Biology curriculum guides (2016-2017)

Form 3

INTRODUCTION
Laboratory safety
What is biology?
What are organisms?
Studying biology with the scientific method
Why do we study biology

MOLECULES OF LIFE
Water and inorganic ions
Biomolecules: carbohydrates, lipids, proteins and nucleic acids

CELLULAR ORGANISATION
Discovery of cells
Using a light microscope
The basic structure of a cell
Prokaryotic and eukaryotic cells
Levels of body organisation

MOVEMENT OF SUBSTANCES ACROSS CELL MEMBRANE
Diffusion and osmosis
Osmosis and cells
Osmosis and tissues
Active transport and phagocytosis

FOOD AND HUMAN
Humans as heterotrophs
The food requirements of human
Food tests
Balanced diet

Form 4

MOVEMENT OF SUBSTANCES ACROSS CELL MEMBRANE

Cell membrane: structure, properties and functions

ENZYME AND METABOLISM:
Metabolism
Properties and actions of enzymes
Factors affecting the rate of enzymatic reactions
Applications of enzymes

NUTRITION IN HUMANS:
The processes of human nutrition
The human digestive system
Ingestion of food
Movement of food along the alimentary canal
Digestion of food
Absorption of digested food
Assimilation of absorbed food
Egestion

GASEOUS EXCHANGE IN HUMANS:
The human breathing system
Gas exchange in the air sac
Transport of respiratory gases
Ventilation

TRANSPORT IN HUMANS:
The transport system
The blood
The blood vessels
The heart
Blood circulation
Exchange of materials between blood and body cells
Lymphatic system

NUTRITION & GAS EXCHANGE IN PLANT
Nutrition in plants
Gas exchange in plants

TRANSPIRATION, TRANSPORT & SUPPORT IN PLANTS:
Transpiration
Transport of water, minerals and organic nutrients in flowering plants
Support in plants

CELL CYCLE & DIVISION
Chromosomes
Mitotic cell division
Meiotic cell division
Comparison between mitotic and meiotic cell divisions

REPRODUCTION IN FLOWERING PLANTS
Types of reproduction
Asexual reproduction in flowering plants
Sexual reproduction in flowering plants
Significance of asexual and sexual reproduction

REPRODUCTION IN HUMANS
Human reproductive systems
The menstrual cycle
Fertilization in humans
Development of the embryo and foetus
The birth process
Parental care
Birth control

GROWTH & DEVELOPMENT
Concepts of growth and development
Growth and development in plants
Measurement of growth
Growth curves

DETECTING THE ENVIRONMENT
Irritability
Detecting light by the eye
Detecting light by plants
Detecting sound by the ear

COORDINATION IN HUMAN
The human nervous system
Transmission of nervous impulses
Reflex action and voluntary action
Human endocrine system

MOVEMENT IN HUMAN
The human skeletal system, joints, muscles
Movement of the body

HOMEOSTASIS
The concept of homeostasis
Regulation of blood glucose level

Form 5

BIODIVERSITY

Diversity of life forms

Classification

The six kingdoms and three domains

Classification can change

Biological keys

ECOSYSTEMS

- Basic concepts of ecology
- Components of an ecosystem
- Functioning of an ecosystem
- Conservation of ecosystem

PHOTOSYNTHESIS

- Basic concepts of photosynthesis
- Requirements for photosynthesis
- Site of photosynthesis
- The process of photosynthesis
- The fate of photosynthetic products
- Factors affecting the rate of photosynthesis

RESPIRATION

- Basic concepts of respiration
- Site of respiration
- Aerobic respiration
- Anaerobic respiration
- Relationship between respiration and photosynthesis

PERSONAL HEALTH

- Meaning of health and disease
- Effect of lifestyles on health

INFECTIOUS DISEASES

- Cause of infectious diseases
- Ways of transmission and control measures of infectious diseases

NON-INFECTIOUS DISEASES AND DISEASE PREVENTION

- Non-infectious diseases
- Prevention of diseases

BODY DEFENCE MECHANISMS

- Non-specific defence mechanisms
- Specific defence mechanisms

BASIC GENETICS

- Basic concept of genetics
- Genes and heredity
- Monohybrid inheritance
- Dihybrid inheritance
- Inheritance in humans
- Variations in characteristics

MOLECULAR GENETICS

- From DNA to proteins
- Mutations

APPLIED GENETICS

- Recombinant DNA technology
- DNA fingerprinting
- Human Genome Project

EVOLUTION I

- Appreciate that there are various explanations for the origins of life
- Be aware of the limitations of using fossil record as evidence of evolution, and the presence of other evidence

EVOLUTION II

- Outline the mechanism of evolution
- Relate speciation to evolution

Form 6

HUMAN PHYSIOLOGY: REGULATION AND CONTROL

- Regulation of water content
- Regulation of body temperature
- Regulation of gas content in blood
- Hormonal control of reproductive cycle

Biotechnology

- Techniques in modern biotechnology
- Applications in biotechnology
- Bioethics