Name _____ **Lab – Currents**

PROJECT Oceanography

Ocean in Motion

I. Temperature and Density Driven Currents

Key Concepts:

a. ice versus water density
b. ocean waters near the equator are heated by the sun's rays
c. surface (warm) and bottom (cold) water currents

Materials:

a tank, or wide-mouth glass jar
ink or food coloring
ground pepper
water
small containers, or an ice cube tray, to freeze water in
prepared colored ice cubes

Objective: To demonstrate and observe the constant exchange of surface and bottom water currents as related to density.

Method: Fill the tank one-half full with warm fresh water. Sprinkle pepper grains into the water. These will settle to the bottom. Place a colored ice cube in the water.

Discussion Questions:

1. Where does the melting ice water go?

2. If the pepper grains represent material on the ocean bottom, what happens to them?

3. What happens to the cold water as it warms up?

II. Salinity and Density-Driven Currents

Key concepts:

a. mixing of waters with different densities

b. location of different salinity waters in the worlds ocean

Materials:

table salt
two different colors of ink or food coloring
tank or wide-mouthed glass jar
2 glasses of fresh water
a teaspoon
a stirring stick

Objective: To observe and determine how different salinity waters drive currents.

Method: In the first glass, dissolve a small pinch of salt and mix in a few drops of red ink. In the second glass dissolve 4 teaspoons of salt and mix in a few drops of blue ink. Pour the red (low salinity) water into the tank. Slowly and carefully pour the blue (high salinity) water into the tank.

Discussion Questions:

1. What happens to the high salinity water and why?

2. Where would you expect to find the saltiest waters in the ocean and why?

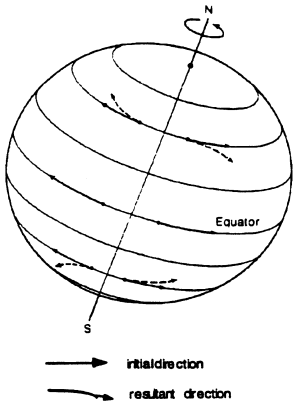
Key Concepts: Demonstrating the Coriolis Effect

a. Coriolis deflection

Materials: Balloon, marker

Objective: The rotation of the earth makes the direction of wind and water flow deflect to the right the Northern hemisphere, and to the left in the Southern Hemisphere. This deflecting force is called the Coriolis Force (Figure 1).

Figure 1.



Method: Draw a line from the pole to the equator. This represents the flow of water (or air) in the absence of the Coriolis force, because the earth (the balloon) is non-rotating. Start the balloon rotating, to represent the rotating Earth. Now try and draw a straight line from the pole to the equator.

Discussion Questions:

1. What happens when you try and draw a straight line on the rotating balloon?