

**January 5, 2008**

## **Blowing up Balloons**

Well the holiday season has come and gone now it's time to get back into the swing of things, and only two more days of vacation then back to school. I tried to get you to still use your brain a bit over the holiday and at the end of last week's column I asked a question: Do you think it is possible to blow up a balloon without using your lungs?

Did you think of any ways that you can blow up a balloon without using your lungs? I know of two different ways, ready to find out? Well read on and see what science can teach us today.

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

### **Materials (for both experiments)**

A bottle  
Balloon  
Hot water  
Cold water  
Bowl  
1 tbsp Baking soda  
125 ml Vinegar  
Funnel

### **Experiment I**

#### **Procedure**

1. Fill the bottle with hot water (you may want to get an adult to do this)
2. Fill the bowl with cold water
3. Let both sit for one minute, then carefully pour the hot water out of the bottle and quickly stretch a balloon over the opening.
4. Now place your bottle into the bowl with the cold water. What happens?

#### **Explanation**

When you put the warm water into the bottle you heated up the bottle and then when you poured the water out the water was replaced with air and the warm bottle transferred its heat to the air, thus heating up the air. Then you trapped the air in the bottles when you covered it with the balloon. By placing the bottle into the cold water you cooled the air inside the bottle. When air is warmed it expands and takes up more space and when it is cooled it contracts, getting smaller and taking up less space, that is why the balloon gets sucked into the bottle and inflating it on the inside of the bottle.

To find out how to blow up a balloon on the outside of the bottle do the next experiment.

## **Experiment 2**

### **Procedure**

1. Take the bottle from and carefully pour the vinegar into the bottle using the funnel and set aside
2. Wipe the funnel dry
3. Use the funnel to put the baking soda into the balloon.
4. Carefully stretch the balloon over the opening of the bottle, letting the balloon hang, be careful not to get any of the baking soda into the bottle yet.
5. Ready now carefully pull the balloon up and let the baking soda fall into the bottle
6. Watch. What is happening?

### **Explanation**

The vinegar and baking soda react with each other to produce carbon dioxide a gas. But how do we know that carbon dioxide has been produced, well because you have covered the opening of the bottle with the balloon the gas has nowhere to go but into the balloon and thus blowing it up for you. The reaction stops because one of the two chemicals in the reaction has been used up. To get a bigger reaction use more baking soda and vinegar.

## **January 12, 2008**

Water is an amazing compound. Have you ever really thought about some of the properties of water that make it so neat and different from other liquids. This week I want to take a look at one of these special properties of water, its surface tension. Water has the ability to almost stretch out and not break. To see what I mean try this experiment.

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### **Materials:**

A glass of water  
Pennies

### **Procedure:**

1. Fill the glass full of water make sure you get it as full as possible, and set it on a flat surface.
2. Predict how many pennies you think that you can add to the glass before the water spills out.

3. Slowly and carefully add the pennies one at a time to the glass of water. Keep adding the pennies until the water spills over the edge of the glass.
4. How many pennies did it take? How close was your prediction?

### **Explanation**

Water molecules have a strong attraction for one another. Inside the glass, the molecules that are surrounded by other molecules are attracted in all directions. But the molecules at the surface have no water above them, so they are strongly attracted downwards by the molecules below them. These attractive forces are strong enough to keep the water from spilling over the top of the glass, even when the level rises quite a bit beyond it. But eventually the volume of water above the rim of the glass becomes too great for the surface tension to hold, and the water will spill.

### **January 19, 2008**

I try to have nice simple experiments for you to try every week that are fun and explain some scientific concept in a way that we can all understand. I think that this experiment achieves that nicely. We always hear about weight and friction but what exactly do they do, how does weight affect the way that something moves? How does friction slow things down? This experiment explains both of these things. The results might not be what you had expected before you try the experiment.

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### **Materials**

2 identical bottles or jars  
Binder (or something else to use as a ramp)  
Water  
Space on the floor

### **Procedure**

1. Fill up one of the bottles with water all the way to the top, you don't want any air in the bottle
2. Hold both bottles at the top of the ramp, ready to roll down it.
3. Let go of both bottles at the same time. Watch what happens, which bottle gets to the bottom first? Which bottle rolls the farthest?

### **Explanation**

It may surprise you but the bottle that is filled with water reaches the bottom of the ramp first. This is because the weight in this bottle is even distributed through out the entire bottle thanks to the water inside. The empty bottle has all of its weight on the outside (in the plastic or glass)

and so it doesn't roll as fast. When the jars get to the flat surface the weight inside the full bottle starts to slow it down, because of the friction between the bottle and the floor, and the water in the bottle and the bottle. So the empty bottle which is lighter has less friction and it rolls further in the end.

As an extension to this try rolling a bottle half full of syrup, make sure the bottle is half full or less and that the lid is on tightly. Watch how this bottle rolls down the ramp.

**January 26, 2008**

### **Sucking eggs into jars**

Have you ever seen something happen and then wondered how it could be done? Well this week I have an experiment that looks pretty neat, and with a little preparation you could use it for your own little demonstration. Have you ever seen someone suck an egg into a jar? It can be done; all it takes is a little science. Read on to find out how.

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#### **Materials**

Hard boiled egg with the shell removed

Jar with a mouth that is a little too small for the egg to fit through

Matches

Piece of paper

#### **Procedure**

1. Crumple the paper up into a ball
2. Light the piece of paper and drop it into the jar (an adult should probably do this)
3. Put the egg on the mouth of the bottle and watch what happens.

#### **Explanation**

Lighting the paper and putting it into the bottle caused the air inside the bottle to heat up and as it is heated up it expands. When the air cools down again it contracts. As it contracts it needs to pull more air into the bottle, but the egg is blocking the air flow, so it sucks the egg into the bottle, and more air flows in too, filling up the empty space in the bottle.

Now how do you think that we can get the egg out of the bottle without breaking the bottle? It's easier than you think. Hold the bottle upside down and carefully blow into it. The egg should now pop out. When you are blowing into the bottle you are pushing more air into the bottle and this forces the egg out. If this doesn't work, you may have to stick a straw or skewer into the bottle and chop the egg up and then flush it out with some water.