

KIDS ENVIRONMENTAL LESSON PLANS

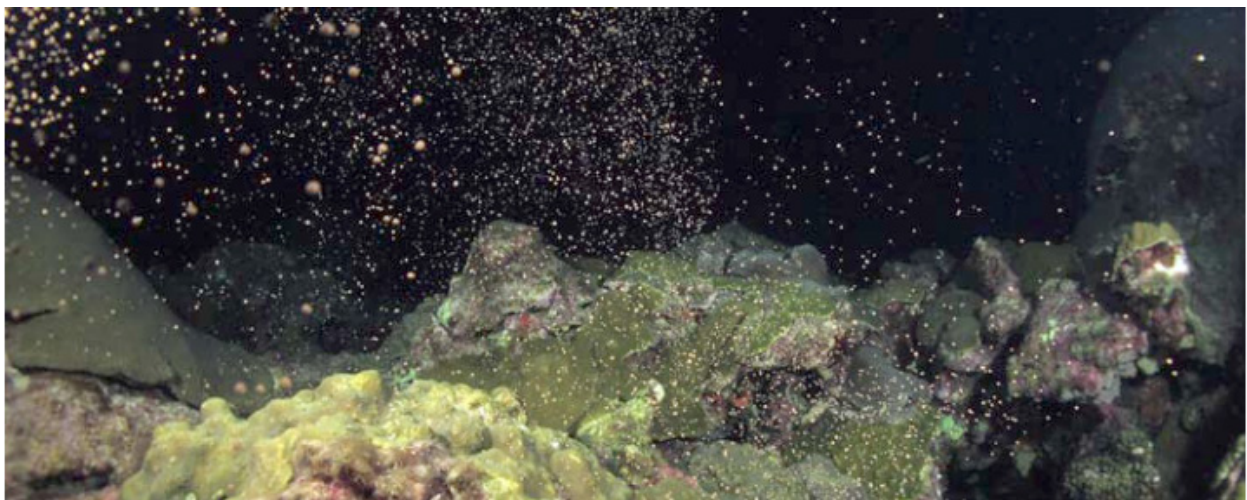
This lesson plan developed by:



Coral Spawning Globe

Overview:

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.



Ocean Literacy Principles:

- 5. The ocean supports a great diversity of life and ecosystems
- 7. The ocean is largely unexplored

**Key Concepts:**

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

Materials:

Makes 24 Globes:

- 24 plastic jars with screw on lids (8-10 ounces in size)
- oil-based modeling clay
- watercolor paintbrushes with narrow handles (or other blunt ended tools of similar size)
- 25 bump chenille stems
- scissors or wire cutters
- large mixing container (8 quarts or larger)
- 24 cups of water
- 8 tsp Knox Original Gelatin (unflavored) – other brands may produce different results
- large spoon
- blue food coloring
- 24 tbsp plastic stuffing pellets
- Teflon tape (used by plumbers)

Set-up Prior to Activity:

Prepare liquid

- Sprinkle gelatin over 6 cups of cool water in mixing container
- Bring the 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

Duration:

30-60 minutes

Physical Activity:

Low

Background:

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



Vocabulary:

- **asexual reproduction:** a method of reproduction which produces an offspring that is a clone of the parent organism
- **sexual reproduction:** a method of reproduction involving the fusion of a male and a female gamete to form genetically different offspring
- **gametes:** reproductive cells, such as sperm and eggs, that unite and develop into a new organism
- **spawning:** depositing gametes into the water for the purposes of reproduction

Activity:

1. Use various colors of modeling clay to create a small reef of boulder corals on the inside of each jar lid. Press down firmly around outer edges to make it adhere firmly to the lid.
2. Use the handle end of a paintbrush 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 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 to 4 per reef).



Coral Spawning Globe (cont.)



4. Fill jar with the blue liquid (prepared earlier). Leave a little bit of 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 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.



Coral Spawning Globe (cont.)

**Discussion:**

1. Have students brainstorm the benefits and drawbacks of mass spawning as a reproductive strategy. For example, since corals 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.
2. Learn and discuss other organisms (both plants and animals) that use a mass spawning strategy for reproduction.

Additional Resources:

Coral Spawning Videos and Information:

http://flowergarden.noaa.gov/image_library/spawnvideo.html

<http://flowergarden.noaa.gov/education/coralspawning.html>

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