**Bio 3 Exam 3 Study Guide**

Key words or terms from each lecture are new words introduced during the lecture that will likely be used in true or false, or multiple-choice questions. **Short answer free response questions will come from emboldened topics.** **Long answer free response questions will come from the emboldened and underlined topics**

**Plant Structure and Function**

**Know the evolutionary history of plants and be able to construct a phylogenetic tree with the four main categories of plants (seedless nonvascular, seedless vascular, gymnosperms, and angiosperms). Be able to correctly place the key adaptations (vascular tissue, seeds, and flowers) on a phylogenetic tree of plants**. Know some common examples of plants that can be found in each group of plants (ex. Mosses, ferns, pine trees, flowering plants). Know which groups have spores and which groups have seeds. Know the different types of vascular tissue (xylem and phloem) and what each type of tissue transports. What is function of roots? What is the difference between gymnosperms and angiosperms? What is a seed and what is the function of the different parts (cotyledons, endosperm)? How are gymnosperm seeds and pollen dispersed? Know the differences between monocots and eudicots concerning number of cotyledons, leaf venation, vascular tissue, roots, and flower parts. **Know the different parts of the flower including the male and female reproductive parts (fill in)**. How is the pollen of many angiosperms dispersed? What is pollination? Why have flowers evolved to look the way they do? What is happening during double fertilization? What is transpiration and how is it involved in water transport in plants (cohesion-tension hypothesis). What is the cohesion-tension hypothesis? Be able to describe the trade of between leaf size and water loss. What adaptations have plants evolved to reduce water loss?

**Key words and terms**: Phylogenetic tree, spores, xylem, phloem, stem, leaves, buds, roots, root hairs, mycorrhizae, gymnosperm, angiosperm, seed, cotyledon, endosperm, monocot, eudicot, taproot, sepal, petal, carpel, stigma, style, ovary, stamen, anther, filament, pollination, double fertilization, transpiration, cohesion-tension hypothesis, cuticle

**Photosynthesis**

What organisms make up the base of all food webs? What are photons? What are pigments? Know the three main pigments found in plants and the light wavelengths that they absorb. Why do leaves of deciduous trees turn orange, red, and yellow in the fall? Know the different parts of the leaf and chloroplast including the stomata, thylakoid and stroma? What goes in and what comes out of the stomata? **Be able to describe the two stages of photosynthesis. Provide a summary of what happens in each step. What are the reactants and products of each step? Where does each stage take place?** What donates an electron to photosystem II in the light reactions? What are the products of the light reactions? How is light used in the light reactions? What molecule starts the Calvin Cycle? What does Rubisco do? What is the product of the Calvin Cycle? What is photorespiration? Know the table of the different photosynthetic pathways? Which pathways use Pep carboxylase? Which pathway opens the stomata at night and close the stomata during the day? What are the four main greenhouse gases? Know the different types of evidence for climate change? What greenhouse gas has shown the greatest increase since 1990? What sector has shown the greatest increase in greenhouse gases? What is carbon sequestration? What is a carbon sink?

**Key words and terms:** Photon, pigments, chlorophyll a, chlorophyll b, carotenoids, stomata, chloroplasts, thylakoids, stroma, photorespiration, C3, C4, CAM, greenhouse gas, carbon dioxide, methane, nitrous oxide, fluorinated gases, carbon sequestration, carbon sink

**Intro to Life, Protists, and Fungi**

Know the three domains of life. What are the three domains of life? Which domains are made up of prokaryotic cells and which one has eukaryotic cells? What are the characteristics of the domain bacteria? How do bacteria divide? Know the two processes that can be performed by cyanobacteria.Know the examples of the different types of Archaea (thermophiles, halophiles and methanogens).Know the different types of protists and their characteristics.  **Know the differences between Prokaryotic and Eukaryotic cells concerning cell size, organization, the nucleus, membrane-bound organelles, chromosomes and cell division.** What the two reasons that viruses are considered non-living? Know the different protists, including Diatoms, Dinoflagellates, Foraminiferans and macro algae. What is a mixotroph? What is eutrophication? What causes eutrophication? What can eutrophication lead to? **Be able to describe how dead zones are formed.** What are plankton? Know the difference between phytoplankton and zooplankton. **Describe the process of biomagnification.** What are zooxanthellae and how are they involved with coral? **Be able to describe how coral bleaching occurs. Be able to describe how the presence and absence of sea otters shape the ecology of kelp forests.** How do fungi obtain their nutrients? What are hyphae? Mycelium? What are lichen and what two organisms make up lichens? What role do fungi play in an ecosystem? What is mycosis, and how has chytridiomycosis affected amphibian populations?

**Key words and terms**: Bacteria, Archaea, Eukarya, taxonomy, Carl Linnaeus, binomial nomenclature, phylogeny, synapomorphy, symbiotic relationship, bioluminescent, Diatoms, Diatomaceous Earth, Dinoflagellates, mixotroph, eutrophication, dead zones, hypoxia, algal blooms, biomagnification, zooxanthellae, Foraminiferans, radiolarians, macroalgae,

**The Diversity of Life**

Know when the age of the earth and when the first prokaryotes, eukaryotes, and animals appeared. Know the characteristics of animals. Know the different types of symmetry (asymmetry, radial symmetry, and bilateral symmetry) and which phyla have each kind of symmetry. Know the different types of digestion and which phyla have each type of digestion. Know the different types of skeletons and the phyla that have each type of skeleton. Know the different phyla that are segmented. Know the two major groups of animals (protostomes and deuterostomes) and how each of them develops.What is an invertebrate and what proportion of animals are invertebrates? Know the characteristics of sponges, cnidarians, flatworms, annelids, roundworms, molluscs, arthropods, echinoderms and chordates, concerning their development, symmetry, digestion, and skeleton, as well as the distinguishing characteristics (synapomorphies) of each phyla (matching). What are collar cells? Osculum? What are the two life stages of cnidarians (polyp and medusa)? Synapomorphies of molluscs (radula, muscular foot, mantle). Know the characteristics of arthropods (jointed appendages, exoskeleton), and the name of the three body sections. Know the characteristics of insects including the number of legs and where they are attached to the body, the type of eyes, and the number of antennae. Know the differences between complete and incomplete metamorphosis and the stages of each. Know the different insect orders, the type of mouthparts they have and the type of metamorphosis they undergo. Which phyla is most closely related to chordates? Know the characteristics of chordates (development, symmetry, digestion, and skeleton). What are the four characteristics of chordates? **Be able to provide the four adaptations that led to the success of terrestrial vertebrates and briefly describe how each adaptation was beneficial. Know when each adaptation evolved and be able to place the four synapomorphies in the correct position on a phylogeny**. What is an indicator species? What characteristics of amphibians make them good indicators of environmental health? What is the difference between altricial and precocial chicks? Know the characteristics of reptiles, birds and mammals, concerning the number of inner ear bones, the red blood cells, the heart chambers, the thermoregulatory strategy (endothermic or ectothermic), the reproductive strategy (lays eggs = oviparity, live birth = viviparity), and the type of eggs they lay. What are the synapomorphies of mammals? Do all mammals give live birth? What are the different tooth types in mammals and what is each tooth used for? Know the different timing of mammal activity? What are the three groups of mammals and how do they differ? What evidence is there for mammals return to water? Know the characteristics of primates. What trend occurred over the course of human evolution?

**Key words and terms**: Collagen, asymmetry, radial symmetry, bilateral symmetry, intercellular digestion, gastrovascular cavity, alimentary canal, hydrostatic skeleton, exoskeleton, endoskeleton, segmentation, protostome, deuterostome, invertebrate, collar cells, osculum, cnidocytes, polyp, medusa, hermaphroditic, radula, muscular foot, radula, head, thorax, abdomen, dorsal hollow nerve cord, notochord, pharyngeal gill slits, post anal tail, jaws, lungs, limbs, amniotic egg, altricial, precocial, endothermic, ectothermic, incisor, canine, premolar, molar, diurnal, crepuscular, nocturnal, monotreme, marsupial, placental,