

# Biology Topic Sheet

## ORGANIZATION AND PATTERN

- characteristics of life
- homeostasis
- taxonomy and classification
- Linnaeus and binomial nomenclature
- phylogenetic tree and cladogram
- dichotomous key
- pieces of evidence used to construct phylogenetic trees and cladograms (same as evolution evidence)
- levels of organization for classification
- viruses
- 6 kingdoms

## EQUILIBRIUM

- properties of water
- functions of macromolecules
- monomers of macromolecules
- prokaryotic cell and eukaryotic cell
- cell organelles and functions
- cell membrane parts and function
- passive and active transport
- diffusion, facilitated diffusion, and osmosis
- osmosis: hypertonic, hypotonic, and isotonic.
- sodium/potassium (Na/K) pump, endocytosis, and exocytosis

## ENERGY

- ATP
- enzyme
- activation energy, substrate, and active site
- factors affect enzyme function
- cell cycle
- equations for photosynthesis and cell respiration.
- organelles for photosynthesis and cell respiration
- 2 parts of photosynthesis: Light reaction and Calvin cycle
- 3 parts of cell respiration: Glycolysis, Krebs cycle, Electron transport chain
- Fermentation

## INFORMATION

- DNA and RNA
- traits, alleles, and genes
- parts of a nucleotide
- DNA replication
- three types of RNA
- transcription
- translation
- genetic engineering
- gel electrophoresis, PCR, cloning, and stem cells
- DNA mutations

## VARIATION

- mitosis and cytokinesis
- binary fission
- chromosome/chromatin, chromatid/centromere
- advantages and disadvantages of sexual and asexual reproduction
- meiosis
- differences between Mitosis and Meiosis
- Mendel's experiment
- Punnett squares: monohybrid and dihybrid
- dominant/recessive, homozygous/heterozygous, genotype/phenotype
- diploid/haploid, monohybrid/dihybrid
- complete dominance, incomplete dominance, and co-dominance
- Mendel's Law of Independent Assortment and Law of Segregation
- pedigree analysis

## INTERDEPENDENCE (ECOLOGY)

- ecology
- biodiversity
- biosphere, ecosystem, community, population, organism
- biotic and abiotic
- biomes
- food chain and food web
- autotrophs and heterotrophs
- trophic level
- nutrient cycles for carbon, water, and nitrogen
- primary and secondary succession
- pioneer species and climax community
- two population model graphs
- equation for determining population growth
- carrying capacity
- symbiosis, predation, competition, mutualism, commensalism, parasitism.
- density-independent and density-dependent factors
- niche and a habitat
- renewable and nonrenewable resources
- pollution
- human impact

## EVOLUTION

- evolution
- macroevolution and microevolution
- descent with modification and modification by natural selection
- natural selection and artificial selection
- Lamarck's contribution to evolution
- adaptation
- adaptive radiation
- reproductive and geographic isolation
- stabilizing, directional, disruptive, and diversifying selection
- pieces of evidence for evolution: fossils, anatomy, embryology/development, molecular
- homologous structures, vestigial structures, and analogous structures
- radioisotope dating and relative dating
- co-evolution, convergent evolution, and divergent evolution
- extinction
- speciation
- gradualism and punctuated equilibrium
- biological resistance (insects and bacteria)
- endosymbiotic theory
- plant tropisms and animals adaptations