**Marine Biology Exam 2 Study Guide**

Key words or terms are new vocabulary from each lecture, which will likely be used in true or false, or multiple-choice questions. **Short answer and short essay questions will come from emboldened topics.** **Long essay questions will come from the emboldened and underlined topics**

**Chapters 5 and 6 – Taxonomy, Microbes and Multicellular Primary Producers**

Know the tree domains of life. How old is the Earth? How long did the first animals evolve? Who is the father of taxonomy? Know how to write a scientific name correctly (*Genus species*). Know the correct order for the taxonomy. (Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species). Which species are more closely related, species in the same class or family? Know how to interpret a phylogeny and identify the last common ancestor between two groups. What role do heterotrophic bacteria play in the marine environment? **Know why cyanobacteria are so important to marine environments and the two processes that can be performed by cyanobacteria.** Know the different ways that bacteria form a symbiotic relationship with other organisms. Know the different types of protists and their characteristics. What is eutrophication? What causes eutrophication? What can eutrophication lead to? **Be able to describe how dead zones are formed**. What protist produces bioluminescence? **Describe the process of biomagnification.** What are zooxanthellae and how are they involved with coral? **Be able to describe how coral bleaching occurs.** What is the difference between macroalgae and marine plants? Know the names of the different structural parts of the macroalgae (fill in). Know the different groups of macroalgae (brown, green, and red) and the photosynthetic pigments found in each group. Which type of macroalgae forms kelp forests? Know the ways that marine algae are used by humans. Know the different types of marine plants and some of the adaptations they have for surviving in the marine environment.

**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, pseudopodia, macroalgae, thallus, blades, stipe, pneumatocysts, holdfast, fucoxanthin, chlorophyll, phycocyanin, phycoerythrin, algin, agar, sea grasses, rhizomes, halophytes, mangroves, pneumatophores

**Chapter 7 – Marine Invertebrates I**

Know the different characteristics of animals. Which organisms are the sister group to all animals? What percentage of animals are invertebrates? Know how to interpret the animal phylogeny and know which derived characteristics (synapomorphies) belong to each phylum. **Know the two major groups of animals based on the different types of development and describe how each group develops**. **Be able to provide an example of an organism that belongs to each group.** Protostomes. Deuterostomes. Know the different types of symmetry and the symmetry found in the different phyla. Know the different types of cellular organization and the organization found in the different phyla. Know the different types of digestive systems and the digestive systems found in the different phyla. Know the different types of body cavities and the type of cavity found in the different phyla. Know the different skeletal systems and the skeletal systems found in the different phyla. **Be able to describe the differences between an open and closed circulatory system and know an example of an organism with each type of system.** Which phyla exhibit segmentation? Know the different parts of sponges including collar cells (choanocyates), spongocoel, and the osculum. What is the difference between suspension feeders and deposit feeders? What are the two main components of the sponges skeleton? What is each component made of? What are cnidocytes? Nematocysts? Know the two different life stages in cnidarians and which classes which life form. How do cnidarians reproduce asexually? What can I use to treat a sea jelly sting? What type of digestive system do flatworms have? Do flatworms have a body cavity or a skeleton? What specialized structure to worms in the phylum nemertea have that they use for feeding? **Know the four characteristics found in the mollusc body plan and the function of each part.** Which mollusc class lacks a radula? How do bivalves feed? Know the four mollusc classes and examples of organisms found in each class. How do cephalopods move? Know how the different parts of the mollusc body plan have been modified in cephalopods.

**Key words and terms:** Collagen, choanoflagellates, protostomes, deuterostomes, asymmetry, radial symmetry, bilateral symmetry, tissue, intracellular digestion, gastrovascular cavity, alimentary canal, acoelomates, pseudocoelomates, coelomates, hydrostatic skeleton, exoskeleton, endoskeleton, hemolymph, capillaries, collar cells (choanocytes), spongocoel, osculum, spicules, spongin, polyp, medusa, budding, hydrozoa, scyphozoa, cubozoa, anthozoa, proboscis, visceral mass, mantle, muscular foot, radula, polyplacophora, Bivalvia, gastropoda, cephalopoda,

**Chapter 7 – Marine Invertebrates II**

Know the different characteristics of annelids. What are parapodia? Chaetae? How do annelids move? What is the clitellum used for? What is hirudin? How do marine annelids and terrestrial annelids breath? What are the characteristics of arthropods? Which phylum of animals contains the greatest number of species? Know the different subphyla of arthropods, including the characteristics of each subphylum and the organisms found in each subphylum. What are chelicerae? How is horseshoe blood unique? What are chelipeds? How do isopods and amphipods differ? What crustaceans are an important food source for many other marine species? How do cirri feed? What are cirri? What are the characteristics of echinoderms? What type of development for echinoderms go through? What is the water vascular system? What is the madreporite? What are pedicellaria? **Be able to describe the path of water through the water vascular system**. How do echinoderms breath? Dermal branchiae. Know the different echinoderm classes and examples of organisms found in each class. Know the characteristics of chordates including their development, symmetry, coelom, and skeleton. **Know the four characteristics of chordates and the what each develops into**. Know the different chordate subphyla and examples of organisms in each subphylum. What subphyla is closely related to vertebrates? What are pyrosomes? What are the characteristics of vertebrates?

**Key words and terms**: Parapodia, chaetae, peristalsis, clitellum, hirudin, cephalothorax, abdomen, chelicerae, pedipalps, hemocyanin, antennae, biramous appendages, cheliped, cirri, water vascular system, madreporite, pedicellaria, stone canal, ring canal, radial canal, lateral canal, ampulla, tube feet, crinoidea, echinoidea, Holothuroidea, ophiuroidea, asteroidea,

**Marine Biology Article #2: Invisible Forest**

**What role does iron play in helping reduce climate change? What are some of the potential problems with fertilizing the oceans with iron?**