MarineLab
Marine Resources Development Foundation
Marine Science education in the Florida Keys

Water Quality Lab

Abiotic water parameters determine the health and the community of any fresh or salt water system. Primary water quality parameters will be discussed as well as the best tools and methods to measure each parameter. Various tools are available to the scientific community to increase precision and accuracy. Students will have hands on opportunity to use a variety of tools in preparation for water quality field collection and analysis. Students will collect water quality data during scheduled snorkel trips at a minimum of two sites.

Grade Level: High School and above

Timing: 1 hour

Concepts Covered:

- Environmental conditions determine the geographical distribution of all organisms
- Relevant water quality parameters and the common tools used to measure each parameters
- Water quality parameters can vary significantly from the Bay to the Ocean and inshore versus offshore.
- Causes and effects of fluctuations of each parameter including ocean acidification and increased salinity
- Healthy levels for all water quality parameters
- Units of measurement for all water quality parameters
- Techniques for measuring each water quality parameter
- Importance of long term monitoring

Vocabulary: Salinity, specific gravity, hypoxia/anoxia**,** Refraction, refractometer, hydrometer**,** turbidity, Secchi disk, YSI sonde, acidity/alkalinity, hypersaline**, h**yposaline, pH, ammonia, precision, accuracy, eurythermal, stenothermal, euryhaline, stenohaline, anoxic, eutrophic, oligotrophic

Extensions: It is recommended to include the "summary" program into your schedule if your group is participating in this lab. During the summary, all water quality data will be discussed and entered into the GLOBE database. Additionally, all water quality data collected by MarineLab staff and/or students is available for analysis before or after your MarineLab program.

Resources: www.globe.gov

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Standards:

Next Generation Sunshine State Standards

SC.5.N.1.3: Recognize and explain the need for repeated experimental trials.

SC.6.N.1.2: Explain why scientific investigations should be replicable.

SC.7.N.1.2: Differentiate replication (by others) from repetition (multiple trials).

SC.8.N.1.2: Design and conduct a study using repeated trials and replication.

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.17.18: Describe how human population size and resource use relate to environmental quality.

Ocean Literacy Principles

Principle 1. The Earth has one big ocean with many features.

e. 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.

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

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, 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.

Principle 7. The ocean is largely unexplored.

d. New technologies, sensors and tools are expanding our ability to explore the ocean system. Scientists are relying more and more on satellites, drifters, buoys, subsea observatories and unmanned submersibles