

February 6

I am not sure if it is just me, but wherever I go, I seem to get shocked all of the time! What is going on? Do you know what is happening? Well, I think that we had better further investigate something called static electricity.

Remember to ask an adult before doing this experiment.

Materials

Salt

Pepper

Measuring spoon

Wool cloth (an old wool sock will also work well)

Plastic ruler

Piece of white paper

Procedure

1. Measure 10mL of salt.
2. Place the salt on the sheet of white paper.
3. Measure 10mL of pepper.
4. Place the pepper on the white sheet of paper.
5. Using the measuring spoon, carefully mix up the salt and pepper.
6. Take the ruler and rub it with the wool cloth ten times.
7. Set the wool cloth aside
8. Hold the plastic ruler over the mixture.
9. What is going on?
10. You will see the pepper become attracted to the ruler.

Explanation

In this experiment, you created something called static electricity. Static electricity is the build up of an electric charge on the surface of an object. This may sound pretty simple, but the science behind static electricity is a bit more complicated than one might think. We should start with atoms. Did you know that all matter has atoms? Everything around us is made up of atoms and combinations of these atoms. These atoms are made up of even smaller particles. The middle of each atom contains a nucleus. This nucleus contains two kinds of particles. These particles are called protons and neutrons. Even smaller particles called electrons are also in there, and they are orbiting around the nucleus.

Generally, the protons and neutrons in the nucleus of an atom are held together very tightly. Normally, the nucleus does not change. But sometimes, the outer electrons in the atom are loosely held together and can move from one atom to another. When we create static electricity, some of the electrons will move from the atoms of one item to another. In this experiment, the pepper moved to the ruler.

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February 13

I am sure that many of you are excited as the 2010 Olympics start in Vancouver. The athletes that we send to the games have trained and worked very hard for many years. It is not something that you may realize, but their training incorporates many parts of the sciences. For instance, there is sports nutrition, physiology, biology, and even chemistry to name a few. I thought that we could look at some of the science behind ice skating this week. We will be investigating how they are able to spin so fast and then slow down so quickly!

***Remember to ask an adult before doing this experiment.**

Materials

chair (one that swivels)
2 heavy books
an assistant

Procedure

1. Have your assistant place the chair in the middle of the room away from all objects.
2. You can have your assistant now sit in the chair.
3. Make sure they are sitting up straight and their feet are firmly planted on the floor.
4. Place both of the books on your assistant's lap.
5. Give the chair a push just once. Do not touch it again.
6. What happens?
7. Hand the assistant one of the heavy books. They can hold this book in their left arm.
8. Take the other book and have your assistant hold it in their right arm.
9. Make sure that they are holding their arms close to their body to begin with.
10. Give the chair a push so it will spin around.
11. Have your assistant slowly push their arms out and away from their body until they are fully extended.
12. What happens this time?
13. Have your assistant start with their arms extended.
14. Give the chair a push.
15. What happens now?

What is going on?

The first time your assistant sat in the chair, they spun around and gradually came to a stop. When your assistant moved the books slowly away from their body, they slowed down much quicker. The final time when the assistant started with their arms out and slowly brought them in closer into their body, this actually allowed them to speed up a bit.

In this experiment, you were investigating something called **angular momentum**. Angular momentum is equal to the mass of an object times its speed times the radius of a circle the object is moving in. In this experiment, the only things that change are the speed and the radius of the circle. When you bring the books closer to your body, you decrease the radius of the circle in which you are rotating. In order to compensate for this decrease, your speed increases to maintain the same amount of angular momentum.

February 20

This relates to Olympic Figure Skaters. I am sure that you have seen an ice skater spin with their hands out initially. By starting in this position, they have a large radius (circle). Slowly, they bring their arms in and closer to their body which allows them to spin really fast! When they are ready to slow down, they extend their arms outwards and so on.

I hope that you will take the time to enjoy some of the Olympic events now that we have investigated the science behind them!

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As I sit and write this article this week, I am looking outside and see the beautiful snow falling ever so gently outside. Have you ever thought about what snow really is? Technically speaking, snow is precipitation formed by the sublimation of water vapour into a solid when the temperatures are below freezing. Conditions are perfect this week, which makes it a perfect time to investigate snowflakes and what they look like! Let's get started.

***Remember to ask an adult before doing this experiment.**

Materials

Black construction paper
Magnifying glass
Snow
Small ruler
Pencil
Science Journal (notebook)

Procedure

1. Place the construction paper in the freezer. Because snow melts so fast, the paper needs to be icy cold before the snowflakes touch it.
2. Dress warmly, and make sure you do not forget your mittens!
3. Take your piece of paper out of the freezer.
4. Go outside and collect snowflake on your paper.
5. Carefully examine the snowflakes with the magnifying glass.
6. What does your snowflake look like?
7. Draw a picture of your snowflake in your journal.
8. How many sides does the snowflake have?
9. Measure the snowflake with your ruler.

10. How many different snowflakes did you find?

Explanation

Different kinds of snow crystals result from certain combinations of conditions—particular temperature and moisture level in the clouds near the Earth’s surface. There is an international system for grouping snow crystals based on the structure of the crystals. When ground temperatures are near the freezing point, needle crystals are formed (-5 to -10 degrees C). They are often packed closely to make a dense, stiff snow. Columns are formed over a wide range of temperatures (-15 to -25 degrees C) when conditions are less moist. Plates are flakes that are formed at temperatures of -10 to -20 degrees C. Dendrites are beautiful hexagonal ice crystals with complex and often fern like branches. Enjoy looking at the beautiful different snowflakes you have collected. I am often told that there are no two that are identical!

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February 27

I am sure that many of you have been taking in the Olympics the past couple of weeks. It has been an exciting time for Canada! Of course, as I watch the different events at the Olympics it makes me wonder about the science behind the event. A couple of exciting events this past week have been skiing and snowboarding. Have you ever watched the skiers and boarders before the event? Do you know that they are doing to their equipment? Why? Well, let us investigate!

***Remember to ask an adult before doing this experiment.**

Materials

saw
two pieces of wood (1x4)
paraffin wax
measuring tape
ice cubes
pencil
assistant

Procedure

1. Measure the board and mark off 60 cm.
2. With the help of an adult, use the saw to cut the board.
3. Measure another length of 60 cm.
4. Have the adult cut this piece off as well.
5. Take the piece of paraffin wax and rub ONE of the boards on ONE side. Be patient, this may take a while, as it needs to be coated REALLY well.
6. Find an empty area to work (preferably a sturdy table).
7. Place the board that does not have the wax on it, flat on the table.
8. Have your assistant hold the ruler on the side of the board.
9. Place an ice cube on the board.

10. Slowly raise the board up.
11. Measure how high you had to raise the board until the ice cube began to slide down the board.
12. Repeat with the board you applied the wax to.
13. How high did you have to lift it? Was it higher or lower than the board without wax?

Explanation

The ice cube should have slid down the waxed board when the board was held at a lower height. This is because you decreased the friction on the waxed board. Friction is the force that resists motion when one material rubs against the surface of another object. In this case, when you waxed the board, you made it really smooth, which decreased the friction, and made it easier for the ice cube to slide down.

Skiers and snowboarders also do this. They wax the bottoms of their equipment in order to decrease the **friction** between them and the snow so they can move faster down the hill (and hopefully win the gold medal!).

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