Wind

Levels

Grades K-4

Overview:

Wind direction and speed tell scientists in which directions and how fast clouds are moving. This helps them predict what the weather will be in nearby regions. In this activity, students will build a kite and examine a windsock to learn about wind speed and direction.

Objectives:

The student will:

- understand relative wind intensity;
- review wind direction;
- measure wind speed; and
- build a kite.

GLEs Addressed:

Science

- [3-4] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [3] SD1.2 The student demonstrates an understanding of geochemical cycles by describing the water cycle to show that water circulates through the crust, oceans, and atmosphere of Earth.

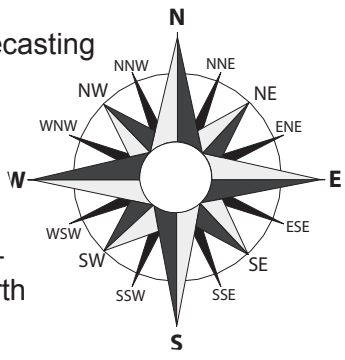
Whole Picture:

The term *wind* is used to describe the movement of air. Wind is the air reacting to differences in pressure, with air moving from higher pressure toward lower pressure. Wind can also be modified by mountains and can be turned by the spinning of the earth.

Wind *direction* and *speed* are monitored by meteorologists, pilots, sailors, scientists, architects and myriad others who need to know Earth's wind and weather activity. From planning trips, to building sound structures, to understanding what shapes Earth, wind speed and direction are integral.

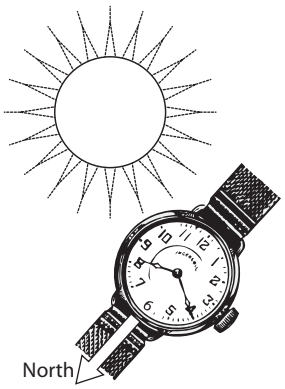
Wind speed:
There are many ways to measure and report wind speed.
MPH (miles per hour) – unit of speed measuring the number of miles covered in a period of one hour.
Knots – unit of speed measuring one nautical mile per hour.
M/S (meters per second) – unit of speed measuring the number of meters covered in one second.
F/S (feet per second) – unit of speed that tells the number of feet covered in one second.
KM/H (kilometers per hour) – unit of speed that tells the number of kilometers covered in one hour.

The speed at which the wind is moving the clouds is especially important in forecasting (predicting) the weather.



Wind direction:
Winds are named from their source direction. A West wind is *coming from* the West, not going toward it. Direction is expressed in interim degrees using the 16 points on a compass rose. (See illustration.) For example, a wind from a direction between North and East would be termed northeast. A wind closer to North than East would be further distinguished as north by northeast.

A determination of true North must be made in order to correctly determine wind direction. This can be done with a compass or by using alternative methods. In forested areas, trees may support the growth of moss on the North face of their trunk. If no trees are present, the following method may be useful:



The Watch Method for use in the Northern Hemisphere
Place an analog watch – set to the current time – on a level surface. Point the hour hand at the sun then carefully move it so the sun is halfway between the current hour and the number 12. At this point the number six will point North.

Materials:

- 9” Styrofoam plate (1 per student)
- Spool of thread (nylon or fishing line)
- Wooden dowel, to be threaded through spool (6” piece per student)
- Flagging tape (18” per student)
- Masking tape
- Markers, colored pens, colored pencils, crayons (for decorating kites)
- Ruler
- Scissors
- Windsock
- Wind meter
- 4 orange cones labeled N, S, E, and W
- OVERHEAD: “Windsock”
  (Download from the Web from the Lessons page at http://www.ArcticClimateModeling.org)
- STUDENT INSTRUCTION SHEET, Level I: “Build a Kite”
- STUDENT INSTRUCTION SHEET, Level II: “Build a Kite”
- STUDENT WORKSHEET, Level I: “Wind Speed”
- STUDENT WORKSHEET, Level II: “Wind Speed”

Activity Preparation:

1. For all students:
   a. Cut flagging tape into 18” long sections.
   b. Cut wooden dowel into 6” sections.
   c. Set up windsock outside the school.
   d. Place labeled orange cones near the windsock in appropriate locations to demonstrate direction.
2. For Level I students:
   a. Draw a line in the center of the front of the Styrofoam Plate.
   b. Punch a hole 3.5” from the top of the plate.
   c. Thread the dowel into the middle of the spool of thread and secure it with tape.

Activity Procedure:

1. Review wind direction with students.
2. Ask students if they have ever noticed the wind blowing really hard. How did they know it was blowing hard?
3. Tell students that wind blows clouds around the world. Scientists measure wind speed and direction in order to tell which direction and speed clouds will travel. This helps them determine which communities will have the possibility of rain or snow next. Wind direction is determined by the direction the wind is coming from, rather than the direction in which the wind is traveling.

4. Distribute the STUDENT INFORMATION SHEET for Levels I and II: “Build a Kite.” Lead students through the steps of building a kite.
5. Explain that by looking at a windsock or kite we can estimate how fast and in what direction the wind is blowing. Show the OVERHEAD: “Windsock.” If the windsock is laying flat against the pole and isn’t moving at all, there is no wind (Image 1). If the windsock is moving a little bit (Image 2), it is slightly windy. If the windsock is moving more than a little bit (Image 3) it is windy. If the windsock is blowing straight out (Image 4) it is very windy. If the windsock is pointing toward the South, we know that the wind direction is North, since the wind is coming from the North.
6. Distribute the STUDENT WORKSHEET for Levels I and II: “Wind Speed.” Review the scientific method with students. Explain a hypothesis is a guess you make and then test. Data is the information collected during the experiment. The conclusion is what is found out in the experiment.
7. Ask Level II students to complete the hypothesis section of their worksheets.
8. Show Level II students how to use a wind meter.
9. Take students outside. Point out the orange cones and windsock. Ask students which direction the windsock is going.
10. Ask students to take turns flying their kites and using the wind meter.

Answers:

Answers will vary, except for:
Level II: Further Questions: 1. c, both b and c

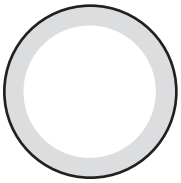
Build a Kite

Student Information Sheet

Level I

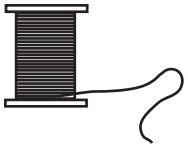
You will need:


tape



plate

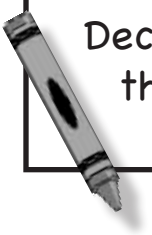

tail


thread

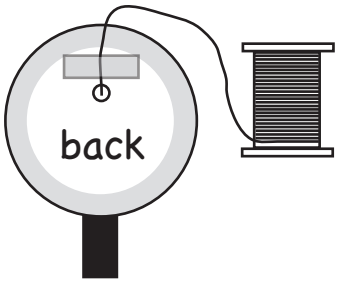

crayon


stick

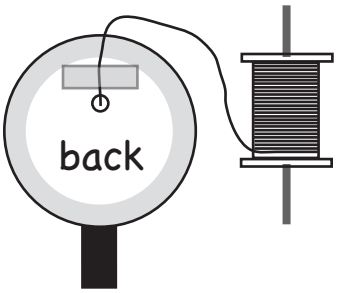
Build a kite:



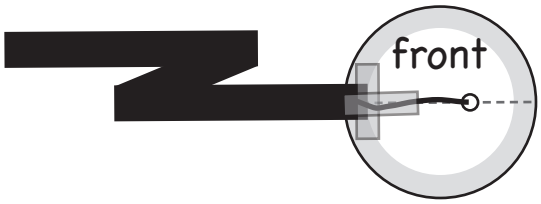
Decorate the plate.



Put thread through hole.



Tape thread to back of plate.
Put stick through thread spool.



Tape thread to line on the front of the plate.

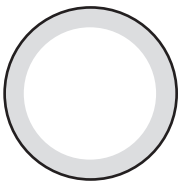
Build a Kite

Student Information Sheet

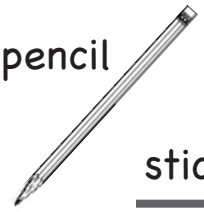
Level II

Build a kite:

You will need:



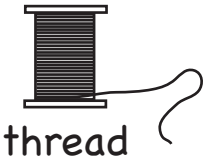
plate

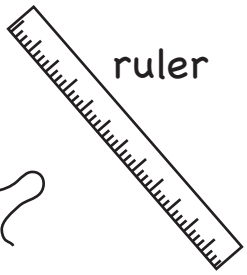

pencil


tape

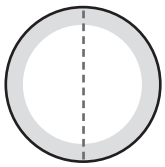
stick


tail

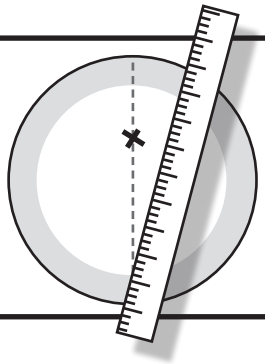

thread


ruler

Use a ruler to draw a straight line down the center on the front of the plate.

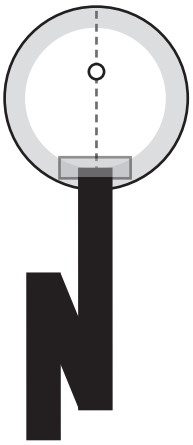


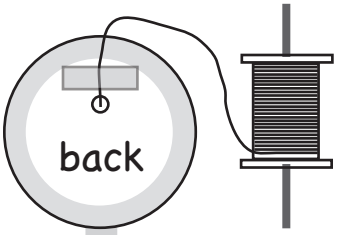
Measure 3 1/2 inches from the top of the plate and make an X to mark the spot. Ask your teacher to punch a hole in the plate at the X.



Decorate the back of the plate.

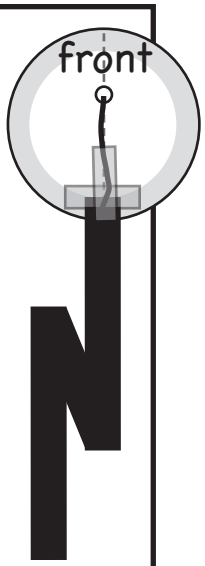
Tape the tail to the bottom of your plate where you drew the line.




back

Put thread through hole and tape it to the back of the plate. Put stick in the thread spool.

With the front of the plate facing upward, tape the loose end of the thread to the bottom of the plate over the tail.


front

Name:_____

Level I

Wind Speed

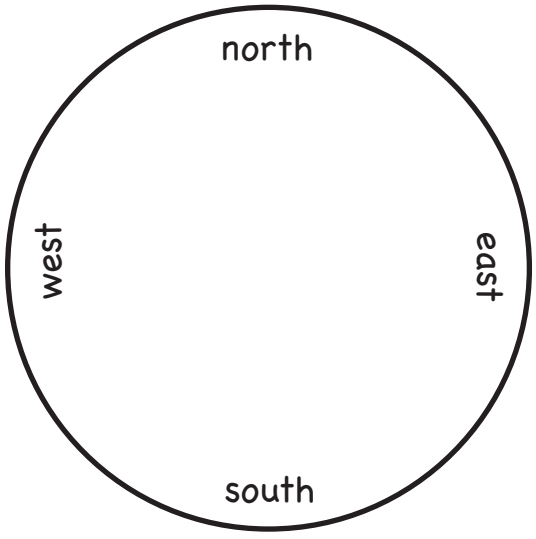
Student Worksheet

1. In the box below, draw a picture of the class windsock.

2. How windy is it?

   a. not windy b. a little windy c. windy d. very windy

3. In the circle below, draw an arrow toward the direction the wind is blowing.



Name:_____

Level II

Wind Speed

Student Worksheet

Testable Question:

What is the wind speed today?

Hypothesis:

Look at the class windsock or fly your kite to make a guess at the following: The wind is blowing at _____ mph today.

Experiment:

Materials: wind meter

Procedure: Use the class wind meter to measure the wind speed and record it in the Data section below.

Data:

1. The wind speed is blowing at _____ mph.

Analysis of Data:

1. What is the wind speed? _____ mph
2. In which direction is the wind moving? _____

Conclusion:

1. The wind is blowing at _____ mph today.
2. Was your hypothesis correct? _____

Further Questions:

1. Why do scientists measure wind speed and direction?
   a. to determine in which direction the clouds are moving
   b. to predict the weather
   c. both b and c

Windsock
Overhead

A windsock can be used to determine how fast and in what direction the wind is blowing.

not windy

a little windy

windy

very windy

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