

## Energy Changes in Chemical Reactions - Activity Sheet

### Objectives:

1. \_\_\_\_\_  
\_\_\_\_\_.
2. To be able to use the concept of \_\_\_\_\_ and \_\_\_\_\_ to explain why one reaction can be endothermic and another reaction can be exothermic.

### ACTIVITY

#### Question to investigate

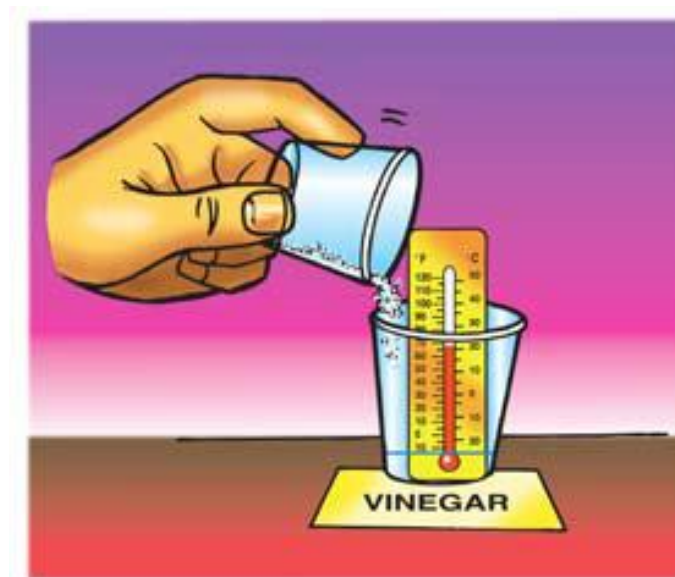
Does the temperature increase, decrease, or stay the same in the reaction between baking soda and vinegar?

#### Materials

- Vinegar in a cup
- Baking soda in a cup
- Thermometer

#### Procedure

1. Place a thermometer in the vinegar. Read the thermometer and record the temperature on the activity sheet.
2. While the thermometer is in the vinegar, add all of the baking soda from your cup.
3. Watch the thermometer to observe any change in temperature. Record the temperature after it has stopped changing.



Starting Temperature- \_\_\_\_\_ Ending Temperature- \_\_\_\_\_

1. Did the temperature increase, decrease, or stay the same when you combined the baking soda and vinegar?
2. What was the lowest temperature reached during your group's reaction?

**Question to investigate**

Does the temperature increase, decrease, or stay the same in the reaction between baking soda and calcium chloride?

**Materials**

- Baking soda solution in a cup
- Calcium chloride solution in a cup
- Thermometer

**Procedure**

1. Place a thermometer in the baking soda solution. Read the thermometer and record the temperature on the activity sheet.
2. While the thermometer is in the cup, add all of the calcium chloride from the cup.
3. Watch the thermometer to observe any change in temperature. Record the temperature when it stops changing.

Starting Temperature- \_\_\_\_\_ Ending Temperature- \_\_\_\_\_

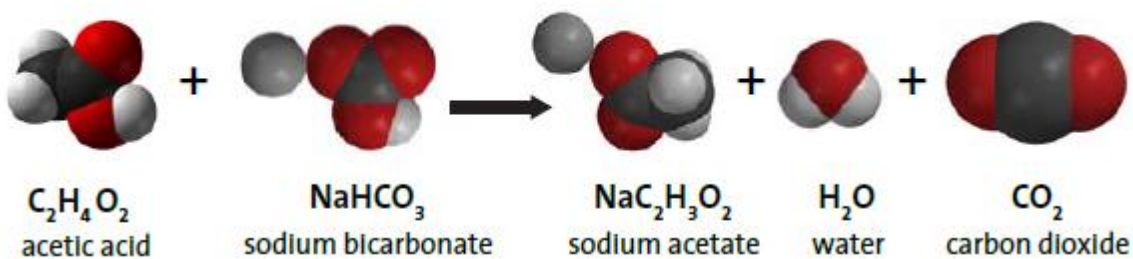
3. Did the temperature increase, decrease, or stay the same when you combined baking soda solution and calcium chloride?

4. What was the highest temperature reached during your group's reaction?

## EXPLAIN IT WITH ATOMS & MOLECULES

When the temperature of a chemical reaction decreases, the reaction is called an *endothermic* reaction. When the temperature of a chemical reaction increases, the reaction is called an *exothermic* reaction.

Vinegar and baking soda reaction

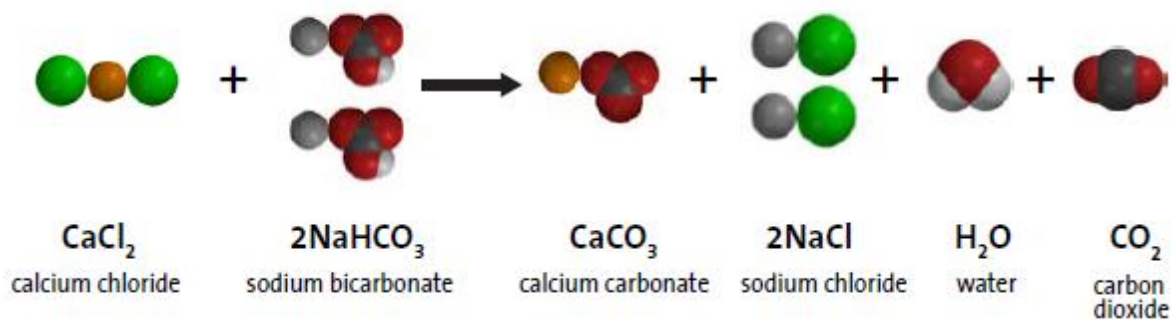


5. Is this an endothermic or exothermic reaction?

6. Draw an energy arrow on the reactants side and another on the product side to compare the amount of energy used and released during the reaction.

7. What do the arrows show about the amount of energy required to break the bonds of the reactants compared to the amount of energy released when the products are formed?

Baking soda solution and calcium chloride reaction



8. Is this an endothermic or exothermic reaction?

9. Draw an energy arrow on the reactants side and another on the product side to compare the amount of energy used and released during the reaction.

10. What do the arrows show about the amount of energy required to break the bonds of the reactants compared to the amount of energy released when the products are formed?