

## Hot or cold? (Exothermic or Endothermic)? Part 1

**Background:**

1. Exothermic reactions release energy and produces heat (heat production)
2. Endothermic reactions absorb heat and makes the surroundings feel cold

**Objectives:**

1. To make scientific observation, measurements, and predictions
2. To measure and determine if a reaction is exothermic or endothermic
3. To measure the evidence for chemical change

**Materials:**

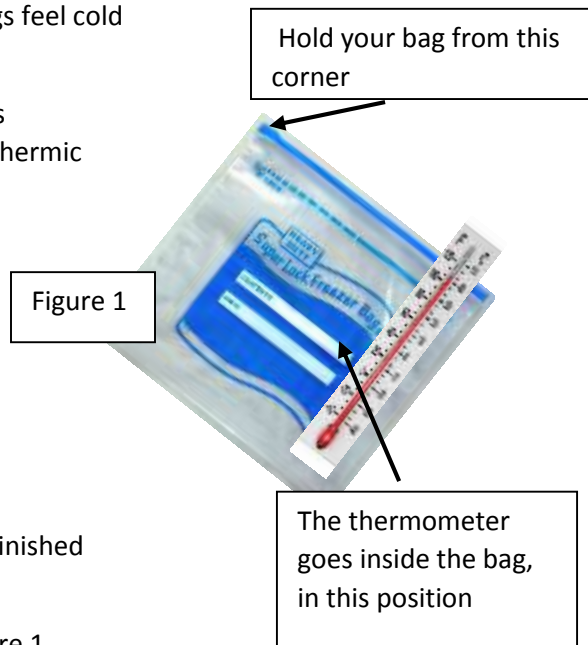
Ziploc bags (two)	CH <sub>3</sub> COOH (Vinegar)
Small spoon (two)	NaHCO <sub>3</sub> (Baking soda)
Thermometer	
Timer	Universal indicator

**Safety / Disposal:**

1. Always wear you safety goggles and apron during this lab
2. Dispose all bags with chemical in the trash can after you have finished

**Procedures:**

1. Take one bag and hold it in a tilted position as displayed in figure 1
2. Pour ½ of spoon of NaHCO<sub>3</sub> inside the bag
3. Place the thermometer inside the bag as instructed in figure 1 (don't touch the bottom of the thermometer to avoid misreading)
4. Record the "initial temperature" in your data table before you proceed with the next step.
5. Measure 20 mL of CH<sub>3</sub>COOH, and add it to the bag. (START YOUR TIMER NOW!)
6. Record the temperature in your data table every 30 seconds for 3 minutes. (you should have 7 readings in total)
7. Using the dropper, add 10 drop of the compound from the bag into well #5 in your chemplate
8. Add 3 drops of universal indicator and record the PH number on your data table
9. Using your pH chart, determine if the substance crated is acidic or alkaline
10. Rinse the thermometer, throw the bag, and answer the questions for full credit



Initial Temperature	After 30 seconds	After 1 minute	After 1 ½ minutes	After 2 minutes	After 2 ½ minutes	After 3 minutes	Final temperature	PH

**Questions**

1. What happen to the temperature of the chemicals after mixing the compounds
2. Did you see a physical or chemical change?
3. How is this type of reaction called?
4. What other evidence of chemical change did you see?
5. Was the substance acidic or alkaline (basic)?

## Hot or cold? (Exothermic or Endothermic)? Part 2

Background:

1. Exothermic reactions release energy and produces heat (heat production)
2. Endothermic reactions absorb heat and makes the surroundings feel cold

Objectives:

1. To make scientific observation, measurements, and predictions
2. To measure and determine if a reaction is exothermic or endothermic
3. To measure the evidence for chemical change

Materials:

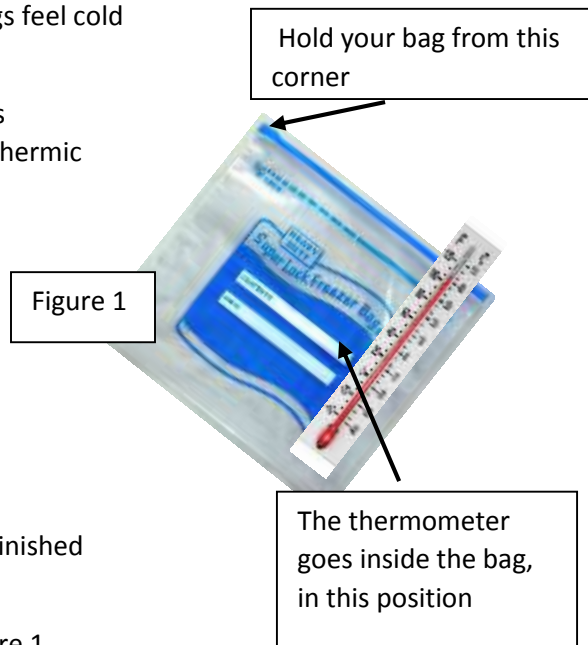
Ziploc bags (two)	CH <sub>3</sub> COOH (Vinegar)
Small spoon (two)	
Thermometer	CaCl <sub>2</sub> (Calcium chloride)
Timer	Universal indicator

Safety / Disposal:

1. Always wear you safety goggles and apron during this lab
2. Dispose all bags with chemical in the trash can after you have finished

Procedures:

1. Take one bag and hold it in a tilted position as displayed in figure 1
2. Pour one full (normal) spoon of CaCl<sub>2</sub> inside the bag
3. Place the thermometer inside the bag as instructed in figure 1 (don't touch the bottom of the thermometer to avoid misreading)
4. Record the "initial temperature" in your data table before you proceed with the next step.
5. Measure 20 mL of CH<sub>3</sub>COOH, and add it to the bag. (START YOUR TIMER NOW!)
6. Record the temperature in your data table every 30 seconds for 3 minutes. (you should have 7 readings in total)
7. Using the dropper, add 10 drop of the compound from the bag into well #5 in your chemplate
8. Add 3 drops of universal indicator and record the PH number on your data table,
9. Using your pH chart, determine if the substance crated is acidic or alkaline
10. Rinse the thermometer, throw the bag, and answer the questions for full credit



Initial Temperature	After 30 seconds	After 1 minute	After 1 ½ minutes	After 2 minutes	After 2 ½ minutes	After 3 minutes	Final temperature	PH

Questions

1. What happen to the temperature of the chemicals after mixing the compounds
2. Did you see a physical or chemical change?
3. How is this type of reaction called?
4. What other evidence of chemical change did you see?
5. Was the substance acidic or alkaline (basic)?