Our Lady Queen of Peace

Catholic Engineering College

Curriculum Overview

YEAR 9 SCIENCE

	Knowledge & Understanding			Subject Specific Literacy Development		Cultural Capital / Enrichment Opportunities
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Reading for meaning focus**	**Key Vocabulary**	
Half Term 1	**Inheritance and Evolution** How do organisms grow and reproduce?	Differences between inherited and environmental characteristics Variation within a species Reproduction and the passing on of genetic information Simple understanding of genes, chromosomes, and DNA Theory of evolution by natural selection (Charles Darwin) How variation, competition, and survival lead to evolution Adaptation of organisms to their environments Fossil evidence for evolution Extinction and its causes (natural and human-induced) Basic understanding of selective breeding in plants and animals Ethical considerations of genetic modification (introductory level)	• What makes you similar to or different from other people, and how much of that do you think comes from your genes or your environment? • How is genetic information passed from parents to offspring, and what role do genes, chromosomes, and DNA play in this process? • How do variation, competition, and survival lead to evolution over time? • How do humans influence the traits of plants and animals through selective breeding or genetic modification, and what are the ethical questions around this?	Charles Darwin and natural selection. Animals that are no longer.	Gene Chromosome Heredity Evolution Natural selection Continuous Discrete Competition Adaptation Extinction Species	Opportunity to discuss relevant news. Highlighting the relevance and transferability of science for daily and future lives. Challenging popular stereotypes. Creating opportunities for students to explore STEM activities through practical and encouragement of STEM club.

	Knowledge & Understanding			Subject Specific Literacy Development		Cultural Capital / Enrichment Opportunities
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Reading for meaning focus**	**Key Vocabulary**	
	Forces and Motion Why do things move and change?	Describing motion using speed = distance ÷ time Interpreting distance-time graphs Effects of forces on motion: speeding up, slowing down, changing direction Resultant force and its impact on motion	• How can you use the formula speed = distance ÷ time to compare the motion of two different objects? • What can a distance-time graph tell you about how an object is moving, and how would you describe different types of motion shown on the graph? • How do different forces cause an object to speed up, slow down, or change direction in real-life situations? • What is a resultant force, and how does it affect the motion of an object when forces are balanced or unbalanced?	Interpreting speed distance time graphs Deep sea creatures	Pressure Fluid Moment Lever Motion Gradient Stationary Acceleration Deceleration Resultant force	
Half Term 2	**Ecosystems and Interdependence** Why do organisms depend on each other and their environment?	Definition of an ecosystem: interaction between living organisms (biotic) and their physical environment (abiotic) Examples of ecosystems (e.g., pond, forest, desert) Producers, consumers, and decomposers Food chains and food webs Energy transfer and trophic levels How organisms depend on each other for survival (e.g., pollination, predation, symbiosis) Impact of changes in population or environment on other organisms Competition for resources (light, food, water, space)	• What is an ecosystem, and how do living organisms interact with both each other and their physical environment within it? • How do producers, consumers, and decomposers work together in food chains and food webs to transfer energy through an ecosystem? • In what ways do organisms depend on each other for survival, and how can changes in population or environment affect these relationships? • Why do organisms compete for resources like light, food, water, and space, and how does this competition influence their survival and distribution?	Interpreting predator prey relationships The importance of pollinators	Ecosystem Habitat Consumer Interdependence Population Habitat Producer Herbivore Carnivore Deforestation Bioaccumulation Biodiversity	Opportunity to discuss relevant news. Highlighting the relevance and transferability of science for daily and future lives. Challenging popular stereotypes. Creating opportunities for students to explore STEM activities through practical and encouragement of STEM club.
Half Term 3	**Waves** How is information and energy transferred?	Transverse waves (e.g., light, water waves) Longitudinal waves (e.g., sound) Key features: crest, trough, compression, rarefaction Wave Properties:	• How do transverse and longitudinal waves differ in the way they transfer energy, and what are some real-life examples of each? • What are the key features of a wave—such as amplitude, wavelength, frequency, and speed—and how do	Discovering the uses of ultrasound From pinholes to pixels.	Transverse Longitudinal Wavelength Refraction Echo Ultrasound Cochlea	Opportunity to discuss relevant news. Highlighting the relevance and transferability of

	Knowledge & Understanding			Subject Specific Literacy Development		Cultural Capital / Enrichment Opportunities
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Reading for meaning focus**	**Key Vocabulary**	
		Amplitude, wavelength, frequency, and wave speed How sound travels through solids, liquids, and gases Pitch and volume related to frequency and amplitude Reflection of sound (echoes) Human hearing range Reflection and refraction Dispersion of light (spectrum) How we see: light entering the eye Opaque, transparent, and translucent materials	they affect the way we experience sound and light? • How does sound travel through different materials, and what happens when it reflects off surfaces to create echoes? • How does light behave when it reflects, refracts, or disperses, and how do these processes help us see and understand the world around us?		Amplitude Medium Oscillation Pitch	science for daily and future lives. Challenging popular stereotypes. Creating opportunities for students to explore STEM activities through practical and encouragement of STEM club.
Half Term 4	**Cells to systems**	Introduction to microscopy (light vs. electron) Cell structure and function (plant vs. animal) Specialised cells and their adaptations Diffusion, osmosis, and active transport in context Mitosis and the importance of cell division	• How do light and electron microscopes differ in what they reveal about cells, and why are both important in studying cell structure? • What are the main differences between plant and animal cells, and how do the structures of specialised cells help them carry out their functions? • How do diffusion, osmosis, and active transport help substances move in and out of cells, and why are these processes vital for life? • Why is mitosis important for growth and repair, and how does it ensure that new cells are identical to the original cell?	Exploring Microscopy Uses of stem cells in science	Eukaryotic Prokaryotic Resolution Mitosis Cell cycle Diffusion Osmosis Active transport Concentration gradient Partially permeable membrane	Opportunity to discuss relevant news. Highlighting the relevance and transferability of science for daily and future lives. Challenging popular stereotypes. Creating opportunities for students to explore STEM activities through practical and encouragement of STEM club.

	Knowledge & Understanding			Subject Specific Literacy Development		Cultural Capital / Enrichment Opportunities
	Topics (Bigger Picture)	**Knowledge (Key Concepts)**	**Recall & Retrieval Practice Focus**	**Reading for meaning focus**	**Key Vocabulary**	
Half Term 5	**The building blocks of Chemistry**	Structure of the atom: protons, neutrons, electrons Development of atomic models (Dalton to Bohr) Atoms. Elements, Compounds and Mixtures Periodic Table: groups, periods, and trends Metals vs. non-metals, reactivity patterns Separating techniques	• How has our understanding of the structure of the atom changed over time, and what are the roles of protons, neutrons, and electrons in an atom? • What are the differences between atoms, elements, compounds, and mixtures, and how can we identify them in everyday materials? • How is the Periodic Table organized, and what patterns or trends can we observe in the properties of elements across groups and periods? • What methods can be used to separate mixtures, and how do these techniques take advantage of the physical properties of substances?	Understanding the periodic table Interpreting methods to separate substances	Subatomic particles Atomic number Mass number Isotope Ion Element Compound Mixtures Filtration Distillation Chromatography	
Half Term 6	**Particles and their properties**	Particle model and its limitations Changes of state and energy transfers Density and how to measure it Specific heat capacity and latent heat (introductory level)	• What happens to particles and energy during changes of state, such as melting or boiling, and how is this energy transferred? • How can we measure the density of different materials, and what does density tell us about how particles are arranged?	Density and its applications	Kinetic energy Internal energy Specific latent heat Specific heat capacity Melting Boiling Evaporating Sublimation Density Mass Volume	

Key Assessments – Year 9 Science

When	What will be assessed?	Why is this being assessed?
Half Term 1	• Students will have Essential Knowledge Checks on the Inheritance and Health topic and the Fores in Motion topic.	• To look at the work in books and give teachers a good understanding of the learning taking place so they can address gaps in knowledge early.
Half Term 2	• The Inheritance and Health topic, and the Forces and Motion topic started in Half Term 1 are assessed part way through Half Term 2 with the big questions, "How did giraffes evolve to have long necks?" and "How to interpret a distance time graph?" •	• To track progress and give teachers and students a clear picture of strengths and weaknesses, which can then be addressed through feedback and students' responses to feedback. •
Half Term 3	• The Mid-Year Exam will assess content covered in the year so far, from biology (Inheritance and Health), and physics (Forces) and science skills, safety in the lab, variables etc • The Waves topic is assessed with the big questions, "How does light interact with different objects?"	• The mid-year supports conversations at parents evening, and setting decisions where applicable, as well as giving students and teachers a quantitative test score so we can trach progress over time • To track progress and give teachers and students a clear picture of strengths and weaknesses, which can then be addressed through feedback and students' responses to feedback.
Half Term 4	• Topic 5: Building Blocks of Chemistry will be assessed through the Essential Knowledge Checks (and later in the End of Year test) as well as through homework and in class past paper questions.	• To track progress and give teachers and students a clear picture of strengths and weaknesses, which can then be addressed through feedback and students' responses to feedback.
Half Term 5	• Topic 5: Building Blocks of Chemistry will be assessed through the Essential Knowledge Checks (and later in the End of Year test)	• To track progress and give teachers and students a clear picture of strengths and weaknesses, which can then be addressed through feedback and students' responses to feedback.
Half Term 6	• The End of Year Exam will also take place in HT 5, assessing a broad range of content covered in the year so far, from the Human Body and Health topic, Electricity and Magnetism and the Chemical Reactions Topic, as well as assessing skills e.g. drawing a graph, safety in the lab, and content from the becoming a scientist topic. • The Particles topic is taught and assessed in Half Term 6. It does not feature in the End of Year test but is assessed through Essential Knowledge Checks, looking at work in books, formative assessment tasks e.g. quizzes, class activities and homework tasks.	• The End of year guides setting decisions where applicable, as well as giving students and teachers a quantitative test score so we can trach progress over time and against progress targets. • To track progress and give teachers and students a clear picture of strengths and weaknesses, which can then be addressed through feedback and students' responses to feedback.