

Another **Sneakin' in Science** Experiment. This one blows up! I know you've been waiting for that.

### Here is what you have

A Film Canister

Seltzer Tablets

Stickers to decorate your Rocket with

### Here is what you do

\* A word of caution before you begin. The rocket will shoot up with quite a bit of force. Do not point the rocket at any person or animal. If for some reason you set up the rocket and it doesn't go off, wait a few extra minutes before approaching it, sometimes it takes awhile. If it really seems like its not going to go off approach it with caution and kick it over to its side with your foot. Pick it up carefully. **NEVER CROUCH DOWN WITH YOUR FACE OVER THE TOP OF THE ROCKET!!**

1. Take the rocket outdoors to an area where you can release it safely. It will fly up the air around 10 feet. Unless the wind is blowing hard it should land near where it is set off. Fill the film canister half full of warm water and drop in 1/4 seltzer tablet. Put the top on quick! Quickly set the canister on the ground so that the top (the lid) is touching the ground. **RUN AWAY!!** Okay don't really run away but back up about 3 big steps. Please see safety info above. It will take the rocket several seconds to go off.

2. Next, Experiment! This is Science after all. I know you are already wondering... what would happen if I put in a whole tablet? Try it. Try varying the size of the tablet, the amount of water and the temperature of water.



### More about your Rocket

What in the world is going on inside that little film canister to make it shoot so high up in the air? If you have never used a seltzer tablet before, take a little piece and put it into a clear glass of water. Observe what happens, do you see what looks like steam or smoke rising off the top along with all of the little bubbles? The bubbles and "smoke" are actually caused by carbon dioxide gas being produced. The gas is a result of a chemical reaction.

Evidence for chemical reactions are:

- \* Gas is produced
- \* A new substance is produced
- \* Light is produced
- \* Smell is produced
- \* Sound is produced
- \* Heat is produced
- \* Color change
- \* \*That doesn't mean that every time something changes color or smells or creates a sound that a chemical reaction has occurred. But if some or many of these are observed a chemical reaction may have taken place. For example, when something is burned how many of the list above do you observe? Light, smell, sound, heat, color change, new substance (wood changes to ash). A fire is definitely a chemical reaction!

During a chemical reaction substances are broken down and changed into different substances. In the fire example, wood is broken down into different gases (the smoke) and carbon (the ash). It isn't wood anymore its been changed into something new. When you put the seltzer tablet into the water it changes into a gas (Carbon Dioxide). What happens inside the canister is that so much gas is created that the film canister can't hold it anymore. The pressure builds up to the point to where the top and bottom of the film canister separate, thus sending the bottom of the canister shooting in the air!! Isn't Science Awesome??!!

If a reaction occurs and the substance isn't changed chemically (meaning the molecules aren't broken apart) it is a Physical Change. Examples of physical changes are ripping paper, folding clothes, cutting hair, writing with a crayon. Physical changes aren't usually as exciting as chemical reactions but there is one experiment listed below to try that I think you will find pretty incredible.

### Websites

<http://www.thenakedscientists.com/HTML/content/kitchenscience/food/>  
(Don't worry they have clothes on!!! I hesitated to include this site because of the name but it has some great experiment ideas and even more information about the film canister rocket)

<http://www.chem4kids.com/>

<http://www.surfnetkids.com/chemistry.htm>

### Try This!

Want to try some more chemical reactions? You've probably done this before but you may not have known it is a chemical reaction. Mix baking soda with vinegar. You only need a little bit of each to see the reaction. Look back at the list above, which of the indicators of a chemical reaction did you observe?

Another really cool chemical reaction is easy to make with the help of an adult in the kitchen. You will need a red cabbage, vinegar and baking soda. Pull some leaves

off of the red cabbage, chop them up or just pull them apart and boil them in water for about 5-10 minutes. Drain the now colored water from the left over leaves. In a clear glass, add vinegar to the cabbage juice water just until you see a reaction. Which indicator for a chemical reaction is this? Next add a little bit of baking soda. You will observe lots more indicators that chemical reactions are taking place (fun hint if you keep adding vinegar and baking soda the solution should eventually become clear!).

Alright one more really neat chemical reaction. This one requires a few more ingredients than the other two but nothing you can't get easily at the grocery store.

- 16 oz empty plastic soda bottle (the ones with a narrow neck are best)
  - 1/2 cup hydrogen peroxide
  - Squirt of Dawn dish detergent
  - A couple of drops of food coloring
  - 1 teaspoon yeast dissolved in approximately 2 tablespoons very warm water
  - Large bowl or something to catch overflow....cause trust me its going to overflow!
  - Safety glasses
1. Put the bottle into the large bowl. Put the 1/2 cup of peroxide into the plastic bottle. Add a couple of drops of food coloring.
  2. Put in a squirt or so of the dawn dish detergent.
  3. Make sure the yeast is well mixed and pour it into the bottle. Stand back.

What did you observe? Any indicators that a chemical reaction took place? Touch the bottle, how does it feel? Why do you think the mixture acted as it did? Why did it foam up so much. It has to do with the molecules. There are a lot of oxygen atoms that make up hydrogen peroxide. When you mix the different ingredients together the oxygen atoms are released (the molecules are changed which is what a chemical reaction is) and they cause the mixture to foam up and appear to move on its own. For a more thorough explanation research "elephant toothpaste" online.

If you remember from above a physical change is a change in which the molecules stay the same. They aren't usually as exciting as chemical changes. Sure ripping paper is fun and putting food coloring in water looks like tiny fireworks, but here is a recipe for a really exciting physical change. You will need a bar of ivory soap and a microwave and the permission and help of an adult. Put the bar of ivory soap in the microwave for about 5 minutes. Wait a while before touching the soap after it is done. What is going on here? If you happen to have another bar of ivory soap put it in a dish of water. It floats. Ivory soap has a lot of little open spaces inside of it that are filled with air and water vapor. That is why it floats. It is less dense than water. Meaning that there isn't a lot of material packed closely together inside of it. When you microwave anything what it does is add energy to the item you are cooking. When energy is added to the air and water inside of the soap they start to move back and forth very quickly and they cause the soap to expand. The same thing happens when you pop popcorn in the microwave. There is a little bit of water inside of the kernel of the popcorn and as energy is added to it in the microwave it starts moving so fast that it explodes!

## **A Day in the Life of a Chemist**

If you really like mixing different things together and seeing what happens, you might be interested in becoming a chemist. There are all sorts of job opportunities for chemists. Some chemists create new materials that people use everyday, or they might work to find different chemicals that can mix together to make products we use better in some way, making plastic stronger, or more flexible for example. Chemists also work at making different types of makeup and medicines. Many of the foods we eat have chemicals added to them that make them last longer or appear to be fresher. If you decide to do your own chemical experiments be sure to ask an adult for help. Never ever mix cleaning chemicals together because they can be dangerous on their own and sometimes when you mix them they can produce gasses that can make you very, very sick!!

Next Month's experiment. Don't peek if you don't want to know!

Rocks that do what....? Float, Glow, Magnetic.... and more! Learn all about geology!

