Teacher Sheet

LAB ACTIVITY:
EXPLORING CONVECTION CURRENTS

OBJECTIVE: Students will:

- Construct models to demonstrate the principle of convection,
- Use their observations to explore the role convection plays in the development of atmospheric circulation and ocean currents.

MATERIALS: (Note: this activity can be done as a demonstration or in individual groups of 3-4 students.)

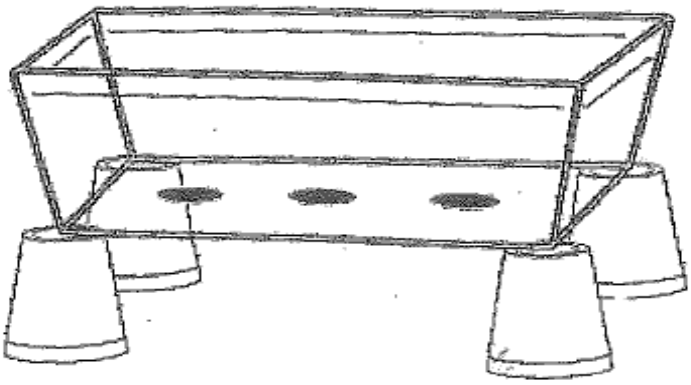
Per Lab Group	Shared Materials
1 Clear Plastic Box 1 Beaker, 50 ml 1 Wood Block 2 Eye droppers 6 Styrofoam Cups 8 Plastic Lids (spacers) 1 Plastic Spoon Student Lab Sheets	Food Coloring (blue) Salt Water (hot and cold) Ice Cubes Graduated Cylinder, 100 ml Colored Pencils Periodic Table

PROCEDURE:

Setup A:

1. Fit two plastic lids on each of 4 Styrofoam cups. Set the clear plastic box onto the four Styrofoam cups as shown in the FIGURE 1.
2. Carefully fill the box with cold tap water to within 3-4 cm from the top. Let the water calm before proceeding.
3. Using the eyedropper, carefully place 3 spots of red food coloring on the bottom of the box as shown in FIGURE 2. Insert the dropper all the way down to the bottom of the box before squeezing out the dye. Each spot should be about 2-4 cm in diameter. Try to minimize disturbing the water as you insert and remove the dropper.

FIGURE 1:

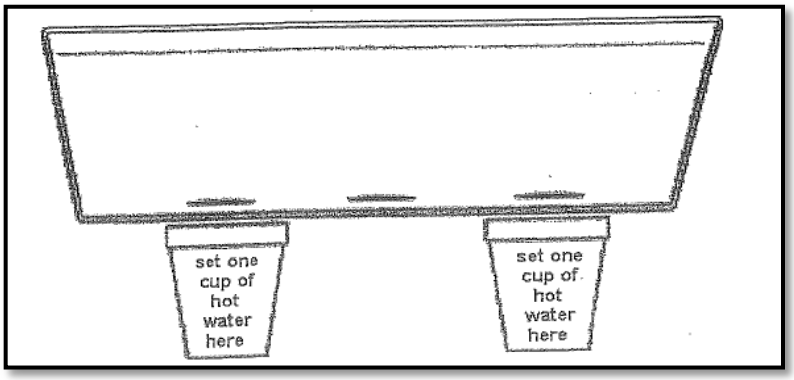


4. Fill one empty Styrofoam cup with hot water and then carefully position it beneath the center dye spot. The plastic lid spacers you fitted on the corner cups should provide you with enough clearance to gently slide the cup with to water under the spot.
5. Now position yourself so that you can view the box from the side at eye level, and observe what happens to the 3 spots over the next 5 minutes. **Be sure to look for changes in all 3 spots.**
6. Sketch what you observed in **DIAGRAM 1** on **Student Sheet 2**. Use arrows to show the direction of flow.
7. Carefully empty the water into a sink, and begin **Setup B**.

SETUP B:

1. Repeat procedures 1 & 2 from **Setup A** to set up the box one again.
2. This time, fill two cups with hot water and position them beneath the two outside spots. Observe what happens over the next 10 minutes, and then sketch what you observed in **DIAGRAM 2**. Be sure to look for changes in the middle spot. Use arrows to show direction of flow.
3. Carefully empty the water into a sink, and begin **Setup C**.

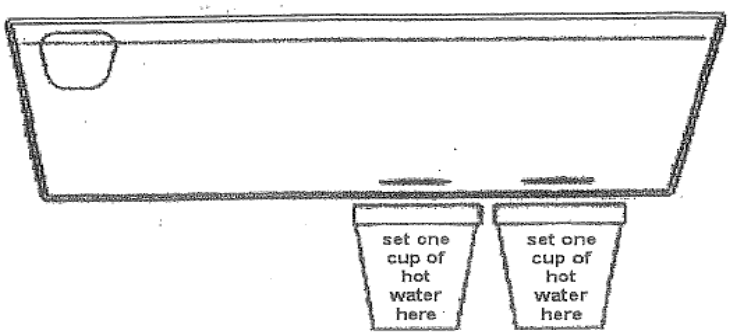
FIGURE 2



Setup C:

1. Set up the plastic box once again as is and fill with cold tap water to within 3-4 cm of the top. Let the water become calm. Next, place two spots of food coloring near one end of the box. Position one cup of hot water beneath each spot.

FIGURE 3



2. Use a plastic spoon to obtain a blue ice cube from your instructor. Carefully set the cube into the water at the opposite end of the box from your dye spots. Use the spoon to steady the cube until it stops moving.
3. Position yourself at eye level with the side of the box, and observe the water as the ice cube melts.
4. Sketch your observations in **Diagram 3**. Use arrows to indicate flow direction.