

# #1

## **Fizzy explosion bags**

1. Go outside - or at least do this in the kitchen sink.
2. Put 1/4 cup of pretty warm water into the bag.
3. Add 1/2 cup of vinegar to the water in the bag.
3. Put 3 teaspoons of baking soda into the middle of the tissue
4. Wrap the the baking soda up in the tissue by folding the tissue around it.
5. You will have to work fast now - partially zip the bag closed but leave enough space to add the baking soda packet. Put the tissue with the baking soda into the bag and quickly zip the bag completely closed.
6. Put the bag in the sink or down on the ground (outside) and step back. The bag will start to expand, and expand, and if all goes well...POP!

Cool huh? Nothing like a little chemistry to add fun to a boring afternoon. What happens inside the bag is actually pretty interesting - the baking soda and the vinegar eventually mix (the tissue buys you some time to zip the bag shut) When they do mix, you create an ACID-BASE reaction and the two chemicals work together to create a gas, (carbon dioxide - the stuff we breathe out) well it turns out gasses need a lot of room and the carbon dioxide starts to fill the bag, and keeps filling the bag until the bag can no longer hold it any more and, POP! Be sure to clean up well and recycle those plastic bags...have fun!

# #2

## **Walking Water**

For this experiment all you need is paper towel, a couple of glasses and some water .

We prefer to color the water to make it easier to see what is happening.

Fill one of the glasses with the water and raise it up higher than the other glass. Place a strip of paper towel from the top glass, ensuring it touches the bottom, down to the lower glass.

Now watch what happens as the paper towel absorbs and siphons the water through the paper into the lower glass.

It will take a little while ...but eventually the entire glass of water will empty into the bottom glass.

# #3

## bend water

A dry plastic comb

An indoor faucet

A head full of clean dry hair.

1. Turn on the faucet and slowly turn down the water until you have a VERY thin stream of water flowing.

2. Take the plastic comb and brush it through your hair ten times.

3. Now slowly bring the comb close the flowing water, (without actually touching the water) If all goes well, the stream of water should bend towards the comb! Magic you ask? Not really.

SCIENCE: When you brushed that comb through your hair, tiny parts of the atoms in your hair, called ELECTRONS, collected on the comb. These electrons have a NEGATIVE charge. Remember that, its important. Now that the comb has a negative charge, it is attracted to things that have a POSITIVE charge. It is similar to the way some magnets are attracted to certain metals.

When you bring the negatively charged comb near the faucet it is attracted to the POSITIVE force of the water. The attraction is strong enough to actually pull the water towards the comb as it is flowing! If you want to try another experiment with your comb, tear up pieces of tissue until they are as small as you can get them...I mean really small! Then charge your comb again by brushing it through your hair, and bring it close to the tiny pieces of tissue. If the pieces are small enough they will jump off the table to the comb the same way that the water was pulled to the comb. It is all thanks to the wonders of static electricity.

<http://www.sciencebob.com/experiments/bendwater.php>

## #4

### **Make a paperclip float!**

clean dry paper clips  
tissue paper  
a bowl of water  
pencil with eraser

Fill the bowl with water Try to make the paper clip float...not much luck, huh? Tear a piece of tissue paper about half the size of a dollar bill GENTLY drop the tissue flat onto the surface of the water GENTLY place a dry paper clip flat onto the tissue (try not to touch the water or the tissue) Use the eraser end of the pencil to carefully poke the tissue (not the paper clip) until the tissue sinks. With some luck, the tissue will sink and leave the paper clip floating!

How is this possible? With a little thing we scientists call SURFACE TENSION. Basically it means that there is a sort of skin on the surface of water where the water molecules hold on tight together. If the conditions are right, they can hold tight enough to support your paper clip. The paperclip is not truly floating, it is being held up by the surface tension. Many insects, such as water striders, use this "skin" to walk across the surface of a stream.

<http://www.sciencebob.com/experiments/paperclip.php>

## #5

### **a balloon rocket**

1 balloon (round ones will work, but the longer "airship" balloons work best)  
1 long piece of kite string (about 10-15 feet long)  
1 plastic straw  
tape

Tie one end of the string to a chair, door knob, or other support. Put the other end of the string through the straw. Pull the string tight and tie it to another support in the room. Blow up the balloon (but don't tie it.) Pinch the end of the balloon and tape the balloon to the straw as shown above. You're ready for launch. Let go and watch the rocket fly!

So how does it work? It's all about the air...and thrust. As the air rushes out of the balloon, it creates a forward motion called THRUST. Thrust is a pushing force created by energy. In the balloon experiment, our thrust comes from the energy of the balloon forcing the air out. Different sizes and shapes of balloon will create more or less thrust. In a real rocket, thrust is created by the force of burning rocket fuel as it blasts from the rockets engine - as the engines blast down, the rocket goes up!

<http://www.sciencebob.com/experiments/balloonrocket.ph>

## #6

# **blow up a balloon**

A packet of yeast (available in the grocery store)

A small, clean, clear, plastic soda bottle (16 oz. or smaller)

1 teaspoon of sugar

Some warm water

A small balloon

**1. Fill the bottle up with about one inch of warm water**

( When yeast is cold or dry the micro organisms are resting.)

**2. Add all of the yeast packet and gently swirl the bottle a few seconds.**

(As the yeast dissolves, it becomes active - it comes to life! Don't bother looking for movement, yeast is a microscopic fungus organism.)

**3. Add the sugar and swirl it around some more.**

Like people, yeast needs energy (food) to be active, so we will give it sugar. Now the yeast is "eating!"

**4. Blow up the balloon a few times to stretch it out then place the neck of the balloon over the neck of the bottle.**

**5. Let the bottle sit in a warm place for about 20 minutes**

If all goes well the balloon will begin to inflate!

As the yeast eats the sugar, it releases a gas called carbon dioxide. The gas fills the bottle and then fills the balloon as more gas is created. We all know that there are "holes" in bread, but how are they made? The answer sounds a little like the plot of a horror movie. Most breads are made using YEAST. Believe it or not, yeast is actually living microorganisms! When bread is made, the yeast becomes spread out in flour. Each bit of yeast makes tiny gas bubbles and that puts millions of bubbles (holes) in our bread before it gets baked. Naturalist's note - The yeast used in this experiment are the related species and strains of *Saccharomyces cerevisiae*. (I'm sure you were wondering about that.) Anyway, when the bread gets baked in the oven, the yeast dies and leaves all those bubbles (holes) in the bread. Yum.

<http://www.sciencebob.com/experiments/yeast.php>

## #7

# Make your own rock candy

A wooden skewer (you can also use a clean wooden chopstick)

A clothespin

1 cup of water

2-3 cups of sugar

A tall narrow glass or jar

Clip the wooden skewer into the clothespin so that it hangs down inside the glass and is about 1 inch (2.5 cm) from the bottom of the glass. (as shown) Remove the skewer and clothespin and put them aside for now. Get a helpful adult! Pour the water into a pan and bring it to boil. Pour about 1/4 cup of sugar into the boiling water, stirring until it dissolves. Keep adding more and more sugar, each time stirring it until it dissolves, until no more will dissolve. This will take time and patience and it will take longer for the sugar to dissolve each time. Be sure you don't give up too soon. Once no more sugar will dissolve, remove it from heat and allow it to cool for at least 20 minutes. NOTE: While it is cooling, some people like to dip half of the skewer in the sugar solution and then roll it in some sugar to help jump start the crystal growth. If you do this, be sure to let the skewer cool completely so that sugar crystals do not fall off when you place it back in the glass. Have your friendly ADULT carefully pour the sugar solution into the jar almost to the top. Then submerge the skewer back into the glass making sure that it is hanging straight down the middle without touching the sides. Allow the jar to fully cool and put it someplace where it will not be disturbed. Now just wait. The sugar crystals will grow over the next 3-7 days.

Want colored rock candy? Add food coloring to your sugar water and make sure sure that it is pretty dark in color for the best result.

When you mixed the water and sugar you made a SUPER SATURATED SOLUTION. This means that the water could only hold the sugar if both were very hot. As the water cools the sugar "comes out" of the solution back into sugar crystals on your skewer. The skewer (and sometimes the glass itself) act as a "seed" that the sugar crystals start to grow on. With some luck and patience you will have a tasty scientific treat! Enjoy!

<http://www.sciencebob.com/experiments/rockcandy.php>

#8

## A hoop glider

A regular plastic drinking straw

3 X 5 inch index card or stiff paper

Tape

Scissors

1. Cut the index card or stiff paper into 3 separate pieces that measure 1 inch (2.5 cm) by 5 inches (13 cm.)
2. Take 2 of the pieces of paper and tape them together into a hoop as shown. Be sure to overlap the pieces about half an inch (1 cm) so that they keep a nice round shape once taped.
3. Use the last strip of paper to make a smaller hoop, overlapping the edges a bit like before.
4. Tape the paper loops to the ends of the straw as shown below. (notice that the straw is lined up on the inside of the loops)

. That's it! Now hold the straw in the middle with the hoops on top and throw it in the air similar to how you might throw a dart angled slightly up. With some practice you can get it to go farther than many paper airplanes

Can we really call that a plane? It may look weird, but you will discover it flies surprisingly well. The two sizes of hoops help to keep the straw balanced as it flies. The big hoop creates "drag" (or air resistance) which helps keep the straw level while the smaller hoop in at the front keeps your super hooper from turning off course. Some have asked why the plane does not turn over since the hoops are heavier than the straw. Since objects of different weight generally fall at the same speed, the hoop will keep its "upright" position.

[http://www.sciencebob.com/experiments/straw\\_hoop\\_plane.php](http://www.sciencebob.com/experiments/straw_hoop_plane.php)

## #9

# **chicken sounds**

A plastic drinking cup

- \* Yarn or cotton string (nylon string will not work well)
- \* 1 paper clip
- \* Paper towel
- \* A nail
- \* Scissors
- \* Water

Cut a piece of yarn about 20 inches (40 cm) long. Ask an adult to use the nail to carefully punch a hole in the center of the bottom of the cup. Tie one end of the yarn to the middle of the paper clip. Push the other end of the yarn through the hole in the cup and pull it through as shown in the picture. Get a piece of paper towel about the size of a dollar bill, then fold it once and get it damp in the water. Now it's time to make some noise! Hold the cup firmly in one hand, and wrap the damp paper towel around the string near the cup. While you squeeze the string, pull down in short jerks so that the paper towel tightly slides along the string. If all goes well - you hear a chicken!

This is an example of how a sounding board works. The vibrations from the string would be almost silent without the cup, but when you add the cup, it spreads the vibrations and amplifies them (makes them louder.) Pianos and music boxes use wood to act as a sounding board to make the instrument louder

[http://www.sciencebob.com/experiments/chicken\\_cup.php](http://www.sciencebob.com/experiments/chicken_cup.php)

# #10

## make your own slime

Elmer's glue (most kinds of white craft glue will work)

2 disposable cups

Food coloring (you pick the color)

Water

Borax Powder (available at most large grocery stores near the laundry detergent)

A plastic spoon (for stirring)

A tablespoon (for measuring)

Fill one small cup with water and add a spoonful of the Borax powder and stir it up. Then set it aside.

Fill the other small cup with about 1 inch (2.5 cm) of the glue.

Add three tablespoons (20 ml) of water to the glue and stir.

Add a few drops of the food coloring and stir it up until mixed.

Now the fun part...Add one tablespoons of the Borax solution you made earlier and stir well. Watch the slime form!

After the slime forms let it sit for about 30 seconds and then pull it off the spoon and play with it!

Tip: Keep your slime in a tightly closed plastic bag when you are not playing with it, and keep it away from carpet and your little sister's hair.

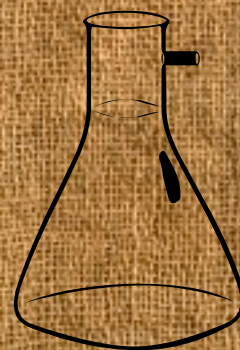
Now for the SCIENCE part.... This **POLYMER** is unique because it has qualities of both a solid *and* a liquid. It can take the shape of its containers like a liquid does, yet you can hold it in your hand and pick it up like a solid. As you might know, solid molecules are tight together, liquid molecules spread out and break apart (drops) POLYMER molecules CHAIN themselves together (they can stretch and bend like chains) and that makes them special. Jell-O, rubber bands, plastic soda bottles, sneaker soles, even gum are all forms of polymers. The polymer you made should be kept in a sealed plastic bag when you aren't playing with it. Also, be sure to keep it away from young kids or pets who might think it's food. Have fun

<http://www.sciencebob.com/experiments/polymer.php>





# Science Box



# Science Notes





# Experiment #1

# Experiment #2

# Experiment #3



# Experiment

## #4

# Experiment

## #5

# Experiment

## #6



# Experiment #7

# Experiment #8

# Experiment #9



# Experiment #10



