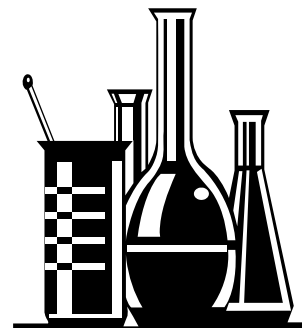


Name: \_\_\_\_\_ Class \_\_\_\_\_ Date: \_\_\_\_\_

## Lab: Thermal Expansion of Liquids.

**Background Information:** As thermal energy is added to an object, its molecules move faster and get farther apart so the object expands. This is called *thermal expansion*. Also, when an object cools, its molecules slow down and get closer together and the object shrinks, or contracts.

**Objectives:** To observe a liquid's properties when thermal energy is added.  
To compare the properties of different liquids.  
To organize and interpret data.



### Hypothesis:

If thermal energy is added to a liquid **then** the liquid will \_\_\_\_\_  
**because** \_\_\_\_\_

**Materials:** (List all materials used) \_\_\_\_\_

In the space below draw a diagram of the apparatus set up.

### Procedure:

1. Set up apparatus as shown in the diagram. FOLLOW ALL SAFETY RULES.
2. Mark the level of each liquid on the glass tube. This mark is your starting point or 0cm.
3. Place each test tube in a buret clamp so that all three tubes can fit into your beaker.
4. Place your beaker on the hot plate.
5. Adjust the height of each test tube so that all are at the same height and just above the bottom of the beaker. Be sure the test tubes are not touching the bottom of the beaker.
6. Add water to the beaker until it reaches the \_\_\_\_\_ ml. mark.
7. Record the starting temperature of the water. This is also the temperature of all your liquids.
8. Turn on the hot plate to \_\_\_\_\_ and begin recording the temperature and liquid levels every 30 seconds for a total of 15 minutes.
9. Create a line **graph of your data**.
10. Write your **conclusion**, answer **all questions** and attach your **summary**.

**Data: Liquid Expansion**

<b>Time</b>		<b>Temperature</b>		<b>Height (in cm.)</b>					
<b>(in seconds)</b>		<b>(in °C)</b>		<b>Liquid 1</b>		<b>Liquid 2</b>		<b>Liquid 3</b>	
<b>30</b>	<b>480</b>								
<b>60</b>	<b>510</b>								
<b>90</b>	<b>540</b>								
<b>120</b>	<b>570</b>								
<b>150</b>	<b>600</b>								
<b>180</b>	<b>630</b>								
<b>210</b>	<b>660</b>								
<b>240</b>	<b>690</b>								
<b>270</b>	<b>720</b>								
<b>300</b>	<b>750</b>								
<b>330</b>	<b>780</b>								
<b>360</b>	<b>810</b>								
<b>390</b>	<b>840</b>								
<b>420</b>	<b>870</b>								
<b>450</b>	<b>900</b>								

**Conclusion:** Be sure to explain if your hypothesis was supported or negated. Be sure to discuss your observations of the different liquids. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Analysis Questions:**

1. Indicate the independent variable for this experiment. \_\_\_\_\_
2. Indicate the dependent variable for this experiment. \_\_\_\_\_
3. Explain the relationship between temperature and a liquid's expansion. \_\_\_\_\_
4. How can this lab help to explain the function of a thermometer? \_\_\_\_\_
5. What was the most interesting part of this lab? \_\_\_\_\_
6. What was the most challenging part of this lab? \_\_\_\_\_
7. Identify at least three things that you learned from this lab. \_\_\_\_\_
8. Identify at least three lab skills that you reinforced during this lab. \_\_\_\_\_
9. **Challenge (attach with summary):** Boiling point is a characteristic property of a liquid or an element. Explain how the boiling point relates to the rate at which a liquid expands. How can the boiling point of an element help us determine the expansion rate of a liquid?

**Summary:** Attach a three paragraph summary of this lab. (1. What you were doing and why; 2. What you found out from your data; 3. How what you learned relates to your life.)