

The IB Diploma Programme, for students aged 16 to 19, is an academically challenging and balanced programme of education that prepares students for success at university and life beyond. Students take courses in six different subject groups, maintaining both breadth and depth of study. Biology higher level is in group 4, experimental sciences. In addition, three core elements—the extended essay, theory of knowledge and creativity, action, service—are compulsory and central to the philosophy of the programme.

About the IB: For over 40 years the IB has built a reputation for high-quality, challenging programmes of education that develop internationally minded young people who are well prepared for the challenges of life in the 21st century and able to contribute to creating a better, more peaceful world.

The IB subject briefs illustrate key course components in the IB Diploma Programme.

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|--------------------------------|-----------------------|
| I. Course description and aims | III. Assessment model |
| II. Curriculum model overview | IV. Sample questions |

Overview of the biology higher level course and curriculum model

I. Course description and aims

The IB Diploma Programme biology higher level course covers the relationship of structure and function at all levels of complexity. Students learn about cell theory, the chemistry of living things, plant science and genetics, among many other topics to further their understanding of and learning about biology.

Throughout this challenging course, students become aware of how scientists work and communicate with each other. Further, students enjoy multiple opportunities for scientific study and creative inquiry within a global context. In addition, the course is designed to:

- provide a body of knowledge, methods and techniques that characterize science and technology
- enable students to apply and use a body of knowledge, methods and techniques that characterize science and technology
- develop an ability to analyse, evaluate and synthesize scientific information
- engender an awareness of the need for, and the value of, effective collaboration and communication during scientific activities
- develop experimental and investigative scientific skills
- develop and apply the students' information and communication technology skills in the study of science
- raise awareness of the moral, ethical, social, economic and environmental implications of using science and technology
- develop an appreciation of the possibilities and limitations associated with science and scientists
- encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method.

II. Curriculum model overview

Biology higher level

Theory		180 hours
<i>Core</i>	80 hours of instruction on six topics <ul style="list-style-type: none"> • Statistical analysis • Cells • The chemistry of life • Genetics • Ecology and evolution • Human health and physiology 	80 hours
<i>Additional higher level</i>	55 hours of instruction on five topics <ul style="list-style-type: none"> • Nucleic acids and proteins • Cell respiration and photosynthesis • Plant science • Genetics • Human health and physiology 	55 hours
<i>Options</i>	45 hours of instruction on additional topics, including: <ul style="list-style-type: none"> • Evolution • Neurobiology and behaviour • Microbes and biotechnology • Ecology and conservation • Further human physiology 	45 hours
Practical work		60 hours
<i>Investigations</i>		50 hours
<i>Group 4 project</i>		10 hours
Total teaching hours		240 hours

III. Assessment model

Assessment for biology higher level

The IB assesses student work as direct evidence of achievement against the stated goals of the Diploma Programme courses, which are to provide students with:

- a broad and balanced, yet academically demanding, programme of study
- the development of critical-thinking and reflective skills
- the development of research skills
- the development of independent learning skills
- the development of intercultural understanding
- a globally recognized university entrance qualification.

The assessments aim to test all students' knowledge and understanding of key concepts through:

- applying and using scientific methods, techniques and terminology
- constructing, analysing and evaluating scientific hypotheses, research questions and predictions, scientific methods and techniques, and scientific explanations
- demonstrating both the personal skills of cooperation, perseverance and responsibility appropriate for effective scientific investigation and problem-solving and the manipulative skills necessary to carry out scientific investigations with precision and safety.

Students' success in the biology higher level course is measured by combining their grades on external and internal assessment.

Even multiple-choice questions require that students know what each term or concept means in order to respond correctly, demonstrating an understanding of both basic facts and complex concepts. Calculators are not permitted in the multiple choice examination.

The internal assessment is of each student's practical or laboratory work. This includes the group 4 project, a total of 10 hours within the higher level course of 240 hours, in which students from different group 4 subjects collaborate in addressing a scientific or technological topic, allowing for concepts and perceptions from across the disciplines that "encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method".

Assessment at a glance

Type of assessment	Format of assessment	Time (hours)	Weighting of final grade (%)
External			76
<i>Paper 1</i>	Multiple choice	1	20
<i>Paper 2</i>	Data analysis, short answer and extended response	2.25	36
<i>Paper 3</i>	Short answer and extended response	1.25	20
Internal			24
<i>Practical work</i>	General laboratory work and fieldwork. Computer simulations, data-gathering exercises and data-analysis exercises may also be carried out.		
	Group 4 collaborative, interdisciplinary project		

IV. Sample questions

The following questions appeared in previous IB Diploma Programme biology higher level examinations.*

1. What is the first identifiable product of carbon dioxide fixation in photosynthesis? (Paper 1)
 - A. Ribulose biphosphate (RuBP)
 - B. Glycerate-phosphate (GP)
 - C. Triose phosphate (TP)
 - D. Acetyl CoA
2. (a) Draw a labeled diagram showing the structure of a plasma membrane; (b) Outline the role of chlorophyll and the effects of temperature, light intensity and carbon dioxide concentration on the rate of photosynthesis; (c) Explain the production of energy during aerobic respiration from pyruvate that has been produced by glycolysis. (Paper 2)
3. Discuss the correlation between change in the diet and increase in brain size in early hominid evolution. (Paper 3)

* the syllabus for examinations current until 2015

Learn more about how the IB Diploma Programme prepares students for success at university by going online to www.ibo.org/universities or email us at recognition@ibo.org.