



ECOSYSTEM HEALTH: WATER QUALITY

SUMMARY

Marine ecosystems are defined by environmental factors and the community of organisms living there. The ocean offers vast living space and diverse habitats from the surface through the water column to the seafloor. Students will be introduced to abiotic factors that explain how ocean life is not evenly distributed. They will use these abiotic differences to explore how physical, chemical, and biological components can influence populations.

Next Generation Science Standard

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

BACKGROUND INFORMATION

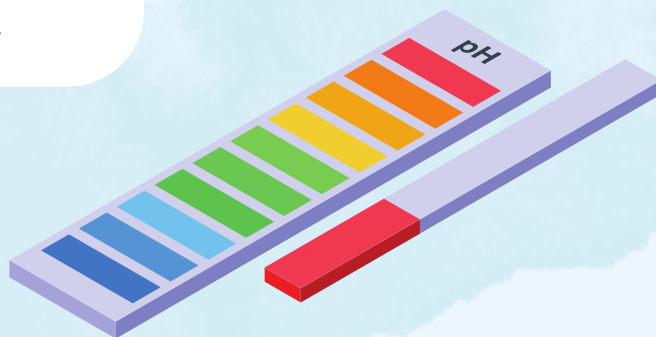
As the human population continues to increase, the exploitation of natural resources increases as well. To continue to provide people with food, places to live, energy, water, etc., once undeveloped land is converted for human use. Land development specifically coastal development can lead to habitat loss, sedimentation of rivers and streams, increased runoff, and water pollution. These impacts can negatively affect ecosystems and species populations.

When deciding what to do with a piece of land, many factors must be taken into consideration, including ecosystem services and how local species may be affected. When determining the impacts on the marine environment, water quality is assessed.

OBJECTIVES

Students will:

- Understand the importance of water quality for ecosystems.
- Conduct water quality testing using appropriate tools and methods.
- Analyze and interpret water quality data to draw conclusions about the health of a water body.



LESSON PLAN: ECOSYSTEM HEALTH - WATER QUALITY

TIME

75 - 90 minutes

MATERIALS

- Water quality testing kit
- Guide for zooplankton identification
- Data collection sheet or notebook
- Microscope or hand lenses

ENGAGE

Prior to this lesson, take students to a local body of water to collect samples including a plankton tow, or bring in samples.

Begin by discussing the importance of water quality for ecosystems and human health. Review that species in wetlands and the roots of mangroves play an important role in filtering water and protecting the coastline.

Explain that water quality refers to the physical, chemical, and biological features of water and can affect the functioning and health of an ecosystem.

Then, discuss components such as temperature, pH, dissolved oxygen, and nutrient levels.

EXPLORE

Set up stations around the classroom for students to complete different water quality testing: pH, temperature, dissolved oxygen, nitrate, and nitrite levels.

Prepare a microscope slide and set up for students to observe plankton or bacteria.

Have students record their data.

EXPLAIN

Together, analyze and interpret student data. Discuss as a class the results of water quality and make inferences for the health of the body of water. Ask students what human activities may or may not contribute to the observed results. Ask students how long these effects may be felt. For example, fishing or building along the coastline.

EXTEND

Then, have students work in small groups, or individually to sketch what they see under the microscope.

Optional: If you have zooplankton, see if students can identify the type using an identification guide.

EVALUATE

Conclude the lesson by reviewing how the different physical, chemical, and biological features of water influence the type or abundance of species found in an ecosystem.

To assess students, have them draw a picture of a body of water with one of the following:

- High temperature
- Low dissolved oxygen
- High or low pH
- High nitrate