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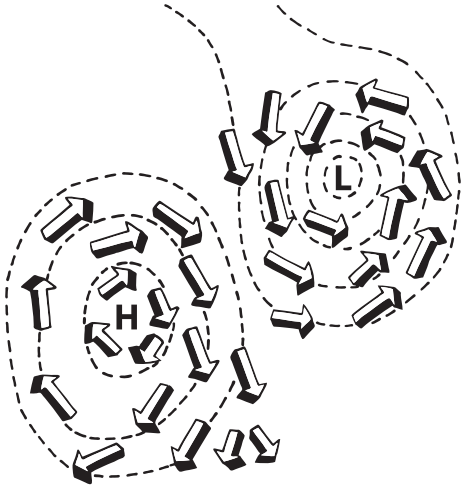
Wind

Unit 7

DID YOU KNOW THAT . . . ?

- *There are two **jet streams** (one in each hemisphere) several hundred miles wide which circle the earth about six miles above the ground.*
- *The polar jet stream in the Northern Hemisphere can reach speeds of 250 miles per hour.*
- *The highest wind speed ever recorded on the surface of Earth was at Mount Washington, New Hampshire on April 12, 1934. The speed was 231 miles per hour.*

WIND AND AIR PRESSURE



Air never stops moving. The constant circulation of air between areas of different temperature and air pressure creates wind. Wind carries heat and moisture throughout the world. Wind is dependent upon several factors. **Atmospheric pressure** and temperature create wind. Air moves from areas of high atmospheric pressure to areas of low pressure. Cold air is heavier and sinks creating areas of high pressure. These are called "**highs**." This sinking air absorbs moisture in the air and often signals light winds and clear skies with no **precipitation** (rain or snow). Warm air is lighter and rises into the atmosphere. This creates areas of low pressure called "**lows**" or "depressions." This rising warm air forms clouds and may bring wet weather.

Areas near oceans and seas often have local land and sea breezes created by the warming and cooling of air over land and water. Land heats up and cools down more quickly than water, and the cool air sinks and flows out to the sea at night and in from the sea during the day.

PREVAILING WINDS

Some winds blow all the time in the same place. They are called **prevailing winds**. These winds affect weather all over Earth. They are generated because the direct rays of the Sun heat the air at the **equator** more than the air at Earth's North and South poles. Hot air then moves north and south from the equator. Cooler air moves in to take the place of the warm air.

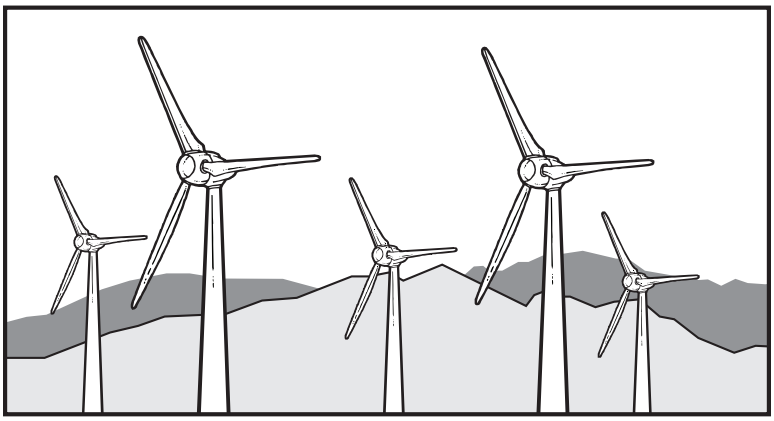
THE CORIOLIS EFFECT

The rotation of Earth spinning on its axis changes the direction of wind. Earth spins from west to east. This rotation of Earth deflects winds to the right in the Northern Hemisphere (above the equator) and to the left in the Southern Hemisphere (below the equator). This is called the **Coriolis Effect**. There is little wind movement along the equator itself.

Unit 7

Wind

WIND POWER



Man learned to harness the wind thousands of years ago. As early as 4000 B.C., ancient sailors fixed sails to catch the wind and move their boats. Windmills were used for irrigation by the Babylonians by 1700 B.C. Windmills have been used in flat countries, like the Netherlands, for many years to pump water and to grind grain into flour. Wind generators are used in many countries, including the United States, to generate electricity efficiently and inexpensively. Some states, such as California, have large "**wind farms**" of these electricity-creating turbines.

Facts to Remember

- *Wind is the movement of air.*
- *Air moves from areas of high pressure to areas of low pressure.*
- *The Coriolis Effect is the deflection of wind caused by the rotation of the Earth on its axis.*
- *The Beaufort Wind Scale expresses the force of wind in terms of a scale from 0 to 12—from no wind to hurricane-force winds.*
- *Some areas on Earth have constant, prevailing winds.*
- *Local winds can be created by the movement of warm and cool air from land to sea.*

VOCABULARY

atmospheric pressure—*air pressure created by temperature*

Coriolis Effect—*the deflection of winds due to the rotation of Earth*

equator—*an imaginary line around the center of Earth*

high—*high air pressure created by sinking, cold air*

jet stream—*a stream of winds several hundred miles wide*

low—*low air pressure created by rising warm air*

precipitation—*rain or snow*

prevailing wind—*a wind that blows all the time in the same area of Earth*

wind farm—*many wind-driven turbines used to generate electricity*

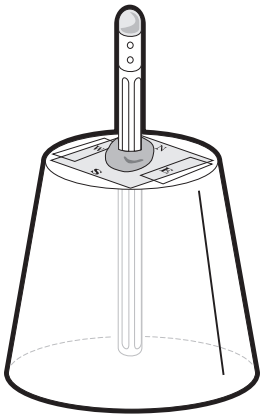
Wind Vanes

Materials

- *paper or plastic cup*
- *pushpin*
- *modeling clay*
- *new pencil with eraser*
- *straw*
- *tagboard, cardboard, or manila folder*
- *masking tape*
- *scissors*
- *straight pin*
- *magnetic compass*
- *ruler*

Directions

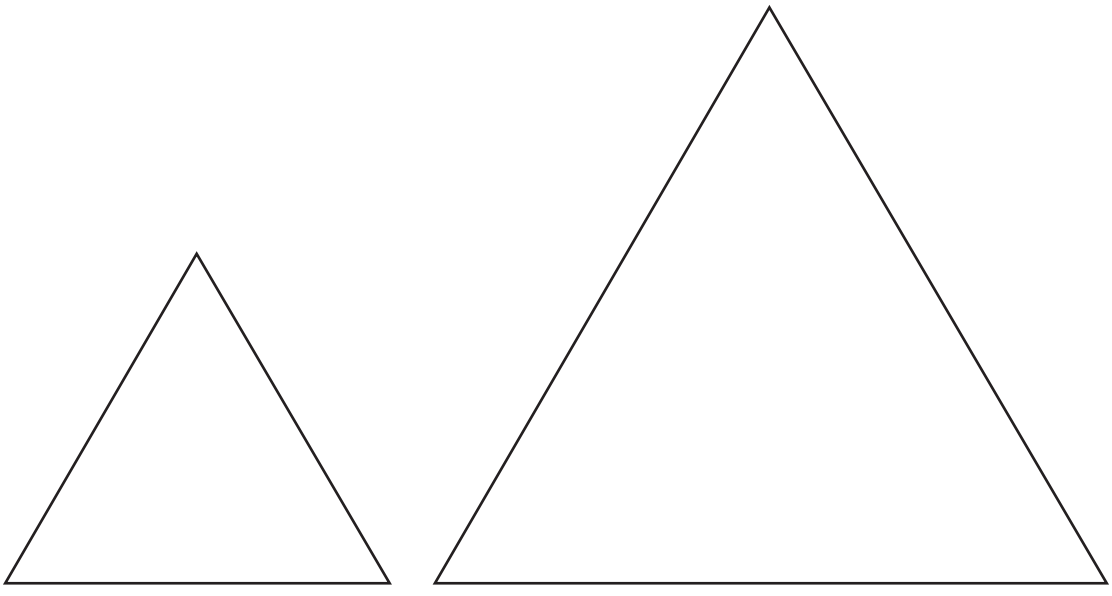
Use with page 65.



1. Use the pushpin to make a small hole in the middle of the bottom of the paper or plastic cup. Wiggle the pushpin to make the hole larger. Use the point of a pencil to enlarge the hole so that a new unsharpened pencil will fit tightly in the hole.
2. Measure and cut a square piece of tagboard, cardboard, or manila folder that fits the bottom of the cup.
3. Label the square's sides—N, S, E, and W—as shown on the illustration.
4. Place a one-ounce ball of modeling clay in the center of the square.
5. Push the pencil through the hole into the clay so that the pencil stands straight up with the eraser on top.
6. Tape the card firmly to the cup.

Making the Vane

1. Cut out the two triangles on this page.
2. Use the cutouts as a pattern. Draw an outline of each triangle on the tagboard or manila folder.
3. Use the scissors to make a one inch slit in each end of the straw. The slits must line up along the straw.
4. Push the small triangle into the slit at one end of the straw. The triangle point must face <u>away</u> from the straw.
5. Push the large triangle into the other slit. The point of this triangle must face <u>into</u> the slit.



Wind Vanes

Attaching the Vane

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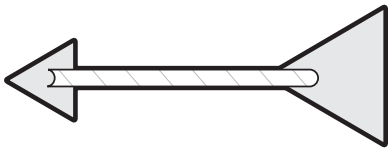

1. Tape each triangle in place.
2. Use your finger as a balance under the straw.
3. Find the point where the vane balances. It will be a little closer to the large triangle.
4. Use a pushpin to make a hole in the straw at this point so that the triangles are vertical (straight up and down).
5. Use the pushpin or a straight pin to attach the straw to the pencil eraser.
6. Swing the vane several times to make sure that it swings freely and smoothly.

Using the Wind Vane

1. Take the model outside.
2. Use a magnetic compass to locate north.
3. Place the wind vane on a table or on the walkway or playground where there are no barriers to the wind.
4. Face the cardboard base towards the north and tape the cardboard to the cement or asphalt or wood.
5. Watch the small arrow or pointer line up with the wind. The small triangle will point into the wind. This tells you which direction the wind is coming from.

Wind Watching

Record the direction the wind is coming from several times a day.

Date	Time	Direction
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Which direction does the wind usually come from at your school during the day? _____