

 **Purpose:** To observe evidence of a chemical reaction

? Hypothesis:

I believe that the hydrogen gas produced by the chemical reaction will cause the fire to travel and expand through the gas and create a large flame. When the chemicals mix and react, I believe that oxygen will be produced and create bubbles that produce hydrogen gas.




Experiment 2A

Skills and Strategies

- Processing and Analyzing
- Evaluating
- Communicating

Safety



- 1 mol/L hydrochloric acid can cause burns. Inform your teacher immediately if any hydrochloric acid contacts your skin, flush the area with cold water for 15 minutes.

What You Need

- 2.5 g mossy zinc
- large test tube
- 50 mL beaker
- test tube clamp
- 5 mL 1 mol/L hydrochloric acid
- graduated cylinder
- 2 wooden splints
- matches
- ring stand

Safely Observing a Chemical Reaction

An important part of investigating matter involves observing what happens when different substances interact. In order to perform lab activities safely, including those that involve potential hazards such as splint tests and acids, it is essential to read and understand the procedure and safety precautions before you start.

One technique for identifying substances is to observe the effect on the substance of a flame or glowing ember. For example, when a flame is brought close to a source of hydrogen, the flame will ignite the hydrogen and produce a loud “pop” sound.

Question

How can a burning splint test be carried out safely to help you identify the element produced when zinc and hydrochloric acid are mixed?

Procedure

1. Work in pairs. Place 2.5 g of mossy zinc in a large test tube.
2. Place the test tube in a clamp and attach the clamp to a ring stand so that the mouth of the test tube is angled up and away from you. Attach the clamp about halfway down the tube.
3. Measure 5 mL of 1 mol/L hydrochloric acid in a graduated cylinder. CAUTION: 1 mol/L hydrochloric acid could cause burns and produce hazardous fumes.
4. Light a wooden splint with a match. Dispose of the match as directed by your teacher. CAUTION: If you are using gloves, do not wear them for this step.
5. Place the burning splint at the mouth of the test tube, then move the burning splint to the mouth of the graduated cylinder. Record your observations.

6. Extinguish the flame and dispose of the splint as directed by your teacher.
7. Carefully pour the hydrochloric acid into the test tube.
8. Wait 2 minutes. Then invert the small beaker over the top of the test tube.
9. Wait 90 seconds. Then repeat step 4.
10. Remove the beaker from the test tube. Then place the burning splint at the mouth of the test tube. Record your observations.

Evaluate and Communicate

1. Describe any changes you observed during the test.
2. What caused the bubbles to form when you added the hydrochloric acid to the zinc metal?
3. Why did you test the zinc metal and hydrochloric acid with the burning splint before mixing them?
4. What happened to the burning splint in step 10? Compare this to what happened in step 5. How do you explain the differences in what you observed?



 **Materials/Procedure: Insert Keynote animation as a PDF**

 **Data/Analysis: (answer the questions in the textbook)**

1. Describe the change observed during the test.

- When the hydrochloric acid was added, bubbles formed and the acid became slightly opaque
- As bubbles formed hydrochloric gas was released and created a gas form within the test tubes

2. What caused the bubbles to form when you added the hydrochloride acid to the zinc metal?

- the chemicals reacted and thus separated the oxygen compounds. That caused the heterogenous mixture to form bubbles and released gas

3. Why did you test the zinc metal, and hydrochloric acid with the burning splint before mixing them

- To ensure that the reaction that occurred was caused by the mixture forming, and the gas produced by the first chemical reaction caused the result to occur.

4. What happened to the burning splint in step 10? Compare this to what happened in step 5. How do you explain the difference in what you observed?

- In step 10, the burning splint was extinguished by the gas, and formed smoke in both test tubes. It reacted with the flammable gas to create a high-pitched dog-like bark or squeak.
- In step 5, no reaction occurred. The splint continued to burn and both substances were not altered or affected by the splint.
- The difference between the two was that in step 10, because of the chemical reaction as the mixture was formed, the gas reacted with the flame. In step 5, because no chemical reaction occurred, no gas was formed thus not creating a chemical reaction.

 **Conclusion:**

(Confirm or deny that the purpose of the experiment was accomplished, confirm or deny if your hypothesis was correct with supporting evidence)

- The purpose of this experiment was accomplished. The goal was to see a chemical reaction occur and observe, which we did. As the mossy zinc combined with the hydrochloric acid, a heterogenous mixture formed. This created a chemical reaction that produced a gas which later reacted to the burning splint. From the first chemical reaction, we observed the bubbles being produced and a gas being created. In the second chemical reaction, we observed the flame reacting with the gas to produce a noise. My hypothesis was incorrect. I predicted the flame would react in a way similar to gasoline in which the flame expands and travels throughout the substance that is created. However I was wrong, instead, the flame was extinguished and it created a noise.