9 CHEMICAL REACTIONS IN ACTION

Have you ever wondered why certain things bubble, change color, or even produce heat when mixed together? These are all signs that a chemical reaction is happening! In this lesson, we'll explore what happens at the molecular level when bonds break and new ones form. Plus, you'll learn to spot the telltale signs of a chemical reaction, like color changes, fizzing bubbles, temperature shifts, and even light!

Recommended Reading

- *Chemical Reactions: It Matters,* by Rachael Morlock
- *Fizz, Gurgle, Pop! Chemical Reactions in the Lab,* by Daniel R. Faust
- *Building Blocks of Chemistry: Chemical Compounds and Reactions,* by William D. Adams, pp. 4-16
- *Chemical Reactions,* by Jenna Winterberg
- *Chemistry for Curious Kids,* by Lynn Huggins-Cooper, pp. 100-101
- *Every Day, Chemistry,* by Julia Sooy

ACTIVITY Chemical Detectives: Uncovering Reaction Clues

This week you'll become a science detective and investigate a mysterious chemical reaction right in your own kitchen! In this lab, you'll mix two common household substances—calcium chloride (often found in de-icing products) and baking soda—to uncover what happens when they react together. Will you witness gas bubbles fizzing up? Will the temperature change as the reaction takes place? Could there possibly be a solid precipitate or a color change? Let's see what you uncover!

SUPPLIES

- Calcium chloride ($CaCl_2$) (available in de-icing products)
- Baking soda
- Water
- 2 clear plastic or glass containers
- 1 Tablespoon measuring spoon
- 1 cup measuring cup
- Stirring stick or spoon
- Safety goggles and gloves (recommended)

INSTRUCTIONS

1. You'll be watching a chemical reaction take place, so be sure to complete this lab with a parent or another adult present. It's also recommended that you wear safety goggles and gloves.
2. Prepare your calcium chloride solution.
   a. In your first container, mix 2 tablespoons of calcium chloride with 1 cup of water. Stir gently with a stirring stick or spoon until the calcium chloride is dissolved.
   b. What do you notice happening as you stir the substances together? Be sure to feel the side of your container to see if there is any change in temperature. Watch to see if there are any other indications that a chemical reaction has occurred.
   c. Record your observations in the table below.

3. Prepare your baking soda solution.

   a. In your second container, mix 2 tablespoons of baking soda with 1 cup of water. Stir gently with a stirring stick or spoon until the baking soda is dissolved.

   b. What do you notice happening as you stir the substances together? Be sure to feel the side of your container to see if there is any change in temperature. Watch to see if there are any other indications that a chemical reaction has occurred.

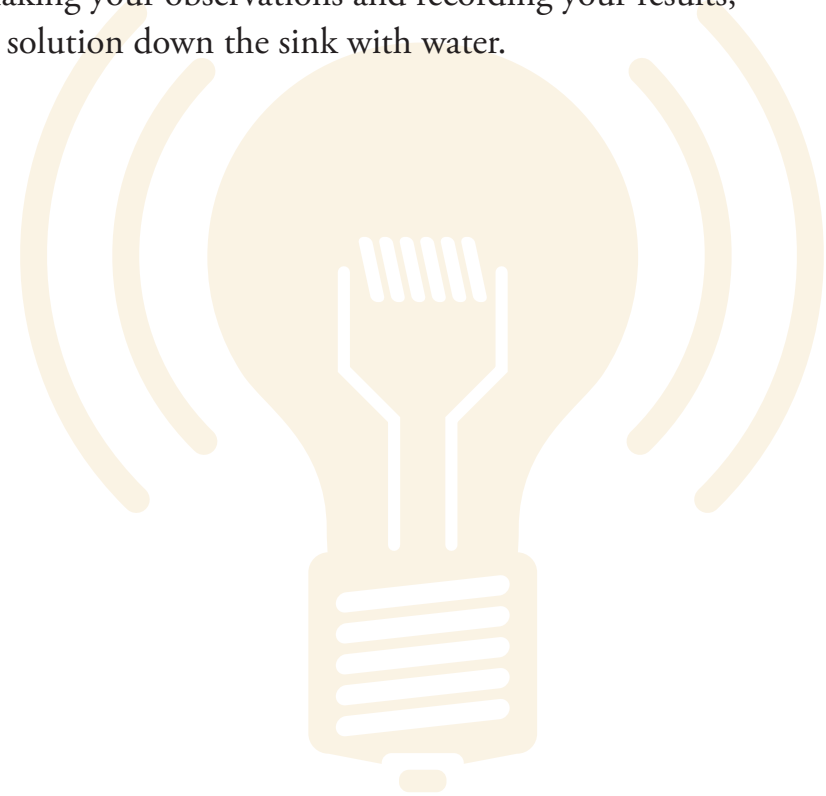
   c. Record your observations in the table below.

4. Mix the two solutions.

   a. Slowly pour the calcium chloride solution into the baking soda solution. Stir gently with a stirring stick or spoon.

   b. What do you notice happening as you stir the substances together? Be sure to feel the side of your container to see if there is any change in temperature. Watch to see if there are any other indications that a chemical reaction has occurred.

5. After you've spent time making your observations and recording your results, clean up by washing your solution down the sink with water.



	Calcium chloride + water	Baking soda + water	Calcium chloride solution + baking soda solution
Temperature			
Light emission			
Color change			
Gas formation			
Formation of a precipitate			
Do you think a reaction occurred?			

QUESTION:

What is a chemical reaction?

ANSWER:

A chemical reaction occurs when bonds between molecules break and atoms combine to form new molecules.

LESSON 9

QUESTION:

What are the signs you can look for to determine whether a chemical reaction has occurred?

ANSWER:

1) Color change
2) Gas formation
3) Temperature change
4) Light emission
5) Formation of a precipitate

LESSON 9

LESSON 9: GILBERT LEWIS

A molecule may be a mixture of bonds, but it is the breaking and making of bonds that leads to the magic of chemical change.

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Lesson 9 Quiz

1. What happens during a chemical reaction?

A) Atoms stay the same and only change position.
B) Atoms never change, only molecules do.
C) New atoms are created.
D) Molecules break apart and atoms form new molecules.

2. What are the substances that you start with in a chemical reaction?

A) Products
B) Catalysts
C) Reactants
D) Elements

3. When you mix iodine and starch, the color changes to blue-black. What sign of a chemical reaction is this?

A) Gas production
B) Color change
C) Temperature change
D) Formation of a precipitate

4. What type of reaction feels hot to the touch?

A) Endothermic
B) Exothermic
C) Precipitation
D) Bioluminescent

5. What is it called when a solid forms in a liquid solution after mixing two liquids together?

A) Precipitate
B) Gas
C) Light emission
D) Evaporation

6. What do we call the substances formed after a chemical reaction?

A) Products
B) Reactants
C) Atoms
D) Bonds

7. What is most likely happening if you notice bubbles and fizzing when mixing two substances?

A) A color change is occurring.
B) A temperature change is happening.
C) A gas is being produced.
D) A precipitate is forming.

8. Which of these is NOT a sign of a chemical reaction?

A) Gas bubbles are formed.
B) A color change happens.
C) A solid forms in a liquid.
D) The substance freezes.

9. What holds atoms together to form molecules?

A) Physical forces
B) Gravity
C) Chemical bonds
D) Heat