PROJECT OCEANOLOGY

Nearshore Fish Study Elementary NGSS Alignments

Overview

Fish use estuaries for breeding and as safe nursery areas. Small nearshore fish are also an important part of the diet for larger fish important to shallow subtidal ecosystems as well as to recreational anglers and commercial fishers. In this 2.5 hour program, students will use seine nets to collect nearshore organisms. They will study diversity, abundance, and population size structure of nearshore organisms from one or more locations. They will also collect data on shoreline water chemistry at each seining location, and discuss how variation in water chemistry might affect fish populations. Later, in the classroom, they'll use their data to make graphs and build a food web model, and present/discuss their findings in the context of nearshore ecosystems.

Note: this alignment includes the follow-up food web and data analysis activities.

Performance Expectations

HS-LS2-6 Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

Nearshore fish are an important food resource for larger fish populations. Students will collect empirical data on nearshore fish diversity, abundance, and population size structure, from one or more locations. They will discuss how these ecosystems might change over different timescales.

HS-LS4-5 Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

Students will collect empirical data on the physical and biological components of nearshore ecosystems, and discuss how they are related.

Science and Engineering Practices

Developing and using models

Students will collect empirical data and then work collaboratively to use those data to construct a food web model for the nearshore ecosystem.

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Analyze and interpret data

Students will share their findings with the group, and then work together to analyze the results and discuss what they mean for the ecosystem.

Engaging in argument from evidence

Students will use the empirical data they have collected to make graphs and also to build food web models, and then present and defend them to the group.

Crosscutting Concepts

Cause and Effect: Mechanism and Explanation

Students will collect empirical evidence on the physical and biological components of nearshore ecosystems, and discuss how they are related.

Stability and Change

Students will collect empirical data on the physical and biological components of nearshore ecosystems, and discuss how they might change over long and short terms.

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems. Organisms and populations are dependent on their environmental interactions both with other living things and with nonliving factors.

Students will gather empirical data on the living and non-living components of nearshore ecosystems, and discuss how they are connected. They will also discuss the ecological connections between nearshore ecosystems and other adjacent ecosystems.

LS2.C: Ecosystem Dynamics, Functioning, and Resilience. Ecosystems are dynamic in nature; their characteristics vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.

Students will gather empirical data on the living and non-living components of nearshore ecosystems, discuss how they are connected, and discuss how and why they may have changed over time.

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Nature of Science

Scientific Knowledge is Based on Empirical Evidence

Students will gather empirical data on the living and non-living components of nearshore ecosystems, then use their information to assess the health of those systems.