

## **Biology Curriculum Guides (2024-2025)**

### **Curriculum aims**

The overarching aim of the Biology Curriculum is to provide biology-related learning experiences that enable students to develop scientific literacy, so that they can participate actively in our rapidly changing knowledge-based society, prepare for further studies or careers in the fields related to life science, and become lifelong learners in science and technology.

The broad aims of the Biology Curriculum are to enable students to:

- develop and maintain an interest in biology, a sense of wonder and curiosity about the living world, and a respect for all living things and the environment;
- construct and apply knowledge of biology, understand the nature of science in biology-related contexts, and appreciate the relationships between biological science and other disciplines;
- develop the ability to make scientific inquiries; think scientifically, critically and creatively; and solve biology-related problems individually and collaboratively;
- understand the language of science and communicate ideas and views on biology-related issues;
- be aware of the social, ethical, economic, environmental and technological implications of biology, and be able to make informed decisions and judgments on biology-related issues; and
- develop an attitude of responsible citizenship, and a commitment to promote personal and community health.

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### **Form 3**

#### Laboratory Safety

1. Food substances
2. Food test
3. Digestion and absorption
4. Diet and health
5. Infectious diseases
6. Non-infectious diseases
7. Biotechnology and medicine

## **Form 4**

### Laboratory Safety

1. Studying biology & Nature of Science
2. Cellular structure
3. Movement of substances
4. Enzymes and metabolism
5. Food and humans
6. Nutrition in human
7. Gas exchange in humans
8. Transport in humans
9. Nutrition and Gas exchange in plants
10. Transport in plants
11. Cell division
12. Reproduction in plants
13. Reproduction in humans
14. Growth and development
15. Detecting the environment

## **Form 5**

### Laboratory Safety

1. Detecting the environment
2. Coordination in humans
3. Movement in humans
4. Ecosystem
5. Basic Genetics
6. Molecular genetics
7. Biotechnology
8. Biodiversity
9. Evolution
10. Homeostasis
11. Non-infectious Diseases and Disease Prevention
12. Body Defence Mechanism
13. Photosynthesis
14. Respiration
15. Biotechnology 1
16. Biotechnology 2

## **Form 6**

### Laboratory Safety

1. Regulation of water content
2. (osmoregulation)
3. Regulation of body temperature
4. Regulation of gas content in blood
5. Hormonal control of reproductive cycle

### HCY School-based Biotechnology curriculum 2024-2025

Form	Topic	Content	Activity
1	Ch 4. DNA and heredity	Structure of DNA	DNA extraction from banana, Forensic Science workshop
2	Ch 9. Acids and Alkalis	Cell culture	Effect of pH on bacterial growth
3	Ch12 Digestion	Use of micropipette to transfer solution	Effect of amylase on starch
3	Ch12 Infectious disease	Cell culture	Streak plating (Investigate the hygienic condition of the school campus)
3	Ch 12 Biotechnology	Application of biotechnology - Basics of recombinant DNA technology, PCR, DNA fingerprinting	Visit the school biotechnology laboratory
4	Ch4 Enzymes	Use of micropipette to transfer solution	Effect of temperature on amylase activity/ Effect of pH on protease activity
5	Ch 25 Basic Genetics	Use of micropipette to transfer solution	ABO blood test
5	Ch 27 Biotechnology	Gel electrophoresis with the use of micropipette to transfer solution	Separate DNA in DNA samples and measure its size with DNA ladder
6	Elective 4 Biotechnology	- Gel electrophoresis with the use of micropipette to transfer solution - Polymerase Chain Reaction (PCR)	Identify alleles of bitter gene  Amplify DNA samples
3-5	iGEM competition	Recombinant DNA technology	Theory and practice of recombinant DNA technology