February 2003

SeaWorld/Busch Gardens

Coral Reefs

4-8 Classroom Activities

A Chance of Success

OBJECTIVE

The student will learn about the physical factors that limit where coral reefs develop.

ACTION

1. Lead students in a discussion about what things might limit where coral reefs develop. Ask them to name some of the conditions they know reef-building corals need in order to survive such as right water temperature; clear, shallow water; strong wave action to bring in nutrients. Write these on the board. Explain to students that a site must meet these criteria for a reef to successfully establish and thrive.
2. Show students the die and explain that they'll be playing a game in which they'll all be coral planula (immature coral polyp) in search of a settling site. Each student will roll the die three times, once for each survival factor.
3. Explain that to survive, they must roll one of these numbers when casting the die for that condition: Temperature = 2,3,4,5 (1 too cold, 6 too hot) Substrate/depth =1,2,3,4 (5,6, too deep) Wave action = 4,5,6, (1,2,3, too weak to bring in nutrients)
4. Place the score sheet on an overhead, or have a student keep score on the board.
5. Invite students up one at a time to roll the die. (Or to shorten time, students can work in student groups.) Be sure to state what factor they're rolling for each time. If they get a good number for all three rolls, they qualify for the next round.
6. Gather the qualifying planulas in front of the class for the final round. Ask each student the following questions:
   - What are coral temperature requirements?
   - What are depth requirements?
   - Why do reef-building corals need strong wave action?

   Those students that can answer the questions are the winning polyps.
7. Remind your students that corals release thousands of eggs and sperm, some which develop into planula. Do they think all the planula survive? Why not? Explain that the reproductive process leans toward high numbers to allow for high mortality. Many planula are eaten by marine animals before they settle and attach to the bottom. By producing hundreds of thousands of eggs at a time, a coral polyp increases the chance that one of its offspring will mature and reproduce, the measure of a species' survival success.

DEEPER DEPTHS

Calculate the percentage of planulas that survive each round.

MATERIALS

For each student group or class:

- 1 die
- copy of score card

Score Card

name	water temperature	water depth	wave action

SeaWorld/Busch Gardens

Coral Reefs

4-8 Classroom Activities

What's My Name?

OBJECTIVE

The student will learn to use a dichotomous key to identify a variety of reef organisms.

ACTION

1. Lead students in a discussion about organizing objects into groups based on things they have in common. For example, ask students to describe how books are organized in a library (*alphabetically for fiction, by topic for nonfiction*). Why is it important to have a system to organize books? (*So it's easy for people to find a book.*) What other examples of grouping by similarities can students think of? (*Items in a grocery store, businesses in a phone directory, record collections, etc.*) Explain that biologists also have a system to organize living things. It places organisms into groups that have clear-cut similarities. Ask students to name some of the characteristics of birds and to explain why a fish isn't a mammal. Tell students that there is a scientific method for determining to what group an organism belongs. It's a key that leads you through a series of choices based on your observation of the organism. Eventually, you make a final choice that identifies the organism. Because there are two choices at every step, this system is called a dichotomous key (*di means two, chotomous means branched*).
2. Use an overhead projector to show the picture of the fireworm (card number C) or just hold the card up for the class to see. Demonstrate how the key works by leading the class through two or three steps, but don't identify the creature for them. Read the statements from the key out loud, and let students make the decisions based on their observations.
3. Divide class into groups of four students each. Have students cut out picture cards of organisms and divide them among the members of their group. Each group should select one person to read from the key.
4. One student selects an organism from her/his pile, and the person with the key reads the criteria. All members of the group should agree on whether or not the organism fits the criteria before moving on to the next step of the key.

5. When the organism has been identified, the person whose pile it came from writes its name on the picture and sets it aside. The next person selects a card from his/her pile and the group repeats the steps in keying it out.

6. When all the groups have identified each organism, review their findings as a class. Explain that since they were using only pictures of the animals, their criteria was limited to overall appearance only. If they had the actual organism in front of them, what other criteria could they have used? (size, color, weight, features that may have been hidden in the drawing)

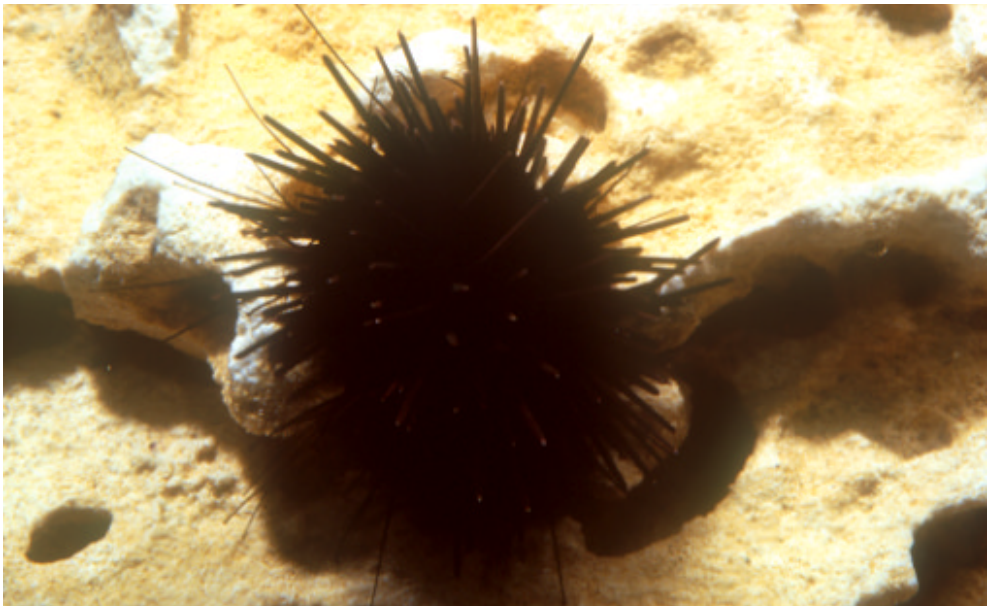
DEEPER DEPTHS

The animals in this activity are invertebrates from the phyla Cnidaria, Mollusca, Arthropoda, Echinodermata, Annelida, and Platyhelminthes. Have the students hypothesize which animals are related. Then have the students do research and determine the characteristics of animals in each of these phyla and identify the phylum for each animal.

MATERIALS

For each student group of four:

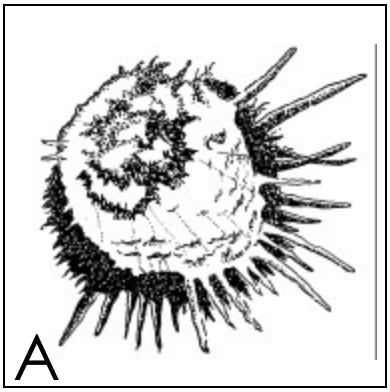
- copy of animal cards
- copy of Coral Reef Animal Key
- pencils
- scissors



Sea urchins are common inhabitants of reef ecosystems.

Coral Reef Animal Key

1. a. long spines: go to 2	
b. very short spines or no spines: go to 4	
2. a. spines all over body: go to 3	
b. spines projecting only from the edge of the shell:	*Atlantic thorny oyster*
3. a. spines are long, thin, and finely pointed:	*long-spined urchin*
b. spines shorter and very thick:	*club urchin*
4. a. stonelike appearance with branches: go to 5	
b. not stonelike: go to 7	
5. a. branches extend horizontally and vertically: go to 6	
b. branches only extend vertically:	*pillar coral*
6. a. blunt, fingerlike branches:	finger coral
b. broad, flat branches:	*elkhorn coral*
7. a. transparent: go to 8	
b. not transparent: go to 9	
8. a. numerous, fine tentacles line edge of round body:	*moon jelly*
b. two hairlike tentacles trail behind oval body:	*comb jelly*
9. a. five to six distinct arms: go to 10	
b. no distinct arms or more than six arms: go to 11	
10. a. slender, whiplike arms, spines project from sides of arms:	*brittle star*
b. thick, fingerlike arms with blunt tips:	*comet star*
11. a. numerous tentacles: go to 12	
b. few or no tentacles: go to 13	
12. a. tentacles long, slender, and fine-tipped:	*corkscrew anemone*
b. tentacles short and blunt-tipped:	*sun anemone*
13. a. wormlike: go to 14	
b. not wormlike: go to 16	
14. a. tufts of bristles along both sides of body:	*fire worm*
b. no bristles: go to 15	
15. a. thick, tubelike body resembling a cucumber:	*soft sea cucumber*
b. flat, ribbonlike body with smooth edges: polyclad flatworm	
16. a. hinged shell with zigzag shell opening:	*Frons oyster*
b. no hinged shell: go to 17	
17. a. round body shape: go to 18	
b. body shape not round: go to 19	
18. a. five pointed star on surface:	*heart urchin*
b. groves form wavy pattern on surface:	*brain coral*
19. a. crablike with prominent front claws:	*swimming crab*
b. not crablike: go to 20	
20. a. legs: go to 21	
b. no legs:	*trumpet triton*
21. a long antennae: go to 22	
b short, flat antennae:	*Spanish lobster*
22. a. no spines on body:	*rock lobster*
b. spines on body:	*spiny lobster*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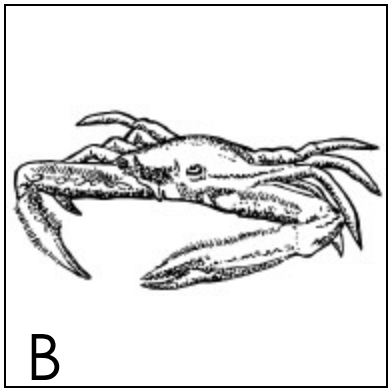
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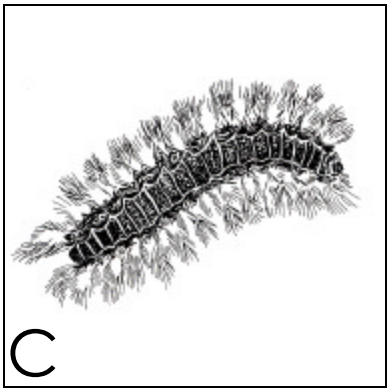
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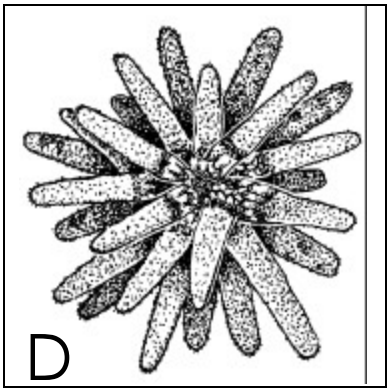
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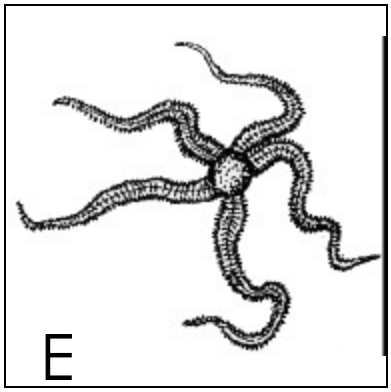
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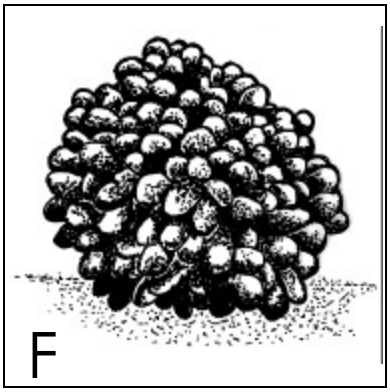
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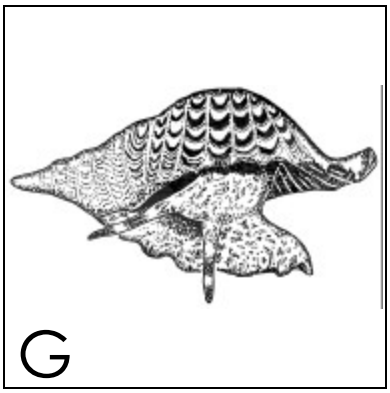
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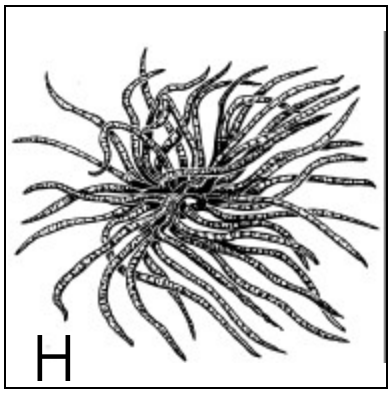
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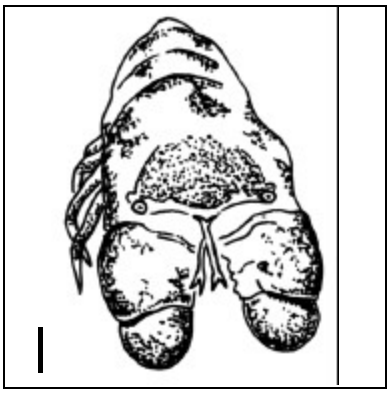
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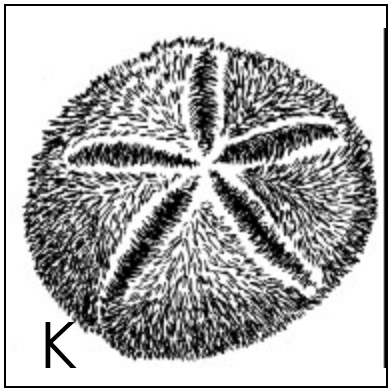
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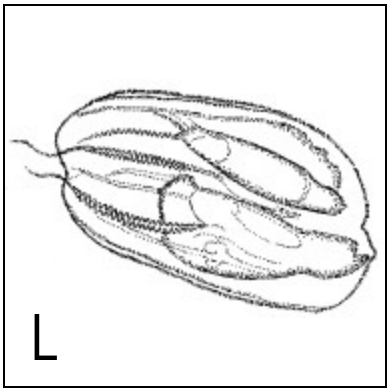
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