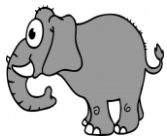
Name_____

Hour_____

Lab #3: Elephant Toothpaste

Scientific Concept:
To investigate one of the types of reactions.



Purpose:
This activity is a type of dissociation reaction, in which Hydrogen Peroxide is broken down into Oxygen and Water, with the use of a catalyst.

Background Information:
You might remember Mom treating your scraped knee or a cut with hydrogen peroxide. H_2O_2 is the scientific name for hydrogen peroxide, which is made up of two hydrogen atoms and two oxygen atoms. H_2O_2 looks like ordinary water (H_2O), but the addition of that extra oxygen atom turns the molecule into an extremely powerful oxidizer. The secret ingredient is actually a **catalyst** (something that speeds up a chemical reaction by lowering the activation energy needed for the reaction to run, and in this case, it's the decomposition of hydrogen peroxide). When hydrogen peroxide (H_2O_2) decomposes, it breaks down to form water (H_2O) and oxygen (O_2). The soap bubbles that erupt from the cylinder are actually filled with oxygen. As the reaction takes place, you'll also feel a temperature change in the reaction. This shows that the reaction is **exothermic**, meaning that it gives off heat.

The breakdown of Hydrogen Peroxide into Water and Oxygen follows the reaction:

$$2H_2O_2 \rightarrow 2H_2O + O_2$$

Materials:
-Erlenmeyer Flask (or other flask with a neck)
-100 mL Hydrogen Peroxide Solution (1% in a classroom, higher concentrations produce larger reactions)
-25 mL warm Water
-Dish Soap
-1 package quick-rise yeast
-Food Coloring (Everything is Better in Color)
-Pie Container to catch mess.

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Procedure:

Preparing the Reaction:

In the Erlenmeyer flask, combine 100 mL Hydrogen Peroxide with dish soap (add a fair amount, then swirl to mix) and food coloring. Place this in the pie tin.

In a separate container, heat up the water. Add the yeast into the water and stir.

Add the yeast and water solution (catalyst) into the Hydrogen Peroxide Solution and observe.

Data/Observations:

Draw a "Before", "During" and "After" Diagram to show what you observed during the various stages of the reaction.

Before	During	After

Feel the sides of the pie container or the solution in the pie container. What do you feel?

Results: What does your data mean?

Discussion Questions:

1. Reactions that give off energy in the form of heat are called exothermic. Do your observations in the question above support that this reaction is exothermic? Why?

2. What was the yeast and hot water used for? What does a catalyst do?

3. In this reaction, oxygen molecules were breaking away from the hydrogen peroxide. When you observed the "toothpaste" leave the container, why do you think that was?