**Marine Biology Final Exam 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.**

**Chapter 1 – The Science of Marine Biology**

Know the characteristics of living things. **Be able to list the steps of the scientific method and describe the purpose of each step.**

**Chapter 2 – The Sea Floor**

Know the five-major ocean basis on Earth. Which ocean is the largest? Which is the deepest? Shallowest? (Matching). Know the difference between oceanic crust and continental crust. Which is denser? Which is older? Know the differences between mid-ocean ridges, transform faults, and trenches. Know the different types of plate boundaries and how the plates are interacting at each boundary. What is the difference between active margins and passive margins? (Matching).

**Chapter 3 – The Chemical and Physical Properties of Seawater**

What is the average salinity for seawater? What factors affect the density of seawater? What wavelength of light penetrates the deepest in open ocean? Coastal waters? Why are many deep-sea organisms red in color? Know the differences between spring tides and neap tides concerning the tidal height and the alignment of the moon and sun.

**Chapter 4 – The Fundamentals of Biology**

Know the 4 main elements that make up living things. What is the function of ATP? Know the reactants and products of cellular respirations and photosynthesis, and where each process occurs in the cell. What is the difference between autotrophs and heterotrophs? Which one makes up the base of all food webs on Earth? Primary production. Which marine environment has the greatest net primary productivity?Know the differences between prokaryotic and eukaryotic cells.Know the differences between hypertonic, isotonic, and hypotonic. Know how freshwater fish, saltwater fish, and cartilaginous fish, regulate water in their respective environments. Know the difference between regulators and conformers, and the different modes of thermoregulation. Know what thermoregulatory strategy is found in most marine fish? Marine mammals? Know the different modes of heat loss or gain. Know the differences between internal and external fertilization and which is most common in marine organisms.

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

Know the tree domains of life. How old is the Earth? Know the correct order for the taxonomy. (Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species). What is eutrophication? What causes eutrophication? What can eutrophication lead to? **Be able to describe how dead zones are formed**. What is biomagnification? What are zooxanthellae and how are they involved with coral? **Be able to describe how coral bleaching occurs.** Know the names of the different structural parts of kelp.

**Chapter 7 – Marine Invertebrates**

Know the different characteristics of animals. What percentage of animals are invertebrates? Know the different types of symmetry and the symmetry found in the different phyla. Know the different skeletal systems and the skeletal systems found in the different phyla. Know the defining characteristics of the major phyla discussed in class (Matching). What is the difference between suspension feeders and deposit feeders? Know the four characteristics found in the mollusc body plan. Know the different examples of molluscs discusses in class. Know the two different life stages in cnidarians.Know the two major groups of animals based on the different types of development and describe how each group develops.

**Chapter 7 – Marine Invertebrates II**

What are the characteristics of arthropods? Which phylum of animals contains the greatest number of species? Know the different examples of arthropods discussed in class. What are the characteristics of echinoderms? Know the different examples of echinoderms discussed in class. Know the four characteristics of chordates.

**Chapter 8 – Marine Fishes**

Know the characteristics found in most fishes. What did the evolution of jaws allow for? Know the characteristics of chondrichtyans. **Know the anatomy of the fish including the nares, operculum, lateral line, swim bladder, and names of the fins (fill in).** Know the differences between cartilaginous fish and bony fish including the location of the mouth, gill opening, scales, tail shape, and method of buoyancy. What is the difference between anadromous and catadromous. Know the fish that are anadromous.

**Chapter 9 – Marine Reptiles and Birds**

Know the changes that occurred during the evolution of tetrapods. . Know the characteristics of reptiles and the examples of the marine reptiles discussed in class. How does temperature affect sex of the offspring in reptiles? Know the characteristics of birds and the examples of the different types of seabirds discussed in class. Know the differences between reptiles, birds and mammals concerning the inner ear bones, heart, thermoregulation, reproduction and egg shell. **Be able to explain the concept of resource partitioning**.

**Chapter 9 – Marine Mammals**

Know the characteristics of mammals. Know the different types of teeth and their function. **Be able to describe the concept of convergent evolution.** Know the differences between baleen whales (Mysticeti) and toothed whales (Odontoceti). Know the different examples of marine mammals discussed in lecture.

**Chapter 10 – Population and Community Ecology**

Know the definition for ecology and the different levels that ecology is studied. Know the difference between exponential growth and logistic growth and the shape of each growth curve. What is the carrying capacity of a population and what are some of the factors that act as environmental resistance? What type of population growth are humans currently experiencing? Know differences between r-selected and k-selected species. Know the four interactions between organisms and know the affect each interaction has on the organisms involved. What is an organism’s ecological niche? **Be able to define a keystone species and provide an example of a keystone species.** Know the examples of mutualism, parasitism, and commensalism. Know the difference between pelagic organisms and benthic organisms, and the difference between plankton, nekton and sessile organisms. Know the different trophic levels and what each trophic level eats. How much biomass is transferred between trophic levels? Why are there fewer top predators? What is biomagnification?

**Chapter 11 - Between the Tides**

What is the difference between the intertidal zone and the subtidal zone Know the four zones in the rocky intertidal and know the examples of organisms found in each zone. What zone are most soft bodied organisms found in? What zone are the greatest number of species found in? What is the difference between epifauna and infauna? Know the different reasons why estuaries are important. Are continental shelves larger on active margins or passive margins of continents?

**Chapter 14 – Human Impacts on Marine Environments**

What is biodiversity? What human impact poses the greatest risk to biodiversity? **Be able to describe the concept of fishing down the food web.** What is bycatch? What is aquaculture? Know the impacts of marine plastics. Know the countries that still participate in annual whale hunts. What affects is climate change expected to have on our oceans? **Know the definition of an invasive species and be able to provide an example of an invasive species.** Know the characteristics that make something a successful invader. Know the different ways that invasive species are introduced.