Measuring Wind Speed

Levels

Grades K–4

Overview:

During this project, students learn about wind and collect wind speed data over a five-day period.

Objectives:

The student will:

- follow the basic steps of the scientific method;
- collect, record, and analyze wind speed data; and
- compare their own data to data recorded on the Science Observation Network.

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] SA2.1 The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by answering "how do you know?" questions with reasonable answers.
- [3] SD3.1 The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by using recorded weather patterns (e.g., temperature, cloud cover, or precipitation) to make reasonable predictions.

Whole Picture:

An anemometer measures the force or speed of the wind. A common anemometer, such as the one constructed in this lesson, uses cups mounted on four horizontal arms at equal distance from each other on a vertical shaft. The air flow past the cups turns the cups in proportion to the speed of the wind.

Many anemometers convert the revolutions per minute into wind speed measured in several different ways:

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.

Vocabulary

analyze - to study something carefully
conclusion - something decided after thinking
data - individual facts, figures, and other items of information; information as a whole
forecast - to tell what will or may happen; predict
graph - a drawing that shows the relationship between changing things
hypothesis - something that is suggested as being true for the purposes of argument or of further investigation; a guess
observations - the act of noticing something
predict - to tell beforehand
record - to put something down in writing

Information about wind speed, collected from anemometers world-wide, is used by weather forecasters, pilots, sailors, scientists and builders – to name a few.

A crane operator, for example, needs to know wind speed and direction when there are plans to operate a tall crane. A landfill must know the behavior of the wind in order to maintain odor control. The

speed at which the wind is moving the clouds is especially important in forecasting (predicting) the weather. A scientist may study the way in which wind causes erosion. From planning trips, to building sound structures to understanding what shapes Earth, wind speed and direction are integral.

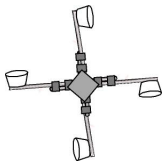
Materials:

- Anemometer models
- Crayons
- Stopwatch
- STUDENT WORKSHEETS:
  Level I "Measuring Wind Speed" and "Observing Wind"
  Level II "Measuring Wind Speed"

Activity Procedure:

1. Visit the Website: http://climate.gi.alaska.edu/Wx/forecast.html to get the local wind speed forecast for the week.
2. Lead a class discussion on wind. What is wind? How do we know when the wind is blowing? Explain that scientists who study the weather can predict (make a good guess) what the wind will be tomorrow, or even several days from now.
3. Share and discuss the local wind speed forecast with students. Explain the higher the number in miles per hour, the harder the wind is blowing.
4. Write the wind speed forecast (in mph) on the chalkboard and ask students which day is predicted to have the strongest winds. Ask students the **testable question**: "Which day will be windiest this week?"
5. Explain that a **hypothesis** is a guess. For the hypothesis, clip a smiley face to the day on the calendar that is predicted to have the strongest winds this week. ***Note:*** *If you do not have a class calendar, write the days of the week on the chalkboard and circle the day that is predicted to have the strongest winds. Leave the writing on the board throughout the week.*
6. Ask students to think about how they could measure the wind. Distribute the Student Worksheets (levels I and II have different worksheets), and anemometer models.
7. Ask students to go outside at the same time each day (Monday through Friday) and count how many times their anemometer spins during a period of 20 seconds. Keep time with the stopwatch. ***Note:*** *Depending on the amount of wind in your village, you may change the amount of time to ensure the students will not run out of room on the graph. Ensure time is kept the same each day.*
8. Ask students to **record the data** (the number of times the smiley face went around) and color in the correct number of smiley faces on the data chart.
9. Lead the class in **analyzing the data**. Ask students the following questions: Which day had the strongest wind? How do you know? Which day had the least wind? How do you know?
10. Go to the ACMP Website (http://www.ArcticClimateModeling.com). Click on the Science Observation Network. Select the nearest community and determine what the wind speed is for the day. Share the data with the class. Ask students to compare the online data with the data they collected. Does their data support the online data?
11. Discuss student observations and results. For the **conclusion**, clip a smiley face to the day on the calendar that had the strongest wind.
12. Ask students to complete the remaining sections of the worksheets. Ask Level I students to circle the day on their graph that had the strongest wind. Then, ask them to circle the instrument that measures how fast the wind is blowing, and the type of weather an anemometer measures. Ask Level II students to answer the questions on the worksheet independently.

Answers to Level I Student Worksheet:

1. Answers will vary.
2. 
anemometer
3. 
wind

Answers to Level II Student Worksheet:

1. Answers will vary.
2. Answers will vary.
3. c. wind
4. Anemometer

Name:_____

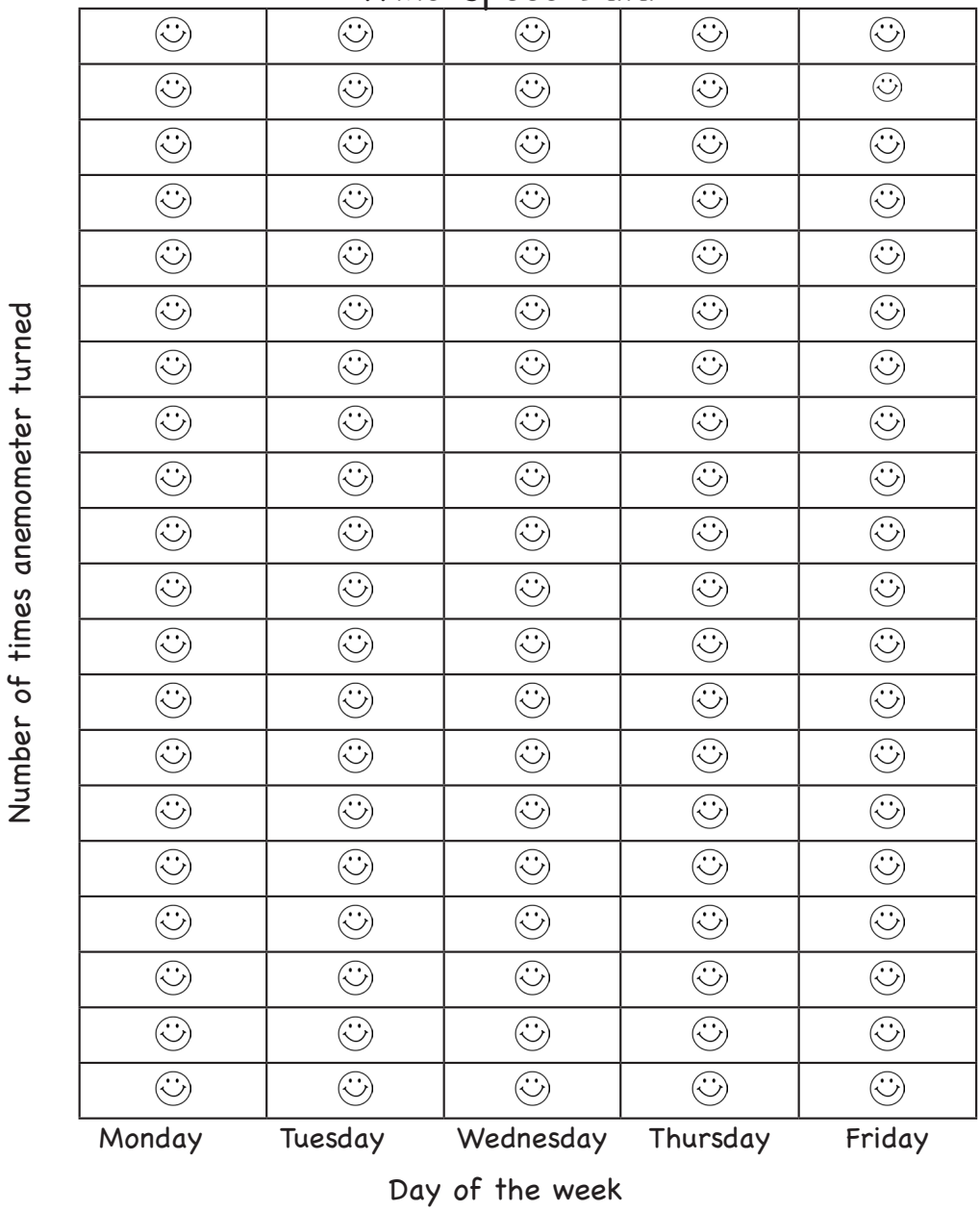
Level I

Measuring Wind Speed

Student Worksheet

Color in the number of smiley faces you counted as the anemometer turned on each day.

Wind Speed Data



1. On the graph above, circle the day that had the strongest wind.

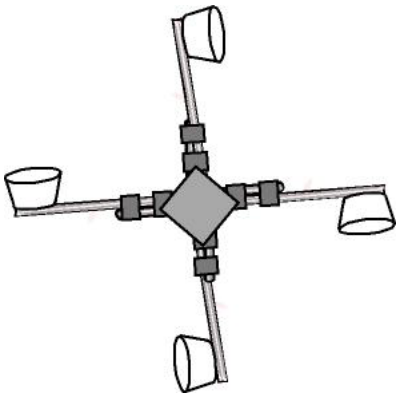
Name:_____

Level I

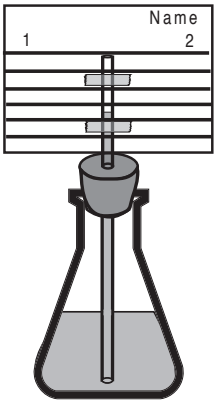
Observing Wind

Student Worksheet

2. Circle the tool that measures how fast the wind is blowing.



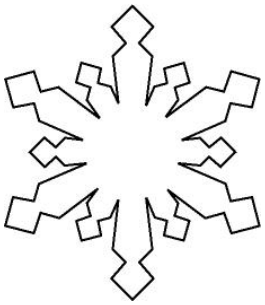
anemometer



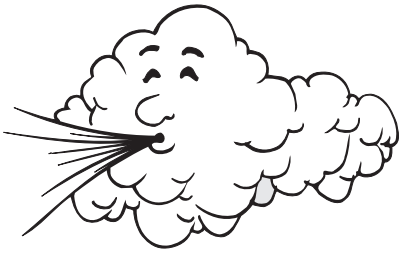
thermometer

3. Circle the picture of the type of weather an anemometer measures.

rain



snow



wind

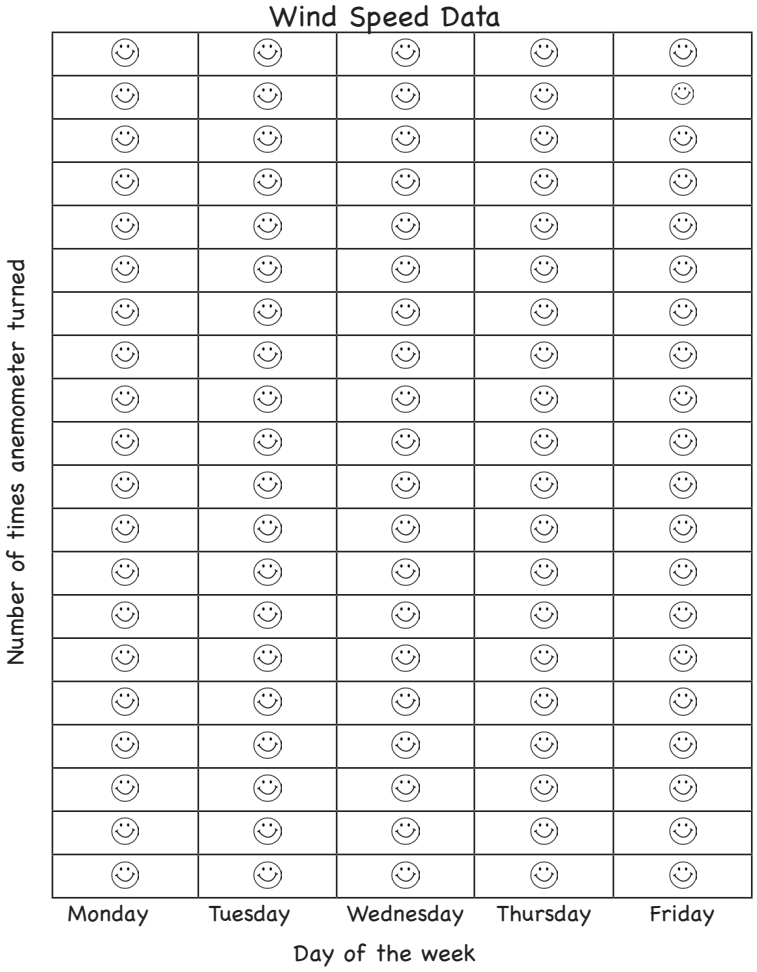
Name:_____

Level II

Measuring Wind Speed

Student Worksheet

1. On the chart below, color in the number of smiley faces you counted as the anemometer turned on each day.



2. On the chart above, circle the day that had the strongest wind.

3. What does an anemometer measure?

   a. rain b. snow c. wind

4. What instrument (or tool) can a scientist use to measure wind speed?

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