

AT-HOME SCIENCE

Inflation Station

Learning about chemical changes and change in temperature

Have you ever wondered how those cool chemistry lab experiments work, where scientists combine certain chemicals and they fizzle or sometimes even explode? These chemists perform **chemical reactions**. These chemical reactions are processes that happen in which substances (**reactants**) are initially combined and rearranged by its atoms, becoming completely different substances (**products**) after the reaction.

Why don't chemical reactions occur whenever you combine any kind of substance, like salt and water, sugar and milk, or water and oil? The reactants must also have certain properties to react with one another that allows them to rearrange the atoms within the molecules, making them new substances as products. These properties can include differing pH measures or increases in thermal energy. The products can sometimes even have noticeable change in temperature, another indication that your chemical reaction was successful.

Today in this At-Home Science experiment, you will explore these chemical reactions in an exciting way: you'll see and feel the effects of performing a chemical reaction between baking soda and vinegar while observing how one of the products, carbon dioxide gas, can inflate a balloon.

CONTENT AREA(S)

Chemistry, chemical reactions, endothermic reactions

SAFETY

This activity requires some adult supervision for younger scientists. Be aware that some of the reactants in this chemical reaction can irritate the eyes and skin. If these are accidentally splashed onto skin, wash the affected area with plenty of water.

Materials

- Balloon
- Empty 20 oz Plastic Bottle
- Funnel
- Measuring Cup
- Baking Soda
- Vinegar

Protocol

1. Measure 1 cup of vinegar.
2. Pour 1 cup of vinegar into plastic bottle.
3. Measure 1/3 cup of baking soda.
4. Use the funnel to add 1/3 cup of baking soda to the inside of your balloon.
5. Carefully attach the mouth of the balloon to the mouth of the plastic bottle without allowing any baking soda to enter the bottle.
6. Add the baking soda into the plastic bottle filled with vinegar by slowly lifting the balloon upright to where the baking soda will fall into the vinegar.
7. Observe your reaction!

Why did this happen?

The properties that make baking soda react with vinegar are the reactants' differing pH measures, with baking soda being relatively basic and vinegar being relatively acidic. The atoms in the two reactants interact and rearrange structure in both reactants, creating new products called sodium acetate and carbon dioxide gas. The products in this reaction are also cold to touch. This means that the reaction between baking soda and vinegar is an **endothermic reaction**, a reaction in which heat is absorbed instead of being released, explaining the cold contact of the products.