



BIOLOGY

Curriculum Intent and Overview (Years 7-11)

Intent Statement:

The intent of the Biology Curriculum at Bishop Vesey's Grammar School is to foster a lifelong curiosity about the natural world. This is done through progressively building knowledge, skills and understanding of several key biological ideas: core cell concepts, the functioning of multicellular organisms, how organisms interact with each other and their environment, how to structure scientific investigations, and the numerical, analytical and literacy skills required to communicate biological ideas effectively. Our knowledge-rich curriculum will not only prepare students for success in their examinations but will also prepare them for life in the wider world; with an appreciation of the complexities of living organisms and the skills required to make successful life choices regarding their health and environment, irrespective of background.

		MICHAELMAS TERM	LENT TERM	SUMMER TERM
KEY STAGE 3	Year 7	<p>Structure of cells Students explore the structure, adaptations and characteristics of animals, plants, bacteria and fungi and develop their microscopy skills by looking at animal cells, plant cells and Euglena.</p> <p>Skeleton, Joints and Muscles Students will explore the structure and function of the skeletal and muscular system and how the systems can work together to allow movement.</p>	<p>Food chains and Webs Students study the interdependence of organisms within an ecosystem and the problems human interference can cause on the health of an ecosystem.</p> <p>Flowers and Pollination Students explore various methods of pollination and seed dispersal, appreciating how this can promote biodiversity.</p>	<p>Human Reproduction Students look at developmental changes and cycles during adolescence. They make links to processes involved in cell division and reproduction in various organisms.</p> <p>Variation They develop the foundation for how variation in organisms leads to specific adaptations. Students learn that both genes and the environment can give rise to variation. Students develop their graphical skills in this topic and develop their ideas on how best to present data.</p>



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	<p>Year 8</p>	<p>Digestive System Students develop an understanding of the physiology and anatomy of the digestive system by looking at how enzymes and bacteria aid the process. They develop practical skills on how to test for various biological molecules and investigate rates of enzyme controlled reactions</p> <p>Respiratory System They explore the structure and function of the respiratory system and look at the effects of drugs, alcohol and smoking on the body and lung function respectively.</p>	<p>Respiration Students discover biochemical reactions and look at the processes of Respiration and its role in transferring energy to those organisms. Students also investigate the effect of exercise on breathing and heart rate.</p> <p>Photosynthesis Students look at Photosynthesis and its role in releasing the energy required in supporting all organisms. Students continue to develop their mathematical and graphical skills in this topic and learn to interpret data on factors limiting the rate of photosynthesis</p>	<p>Evolution They explore Darwin's theory of evolution via natural selection and how humans can achieve artificial selection in processes such as selective breeding, cloning and genetic engineering.</p> <p>Inheritance Students appreciate that DNA is the molecule of life and codes for our characteristics and proteins. Students could also understand the importance of the human genome project and seed banks.</p>
	<p>Year 9</p>	<p>Cell Structure and Transport Students gain an in depth understanding of the differences in structure and function of various animal, plant, bacterial and fungal cells. They are able to prepare their own slides to observe under microscopes and draw scientific diagrams from their field of view.</p>	<p>Organising an organism Students understand the model of organisation and how organ systems are made up organs, tissues and cells.</p> <p>Digestive system and enzymes Students model and explore enzyme action and develop their skills in analysing graphs, understanding limiting factors and rate calculations linked to their required practicals.</p>	<p>Organising Animals and Plants Students use dissections to help them understand the anatomy and function of the heart. They also evaluate the uses of biological and mechanical heart valves and stents and statins. They also explore the structure and functions of the vascular bundle in plants and the importance of plant tissues in relation to photosynthesis and respiration in plants.</p>



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		<p>Cell Division They are able to evaluate the use of stem cells and the ethics surrounding the use of embryonic and adult stem cells. They look at the process of how cells divide through the process of mitosis.</p>		<p>Communicable Diseases Students develop an in depth understanding of specific pathogens such as bacteria, fungi and viruses. They look at how they work to cause infection in the human body and plants and how the human body responds to infection in the primary and secondary response including antibody production and action.</p>
KEY STAGE 4	Year 10	<p>Preventing and treating diseases Students use and analyse data to look at how vaccines work to provide immunity. They review the process of drug and clinical trials and look at the importance of drug safety. Student also look at the use of monoclonal antibodies with real life application such as pregnancy tests</p> <p>Non-communicable diseases Students compare the difference in communicable and non-communicable diseases and look at how lifestyle factors such as smoking, exercise and diet can impact the risks for such diseases.</p>	<p>Respiration Students look at the biochemical process of aerobic and anaerobic respiration and the effects of exercise on this process. They investigate this by measuring heart rate and explore effects of metabolism on the liver</p> <p>Nervous System Students study the anatomy of the nervous system, including neurons and the structure and function of the human eye and how vision is corrected. They also look at reflex actions and develop skills in analysing data and calculating mean</p>	<p>Homeostasis Students review the structure and function of the kidney and look at how hormones are used to help control water levels in the blood.</p> <p>Reproduction Students look at the process of meiosis and how this creates gametes and they begin to explore how proteins are made and the link to our genetic material.</p>



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	<p>Photosynthesis Students develop detail in their understanding of photosynthesis from KS3 and explore how to measure and calculate the rate of photosynthesis , identify factors that might limit the rate of photosynthesis and interpret experimental data</p>	<p>Hormones Students look at a variety of endocrine glands, the hormones they release and their function on the human body. Examples include, blood glucose control, effects of adrenaline, control of metabolism by thyroxine and the role of hormones in the menstrual cycle. They further develop their skills in analysing trends in data and graphs</p>	
Year 11	<p>Inheritance Students further develop their knowledge of how certain conditions are genetically inherited. Students also need to know some examples of inherited genetic conditions and how they are inherited using a genetic cross.</p> <p>Variation and evolution Students develop the link to genetics in industry looking at processes such as genetic engineering, adult cell cloning and the ethics of such DNA technology. They develop their skills in evaluating their uses. Students also explore the theory of evolution and the work of Darwin, Lamarck and Mendel.</p>	<p>Adaptation and Interdependence Students explore predator prey relationships and how competition of abiotic and biotic factors can affect population size. They also look at how ecosystems can be sampled to look at the diversity of plant and animal species.</p> <p>Ecosystems Students look at various biological cycles including the water cycle, carbon cycle and nitrogen cycle and the role that decay and biomass has in these</p>	<p>Biodiversity Students analyse data to explore the effects of pollution and climate change on populations and how human activity such as deforestation can cause habitat destruction and how this impacts food security</p>