# IB Biology

## 1. NATURE OF SCIENCE

**Standard 1.1: Understand the nature of scientific inquiry *(Understand and use the scientific method)***

- 1.1.1 Ask scientific questions
- 1.1.2 Formulate hypotheses
- 1.1.3 Identify and distinguish dependent, independent and control variables
- 1.1.4 Implement and revise experimental procedures.
- 1.1.5 Collect and organize raw data
- 1.1.6 Process and present data.

**Standard 1.2: Communicate scientific ideas and activities clearly**

- 1.2.1 Compare results with published accepted values
- 1.2.2 State a justifiable conclusion.
- 1.2.3 Evaluate the results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists
- 1.2.4 Explain how and why ethical consideration can limit scientific research

**Standard 1.3: Investigate using appropriate tools and instruments to conduct scientific activities**

- 1.3.1 Use technology and mathematics to perform accurate scientific investigations and communication
- 1.3.1 Choose/use scientific tools appropriately

**Standard 1.4: Understand the nature of scientific knowledge and enterprise *(Understand why science is important)***

- 1.4.1 Develop awareness of ethics involved in the scientific enterprise
- 1.4.2 Recognize the dynamic nature of scientific knowledge.
- 1.4.3 Peer review and reflect on scientific presentations.

## 2. LIFE SCIENCES

**Standard 2.1 Understand biological evolution and diversity**

- 2.1.1 Explain biological characteristics used to define a species
- 2.1.2 Explain the Darwin-Wallace theory of natural selection
- 2.1.3 Outline the evidence for evolution
- 2.1.4 Classify biological organisms according to morphological characteristics.

**Standard 2.2: Understand the structure and function of cells and organisms**

- 2.2.1 Describe the structures and functions of the basic elements and molecules of living organisms
- 2.2.2 Describe the structures and functions of the cell membrane
- 2.2.3 Explain the other chemical reactions necessary for life.
- 2.2.4 Explain the structure, function, and chemical process of DNA
- 2.2.5 Describe all stages of the cell cycle.
- 2.2.6 Understand the structures involved and the processes occurring in the human ventilation system
- 2.2.7 Understand the structures and processes involved in human digestion
- 2.2.8 Understand the structures and processes involved in circulation
- 2.2.9 Understand the structures and processes involved in the defense against disease.
- 2.2.10 Understand the structures and processes involved in homeostasis.
- 2.2.11 Understand the structures and processes involved in human reproduction.
- 2.2.12 Understand the structures and processes involved in exercise physiology.
- 2.2.13 Understand the chemicals, processes, and issues involved in human nutrition.

**Standard 2.3 Understand the relationships among organisms and their environment**

- 2.3.1 Identify the factors that control population fluctuations in a given ecosystem.
- 2.3.2 Identify the symbiotic relationships among different organisms.

**Standard 2.4: Understand the cycling of matter and the flow of energy through ecosystems**

## IB Biology

2.4.1 Explain and model trophic levels in an ecosystem
2.4.2 Describe and distinguish between energy flows and nutrient cycles
2.4.3 Discuss sources and sinks in matter and energy cycles
2.4.4 Describe the laws of thermodynamics and apply the principles to an ecosystem.

**Standard 2.5: Understand the principles of heredity and related concepts**

2.5.1 Explain how sexual reproduction results in a variety of offspring
2.5.2 Describe the different modes of inheritance
2.5.3 Discuss how gene mutations affect the phenotype of an organism
2.5.4 Identify and discuss inherited genetic disorders in humans
2.5.5 Discuss the ethics and implications of genetic engineering.



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