

Elephant Toothpaste Activity Guide

Grade Level: K-5

Preparation Time: 15 minutes

Activity Time: 15-20 minutes

Grouping: Small groups of 4-8


Objective: To explore the catalytic action created by the combining of yeast, hydrogen peroxide and dishwashing liquid

Kid Safe Elephant Toothpaste ‘Recipe’

- One 16 ounce empty plastic bottle, preferably with a narrow neck
- ½ cup 3% hydrogen peroxide
- Liquid dishwashing detergent (one squired is all you’ll need)
- One packet of dry active yeast dissolved in about 2 tablespoons of warm water – *Prepare this before participants arrive for your session-*
- A funnel
- A spoon to stir with
- A foil pan with fairly high sides

Activity Directions

1. About 30 minutes prior to the activity mix up the yeast and water and let it sit undisturbed.
2. When youth arrive introduce the activity. Provide an opportunity for youth to explore the yeast with their senses (smell, touch, sight).
3. Introduce the other materials by engaging the senses of youth and asking if they know what the materials are typically used for.
4. Depending on the age of youth, have one individual add the food coloring to the hydrogen peroxide, if desired.
5. Stand the plastic bottle in the middle of the foil pan.
6. Use the funnel to pour the peroxide into the bottle, again this could be done by youth, depending on the age you are working with.
7. Squirt a small amount of dishwashing liquid into the bottle, add the yeast, remove the funnel quickly and then stand back and watch the foam erupt!



The catalytic action creates foam that shoots up out of the bottle and resembles toothpaste being squeezed out of its tube. The foam consists of soap and water with oxygen bubbles, so it's safe for kids to play with. This foamy substance isn't really toothpaste - people just call it that because when it's made, it looks like enough toothpaste to clean an elephant's teeth. Making this foam is a fun way to teach kids some basic chemistry, and all you need are some ordinary household supplies. Sometimes called the "marshmallow experiment," the process of making foam is a favorite with kids and a whole lot of fun for everyone watching.

How to Make Foam

Basically, making elephant foam toothpaste involves mixing hydrogen peroxide with liquid soap and then adding a catalyst (yeast or potassium iodide, for example) to make the hydrogen peroxide quickly break down into oxygen and water and releases some energy in the form of heat. This rapid breakdown of peroxide releases oxygen, which is quickly pushed out of the mixture's container. And, as the peroxide is breaking down into oxygen and water, the liquid soap in the mixture combines with the water that is produced and becomes foamy.

The oxygen gushing out of the container carries millions of tiny soap bubbles along with it, producing a rising column of foam that kids like to call "elephant toothpaste." Many people add food coloring to the mixture before adding the catalyst, because the colored column of foam that results resembles toothpaste even more closely. The key to this fun science experiment is making the hydrogen peroxide break down into its constituent oxygen and water molecules as quickly as possible. The catalyst speeds up the breakdown process.

How Does it work?

As mentioned earlier, the peroxide releases a large amount of oxygen as it is breaking down, and the more highly concentrated the peroxide, the more oxygen it will release. This is why science teachers often make elephant toothpaste with a concentrated 30% hydrogen peroxide solution - the chemical reaction is very dramatic because so much oxygen is released. However, 30% peroxide is difficult to find and dangerous to work with. It should only be used while you're wearing safety goggles, gloves and other protective equipment. The 3% hydrogen peroxide you can buy in grocery stores and pharmacies is much more diluted and safer to work with.

Hydrogen peroxide (H_2O_2) basically consists of water molecules (H_2O) with an extra atom of oxygen (O) attached. Making elephant toothpaste is a great way to teach kids how substances can be broken down into their constituents with the assistance of catalysts!