Anglo-Chinese School (Independent)
Science Department (Biology)
IBDP Biology

To see a world in a grain of sand
And a Heaven in a wild flower
Hold infinity in the palm of your hand
And eternity in an hour

William Blake

INTRODUCTION
This course helps students to better understand the world that they live in and the world within them. It allows an in-depth study of a wide range of biological concepts as they apply them to diversity, interactions, systems and interacting communities. The IBDP develops an understanding of biological systems.

This course is suitable for students who have a keen interest in the living world. The student should also possess good reasoning ability grounded on scientific principles. Students selecting Higher Level (HL) Biology should have done well in the 'O'-Level Biology or at the Pre-IB course having acquired a distinction for the relevant subject.

Structure of the syllabus and conceptual understanding
The biology syllabus comprises four themes, each made up of two concepts. Each theme is a lens through which the syllabus content can be viewed.

- **Theme A:** Unity and diversity
- **Theme B:** Form and function
- **Theme C:** Interaction and interdependence
- **Theme D:** Continuity and change

The arrangement of syllabus content follows four levels of biological organization, which also serve as conceptual lenses.

- **Level 1:** Molecules
- **Level 2:** Cells
- **Level 3:** Organisms
- **Level 4:** Ecosystems

The content is further arranged into topics, each with two guiding questions as signposts for inquiry. These questions help students view the content of the syllabus through the conceptual lenses of both the themes and the levels of biological organization.

Coursework (HL and SL)
The course comprises a substantial amount of laboratory based work requiring regular experimental reports throughout the two years of study.
In addition, students will work on a Collaborative Sciences Project which may not be syllabus related but will not be assessed.

Assessment (HL and SL)
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)

Written Examinations (80%):
HL BIO

External assessment (4 hours 30 minutes)
Paper 1 (2 hours) : 36%
Paper 1A—Multiple-choice questions
Paper 1B—Data-based questions (four questions that are syllabus related, addressing all themes)
(Total 75 marks)

Paper 2 (2 hour and 30 minutes) : 44%
Section A—Data-based and short answer questions
Section B—Extended-response questions
(Total 80 marks)

SL BIO

External assessment (3 hours)
Paper 1 (1 hour and 30 minutes) : 36%
Paper 1A—Multiple-choice questions
Paper 1B—Data-based questions (four questions that are syllabus related, addressing all themes)
(Total 55 marks)

Paper 2 (1 hour and 30 minutes) : 44%
Section A—Data-based and short answer questions
Section B—Extended-response questions
(Total 50 marks)

University Courses and Careers
HL Biology lays the foundation for courses in 'pure sciences' and is also valuable for courses in applied sciences, Medicine, Pharmacy, Biochemistry, Microbiology, Life Sciences, Veterinary Science, Forestry, Physiotherapy, etc.

Distinction between SL and HL

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 Roadmap

The following table shows the integration of concepts and topic content into themes and level of organization.

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** Mutation 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