

CULMINATING LESSON Coral Reef Ecosystems

Lesson at a Glance

Students will collaborate in creating an authentic food web reflecting interactions of coral reef producers, consumers and decomposers. Direction of arrows indicate the flow of energy in the reef ecosystem and use of different colors highlight the cycling of common elements of matter.

Lesson Duration

One 60-minute period

Essential Question(s)

How are the variety of organisms that live in a coral reef ecosystem important to its functioning in terms of cycles of matter and flow of energy?

Key Concepts

- A coral reef ecosystem has a variety of plants and animals that live together.
- These organisms all have specific roles to play in the functioning of the reef ecosystem.

Instructional Objectives

- I can draw a diagram to show the flow of energy and the cycles of matter involving producers, consumers, and decomposers in a coral reef ecosystem.
- I can explain the interdependent relationships among organisms in this ecosystem.

Related HCPSIII Benchmark(s):

Science SC.5.2.1
Use models or simulations to represent and investigate features of objects, events and processes in the real world

Science SC.5.3.1
Describe the flow of energy among producers, consumers and decomposers.

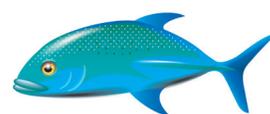
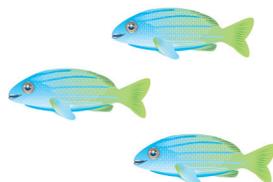
Science SC.5.3.2
Describe the interdependent relationships among the producers, consumers and decomposers in an ecosystem in terms of matter.



Assessment Tools

Benchmark Rubric:

Topic		Unifying Concepts and Themes	
Benchmark SC.5.2.1		Use models and/or simulations to represent and investigate features of objects, events, and processes in the real world	
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Consistently select and use models and simulations to effectively represent and investigate features of objects, events, and processes in the real world	Use models and/or simulations to represent and investigate features of objects, events, and processes in the real world	With assistance, use models or simulations to represent features of objects, events, or processes in the real world	Recognize examples of models or simulations that can be used to represent features of objects, events, or processes
Topic		Cycles of Matter and Energy	
Benchmark SC.5.3.1		Describe the cycle of energy among producers, consumers, and decomposers	
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Explain and give detailed examples of the cycle of energy among producers, consumers, and decomposers	Describe the cycle of energy among producers, consumers, and decomposers	Describe a part of the energy cycle with an example (e.g., describe one or two parts of a food chain)	Recognize an example of part of an energy cycle
Topic		Interdependence	
Benchmark SC.5.3.2		Describe the interdependent relationships among producers, consumers, and decomposers in an ecosystem in terms of the cycles of matter	
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Explain and give examples of how specific relationships among producers, consumers, and decomposers in an ecosystem affect the cycling of matter	Describe the interdependent relationships among producers, consumers, and decomposers in an ecosystem in terms of the cycling of matter	Identify a few relationships between producers, consumers, or decomposers in an ecosystem in terms of the cycling of matter	Recall, with assistance, that matter cycles in an ecosystem among producers, consumers, and decomposers



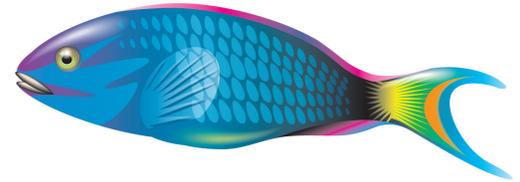
Assessment/Evidence Pieces

Lesson

- Student drawings of simple food chain with labels and written piece that describes the interdependency between the organisms in their drawing.

Materials Needed

Teacher	Class	Group	Student
<ul style="list-style-type: none"> • Large piece of butcher paper • Colored Index Cards • Markers • Tape 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Student Worksheets from previous lessons



Instructional Resources

None

Lesson Plans

Lesson Preparation

- Prepare colored index cards for herbivores, carnivores, omnivores, detritivores, top predators and write a different name of a corresponding vertebrate on the appropriate color card.
- Have students gather the following worksheets to be used in this lesson:

Invertebrates of the Coral Reef City

The graphic organizer from Lesson 2

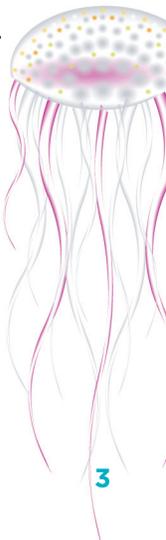
Investigating Invertebrate Food Chains

Vertebrates of the Coral Reef City

Investigating Vertebrates Food Chains

I. Unit Review

- Review with the students the different organisms and their roles (producers, consumers, decomposers) within a coral reef ecosystem.
- Instruct students to draw and label a simple food chain, which illustrates the flow of energy and the cycles of matter among the organisms.
- Have the students describe, in writing, the interdependency between the organisms in their drawing.



II. Review Activity

- A. Divide the class into teams with 3-4 students in each group. Shuffle cards and distribute a variety of colored cards to each team. They will use the organisms randomly assigned to form examples of food chains in the coral reef ecosystem. Data from the invertebrate/vertebrate tables, food chain worksheets, and class mural on interactions in the coral reef ecosystem can also be referenced. Be sure arrows are pointing in the direction of the flow of energy as their organisms interact in the marine environment.
- B. The next step is to collaborate as a class to form a food web. Put up a large sheet of butcher paper on the board. Have markers and tape ready. Begin by asking the producers to tape their index cards on the butcher paper, randomly spread throughout. Then ask for the first level consumers (the herbivores) to tape their cards up and, using the marker, draw an arrow from the algae to their card. You can have more than one herbivore attached to a plant. Remember that the arrow shows the flow of energy. The arrow always points to the predator. Then, ask the class if anyone has a predator that feeds on an organism that's on the board. Have them tape their cards and drawn in the arrows. Continue this until all the cards are up on the board. Then, ask the class to examine the chart carefully and if they see other predator/prey relationships that aren't marked. Have them insert the arrows. When all is done, the class created a food web where everyone has a role in the coral reef ecosystem.
- C. Additional organisms may need to be added to the food web to show cycling of matter (i.e., bacteria that "fixes" nitrogen into a form that can be utilized again by producers).

