Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Date: \_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_

**Ocean Stratification and Debris**

**Materials:**

* 4 baby food jars
* 2 500 mL beakers
* Hot plate
* Blue and red food color
* Glitter
* 3 x 5 cards
* Tray (pie pan or cookie sheet)

**Experimental Procedure:**

1. Warm a 400 mL beaker with water on a hot plate. Continue to heat until the water reaches over 500C but do not let it get too hot, as you want to comfortably hold this beaker. Add 5 drops of red food coloring and approximately half a gram of glitter and stir.
2. Add 400 mL cold tap water to a beaker. Add 5 drops of blue food coloring plus approximately half a gram of glitter and stir.
3. Procedure A: Place a baby food jar in the tray. Pour the blue cold tap water into the baby food jar brim full using the tray to catch any overflow.
4. Fill a second baby food jar with red warm water, brim full like the first jar.
5. Cover the warm red water baby food jar with an index card and **carefully** place it upside down on top of the cold blue water. Make sure the mouths of the jars line up and then **very carefully and slowly** pull out the card. Write your observations.
6. Procedure B: Repeat the experiment in reverse. Place the blue cold water on top of the red hot water. Write your observations.

**Data (qualitative) in complete sentences:**

1. Illustrate Procedure A below. Use color pencils. Include observation of glitter.
2. Illustrate Procedure B below. Use color pencils. Include observation of glitter.

**Analysis:**

1. As molecules warm up they move faster, bumping and bouncing off of each other. How would this affect the space that water takes up? In other words, if you have 50 grams of cold water and 50 grams of hot water, would the space they occupy be the same also?
2. If you have 100 mL of warm water and 100 mL of cold water, are the quantity of water molecules the same? Would this affect the mass of the water? How is this demonstrated with this experiment?
3. If the temperature of the ocean is increasing how might this lead to ocean stratification?
4. What could also occur to the oceans if the temperature is increasing?
5. How did the movement of the glitter compare between the two temperatures? Compare the rate at which they rose and fell.
6. If the glitter represents organic matter or nutrients, what would one expect to be the result of warming oceans?