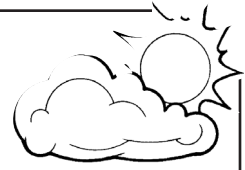


# Wind



## Content Area(s):

- earth science

## Objectives:

In this section students:

- make a simple instrument to measure the speed of the wind.
- use the instrument to record the wind speed over a number of days.
- construct a simple weather vane to measure wind direction.
- use the weather vane to record the wind direction over a number of days.
- investigate how the wind can be put to work.
- construct a simple machine that is powered by the wind.

## Materials Required:

- pencil or pen
- General Activity Pages
- experiment materials as stated on activity pages

## Time:

- approximately 20–35 minutes.

## Background Information:

### Measuring the Wind 1 (Page 39)

- The pressure of the air on the earth's surface is different in different places. The differences in pressure causes the movement of air or winds. If a pressure difference exists, air moves from the higher pressure to the lower pressure area, in order to even out the pressure. If the high pressure center is close to a low pressure center, the movement from the high pressure to the low pressure is faster and the winds will move faster. The larger the pressure difference, the stronger the winds are. Instruments such as anemometers or wind gauges are used to measure the speed and strength of the wind.

### Measuring the Wind 2 (Page 40)

- The direction of the wind is determined by the direction the wind is coming from and not the direction it is blowing to. Instruments such as weather vanes and windsocks can measure the direction of the wind.

### Wind Power (Page 41)

- Using the wind for power is a good idea because it does not cause pollution. In places that are very windy, wind farms are set up where a field full of windmills turn machinery that generates electricity.

Name: \_\_\_\_\_

# Measuring the Wind 1

\* You can make a simple instrument to measure the speed of the wind.

You will need:

- paper plate, wooden stick (about one foot or 30 cm long), adhesive tape, cotton reel, four paper cups (one has to be a different color from the rest)

Here's what to do:

1. Tape the cups evenly around the edge of the paper plate. The cups should all face the same way.
2. Tape the cotton reel to the bottom of the plate. Push one end of the stick into the center hole in the cotton reel and the other in the ground.

How to use the instrument:

The plates spin around as the cups catch the wind. If you count how many times the different cups go round in a minute, you can record the wind speed. Use this information to record the wind speed at different times every school day for a week.

Day	10 pm	1pm	3pm

Which day had the highest wind speed? \_\_\_\_\_

What time did the highest wind speed happen? \_\_\_\_\_

Which day had the lowest wind speed? \_\_\_\_\_

\_\_\_\_\_



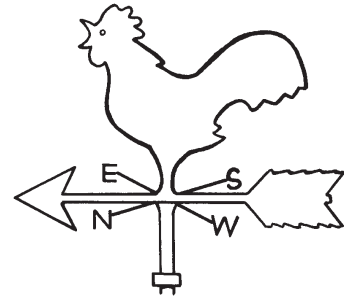
Name: \_\_\_\_\_

## Measuring the Wind 2

\* You can find out which direction the wind is coming from by making a weather vane.

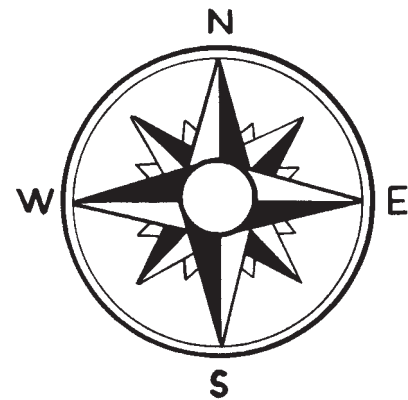
You will need:

- cardboard, knitting needle, pen top adhesive tape, compass, paper



Here's what to do:

1. Cut out a cardboard arrow and tape the top of the pen to the back of the arrow.
2. Put the knitting needle into the pen top and make sure the arrow is able to move freely.
3. Mark the compass points on a piece of square paper.
4. Place the paper on the ground and push the knitting needle through it. (Make sure the paper has been placed so the compass points on the paper are facing the right direction. You may need a compass to help.)



\* Record the wind direction at different times every school day for a week.

Day	10 pm	1pm	3pm

Name: \_\_\_\_\_

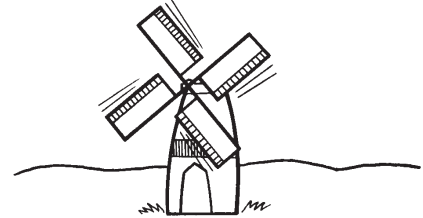
# Wind Power

Pollution from power stations, factories, and cars is harming the air that we breathe. Using wind power does not cause pollution.

\* Make a windmill to show how the wind can be put to work.

You will need:

- paper, scissors, 2 straws, playdough, paper clip, adhesive tape, thread, button



Here's what to do:

1. Cut out a piece of paper about 4 inches (10 cm) square. Cut 2-inch (5 cm) slits from each corner of the square towards the center of the square.
2. Fold every second corner towards the middle and glue them down.
3. When the glue is dry, make a hole in the middle of the windmill. Push a straw through the hole and fasten it with playdough.
4. Tape a paper clip to the end of the second straw so half of the paper clip is secured to the straw and half of it forms a loop. Push the bottom end of the windmill straw through the paper clip loop so the second straw forms a handle.
5. Tape some thread on the windmill straw close to the windmill end of the straw. Tie a button to the end of the thread.
6. Hold the second straw and blow into the windmill.

What happens when you blow into the windmill? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Can you think of any machines that are powered by the wind? \_\_\_\_\_

\_\_\_\_\_

# Answer Key

## Snowflakes (page 7)

Snow Facts: 1. True, 2. False, 3. True, 4. False, 5. True, 6. True

## Lightning (page 9)

Sky, cumulus, larger, higher, darken, winds, particles, charged, electricity, overflow, cloud, cloud, earth, shortest, highest, flat field; lightning takes the shortest path; true, false, false.

## Tornado Safety Tips (page 15)

Home—Get away from windows; Go to the basement; If there is no basement go to an inside closet, bathroom, hallway or lowest part of the house; Get under a mattress and protect your head.

Mall—Get off the street; Stay away from windows and doors.

Outside—Get out of a car and go inside a house or a building; Don't try to outrun a tornado in a car; If you are caught outside, lie in a ditch or crouch near a building; Cover your head with your hands.

School—Follow directions; Go to an inside hall on the lowest floor; Crouch near the wall; Bend over with your hands on the back of your head; Keep away from glass and stay out of big rooms like gyms and cafeterias.

Trailer—If you live in a trailer or mobile home, get out quickly because it can easily be shattered by the tornado.

## Weather Instruments (page 19)

1. Fahrenheit, Celsius; 2. air pressure; 3. weather balloon, rain gauge, weather satellite; 4. the temperature at which water vapor condenses; 5. weather vane; 6. anemometer; 7. by the direction it comes from

## Water (page 26)

precipitation-rain, sleet-rain that freezes on the way to the earth, atmosphere-layer of air that surrounds the earth, freezing point-32°F or 0°C, humidity-amount of water in the air, vapor-gas, gravity-pull to the earth.

## The Water Cycle (page 27)

1. sun, water, 2. water, 3. cloud, 4. clouds, 5. ground, 6. lakes, oceans and puddles, 7. water cycle.

## Desert Weather (page 31)

1. less than 10 inches; 2. near the equator; 3. The sun's rays are more concentrated near the equator. 4. Answers will vary.

## Arctic Weather (page 32)

1. the solid mass of permanently frozen earth, ice and rock; 2. up to 1,000 feet (300 meters) deep in winter; 3. It partly thaws; 4. 2 to 6 feet (0.6 to 2 meters) deep in summer.

The sun's rays are less concentrated at the Arctic Circle; Antarctica (South Pole).

## Tropical Rain Forest (page 33)

1. In the tropics close to the equator; 2. 7%; 3. Three facts: Tropical rain forests stay green all year. Because of the warm, moist climate, rain forest plants also grow very fast. A rain forest has different layers of plant growth.

## The Seasons (page 34)

Summer is the warmest season of the year. The sun can be very strong in summer and it is important to protect yourself from the sun's rays by wearing sun screen and a hat. In the top part of the world the summer months are June, July, and August. In the bottom half of the world the summer month's are December, January, and February.

In autumn the weather is not as hot as summer. The days are warm and the nights are cool. As winter approaches the air becomes colder. Some trees lose their leaves in autumn and the land is dry after the hot summer. In the top half of the world autumn is in September, October, and November. In the bottom half of the world the autumn month's are March, April, and May.

Winter is the coldest season of the year. Many areas of the world have very cold conditions. Ponds and lakes turn to ice and snow falls from the sky. In cold weather, people wear thick clothes to keep warm. Animals that live in very cold areas grow thick fur to keep out the cold. Some animals hide away in their warm burrows for the winter. Some birds fly away to warm countries and return when the weather warms up.

Spring is the season between winter and summer. The top half of the world has spring in March, April, and May. In the bottom half of the world spring weather begins about September and ends in November. The days of spring are warmer than winter days. Snows that has fallen during the winter months melt. Flowers bloom and animals leave their winter sleeping places. The days of spring have more hours of daylight and become warmer as summer approaches.

## All General Activity Pages (page 35–47)

Answers will vary.