

Elephant Toothpaste

Are you interested in **chemical reactions**? Are you between the ages of 11 and 14? If so, try this STEM2D activity.

Here is what you need:

- 1 empty and clean 20 oz. plastic bottle
- 1/2 cup hydrogen peroxide (4 oz) (6% solution)
- 1 packet (1 tablespoon or 14 ml) dry yeast
- 3 tablespoons (44 ml) warm water
- 1 tablespoon (15 ml) liquid dish washing soap
- 4 drops food coloring
- 4 small cups or other containers (1 for each major ingredient)
- 1 small mixing bowl

Before you try it, ask yourself . . .

- What will happen when I combine these ingredients?
- What is a chemical reaction?

A **chemical reaction** is a process in which the structure of atoms or molecules that make up a substance are changed. There are **several different types** and they are often visible in our everyday world.

Try it . . .

Carefully combine the ingredients in sequence, as follows: Pour 1/2 cup (4 oz) hydrogen peroxide into the 20-ounce plastic bottle.

- Add 1 tablespoon liquid dish soap and 4 drops of food coloring to the plastic bottle.
- In the mixing bowl, combine 1 packet dried yeast and 3 tablespoons warm water. Stir for 30 seconds.
- Pour the yeast mixture into the bottle.
- Watch it go! Check out this [video](#) to see what happened when we tried it. Try making your own video and sharing it with us.

After the elephant toothpaste, ask yourself . . .

- What did you learn about chemical reactions?
- Was the bottle warm to the touch? If so, why?
- Chemistry matters from everything to producing food and drink, to creating medicines.

Be sure to clean up. This foam/liquid is safe to pour down any drain and should wipe cleanly from most surfaces.

This is an **exothermic reaction**, a chemical reaction that creates heat. The foam expanded rapidly because the yeast acted as a catalyst, allowing the hydrogen peroxide to break into two elements—water (H₂O), and oxygen (O₂). The foam is effectively **oxygen bubbles** and **soapy water**.



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Elephant Toothpaste tip sheet and video were developed by Junior Achievement Worldwide for Johnson & Johnson's WiSTEM²D initiative.

(**W**omen in **S**cience, **T**echnology, **E**ngineering, **M**athematics, **M**anufacturing, and **D**esign)