

IB Biology 12 (HL) 2026/2027

Welcome to IB Biology. The curriculum will be divided between grade 11 and 12 and will all be examined in May of grade 12.

In IB Biology 11, we covered:

- Early Life on Earth
- Cell Biology
- Viruses
- Molecular Biology (most of it)
- Nucleic Acids
- Evolution and biodiversity
- Genetics
- Half of the Ecology topics

In IB Biology 12, we will cover:

- Second half of Ecology (A4.2, C4.2, D4.2, D4.3)
- Enzymes, metabolism, cell respiration and photosynthesis (C1)
- Plant and Human biology (B3, C2, C3, D3)

In both grades we will also do practical activities such as labs, computer simulations, and field studies. Students were introduced to the Scientific Investigation assignment in grade 11 and we practiced skills that will be used in grade 12 when we complete this individualized paper.

A detailed list of all the IB Biology learning outcomes will be handed out in class.

Theme	Level of organization			
	1. Molecules	2. Cells	3. Organisms	4. Ecosystems
A Unity and diversity	Common ancestry has given living organisms many shared features while evolution has resulted in the rich biodiversity of life on Earth.			
	A1.1 Water A1.2 Nucleic acids	A2.1 Origins of cells [HL only] A2.2 Cell structure A2.3 Viruses [HL only]	A3.1 Diversity of organisms A3.2 Classification and cladistics [HL only]	A4.1 Evolution and speciation A4.2 Conservation of biodiversity
B Form and function	Adaptations are forms that correspond to function. These adaptations persist from generation to generation because they increase the chances of survival.			
	B1.1 Carbohydrates and lipids B1.2 Proteins	B2.1 Membranes and membrane transport B2.2 Organelles and compartmentalization B2.3 Cell specialization	B3.1 Gas exchange B3.2 Transport B3.3 Muscle and motility [HL only]	B4.1 Adaptation to environment B4.2 Ecological niches
C Interaction and interdependence	Systems are based on interactions, interdependence and integration of components. Systems result in emergence of new properties at each level of biological organization.			
	C1.1 Enzymes and metabolism C1.2 Cell respiration C1.3 Photosynthesis	C2.1 Chemical signalling [HL only] C2.2 Neural signalling	C3.1 Integration of body systems C3.2 Defence against disease	C4.1 Populations and communities C4.2 Transfers of energy and matter
D Continuity and change	Living things have mechanisms for maintaining equilibrium and for bringing about transformation. Environmental change is a driver of evolution by natural selection.			
	D1.1 DNA replication D1.2 Protein synthesis D1.3 Mutations and gene editing	D2.1 Cell and nuclear division D2.2 Gene expression [HL only] D2.3 Water potential	D3.1 Reproduction D3.2 Inheritance D3.3 Homeostasis	D4.1 Natural selection D4.2 Stability and change D4.3 Climate change

Evaluation

Students will be assessed through a variety of assignments, labs and tests

- Formative strategies – Students will practice their learning with feedback. It is not counted toward final grade, but builds skills and knowledge that will be applied in summative strategies.
- Summative – Final demonstration of learning. These are written assessments that are a mix of multiple choice and short answer questions. There will also be verbal assessments, in which students are asked to individually explain processes.

Each topic will be weighted to reflect the number of learning outcomes that students must meet. As per **PMSS's IB Assessment Policy**, students will be assessed according to the IB 7 point scale, which reflects which level students are currently at with respect to the IB Biology learning outcomes. This scale mark will then be converted to a percentage following a rubric created by UBC for report cards. UBC's scale takes into account the added difficulty and workload required by IB.

Current Estimated IB grade	Report Card %
7	98-100
6	96-97
5	90-95
4	86-89
3	76-85
2	70-75
1	0-49

PMSS Work Habits rubric

Criteria	N	S	G
Punctuality	Consistently arrives late	Usually arrives on time	Arrives on time and ready to start
Works Independently	Distracts others; not on task; requires close supervision	Usually focused on task; may need some supervision	Remains on task without reminders; works quietly and efficiently
Initiative	Has difficulty starting to work; doesn't ask for help; doesn't get caught up after absence; doesn't participate	Participates when asked; begins to work when assignment given; works hard most of the time	Volunteers to ask and answer questions; will help others; knows what needs to be done and does it
Homework	Few assignments and homework complete	Homework and assignments usually completed	Homework and assignments complete
Teamwork	Interrupts, distracts, or disrupts others; difficult to work with	Usually cooperative; participates and follows the lead of others	Consistently demonstrates cooperation, respect, and leadership

Resources

- Textbook: Biology 2022 Edition Allott and Mindorff
- Notes, powerpoints and videos used in class can also be found in the IB Biology 11 Class on Teams.

Expectations

- **PMSS's IB Academic Integrity Policy** is expected to be followed at all times. Please refer to it on the school's website, and make sure you understand all of the expectations.
 - You are expected to work on your own to complete all assignments. Lab partners may collect data together, but the presenting of the data, calculations, discussions and conclusions in lab write ups must be completed **independently**. Working together constitutes academic dishonesty and is a form of plagiarism that is not acceptable.
 - Plagiarism is not tolerated in any form. You may not use material from the internet, or print material, without referencing. Any AI (Artificial Intelligence) content is not permitted. Work done by a tutor and previous course work from a friend is considered plagiarism. Telling your peers what is on a test, or asking for assessment information is academic dishonesty. Please see the PMSS Academic Honesty Policy for more information.
- Cell phones need to be placed in the "Cell Phone Hotel" as soon as you come into class. They can be retrieved at the end of class.
- All lab work and assignments must be handed in on time, at the beginning of class. If something needs to be printed, it must be done ahead of time, and be ready to hand in at the start of class. Electronic versions of study guides should be emailed to the teacher the night before they are due.
- The Scientific Investigation (Internal Assessment component for IB Biology) will be scaffolded to have many check-in points. The deadlines for each of the check-ins is very important and if assignments are not handed in, parents will be contacted and an IE form will be sent home. Failure to hand in the full draft or final paper on time may result in students receiving an "N" for IB Biology and thus not receiving their IB Diploma.
 - **Full Draft due: Monday December 14, 2026 before 7:40 am**
 - **Uploaded to Managebac drop box before 7:40 am**
 - **Paper copy handed in to Ms. Tsui before the end of lunch.**
 - **Final Draft due: Monday, February 8, 2027**
 - **Uploaded to drop box on Managebac before 7:40 am.**
- Please email me if you will be absent from class, so that I can outline the topics that you will need to catch up on.
- If you miss class on the day that we have an assessment, you **must have your parent email me directly that morning**. We can then set a new time for the assessment to be completed. Expect this new time to be immediately upon your return.
- Please feel free to send me questions by e-mail and Teams.

Office Hours

- As you all have class in block 1 and 2, we will not usually have Flex block available to work. You should find me at lunch, or before block 1 or after block 4 in semester 1 and in block 3 semester 2. Please send messages so that we can arrange to meet.

Final IB Biology Assessment (May 2027)

Internal Assessment: Draft due 7:30am Monday, December 14, 2026

Final due 7:30am Monday, February 8, 2027

External Assessment:

Monday, May 10, 2027 (afternoon): Paper 1a & Paper 1b

Tuesday, May 11, 2027 (morning): Paper 2

Assessment component	Weighting
External assessment (4 hours 30 minutes)	80%
Paper 1 (2 hours) Paper 1A—Multiple-choice questions Paper 1B—Data-based questions (four questions that are syllabus related, addressing all themes) (Total 75 marks)	36%
Paper 2 (2 hour and 30 minutes) Section A—Data-based and short answer questions Section B—Extended-response questions (Total 80 marks)	44%
Internal assessment (10 hours)	20%
The internal assessment consists of one task: the scientific investigation. This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. (Total 24 marks)	

Paper 1

Duration: 2 hours

Weighting: 36%

Marks: 75

Paper 1 is presented as two separate booklets

Paper 1A—40 marks

- 40 multiple-choice questions on standard level and additional higher level material.
No marks are deducted for incorrect answers.

Paper 1B—35 marks

- Four data-based questions related to experimental work and the syllabus.

Paper 1A and Paper 1B are to be completed together without interruptions.

The questions on paper 1 test assessment objectives 1, 2 and 3.

The use of calculators is permitted. See the *Calculators guidance for examinations booklet* on the Programme Resource Centre.

Paper 2

Duration: 2 hours and 30 minutes

Weighting: 44%

Marks: 80

Section A—48 marks

- Data-based question.
- Short-answer questions on standard level and additional higher level material.

Section B—32 marks

- Extended-response questions on standard level and additional higher level material.
Two of three extended-response questions to be attempted by candidates.

The questions on paper 2 test assessment objectives 1, 2 and 3.

The use of calculators is permitted. See the *Calculators guidance for examinations booklet* on the Programme Resource Centre.

Group 4 Aims

The course enables students, through the overarching theme of the NOS, to:

1. develop conceptual understanding that allows connections to be made between different areas of the subject, and to other DP sciences subjects
2. acquire and apply a body of knowledge, methods, tools and techniques that characterize science
3. develop the ability to analyse, evaluate and synthesize scientific information and claims
4. develop the ability to approach unfamiliar situations with creativity and resilience
5. design and model solutions to local and global problems in a scientific context
6. develop an appreciation of the possibilities and limitations of science
7. develop technology skills in a scientific context
8. develop the ability to communicate and collaborate effectively
9. develop awareness of the ethical, environmental, economic, cultural and social impact of science.

Assessment Objectives

The assessment objectives for biology reflect those parts of the aims that will be formally assessed either internally or externally. It is the intention of this course that students are able to fulfil the following assessment 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.



IB learner profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

As IB learners we strive to be:

INQUIRERS

We nurture our curiosity, developing skills for inquiry and research. We know how to learn independently and with others. We learn with enthusiasm and sustain our love of learning throughout life.

KNOWLEDGEABLE

We develop and use conceptual understanding, exploring knowledge across a range of disciplines. We engage with issues and ideas that have local and global significance.

THINKERS

We use critical and creative thinking skills to analyse and take responsible action on complex problems. We exercise initiative in making reasoned, ethical decisions.

COMMUNICATORS

We express ourselves confidently and creatively in more than one language and in many ways. We collaborate effectively, listening carefully to the perspectives of other individuals and groups.

PRINCIPLED

We act with integrity and honesty, with a strong sense of fairness and justice, and with respect for the dignity and rights of people everywhere. We take responsibility for our actions and their consequences.

OPEN-MINDED

We critically appreciate our own cultures and personal histories, as well as the values and traditions of others. We seek and evaluate a range of points of view, and we are willing to grow from the experience.

CARING

We show empathy, compassion and respect. We have a commitment to service, and we act to make a positive difference in the lives of others and in the world around us.

RISK-TAKERS

We approach uncertainty with forethought and determination; we work independently and cooperatively to explore new ideas and innovative strategies. We are resourceful and resilient in the face of challenges and change.

BALANCED

We understand the importance of balancing different aspects of our lives—intellectual, physical, and emotional—to achieve well-being for ourselves and others. We recognize our interdependence with other people and with the world in which we live.

REFLECTIVE

We thoughtfully consider the world and our own ideas and experience. We work to understand our strengths and weaknesses in order to support our learning and personal development.

The IB learner profile represents 10 attributes valued by IB World Schools. We believe these attributes, and others like them, can help individuals and groups become responsible members of local, national and global communities.

Approaches to Teaching and Learning

The IB Diploma Programme Approaches to Teaching and Learning are deliberate strategies, skills, and attitude that permeate the IB Teaching and Learning environment. The IB believes that a large influence on a student's education is not only what you learn by how you learn. Teaching students how to learn will improve the quality of teaching and learning across the entire IB spectrum of programmes.

The IB approaches to learning skills are:

- Thinking skills
- Communication skills
- Social skills
- Self-management skills
- Research skills

The IB approaches to teaching skills are:

- based on inquiry
- focused on conceptual understanding
- developed in local and global contexts
- focused on effective teamwork and collaboration
- differentiated to meet the needs of all learners
- informed by formative and summative assessment.

Links to Theory of Knowledge

- In Theory of Knowledge, students will be introduced to 5 Areas of Knowledge (Language, Arts, Human Sciences, Natural Sciences and Mathematics) and 4 elements of each area of knowledge (Scope, Methods/Tools, Perspectives and Ethics). In IB Biology, we will connect to the TOK course content as we learn about the history and production of biological knowledge. We will also ask knowledge questions that relate to the content, particularly in the areas of perspectives and ethics.

International Mindedness

- Science itself is an international endeavour—the exchange of information and ideas across national boundaries has been essential to the progress of science. Indeed, the idea that science is a Western invention is a myth—many of the foundations of modern-day science were laid many centuries before by Arabic, Indian and Chinese civilizations, among others. The scientific method in its widest sense, with its emphasis on peer review, open-mindedness and freedom of thought, transcends politics, religion, gender and nationality. Increasingly there is a recognition that many scientific problems are international in nature and this has led to a global approach to research in many areas.
- Throughout the two year of IB Biology, students will be introduced to examples of international efforts working together to increase scientific knowledge and examine how scientific breakthroughs affect people in different regions of the world.