

IB Diploma Programme course outlines: Biology HL/SL

Course description:

Biology is the study of living organisms, how these organisms interact with each other, and how these interactions shape them at both micro and macro levels. It is the study of how organisms are interrelated at many levels and how this relationship changes over the course of time due to many connected factors. This course will centre on the basic themes of structure affecting function, equilibrium within systems, universality versus diversity and how these are all affected by the process of evolution.

Whilst it is our aim to increase our students' factual understanding of Biology we also want them to take this information and utilize it in a practical manner. By the end of the course the student should be able to formulate critical questions and transform these questions into testable hypotheses using appropriate scientific methods and techniques. They should also be able to pass this information on to others through different forms of scientific communication using scientific facts, appropriate scientific vocabulary and information technology. By the end of the second year class students must also exhibit their ability to work effectively in collaborative groups.

It is our desire that our students will be able to view the world through a scientific lens and understand that they are part of a global interdependent community. As scientists they will be able to share and collaborate in order to better understand the biosphere. They will be able to use their position as scientists in the international community to understand and debate the moral and ethical issues that are associated with science. Students will be able to understand the ever changing nature of science and identify themselves as part of this continued evolution. The development of such critical thinking skills will aid our students throughout their lives as well as help them to make improved and informed decisions as they move on to adulthood.

We will continually assess and develop these specific areas over the course of the two year program through a number of internal assessments. IB Diploma Biology will be offered concurrently at both the standard and higher level over the course of a two year class. In order to be allowed to enrol in either level of this course our students will already have taken and passed the prerequisite courses of IB MYP Biology and Chemistry during the five years prior to starting this course. Outside entry students will have completed science courses of a similar standard.

Topics:

The IB Biology sequence is organised to move from micro scale Biology, consisting of the Chemistry of life, cells, nucleic acids and proteins to features of macro biology. It is our belief that this is a more natural progression because students will understand the building blocks of Biology as we move into the more macro topics of human health and physiology, ecology and evolution. Students will be able to see how the interdependence of the smaller systems combine together to influence these macro topics. The Group 4 project will be addressed in the first term of the first year and will be combined with the IB Diploma 1 class.

In the second year of the course we will spend time on ecology, plant systems, and evolution as well as revisiting some earlier topics in order to keep them fresh in the students' minds. We have currently decided to offer topics D and G for our options since these are both allowable for standard and higher level options. Both options will be addressed in detail during the second year. The statistical analysis topic will fit into the Group 4 project and will be ongoing. Lab work will be expected for each of these topics and will be used as internal assessments. There will be a non-IB school assessment in the form of a mock exam in January of Year 2. There is no plan to teach to other curriculums.

Connections to TOK Some of the questions we will build into the course are listed below

- How do we acquire scientific knowledge?
- What is scientific knowledge, as compared to other forms of knowledge?
- What part is played by sense perception?
- How do we know that atoms exist?
- What is a scientific theory?
- Do we prove (confirm) or disprove (falsify) scientific theories?
- How can we define a cause?
- To what extent does the language of science depend on mathematics?
- Is science a social endeavour?
- Should scientists be held responsible for their discoveries if they are misused by others?
- Does the end justify the means in scientific research?
- Is scientific knowledge always moving forward?
- Will there ever be a theory of everything?

2 Year Syllabus Overview

Biology HL & SL topic guide		
Start of year 1	HL/SL	HL
	Group 4 Project 1.0 Statistical Analysis	
	2.1 Cell Theory 2.2 Prokaryotic 2.3 Eukaryotic Cells 2.4 Cell Membranes 2.5 Cell Division 3.1 Chemical elements and water. 3.2 Carbohydrates, lipids and proteins 3.6 Enzymes	7.5 Proteins 7.6 Enzymes
Half term		
	3.3 DNA structure 3.4 DNA replication 3.5 transcription and translation. 3.7 Cell Respiration 3.8 Photosynthesis	7.1 DNA Structure 7.2 DNA Replication 7.3 Transcription 7.4 Translation
	4.1 Chromosomes, genes, alleles and mutations. 4.2 Meiosis 4.3 Theoretical genetics 4.4 Genetic engineering and biotechnology	10.1 Meiosis 10.2 Dihybrid crosses and gene linkage 10.3 Polygenic inheritance

Half Term		
	6.1 Digestion 6.2 The Transport System 6.3 Defence against Diseases 6.4 Gas Exchange	8.1 Cell respiration
Half Term		
	6.5 Nerves, Hormones and homeostasis 6.6 Reproduction 5.2 The Greenhouse effect	11.1 Defence against infectious disease 11.2 Muscles and movement 11.3 The kidney 11.4 Reproduction
End of Year 1		

Biology HL & SL topic guide		
Start of year 2	SL	HL
	5.1 Communities and ecosystems 5.3 Populations 5.4 Evolution 5.5 Classification	8.2 Photosynthesis 9.1 Plant Structure and Growth 9.2 Transport in Angiosperms 9.3 Reproduction in Angiosperms
Mock Exams		
	G1 Community ecology G2 Ecosystems and biomes G3 Impacts of humans on ecosystems	G4 Conservation of biodiversity G5 Population ecology
Christmas break	D1 Origin of life on Earth D2 Species and speciation D3 Human evolution	D4 The Hardy–Weinberg principle D5 Phylogeny and systematics
Review		