Name: _____ Class: _____ Date; _____

Expansion and Contraction of Liquids

Learner Outcomes:

- Investigate and describe the effects of heating and cooling on the volumes of different materials

Key Terms:

Expansion Contraction

Question: What happens when heat is applied to different liquids?

Hypothesis:

Materials:

3 large test tubes	3 30 cm glass tubing	Water – blue
3 1 holed stoppers	500 mL beaker	Alcohol – red
	Hot plate	Veg Oil – yellow
	Rubber band	ruler

Procedure:

1. Fill one test tube with colored water (blue), one test tube with colored alcohol (red), and one test tube with vegetable oil. Insert a stopper in each tube so that there are no air bubbles and the liquid rises a few centimeters up the glass tubing.
2. Use a rubber band to keep all three tubes together and place them in a beaker filled about 1/3 with water.
3. Use a marker to record the starting height of the liquid in each of the glass tubes.
4. Heat the water bath for about 5-10 minutes. Be careful not to let the glass tubes overflow. Mark the liquid level in each of the tubes.
5. Remove the beaker from the heat source. Use a ruler to measure the change in height of the liquids in each tube.
6. Repeat steps 3 to 5 but immerse the liquids in a bath of ice water instead.

Observations:

Liquid	**Hot Water** **Change in height (mm)**	**Ice Water** **Change in height (mm)**
Water		
Alcohol		
Veg Oil		

Analysis:

1. What was the manipulated variable in this experiment?

2. What was the responding variable?

3. What variables did we control?

4. Did all of the liquids expand the same amount when they were warmed? If not, which expanded most.

5. Did the liquid that expanded most also contract the most as it cooled?

6. Use the particle theory of matter to explain why some liquids might expand or contract more than others.

7. Which of the liquids tested would be most suitable for making a thermometer that"
    a. Shows small changes in temperature?

    b. Shows large changes in temperature?

Conclusion:

Extension:

Liquid mercury used to be used in many medical thermometers, however it has now been replaced with colored alcohol. What advantages did using mercury have over using alcohol? Why have manufacturers switched to using alcohol instead?