

TOPICS IN BIOLOGY

- CYTOLOGY
 - cell theory: Schleiden and Schwann
 - main cell types: similarities and differences
 - bacterial cell: structure and organization
 - bacterial conjugation, binary fission
 - nutritional types of bacteria
 - cyanobacterial cell: structure and organization
 - cytoskeleton: organization, function
 - cell membrane: organization, function
 - fluid mosaic model: Singer and Nicolson
 - cell membrane transport
 - Na/K pump
 - membrane-bound and non-membrane bound organelles and their main functions
 - vesicular traffic between organelles
 - ATP production, Krebs cycle
 - photosynthesis, Calvin cycle
 - biologically important macromolecules: classes, functions, examples
 - body water: intracellular and extracellular portion, ionic composition
 - chemical elements of the human body
 - cell cycle, mitosis, meiosis

- **GENETICS AND MOLECULAR BIOLOGY**

- genetics, genomics, genotype, phenotype
- alleles, interactions between alleles, multiple alleles
- linked genes, sex-linked genes
- Mendel's Laws, Mendelian monohybrid cross with dominance, Mendelian monohybrid cross with incomplete dominance, Mendelian dihybrid cross with dominance, test cross
- karyotype, homologous chromosomes
- numerical chromosome aberrations (aneuploidy and polyploidy)
- mutations (spontaneous and induced)
- DNA replication, DNA transcription, mRNA translation
- genetic code, genetic codon, genetic anticodon

- **HUMAN PHYSIOLOGY**

- blood composition and function: erythrocytes, leukocytes, thrombocytes
- ABO blood group system
- anemia, types of anemia
- main hematopoietic tissues and organs
- cardiovascular system
- types of blood vessels
- cardiac cycle, stroke volume, minute volume
- heart conduction system components
- parts of respiratory system
- immunity types, histamine
- digestive system composition and function

- metabolic pathway of proteins, carbohydrates and fats
- diseases due to lack of vitamins and minerals
- urinary system composition and function
- endocrine glands and their hormones
- spermatogenesis, oogenesis, fertilization
- gastrulation and three-layer embryo

- **ECOLOGY, EVOLUTION AND SYSTEMATICS**

- ecology, population, ecosystem, biocenosis, biotope, biome, biotic and abiotic factors, ecological amplitude, ecological succession, land reclamation, endemism, relict, species range, mimicry, evolution
- factors that drive evolutionary changes
- Carl Linne, binomial nomenclature