



WOW Program Lesson Plan

Physical vs Chemical Changes

Program Duration:

15-20 minutes

Recommended Grade**Levels:**

Grades K-5, but all ages could participate

Materials Needed:

- Paper (1 sheet)
- Elmer's Glue (1 6 oz. bottle)
- Baking Soda ($\frac{1}{2}$ teaspoon)
- Renu Fresh or Equate Contact Lens Solution ($1\frac{1}{2}$ Tablespoons)

OR

- Shampoo ($\frac{1}{2}$ cup)
- Cornstarch ($\frac{1}{4}$ cup)
- Water (6 Tablespoons)

Learning Objectives

1. Students will be able to identify physical and chemical changes.
2. Students will be able to explain why a change is physical or chemical.

Preparation

- Discuss the biological difference between physical and chemical changes. In other words, what makes a physical change, physical, and what makes a chemical change, chemical?
- Ask students if they can think of examples of physical and chemical changes.
- Point out physical and chemical changes around the house. For instance, cracking an egg is a physical change, but frying it is a chemical change.

Background

We observe all kinds of changes around us from water boiling to leaves changing color, but how do we know what kind of change is happening? There are two types of changes in matter: physical and chemical. Physical changes occur when only the appearance has changed, but no new substances are created! In chemical changes, the chemicals in the object change and a new substance is made – which sometimes also changes the appearance!

Activity

1. Have students discuss what they think some physical and chemical changes are around the house. Discuss why they think their examples are physical or chemical changes.
2. First, to demonstrate a physical change, take a piece of paper and rip it in half. Ask the students whether they think this was a physical or chemical change. Ask them why they think that. Explain that the paper is still made of the same paper before and after ripping it, therefore, it is a physical change.
3. Next, demonstrate a chemical change by making slime. Follow step 4 if using the Glue/Baking Soda/Contact Lens Solution recipe. Follow step 5 if using the Shampoo/Cornstarch/Water recipe.
4. Pour the bottle of Elmer's glue into a bowl and add the $\frac{1}{2}$ teaspoon of baking soda. Mix thoroughly and slowly add in either Renu or Equate contact lens solution to the bowl.

Continue mixing until the slime begins to harden and knead until a slime-like consistency is achieved. Discuss how the change in substance from before and after mixing the ingredients makes this a chemical change.

5. Mix $\frac{1}{2}$ cup of shampoo and $\frac{1}{4}$ cup of cornstarch in a bowl. Slowly add in 1 Tablespoon of water at a time and mix thoroughly until 6 Tablespoons have been added. Knead the mixture for about 5 minutes until a slime-like consistency is achieved (add additional cornstarch if needed). Discuss how the change in substance from before and after mixing the ingredients makes this a chemical change.

Additional Questions

1. Is a change in state (like ice cubes to water) a physical change or a chemical change? Why?
2. Can the new substance in the chemical change be made back into the old substance? What about physical changes?
3. Can physical changes always be reverted back to before the change? If not, what are some examples?
4. How would you describe the difference between a physical and chemical change?

Summary

Changes are constantly happening all around us! Through this experiment, we explored how to distinguish physical changes from chemical ones. The biggest factor differentiating the two is a change in substance. If the substance remains the same from before and after the change, it is physical, but if a new substance is formed after the change, it is chemical.

Extended Exploration

- Have students connect physical changes to changing states of matter.
- Explore other physical changes such as cutting fruit, and chemical changes such as boiling an egg or burning paper.
- Explore changes in 'Squishy Science': <https://science-u.org/everyday-activities/squishy-science.html>
- Explore changes in 'Exploding Science': <https://science-u.org/everyday-activities/exploding-science.html>