

THE FIREPROOF BALLOON

Emily McHugh - IDLA-Chemistry Concentration - Elementary

Materials: -Two Balloons
-Matches
-Water

Procedure: Inflate one of the balloons and tie it shut. Take the other balloon and fill it with $\frac{1}{4}$ cup of water, then inflate the balloon. Take the first balloon and light a match underneath it. The balloon will blow up. Take the second balloon with water in it and light a match under that balloon. This balloon should not explode.

Purpose: This experiment shows how water is a good absorber of heat. When heated, the rubber of the first balloon becomes hot and very soon it can not resist the pressure of the air inside the balloon. The second balloon does not blow up because water absorbs most of the heat away from the plastic of the balloon. Therefore, the balloon does not break.

THE IMPLoding CAN

Emily McHugh - IDLA-Chemistry Concentration - Elementary

Materials: -One soda can
-Shallow, clear dish
-Hot plate
-Water
-Tongs

Procedure: Fill a pop can with a small amount of water, place it can on top of the hot plate and bring water to a boil. Fill the shallow dish with cold water. Once the water comes to a boil, flip the can immediately into the dish of cold water. The can should crush once it hits the cold water.

Purpose: As the water inside the can begins to boil, the water vapor replaces the air inside the can. When the can is inverted into the cold water, the temperature drops suddenly. The

CHEMICAL COMPOUNDS AND THE PERIODIC TABLE

Andrea Lambrecht - IDLA-Chemistry Concentration - Elementary

BACKGROUND INFORMATION: The periodic table is a chart in which elements having similar chemical and physical properties are grouped together. Elements are arranged by atomic number in horizontal rows called periods and in vertical columns known as groups or families, according to similarities in their chemical properties. The elements can be divided into three categories – metals, nonmetals, and metalloids. A metal is a good conductor of heat and electricity, while a nonmetal is usually a poor conductor of heat and electricity. A metalloid has properties that are intermediate between those of metals and nonmetals. A compound is made up of two or more elements. The periodic table correlates the properties of the elements in a systematic way and helps us to make predictions about chemical behaviors.

An atom can lose or gain more than one electron. A positive ion is known as a cation. The formation of a cation is a result of the loss of one or more electrons. On the other hand, an anion is an ion whose net charge is negative due to an increase in the number of electrons.

DIRECTIONS:

NON-BURNING MONEY

Sara Cleaves - Earth Science Concentration - IDLA (Elementary Teacher)

Materials: A dollar bill, lighter or match, 100mL of rubbing alcohol, and 50mL of water.

Set-up: Mix the rubbing alcohol and the water together and soak the dollar bill in it. Light the dollar bill on fire.

Science: As you will see, the bill lights on fire but does not burn. The part that is burning is actually the alcohol on the bill. The bill has enough water on it that it does not burn when the alcohol is burning.

THE FLOUR BOMB

M. Travis O'Hair - Biology

Purpose: The classic high school flour bomb demonstration shows the explosive power of flammable powders under the right circumstances, which is dictated by surface area.

Materials:

500g coffee tin with lid (not too stiff a fit).

Funnel with bottom edge flat to put flour in - can be made from plastic and paper.

Single hole bung to put funnel through.

Small candle.

Bulb-type pipette filler.

One spatula of dry flour (does not work as well if damp).

Splint and matches.

Safety:

Apparatus should be enclosed in safety screens.

Everybody should wear safety goggles.

Coffee tin needs to be wrapped in sticky back plastic or sellotape.

Pupils and staff to stand at least 2 metres back.

When lighting the candle and placing the lid on the coffee tin keep your head out the way.

Do not use a glass funnel.

Procedure:

1. First, demonstrate to the students how a pile of flour (on a table) is not flammable by placing a lit match to it.
2. Next, make a hole in the coffee tin the same size as your bung at approximately the same height as the center of the flame of the candle.
3. Push the funnel into narrow end of the bung as far as it will go, then insert this into the hole in your coffee tin (funnel on the inside). Attach the pipette bulb to the narrow end of the funnel. This needs to make a tight seal.
- 4.

THE CELL MEMBRANE AND SURFACE AREA

M. Travis O'Hair - Biology

Purpose:

APPLE DEMO

Egg in Milk Bottle

Greg Dunn - Biology

Materials: One glass milk jar, matches/lighter, a strip of paper 3cm x 10cm and one peeled hard boiled egg.

Procedure: Demonstrate that the hard boiled egg does not fit through the opening in the bottle.

Next take the piece of paper and light it on fire. Drop the paper into the bottle and allow it to burn out. Place the egg on the opening and watch for the egg to fall into the bottle.

Science:

ELEPHANT TOOTHPASTE

James De Pue - Biology

Procedure

- 1) Put on the safety goggles and gloves.
- 2) Use the scissors to cut one of the garbage bags down one side and across the bottom. Open the bag and spread it over the demonstration area. Save the remaining bag for cleanup.
- 3) Place the graduated cylinder on the open bag.
- 4) Fill the cylinder to about ¼ full with 30% hydrogen peroxide.
- 5) Add from 5 mL to 10 mL liquid soap or dishwashing liquid.
- 6) Sprinkle some food coloring on the inside wall of the cylinder.
- 7) Add 10 mL saturated potassium iodide solution.
- 8) **STAND BACK!** In a few seconds a column of foam will rise out of the cylinder and overflow onto the open bag.
- 9) Use the recommended safety equipment and observe safe handling practices when working with 30% hydrogen peroxide. It is a strong oxidizer.
- 10) Note: To prepare the saturated solution of potassium iodide, dissolve 100 g of potassium iodide in 70 mL of water. You can prepare this solution ahead of time and store it for future use.

Explanation

This activity demonstrates the decomposition of hydrogen peroxide catalyzed by potassium iodide. The rapid production of oxygen causes the mixture to foam, rise, and overflow the cylinder. The 2-step decomposition reaction is written as follows:

