August 1 – Film Canister Rockets

For those of you who follow my article, you have probably realized I like rockets! So to keep up the trend this week we are going to build film canister rockets! These rockets use the old vinegar baking soda favourite, and with a little practice can reach great heights!

***Always remember to ask an adult before doing any science experiment.**

Materials:

- Film canister (easiest to use one of the clear ones with a tight fitting lid), an empty pill container may also work as film canisters are becoming rare!
- Vinegar,
- Baking soda,
- Construction paper,
- Glue,
- Tape.

Procedure:

1. Before building your rocket it is recommended you launch just a film canister (ALWAYS WEAR EYE PROTECTION!) to see how fast the reaction takes place.
2. Fill a film canister half full with vinegar, then using the lid as a bowl; add a small amount of baking soda (experiment with different amounts). In one motion close the lid (which adds the baking soda) and turn the canister lid side down (on a flat surface and outside). The reaction occurs in less than two seconds so practice makes perfect!
3. Now you can make your rocket, make a cylinder out of construction paper for the body of your rocket with the film canister at the bottom (leave enough of the film canister sticking out so you can put the lid on). Use glue or tape to hold in place.
4. Then experiment with different shapes for the nose, you can make a cone by cutting out a circle from the paper, making a cut from the outside of the circle to the center, and then rolling it up.
5. Try to apply fins to the base of the rocket for stable flight.
6. Launch the rocket!! The same way you launched just the film canister.
7. Experiment with different amounts of vinegar and baking soda for the best launch. Also experiment with different rocket types!

Explanation:

So what's going on? The vinegar (containing acetic acid) reacts with the baking soda (sodium bicarbonate) producing a compound called carbonic acid. Carbonic acid is not stable and falls apart to produce carbon dioxide and water. The release of carbon dioxide (a gas) causes the pressure to increase and once the pressure is high enough it blows the lid and canister apart. The force of this is what propels the rocket into the air! Have fun and be sure to get messy!

Jeff Unrau
Regional Executive Director
Praxis the Science and Technology Hotline

August 8 – Worlds Strongest Balloon

This week we are going to defy everything we have ever learned and poke a skewer and a pin through a balloon. I know what you're thinking "I can pop a balloon anytime", but wait, we are going to do it without popping the balloon! It does sound crazy I know, but sometimes science is crazy!

***Always remember to ask an adult before doing any science experiment.**

Materials:

- Balloon
- Bamboo or metal skewer
- A pin
- Cellophane tape
- Cooking oil or Vaseline

Procedure:

1. Blow up a balloon, don't blow it up all the way, and then tie the end in a knot.
2. Take your skewer and either dip it into cooking oil or rub Vaseline on it.
3. Find the end opposite the knot, it should be a slightly different color than the rest of the balloon. Slowly push the skewer through this part of the balloon, turning the skewer while you push.
4. It didn't pop! Jackpot! You put a skewer through a balloon, now for a needle!
5. Blow up another balloon, once filled up place a piece of cellophane tape on the balloon and smooth it out. Poke your needle through the tape and the balloon.
6. Now just to prove that the tape does make a difference, remove the pin (cover the hole with your finger) and poke another part of the balloon.

Explanation:

So what's going on? Did you just so happen to get a batch of super strong balloons? Or is there something else preventing the balloon from popping? The balloons are made up of long strands of molecules, known as polymers. These polymers run in all different directions in the balloon and are held together by cross links, this is what allows the balloon to stretch. When you poked the bamboo skewer through the end of the balloon you displaced some of the polymers. Because you poked it through the end of the balloon (which is thicker and stretches less than the rest of the balloon) there were enough cross links still holding the balloon that it did not pop. If you did this on the side it would surely pop, try it! So how come we could poke the needle through the side? The tape binds with the balloon and holds the polymers in place; this allows you to push the pin through without popping the balloon. Don't you just love balloons?

Have a great week!
Jeff Unrau
Regional Executive Director
Praxis the Science and Technology Hotline

August 15 - Making Crystals

We have all seen different types of crystals, but what are they? Crystals are comprised of a variety or atoms or molecules that are organized in a particular repetitive way which forms their characteristic shapes. The shape and size of the crystal depends on what the crystal is made of. Today we are going to learn how to make crystals with both sugar and salt and compare their structure.

***Always remember to ask an adult before doing any science experiment.**

Materials:

- Cooking pot
- Aluminium pie pan
- Sugar
- Salt
- String
- Pencil
- Paper clip
- An empty cup
- Food coloring
- Spoon

Procedure:

1. First we will make sugar crystals. In the pot boil 0.5 cups of water, once boiling remove from heat (be sure an adult does this step) and add 1.5 cups of sugar and stir until dissolved.
2. Pour the solution into a cup, and add a few drops of food coloring.
3. Tie a piece of string around the center of a pencil and the other end of the string to a paperclip. Hang the paper clip into the water. Set aside for a few days and do not disturb or move the solution.
4. To make the salt crystals heat 0.5 cups of water in a pot to almost boiling, then transfer the solution to an aluminium pie plate (once again with an adult's help).
5. Add salt to the solution a little at a time, stirring until dissolved. Keep doing this until no more salt dissolves. The solution is now supersaturated!
6. Place the pan aside (the same place the sugar crystals are) and check frequently without disturbing.
7. While you wait a few days for your crystals to form you can do all the fun activities from my previous articles!

What's happening?

We are making crystals by evaporation! So as the water slowly evaporates it leaves the crystals behind. The slower the water evaporates the larger the crystals we will see! If you examine both the salt crystals and the sugar crystals you will notice they are different, but we already knew this…

Jeff Unrau
Regional Executive Director
Praxis the Science and Technology Hotline

August 29 – Heating Up Air

This week we are going to look at an interesting little experiment that demonstrates what happens to air as it is heated up. I got the idea from a website I stumbled upon, the link is www.sciencekids.co.nz – it's worth checking out!

***Always remember to ask an adult before doing any science experiment.**

Materials:

- Balloon
- Plastic bottle
- Water
- Pot

Procedures:

1. Take an empty plastic pop bottle and remove the lid. Stretch the mouth of your balloon over the opening of the bottle; make sure no air will be able to escape.
2. Heat your pot of water, but DO NOT allow it to boil. This step should be done with adult supervision.
3. Place the bottle with the balloon attached into the hot water; make sure the bottle stays upright.
4. Wait a few minutes and observe what happens.

Explanation:

So what happened? As the water heated the air inside the bottle you should have noticed the balloon expand. Why did this happen? The hot water was heated up using energy from the

stove; the hot water was then able to transfer energy to the air in the bottle. As the energy was transferred there was an increase in temperature of the air, as the temperature increases the air molecules move faster and faster. These moving molecules keep moving faster and further apart until the balloon stretches. This experiment demonstrates that hot air takes up more space than cold air and also gives you an idea on how heating up the air inside a hot air balloon makes it expand.

Enjoy your last couple weeks of summer holidays!

Jeff Unrau
Regional Executive Director
Praxis the Science and Technology Hotline