

## **Secondary 3 Integrated Science (Biology) Curriculum for the year 2021/2022**

### **Textbooks :**

HKDSE Biology Connecting Concepts Book 1A

Author : WK Chan    YW Faan                      CP Lam              KK NgF Sit

Publisher : Aristo Educational Press

### **Chapter 1    Introduction to biology**

- 1.1    Biology – the science of life
- 1.2    The significance of studying biology
- 1.3    The process of scientific investigation

### **Chapter 2    Molecules of life**

- 2.1    Chemical constituents of organisms
- 2.2    Water
- 2.3    Minerals
- 2.4    Carbohydrates
- 2.5    Lipids
- 2.6    Proteins
- 2.7    Nucleic acids

### **Chapter 3    Cellular organization**

- 3.1    Cells as the basic units of life
- 3.2    Using a light microscope
- 3.3    Sub-cellular structures in animal cells and plant cells
- 3.4    Prokaryotic cells and eukaryotic cells
- 3.5    Levels of organization in organisms

### **Chapter 4    Movement of substances across the cell membrane**

- 4.1 The cell membrane
- 4.2 Movement of substances across the cell membrane

### **Chapter 5    Metabolism and enzymes**

- 5.1 Metabolism
- 5.2 The role and properties of enzymes
- 5.3 How enzymes work
- 5.4 Factors affecting the rate of enzymatic reactions
- 5.5 Applications of enzymes in everyday life

## **Secondary 4 Biology curriculum for the year 2021/2022**

### **Textbooks :**

HKDSE Biology Connecting Concepts Book 1B, 2A, 2B

Author : WK Chan    YW Faan                      CP Lam              KK NgF Sit

Publisher : Aristo Educational Press

### **6 Food and humans**

- 6.1 Humans as heterotrophs
- 6.2 Food requirements of humans
- 6.3 Food tests
- 6.4 Balanced diet

### **7 Nutrition in humans**

- 7.1 The processes of human nutrition and the human digestive system
- 7.2 Ingestion
- 7.3 Digestion in the mouth cavity
- 7.4 Digestion in the stomach
- 7.5 Digestion and absorption in the small intestine
- 7.6 Absorption in the large intestine and egestion
- 7.7 Assimilation

### **8 Gas exchange in humans**

- 8.1 The human breathing system
- 8.2 Gas exchange in the air sacs
- 8.3 Transport of respiratory gases
- 8.4 The mechanism of ventilation

### **9 Transport of substances in humans**

- 9.1 The need for a transport system
- 9.2 The blood
- 9.3 Blood vessels
- 9.4 The heart
- 9.5 Blood circulation
- 9.6 Material exchange between the blood and body cells
- 9.7 Lymphatic system

### **10 Nutrition and gas exchange in plants**

- 10.1 Nutrition in plants
- 10.2 Gas exchange in plants

### **11 Transpiration, transport and support in plants**

- 11.1 Transpiration
- 11.2 Transport of substances in plants
- 11.3 Support in plants

### **12 The cell cycle and cell division**

- 12.1 Chromosomes
- 12.2 The cell cycle and mitotic cell division
- 12.3 Meiotic cell division

### **13 Reproduction in flowering plants**

- 13.1 Types of reproduction
- 13.2 Asexual reproduction
- 13.3 Sexual reproduction in flowering plants
- 13.4 Significance of asexual and sexual reproduction in flowering plants

### **14 Reproduction in humans**

- 14.1 The human reproductive systems
- 14.2 Sperms and ova
- 14.3 Ovulation and menstruation
- 14.4 Sexual intercourse and fertilisation
- 14.5 Development of embryo and foetus
- 14.6 The birth process
- 14.7 Parental care
- 14.8 Birth control methods

### **15 Growth and development**

- 15.1 Concepts of growth and development
- 15.2 How to measure growth
- 15.3 Seed germination
- 15.4 Growth and development in flowering plants
- 15.5 Growth and development in humans

### **16 Stimuli, receptors and responses**

- 16.1 Irritability
- 16.2 Human eyes as the sense organs for detecting light
- 16.3 Human ears as the sense organs for detecting sound
- 16.4 Phototropic responses in plants

### **17 Coordination in humans**

- 17.1 Coordination and the nervous system
- 17.2 Neurones as the basic units of the nervous system
- 17.3 Central nervous system
- 17.4 Reflex actions and voluntary actions
- 17.5 The endocrine system
- 17.6 Comparison between nervous coordination and hormonal coordination

## **Secondary 5 Biology curriculum for the year 2021/2022**

### **Textbooks :**

HKDSE Biology Connecting Concepts Book 2B, 2C, 3 & 5

Author : WK Chan    YW Faan                      CP Lam              KK NgF Sit

Publisher : Aristo Educational Press

### **18 Movement in humans**

- 18.1 The human skeleton
- 18.2 Joints and ligaments
- 18.3 Skeletal muscles
- 18.4 How movement occurs
- 18.5 Initiation of muscle contraction by nerve impulses

### **19 Homeostasis**

- 19.1 The concept of homeostasis
- 19.2 Regulation of blood glucose level

### **20 Ecosystems**

- 20.1 Introduction to ecology
- 20.2 Components of an ecosystem
- 20.3 Energy flow in an ecosystem
- 20.4 The carbon cycle
- 20.5 The nitrogen cycle
- 20.6 A summary: the roles of organisms in energy flow and material cycling
- 20.7 Conservation of ecosystems
- 20.8 Ecological study

### **21 Photosynthesis**

- 21.1 An overview of photosynthesis
- 21.2 The requirements for photosynthesis
- 21.3 The site of photosynthesis
- 21.4 The process of photosynthesis
- 21.5 Conversions of photosynthetic products
- 21.6 Factors affecting the rate of photosynthesis

### **22 Respiration**

- 22.1 An overview of respiration
- 22.2 The sites of respiration
- 22.3 Aerobic respiration
- 22.4 Anaerobic respiration
- 22.5 Comparison of aerobic and anaerobic respiration
- 22.6 Relationship between respiration and photosynthesis

### **23 Personal and infectious diseases**

- 23.1 The meaning of health
- 23.2 Types of diseases
- 23.3 Causes of infectious diseases
- 23.4 Ways of transmission of infectious diseases
- 23.5 Treatments for infectious diseases

## **24 Non-infectious diseases and diseases prevention**

24.1 Non-infectious diseases

24.2 Prevention of diseases

## **25 Body defence mechanisms**

25.1 The importance of body defence

25.2 Non-specific defence mechanisms

25.3 Specific defence mechanisms

## **32 Regulation of body temperature**

32.1 Importance of body temperature regulation

32.2 The structure and functions of human skin

32.3 Mechanisms of body temperature regulation

## **33 Regulation of water content**

33.1 Importance of regulation of water content

33.2 Human urinary system

33.3 Processes in urine formation

33.4 Functions of the kidneys

33.5 Kidney failure and the dialysis machine

## **34 Regulation of gas content in blood**

34.1 Importance of regulation of gas content in blood

34.2 Control of the rate and depth of breathing

34.3 Control of heartbeat

34.4 Effects of exercise on breathing and cardiac output

## **35 Hormonal control of reproductive cycle**

35.1 Hormonal control of the menstrual cycle

35.2 Using hormones as contraceptives

35.3 Using hormones to treat infertility

**SECONDARY 6 BIOLOGY**  
**CURRICULUM FOR THE YEAR 2021/2022**

Textbooks : HKDSE Biology Connecting Concepts Book 4 & 8  
Author : WK Chan YW Faan CP Lam KK NgF Sit  
Publisher : Aristo Educational Press

**26 Basic genetics**

- 26.1 What is genetics
- 26.2 DNA, chromosomes and genes
- 26.3 Mendel's law of inheritance
- 26.4 Inheritance in humans
- 26.5 Variations in characteristics

**27 Molecular genetics**

- 27.1 From DNA to proteins
- 27.2 Mutations

**28 Biotechnology**

- 28.1 Recombinant DNA technology
- 28.2 DNA fingerprinting
- 28.3 The human Genome Project

**29 Biodiversity**

- 29.1 Diversity of life forms
- 29.2 Classifying organisms
- 29.3 The six kingdoms
- 29.4 Dichotomous keys

**30 Origins of life and the evidence for evolution**

- 30.1 The origins of life
- 30.2 The theory of evolution and the evidence supporting it

**31 Mechanisms of evolution and speciation**

- 31.1 Mechanism of evolution: natural selection
- 31.2 Speciation

- 41                    Techniques in modern biotechnology**
- 41.1                Introduction to modern biotechnology
- 41.2                Genetic engineering
- 41.3                Animal and plant cloning
  
- 42                    Application in biotechnology**
- 42.1                Production of pharmaceutical products
- 42.2                Gene therapy
- 42.3                Stem cell therapy
- 42.4                The uses of transgenic animals and plants
  
- 43                    Bioethics**
- 43.1                What bioethics is about?
- 43.2                Issues related to genetically modified food
- 43.3                Issues related to cloning
- 43.4                Issues related to Human Genome Project
- 43.5                Issues related to gene therapy
- 43.6                Issues related to stem cell therapy