

### **May 3 – Geotropism**

As everyone is getting ready to plant their gardens and flower boxes for the summer I was reminded of another one of my science fair projects. I did this experiment years ago in grade 4, and I thought that it would be a good spring activity for kids to try. It will explain some things about how plants grow, and why it doesn't matter what way you put a seed in the ground its stem will always grow towards the sky and the roots will always grow down into the ground.

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

#### **Materials**

Mason jar  
Construction paper  
8 Bean seeds  
Paper towel

\*If you want to have a control (which is a good idea) you will need doubles of everything

#### **Procedure**

1. Soak the bean seeds over night to start germination (Starting the seed growth after a period of dormancy).
2. Cut the construction paper to fit around the inside of the jar
3. Stuff the inside of the jar and construction paper with crumpled up paper towels
4. Fill the jar with water
5. Let the paper towel absorb as much water as it can then pour off the rest of the water
6. Push the bean seeds between the construction paper and the glass jar
7. Space them out about half way down in the jar in different positions (up and down, sideways). If you put the seeds down to far the experiment will take too long.
8. Put the jars in a sunny area but not in direct sunlight
9. Keep them where you can easily check on them each day
10. Check the paper towel regularly to make sure it is wet, water as needed
11. Watch what happens as the seeds start to grow. Which way are the roots growing? How about the stem?
12. After the stem has grown a little but above the top of the jar lay the jar on its side and let the plants continue to grow (if you have two jars leave one upright).
13. After a few days check your plants again. What way are the roots growing now? How about the stem?

#### **Explanation**

You started the seeds in all different directions to show that no matter what way they were facing the roots always grew down towards the Earth and the stems always grew up towards the top of the jar and the sky. When you flipped the jar on it side you should have noticed that the roots and stems turned, the roots should always grow down, and the stem should always grow up, even when you turn the jar on its side, so they will turn and continue to grow in the right direction. Why does this happen? There are certain growth hormones in plants that respond to the Earth's

gravitational pull. This makes the roots grow down and the stems grow up no matter how you plant the seed or how they are turned while growing. This is called geotropism; it is a Greek word meaning turning to earth. This makes it easier for us as we don't have to worry about what way our seeds are facing when we plant them.

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### **May 17 - Earth's Orbit**

Astronomy and space are two topics that have always fascinated me, how our Earth interacts with the sun and moon and other planets is really interesting. When you think about it, it is pretty neat the way the planets stay in their orbit around the sun and never fly right into the sun, or fly away into outer space. Have you ever sat down and thought about it? I have an experiment this week that will help to explain why Earth stay right where it is in its orbit around the sun.

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

#### **Materials:**

Pop bottle with a lid  
Marble

#### **Procedure:**

1. Put your marble in the pop bottle and put the lid on
2. Swirl the marble in the bottle in a clockwise direction, the marble will start to creep up the wall of the pop bottle
3. Watch what happens as you continue to spin the bottle, then what happens when you stop spinning the bottle

#### **Explanation:**

To start off we all need to remember that Earth and the other planets all move around the sun in circular patterns called orbits, in this experiment the marble represents Earth or one of the other planets moving around the sun.

When you started to spin your bottle you should have noticed the marble start to move up the sides of the bottle. Your marble will stay on the sides of the pop bottle as long as you keep the bottle moving in the same direction, and at roughly the same speed, this is due to a force called centrifugal force. It is this same centrifugal force that keeps Earth and the other planets from leaving their orbits and crashing into the sun.

The marble stayed in orbit around the bottle because of the sides of the bottle, which act the same as the sun's gravitational pull on the Earth. You have to keep spinning the bottle to keep the

marble on the sides of the bottle because it is the speed of the marble that keeps it moving around the bottle where it does, same as the Earth's speed of orbit which is really really fast (Earth moves around the sun at roughly 30 kilometers per second) keeps it from getting any closer to the sun.

The combination of the centrifugal force, and the sun's gravitational pull that keep the planets orbiting around the sun the way they do.

Have a great week!

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### **May 24 - Making Homemade Plastic from Milk and Vinegar**

There has been a lot in the news about plastics and some of the harmful chemicals that can be found in them. This week we are going to make a little bit of plastic to play with but don't worry it is an all natural plastic that has none of the harmful chemicals in it, it is made from just two ingredients found in your kitchen.

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

#### **Materials**

Half cup of heavy cream (or Milk)  
Vinegar (lemon juice will also work)  
Pot  
Food coloring (optional)

#### **Procedure**

1. In a pot slowly heat the cream, until simmering (an adult should probably do this for you).
2. Then slowly stir in a few spoonfuls of vinegar.
3. Slowly add more vinegar one spoonful at a time until the mixture begins to gel.
4. Remove from the heat, and allow to cool to room temperature.
5. Now take and rinse the mixture with water. What's left? Little plastic curds for you to play with.
6. Add a few drops of food coloring and work into the plastic.

#### **Explanation**

The acid in the vinegar reacts with the casein (Phosphoprotein) in the milk precipitating it out (forming a solid) making the plastic.

This type of plastic is much too expensive for household use. Casein based plastics are typically used for knife handles or knitting needles.

Oil-based plastics are much cheaper since the raw materials needed are much easier to come by. But alas, even oil is a resource that will someday run out. Scientists know this and are hard at work searching for new ways to make plastic, and for ways to make plastics safe for our everyday use.

I found that if I put the plastic in a baggie and put it in the fridge it worked great as an ice pack the next day.

Have a great long weekend (the last one of the school year), hopefully it will be nice out.

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### **May 31 - Bottle Rockets**

This weekend is Spectrum, I am keeping my fingers crossed that we have good weather for it. Praxis will be downtown with a booth full of fun, interesting hands on science activities for kids, and adults to try. Here is a sneak peek at one of the activities that we may have there for everyone to try out, our balloon rockets, so you can try it out at home too, just make sure that you are in area that is open and there is no one else around who could get in the way.

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

#### **Materials:**

500 ml bottle

Cork to fit in the bottle (you can decorate it with ribbons and streamers if you want)

Water

Alka-Seltzer tablet

Lots of room away from other people outside

#### **Procedure:**

1. Fill the bottle about half full with water
2. Break an Alka-Seltzer tablet in half
3. Drop half of the Alka-Seltzer tablet into the bottle
4. Quickly put the cork into the bottle
5. Point the bottle away from anyone and watch your cork fly

#### **Explanation:**

Your cork should have popped off the top of the bottle and flew through the air. Alka-Seltzer is made of aspirin, Baking soda (sodium Bicarbonate), and citric acid. As the tablets dissolve in the water the base (the baking soda) and the acid react vigorously to produce carbon dioxide gas, the gas then builds up in the bottle until the pressure pops the cork off the top so that the gas can escape.

Hope to see everyone downtown at Spectrum today and tomorrow, make sure you stop by and say hi!

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