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STEAM: S is for Science

Rainbow Flowers

Thirsty Plants

Just like you or me, plants need to drink water in order to survive. They do this through something called the **xylem**. Think of it like a straw whose job it is to suck up all the water and move it up towards the plant from the roots. This straw-like process is called **capillary action**.

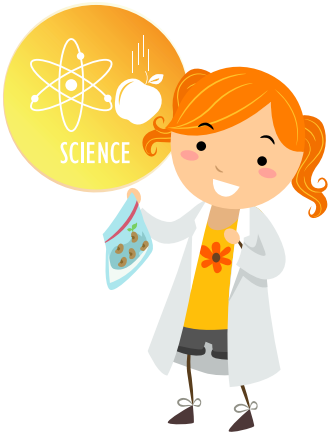
When we cut flowers off a plant, they still require water in order to survive a little bit longer. While the flower will not survive once it has been cut away from the root system, keeping them in water means you can enjoy them for a few more weeks.

Did you know that cut flowers like being in warm water, not cold? If you change their water every few days, they will also last longer!

In order to see how plants drink, let's making the **capillary action** visible with an experiment. We are going to put cut flowers into dyed water to see what happens. What do you think will happen to the flowers?

Materials

- Glasses
- Food colouring
- White or pale flowers (Carnations work well)



Experiment

Step One:

Trim the stem of your flowers so that they fit easily in your glasses.

Step Two:

Fill your each of your glasses with water and add in 10–15 drops of food colouring, making sure to mix it well (use a variety of colors and don't forget you can create your own colours by mixing the food colouring).

Step Three:

Add your flowers to the glasses and check on them over the day. Observe any changes. (Once the experiment is complete you can move them back into clean water and they will keep their colour).

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Non-Newtonian Fluids: Slime Lab

Solids, Liquids, and Gasses

All around us is something called **matter**. This can be anything that takes up space and it normally comes in three forms: **solids, liquids and gasses**.

Solids: Solids keep their shape and even though they can be cut and dented, this only changes the shape into a new one. For example, an apple is a solid. This can be cut and it will still remain a solid, just with a different shape. A solid is made up of tightly packed **molecules** that don't move easily.

Liquids: A liquid will fit its shape to the container into which it is poured. A liquid has **molecules** that are looser and not compacted together as tightly which mean they move about easily.

Gasses: Gasses are the only state that can be invisible – solids and liquids can be transparent like glass or water, but not invisible. Gas **molecules** are spread far apart and can be compressed and squished when needed.

All right, let's test your knowledge on **matter** with a game of solid, liquid or gas? Circle the Gasses Green, the Solids Red, and the Liquids Blue.

Now that you understand different states of matter, let's see it in action! We can use something as simple as water to see all three states.

Solid water is called ice. This is water with the lowest energy and temperature.

Liquid water is just called water. As ice heats up it will change phases to liquid water. You can leave ice at room temperature and watch this happen.

Gas water is called steam or vapor. When water boils it will turn to vapor. If you pour boiled water into a mug, you will see the steam rising from the top which is our gas water.

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Now that you are an expert on **matter**, let's look at another state called **Non-Newtonian**.

Non-Newtonian Fluids are something that is neither a solid or gas. One of the most common forms of Non-Newtonian fluids is Slime. Did you know that slime can be found everywhere in nature? Think of a snail's slime that it coats itself in, or the parrot fish who burbs out slimy mucus to sleep in. Even humans produce slime with snot and mucus!

However, there is a way we can make slime that's a little less gross! Let's get to it and see how its state compares to our solids, liquids or gasses.

Materials

- Elmer's washable school glue
- Edmond's cornflour
- Food colouring
- Moisturiser

Experiment

Step One:

Pour 1/3 to 1/4 cup of glue into a bowl

Step Two:

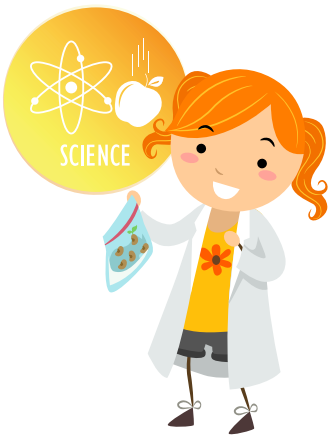
Add food colouring and mix

Step Three:

Slowly add in 3 times the about of cornflour as glue, making sure to mix as you go. If the mixture is still too sticky, add in more cornflour so that the mixture can be kneaded and forms together as one big blob.

Step Four:

Add in a small amount of moisturiser so that the slime has more give. It should now be smooth and stretchy!



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Magnetic Fields: Compass Creation

Magnetic Fields Did you know that our Earth has **magnetic fields**? The Earth's core is made of iron that is part liquid and part solid crystal. The liquid, which sits in the outer core, is believed to be what produces these magnetic fields. Like any magnet, these have a north and sole pole and because of this, we can use these magnetic fields to navigate or find our way around.

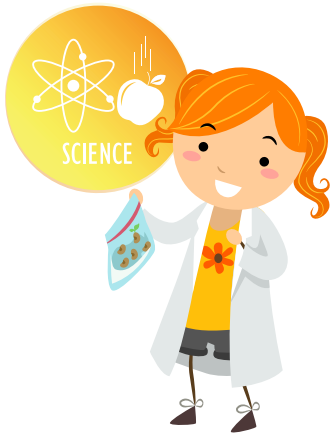
Before we had Google or GPS's, compasses were the most common and oldest tools available to navigate. A compass is really just a magnet that use the Earth's magnetic fields to rotate and provide direction.

Do you know what way is North, South, East and West from where you live?

We are going to learn how to make our own compass out of a few household items and use the Earth's magnetic fields to help us.

Materials

- A magnet
- A small cork
- A blunt needle
- A compass (to test if our homemade compass works. These can be downloaded on a smartphone or device)
- A large bowl of water
- Tape



Experiment

Step One:

Rub the magnet over your needle for about 10-15 seconds. This will magnetise the needle.

Step Two:

Securely tape your magnetised needle to the small cork.

Step Three:

Drop the needle and cork into bowl of water and watch as the needle spins until it faces North. Test this against your compass and repeat the experiment to make sure it works consistently.