

## Can you create a SUNSET IN A BAG? (Inquiry)

### An exploration in thermochemistry

#### I. BQ: Is energy released or absorbed during a chemical reaction?

Independent variable -

Dependent variable

Control -

Purpose: Observe a chemical change and identify some signs of the chemical change.

#### II. Chemicals/Equipment

Baking Soda (sodium bicarbonate)

Calcium Chloride

Phenol Red solution, alizarin yellow,

bromothymol blue, methyl red, or

other indicators

H<sub>2</sub>O

Bag

Spoon/scoopula/spatula

250mL graduated cylinder

#### III. Experimental Design

Make a chemical reaction where energy is released and there is a color change.(like the sunset)

Make a chemical reaction where energy is absorbed and there is a color change. (like the sunset)

*Write a step by step (at least 5 steps)procedure. Your design should be able to be reproduced. Your instructor must sign your design before implementing.*

Guidelines:

*\*Chemicals – no more than 5 mL of indicator solution used, maximum amount of warm water is 20 mL, no more than 1 teaspoon of calcium chloride used, no more than 1 teaspoon of baking soda used.*

*\*Don't mix the baking soda and calcium chloride together AT THE SAME time. They can be added during different times.*

*\*Mixing of chemicals is done in a small ziploc bag.*

#### IV. Data

Make a table of your observations.

#### V. Discussion

- 1) What evidence of chemical change did you **observe**?
- 2) How can you tell whether or not energy is released?
- 3) **Give an example** of a chemical change that does not show an obvious energy change.
- 4) Write a balanced chemical equation.(Remember, H<sub>2</sub>CO<sub>3</sub> breaks down into CO<sub>2</sub> and H<sub>2</sub>O)

#### I. VI. Conclusion

Compare and contrast your experiments. What is the connection to acid-base chemistry? How is this related to thermochemistry?

#### VII. Resources: