School/Team Name _____

Student Names_____

Experimental Design 2012

Brookwood Science Olympiad Invitational

A pharmaceutical company is interested in studying reaction rates of Alka Seltzer tablets. Alka Seltzer tablets are composed of citric acid and sodium bicarbonate. The citric acid and sodium bicarbonate do not react in the solid tablet, but when the tablet is placed in water a reaction begins and carbon dioxide gas is one of the products. Using the following materials, design and conduct an experiment to the study factors that affect the reaction rate of an Alka Seltzer tablet. $H_3C_6H_5O_7 + NaHCO_3 \rightarrow H_2O + CO_2 + NaH_2C_6H_5O_7$

You have the following materials available to use:

At your station:	Stations around the room available for use:

• 3 Alka Seltzer Tablets
• beaker
• stopwatch OR room clock with second hand
• thermometer
• 100ml graduated cylinder
• ruler
	• Weigh Station
	  ○ Balance
	  ○ Weigh boat
	• Mortar and Pestle
	• Ice
	• Hot Plate

1) Statement of Problem (2 pts)

2) Hypothesis (4 points)

3) Variables
   - Independent (3 pts)
   - Dependent (3 pts)
   - Constants (4 pts)
   - Control (2 pts)

4) Materials (3 pts)

5) Procedure (6 pts)

6) Qualitative Observations (4 pts)

7) Quantitative Data – Data Table (6 pts)

8) Graph/s (6 pts)

9) Statisitics (6 pts)

10) Analysis & Interpretation of Results (4 pts) **must be supported by data**

11) Possible Experimental Errors (3 pts)

12) Conclusion (4 pts)

13) Applications and Recommendations for Further Use (4 pts)