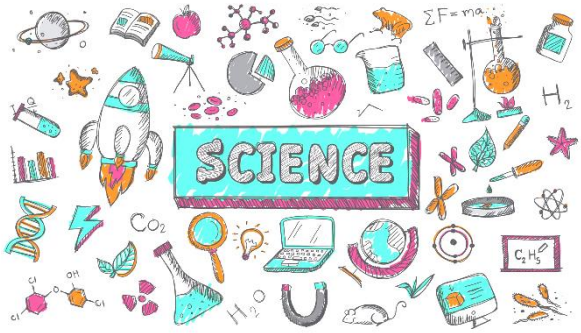
Braidhurst High School

SCIENCE DEPARTMENT



P7 Transition Booklet

DO Try This at Home!

Welcome to the Science Department at Braidhurst High School.

Under normal circumstances, we would be looking forward to showing you round our department soon and letting you have a try at some practical activities.

Because that is not possible at the moment, we have decided to bring the Science to you at home!

The next few pages have some experiments you can try in the house, using everyday substances you can easily buy from a supermarket, or in many cases you might already have. Check the shopping list on the next page.

Try each of these activities and try to think about the questions on each one, then read about the science behind each activity.

Good luck and enjoy. We are looking forward to meeting you all!

Shopping List

Vegetable oil

Fizzy tablets (eg Berocca or own brand)

Food colouring

String

Kitchen towel

Felt tip pens

Cornflour

Lemon

Lime

Bicarbonate of soda

Eggs

Spirit vinegar

PVA glue

Contact lens solution (eg Optrex)

Experiment 1: Homemade Lava Lamp

This uses everyday materials from your kitchen to create a fun lava lamp that will work over and over again!

What you Need:

Drinking glass / Jar

Vegetable oil

Water

Food colouring

Fizzy Vitamin C tablet (e.g. Berocca)

What to Do:

1. About 1/3 fill your glass with water from the tap.
2. Pour vegetable oil into the glass, leaving a small gap at the top. You will notice the oil and water will not mix!
3. Add some drops of food colouring to the glass. You will see the droplets will travel down through the oil and create a 'firework' effect when they reach the water.
4. Leave for a while so the colour diffuses (spreads) into the water.
5. Break your tablet into 4 pieces and drop them into the glass.

Questions to Think About:

1. What happened when you dropped the tablet into the glass?
2. What is created as the tablet reacts? Where does it go when it reaches the surface of the oil?

What's the Science?

Fizzy tablets contain a chemical called SODIUM HYDROGEN CARBONATE, which takes part in a chemical reaction with water to release CARBON DIOXIDE gas. As this gas is released it moves up through the water and into the oil (dragging the food colouring with it). When it reaches the top of the oil it escapes into the air and the food colouring (insoluble in the oil) drops back down into the water layer.

Experiment 2: Secret Bells

This experiment will help you to understand SOUND and how it travels.

What you Need:

String

Wire Coathanger/Metal Spoon/ Metal Fork

What to Do:

1. Take a length of string (approximately 60cm) and form a loop in the middle.
2. From the loop, hang a wire coathanger (if you can find one) or a metal spoon.
3. GENTLY swing the coathanger/spoon against a solid surface, such as a wall, table leg or kitchen cabinet. Listen to the sound it makes.
4. Now take the two ends of the string and carefully hold them in each ear with your fingers.
5. Keeping your fingers in your ears, gently swing the coathanger/spoon against the surface again.
6. Listen to the sound it makes now.

Questions to Think About:

1. How did it sound different when you held the string to your ears?
2. What happens if you change the object? What about non-metal objects?

What's the Science?

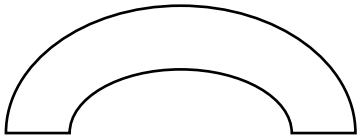
Sounds are basically a series of tiny vibrations. These vibrations travel in waves through the air. We hear sounds because these vibrations reach our ear drums and make these vibrate too, sending signals to the brain that we hear as sound. Sound travels quite well though the air (a gas) but travels much better through solids (such as the string and the hanger). When you put the string into your ears the vibrations were able to travel directly up the string and straight into your ears, sounding much clearer.

Experiment 3: Kitchen Towel Chromatography

In this experiment you are going to see a process called CHROMATOGRAPHY in action.

What you Need:

- Kitchen Towel
- Scissors
- Felt tip pens
- 2 small glasses
- Water



What to Do:

1. Cut half a sheet of kitchen towel into a rainbow shape, making sure it is narrow enough to fit into the two small glasses.
2. Colour the two ends of the shape with the colours of the rainbow using felt tip pens.
3. Carefully place the two ends into a small glass of water, supporting the paper in the middle.
4. Watch what happens to the colours.

Questions to Think About:

1. What did the water do when you placed the kitchen towel into the glasses?
2. What happened to the ink as the water travelled up the paper?
3. Try using black marker. Do you see anything different?

What's the Science?

The water molecules move into the spaces in the dry paper and are pulled upwards. As they move upwards they drag the coloured inks with them, because they are SOLUBLE in the water. Water in this case is a SOLVENT. CHROMATOGRAPHY is used to separate out chemicals that have different solubilities and are dragged different distances across the paper.

Experiment 4: Cornflour Quicksand

This experiment might make you think again about what you know about solids and liquids!

What you Need:

- Cornflour
- Water
- Shallow tray / bowl
- Spoon / Spatula

What to Do:

1. Add half a box of cornflour to a bowl or shallow tray.
2. Gradually pour water over and mix until it looks like custard.
3. Run your fingers through the liquid.
4. Now try to punch the mixture with your fist.

Questions to Think About:

1. What do liquids behave like? Is this mixture like a liquid?
2. What do solids behave like? Is this mixture like a solid?
3. Can you pick up the mixture? What do you need to do to make sure it doesn't run through your fingers?

What's the Science?

The mixture of cornflour and water (known as a suspension) doesn't seem to be able to make up its mind whether it is a solid or a liquid! The cornflour particles are suspended in the water, so it flows like a liquid. But when you apply a force to it, the particles lock together, acting like a solid. As soon as the force stops, the slime goes back to being runny.

Experiment 5: Lemon/Lime Volcano

This experiment shows a chemical reaction that can happen between the acids in fruit juices and bicarbonate of soda. It will work with any citrus fruit.

What you Need:

- Lemon
- Lime
- Sharp knife
- Fork
- Food colouring
- Bicarbonate of Soda

What to Do:

1. Cut the two ends off a lemon or lime. Place the fruit on one of its flat edges on a plate from your kitchen.
2. Using the fork, squash up the fruit to partly hollow it out, this will release some of the juice.
3. Add a few drops of food colouring into the top of the fruit.
4. Add a large spoonful of bicarbonate of soda to the top of the fruit, then use the fork to mix it a little with the juice.
5. Watch what happens!

Questions to Think About:

1. What happened when the bicarbonate of soda came into contact with the fruit juice?
2. Was there any difference between the lemon and the lime?
3. What other fruits could you use? Do they react differently?

What's the Science?

Fruit juices contain CITRIC ACID which when mixed with bicarbonate of soda reacts to form CARBON DIOXIDE and SODIUM CITRATE. The release of the carbon dioxide is what causes the fizzing and bubbling.

Experiment 6: Bouncy Egg

This is an experiment that needs to be set up and left somewhere for a couple of days.

What you Need:

An egg

Spirit Vinegar

Drinking glass

What to Do:

1. Place an egg (uncooked, still in its shell) into a drinking glass.
2. Pour in enough spirit vinegar to completely submerge the egg.
3. Leave in a safe place for 48 hours.
4. After two days, remove the egg from the glass and rinse under tap water. While rinsing, gently rub the outside of the egg and the white film will come off, leaving you with a transluscent egg.
5. Examine the egg, then lift about 5 cm above an (easy to clean) kitchen surface and let go!

Questions to Think About:

1. What visible differences can you see once the egg had been in the vinegar for 2 days?
2. Hold the egg up to the light? Can you see the yolk inside?
3. What happened when the egg hit the surface?

What's the Science?

Vinegar is a kind of acid (ACETIC ACID) and egg shells are made of CALCIUM CARBONATE. Over the two days the egg is left for, the acid dissolves the calcium carbonate shell just leaving the flexible inner membrane, which leaves the egg bouncy.

Experiment 7: Making Slime!

This experiment uses a few things that might be a little harder to find in your house.

What you Need:

- PVA Glue
- Bicarbonate of Soda
- Contact Lens Solution (eg Optrex)
- Food colouring
- Glitter (optional)

What to Do:

1. Pour some glue into a plastic cup or old yoghurt tub.
2. Stir in the food colouring and glitter (if desired).
3. In another cup/glass, mix a spoonful of bicarbonate of soda with a little water, then add this mixture to the glue.
4. Stir the mixture until smooth.
5. Pour in 2 tablespoons of the contact lens solution and stir slowly. The mixture should begin to harden, becoming stringy.
6. Continue mixing slowly until a ball of slime forms.
7. Pick up the slime and work between your two hands, until smooth.
8. If the mixture is particularly slimy, add in another ½ tablespoon of contact lens solution as needed.

Questions to Think About:

1. When did the slime start to change?
2. What happens if you include shaving foam in the mixture?
3. Can you make different slimes? Stretchy? Bouncy?

What's the Science?

A chemical reaction takes place when you mix a chemical called BORAX (found in contact lens solution) and PVA glue. When dissolved in water, the borax molecules combine in a new way with the PVA molecules, forming a new substance, slime!