

Discovery Lab - Types of Energy

Chemistry Chapter 8:

Objective:

- Students will explore energy changes during chemical reactions and the connection between energy changes and chemical changes.
- Design a data table to show your results

Time: 15 mins

SAFETY:

The chemicals can be toxic, please treat with respect and care. Rinse skin immediately upon contact. You **MUST** wear your goggles and aprons at all times. Be sure to rinse and dry your thermometer after each use.

Isopropyl alcohol is a flammable liquid and fire hazard: Keep away from all flames, sparks, or heat sources.

Energy Changes in Chemical Reactions

In this activity, you will explore the energy changes that accompany chemical reactions. All chemical reactions release or absorb energy.

To understand the energy implications of chemical reactions, it's important to keep in mind two key ideas:

1. It takes energy to break bonds.
2. Energy is released when bonds are formed.

Lab Procedure:

Part 1.

Baking Soda and Vinegar

1. Pour about 10 mL of vinegar into a small beaker. Then, place a thermometer into the vinegar. Record the initial temperature (T_i) in a data table.
2. While the thermometer is in the cup, add about $\frac{1}{2}$ teaspoon of baking soda (NaHCO_3) to the cup.
3. Watch the thermometer for any change in temperature. After it has stopped changing, record the final temperature (T_f) and any other observations you made in the data table.
4. Describe what you think is happening energy wise in the reaction.
5. clean up lab materials

Part 2.

1. Measure about 6 g of sucrose and pour into the small container
2. Measure about 1 g of sodium bicarbonate and also pour into small container
3. Put on cap and mix dry chemicals in the container
4. Pour sand, enough to cover the bottom of the evaporating dish.
5. Measure 30 ml of Isopropyl alcohol into a 50ml graduated cylinder.
6. Carefully add the isopropyl alcohol over the sanding making sure to cover all the sand.
7. Add the mixture of solid chemicals toward the center of the sand.
8. With a match light a wood splint (AWAY FROM THE Isopropyl alcohol), and ignite the alcohol in the sand with the lit wood split.
9. Observe the decomposition reaction, and write down your observations.
10. Describe what you think is happening energy wise in the reaction.
11. Clean up lab materials, everything in the evaporating dish can be deposited of in the small garbage cans. (AFTER the chemicals have cooled down!)

ANALYSIS

1. Which reaction is exothermic or endothermic? What evidence do you have?
2. Define endothermic and exothermic in your own words.