St Joseph's College Subject Curriculum Map: BIOLOGY

Curriculum Intent

The curriculum is designed to spiral in content, connecting smaller ideas to more abstract ideas. Students are then better prepared to apply these concepts when approaching an unfamiliar topic.
Big ideas are introduced in KS3 and then further explored in later years to help master scientific concepts.
Students are encouraged to analyse the world around them, explain phenomena, and make predictions.
There is constant development of knowledge and understanding in science driven by working scientifically.
Key aspects of the curriculum from KS3 to KS5 include: development of scientific thinking, experimental skills and strategies, analysis and evaluation skills.
Throughout the curriculum there is a high emphasis on scientific vocabulary, quantities, units, symbols, and nomenclature.

	Year Group	Autumn Term		Spring Term		Summer Term	
		Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Key Stage 3	7	**Cells** *Skills: Graph drawing, practical skills, using a microscope, preparing a slide, identifying variables.*		**Reproduction** *Skills: Literacy, labelling diagrams.*	**Eye dissection (Light)** *Skills: Practical skills, using equipment, lab safety, drawing diagrams.*	**Structure & Function** *Skills: Literacy, practical skills, lab safety, using equipment, identifying variables.*	**Nutrients** **Extinction** *Skills: Practical skills: using indicators, research, literacy, debate, presentation, identifying variables.*
	8	*Students are studying another Science subject	**Inheritance** *Skills: Numeracy, group-work, literacy, modelling.*	**Health & Lifestyle** *Skills: Literacy, practical design, and debate skills.*	**Health & Lifestyle** *Skills: Literacy, practical design, debate, identifying nutrients, identifying variables.*	**Ecosystems** *Skills: Practical design and practical skills, using equipment, literacy.*	**Turning Points of Biology** *Skills: Literacy.*
	9	**Disease & infection** *Skills: Literacy, practical, presentation, exam skills, identifying pathogens and disease.*	*Students are studying another Science subject	*Students are studying another Science subject	**Extinction, Adaptations & Variation** *Skills: Research, debate, literacy, modelling, identifying adaptations, comprehension.*	**Photosynthesis** *Skills: Practical skills, literacy, evaluation, balancing equations, identifying variables.*	**Biology Revision** *Skills: Practical skills, drawing graphs, literacy, identifying variables, exam structure.*
Key Stage 4	10	**Cell Biology** *Skills: Practical, literacy, numeracy, exam techniques.*	**Cell Transport** **Organisation (Animal)** *Skills: Practical, literacy, numeracy, exam techniques, linking topics, identifying variables.*	**Organisation (Plant)** *Skills: Practical, literacy, numeracy, linking topics, exam techniques, identifying variables.*	**Infection & Response** *Skills: Literacy, numeracy, practical, exam techniques, linking topics.*	**Bioenergetics** **Homeostasis & Response** *Skills: Practical skills, evaluating results numeracy, literacy, exam techniques.*	**Homeostasis & Response** **Ecology** *Skills: Practical skills, literacy, numeracy, exam techniques.*
	11	**Ecology** *Skills: Practical, numeracy, literacy, exam techniques.*	**Inheritance, Variation & Evolution** *Skills: Practical, literacy, numeracy, exam techniques.*	**Inheritance, Variation & Evolution** *Skills: Practical, literacy, numeracy, exam techniques.*	**End of Course Revision** *Skills: Literacy, numeracy, organisation, exam techniques.*		**Exams**

Key Stage 5	12	**Basic components of living systems.** **Biological molecules** *Skills: Cellular structures, microscopy, mathematical calculations of magnification and calibration of graticules, laboratory skills, practical tests for biological molecules, molecular structures, and modelling.*	**Enzymes** **Cell Division** **Plasma Membrane** **Nucleic Acids** *Skills: Modelling of transcription and translation, serial dilutions, practical investigations of enzymes and biological molecules, colorimetry, rates, calculations and graph skills, water potential and molecular transport, modelling of mitosis and meiosis.*	**Exchange Surfaces & Breathing** **Classification & Evolution** *Skills: Mathematical calculations of surface area to volume ratio, gas exchange in organisms, measuring spirometry, dissection of tissues, organs and organisms, analysis of taxonomic data and phylogenetic trees, graphical representation of variation and statistical tests.*	**Transport In Animals & Plants** *Skills: modelling of partial pressures, graphical manipulations, interpretation of ECG traces, whole organ dissection, practical investigations of transpiration, dissections of plant structures and tissue identification, microscopy, and staining.*	**Sampling & Biodiversity** **Communicable Diseases** *Skills: measuring biodiversity, sampling techniques, and sampling the natural environment, statistical tests, calculating genetic biodiversity, animal and plant diseases, disease transmission, analysis of graphical data, analysis of scientific literature, modelling the immune response.*	**Biology Field Course** *Skills: Sampling the natural environment, development of scientific hypotheses, application of research methods, formulation of a scientific literature review.*
	13	**Neuronal Communication** **Genetics & Patterns of Inheritance & Variation** *Skills: Analysis of action potentials, modelling of neuronal pathways, modelling propagation of action potentials in the context of ion channels, structural analysis of the brain, histology of muscle types, modelling and application of the sliding filament theory, genetic crosses in mono and dihybrid inheritance, calculations of phenotypic ratios, chi-squared and Hardy-Weinberg principle.*	**Hormonal Communication & Homeostasis** **Manipulating Genomes** *Skills: DNA profiling, practical skills of PCR and electrophoresis, modelling of thermoregulation, dissection of mammalian organs, histological tissue analysis.*	**Plant Responses** **Energy for Biological Processes** **Cloning & Biotechnology** *Skills: Modelling of genetic engineering and practical skills in cloning and culturing, production of immobilised enzymes in the lab, investigation of plant responses, investigation of photosynthetic pigments using thin-layer chromatography, modelling of the biochemical processes of photosynthesis.*	**Respiration** **Ecosystems** **Populations & Sustainability** *Skills: Modelling of the biochemical processes of respiration, investigating respiratory substrates, practical investigation and analysis of respiratory quotient, analysis of population data and sustainability, analysis of scientific literature of ecosystem management.*	**Revision** *Skills: Practical, literacy, numeracy, exam technique, organisation, study skills, revision resources, command words, practice papers.*	**Exams**