

LIFE IN THE DEEP SEA

SCIENCE STANDARDS

Next Generation Sunshine State Standards (Florida)

Big Idea 1: The Practice of Science

- **SC.6.N.1.5** Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.
- **SC.7.N.1.5** Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
- **SC.7.N.1.6** Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
- **SC.8.N.1.5** Analyze the methods used to develop a scientific explanation as seen in different fields of science.

BIG IDEA 2: The Characteristics of Scientific Knowledge

- **SC.6.N.2.2** Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
- **SC.6.N.2.3** Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
- **SC.8.N.2.2** Discuss what characterizes science and its methods.

BIG IDEA 10: Forms of Energy

- **SC.7.P.10.1** Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.
- **SC.7.P.10.2** Observe and explain that light can be reflected, refracted, and/or absorbed.

Standard 15: Diversity and Evolution of Living Organisms

- **SC.912.L.15.13** Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.

BIG IDEA 17: Interdependence

- **SC.7.L.17.1** Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
- **SC.7.L.17.2** Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
- **SC.7.L.17.3** Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
- **SC.912.L.17.2** Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
- **SC.912.L.17.6** Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
- **SC.912.L.17.7** Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems.

Ocean Literacy: Essential Principles and Fundamental Concepts

- 1a. The ocean is the dominant physical feature on our planet Earth—covering approximately 70% of the planet's surface. There is one ocean with many ocean basins, such as the North Pacific, South Pacific, North Atlantic, South Atlantic, Indian and Arctic.
- 1e Most of Earth's water (97%) is in the ocean. Seawater has unique properties: it is saline, its freezing point is slightly lower than fresh water, its density is slightly higher, its electrical conductivity is much higher, and it is slightly basic. The salt in seawater comes from eroding land, volcanic emissions, reactions at the seafloor, and atmospheric deposition.

- 5d Ocean biology provides many unique examples of life cycles, adaptations and important relationships among organisms (symbiosis, predator-prey dynamics and energy transfer) that do not occur on land.
- 5f Ocean habitats are defined by environmental factors. Due to interactions of abiotic factors such as salinity, temperature, oxygen, pH, light, nutrients, pressure, substrate and circulation, ocean life is not evenly distributed temporally or spatially, i.e., it is “patchy”. Some regions of the ocean support more diverse and abundant life than anywhere on Earth, while much of the ocean is considered a desert.
- 5g There are deep ocean ecosystems that are independent of energy from sunlight and photosynthetic organisms. Hydrothermal vents, submarine hot springs, methane cold seeps, and whale falls rely only on chemical energy and chemosynthetic organisms to support life.
- 7a The ocean is the last and largest unexplored place on Earth— less than 5% of it has been explored. This is the great frontier for the next generation’s explorers and researchers, where they will find great opportunities for inquiry and investigation.
- 7b Understanding the ocean is more than a matter of curiosity. Exploration, inquiry and study are required to better understand ocean systems and processes.
- 7d New technologies, sensors and tools are expanding our ability to explore the ocean. Ocean scientists are relying more and more on satellites, drifters, buoys, subsea observatories and unmanned submersibles.
- 7f Ocean exploration is truly interdisciplinary. It requires close collaboration among biologists, chemists, climatologists, computer programmers, engineers, geologists, meteorologists, and physicists, and new ways of thinking.

National Science Standards

- Physical Science - Light, Heat, Electricity and Magnetism
- Life Science
 - Regulation and Behavior
 - Populations and Ecosystems
 - Diversity and Adaptations
 - Interdependence of Organisms