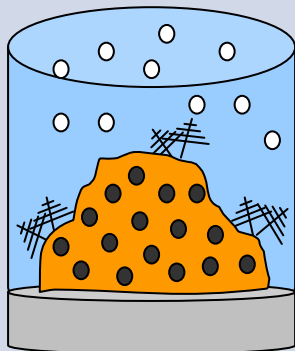


## Education

# Coral Spawning Globe



### Grade Level

- 5-8

### Timeframe

- 30-60 minutes

### Materials (makes 24 globes)

- 24 plastic jars with screw on lids (8-10 oz. size)
- Oil-based modeling clay
- Watercolor paintbrushes with narrow handles (or other blunt ended tools of similar size)
- 24 bump chenille stems
- Scissors or wire cutters
- Large mixing container (8 quarts or larger)
- 24 cups water
- 8 tsp. (4 packets) Knox Original Gelatin (unflavored) – other brands may produce different results
- Spoon
- Blue food coloring
- 24 Tbsp. plastic stuffing pellets
- Teflon tape (used by plumbers)



### Activity Summary

This activity models the appearance of the mass coral spawning event that takes place at Flower Garden Banks National Marine Sanctuary every August. The result is like a snow globe in which the “snow” floats up instead of down, and the scene is a model of a coral reef, complete with Christmas tree worms.

### Learning Objectives

Students will be able to:

- Model the boulder-like coral structures of Flower Garden Banks National Marine Sanctuary;
- Identify some of the animal species that live on the reef;
- Explain how corals release reproductive bundles during mass spawning events and what happens to the resulting larvae; and
- Identify the proper conditions for reef-building coral growth.

### Background Information

Every year, 7-10 days after the full moon in August, the corals at Flower Garden Banks National Marine Sanctuary have a mass spawning event. Each night, corals release their sperm and egg bundles into the water in large quantities, creating an underwater “snowstorm.”



Once the bundles float to the surface, they break open and fertilization takes place. The resulting planula larvae (baby corals) float with the currents as they develop over the next few weeks, until they become heavy enough to sink and settle on the bottom. Those that are fortunate enough to land in an area with the proper conditions will mature into coral polyps (individual animals) that will then reproduce asexually by splitting or budding to form a coral colony.

Optimal growing conditions for reef-building corals include:

- A hard surface for the polyp to attach and anchor itself against currents and waves
- Warm water (68-84 degrees Fahrenheit)
- Clear, sunlit water so that the symbiotic algae (zooxanthellae) that live in the corals' tissue can produce food through photosynthesis
- Moving water to bring a supply of microscopic plankton to the corals as a secondary food source

## Preparation

- Download coral spawning video from [http://flowergarden.noaa.gov/image\\_library/spawnvideo.html](http://flowergarden.noaa.gov/image_library/spawnvideo.html)

- Learn more about coral spawning at <http://flowergarden.noaa.gov/education/coralspawning.html>
- Gather materials
- Prepare liquid:\*\*
  - Sprinkle gelatin over 6 cups of cool water in mixing container.
  - Bring remaining 18 cups of water to a boil, and then add it to the contents of the mixing bowl.
  - Stir mixture until gelatin is thoroughly dissolved, then allow it to cool completely.
  - Add a few drops of blue food coloring and stir until color is uniform.

\*\*Plain water may be used, but the plastic pellets will float to the top more quickly. The gelatin mixture helps slow them down just a bit.

## Procedure

Show video footage of the mass coral spawning at Flower Garden Banks National Marine Sanctuary. Talk to students about how and why this occurs, or have them research the topic, using information available from the sanctuary website. Once students have a basic understanding of the process, invite them to create their own models of the spawning reef.

Have each student:

1. Use various colors of modeling clay to create a small reef of boulder corals on the inside of each jar lid. Press firmly around the outer edges to make it adhere firmly to the lid.



## Vocabulary

**ASEXUAL REPRODUCTION** – A method of reproduction which produces an offspring that is a clone of the parent organism.

**GAMETES** – Reproductive cells, such as sperm and eggs, that unite and develop into a new organism.

**SEXUAL REPRODUCTION** – A method of reproduction involving the fusion of a male and a female gamete to form genetically different offspring.

**SPAWNING** – Depositing gametes into the water for the purposes of reproduction.

2. Use the handle end of a paintbrush (photo on previous page) to poke shallow holes into the “corals” to represent the individual coral cups found on the surface of a coral colony.



3. Cut a chenille stem (photo above) apart between each of the fluffy segments. Fold each chenille segment in half and press the folded end into the “reef” at various intervals to represent Christmas tree worms (3-4 per reef).
4. Fill jar with the blue liquid prepared by the teacher. Leave room for displacement by the coral colony.
5. Add 1 Tbsp. of plastic pellets to the jar. These represent the sperm and egg bundles released by corals during sexual reproduction.
6. Screw the lid onto each jar, with the reef attached. The reef will now be hanging upside down.

7. Check the liquid level in each jar. Remove or add liquid as necessary to make sure each jar is full.
8. With jar firmly on table, remove the lid and place a single layer of Teflon tape around the top edge of the jar, covering the screw threads (this will help prevent leakage). Screw the lid onto the jar for the final time.



9. Shake up the jars and turn them upside down so that the lids are resting on the table. The plastic pellets should rise from the “reef” to what is now the top of the jar, just as the reproductive bundles do during a mass spawning event at Flower Garden Banks National Marine Sanctuary.





## Closing

Have students brainstorm the benefits and drawbacks of mass spawning as a reproductive strategy. For example, since coral are not mobile, mass spawning allows for mixing with gametes from corals of the same species that would otherwise be too far away. On the other hand, reproductive material floating in the water is good food for a variety of organisms and vulnerable to other threats. Many of the gametes will be eaten or otherwise removed from the gene pool.

## Extending the Lesson

Learn about other organisms, both plants and animals, which use a mass spawning strategy for reproduction.

## Related Links

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

FGBNMS Education Lessons & Activities  
[http://flowergarden.noaa.gov/document\\_library/ed\\_documents.html](http://flowergarden.noaa.gov/document_library/ed_documents.html)

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

## For More Information

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## Acknowledgement

This lesson was developed by NOAA's Flower Garden Banks National Marine Sanctuary.

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## Education Standards

National Education Standards	<a href="#">Science</a> : NS. 5-8.3 Structure and function in living systems; Reproduction and heredity; Populations and ecosystems; Diversity and adaptations of organisms
Texas Essential Knowledge and Skills (TEKS) - Science	5.3C Develop a model that represents how something works or looks that cannot be seen 5.10A Compare the structures and functions of different species that help them live and survive 6.3B, 7.3B, 8.3B Use models to represent aspects of the natural world 6.3C, 7.3C, 8.3C Identify advantages and limitations of models 6.12D Identify the basic characteristics of organisms that further classify them in the currently recognized Kingdoms 6.12E Describe biotic and abiotic parts of an ecosystem in which organisms interact 7.10B Describe how biodiversity contributes to the sustainability of an ecosystem 7.13A Investigate how organisms respond to external stimuli found in the environment 7.14B Compare the results of uniform or diverse offspring form sexual reproduction or asexual reproduction
Ocean Literacy Principles	5.The ocean supports a great diversity of life and ecosystems (a,d)