Name:

Period:

LAB 20 - TEMPERATURE AND RATE OF REACTION

BACKGROUND

We have read about chemical reactions and that the rate of chemical reactions can vary. One of the factors that we can sometimes control in a chemical reaction is the temperature at which the reaction takes place.

PROBLEM

What effect will temperature have on the rate (speed) of a chemical reaction?

HYPOTHESIS

_____ _____

independent variable dependent variable

The predicted relationship between the variables is:

_____

_____

_____

_____

MATERIALS

- beaker (250mL) x2
- tongs
- effervescent tablets (1 package of 2)
- hot plate (shared with opposite lab station)
- thermometer
- triple-beam balance
- stopwatch
- ice
- water
- apron & goggles

NOTE: Please handle the effervescent tablets with care to avoid breaking them.

PROCEDURE

1. Fill one of the 250 mL beakers with approximately 200mL of water.

2. Place this beaker on the hotplate. If the hotplate is not yet set up between you and the lab station across from you, do so now. Turn the hotplate to a setting of "9".

3. Fill up the 2nd beaker with 120mL of water. Add ice to the beaker to bring the water level up to 200mL.

4. *Make sure that your lab station is dry.*

5. Carefully unwrap the effervescent tablets. USE CAUTION TO AVOID BREAKING THE TABLETS.

6. Measure the mass of both effervescent tablets, one at a time. Record the mass in table 20-1.

7. When the temperature of the cold water beaker gets to below 10°C, place one effervescent tablet into the beaker. Time how long it takes for the tablet to completely dissolve. Record your observations in table 20-2.

8. When the temperature of the water in the hot beaker becomes greater than 80°C, ***use the tongs*** to remove the beaker from the hotplate. If no more beakers are on the hotplate, turn the hotplate off now. Record the temperature of the water in table 20-2.

9. Place the 2nd tablet into the beaker with the warm water. Time how long it takes for the tablet to completely dissolve. Record your observations in the data table.

10. Clean and dry your lab station. All liquids can be flushed down the sink. Leave the hotplate set up*, but please ensure that it is turned **off**.

DATA

Table 20-1: Mass of Effervescent Tablets	
Tablet 1:	Tablet 2:

Table 20-2: Temperature and Reaction Times	
Hot Beaker	**Cold Beaker**
Temperature:	Temperature:
Reaction Time:	Reaction Time:
Observations:	Observations:

*8th period please return the hotplate to the cupboard

SUMMARY

1. Did the experiment support or refute your hypothesis? Explain.

2. What observations did you make about the tablet during its reaction in the hot and cold water? How do you explain these observations?

3. Review the end of chapter 3.1 (pg 74 – 76) on rates of chemical reactions. Four variables, including temperature, that affect rate of reactions are described. State a hypothesis about how one of the other variables would affect the rate of reaction.

CHALLENGE

1. The increased temperature means that the molecules are moving faster. Using pictures and words, draw a diagram **in the space below** that would explain to someone who wasn't as familiar with chemistry as you how the temperature of the water molecules affected the results of your experiment.