

Finding Wind Direction

Levels



Grades K-4

Overview:

During this project, students use the weather vane they constructed to determine wind direction.

Objectives:

The student will:

- follow the basic steps of the scientific method;
- determine wind direction with a weather vane; and
- understand that investigations can be used to answer questions.

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] SE2.1 The student demonstrates an understanding that solving problems involves different ways of thinking, perspectives, and curiosity by identifying local tools and materials used in everyday life.
- [4] SE2.1 The student demonstrates an understanding that solving problems involves different ways of thinking, perspectives, and curiosity by identifying the function of a variety of tools (e.g., spear, hammer, hand lens, kayak, computer).
- [4] SE2.2 The student demonstrates an understanding that solving problems involves different ways of thinking, perspectives, and curiosity by identifying multiple explanations (e.g., oral traditions, folklore, scientific theory) of everyday events (e.g., weather, seasonal changes).

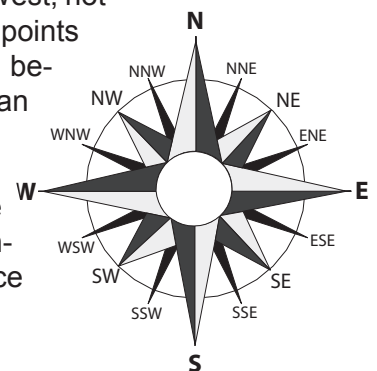
Whole Picture:

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 is monitored by meteorologists, pilots, scientists and myriad others who need to study Earth's weather activity.

- Meteorologist study wind to better understand weather processes.
- Geologist study wind to monitor geologic changes such as erosion.
- Firefighter needs to know wind patterns to effectively fight structural and wild fires.
- Architects need to understand how wind interacts with buildings of varying shapes and sizes.

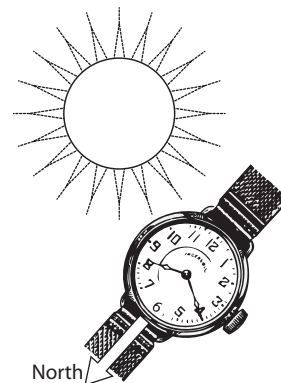
Winds are named from their source direction. A West wind is *coming from* the West, not going toward it. Direction is expressed in interim degrees, as well, using the 16 points on a compass rose. (See illustration.) For example, a wind from a direction between North and East would be termed northeast.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

- Compass
- Weather Vane models
- STUDENT WORKSHEET: Level I “Wind Direction”
- STUDENT WORKSHEET: Level II “Finding Wind Direction”

Activity Preparation:

1. Use a compass to find the north wall in your classroom. Write “north” on a piece of paper and tape it to the wall. Write “south”, “east” and “west” on pieces of paper and tape them to appropriate walls, corners, or locations in the classroom.
2. Go outside and find an open area. Using sticks, stakes, or cones, mark each of the four directions around the area.

Activity Procedure:

1. Explain that during this activity students will learn about wind direction. Discuss geographic directions. Explain that wind occurs because cold air sinks and hot air rises. (Students who live in a cabin with a loft may be able to attest to the fact that the loft is usually warmer than the ground floor.) When the air outside sinks or rises, the movement causes wind.
2. A weather vane is an instrument that measures the direction of the wind. Explain that students will use their weather vanes to find the direction of the wind today.
3. Distribute student worksheets then take students outside to the center of the area marked with the four directions. Guide students through the following steps of the scientific method.
4. Hypothesis: Ask if students can figure out what direction the wind is blowing without using their weather vanes. Some may lick their finger and hold it up. Some may note the movement of a friend’s hair or the feel of the wind on their face.
5. Explain that Native Elders observe the motion of the clouds to determine wind direction. Ask Level I students to point in the direction the wind is blowing then in the direction the wind is coming from. Ask Level II students to name the direction then write their hypothesis on the Student Worksheet.
6. Data: Ask students to carry their weather vanes to the center of the area marked with the four directions and hold the instrument in the wind. Ask students which direction their flag is pointing. Ask Level I students to point in the appropriate direction and Level II students to name the direction then record this information in the Data section of their worksheet.
7. Data Analysis (discussion as a class): Ask students, “What does the direction your flag is pointing tell you about the wind?”

Vocabulary Words:

analysis - a careful study of something

compass - an instrument (or tool) for showing directions (north, south, east, west, etc.)

conclusion - something decided after thinking

data - individual facts and figures

direction - the line or course along which something moves, faces, or lies

hypothesis - a guess; something suggested as true for the purposes of further investigation

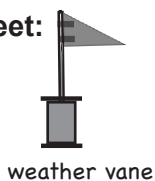
investigation - the act of looking into something carefully to find facts and gain information

observation - the act or power of noticing

8. Conclusion: Ask Level I students which direction the wind is blowing and discuss conclusions. Conclusions may vary depending on when students took their measurements. Wind changes can occur suddenly.
9. Ask Level II students to draw an arrow on their worksheet showing which direction the wind was blowing. Hint: This should be the same as the direction the flag pointed!
10. Ask Level I and II students to circle the instrument that measures wind direction on their worksheet.

Answers:

Level I Student Worksheet:



weather vane

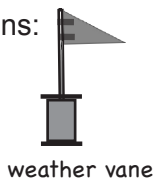
Level II Student Worksheet:

Hypothesis: Wind direction may vary during experiment, so student responses may vary.

Data: Wind direction may vary during experiment, so student responses may vary.

Conclusion: Wind direction may vary during experiment, so student responses may vary.

Further Questions:



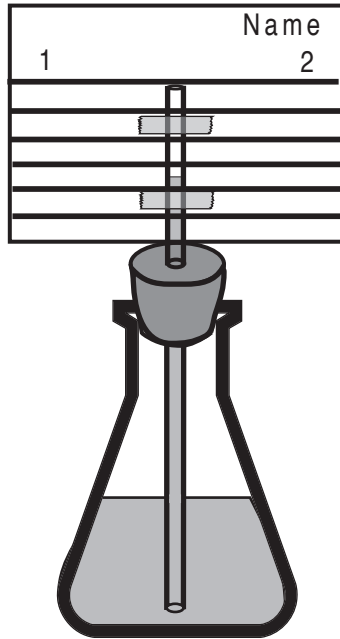
weather vane

Name: _____

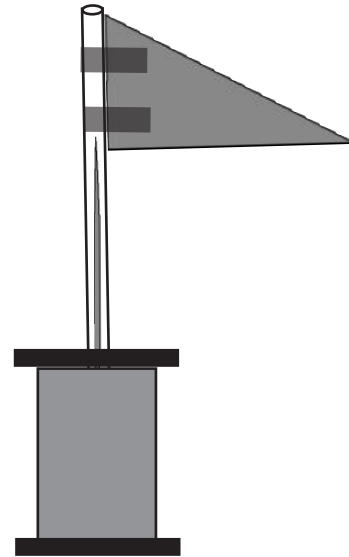
Wind Direction Student Worksheet



Circle the instrument that measures wind direction.



thermometer



weather vane

Name: _____

Level

Finding Wind Direction Student Worksheet



Testable Question:

In what direction is the wind blowing?

Hypothesis (or Guess):

After going outside, look for clues that tell you which way the wind is blowing. Write the direction you think the wind is blowing: _____

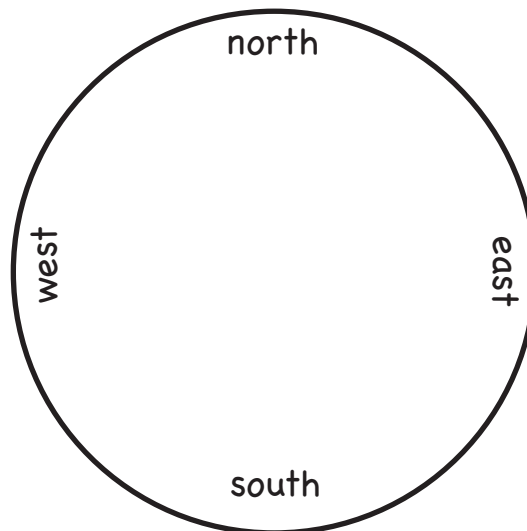


Experiment:

Hold your weather vane in the wind. See which way the flag points.

Data:

1. Draw an arrow in the circle below to show which way your flag pointed.



2. Circle the direction your flag pointed. If your flag pointed between two directions, circle both directions.

a) north

b) south

c) east

d) west

Name: _____

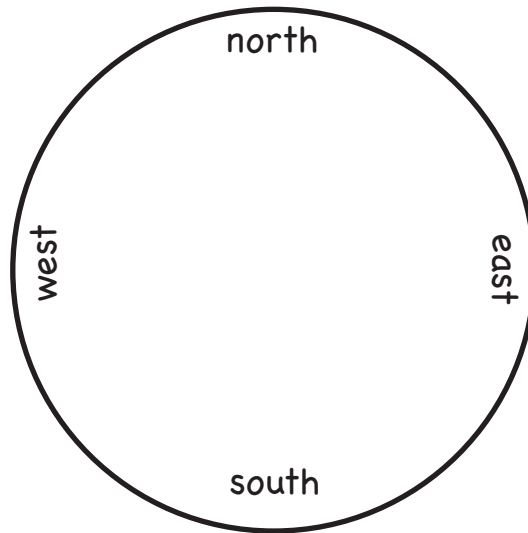
Level

Finding Wind Direction Student Worksheet



Conclusion:

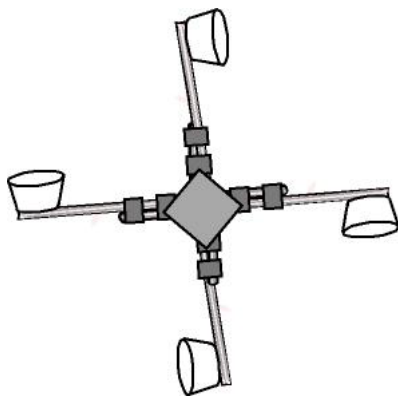
1. Draw an arrow showing which way the wind was blowing. Hint: This should be the same as the direction your flag pointed!



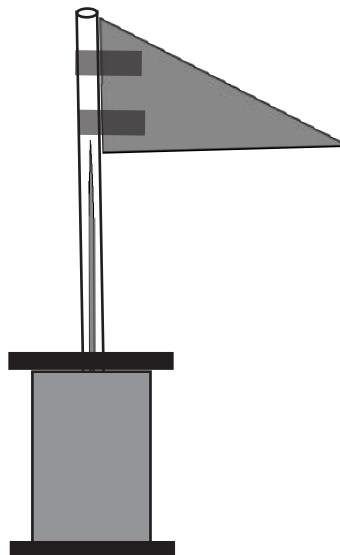
2. In what direction is the wind blowing? _____

Further Questions:

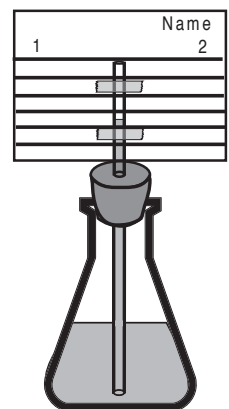
Circle the instrument that measures wind direction.



anemometer



weather vane



thermometer