

## **Coral Reef Ecology II: A closer look**

This program was created for students that have already participated in MarineLab's coral reef ecology program; the concepts build on the ideas introduced during our core coral reef ecology program. Through incorporating recent coral reef research, the program includes a more complex approach to observing the coral reef habitat. After a classroom discussion, students have the opportunity to snorkel two different coral reef sites with a checklist of specific organisms, behaviors, symbioses and environmental impacts to look for. MarineLab staff will be in the water and on the boat to lifeguard, point out marine life, and discuss observations.

**Grade Level:** 9<sup>th</sup> and above (all students in the group must have already participated in our Coral Reef Eco or Advanced Coral Reef Eco program during current trip or on a previous trip)

**Timing:** Class is 1 hour. Field trip is 3 hours (field trip can be shortened, if necessary)

### **Concepts Covered:**

- Horizontal zonation of reefs in the Keys
- Vertical zonation of spur and groove bank reef
- Varying morphology of coral species dependent on depth
- Coral reef community symbioses
- Spatial competition amongst the coral reef benthic community
- Effects of predation in the coral reef habitat
- Sounds of the coral reef
- Anthropogenic impacts on the Florida Keys reef system

**Vocabulary:** zooxanthellae, mutualism, polyp, colonial, hardbottom, zonation, reef, patch reef, bank reef, diversity, zonation, backreef, forereef, reef crest, buttress zone, morphology, excavation, corallivore, spongivore, mesenterial filaments, sweeper tentacles, allelopathy, territoriality, cleaning station, ocean acidification

**Resources:** <http://floridakeys.noaa.gov/corals/welcome.html>,  
<http://coralreef.noaa.gov/aboutcorals/coral101/symbioticalgae/>,  
[http://ccma.nos.noaa.gov/ecosystems/coralreef/fl\\_mapping/FLClassScheme.pdf](http://ccma.nos.noaa.gov/ecosystems/coralreef/fl_mapping/FLClassScheme.pdf)

## Standards:

### ***Next Generation Sunshine State Standards***

SC.5.L.17.1: Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics.

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.17.3: Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms.

SC.912.L.17.4: Describe changes in ecosystems resulting from seasonal variations, climate change and succession.

SC.912.L.17.6: Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.

SC.912.L.17.8: Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.

### ***Ocean Literacy Principles:***

**Principle 3.** The ocean is a major influence on weather and climate.

g. Changes in the ocean-atmosphere system can result in changes to the climate that in turn, cause further changes to the ocean and atmosphere. These interactions have dramatic physical, chemical, biological, economic, and social consequences.

**Principle 5.** The ocean supports a great diversity of life and ecosystems.

d. 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.

f. Ocean ecosystems are defined by environmental factors and the community of organisms living there. Ocean life is not evenly distributed through time or space due to differences in abiotic factors such as oxygen,



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salinity, temperature, pH, light, nutrients, pressure, substrate and circulation. A few regions of the ocean support the most abundant life on Earth, while most of the ocean does not support much life.

h. Tides, waves, predation, substrate, and/or other factors cause vertical zonation patterns along the coast: density, pressure, and light levels cause vertical zonation patterns in the open ocean. Zonation patterns influence organisms' distribution and diversity.

**Principle 6. The ocean and humans are inextricably interconnected.**

d. Humans affect the ocean in a variety of ways. Laws, regulations and resource management affect what is taken out and put into the ocean. Human development and activity leads to pollution (point source, non-point source, and noise pollution), changes to ocean chemistry (ocean acidification) and physical modifications (changes to beaches, shores and rivers). In addition, humans have removed most of the large vertebrates from the ocean.

e. Changes in ocean temperature and pH due to human activities can affect the survival of some organisms and impact biological diversity (coral bleaching due to increased temperature and inhibition of shell formation due to ocean acidification).