Lesson 3:
Fish Feeding

INTRODUCTION
In this lesson, students will build upon their understanding of coral reef ecosystems by examining the different techniques that three fish use to feed. Goatfish, parrotfish and long nose butterflyfish each live and feed on coral reefs in a different way. Students will look at the different methods through a simulation.

OBJECTIVES
Students will be able to:
- Observe three different coral reef fish eating
- Simulate different feeding methods
- Understand how different characteristics are better suited for different types of food
- Understand how feeding behaviors are indicative of where fish live on a coral reef

CALIFORNIA STATE STANDARDS
Life Science
2.a. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.
2.b. Students know both plants and animals need water, animals need food, and plants need light.
2.c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.
2.d. Students know how to infer what animals eat from the shapes of their teeth (e.g., sharp teeth: eats meat; flat teeth: eats plants)

Investigation and Experimentation
4.a. Draw pictures that portray some features of the thing being described.
4.b. Record observations and data with pictures, numbers, or written statements.
4.c. Record observations on a bar graph.
4.e. Make new observations when discrepancies exist between two descriptions of the same object or phenomenon.

BACKGROUND
Fish have specialized feeding apparatuses that are best adapted for certain types of food. Three examples found on coral reefs include the long nose butterflyfish, parrotfish and goatfish. Long nose butterflyfish are found in areas where corals are abundant. These fish pick in between coral branches with their long snouts. They feed on worms, crustaceans, fish eggs and even the tube feet of sea urchins that live in cracks and crevices. They live alone, in pairs or in small groups consisting of less than six individuals. Adult fish usually live in pairs.

Parrotfish have many teeth that form a parrot-like beak. This beak is used to scrape algae growing on rocks and rubble that once formed the skeletons of living corals.

Adrianne Adam
Moorea Coral Reef Long Term Ecological Research Program
Parrotfish are herbivores, which are important for controlling the abundance of algae on coral reefs. Corals and algae compete for space on a reef, and without herbivores, algae would overgrow and smother corals. In addition, Parrotfish produce much of the sand on coral reefs by scraping and ingesting rocks and coral with the algae, then excreting them as sand. Parrotfish are often found swimming and feeding in small groups.

Goatfish are benthic feeders, using a pair of “whiskers” protruding from their chins to rifle through the sediments and search for food, including worms, crustaceans, mollusks and other small invertebrates. By day, many goatfish will form large, inactive (non-feeding) schools. At night the schools disperse and individual goatfish feed in the sand. Other nocturnal feeders will shadow the active goatfish, waiting patiently for any overlooked morsels.

MATERIALS
“Feeding Behavior” video and a way to play it
For each group of 4 students:
4 Fish Feeding Activity Sheets
1 large tub of sand (enough to cover the bottom)
4 tweezers
4 sets of tongs
4 large magnets
Small blocks
Toothpicks
Paperclips

PREPARATION
Depending on access to materials, this activity can be done by the whole class or one group at a time, while the rest of the class participates in an alternate activity. To prepare, fill a tub with sand and collect the “food” (toothpicks, paperclips and small wood blocks—the “ones” blocks from a set of “base ten” pieces work well) and “mouths” (tongs, tweezers and large magnets). Print enough Fish Feeding Activity Sheets for your class, and familiarize yourself with the “Fish Feeding” video.

*If part if the class is participating in an alternate activity, some excellent art activities and other worksheets are available at Enchanted Learning:

ACTIVITY:
• Review the parts of a coral reef.
• Introduce long nose butterflyfish, parrotfish, and goatfish. Show video of each fish eating, using the “Fish Feeding” video.
• Discuss how these fish eat, using the following types of questions:
  o Where are the fish most often found?
  o Are they found individually or in groups?
  o What is their size, body and mouth shape like?
  o What predictions do you have about the types of food they eat?
• Break students into groups of 4 and allow them to investigate how these fish eat. Each group will have a set of materials, including a tub of sand, a cup of toothpicks, a cup of blocks and a cup of paper clips. The toothpicks, blocks and paper clips will serve as the “food” in the “ocean.” In another container, supply students with a set of “mouths,” including tweezers, tongs and magnets. Pour the “food” into the tub of sand and allow your students to use their “mouths” to explore which is most successful at obtaining different types of “food.”

• While students are conducting the simulation, have them record the number of “food” pieces they pick up with each “mouth” on the Fish Feeding Activity Sheet.

• After some experimentation, students will see that tweezers (long nose butterflyfish) are best suited for the toothpicks (small worms that live in the coral), tongs (parrotfish) are best suited for the blocks (rocks in the sand) and the magnets (goatfish) are best suited for the paper clips (animals hiding in the sand).

• To further illustrate this point, have students use the bottom or back of their Fish Feeding Activity Sheet to create a bar graph that shows the results of the activity, or compile the data and create a class graph.

• Discussion: Focus your students’ attention on how different fish use different external features to live. Which tools in the investigation demonstrated similar types of feeding habits to long nose butterflyfish, parrotfish and goatfish? Why?
Fish Feeding Activity Sheet

Directions: Use tallies to record how many pieces of “food” each “mouth” can pick up.

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