

DENSITY STRATIFICATION AND OCEAN CIRCULATION

Materials

For each student:

- Plastic tub of hot tap water
- Food coloring
- 1 cup of iced water (or dyed ice cubes)
- 1 cup of salty ice water (or dyed salty ice cubes)
- Piece of paper
- Colored pencils

National Standards

A: Science as Inquiry

In this activity students explore what happens when cold water and warm water and fresh and saltwater come together.

Background

Antarctica plays a key role in ocean circulation. When water gets colder the molecules of water get closer together and become more packed or dense. As cooler water sinks the warmer water from below moves up and take its place. This is called upwelling. During the process of upwelling lots of nutrients rise to the surface and provide food for plankton and zooplankton. In Antarctica, as seawater freezes the remaining water increases in salinity and becomes more dense. This cold dense water will sink and is replaced by warmer surface water. This salty, very cold water is a major influence of world ocean currents and is known as Antarctic bottom water. Therefore, this activity will allow students to explore how salinity and temperature of water affects its density and subsequently its movement.

Procedure

1. Slowly pour fresh iced water into warm water.
2. Observe what happens.
3. Draw and describe the event with colored pencils.
4. Next, pour salty iced water into warm water.
5. Draw and describe the event with the colored pencils.
6. Can you see any differences between your first and second drawings? Why?