Name: _____

Teacher:_____

Density & Thermohaline Circulation

Safety Rules:

1. Carefully follow all instructions given by the teacher. Be respectful and responsible.
2. Be careful with science tools, equipment, and supplies. Use them according to instructions and return all supplies at the end of the lab.
3. Report any accidents or spills to the teacher.

Materials:

Split tanks	Red/blue food coloring (5mL)	Fresh water (gatorade bottle)
Warm Water (gatorade bottle)	Stir stick	
Cold Water (gatorade bottle)	Spill tray	Salt water (gatordate bottle)

Vocabulary:

Mass: amount of matter in an object, usually measured in grams
Volume: the amount of space occupied by an object
Density: amount of matter packed in a space.
Thermohaline: Dependent on heat and salt

Step 1 Question:

What is density? How do density differences effect ocean circulation?

Step 2 Research:

Density is determined by dividing mass by volume. As substances heat up, the molecules expand and become less dense. Therefore, hot air and water rises and cold air and water sinks. Similarly, if 1 cup of fresh water is compared to 1 cup of water with salt dissolved in it, there are more molecules in the same volume. Therefore fresh water will rise and salty water will sink. Thus, cold, salty water at the Earth's poles will sink and warm, fresh water from the equator will rise and flow towards the poles. This thermohaline circulation is how Earth's Global Conveyer Belt works.

Step 3:

Draw Fresh water molecules vs. Salt Molecules

Draw a model of Warm water molecules vs. Cold water molecules

Part 1: Density Tank Demonstration.

Question: How does the temperature of water create currents?
Procedures:

1. Pour warm water into one side of the density tank and cold water into the other side. This must be done simultaneously.
2. Add food coloring to each side, blue for cold and warm for hot.
3. Make cause and effect observations:

	Cause **(draw molecule movement)**	**Effect** **(how does food coloring spread)**
Cold Side		
Warm Side		

4. **Consider what will happen when the center divider is released.**

Prediction (Before released)	**Observations (after released)**

Question: How does the salinity of water create currents?

Procedures:

1. Pour salt water into one side of the density tank and fresh water into the other side. This must be done simultaneously.
2. Add food coloring to each side, blue for fresh and red for salt.
3. Make cause and effect observations:

	Cause (draw molecule movement)	**Effect (how does food coloring spread)**
Fresh Side		
Salty Side		

4. **What will happen when divider is released?**

Prediction (Before released)	**Observations (after released)**

Conclusion?

1. What happened when cold and warm water released?

_____

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2. What happened when salty and fresh water was released?

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