



Science Unit: *Weather and Seasons*

Lesson 5: *Storms and Extreme Weather*

School Year: 2009/2010

Developed for: Sir Guy Carleton and Sir Sandford Fleming Elementary Schools, Vancouver School District

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Grade level: Presented to grades K and 1/2; appropriate for grades K – 5 with age appropriate modifications

Duration of lesson: 1 hour and 20 minutes

Objectives

1. What causes storms? What is a hurricane, tornado?
2. Discover static electricity and how it relates to lightning.
3. Learn about the causes of thunder and lightning and make your own.

Background Information

Storms are any major disturbance in the earth's atmosphere, affecting the earth's surface with extreme weather. They are often characterized by strong winds, and heavy precipitation (rain, snow, hail, or ice). There are many types of storms including thunderstorms, hurricanes and tornadoes. Hurricanes are severe tropical storms with winds greater than 116 km/h and heavy rains, and they occur in the North Atlantic or Northeast Pacific Oceans. Tornadoes are windstorms made of a funnel of rotating air that touches the ground. This funnel of air moves very fast and like hurricanes, can be very dangerous and can cause widespread damage. A thunderstorm is an electrical storm characterized by a strong electrical discharge (lightning) and its loud sound effect, thunder. One always sees the lightning first and then hears the thunder, as light travels many times faster than the speed of sound. One can count the seconds between the first flash of lightning and the first rumble of thunder. Take the number of seconds and then divide by 3 to get the distance of the thunderstorm from you (in km.)

Vocabulary

<u>Air:</u>	An invisible mixture of gases that takes up space and has weight.
<u>Atmosphere:</u>	The envelope of gases that surrounds a planet. Earth's atmosphere is made up of mostly nitrogen and oxygen and we commonly call it air.
<u>Weather:</u>	Condition of the atmosphere in a specific place at a particular time.
<u>Climate:</u>	The average weather in a region over a long period of time.
<u>Cloud:</u>	A visible mass of water droplets that float in the atmosphere.
<u>Wind:</u>	The horizontal movement of air
<u>Current:</u>	The vertical movement of air
<u>Atmospheric Pressure</u>	The pressure caused by the weight of the atmosphere. Atmospheric pressure can be measured by a barometer.
<u>Storm:</u>	A severe weather disturbance in the atmosphere usually bringing strong winds and



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precipitation (rain, hail, ice, or snow) that affect the earth's surface.

Thunder: The very loud sound made by lightning and caused by a sudden increase in temperature and pressure and the rapid expansion of air.

Lightning: A powerful electrical discharge occurring during a thunderstorm

Electric Charge: The basic property of electrons (negatively charged particles) and protons (positively charged particles) which attract each other.

Hurricane: A severe tropical storm with wind speeds exceeding 116 km/h and towering clouds bringing torrential rain.

Tornado: A violently rotating cloud that touches the ground.

Materials

- 2 empty transparent 2 liter pop bottles,
- rubber connector for pop bottles
- food colouring
- paper lunch bags
- balloons
- sharp pencils or pins
- mirrors
- wintergreen lifesaver candies
- duct tape
- wool, silk, or synthetic cloth
- paper clips
- modeling clay
- plastic strips
- aluminum pie plates
- Styrofoam

Introductory Discussion

What is a storm? What causes a storm? Have you ever been in a storm? What did you feel? What kind of storms are there? Does anyone know what a tornado is? Or a hurricane?

Demonstration 1: Using two pop bottles and a rubber connector, fill one bottle with water and add a few drops of food colouring. Connect the bottles and swirl them vigorously. Then place them on a table and watch the "tornado" as the liquid in the top bottle drains into the bottom one.

Demonstration 2: Using a large glass bowl, fill the bowl 2/3 with water. Stir the water gently until the water is moving in a circle around the bowl. Now add a few drops of food colouring and watch the colour move out to form bands, like clouds do in a hurricane.

Science Activity/Experiment

1. Make Lightning: Blow up a balloon and try to rub it on your head or clothes. Now try to stick the balloon to the wall. Will it stay? What makes it stay? What made your hair stand on end? This is static electricity, similar to the electricity in lightning.



In groups of 3 or 4 students collect items necessary to make lightning (aluminum pie plate, wool, synthetic or silk cloth, Styrofoam, pencil with eraser and a push pin). Stick the push pin through the bottom of the pie plate and attach it to the eraser of your pencil. This is the handle. Now try and create static electricity on your Styrofoam tray by rubbing it on your hair, the carpet, or using a piece of cloth. When it is “charged” hold your pie plate by the pencil handle and place it on the Styrofoam tray without touching the metal. Darken the room and now using your finger or a pair of scissors or a screwdriver, touch it to the side of the pie plate. You should feel, see and hear an electric shock.

Hand out one wintergreen lifesaver candy and a mirror to each student. Darken the room and have the students start to chew on their lifesaver with their mouths open. Holding the mirror in front of them, see if they can see tiny sparks caused by the differently charged candy chunks (sugar crystals) and the wintergreen oil.

2. Make Thunder:

Try to make thunder by blowing up a small paper lunch bag. Quickly close the bag with your hand. Now with your other hand clap the bag until it bursts. Hear the bang and feel the air rush out of the bag through the rip. Try blowing up a balloon and pushing a sharpened pencil or pin into it. Hear the bang and feel the air rush out. This sudden expansion of air, after it has been compressed, makes the sound and this is what makes thunder rumble.

Closure Discussion

What causes storms? What is the difference between a tornado and a hurricane? How can we tell how far away a lightning storm is? What part did you like best? What part did you not like? Why?

References:

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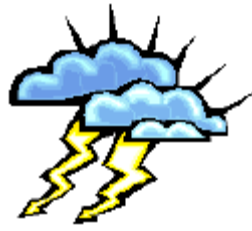
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Making Lightning

Name: _____

I need:

I set up:



I observed: (draw, label and colour)

I learned:



How to make thunder:



I learned:
