

## 3. Elephant Toothpaste

What is a catalyst?

### Do the Experiment!

#### MATERIALS



- ❖ Water Bottles
- ❖ Aluminum Pan
- ❖ Gloves
- ❖ Safety Goggles
- ❖ Hydrogen Peroxide—6%
- ❖ Funnel
- ❖ Soap
- ❖ Food Coloring
- ❖ Yeast
- ❖ Measuring Spoon
- ❖ Dixie Cup
- ❖ Hot Pot
- ❖ Craft Stick

1. Find a partner.
2. Put on your gloves and safety goggles!
3. Carefully measure 2 ounces of 6% hydrogen peroxide into a measuring cup. Use a funnel to pour the peroxide into the water bottle.
4. Squirt some dishwashing soap into your water bottle filled with 6% hydrogen peroxide. Mix the soap and peroxide by slowly and carefully swirling the contents of the flask.
5. Add three drops of food coloring to the soap and peroxide solution. Mix all three chemicals by swirling the water bottle slowly and carefully.
6. Add 1 tablespoon of yeast to your Dixie cup. Add 2 tablespoons of warm water to the yeast. Using a craft stick, stir for 2 minutes.
7. Pour the yeast solution into the water bottle. Watch what happens! After a moment touch the side of the water bottle.
8. Write down your observations in your journal.

## DID YOU KNOW...

The foam you created is pretty cool! The foam is special because each tiny foam bubble is filled with oxygen. The yeast acts as a **catalyst** (an accelerator) to remove the oxygen from the hydrogen peroxide. Since it did this very fast, lots and lots of bubbles are created that erupt quickly out of the small space of the water bottle. You probably also noticed that the pan itself filled up with foam. This is a pretty powerful chemical reaction. Elephant toothpaste is an example of a **chemical change**. A chemical change is when one or more substances combine/change into a new product that can't be changed back to what it/they were. A **physical change** is when the appearance of matter is changed but essentially remains what it is. A good example of physical change is when water changes from solid ice to liquid water to gaseous steam. When the yeast is added to the peroxide, the foam created is a chemical change—the oxygen can't be added back to the peroxide. Elephant toothpaste is an exothermic reaction. The difference between endothermic and exothermic reactions is pretty simple. Endothermic reactions store heat. Exothermic reactions release heat. When touching the side of the water bottle, you could feel that it got warm!



## CHALLENGE

1. Which ingredient caused the “toothpaste” to erupt?
2. How would changing one of the variables change the reaction that you saw?

**STEAM Challenge:** Dinosaur Toothpaste! In your journal multiply all of the ingredients by 9 to create a formula big enough to make toothpaste for a dinosaur.