**FADHL COLLEGE**

**SCHEME OF WORK**

**LEVEL: YEAR FOUR**

**SUBJECT: BIOLOGY**

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| **WEEKS** | **FIRST TERM** | **SECOND TERM** | **THIRD TERM** |
| 1 | **CONCEPT OF LIVING****INTRODUCTION:** Simple introduction to biology, meaning of biology.**CLASSIFICATION*** Living and non-living things
 | **ANIMAL NUTRITION:*** Food substances; classes and sources.
* Balanced diet and its importance.
* Food tests.
* Digestive enzymes:
* Classes, characteristics and functions
* Modes of Nutrition
1. Autotrophic: Photosynthesis.
2. Heterotrophic: holozoic, parasitic,symbiotic and saprophytic.
 | **G. HABITATS*** Aquatic habitat: marine, estuarine fresh water under the following headings:

(i) Characteristics of habitat (ii) Distribution of plants and animals in the habitat,  (iii) Adaptive features of plants and animals in the habitat.* Terrestrial habitat: marsh, forest, grass land, arid land should be studied under the following headings:

(i) Characteristics of habitat(ii) Distribution of plants and animals in habitat.* Balance in Nature: Dynamic equilibrium population and population density.
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| 2 | **CLASSIFICATION:*** Classification of livingthings into Kingdoms:Monera, Protoctista (Protista), Fungi, Plantae, Animalia.
 | **ALIMENTARY SYSTEM:*** Alimentary tract of different animals.
* Dental Formula
* Feeding in protozoa and mammals
 | **H. FOOD WEBS AND TROPHIC LEVELS:** * Autotrophs and Heterotrophs
1. Producers: autotrophs
2. Consumers: heterotrophs
3. Decomposers
* Trophic levels energy relationships
1. Food chain
2. Food web
* Energy flow
1. Food/Energy relationship in aquatic and terrestrial environment.
2. Pyramid of energy and Pyramid of numbers.
* Decomposition in nature

(i) Decomposers: (micro and macro-decomposers)1. Gaseous products
2. Role of decomposers
 |
| 3 | **CLASSIFICATION:*** Structures of some organisms, their components and functions
* Differences between Plants and Animals
 | **PLANT AND ANIMAL NUTRITION:*** Nitrogen cycle
* Modes of nutrition: autotrophic, chemosynthetic, carnivorous plants
 | 1. **ECOLOGICAL MANAGEMENT:**
* Biological Associations:Type of associations: Parasitism, symbiosis, commensalism and saprophytism.
* Adaptation of organisms tohabitats.
* Pollution of the atmosphere
* Nature, names, sources and effects of air pollutants.
* Effect of noise
* Water and Soil Pollution
* Type and effects of pollutants.
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| 4 | **ORGANIZATION OF LIFE:*** Levels of organization

(i) cell (single-celled organisms): *Amoeba, Euglena*, *Paramecium*(ii) Tissue: Hydra(iii) Organ (storage organ) bulb, rhizome and heart.(iv) System/Organ System: In mammals, flowering plants - reproductive system, excretory system etc.* Complexity of organizationin higher organisms:advantages anddisadvantages.
 | **FEEDING HABITS:*** Categories: Carnivorous, herbivorous and omnivorous
* Modifications and mechanisms associated with the following habits; filter feeding, fluid feeding, feeding adaptation in insects, saprophytic feeding, parasitic feeding etc.
 | **J. ECOLOGY OF POPULATION*** Ecological succession

(i) Structural changes in species composition, variety or diversity and increase in numbers.(ii) General characteristics and outcomes of succession* Primary succession: Succession in terrestrial and aquatic habitats.
* Secondary succession, climaxof the succession: characteristicof a stable ecosystem.
* Factors that affect populationsize: natality, mortality,emigration, immigration, foodshortage, predation, competition and diseases.
* Preservation and storage of foods
* The life of selected insects;
1. Weevils and cotton strainer
2. Control of pests
 |
| 5 | **FORMS IN WHICH LIVING CELLS EXIST**:* Single and free-living:*Amoeba, Paramecium,Euglena,* and*Chlamydomonas*
* Colony: *Volvox*
* Filament: *Spirogyra*
* Part of a living organism:Cheek cells, onion root tipcells and epidermis of fleshyleaves.
 | **RELEVANCE OF BIOLOGY TO AGRICULTURE:*** Classification of plants based on life cycle
* Effects of agricultural practices on ecology

(i) Bush burning (ii) Tillage (iii) Fertilizer (iv) Herbicide/pesticide (v) Different farming methods | **K. MICROORGANISMS: MAN AND HEALTH** * Carriers of microorganisms
* Microorganisms in action

(i) Beneficial effects in nature, medicine and industries.(ii) Harmful effects of micro­organisms, diseases caused by microorganisms: cholera, measles, malaria and ring worm.* Towards better Health

(i) Methods of .controlling harmful microorganisms: high temperature, antibiotics, antiseptics, high salinity and dehydration.(ii) Ways of controlling the vectors. |
| 6 | **THE CELL:*** Cell structure and functions of cell components.
* Similarities and differences between plant and animal cells.
 | **BASIC ECOLOGICAL CONCEPTS:****A.** Ecosystem: Components of the ecosystem and sizes* Ecological components:environment, biosphere,habitat, population, bioticcommunity and ecosystem.
* Components of the ecosystem:Biotic and abiotic.
 | **MICROORGANISMS: MAN AND HEALTH*** Public Health:

The importance of the following towards the maintenance of good health practices: 1. Refuse and sewage disposal
2. Immunization, vaccination and inoculation (control of diseases).
 |
| 8 | **THE CELL AND ITS ENVIRONMENT**: Physical and Biophysical processes.* Diffusion
* Osmosis
* Active transport
 | **B. ECOLOGICAL FACTORS:*** Ecological factors in aquatic and terrestrial ecosystems

**C. SIMPLE MEASUREMENT OF ECOLOGICAL FACTORS:*** Physical factors: Climatic, topographic and gaseous.
* Edaphic factors: Chemical and physical composition, moisture content and soil texture.
 | **CELLULAR RESPIRATION:*** Definition and processes of:

(i) aerobic respiration (ii) anaerobic respiration (iii) energy release |
| 9 | **PLANT AND ANIMAL NUTRITION:****A. Plant Nutrition*** Photosynthesis:
1. Process of photosynthesis and its chemical equation
2. Light and dark reactions

 (iii) Materials and conditions necessary for photosynthesis(iv) Evidence of photosynthesis | **D. BASIC ECOLOGICAL CONCEPTS:*** Ecological Components:

Lithosphere, hydrosphere, atmosphere, niche* Population Studies by Sampling
1. Population size
2. Dominance
3. Density
* Energy transformation in nature:
1. Energy loss in the ecosystem
2. Solar radiation: its intake and loss at the earth's surface.
3. Energy loss in the biosphere.
 | **EXCRETION:*** Excretion in single-celled aquatic organisms. Diffusion by body surface and by contractile vacuole.
* Waste products of metabolism
 |
| 10 | **MINERAL REQUIREMENT OF PLANTS:** * Mineral nutrition: Macro and micro-nutrients.
* Soil and atmosphere as sources of mineral elements.
 | **E. NUTRIENT CYCLING IN NATURE:*** Carbon Cycle:

(i) Process of carbon cycle (ii) Importance of carbon in nature.* Water Cycle:

(i) Importance of water cycle,(ii) Importance of water to living organisms.**F. ECOLOGICAL MANAGEMENT**: Tolerance, Minimum and maximum range | **GROWTH*** Basis of growth - cell division (mitosis), enlargement and differentiation.
* Aspects of growth: Increase in dry weight, irreversible increase in size and length and increase in number of cells.
* Regions of fastest growth in plants.
* Influence of growth hormones and auxins.
* Growth curvatures (Tropisms)
 |
| 11 | **GENERAL REVISION** | **GENERAL REVISION** | **GENERAL REVISION** |

**FADHL COLLEGE**

**SCHEME OF WORK**

**LEVEL: YEAR FIVE**

**SUBJECT: BIOLOGY**

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| **WEEKS** | **FIRST TERM** | **SECOND TERM** | **THIRD TERM** |
| 1 | **DEVELOPMENT**: Enlargementand differentiation.**MOVEMENT:*** Organelles for movement: cilia and flagella.
* Cyclosis.
 | **REGULATION OF INTERNAL ENVIRONMENT:** (Homeostasis)* Kidney: Structure and functions
* Liver: Functions of the liver.
* The skin: Structure and function
 | **PROCESS OF DEVELOPMENT OFZYGOTE IN FLOWERING PLANTS:FERTILIZATION.*** Types of fruits (classification).
* Structure of fruit

Dispersal of fruits and seeds: Agents of dispersal |
| 2 | **REPRODUCTION**:* Types of reproduction.

(i) Asexual: fission, budding and vegetative propagation. (ii) Sexual: Conjugation, formation of male and female gametes (gametogenesis), fusion of gametes fertilization)  | **HORMONAL COORDINATION:*** Animal hormones: Site of secretion, functions and effects of over and under-secretion.
* Plant hormones
 | **VARIATION:*** Morphological variations in the physical appearance of individuals
* Size, height and weight
* Colour (skin, eye, hair coat ofanimals)

finger prints  |
| 3 | **TISSUES AND SUPPORTING SYSTEMS:*** Skeleton and supporting systems in animals:
1. Biological significance.
2. Skeletal materials, e.g. bone, cartilage and chitin.
3. Types of skeleton: exoskeleton, endoskeleton and hydrostatic skeleton.
4. Bones of the vertebral column, girdles and long bones of the appendicular skeleton.
5. Mechanism of support in animals.
6. Functions of skeleton in animals: Protection, support, locomotion and respiratory movement.
 | **NERVOUS COORDINATION:*** The central nervous system
1. Components of the central nervous system
2. Parts of the brain and their functions; cerebrum, cerebellum, medulla oblongata, hypothalamus and their functions
3. Structure and function of the Spinal Cord.
* Peripheral Nervous System.
1. Somatic Nervous System
2. Autonomic nervous system.
3. Structure and functions of the neurone.
4. Classification of neurones.
 | **VARIATION**:* Physiological Variations
1. Ability to roll tongue
2. Ability to tastephenylthiocarbamide (PTC)
3. Blood groups (ABO)classification)

**APPLICATION OF VARIATIONS:*** Crime detection
* Blood transfusion
* Determination of paternity
 |
| 4 | **TISSUES AND SUPPORTING SYSTEMS:*** Different types of supporting tissues in plants.
* Main features of supporting tissues in plants.
* Functions of supporting tissues in plants: strength, rigidity (resistance against the forces of the wind and water), flexibility and resilience.
 | **NERVOUS COORDINATION:*** Types of nervous actions
1. The reflex arc
2. Reflex and voluntary actions
3. Differences between reflex and voluntary actions.
4. Conditioned reflex and its role on behavior
 | **BIOLOGY OF HEREDITY (GENETICS)*** Genetic terminologies
* Transmission and expression of characteristics in organisms.
1. Hereditary variation
2. Mendel's work in genetics
* Mendel’s experiments
* Mendelian traits
* Mendelian laws
 |
| 5 | **TRANSPORT SYSTEM**:* Need for transport:
1. Surface area/volume ratio.
2. substances have to move greater distances.
* Transport in animals.
1. Structure of the heart, arteries, veins and capillaries.
2. Composition and function ofblood and lymph.
3. Materials for transport:excretory products, gases,digested food, and othernutrients.
 | **SENSE ORGANS:** Structure and function of the* Eye.
* Ear.
* Skin
* Nose
* Tongue
 | **CHROMOSOMES:** The basis of heredity* Structure

Process of transmission of hereditary characters from parents to offspring |
| 6 | **TRANSPORT SYSTEM**:* Transport in plants
1. Uptake and movement of water and mineral salts in plants.
2. Translocation
3. Transpiration
4. Movement of water to the apex of trees and herbs.
 | **REPRODUCTIVE SYSTEM OF MAMMALS*** Structure and function of male and female reproductive systems.
* Differences between male and female reproductive organs.
* Structure of the gamete (sperm and ovum)
* Fertilization, development of the embryo and birth.
* Birth control
 | **PROBABILITY IN GENETICS (HYBRID FORMATION).*** Linkage, sex determination and sex linked characters.
* Application of the principles of heredity in:
1. Agriculture
* Medicine
 |
| 8 | **RESPIRATORY SYSTEM:*** Body surface: cutaneous, gills and lungs.
* Mechanisms of gaseous exchange in fish, toad, mammals and plants.
 | **REPRODUCTIVE SYSTEM:*** Metamorphosis in insects, life histories of butterfly and cockroach.
* Comparison of reproduction in fish, amphibian, reptile, birdand mammal.
 | **ADAPTATION FOR SURVIVAL AND EVOLUTION.*** Behavioural Adaptations in Social Animals.
1. Termites
2. Bees
 |
| 9 | **EXCRETORY SYSTEMS AND MECHANISMS:** * Types of excretory systems: Kidney, stomata and lenticels
 | **REPRODUCTION IN FLOWERING PLANTS:*** Arrangements of floral parts of a named insect-pollinated flower and a named wind-pollinated flower.
* Structure and function of the male and female parts of a flower.
* Pollination in Plants
1. Types of pollination
2. Features of cross-pollinated and self-pollinated flowers
3. Agents of Pollination

Kinds of placentation: axile, marginal and parietal.* Germination of seeds
1. Essential factors which affect developing embryo.
2. Types of germination
 | * **Adaptation for survival**
1. Factors that bring aboutcompetition
2. Intra and Inter-speciescompetition

(c) Relationship betweencompetition and succession* Structural Adaptation for;
1. obtaining food
2. protection and defense
3. securing mates forreproduction
4. regulating body temperature
5. conserving water
* Adaptive Colouration
1. Plants and animals colouration and theirfunctions
 |
| 10 | **CONSERVATION OF NATURAL RESOURCES:*** Resources to be conserved: soil, water, wildlife, forest and minerals.
* Ways of ensuring conservation
 | **REPRODUCTION:*** Courtship behaviour in animals:(i) Pairing

(ii) Display e.g. peacocks(iii) Territoriality(iv) Seasonal migration associated with breeding in herrings, eels and birds.* Metamorphosis and life history of housefly.
* Adaptive features in a developinganimal:

(i) Yolk in egg of fish, toad and birds for nourishment(ii) Placenta in animals | **EVOLUTION.*** Evidence of evolution.
* Theories of evolution
 |
| 11 | **GENERAL REVISION** | **GENERAL REVISION** | **GENERAL REVISION** |