

ECOSYSTEM: INTRODUCTION

An understanding of the components of an ecosystem is an integral part of comprehending the importance of ocean monitoring. Students must distinguish between the types of producers and consumers within an ecosystem and how they interact with one another. An organism whose life cycle can be easily affected by changes in an ecosystem is the Pacific herring. Students will learn the phases of the herring life cycle and determine factors that can hinder or help them survive within an ecosystem.

KEY WORDS

abiotic	omnivore
adaptations	organisms
biotic	parasites
carnivore	pollution
consumers	population
decomposer	predator
ecosystem	prey
food web	producers
habitat	scavengers
herbivore	

FOCUS QUESTIONS

1. What is an ecosystem?
2. How is energy cycled through an ecosystem?
3. What can we learn by collecting data about oceans?

LEARNING OBJECTIVES

The students will:

- identify an ocean food web.
- demonstrate how one level of the ocean food web links up with another.
- identify key words used to define an ecosystem.
- demonstrate how energy is cycled through an ecosystem.

MATERIALS

yarn
cones
ecosystem vocabulary matching cards
herring life cycle game sheets
dice

AUDIO-VISUAL MATERIALS

ecosystem slideshow
computer with projector and screen

LEARNING PROCEDURE

See "Lesson 2 Activity Instructions" for details.

- A. "What is an ecosystem?" slideshow **(15 minutes)**
- B. Ecosystem Vocabulary Matching Activity **(20 minutes)**
- C. Yarn Food Web Game **(20 minutes)**
- D. Display herring life cycle image and discuss **(5 minutes)**
- E. Herring Life Cycle Game **(30 minutes)**
- F. Ecosystem Vocabulary Crossword Puzzle **(20 minutes)**
- G. Review: discuss Ecosystem Focus Questions **(10 minutes)**

STANDARDS**Alaska State Standards:**

- SA** The student will demonstrate an understanding of the processes and applications of scientific inquiry.
- (5) SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring and communicating.
 - (5) SA1.2** using quantitative and qualitative observations to create their own inferences and predictions.
- SA1** The student will develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend arguments.
- SA2** The student will develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review.
- (5) SA2.1** supporting their statements with facts from a variety of resources and by identifying their sources.
- SA3** The student will develop an understanding that culture, local knowledge, history, and interactions with the environment contribute to the development of scientific knowledge, and local applications provide opportunity for understanding scientific concepts and global issues.
- (5) SA3.1** identifying the limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survives.

National Science Education Standards**Content Standard A: Scientific Inquiry**

All students will develop abilities necessary to do scientific inquiry.

Identify questions that can be answered through scientific investigations.

Design and conduct a scientific investigation.

Use appropriate tools and techniques to gather, analyze and interpret data.

All students will gain an understanding about scientific inquiry.

Different kinds of questions suggest different kinds of scientific investigations.

Technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations.

Scientific explanations emphasize evidence, have logically consistent arguments and use scientific principles, models and theories.

Content Standard C: Life Science

All students will develop an understanding of populations and ecosystems.

A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.

Populations of organisms can be categorized by the function they serve in an ecosystem (i.e., producers, consumers, decomposers). Food webs identify the relationships among producers, consumers and decomposers in an ecosystem.

For ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.

Ocean Literacy Standards

1. The ocean is largely unexplored.
 - b. Understanding the ocean is more than a matter of curiosity. Exploration, inquiry and study are required to better understand ocean systems and processes.

RESOURCES

National Research Council (U.S.), (1996). *National Science Education Standards: observe, interact, change, learn*. Washington, D.C.: National Academy Press.

Project 2061 (American Association for the Advancement of Science), (2001). *Atlas of Science Literacy*. Washington, DC: American Association for the Advancement of Science: National Science Teachers Association.

FEEDBACK

We value your feedback on this lesson.

Send us your comments to: khoffman@pwssc.org

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