



Chemist: Creating a Bounce

Time: 45 Minutes

Skill Level: Elementary (age 6–11)

Background

What is Science Inquiry?

Children are natural scientists. From a very early age they explore the world, ask questions and seek answers. This journey of exploration and discovery is Science Inquiry. Science Inquiry helps young people understand their environment, solve problems and gain knowledge about scientific ideas and processes.

Next Generation Science Standards (NGSS)

Science and Engineering Practices

1. Asking questions
3. Planning and carrying out investigations
6. Constructing explanations
7. Engaging in argument from evidence

Disciplinary Core Ideas

PS1: Matter and its interactions

Crosscutting Concepts

2. Cause and effect: Mechanism and explanation
7. Stability and change

Objective

In this activity, students will learn about chemical reactions and create a bouncy ball.

About the Scientist

Chemists are scientists that study the composition and properties of matter, and the way chemicals interact with each other. Some chemists study substances at the atomic and molecular levels. They often work in laboratories and use their knowledge to identify unknown substances, as well as develop new products or improve existing products.

The Science of Chemical Reactions

A chemical reaction occurs when a chemical substance changes into another substance with a different chemical identity. The key to identifying a chemical reaction is to make observations! A chemical reaction is usually accompanied by easily observed physical effects, such as the emission of heat and light, or a color change. However, a true chemical reaction can only be verified by chemical analysis.

Materials List:

Permanent marker
Disposable plastic cups
Borax
Warm water
Measuring spoons
Disposable spoons or craft sticks for stirring
Food coloring (optional)
White glue or clear school glue
Cornstarch
Plastic zip-close bags

Prep

Prepare two cups for each student: one with 1/2 teaspoon Borax, the other with 1 tablespoon glue and 1 tablespoon cornstarch.

Discuss ...What do students know about chemical reactions? Have they seen a chemical reaction? How does a chemist predict when a chemical reaction will occur or what will result? What do you think will happen if we mix these ingredients together?

Predict ...Generate Ideas. Select a Solution

Experience “What to Do”- What is the plan for the investigation?

Show students how to do the following:

1. Add 2 tablespoons warm water to the Borax cup and stir it well to dissolve the Borax.
2. Add 2-3 drops of food coloring and keep stirring.
3. Pour the Borax mixture into the second cup with the glue and cornstarch, and stir to combine.
4. Keep stirring until the mixture stiffens.
5. Scoop the stiffened mixture out of the cup with a spoon and begin kneading it with your hands.
6. Shape the mixture into a ball as you are kneading it. The mixture will be messy and sticky initially, but it will begin to solidify with handling and exposure to air.
7. Once it's no longer sticky, it's ready to bounce. Store the bouncy ball in a sealed plastic bag at room temperature.

Share ...Encourage students to discuss their observations as they combine the mixtures.

Reflect ...Analyze and interpret the data and results. Discuss among the group. Was there a chemical reaction? How do we know?

Generalize ...to real world examples. Construct explanations. This chemical reaction created a type of *polymer*. What are examples of other polymers? Examples of natural polymers include wool and silk; examples of synthetic polymers include PVC and silicone.

Apply ...outside the classroom or club meeting.

Where have you seen other chemical reactions (e.g., baking)?

Additional resources:

- For more information on polymers, see <http://en.wikipedia.org/wiki/Polymer>

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Agriculture Sciences & Natural Resources, Family & Community Health, 4-H Youth, Forestry & Natural Resources, and Extension Sea Grant programs. Oregon State University Extension Service offers its programs and materials equally to all people.