LESSON 2 Everybody Has a Role in a Coral Reef

Lesson at a Glance

Students will examine coral reef ecosystems and identify different animals, plants and bacteria that live there. They will determine the roles different organisms play and define food chains and food webs found within the coral reef ecosystem.

Lesson Duration

One 45-minute period

Essential Question(s)

What are the roles organisms play in a coral reef ecosystem?
How does energy flow and matter cycle within a coral reef ecosystem?

Key Concepts

- A coral reef ecosystem has a variety of plants, animals and bacteria that live together. These organisms have specific roles in the functioning of the coral reef ecosystem.
- Food chains and food webs are diagrams scientists use to visualize the feeding relationships of organisms in an ecosystem. In a food chain you will find herbivores, carnivores, omnivores, detritivores, and predator/prey relationships connected with the arrows.
- The direction of the arrows in a food chain diagram reflects the flow of energy among organisms in the reef ecosystem.
- Matter cycles as producers, consumers, and decomposers interact in the reef 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 cycle of energy among producers, consumers, and decomposers

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

Instructional Objectives

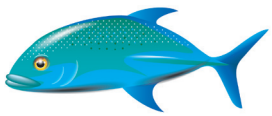
- I can create a food chain using images of coral reef organisms.
- I can create an example of a food chain in a coral reef ecosystem to show flow of energy and cycling of matter among reef organisms.
- I can give examples of herbivores, carnivores, omnivores, detritivores, and predator/prey relationships found in a coral reef ecosystem.
- I can create a food web.

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 worksheet *Everybody Has a Role in a Coral Reef*

Materials Needed

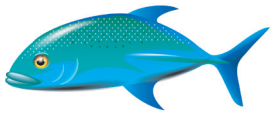
Teacher	Class	Group	Student
• Method to project PowerPoint	• None	• Student worksheet: *Everybody Has a Role in a Coral Reef* • Scissors • 14 x 20 construction paper (per 2 student team) • Felt markers • Glue	• None

Instructional Resources

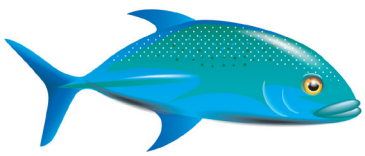
PowerPoint: *Life in a Coral Reef*
Student Worksheet: *Everybody Has a Role in a Coral Reef*
Teacher Answer Key: *Everybody Has a Role in a Coral Reef*

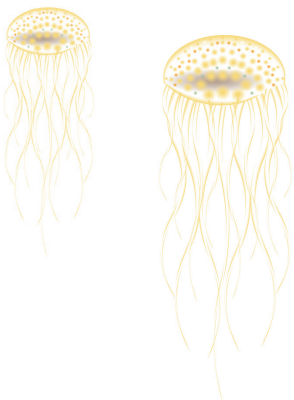
Student Vocabulary Words

algae: simple one celled or many celled organisms that photosynthesize, but lack true roots and leaves.
carnivore: an animal that eats other animals.
consumer: an organism that eats other living things to get food for its energy and growth.
decomposer: special kind of detritivore that digests decaying matter. Examples of decomposers are bacteria and fungi.
detritivore: an organism that eats parts of dead organisms and waste products. Examples are earthworms and some crabs.
food chain: a series of organisms linked by the order in which they eat and are eaten by one another.
food web: a group of interconnected food chains, in which organisms from one chain are seen to eat organisms on other chains.



herbivore: an animal that eats only plants.
invertebrates: an animal without a backbone.
omnivore: an animal that eats both plants and animals.
organism: a living thing.
producer: a green plant or plant like organism that can make food out of carbon dioxide and water by photosynthesis.
scavenger: an organism that feeds on dead organisms (but not waste products).
vertebrate: an animal with a backbone.





Lesson Plan

Lesson Preparation

- Review the Science Background provided in the Unit's Overview.
- Preview the PowerPoint *Life in a Coral Reef* and make arrangements to project it.
- Make copies of the Student Worksheets *Everybody Has a Role in a Coral Reef*, one per student.
- Add the new vocabulary to the Word Wall as you go through this lesson.

I. Everybody Has a Role in a Coral Reef

A. Share the PowerPoint presentation *Life in a Coral Reef*. Have the students take notes in their science journal.

B. Review the terms: predator, prey, carnivore, omnivore, herbivore, decomposer, detritivore, and scavenger. Discuss the following words in the vocabulary list:

Producers: plants, seaweed or limu.

Consumers: omnivores, carnivores, and herbivores.

Detritivores: scavengers, decomposers, and micro-decomposers (Decomposers are a special type of detritivores that digest decaying matter).

C. Explain to students that there are many different types of bacteria and many different roles that bacteria play. However, for our lesson, we will be discussing bacteria whose role is decomposition or the breaking down of decaying matter. By decomposing organic matter for energy, the bacteria help to recycle nutrients like nitrogen, carbon and phosphates back into the environment.

II. Food Chains to Food Webs

A. Review the concepts of food chains and food webs.

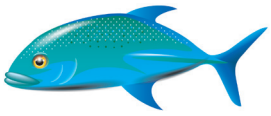
B. Pass out the student worksheet, *Everybody Has a Role in a Coral Reef*. Have students give examples from the chart of omnivores, herbivores, carnivores and detritivores, which includes decomposers and scavengers. Make sure all of the plants and animals are correctly identified before moving onto the next step.

C. Have students cut apart the animals on the worksheet. Students can also use other examples not on the worksheet. They can download pictures of other marine plants, animals and bacteria from the Internet or draw their own examples.

D. Using the cut out examples of animals, plants and bacteria, have the students create as many food chains as possible.

E. Have students combine the food chains into a food web and glue it to construction paper or add food chains and webs to the class butcher paper of the coral reef ecosystem interactions posted in the classroom.

F. Have student volunteers come up and explain how energy flows and matter cycles through the food chains and food webs on the butcher paper.



LESSON 2

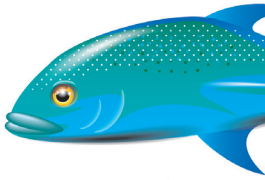
Name: _____ Date: _____

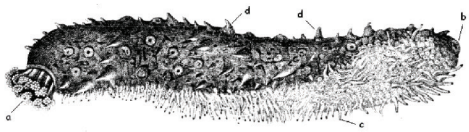
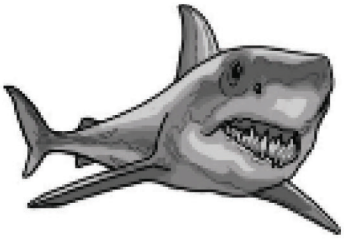
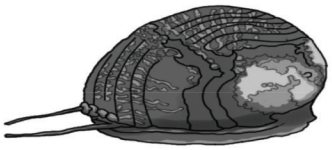
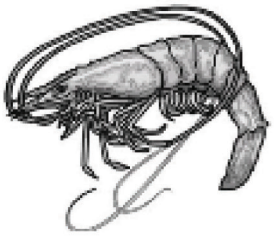
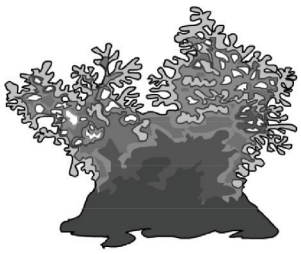
Everybody Has a Role in a Coral Reef

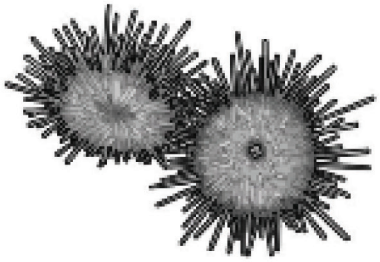
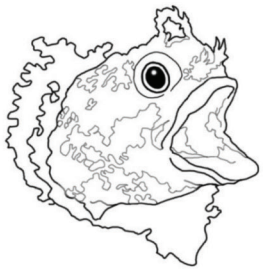
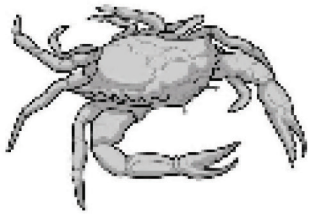
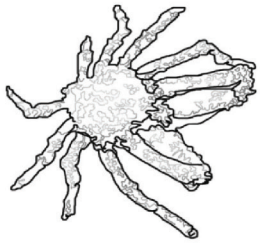
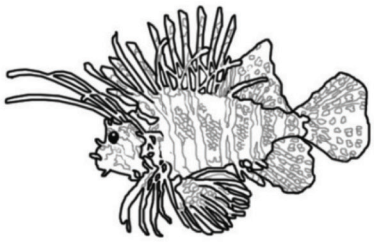
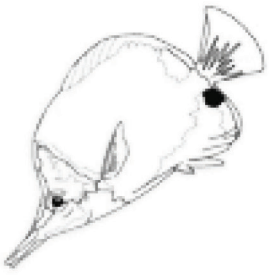
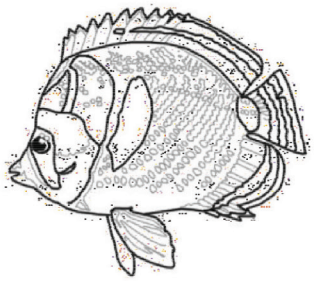
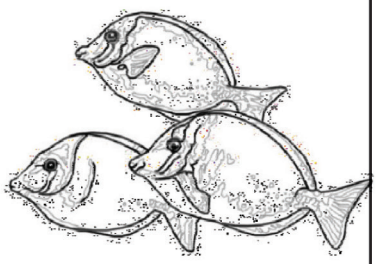
Directions: Identify each of the animals as:

Herbivore (H)	Micro-Decomposer (MD)	Omnivore (O)	Carnivore (C)
Scavenger (S)	Detritivore (D)	Producer (P)	

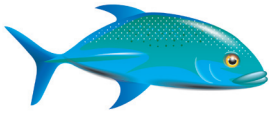
Note: Some organisms may have more than one role.



Brittle Star: _____ 	**Sea Cucumber: _____**  *Image taken from Wikimedia Commons. Image originally from 1st or 2nd edition of Nordisk familjebok (1904–1926). This image is in the public domain.*
Shark: _____ 	**Snail: _____** 
Shrimp (plankton): _____ 	**Limu: _____** 

Sea Urchin: _____ 	**Moray eel: _____** 
Blenny: _____ 	**Crab: _____** 
Decorator crab: _____ 	**Hawaiian lionfish: _____** 
Longnose Butterfly fish: _____ 	**Butterfly fish: _____** 
Surgeon fish: _____ 	**Bacteria: _____** 

LESSON 2 - Teacher Answer Key



Everybody Has a Role in a Coral Reef

Directions: Identify each of the animals as:

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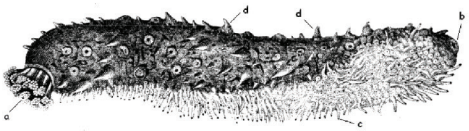
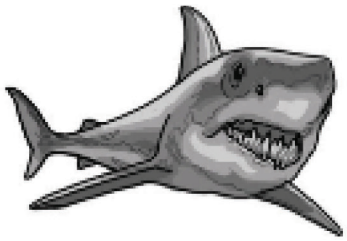
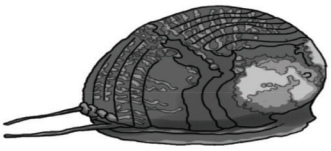
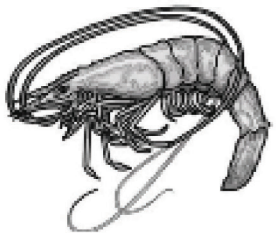
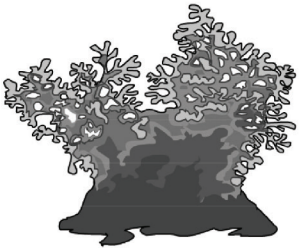
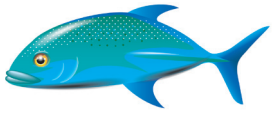
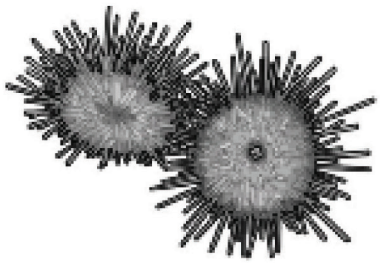
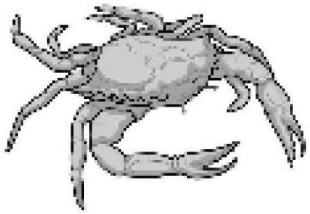
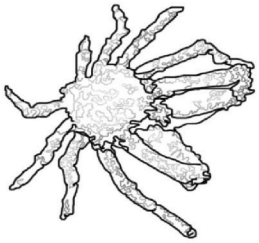
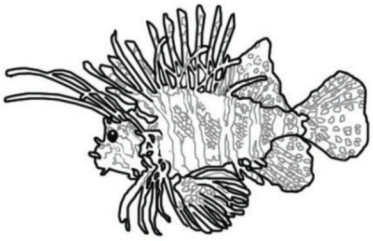
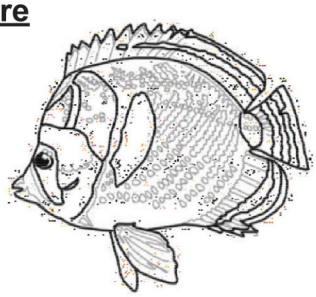
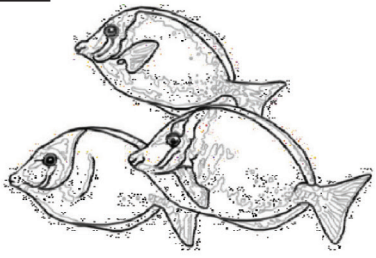
Scavenger (S)	Detritivore (D)	Producer (P)	

Note: Some organisms may have more than one role.

Brittle Star: <u>detritivore</u> 	**Sea Cucumber: <u>detritivore</u>**  *Image taken from Wikimedia Commons. Image originally from 1st or 2nd edition of Nordisk familjebok (1904–1926). This image is in the public domain.*
Shark: <u>carnivore/scavenger</u> 	**Snail: <u>herbivore</u>** 
Shrimp (plankton): <u>detritivore/carnivore</u> 	**Limu: <u>producer</u>** 



Sea Urchin: Herbivore 	**Moray eel: Carnivore** 
Blenny: Omnivore 	**Crab: Scavenger/Omnivore** 
Decorator crab: Scavenger/Omnivore 	**Hawaiian lionfish: Carnivore** 
Longnose Butterfly fish: Carnivore 	**Butterfly fish: Omnivore** 
Surgeon fish: Herbivore 	**Bacteria: Micro-Decomposer**