Water Currents

Age: Middle School

Objective

- **To gain an understanding or how ocean currents are influenced by changes in water density**
- **To observe how temperature and salinity affect water density**

Background Lesson

Earth's oceans are salty and, in general, cold. The majority of the water in the oceans is less than 2.2ºC or 36ºF. In tropical regions, the surface water may reach 28ºC (82ºF). The difference in water density associated with temperature and salinity play a vital role in the shaping of ocean currents.

The Activity

Materials:

- **Food colouring**
- **Ice cube tray**
- **Small aquarium**
- **Salt**
- **Small cup**
- **Hot tap water**

Procedure

1. **Before you are ready to begin the experiment you need to add a small amount of food colouring to a half cup of water. Pour the coloured water into an ice cube tray to make a few coloured ice cubes. Make sure that the colour of the water is fairly dark.**
2. **Fill the aquarium to the rim with room temperature water. Let it stand for a short period of time to let the water settle before the experiment begins.**
3. **Place a coloured ice cube gently on the surface of the water in the tank and observe. Record your observations. Once the ice cube has completely melted, disturb the tank (ie. Stir or shake gently) and record your observations.**
4. **Describe your findings and explain why this happened.**
5. **Empty the aquarium and refill a second time with room temperature water**
6. **Fill the small cup to the top with hot tap water. Add drops of food colouring to the cup until the colour of the water is very dark.**
7. **Pour the warm coloured water from the cup gently into the aquarium and observe for a minute or two. Record your observations.**
8. **Describe you findings and explain why this happened.**
9. **Empty and fill the aquarium with room temperature water a third time.**

10. **Fill the small cup with room temperature water and add 1-2 teaspoons of salt. Add food colour to the saltwater add until the colour of the water is dark.**
11. **Gently pour the cup of saltwater onto the surface of the aquarium water. Observe and record your observations after one to two minutes.**
12. **Describe your findings and explain why this happened.**

Post Activity Discussion

- **How do warm and cold water currents affect the climate?**
- **Where in nature might you find conditions similar to those in the three different demonstrations? How do they interact with on another?**
- **What are surface currents? What causes surface currents?**
- **What drives ocean currents below the surface?**
- **What is the difference between currents and tides?**
- **How important are ocean currents?**

One Fish at a Time