**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. |
| 2 | **CLASSIFICATION:**   * Classification of living things 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 to habitats. * Pollution of the atmosphere * Nature, names, sources and effects of air pollutants. * Effect of noise * Water and Soil Pollution * Type and effects of pollutants. |
| 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 organization in higher organisms: advantages and disadvantages. | **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, climax of the succession: characteristic of a stable ecosystem. * Factors that affect population size: natality, mortality, emigration, immigration, food shortage, 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 tip cells and epidermis of fleshy leaves. | **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, biotic community 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**: Enlargement and 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 OF ZYGOTE 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 of animals)   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 taste phenylthiocarbamide (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 of blood and lymph. 3. Materials for transport: excretory products, gases, digested food, and other nutrients. | **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, bird and 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 about competition 2. Intra and Inter-species competition   (c) Relationship between  competition and succession   * Structural Adaptation for;  1. obtaining food 2. protection and defense 3. securing mates for reproduction 4. regulating body temperature 5. conserving water  * Adaptive Colouration  1. Plants and animals colouration and their functions |
| 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 developing animal:   (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** |