NAME_____

OCEAN CURRENT LAB

INTRODUCTION

Using temperature sensors and buoys that float at fixed depths, scientists have found that water in the oceans is on the move, even in the deepest trenches. The sun powers deep ocean currents. Wind guides surface currents. Ocean currents are essential to life in the sea. They dissolve oxygen from the atmosphere and bring minerals up to the surface, where tiny floating plants can use them. And like the air in the earth's atmosphere, ocean currents help move heat around the globe.

You now know that temperature differences on the earth occur because the sun heats the earth unevenly. The sun is a major force that causes convection currents in the air and cur- rents in the oceans. Temperature and wind are major forces that drive ocean currents. Other factors also affect ocean currents. These include the earth's rotation and the water's density. For example, salt dissolved in ocean water will cause the water to be heavy and to sink.

In this lesson, you will investigate the effects of temperature and wind on ocean currents. You will also investigate how these currents affect the climate throughout the entire world.

OBJECTIVES FOR THIS LESSON

Investigate the effect of water temperature on the way water moves.

Investigate the effect of wind on surface currents.

OCEAN CURRENTS

The waters of the ocean move in streams called currents. A current results when a fluid, either gas or a liquid, moves in a definite direction. Ocean currents form in response to many factors: heat from the sun, wind, salinity (saltiness), land masses acting as barriers, and the rotation of the earth. Some currents are strong enough to affect the speed and direction of ships. Others bring drastic weather changes to faraway lands.

In the 18th century, Benjamin Franklin made some of the earliest studies of ocean currents. From first-hand experience, he knew that ships crossing the North Atlantic from America were either helped or hindered by a current flowing in a northeasterly direction toward Europe. Franklin investigated the temperature of the current. He found that it was warmer than the water around it. Instead of mixing with the surrounding water, the current moved along like a river within the ocean. The boundary between the warm and the cold water was sharp. Franklin discovered how sailors could use thermometers to guide their ships into the current or out of it.

Why do you think the warm water moved in a northeasterly direction? What might have caused the sharp boundary between the warm water and cold water? Think back to earlier lessons on how air moves. Try to apply some of the things you have learned about air currents to what you will learn in this lesson about ocean currents.

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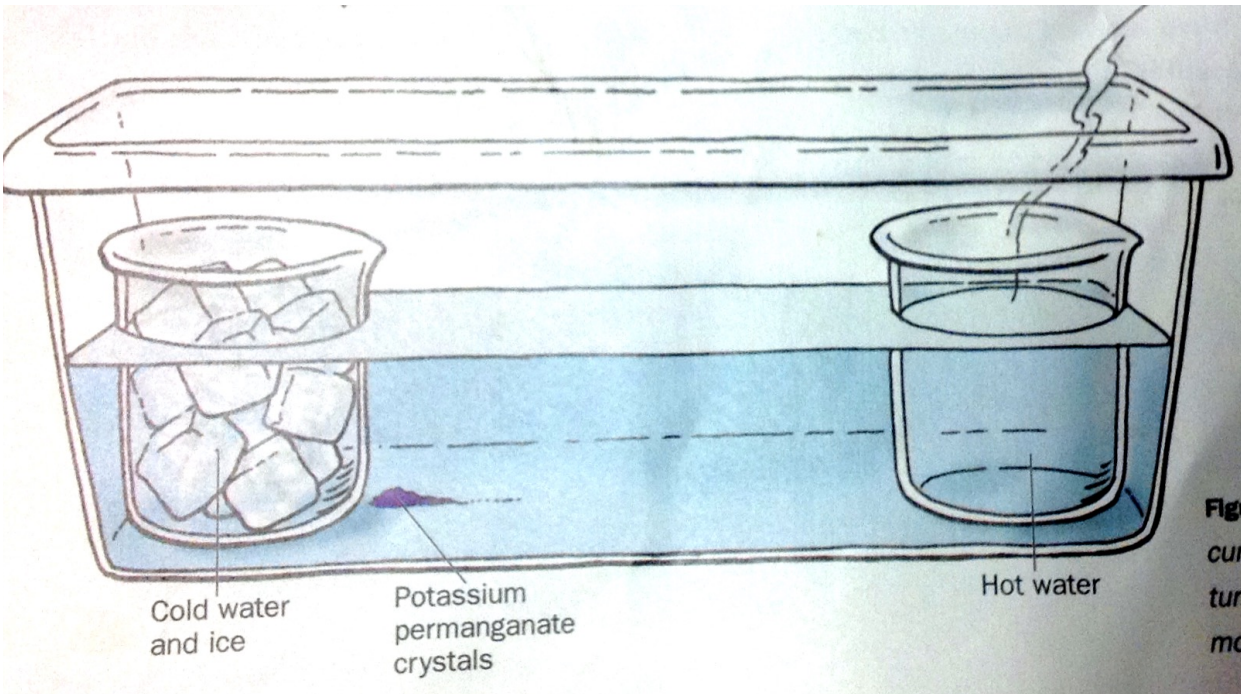
Part 1

Gather the following materials

1. Fill a plastic container with water to about 4 inches.
2. Fill 1st beaker with ice and place at one end of the of the plastic container
3. Fill the 2nd beaker with hot water and place at the opposite end of the plastic container.
4. When your set up looks like the picture below inform Mr Brennan he will give you a spoon of Potassium Permanganate Crystals.
5. He will place the PMC near the Ice.
6. Looking from the side of the container watch the movement of color and crystals in the water. Record your observations.

Set up the following model at your table.



Write your observations in the space below. Look from the side of the model.

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In the box below draw a labeled diagram of how the crystals moved in the model.

1. How did the water move?

2. What happened once the crystals moved close to the hot water?

3. When the crystals moved back towards the ice why did they sink?

4. Which is more dense:hot water or cold water? What evidence do you have?

5. Which climate factor did we observe?

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6. What controls how the ocean currents move?

7.Which process initiates the movement of water, surface water currents or deep-ocean currents?