



Elephant Toothpaste

OVERVIEW	
In this activity, campers will observe a decomposition reaction that uses a catalyst. Yeast, hydrogen peroxide and dish soap combine to create a visually impressive reaction. Discussion/instruction of physical and chemical reactions and catalysts can be simplified to suit any grade level.	
TOPIC AREA(S)	GRADE LEVEL
Chemistry	Can be explained to suit any grade level
QUESTIONS PRIOR TO THE LESSON/GETTING EXCITED	
<ul style="list-style-type: none">● What is matter?● What is a chemical reaction? Where do we see chemical reactions in our daily lives?● How might you know a reaction has taken place?● Are there ways to make chemical reactions work faster? Slower?●	
BACKGROUND INFORMATION FOR INSTRUCTORS (INCLUDE QUESTIONS W/ ANSWERS)	
<p><u>For younger grades</u></p> <p>What is matter? How do we define a pure substance or a mixture?</p> <p>Matter is often classified as either a pure substance or a mixture. All matter is made up of basic elements. Elements are pure substances that cannot be broken down further by normal chemical means. They are known as the building blocks of matter. A compound is a pure substance made up of two or more elements joined in a defined ratio. For example, water is a compound made up of the elements hydrogen and oxygen in a 2:1 ratio. Two hydrogen atoms and one oxygen atom join together, giving water the chemical formula H₂O. However, hydrogen peroxide has two hydrogen atoms attached to two oxygen atoms (H₂O₂). Hydrogen peroxide is often mixed with water for household use. It is a mixture! A mixture is made of two or more substances that are combined physically.</p> <p>What is a physical change? What is a chemical change?</p> <p>A physical change is any change in a substance's form that does not change its chemical makeup. The chemical formula of the substance stays the same before and after the change. Examples of physical changes are breaking a stick or melting ice.</p> <p>A chemical change or chemical reaction occurs when atoms of a substance are rearranged, the structure or composition of the materials changes. When a chemical change is complete, the resulting substance(s) is/are different from the original substance(s). As a result of a chemical reaction, new substances with new properties are formed.</p>	



An example of a chemical change is baking a cake. After the batter is heated, a new substance (the cake!) is formed.

change is baking a cake.

In this experiment, hydrogen peroxide breaks down into water and oxygen gas. Yeast is our catalyst. A **catalyst** can be used to speed up the rate of a reaction. We use the soap so we can see the reaction. The bubbles of oxygen get trapped in the soap, which creates a foam. The reaction happens very quickly, so the foam begins to flow out of the bottle, it looks like toothpaste being squeezed out of a tube.

RELEVANCE TO THE CURRICULUM

Grade 1 and 2	Grade 3 and 4	Grade 5 and 6	Grade 7 and 8
<ul style="list-style-type: none"> € Needs & Characteristics of Living Things € Growth and Changes in Animals € Materials, Objects and Everyday Structures € Movement € Energy in Our Lives € Properties of Liquids and Solids € Daily and Seasonal Changes € Air and Water in the Environment 	<ul style="list-style-type: none"> € Growth and Changes in Plants € Habitats and Communities € Strong and Stable Structures € Pulleys and Gears € Forces Causing Movement € Light and Sound € Soils in the Environment € Rocks and Minerals 	<ul style="list-style-type: none"> € Human Organ Systems € Biodiversity € Forces Acting on Structures and Mechanisms € Flight € Properties of and Changes in Matter € Electricity and Electrical Devices € Conservation of Energy and Resources € Space 	<ul style="list-style-type: none"> € Interactions in the Environment € Cells € Form and Function € Systems in Action € Pure Substances and Mixtures € Fluids € Heat in the Environment € Water Systems



**MATERIALS (SPECIFY
GROUP OR CLASS)**

WHETHER PER CAMPER,

Per person (if for outreach purposes)

- Empty plastic soda pop bottle or other appropriate container
- Foil cake pan (some type of container to control spilling)
- Hydrogen peroxide (6% solution)
- Liquid dish soap
- Active yeast
- Funnel
- Warm water
- Cup or bowl
- Food coloring (optional)

SAFETY CONSIDERATIONS

- **Exercise caution when handling hydrogen peroxide**
- **Remind campers that we don't eat science under any circumstances!**

PROCEDURE

1. Place the empty soda pop bottle in the center of the cake pan. Put the funnel in the opening of the bottle.
2. Pour $\frac{1}{2}$ cup of hydrogen peroxide through the funnel into the soda pop bottle.
3. Add about one tablespoon of liquid dish soap to the hydrogen peroxide in the bottle
4. In a separate cup or bowl, mix one packet of yeast with warm water. (Follow the instructions on the packet of yeast when adding water.)
5. Pour the yeast mixture into the bottle, and then quickly remove the funnel



6. Observe the _____ reaction! (Along with observing with their eyes, students can also be allowed to touch the bottle to feel any changes taking place, and touch the foam that forms from the reaction.)

REFERENCES

<file:///Users/alexandrigrillo/Downloads/Elephant%20Toothpaste.pdf>