

**Warm-up: What makes a good scientific investigation?**

**Project:** Working with a group of 2-4 students, your task is to determine a way to collect and analyze data in order to answer a specific question about endothermic and exothermic reactions. Then, you will complete your investigation and analyze your data to arrive at a conclusion. Everyone in the research team is responsible for turning in their own individual papers with their own unique and individually written Analysis and Conclusion/Summary. **THE ONLY PARTS OF YOUR PAPER THAT CAN BE IDENTICAL** are the:

**7.1a** Research Question, **7.1c** Variables, **7.1d** Hypothesis, **7.2**.Procedure, **7.3a**. Raw Data Table(s).

People in my group: #1 \_\_\_\_\_ #2 \_\_\_\_\_ #3 \_\_\_\_\_

You have the following materials available to you:

- A balance
- Thermometers
- Beakers
- Graduated cylinders
- Baking soda,  $\text{NaHCO}_3$  (s)
- Calcium chloride,  $\text{CaCl}_2$ (s)
- Citric Acid,  $\text{C}_6\text{H}_8\text{O}_7$  (s)
- Distilled Water,  $\text{H}_2\text{O}$ (l)
- Sodium hydroxide,  $\text{NaOH}$ (s)
- Vinegar,  $\text{CH}_3\text{COOH}$ (aq)

Potential Research Questions :

**Choose from one of the questions 1-3, or your team can pose your own testable research question.**

1. Does the amount of reactant(s) vary the amount of energy absorbed/released?
2. Can we predict how much energy will be absorbed or released when reactant amounts are varied based on evidence collected in lab?
3. Are some reactions more endothermic/exothermic than others? How can we tell?

The question we will try to answer:

Our variables:

IDV = independent variable; DV = dependent variable; CV = controlled variable.

Independent Variable (x-axis)		Describe the levels or the range of data:
Dependent Variable (y-axis)		How this will be measured:
Controlled Variables		What each should be and how it will be kept the same.

Our proposed lab procedure (A numbered list of steps.):

Sketch of Data Table (for data we plan to collect):