Creating Hydrogen in A Test Tube

Scouts VICTORIA

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Sections

Joey Scouts | Cub Scouts | **Scouts** | **Venturer Scouts** | **Rover Scouts**

Challenge Areas

COMMUNITY | CREATIVE | OUTDOOR | **PERSONAL GROWTH**

Scout Method Elements

COMMUNITY INVOLVEMENT | **LEARNING BY DOING** | NATURE AND THE OUTDOORS | PROMISE AND LAW | **PERSONAL PROGRESSION** | **PATROL SYSTEM**

SYMBOLIC FRAMEWORK | YOUTH LEADING, ADULTS SUPPORTING

SPICES Growth Areas

CHARACTER | EMOTIONAL | **INTELLECTUAL** | PHYSICAL | SOCIAL | SPIRITUAL

The Adventure

In your unit or patrol, learn about hydrogen gas including how it can be created and how it reacts with fire.

Plan

1. Investigate different gases in our atmosphere and how they react to fire, in particularly hydrogen. Make sure to investigate if hydrogen is heavier or lighter than oxygen.
2. Investigate elemental magnesium and hydrochloric acid. What are some of their properties and how might they react when combined?
3. Investigate concentrations and how this effects chemicals. What terms do we use to describe concentration?
4. Read the safety information and discuss with your leaders or another appropriate adult what safety equipment, precautions, and supervision may be required. Ensure that you have these safety measures in place before starting the ‘Do’ section. A risk assessment should also be completed.
5. Collect the equipment and ingredients you will need to make hydrogen, noting that some of the equipment may be specialist equipment. You will need the following: protective equipment, a test tube, 2M hydrochloric acid, magnesium ribbon, a skewer, a tea light candle, matches, and a fire bucket with sand in it.

Do

1. Make sure everyone knows the safety requirements and are wearing correct protective equipment. As you will be handling chemicals, it is very important that you wear gloves.
2. Into a test tube, add 1.5 mL 2M hydrochloric acid.
3. Add an approximately 1 cm strip of pre-cut magnesium ribbon to the test tube and immediately place your thumb over the top of the test tube.
4. Light a skewer from a tea candle and, after approximately 15 seconds, slowly lower the skewer down into the test tube, making sure not to touch the edges of the tube.
5. Observe what happens and if you hear any sound.
6. Repeat your experiment by adding more magnesium, if needed.

Review

1. Did the reaction occur as you expected? Why or why not?
2. What did you enjoy the most about this experiment? What did you learn?
3. If you were to do this activity again, what would you do the same? What would you do differently?
4. We place our thumb over the top of the test tube. Why do you think this is? What do you think would happen if we didn’t?

Safety

- Hydrochloric acid is an acid and therefore corrosive and dangerous. Care should be taken when handling and correct personal protective equipment, such as gloves, should be worn. Make sure an adult helps you and that you and/or the adult have read the Safety Data Sheet for this chemical and consider the appropriate safety precautions for its use.
- Magnesium metal is flammable. Make sure to keep it away from sources of ignition.
- Fire risk: As fire is being used, there is the risk of burns. Care should be taken.

Variations

- This challenge card can be paired with other challenge cards such as ‘Make your Own CO2 Extinguisher’ to explore different types of gases and how fire reacts to them.
- This activity can be run with Joeys and Cubs but should be run as more of a demonstration.