

Midterm Exam Study Topics

Behavior

- altruism
- fixed action patterns
- foraging
- habituation
- imprinting
- kinesis
- sign stimulus
- spatial learning
- taxis

Ecology

- succession
- climax stages of succession
- K-selected species
- r-selected species
- carrying capacity
- density-independent factors
- density-dependence factors
- mutualism
- aposematic coloration
- mimicry
- food web and food chain parts with energy transfer
- predator-prey relationships
- net primary productivity
- gross primary productivity
- dissolved oxygen changes in water: temperature and depth
- **population growth: logistic and exponential**
- respiration
- commensalism
- parasitism
- ozone depletion
- biological dead zones
- biological magnification
- eutrophication

Evolution

- Darwin's theory of evolution
- natural selection
- source of variation in populations
- prezygotic barriers
- postzygotic barriers
- evidence for evolution

- endosymbiotic theory and evidence
- history of life on Earth: order of organisms appearance
- gene flow
- **Hardy-Weinberg**
- convergent/divergent evolution
- bottleneck effect and founder effect
- homologous structures
- geographic isolation
- analogous structures
- balanced polymorphism
- speciation: sympatric and allopatric
- punctuated equilibrium
- **chi-square analysis**

Biochemistry

- properties of water and bonds
- hydrolysis and dehydration synthesis reactions
- carbohydrate structure and function: starch, cellulose, glycogen and chitin differences, and monomer
- protein structure (levels and amino acids) and function: monomer
- lipid structure and function
- nucleic acid structure and function: differences between DNA and RNA

Cells

- prokaryotic and eukaryotic cells
- endomembrane system
- organelles structure and functions: ER, golgi, mitochondria, chloroplast, ribosome, nucleolus, peroxisomes, cell wall
- **surface area-to-volume ratio**
- cell junctions

- membrane protein functions
- extracellular matrix
- passive transport: diffusion and facilitated differences
- passive transport: osmosis – hypertonic (low water potential/high solute), hypotonic, isotonic
- **water potential**
- active transport: endocytosis, exocytosis, and Na/K pump

Cell Communication

- ligand
- signal transduction pathway: reception, transduction and response
- G-protein and tyrosine kinase pathways
- second messengers
- resting membrane potential
- action potential steps
- synapse signaling steps
- brain part functions: hypothalamus, medulla oblongata, occipital lobe, frontal lobe, cerebellum, pons
- reflex arc parts
- main hormones and functions: anterior pituitary, thyroid, thymus, pancreas
- differences between water-soluble and lipid-soluble hormones