reaction Time RQP, The Brain (Sep Only), The Eye (Separates Only), Controlling Temperature (Sep Only), The Endocrine System, Control of Blood Glucose Levels, The Kidneys (Sep Only), Menstrual Cycle, Artificial control of fertility, IVF (Higher and Sep	Recall cells, organ systems, hormones and the basic needs of living organisms.	Homeostasis Negative feedback Nervous system Reflex arc Synapse Reaction time Brian Thermoregulation Endocrine system	
Half Term 2	C7: Organic Chemistry	Crude Oil and Hydrocarbons, Fractional distillation of oil, Burning Hydrocarbons, Cracking hydrocarbons, Reactions of Alkenes (Sep Only), Additional Polymerisation (Sep Only), Alcohol (Sep Only), Carboxylic Acids (Sep Only), Condensation Polymerisation (Sep Only), Natural Polymers (Sep Only)	Recall atomic structure, bonding, hydrocarbons and combustion reactions.	Hydrocarbon Alkane Fractional distillation Combustion Cracking Alkene Addition reaction Addition polymerisation Alcohol Carboxylic acid Condensation	

	Knowledge & Understanding			Subject Specific Literacy Development	Cultural Capital / Enrichment Opportunities
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Key Vocabulary**	
	C8 Chemical Analysis	Purity and Formulations, Paper Chromatography RP, Testing Gases, Testing for positive & negative ions (Sep Only), Instrumental Analysis (Sep Only)	Recall mixtures, pure substances, separation techniques and chemical reactions.	Purity Formulation Chromatography Rf value Gas test	
	P6: Waves	Transverse and Longitudinal Waves, Wave Speed, Ripple Tank RP, Reflection & Refraction (Sep Only), Sound waves (Sep Only), Waves for detection and exploration (Sep Only), EM Spectrum and uses, EM Spectrum Uses – Communication, Infrared, Lenses (Sep Only), Visible Light (Sep Only), Black body	Recall energy transfer, vibrations, sound and light from earlier science learning.	Transverse Longitudinal Wave speed Frequency Wavelength Reflection Refraction Sound wave Ultrasound	
Half Term 3	B6: Inheritance	Meiosis & Fertilisation, Sexual and Asexual Reproduction, Genes, DNA & Chromosomes, Protein Synthesis SEP ONLY, Genetic Inheritance, Inherited disorders, Sex & Family Trees, Mendel SEP ONLY, Variation and Natural Section, Evolution & Extinction, Speciation SEP ONLY, Evidence of Evolution, Selective Breeding, Genetic Engineering.	Recall cells, reproduction, specialised cells and adaptation in living organisms.	Meiosis - Fertilisation Asexual reproduction Sexual reproduction Gene - Chromosome Protein synthesis Allele Inheritance Dominant Recessive Inherited disorder	Opportunity to be a STEM leader within the Science club. Historical development of key concepts and discoveries; students will become familiar with influential scientists, experiments, and milestones, e.g. Gregor Mendel (inheritance and genetics), Charles Darwin (evolution by natural selection).
	C9: Earth Atmosphere	Composition and Evolution of the Atmosphere, Greenhouse Gases and the Greenhouse Effect, Global Climate Change, Atmospheric Pollutants from Fuels, Carbon Footprint and Reducing Emissions,	Recall particle theory, gases, chemical reactions and Earth's resources.	Atmospheric evolution Pollution Greenhouse effect Climate change	

	Knowledge & Understanding			Subject Specific Literacy Development	Cultural Capital / Enrichment Opportunities
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Key Vocabulary**	
	B7: Ecology	Communities, Abiotic and Biotic Factors, Adaptations in plants, Adaptations in animals, Sampling, Recycling Materials, Decay (Sep Only), Feeding Relationships, Biodiversity, Pollution, Deforestation, Global Warming, Trophic Levels (Sep Only), Pyramids of Biomass (Sep Only), Transfer of Biomass (Sep Only), Food Security and Farming Techniques (Sep Only),	Recall feeding relationships, habitats, adaptation and interdependence of organisms.	Ecosystem Community Biotic Abiotic Adaptation Competition Sampling Quadrat Decay Tropic level Nutrient cycle	Career spotlights for each topic STEM careers lesson (e.g. internation science week) Visits to local colleges and universities, STEM Big Bang etc.
Half Term 4	P7: Magnetism	Magnetism, Magnetic fields, Electromagnetism, Motor effect (Higher & Sep Only), Fleming's LHR (Higher & Sep Only), Induction (Sep Only), Transformers (Sep Only)	Recall electricity, circuits and magnetic materials.	Magnetic field Induced magnetism Magnetic field lines Electromagnet Motor effect Flemings left hand rule Electromagnetic	
	C10: Using Resources	Finite and Renewable Resources, Alternative to extraction of copper (Higher and Sep Only), Life Cycle Assessment, Reuse, Reduce and Recycle, Potable Water, Wastewater Treatment, Water Analysis RQP, Ceramics, Composites and Polymers (Sep Only), Corrosion & Alloys (Separates Only), The Haber Process (Sep Only), NPK Fertilisers (Sep Only)	Recall material properties, separation techniques, chemical analysis and Earth's resources.	Sustainable development Phytomining Bioleaching Life cycle assessment Recycling Potable water Waste water treatment Purity Composite Corrosion Alloy Harber process NPK fertiliser	

	Knowledge & Understanding			Subject Specific Literacy Development	Cultural Capital / Enrichment Opportunities
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Key Vocabulary**	
	P8: Space (Sep Only)	The Solar System, Orbits and Satellites, Life Cycle of a Star, Red-Shift and the Expanding Universe, The Big Bang Theory	Recall that gravity provides the force that keeps planets and satellites in orbit; Explain nuclear fusion; recall hydrogen fusion in stars; identify fusion	Nebula, protostar, main sequence star, red giant, red supergiant, white dwarf, neutron star, black hole, supernova	Explore current NASA and ESA missions; discuss the importance of space exploration and its impact on technology and society. Examine how scientists use evidence to explain the origins of the universe; compare historical and modern

Key Assessments			
When	**What will be assessed?**	**Why is this being assessed?**	**How will results be stored & students receive feedback?**
Half Term 1	Chemistry – Rate of Reaction – End of topic test Physics – Forces – End of topic test Biology – Homeostasis – End of topic test Required Practical DD Assessment	To assess students understanding of the factors that effect the rate of a chemical reaction and collision theory. To assess students understanding of how forces affect the motion of objects in a range of scenarios. To assess students understanding of how the nervous and endocrine systems work to control the body's functions.	Pupil Progress Teacher marked with WWW and EBI on green sheet.
Half Term 2	Chemistry – Organic Chemistry & Chemical Analysis – End of topic test Mock exams	To assess students understanding organic compounds, how they are obtained, refined and used. Also, how chemical tests are carried out and what they are used for. To assess students understanding of the topics that make up Biology, Chemistry and Physics Paper 1.	Pupil Progress. Teacher marked with WWW and EBI on green sheet. Pupil Progress Whole class feedback.
Half Term 3	Biology – Inheritance – End of topic test Chemistry – Earth and Atmosphere – End of topic test Biology - Ecology – End of topic test	To assess students understanding of how inheritance causes variation, how it occurs and how certain diseases are inherited. To assess students understanding of the Earth's atmosphere, how it developed and changed and the human impact (pollution).	Pupil Progress Teacher marked with WWW and EBI on green sheet.

		To assess students understanding of animal adaptations, human impact on the environment and how to investigate the distribution of organisms.	
Half Term 4	Physics – Magnetism – End of topic test Chemistry – Using resources – End of topic test	To assess students understanding of magnetic fields & electromagnets. To assess students understanding of how the earth's resources can be obtained and used. Also, the impact of using resources on the environment.	Pupil Progress Teacher marked with WWW and EBI on green sheet. Pupil Progress Teacher marked with WWW and EBI on green sheet.