

Knowledge required in life sciences and environment

1. Genetics and evolution

- A. CHARACTERISTICS OF MAIN BRANCHES OF THE LIFE PHYLOGENETIC TREE: Bacteria, Eubacteria and Eukaryotes
- B. POPULATION GENETICS: mutation-migration-genetic drift-selection, polymorphism
- C. MENDELIAN GENETICS: allele transmission, genetic relationship (dominance/recessivity)
- D. NOTIONS OF EVOLUTION: Darwin, Wright, Fisher and Kimura's main contributions

2. Biochemistry and molecular biology

- A. MAIN CELLULAR COMPONENTS BIOSYNTHESIS: Proteins, Lipids, Amino Acids, Sugars
- B. PROTEIN FEATURES AND FUNCTIONS: Hemoglobin, Myoglobin, Enzymes Kinetics (Michaelis-Menten principles), Digestion and blood coagulation, Structure of biological membranes
- C. MAIN METABOLIC FUNCTIONS: Glycolysis, Citrate cycle, Pentose-phosphate pathway and TCA, Fermentation, Photosynthesis
- D. BIOLOGICAL INFORMATION FLUXES: transcription, translation, replication, regulation

3. Plant and animal main physiological functions

- A. NUTRITION
- B. DEVELOPMENT: organs, hormones, immunology, defense
- C. REPRODUCTION

4. Populations, ecosystems and earth system

- A. INTERACTIONS: between living organisms (biotic) and with the environment (abiotic).
- B. ATMOSPHERE, BIOSPHERE, HYDROSPHERE AND GEOSPHERE: description, main features and interactions
- C. NATURAL RESSOURCES: different types, distribution, threats, conflicts, preservation