



Elephant Toothpaste

Supplies:

1. ½ cup – 6% Hydrogen Peroxide (This is easiest/cheapest to buy as 20 volume liquid developer at beauty stores.)
2. 2 tsp. Yeast
3. 3 tbsp. Warm Water
4. Dish Detergent
5. Food Coloring (optional)
6. Empty plastic water bottle (16oz.)
7. Mixing Cup
8. Paper Towels
9. Funnel
10. Tray to catch the mess
11. SAFETY GOGGLES

Directions:

1. Add about 8 drops of food coloring to the bottle (optional.)
2. Add about 1 tbsp. of liquid dish soap into the bottle and swish it just a bit to mix it.
3. In a separate cup, combine yeast and warm water. Mix for about 30 seconds until most lumps are gone.
4. Pour the yeast mixture into the bottle (using a funnel) and watch the foaming begin.
5. The foam is just water, soap and oxygen so it's safe to touch, but it will be warm because of the reaction!



Why does it work?

The foam is made as the dishwashing detergent traps tiny oxygen bubbles created by the chemical reaction that is happening inside the bottle. Hydrogen peroxide is a molecule made up of hydrogen atoms and oxygen atoms. It can be expressed using the chemical formula, $2\text{H}_2\text{O}_2$. Under the right conditions, hydrogen peroxide will undergo a chemical reaction to break down into two parts, oxygen and water. When a chemical that is made up of only one molecule breaks down into two different, smaller molecules, it's called a decomposition reaction. This particular decomposition reaction is also an 'exothermic' reaction, meaning it gives off heat. If you feel the sides of the bottle, the plastic should feel quite warm. Yeast contains an enzyme called catalase. The enzyme is called catalase because it works as a 'catalyst' in this reaction. A catalyst is a substance that speeds up the rate of a chemical reaction without changing its products. The yeast is added to the hydrogen peroxide to speed up the reaction. The catalase in the yeast speeds up the process of breaking down the hydrogen peroxide and thus produces oxygen and water more quickly. The oxygen gets trapped by the dishwashing detergent as many tiny bubbles.