



Try This at Home Science: Elephant Toothpaste

Activity Overview:

This bubbly chemical reaction produces a huge pile of soap bubbles and resembles toothpaste coming out of a tube. ***Disclaimer:** do not treat it as actual toothpaste.

Materials:

- Empty plastic bottle (~16oz)
- 3 Tablespoons of warm water
- Liquid dish soap
- ½ cup 3% or 6% hydrogen peroxide (H₂O₂)
- 1 Tablespoon of dry yeast
- Funnel
- Small bowl
- Large tub/try to catch the foam
- Liquid food coloring (optional)
- Safety goggles and glasses

Safety precaution:

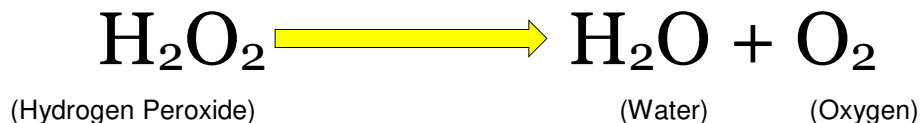
Hydrogen peroxide can irritate the skin and eyes. Adult supervision is recommended.

Try this!

1. Place the plastic bottle inside the large tub
2. Funnel in ½ cup of hydrogen peroxide into your plastic bottle
3. Add a squirt of dish soap and about 8 drops of food coloring (optional) into your bottle. Give the solution in the bottle a gentle swirl.
4. Then, in a separate small bowl, prepare a solution of dry yeast (1 tablespoon) and warm water (3 tablespoons) and mix for approximately 30 seconds. You want a smooth solution, make sure it is not paste-like. Add more warm water if needed.
5. Combine the yeast mixture into the bottle with your hydrogen peroxide solution, step back, and observe!
6. The remains of the experiment are safe to throw away or wash down the drain.

What's happening?

Hydrogen peroxide is a highly unstable chemical that is constantly breaking down. When the hydrogen peroxide starts to decompose, it breaks down to form water and oxygen. The chemical reaction is shown below:



In this experiment, the dry yeast acted as a catalyst, which is a substance that speeds up the rate of a chemical reaction. The rapidly released oxygen molecules that were generated during the decomposition reaction get trapped in the soap, creating a ton of bubbles. The result is a pile of foam big enough for elephants to play in!

This experiment is also an exothermic reaction; you can tell because the bottle will feel warm to the touch. Exothermic reactions give off energy in the form of heat.

How does this relate to everyday life?



The catalyst found in the dry yeast is also found in us! It is an enzyme called catalase! When we fall and get a scrap on our knee, our parents usually tell us to clean it with some hydrogen peroxide. When that enzyme and the peroxide mix, the oxygen that is released from the breakdown is what kills the germs!

Now try...

- Experiment using different types of bottles. Try using a graduated cylinder or Erlenmeyer flask, do either give off a bigger reaction?
- Does using a different percent hydrogen peroxide make a difference in your reaction? Be careful using stronger than over-the-counter hydrogen peroxide, follow all safety precautions listed on the bottle.

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