

Curriculum Overview

IB Biology – Grade 11 and

In the secondary school, science lessons are designed to give students the opportunity to enjoy science as a practical, hands-on activity through which they will:

- value and challenge each other's ideas, hypotheses and theories.
- develop their practical skills.
- learn the application and importance of technology.
- maintain and direct their natural spirit of enquiry.
- develop an understanding of scientific methods and concepts.
- acquire a broad base of scientific knowledge.
- learn to communicate scientific ideas and findings.
- become aware of the influence of science and technology in society (and vice versa).
- discuss the ethical implications of science and the moral responsibilities of scientists.

In the IB Diploma lessons for Biology, these aims are still valid, but there is a more specific focus on the scientific method as it has been applied to the study of life. A deep understanding of biology is developed via a thorough and rigorous theoretical teaching and learning programme.

Internationalism is naturally built in to the course as science is such an international activity. A historical approach is taken whenever appropriate, with examples of the prevalence of life in different areas of the globe, diseases and their occurrence, as well as a thorough understanding of how evolution and adaptation have shaped the world we see around us. The experiences of students and staff in moving around the world are used to guide discussions and current events will be referenced to show the relevance of the material taught.

The life sciences are becoming an increasingly important part of the world we live in. The course already includes very topical issues such as global warming, stem-cell research, genetic modification and evolutionary evidence. The course is also flexible enough to encompass contemporary news topics as they arise. The course aims to ensure that the students are armed with sufficient understanding to assess and interpret these kinds of contentious topics but also to be able to look further as to what kind of research and evidence is needed in the future.

Assessment is both formative and summative, with regular feedback on all aspects. Peer and Self Assessment are regular features of the programme, enabling students to better understand the assessment criteria.

The teaching of the IB Biology programme follows the syllabus sections closely, with ample time at the end of the course to revisit each topic in a revision programme. All students follow the same syllabus in year 11 with students wishing to pursue the subject to higher level in year 12 taking extra topics throughout the second year of study.

Term	SL & HL	HL Only
1	Topic 3 The Chemistry of Life Topic 2 Cells	
2	Topic 4 Genetics Topic 5 Ecology and Evolution	
3	Topic 6 Human Health and Physiology Group 4 project Introduction to Labs with Topic 1 Statistical Analysis	
Summer Project	Study Project on First Option Topic	
4	First Option Topic (Probably Option F: Microbes and Biotechnology) First and second practice Labs	Topic 7 Nucleic Acids and Proteins Topic 8 Cell Respiration and Photosynthesis Topic 9 Plant Science
5	Second Option Topic (Probably Option D: Evolution) Final Lab assessment	Topic 9 Plant Science (Cont...) Topic 10 Genetics Topic 11 Human Health and Physiology
6	Final Preparation of the Internal Assessment Portfolio Revision Programme & Past Papers Final Revision Exam	

Methods of Assessment

1. **Tests**

- A. Essay questions
- B. Multiple choice
- C. Short answer
- D. Problem-solving

2. **Quizzes**

Quizzes will include questions focused on specific topics designed to encourage daily reading, participation, and engagement.

3. **Laboratory Notebooks**

A concise and detailed laboratory journal is required for each student. It contains the student's lab write-ups and some grading may be given according to completion and quality.

- 4. Formal laboratory write-ups are required after each formal Lab (Laboratory practical) starting after the 3rd trimester in year 11.

5. **Laboratory analytical thinking**

The student is challenged with problems where a laboratory-based solution is required. An explanation of the designated experiment and the application of the scientific method must be documented.

External and internal assessment will be utilized in IB Biology SL/HL.

External Assessment

In the form of three papers, this assessment comprises 76% of the IB Biology exam score.

- Paper 1 (20%) includes topical questions on biochemistry, genetics, human health and physiology; nucleic acids and proteins, photosynthesis and cellular respiration, reproduction, immune system and diseases, nervous and muscular systems, ecology, plants and evolution.
- Paper 2 (36%) includes a data-based question, multiple short-answer questions on the core and on higher level, and two extended response questions on the core and higher level.
- Paper 3 (20%) includes several short-answer questions and one extended-response in each of the two options.

Internal Assessment

This assessment is 24% of the IB Biology exam score. The educator determines each student's internal assessment score based on the student's performance through investigations, labs, reports, and group 4 projects.

Non-IB monitoring (Assessment on report cards and progress reports)

A typical weighting for a marking period will be:

End of Trimester Examinations 40% Topic Exams 40% Quizzes, Homework, Short essays, Lab reports, etc. 20%

Yr 11				
Timing		Main Topic	Standard Level	Higher Level Additions
Term 1	March - May	Topic 3. Chemicals of life	4.1 Chemical elements and water 4.1 Carbohydrates, lipids and proteins 4.1 DNA structure 4.1 DNA replication 4.1 Transcription and Translation 4.1 Enzymes 4.1 Cell respiration 4.1 Photosynthesis	
		Topic 2. Cells	1.1 Cell Theory 1.2 Prokaryotic cells 1.3 Eukaryotic cells 1.4 Membranes 1.5 Cell Division	
Term 2	June - September	Topic 4. Genetics	4.1. Chromosomes, genes, alleles and mutations 4.2. Meiosis 4.3. Theoretical genetics 4.4. Genetic engineering and biotechnology	
		Topic 5. Ecology and evolution	5.1 Communities and ecosystems 5.2 The greenhouse effect 5.3 Populations 5.4 Evolution 5.5 Classification	

Timing		Main Topic	Core Topics	Higher Level Additions
Term 3	September - December	<p>Topic 6. Ecology and Evolution</p> <p>Topic 1. Statistical analysis</p> <p>Group 4 project/presentation</p>	<p>6.1 Digestion</p> <p>6.2 The Transport system</p> <p>6.3 Defence against infectious disease</p> <p>6.4 Gas Exchange</p> <p>6.5 Nerves, hormones and homeostasis</p> <p>6.6 Reproduction</p> <p>Students perform practice Labs (SL students = 10 hours, HL students = 15 hours)</p>	
Yr 12				
Term 1	March - May	<p>Option topic F. Microbes and biotechnology</p> <p>Topic 7. Nucleic acids and proteins (HL only)</p> <p>Topic 8. Cell respiration and photosynthesis (HL only)</p> <p>Topic 9. Plant science</p>	<p>F1 Diversity of microbes</p> <p>F2 Microbes and the environment</p> <p>F3 Microbes and biotechnology</p> <p>F4 Microbes and food production</p> <p>Formal practice Labs 1 and 2 (SL students = 20 hours, HL students = 30 hours)</p>	<p>F5 Metabolism and microbes</p> <p>F6 Microbes and disease</p> <p>7.1 Dna structure</p> <p>7.2 Dna replication</p> <p>7.3 Transcription</p> <p>7.4 Translation</p> <p>7.5 Proteins</p> <p>7.6 Enzymes</p> <p>8.1 Cell respiration</p> <p>8.2 Photosynthesis</p> <p>9.1 Plant structure and growth</p>

Timing		Main Topic	Core Topics	Higher Level Additions
Term 2	June - September	<p>Option topic D. Evolution</p> <p>Topic 9. Plant science</p> <p>Topic 10. Genetics</p> <p>Topic 11. Human health and physiology</p>	<p>D1 Origins of life on Herat</p> <p>D2 Species and speciation</p> <p>D3 Human evolution</p> <p>Final Lab assessment (SL students = 10 hours, HL students = 15 hours)</p> <p>Practical Portfolios completed by end of September</p>	<p>D4 The Hardy-Weinberg principle</p> <p>D5 Phylogeny and systematics</p> <p>9.2 Transport in angiospermophytes</p> <p>9.3 Reproduction in angispermophytes</p> <p>10.1 Meiosis</p> <p>10.2 Dihybrid crosses and gene linkage</p> <p>10.3 Polygenic inheritance</p> <p>11.1 Defence against infectius disease</p> <p>11.2 Muscles and Movement</p> <p>11.3 The kidney</p> <p>11.4 Reproduction</p>
Term 3	September - December	Revision and past paper practice	IB Exams Start November	