

BIOLOGY II For all ap students and second year students.

60 Multiple choice Questions.

Question topics for each test will include questions which relate to the Big Ideas I –IV listed below taken from the Advanced Placement Curriculum designed by The College Board. Questions will involve science practices such as analysis of data and evidence to support biological principles. All levels of life (molecules through ecosystems) will be explored on each exam. In addition, for each exam the identified content (e.g. osmoregulation) is linked to the excretory system. For example students should be able to answer, how does osmoregulation occur in the nephron in the excretory system.

Big Idea 1: The process of evolution drives diversity and unity of life

Big Idea 2: Biological Systems utilize free energy and molecular building blocks to grow, reproduce, and to maintain dynamic homeostasis

Big Idea 3: Living Systems store, retrieve, transmit and respond to information essential to life processes.

Big Idea 4: Biological Systems interact, and these systems and their interactions possess complex properties.

EXAM 1 January: Structure and function of Biological Molecules, Protein Folding, Bonding in Polymers, Enzymes, Coenzymes, Cofactors, Lipid and their Properties, Carbohydrates. Structure and function of Cells, Organelles and subcellular structures. Cell and tissue types, Germ layers and development. Free Energy and Gibbs Reactions, Enthalpy in Biological Systems, Biological Applications to the Laws of Thermodynamics, Endothermic/Exothermic Reactions, Coupled Reactions, Photosynthesis, Cellular Respiration, Endotherm/Exotherm in Body Temperature Regulation, Cell Types, Surface Area/Volume Ratios, Fluid Mosaic Model of the Membrane, Properties of Water, Osmoregulation, Membrane Transport, Cellular Feedback Mechanisms, Metabolic Processes and Metabolism, Communication; signaling, reception, transduction and response. Systems in plants and animals include Nervous, Endocrine, Immune and Excretory

EXAM 2 February DNA and replication, RNA and Protein Production, RNA Types, Cell Cycle and Controls, Mitosis, Meiosis, Application of Mendel's Laws, Mendelian and NonMendelian Genetics, Genetic Disorders, Cancer, Genetic Engineering Techniques, Nonnuclear Inheritance, Transposons, Crossover, Gene Regulation, Apoptosis, Developmental Genes, Mutations, Biotechnology, Embryonic Development in Plants and Animals, Signaling Mechanisms, Transmission and Transduction Pathways, Polyploidy, Sex Inheritance, Mutation Effects, Viral Replication, Genetic Variation Processes, Mating Types, Behaviors and Parenting, Bacteria and Yeast Reproduction and use in Biotech, Systems in plants and animals include Reproduction and Development

EXAM 3 March Evolution, Natural Selection, Artificial Selection, Mechanisms for Evolution, Hardy Weinberg Principles, Genetic Drift, Gene flow, Evidences for Evolution, Blast Genomic Analysis, Cladogram, Evolutionary Trees, Evolution of the Domains, Adaptive Radiation, Island Biogeography Theory, Speciation,

Prezygotic and Postzygotic Mechanisms, Energy in Reproductive Strategies
Hypothesis on Origins of Life, Virus and Bacteria types and adaptations.
Evolution of systems in plants and animals include Respiration, Excretion,
Digestion, Circulation, Senses

EXAM 4 April Ecosystem Energy Pyramid Structure, Food Web Alterations,
Organ and System Specialization, Interactions and Coordination in Plants and
Animals, Organism Responses Adaptation to Environment, Ecosystem
Transformations, Components of a community, Transpiration, Population:
Variation, Growth, Dynamics and Distribution, Exponential and Logistic
Population Growth Models, Population Density, Limiting Factors, Species
Richness, Species Diversity, Competition, Bacteria, Fungi, Symbiotic
Relationships, Food Webs, Productivity, Energy Dynamics, Keystone species,
Exotic and Alien Species Biogeochemical Cycles, Energy of Reproductive
Strategies, Behavioral and Physiological Response to Environmental Stress,
Taxis and Kinesis, Tropisms, Biological Rhythms, Behavioral Biology.