

Course Description: **Marine Science 2002500**

**Major Concepts/Content.** The purpose of this course is to provide an overview of the marine environment.

The content should include, but not be limited to, the following:

- the nature of science
- the origins of the ocean
- the chemical, physical, and geological aspects of the marine environment
- ecology of various sea zones
- marine communities
- the diversity of marine organisms
- characteristics of major marine ecosystems
- characteristics of major marine phyla/divisions
- the interrelationship between man and the ocean

**Course Requirements.** These requirements include, but are not limited to, the benchmarks from the Sunshine State Standards that are most relevant to this course. Benchmarks correlated with a specific course requirement may also be addressed by other course requirements as appropriate. Some requirements in this course are not fully addressed in the Sunshine State Standards.

Benchmarks from Science, Strand H, should not be taught and assessed in isolation, but should be combined with other benchmarks listed for this course.

After successfully completing this course, the student will:

**1. Apply knowledge of the nature of science and scientific habits of mind to solve problems, and employ safe and effective use of laboratory and field technologies.**

- SC.H.1.4.1 Know that investigations are conducted to explore new phenomena, to check on previous results, to test how well a theory predicts, and to compare different theories.
- SC.H.1.4.2 Know that from time-to-time, major shifts occur in the scientific view of how the world works, but that more often, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge.
- SC.H.1.4.3 Understand that no matter how well one theory fits observations, a new theory might fit them as well or better, or might fit a wider range of observations, because in science, the testing, revising, and occasional disregarding of theories, new and old, never ends and leads to an increasing better understanding of how things work in the world, but not to absolute truth.

**2. Describe the unique physical characteristics of the marine environment.**

- SC.D.1.4.1 Know how climatic patterns on Earth result from an interplay of many factors (Earth's topography, its rotation on its axis, solar radiation, the transfer of heat energy where the atmosphere interfaces with lands and oceans, and wind and ocean currents).
- SC.D.1.4.2 Know that the solid crust of Earth consists of slow-moving, separate plates that float on a denser, molten layer of Earth and that these plates interact with others, changing the Earth's surface in many ways (e.g., forming mountain ranges and rift valleys, causing earthquake and volcanic activity, and forming undersea mountains that can become ocean islands).

3. **Demonstrate knowledge of marine communities, food chains, and food webs.**
  - SC.E.1.4.3 Know the various reasons that Earth is the only planet in our Solar System that appears to be capable of supporting life, as we know it.
  - SC.G.1.4.1 Know of the great diversity and interdependence of living things.
  - SC.G.1.4.2 Understand how the flow of energy through an ecosystem made up of producers, consumers, and decomposers carries out the processes of life and that some energy dissipates as heat and is not recycled.
  - SC.G.1.4.3 Know that the chemical elements that make up the molecules of living things are combined and recombined in different ways.
4. **Describe the physical and biological characteristics of the planktonic, benthic, and nektonic regions of the ocean.**
  - SC.F.1.4.1 Know that the body processes involve specific biochemical reactions governed by biochemical principles.
  - SC.F.1.4.2 Know that body structures are uniquely designed and adapted for their function.
  - SC.G.2.4.4 Know that the world ecosystems are shaped by physical factors that limit their productivity.
5. **Explain how the physical and chemical properties of seawater and the geology of the ocean basin shape the nature of oceanic life.**
  - SC.B.1.4.1 Understand how knowledge of energy is fundamental to all the scientific disciplines (e.g., the energy required for biological processes in living organisms and the energy required for building, erosion, and rebuilding of Earth).
  - SC.B.1.4.2 Understand that there is conservation of mass and energy when matter is transformed.
6. **Compare the diverse characteristics of representatives of the major phyla/divisions represented in marine systems.**
  - SC.G.2.4.3 Understand how genetic variation of offspring contributes to population control in an environment and the natural selection ensures that those who are the best adapted to their surroundings survive to reproduce.
7. **Describe the interrelationship between man and the ocean environment and the need for protection of the natural systems on Earth.**
  - SC.D.2.4.1 Understand the interconnectedness of the systems on Earth and the quality of life.
  - SC.G.2.4.5 Understand that the amount of life any environment can support is limited and that human activities can change the flow of energy and reduce the fertility of the Earth.
  - SC.G.2.4.6 Know the ways in which humans today are placing their environment support systems at risk (e.g., rapid human population growth, environmental degradation, and resource depletion).
8. **Describe the present and potential resources of the ocean.**
  - SC.G.2.4.1 Know that layers of energy rich organic materials have been gradually turned into great coal beds and oil pools (fossil fuels) by pressure of the overlying earth and that humans burn fossil fuels to release the stored energy as heat and carbon dioxide.
  - SC.G.2.4.2 Know that changes in a component of an ecosystem will have unpredictable effects on the entire system but that the components of the system tend to react in a way that will restore the ecosystem to its original condition.
9. **Describe how marine science interacts with technology and society.**
  - SC.H.3.4.5 Know that the value of a technology may differ for different people and at different times.
  - SC.H.3.4.6 Know that scientific knowledge is used by those who engage in design and technology to solve practical problems, taking human values and limitations into account.