

WEEK

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The Original Reaction

Experiment: Elephant Toothpaste

Release the awesome power of oxygen with an oozing, foaming and safe chemical reaction. It makes a great origin story for how you got your superhero powers!

MATERIALS

- 3% hydrogen peroxide (household grade, the type used to clean minor cuts)
- Plastic bottle with a narrow opening, like one for water or soda
- Liquid dish soap
- Dry yeast
- Measuring cups and spoons
- Small cup
- Plastic table covering or large pan
- Water

INSTRUCTIONS

Pour one cup of hydrogen peroxide into the bottle. Add a good squirt (about one tablespoon) of dish soap and several drops of food coloring. Gently mix these ingredients by swirling the bottle.

In a separate small cup, pour one pouch (about two teaspoons) of dry yeast and add two tablespoons of warm water. The temperature doesn't have to be exact, but the temperature you use for a hot bath is good. Mix together with a spoon.

The next step will make a bit of a mess, so protect your surface with a plastic table covering or large pan.

Pour all of the yeast mixture into the bottle containing the hydrogen peroxide solution. The peroxide should immediately create foam, filling the bottle and oozing out of the top.

WHAT'S HAPPENING?

Hydrogen peroxide is a molecule that has two hydrogen atoms and two oxygen atoms (H_2O_2). That means it's like water (H_2O) but has extra oxygen. That extra oxygen atom is released when exposed to an enzyme called catalase that's found in most living organisms. When you pour hydrogen peroxide on a cut and it foams, all those little bubbles are oxygen being released by the catalase enzyme found in bacteria and your own skin. The yeast in this experiment also has the catalase enzyme. Dish soap traps the oxygen bubbles and makes a foam. The more oxygen that is released, the more foam is made. Eventually the foam runs out of space and is forced to ooze out of the top of the bottle.





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SAVE THE DAY!

Try this experiment again with different colors of food coloring, or a larger bottle (be sure to adjust your measurements for a larger bottle). Or be creative—write the story of your superhero's origin, starting with what effect this chemical reaction has on your powers.

TIPS

This chemical reaction uses items that are all safe to touch skin. None of the ingredients are toxic, but they should not be ingested. Only use household-grade hydrogen peroxide (3%). Other grades of hydrogen peroxide, such as those used for bleaching hair, are more concentrated and can cause skin irritation.

LEARN MORE

Explore other chemicals and see what reactions they create with MSI's online goREACT game (msichicago.org/goreact).

RECOMMENDED READING

Crazy Concoctions: A Mad Scientist's Guide to Messy Mixtures, by Jordan Brown

Public School Superhero, by Chris Tebbetts