Coral Constructors

Photo: FGBNMS//Drinnen

Acknowledgement

This activity has been adapted from Shedd Aquarium's Coral Reefs Activity Guide for Grades 3-5 *that is no longer in publication.*

Grade Level

3-12

Timeframe

45 Minutes

Materials

- Lego® building bricks
- 1 large, flat Lego® base sheet
- 1 hand towel
- Coral Shape images

Photo: FKNMS/Precht

Activity Summary

This activity compares coral growth with building construction to help students understand the benefits of different coral shapes for survival.

Learning Objectives

Students will:

- build replicas of different coral colony shapes
- test their replicas to see how well they withstand wave action
- understand some of the challenges coral colonies face for survival

Background Information

Coral reefs are like city skylines, made up of shapes from tall narrow skyscrapers, to sturdy squat structures, and everything in between. These shapes are adaptations that help them compete for the limited resources of the reef.

Since sunlight is essential for reef-building corals to grow, the quest for light affects the shape of coral colonies and how they grow. Branching corals, such as Elkhorn and Staghorn, grow close to the surface to capture sunlight from every angle possible. Plate corals often live in deeper water and fan out to capture any rays of light that may penetrate the depths.

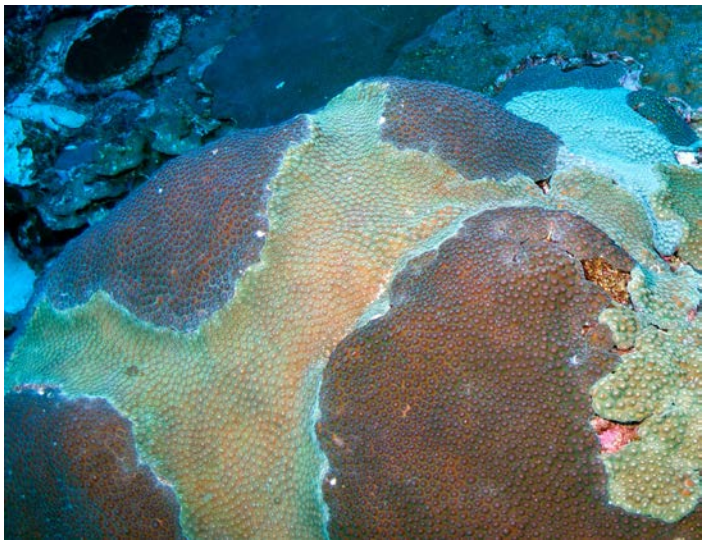

Photo: FGBNMS/Schmahl

Another factor determining the shape of coral colonies is the challenge of withstanding ocean waves and storms. Corals growing near the surface are more susceptible to wave action than those found in deeper water. Corals found in shallow waters tend to break more easily but are also able to recover from damage quickly because they are relatively fast growing.

If a piece of coral breaks off, its ability to continue growing depends on where it lands. In some ways, breakage can be beneficial as it helps the coral to spread and form new colonies.

Sturdy boulder-shaped corals, such as brain corals, withstand rough seas better but also grow more slowly.

Although corals look passive, they can be very aggressive when it comes to competing for space with colonies of other species, or even different colonies of the same species.

Fast-growing species tend to grow upward and then branch out, shadowing their neighbors. Other corals actually attack the neighboring colonies with their stinging tentacles or with special long filaments that digest “enemy” polyps. Large, slow-growing corals tend to be more aggressive, but both strategies have their advantages.

More information about coral biology is available at http://flowergarden.noaa.gov/education/coralbasics.html

Procedure

1) Review information about reef-building coral biology and the corals’ need for sunlight.
2) Share images of different coral colony shapes and discuss how these shapes might have developed to help them access light.
3) Explain that individual coral polyps, like bricks in a wall, are the building blocks of the reef. Like bricks, it takes many coral polyps to create a large structure, and the bigger the structure the longer it takes to build.
4) Create groups of four to six students. Give each group photographs of a variety of coral species and a pile of Legos®.
5) Using Lego® bricks to represent the coral polyps, ask students to build different coral colony shapes. Encourage each student within a group to build a different colony shape. Remind students that the shape is what is important, not the color of the bricks used.
6) Allow time for colony construction, then collect finished colonies and place them on the Lego® base sheet to create a reef.
7) Once the reef is formed, ask students how they think reefs might stand up to wave action, especially strong waves created by storms. Ask them to predict which coral shapes are most likely to sustain damage from wave action.
8) Simulate wave action on the reef by passing the hand towel back and forth across the reef. Observe what happens.

Photo: FGBNMS/DuPuy

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Vocabulary

Adaptation – An alteration of form or function that makes an organism better fitted to survive in its environment.

Boulder – A large rock, often with a rounded shape, that is too big to be moved by a person.

Branching – Having several structural limbs or offshoots.

Coral Colony – A group of genetically identical interconnected coral polyps and the external skeleton that they create.

Encrusting – Growing across the surface of another structure and taking its shape

Plate – A thin, relatively flat shape.

Discussion

Discuss the reasons some shapes break while others do not.

1. *Does it matter which direction the waves come from?*
2. *Does it matter where colonies are positioned on the reef?*
3. *How does this compare to building construction and what happens to buildings in a strong wind storm, such as a hurricane or tornado?*

Point out that there is no ideal design for coral. Each species has developed strategies for growth and survival, and each plays an important role on the reef.

Education Standards

National Education Standards - Science	3-LS3.A Heredity: Inheritance and Variation in Traits 3-LS4.C Biological Evolution: Unity & Diversity 4-LS1.A From Molecules to Organisms: Structures & Processes MS-LS2.A, HS-LS2.A Interdependent Relationships in Ecosystems
Texas Essential Knowledge & Skills (TEKS) - Science	3.3C Represent the natural world using models. Identify their limitations. 3.10A Explore how structure and functions of plants and animals allow them to survive in a particular environment. 4.3C Represent the natural world using models. 4.10A Explore how adaptations enable organisms to survive in their environment. 5.10A Compare the structures and functions of different species that help them survive. 6.3B Use models to represent aspects of the natural world. 6.3C Identify advantages and limitations of models. 7.3B Use models to represent aspects of the natural world. 7.3C Identify advantages and limitations of models. 7.8A Predict and describe how different types of catastrophic events impact ecosystems. 7.13A Investigate how organisms respond to external stimuli found in the environment. 8.3B Use models to represent aspects of the natural world. 8.3C Identify advantages and limitations of models. Aquatic Science.10B Compare and describe how adaptations allow an organism to exist within an aquatic environment. Aquatic Science.12A Predict effects of thermal changes from humans on the living and nonliving components of an aquatic ecosystem. Biology.12B Compare variations and adaptations of organisms in different ecosystems. Biology.12F Describe how environmental change can impact ecosystem stability.
Ocean Literacy Principles	5. The ocean supports a great diversity of life and ecosystems. (a, d)
Climate Literacy Principles	3. Life on Earth depends on, is shaped by, and affects climate. (a) 7. Climate change will have consequences for the earth system and human lives. (c)

Related Links

Flower Garden Banks National Marine Sanctuary (FGBNMS)
http://flowergarden.noaa.gov

FGBNMS Education Lessons & Activities, including this lesson and the Coral Shape images
http://flowergarden.noaa.gov/document_library/eddocuments.html

Coral Basics
http://flowergarden.noaa.gov/education/coralbasics.html

National Marine Sanctuaries
http://sanctuaries.noaa.gov

For More Information

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Acknowledgement

This lesson was originally developed by Shedd Aquarium and appeared in their *Coral Reefs Activity Guide for Grades 3-5* published in 2000. This is a modified version of the activity as it has been adapted by Flower Garden Banks National Marine Sanctuary, with approval from Shedd Aquarium.

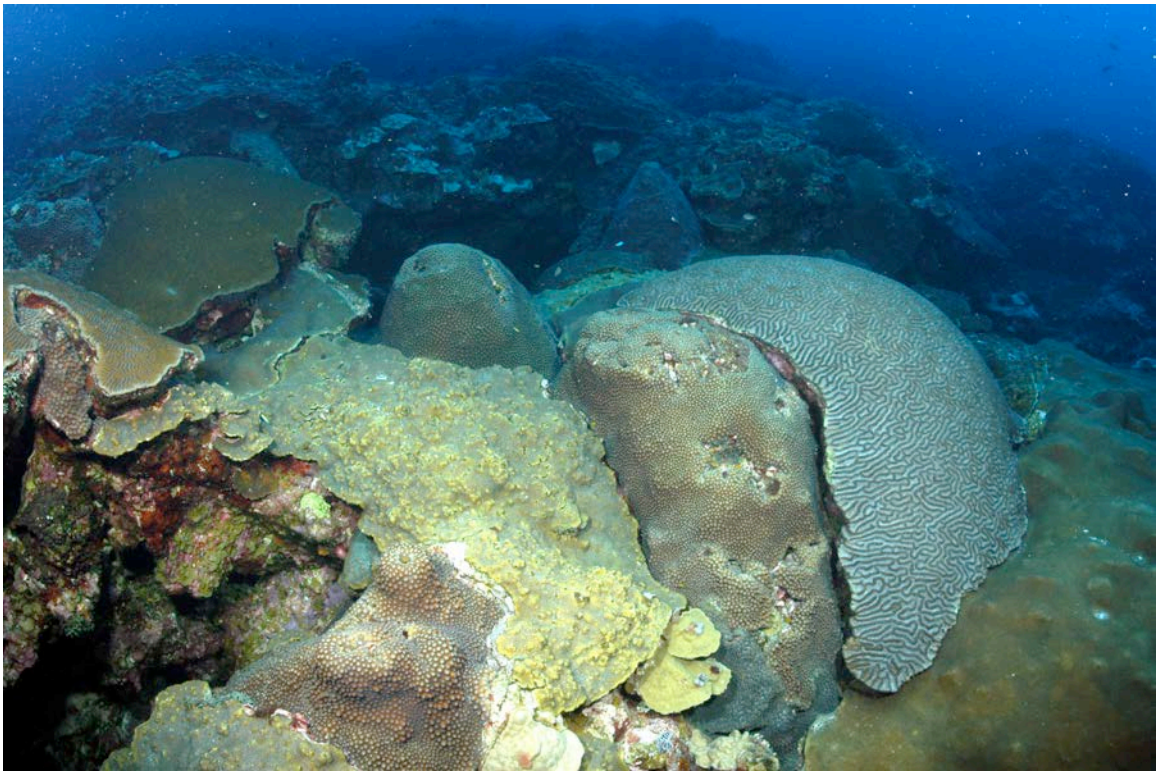

Photo: FGBNMS/Schmahl