



**Science Unit: *Weather and Seasons***

**Lesson 4: *Wind and Air Pressure***

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 is wind?
2. Learn about how warm air rises and cool air sinks.
3. Explore how to make an anemometer to measure wind speed.
4. Discover aspects of air pressure and how to make a barometer.

**Background Information**

Wind is the horizontal movement of air. Warm air molecules have more energy and move around faster compared with slower-moving cold air molecules. Warm air molecules are also spaced further apart. This makes warm air less dense and it will rise, whereas colder heavier air sinks. When warm air rises, it leaves areas of low air pressure and cool air rushes in to fill the void: this is what makes wind. Wind moves from areas of high pressure to areas of lower pressure. Wind is often seen at the beach. This is due to the unequal heating of the land and sea. Warm air from the land rises, leaving an area of lower pressure, and cooler, heavier air from the sea moves horizontally to fill the space. This is what gives us a cool sea breeze during the summer months. Topography, water bodies, and the rotation of the earth all affect wind.

**Vocabulary**

Air: An invisible mixture of gases that takes up space and has weight.  
Atmosphere: 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.  
Weather: Condition of the atmosphere in a specific place at a particular time.  
Climate: The average weather in a region over a long period of time.  
Wind: The horizontal movement of air  
Current: The vertical movement of air  
Atmospheric Pressure: The pressure caused by the weight of the atmosphere. Atmospheric pressure can be measured by a barometer.  
Anemometer: An instrument that measures wind speed.  
Barometer: An instrument which measures air pressure



## Materials

- 2 empty transparent bottles, one with a hole in the bottom
- Balloons
- Electric Fan
- Transparent tub or large jar
- Small jar
- Food Colouring
- Tin foil
- Elastic bands
- Poster with the Beaufort Wind Scale
- Tape
- Rulers
- Tin cans
- Balloons
- Cardboard
- Ping Pong balls
- Strong thread
- Petroleum jelly
- Plastic yogurt or deli lids

## Introductory Discussion

What is wind? How does wind form? Where does it come from? Sometimes there is no wind and sometimes we have lots of wind? Why?

Demonstration 1: Does air push on things? Using a pop bottle, place a balloon inside the mouth of the bottle with the lip of the balloon stretched over the top of the bottle, so that you can blow the balloon up inside the bottle. Ask the students what might happen if you try and blow the balloon up. Then try it. Next try to do the same thing with a bottle which has a small hole in the bottom of it. What happens? Why?

Demonstration 2: Does warm air and cold air weigh the same? Do they mix together?

Using a large transparent tub, fill it with cold water. Fill a small jar with hot water and put in a few drops of red food colouring. Cover the small jar with tin foil and secure it with elastic bands. Place the small jar inside the big tub. Then make a few holes in the tin foil lid with a sharp pencil. Watch with your eyes level with the tub. What is happening? Is the hot water mixing with the cold water? Is it lighter or heavier? This is the same with air, although we can't see it. (The red-coloured hot water should rise to the top of the tub and form a film on the surface of the water.)

## Science Activity/Experiment

### 1. Make an anemometer

Weather scientists record wind speed and direction. We will make a simple instrument to measure wind speed. We can try it out today with the electric fan, and we can try it outside on a windy day. Using a piece of cardboard and a drawing compass, draw out a quarter of a circle. Using a ruler, measure 5 even intervals and number them on the cardboard, starting with 0 at the bottom. Tape the cardboard on to a ruler or flat stick, so that a straight edge of the quarter circle is lined up with the ruler edge. Next get a ping pong ball and stick a long piece of thread to it. Tie the other end to the end of the ruler. You now have an anemometer. Try it out near the electric fan, by pointing the anemometer into the wind. Read how far the ping pong ball moves on your anemometer. On a windy day, let students take out their anemometers to measure wind speed by pointing them into the wind.

### 2. Make a barometer



To measure air pressure, weather scientists use a barometer. We will make a simple barometer using a tin can, a balloon and a straw. Stretch a cut balloon over the mouth of the clean, empty can. Secure it with an elastic band. Now place a long straw with one end in the middle of the balloon and tape it. The other end of the straw should be pointing out horizontally. Place your can next to a wall and tape a piece of paper on the wall. Mark the paper with a line where the straw reaches. During different days and times check the position of the straw. The straw will act as a pointer. When there is low pressure, the balloon will puff up and the straw should go down. During times when there is high pressure, the balloon will cave in and the straw should go up.

### **3. Make a wind catcher:**

To find out what the wind brings, let each student punch a hole in a plastic yogurt or deli lid. Tie a string through the hole. Give students a glob of petroleum jelly to smear on one side of their lid. On a windy day, hang the wind catchers from a tree branch or fence and leave them out for a few hours. Bring them in and with a magnifying glass look for things that the wind carried. (One may see dust particles, soil particles, bits of leaves, soot, etc stuck to the petroleum jelly.)

### **Closure Discussion**

Review: What makes wind? Where does hot air go? And cold air?

### **References:**

[www.weatherwizkids.com](http://www.weatherwizkids.com)

Levine, Shar and Leslie Johnstone. 2003. Wonderful Weather: First Science Experiments. Sterling Publishing Co. New York.

VanCleave, Janice. 1995. Weather: Spectacular Science Projects. John Wiley and Sons, Toronto.

Wyatt, Valerie. 1990. Weather Watch. Kids Can Press, Toronto.