

Shoebox Currents Lab

Please turn in this assignment

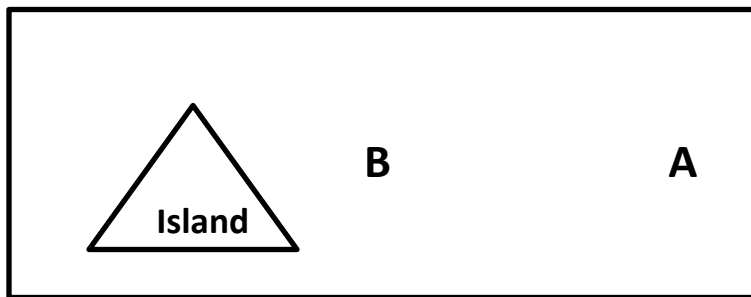
SAFETY PROCEDURES

- Water is used throughout the lab. Place all electronic devices completely away.
- Food coloring dye is used throughout the lab and will stain clothing.
- Store all belongings away from the experimental area.
- Be mindful and careful of the experiment at all times!

DISCLAIMER

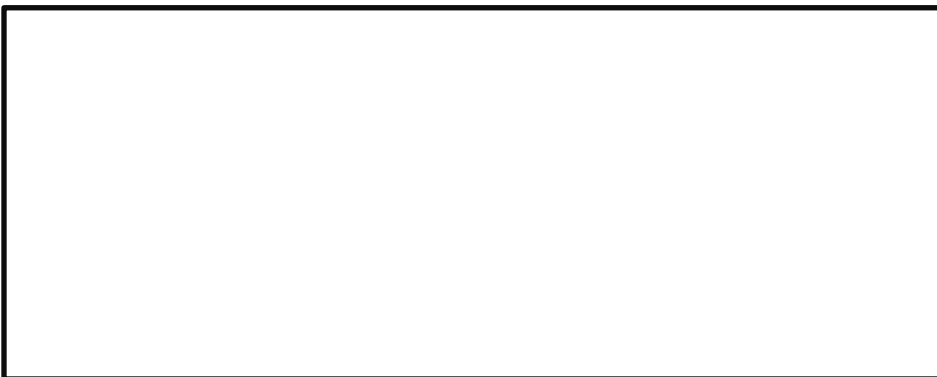
Conducting labs in a safe and responsible manner is expected of ALL STUDENTS. If at any point in the lab you are found to be horse playing or using the materials inappropriately you will be promptly removed from your group's lab project.

Shoebox Diagram:



Part 1 – Warm & Cold Water

1. Mrs. Feldmann will come around with a blue ice cube. Drop the blue **ice cube** gently into the tray at **point A**.
2. Mrs. Feldmann will give you a spoon with warm red dye. Gently dip the **spoon** into the tray at **point B**.
3. Observe where the red and blue food coloring goes by looking through the side of the plastic box. Draw a picture of the side view of the box to show what happened to the cold blue and warm red water. Use colored pencils to indicate where the cold (blue) and warm (red) water travelled.



Key:



Warm



Cold

4. Have one group member gently blow onto the water at point B. Record your observations below:

Part 2 – Salt & Fresh Water

1. Carefully empty the container into a waste water container and return the empty container to your desk.
2. Ask Mrs. Feldmann to refill your container with fresh water at room temperature.
3. Send one group member to retrieve one blue and one red test tube from the front of the room.

Red: Salt Water

Blue: Fresh Water

4. At the same time, gently pour in the blue tube at point A and the red tube at point B. You may rest the used test tubes in the small beaker on your desk.
5. Observe where the red and blue food coloring goes by looking through the side of the plastic box. Draw a picture of the side view of the box to show what happened to the cold blue and warm red water. Use colored pencils to indicate where the fresh water (blue) and salt water (red) travelled.



Key:



Salt Water



Fresh Water

6. Carefully empty the container into a waste water container and return the empty container to your desk.
7. Return the two test tubes to the yellow holding rack at the front of the room.

Discussion Questions

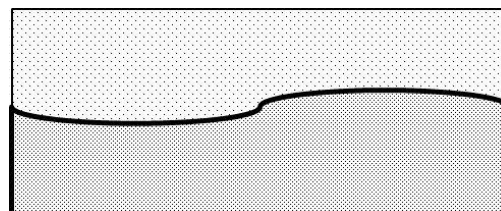
Complete the following discussion questions with your lab group. Write in your responses below after each question.

1. Liquids that are less dense float on top. Liquids that are more dense float on the bottom.

Using your lab observations label the following two diagrams:

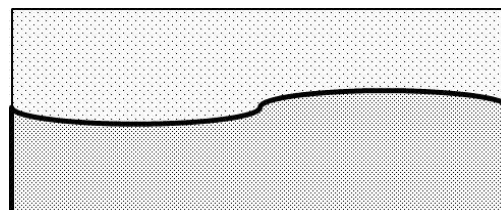
Part 1- Label the:

- (A) Warm Water
- (B) Cold Water



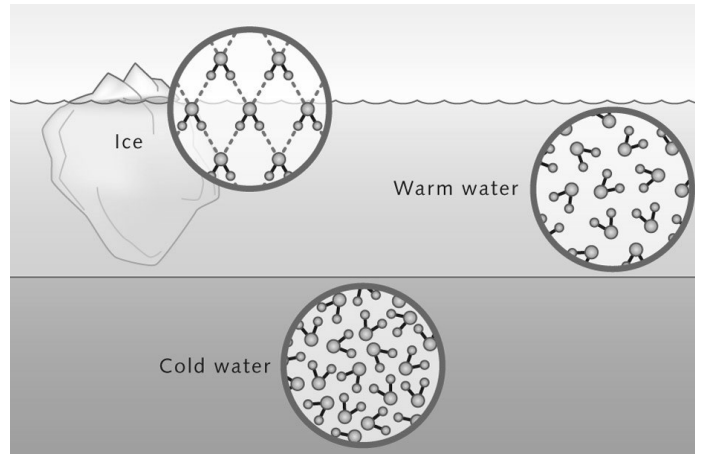
Part 2- Label the:

- (A) Salt Water
- (B) Fresh Water



2. Use your lab observations and the diagram to the right.

How is the density of ocean water affected by temperature?



3. Use your lab observations and the paragraph below on *The Ocean in Motion*

The Ocean in Motion

The ocean water is in motion because of differences in temperature and saltiness. Water that is warmed at the sea surface near the equator moves toward the chilly poles. Cold, salty currents flow into the deepest parts of the sea.

How do ocean currents form?



4. Use your lab observations and other discussion questions to fill in the summary chart below using the provided word bank:

Word Bank

increases	Current	Density Currents	Wind Currents	Heat Transport by Currents
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Summary Chart

Word from Word Bank	Description
	A body of water moving in a definite direction
	Kinetic energy (energy of motion) is transferred from the wind to surface water as a result of the friction between the wind and the ocean surface.
	Movement of ocean water that occurs in depths too great to be affected by surface winds and is generated by differences in water temperature and salinity.
	Ocean circulation transfers heat from the tropics toward the poles, moderating mid- and high-latitude climates.
	The temperature of the ocean decreases as you go to the bottom of the ocean. So, the density of ocean water _____? _____ as you go to the bottom of the ocean.