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

Diversity Indexing Lab

The lab begins with a discussion relating biodiversity to ecosystem health and stability. Students work in pairs to count and identify every invertebrate he/she can find on a live rock freshly collected from Largo Sound. Each pair calculates a diversity index for their rock. Discussion continues regarding application to true scientific studies and the need for increased sample size. Students use raw data from all rocks in the lab to calculate an "overall" diversity index and numbers are compared and discussed. The lab concludes with a discussion regarding the validity of the study overall. What are the "pros" and cons of utilizing a mathematical measurement of biodiversity? What is the study lacking?

Grade Level: High School or Above

Timing: 2 hours

Concepts:

- Diversity Indices with a focus on Simpsons Diversity Index
- Environmental impact studies
- Biodiversity and its indication on the health of an ecosystem
- Use of mathematical measures of diversity; strengths and weaknesses
- Applicability of biodiversity measurements to "real life" science
- Importance of sample size
- Characteristics of common marine phyla and identification of frequently seen marine invertebrates
- Students will understand the idea that biodiversity can be an indication of overall health of an ecosystem

Vocabulary: invertebrate, diversity, abundance, diversity index, biodiversity, species richness, species evenness, Simpson's Diversity Index, Ecosystem Health, sample size, random sampling, indicator species

Extensions: Often, students that participate in the Diversity Indexing Lab, follow up with a Rodriguez Key field trip. The field trip provides a second opportunity for students to calculate a diversity index. Numbers can be compared and discussed.

Resources: Long term data that students have collected during this particular lab are accessible to teachers before or after field trip to MarineLab for use in the classroom

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

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.5.L.15.1: Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.

SC.6.L.15.1: Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.

SC.7.N.2.1: Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.

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

SC.912.L.17.5: Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.

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.

SC.912.L.17.13: Discuss the need for adequate monitoring of environmental parameters when making policy decisions.

Ocean Literacy Principles:

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.