

DAV PUBLIC SCHOOL, SRESHTHA VIHAR

Class 12

Subject: Biology (044) (2023-24)

Learning Objectives:

1. Understanding advanced concepts in genetics and molecular biology: Students should deepen their understanding of genetics and molecular biology by studying topics such as DNA replication, gene expression, protein synthesis, and genetic engineering techniques like PCR and DNA sequencing. They should also learn about the role of genetics in human diseases and advancements in genetic research.
2. Exploring the principles of evolution and speciation: Students should study the principles of evolution, including natural selection, genetic drift, and speciation. They should understand the evidence for evolution, such as fossil records, comparative anatomy, and molecular biology. Additionally, they should explore the mechanisms of speciation and the factors that drive evolutionary changes.
3. Investigating the structure and functions of biomolecules: This objective involves studying the structure, properties, and functions of various biomolecules, such as carbohydrates, lipids, proteins, and nucleic acids. Students should learn about the biochemical processes, such as enzymatic reactions and metabolic pathways, and their regulation within cells.
4. Understanding the physiological processes in plants and animals: Students should develop a comprehensive understanding of physiological processes in plants and animals. This includes topics such as photosynthesis, respiration, digestion, circulation, excretion, and hormonal regulation. They should also explore adaptations of plants and animals to their respective environments.
5. Examining human health and disease: Students should study human health, including the structure and functions of organs and organ systems. They should learn about common diseases, their causes, prevention, and treatment methods. This objective also covers topics like immunology, human reproduction, and reproductive health, including contraception and sexually transmitted infections.

The prescribed syllabus is expected to:

- promote understanding of basic principles of Biology.
- encourage learning of emerging knowledge and its relevance to individual and society.
- promote rational/scientific attitude towards issues related to population, environment and development.
- enhance awareness about environmental issues, problems and their appropriate solutions.
- create awareness amongst the learners about diversity in the living organisms and developing respect for other living beings.

- appreciate that the most complex biological phenomena are built on essentially simple processes It is expected that the students would get an exposure to various branches of Biology in the curriculum in a more contextual and systematic manner as they study its various units.

Curriculum Planner:

Periodic Test 1:

Chapter-2: Sexual Reproduction in Flowering Plants Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; out breeding devices; pollen-pistil interaction; double fertilization; post fertilization events - development of endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

Chapter-3: Human Reproduction Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis -spermatogenesis and oogenesis; menstrual cycle; fertilization, embryo development up to blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).

Term 1:

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Chapter-3: Human Reproduction Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis -spermatogenesis and oogenesis; menstrual cycle; fertilization, embryo development up to blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).

Chapter-4: Reproductive Health Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods, contraception and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).

Chapter-5: Principles of Inheritance and Variation Heredity and variation: Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; Sex determination - in humans, birds and honey bee; linkage and crossing over; sex linked inheritance - haemophilia, colour

blindness; Mendelian disorders in humans - thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Chapter-6: Molecular Basis of Inheritance Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central Dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; Genome, Human and rice genome projects; DNA fingerprinting.

Periodic Test 2:

Chapter-7: Evolution Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy - Weinberg's principle; adaptive radiation; human evolution.

Chapter-10: Microbes in Human Welfare Microbes in food processing, industrial production, sewage treatment, energy generation and microbes as bio-control agents and bio-fertilizers. Antibiotics; production and judicious use.

Term 2:

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Chapter-8: Human Health and Diseases Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

Chapter-10: Microbes in Human Welfare Microbes in food processing, industrial production, sewage treatment, energy generation and microbes as bio-control agents and bio-fertilizers. Antibiotics; production and judicious use.

Chapter-11: Biotechnology - Principles and Processes Genetic Engineering (Recombinant DNA Technology).

Chapter-12: Biotechnology and its Applications Application of biotechnology in health and agriculture: Human insulin and vaccine production, stem cell technology, gene therapy; genetically modified organisms - Bt crops; transgenic animals; biosafety issues, biopiracy and patents.

Chapter-13: Organisms and Populations Population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution. (Topics excluded: Organism and its Environment, Major Abiotic Factors, Responses to Abiotic Factors, Adaptations)

Chapter-14: Ecosystem Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy (Topics excluded: Ecological Succession and Nutrient Cycles).

Chapter-15: Biodiversity and its Conservation Biodiversity-Concept, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

Final Term:

All chapters mentioned above.