



Biology *(First Examination 2025)*

Nature of the Subject

IB Biology Standard (SL) and Higher Level (HL))

The IB Biology course provides a body of knowledge on basic biological topics and some recent advances. It is hoped students will acquire scientific facts, terminology and methods of presenting scientific information and, at the same time, develop a broad, general understanding of the principles of Biology together with experimental and investigative scientific skills.

Throughout the course there will be emphasis on understanding the living world **at all levels of organization, from the cell and its molecular structure to the interactions between living organisms and the environment that form the ecosystem dynamics.** Unifying themes (Concepts) in the study of biology provide frameworks for the interpretation of the living world: **Form and Function, Unity and Diversity, Continuity and Change, and Interaction and Interdependence.** These are the four themes around which this syllabus is constructed.

A student of biology should not only gain a conceptual understanding, but also awareness of how biologists construct knowledge claims along with the limitations of these methods.

Distinction between Higher and Standard Level:

Students at SL and HL share the following.

- An understanding of science through a stimulating experimental programme
- The nature of science as an overarching theme
- The study of a concept-based syllabus
- One piece of internally assessed work, the scientific investigation
- The collaborative sciences project

The SL course provides students with a fundamental understanding of biology and experience of the associated skills. The HL course requires students to increase their knowledge and understanding of the subject, and so provides a solid foundation for further study at university level.

The SL course has a recommended 150 teaching hours, compared to 240 hours for the HL course. This difference is reflected in the additional content studied by HL students. Some of the HL content is conceptually more demanding and explored in greater depth. The distinction between SL and HL is therefore one of both breadth and depth. The increased breadth and depth at HL result in increased networked knowledge, requiring the student to make more connections between diverse areas of the syllabus.

Syllabus outline

Apart from the theory taught in class, the course includes extensive practical/experimental work in the form of activities or investigations.

1. Theory:

The following topics will be covered in both SL and HL classes, however in HL classes more material is covered in each topic and to a greater depth.

The material is based on conceptual understanding.

- Cells as the Basis of Life
- Metabolism and Chemistry of Life
- Molecular Genetics
- Ecological Systems
- Botany
- Animal Physiology
- Inheritance
- Evolution and Biodiversity

2. Practical Work:

Different investigations and activities will be carried out during the two-year course. These may include in-class activities, short experiments and experimental projects in the lab, computer simulations, analysis and processing of data from databases, data gathering through questionnaires or surveys and fieldwork. Students will gain the required skills to design and perform their experimental research project for their Internal Assessment (IA).

3. Collaborative Sciences Project:

Ten hours are allocated to a collaborative interdisciplinary project where real-world problems can be explored through the range of subjects in the sciences group. Through this project students will integrate factual, procedural and conceptual knowledge developed through the study of their science discipline(s). They will also apply their collective understanding to develop solution-focused strategies that address the issue and to develop an understanding of how interrelated systems, mechanisms and processes impact a problem.

Prior Learning

Past experience shows that students will be able to study biology at SL successfully with no background in, or previous knowledge of, science. Their approach to learning, characterized by the IB learner profile attributes, will be significant here.

However, for most students considering the study of biology at HL, while there is no intention to restrict access, some previous exposure to formal science education would be necessary. Specific topic details are not specified but students who have undertaken the IB Middle

Years Programme (MYP) or studied an equivalent national science qualification or a school based science course would be well prepared for an HL subject.

Assessment Objectives

The aim of the Biology course is that students are able to fulfil the following objectives.

1. Demonstrate knowledge of:
 - a. terminology, facts and concepts
 - b. skills, techniques and methodologies.
2. Understand and apply knowledge of:
 - a. terminology and concepts
 - b. skills, techniques and methodologies.
3. Analyse, evaluate, and synthesize:
 - a. experimental procedures
 - b. primary and secondary data
 - c. trends, patterns and predictions.
4. Demonstrate the application of skills necessary to carry out insightful and ethical investigations.

Teaching Approach

Teaching Biology in the IBDP aims to create and facilitate learning experiences through which students will be engaged in **structured inquiry**, develop **critical and creative thinking**, and acquire the **IB Learner** profile. Inquiry-based learning is being promoted by introduction of guiding questions, experimental investigations, class presentations, and collaborative project(s). Opportunities for students to develop and to apply critical thinking skills will be provided through the interpretation and analysis of their own data, evaluating scientific sources and testing methodologies/hypotheses from data-based questions. Links to Theory of Knowledge and Nature of Science will also be introduced in several parts of the syllabus. These links will allow students to deepen their understanding, make connections with other disciplines and work with real life examples.

Why students might choose this subject

Biology is required for a career in medicine, paramedical services, veterinary medicine, nursing, dietetics, pharmacy, biotechnology, psychology, food and drugs industry, agriculture, conservation, environmental studies, teaching or performing experimental research. Various areas of research in biology are extremely challenging and many discoveries remain to be made!

Most universities offer courses in Biology and related subjects such as molecular and cell biology, genetics, applied biology, ecology, marine biology, human biology, physiology, biochemistry, zoology, environmental science and many others.

Biology is a useful subject for everyone, even those who don't want to pursue a career in science, because it teaches us about how our bodies function and how they interact with the

environment and other organisms. It is important to be aware of these interactions at a time when a growing human population is placing a great pressure on food supplies and on habitats of other species, threatening the planet we live on.

Course Assessment

Students' progress will be continuously evaluated on the basis of participation in class discussions and activities, delivering homework and assignments on time, as formative assessments while performance in written assignments, quizzes and revision tests will be a summative assessment. Written work is assessed against criteria specified by the IB. During the IB2 year, the first IA draft and the final IA copy will be considered as a summative assessment.

The final Diploma grade in the subject is determined by two assessment components:

1. Internal assessment: Scientific investigation

This component is internally assessed by the subject teacher and externally moderated by the IBO. The grade awarded comprises 20% of the final IB Diploma grade.

The **scientific investigation** is an investigation performed by the student on a topic covered by the course material. The outcome of the investigation will be presented in the form of a written scientific report. The assessment of the investigation will be based on 4 criteria including personal research design, data analysis, conclusion and evaluation. The overall word count of the report should not exceed 3000 words.

2. External assessment: Written examinations

The final written examination takes place in May of the second year and comprises 80% of the final IB Diploma grade. It is externally assessed by the IBO.

It consists of 2 papers:

Paper 1:

Paper 1A consists of multiple-choice questions testing core topics for SL students and both core and AHL topics for HL students.

Paper 1B has four data-based questions related to experimental work and the syllabus.

Paper 2:

Section A: a data-base question and short-answer questions

Section B: one extended response question from a choice of two at SL level and two extended response questions from a choice of three at HL level on the same material as Paper 1.