

Hydrogen Peroxide

Student Worksheet

Name _____

Overview: In this experiment, you will get a chance to heat up hydrogen peroxide (that stingy stuff in the brown bottle!) and see a real-life chemical reaction take place before your very eyes.

What to Learn: You will need to figure out what happens to the hydrogen peroxide. The molecule decomposes (or breaks down) when it is heated and turns into two completely different substances! The equation looks like this: $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$. By doing the experiment, you'll be able to follow the molecules and see where they end up!

Materials

- 2 test tubes
- Burner
- Lighter
- Chemistry stand
- Test tube holder
- Rubber stopper with 1 hole
- Water pan
- Water
- Rubber tubing
- 90° glass tubing
- 3% Hydrogen peroxide (H_2O_2) ([MSDS](#))

Lab Time

1. Place a test tube stand onto a chemistry holder. Place test tube in stand, keeping it at an angle.
2. Fill up test tube halfway with hydrogen peroxide. Put cap back on hydrogen peroxide and **keep far from flame!**
3. Attach the rubber stopper to the end of the test tube.
4. Twist the 90° glass tubing into the rubber stopper, and attach the rubber tubing to the glass tubing.
5. Fill the water pan with water.
6. Fill the second test tube with water from the pan. Don't allow any air to remain!
7. Allow the second test tube to rest on the side of the pan and place the rubber tubing inside.
8. Put lighter underneath the apparatus, making sure that only the *flame* will reach the test tube and *not the wick*.
9. Light the flame and carefully heat the test tube containing hydrogen peroxide. Be very careful to heat evenly and not too much in one place. If it begins boiling too rapidly, remove from heat until it has cooled down a bit. **Be very careful, as hydrogen peroxide can be unstable!**
10. Observe the test tube filled with water and the water pan. What is happening?!
11. When bubbles form in the water bath, this signals the end of the experiment.
12. **Important: Once the experiment is concluded, immediately uncap the test tube to prevent cold water from coming back up into the hot test tube. This may cause it to shatter!**
13. Let apparatus cool for about 5 minutes. Then, pour cool liquid down the drain and rinse test tubes with plenty of water.

1. Optional Experiment: Pour hydrogen peroxide into an empty plastic water bottle. Add a scoop of activated charcoal. (You can also smash regular charcoal with a hammer to get it to fit – the smaller the bits, the better it will work, but make sure you do NOT use charcoal pre-soaked in lighter fluid.) Cap your bottle with a helium-quality latex balloon and set aside. After several hours, you will have a balloon filled with oxygen.

Decomposing Hydrogen Peroxide Data Table

Draw a diagram of the hydrogen peroxide experiment apparatus in each box. Label each chemical (including water) before and after the experiment. Where did the products end up?

Before	After

Exercises Answer the questions below:

1. Write the chemical reaction you observed today.
2. What happened to the water that was originally inside the second test tube? Why did this happen?
3. What was left in the test tube that originally held the hydrogen peroxide?
4. How do you know hydrogen peroxide couldn't produce hydrogen and oxygen instead?
5. Why do you think hydrogen peroxide is kept in a brown bottle?

Exercises

1. Write the chemical reaction you observed today ($2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$)
2. What happened to the water that was originally inside the second test tube? (It was forced out into the water bath.) Why did this happen? (It was displaced by oxygen as the hydrogen peroxide decomposed.)
3. What was left in the test tube that originally held the hydrogen peroxide? (water)
4. How do you know hydrogen peroxide couldn't produce hydrogen and oxygen instead? (Water was one of the byproducts, and it remained in the test tube where the hydrogen peroxide was originally. Since the hydrogen is part of the water molecule, the only other element involved is oxygen.)
5. Why do you think hydrogen peroxide is kept in a brown bottle? (Sunlight may cause decomposition.)

Closure: Before moving on, ask your students if they have any recommendations or unanswered questions that they can work out on their own. Brainstorming extension ideas is a great way to add more science studies to your class time.