

3rd Grade: Marine Science

Ocean in a Bottle: Exploring Marine Layers and Currents

Goals: Understand the concept of ocean layers and how they differ in temperature and density. Learn how ocean currents work and why they are important in marine ecosystems. Engage in hands-on science while fostering creativity and critical thinking

Objective: Students will create their own "ocean in a bottle" to explore how ocean layers, density, and currents work. They'll learn about the different layers of the ocean (surface, deep ocean) and how currents move water around the world.

Materials (for each student/group):

- Clear plastic bottle with a cap (empty 16 oz water bottle)
- Blue food coloring
- Vegetable oil
- Water
- Glitter or small fish-shaped sequins (optional for marine "life")
- Funnel

Activity Steps:

1. Introduction to Ocean Layers (5 minutes):

Briefly discuss the layers of the ocean with the class

- Surface Layer: Warmer, less salty water that's affected by wind and sunlight.
- Deep Ocean: Colder, saltier water where sunlight doesn't reach.
- Explain that currents, like rivers in the ocean, help mix the water between layers.
- Ask questions like, "Why do you think some animals live near the surface and others live deep down?"

2. Preparing the Ocean in a Bottle (8 minutes):

- Step 1: Fill each bottle about halfway with water using a funnel.
- Step 2: Add a few drops of blue food coloring and stir with a stick to make the water represent the ocean.
- Step 3: Carefully pour vegetable oil on top of the colored water (about $\frac{1}{4}$ of the bottle) to represent the less dense surface water layer. The oil will float on top of the water, forming two layers.

3. Adding Marine Life and Currents (7 minutes):

- Step 4: If you have small fish-shaped sequins or glitter, students can sprinkle them into the bottle to represent marine life moving between layers.
- Step 5: Seal the bottle tightly with the cap.
- Step 6: Have the students gently tilt or rotate their bottles. They'll see how the water and oil move differently, representing how ocean layers and currents behave in real life (oil and water don't mix, and denser water stays below the surface layer).

4. Ocean Current Challenge (5 minutes):

Divide the class into small groups. Give each group one bottle and ask them to make their "ocean" move in different ways to simulate ocean currents. Can they create waves, swirls, or see how the glitter moves differently in each layer?

Ask the groups to observe:

- How does the oil (surface water) move differently from the blue water (deep ocean)?
- What happens when they tilt or swirl the bottle?

5. Discussion and Wrap-Up (5 minutes):

- Ask the students what they learned about ocean layers and currents from the experiment.
- Discuss how different marine animals live at different depths in the ocean, and how currents help distribute nutrients.
- Ask, "Why is the deep ocean so much colder than the surface?" and "How do you think marine animals move in these layers?"