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CLIMATE RESEARCH FACILITY

Education and Outreach Lesson Plan

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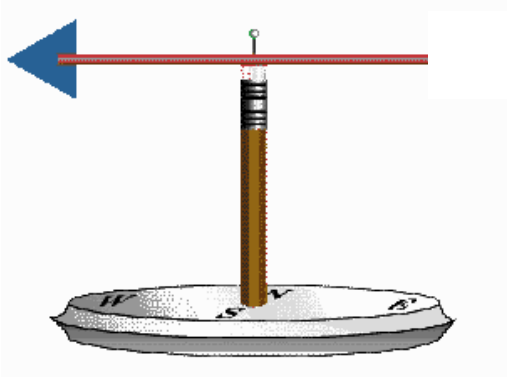
Grade levels 3–5

Understanding Wind Direction and Making a Wind Vane



Understanding Wind Direction and Making a Wind Vane

Approximate Time

1 hour to construct wind vane. Approximately five 10-minute sessions, 3 times per day for 2 weeks, as follow-up.

Objective

The objective of this lesson is to investigate and learn the four wind directions and understand that wind direction and weather are correlated as evidenced by completion of wind direction activity. Students will also learn how to construct a wind vane and understand the parts of a wind vane.

Materials

For each wind vane

- Triangle template made from poster board for students to trace
- 1 small piece of poster board
- 2 pieces of tape
- 1 straw
- 1 straight pin or tack with a flat head
- 1 new pencil with unused eraser
- 2 strong paper plates
- Glue
- A small rock or pieces of clay to anchor wind vane
- Student Record Sheet

Key Points to Understand

- A weather vane is also called a wind vane. It is one of the oldest weather tools for measuring wind direction.
- Wind vanes are still used today to measure wind direction.
- The four cardinal directions are North, East, South, and West. They are used on compasses and wind vanes to indicate the four major directions. Intermediate directions are Northwest, Northeast, Southwest, and Southeast. These lie between the cardinal directions. Example: Northeast lies halfway between North and East on the compass.

Background Information

- Weather vanes are usually found on the tops of buildings so they can catch an open breeze. They are placed on top of barns, houses, weather stations, hardware stores, and other high places.
- It is easier to see how the energy from the wind moves a weather vane if it is up high and in an open area.
- Weather vanes can only measure wind direction a few yards (meters) off the ground. The weather vane spins on a rod and points in the direction from which the wind comes. Large, helium-filled weather balloons are used to measure winds high above the Earth's surface. The balloons move with the same speed and direction as the wind.
- Weather vanes and understanding wind direction in a specific region can be helpful in weather prediction.
- Scientists use weather vanes as one tool in understanding the current weather and in predicting the weather. A weather vane is one of the most useful tools for forecasting because certain winds tend to bring certain weather patterns. Once your wind vane is working, a glance at it will give you an important clue about what to expect. (For example, in New Mexico, winds from the east are likely to usher in fair weather, while winds mainly from the west are likely to bring unsettled conditions. If the wind is blowing from the south, the wind is usually warm. If the wind is blowing from the north, the wind is usually cooler). Determine what types of weather the winds in your area bring!

Key Vocabulary

- **Align**: To arrange in a straight line.
- **Anchor**: To fix or fasten; affix firmly.
- **Cardinal Directions**: Cardinal directions are North, South, East, and West. (See below: Four Wind Directions.)
- **Energy**: The capacity of a physical system to perform work. Energy exists in several forms such as heat, kinetic or mechanical energy, light, potential energy, electrical, or other forms such as wind energy.
- **Forecasting**: To estimate or calculate in advance, especially to predict weather conditions.
- **Four Wind Directions**: Also referred to as the cardinal directions, these are North, South, East, and West. Some teachers use the phrase: Never Eat Soggy Waffles to help students remember the order of the cardinal directions as they appear on a compass.
- **Intermediate Directions**: Intermediate directions are Northwest, Northeast, Southwest, and Southeast. These lie between the cardinal directions. Example: Northeast lies halfway between North and East on the compass.
- **Region**: A large, usually continuous segment of a surface or space or area. A large, indefinite portion of the Earth's surface. A specified district or territory.
- **Weather Balloons**: A balloon equipped with meteorological apparatus that is sent into the atmosphere to provide information about the weather.
- **Weather Prediction**: See Forecasting.

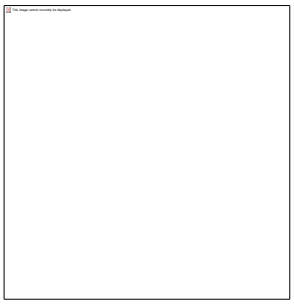
- **Wind Vane**: A wind vane or weather vane is an instrument that shows the direction the wind is blowing.

Preparation

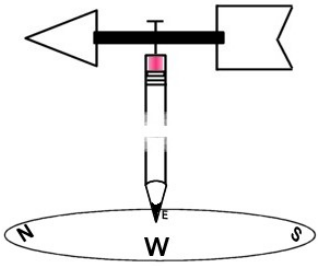
- Gather materials needed to construct wind vanes prior to the lesson. You may have to pre-cut the triangles depending upon age level of students.
- You may also want to pre-teach the cardinal directions and intermediate directions of the compass and review basic weather concepts related to wind, clouds, and types of weather your region experiences.
- Print one Wind Directions Student Record Sheet for each student.

Note: Students will make an entry 3 times per day for 2 weeks.

Procedure



1. Give each student a paper plate. Have them turn it upside down and write the four directions on it.
2. Give each student a cutout template from poster board and another piece of poster board on which to trace and cut out two triangles.
3. Students can either make a small slit in each end of their straw to insert the two triangles, or they can use glue or small pieces of tape to attach the two triangles to the ends of the straw.



4. Insert a straight pin through the center of the straw and into the eraser end of a pencil. (Teachers might want to do this for their students if they are very young.)
5. Push the other end of the pencil through the center of the plate.
6. Place plate with the pencil on top of the second plate and secure it with glue or tape around the edges after placing a few small rocks or small pieces of clay inside for weight. (If you used clay, press the pencil into the center of the clay for added security. This is recommended for stability of the pencil.)
7. Students can decorate their weather vanes if they want to.
8. Allow the glue to dry if you used this method to affix the plates, and go outside to see from which direction the wind is blowing!
9. Record the wind direction and the weather condition on the Student Record Sheet three times a day for 2 weeks.
10. Students can also record directions from different locations around the schoolyard, i.e., near main door, behind school, or in playground.

Management Tip

1. It is very important to place rocks or clay inside the two-plate configuration so that the wind vane will not tip over in a strong wind. Check to see that all students' vanes swing freely. This may involve adjusting the pin or thumb tack positioning into the eraser of the pencil. A dab of Vaseline or another type of lubricant to the top of the eraser may help facilitate the movement of the straw vane.
2. Students may need to fill in the Student Record Sheets as directed by the teacher, depending upon student needs. The Student Record Sheet can be modeled under a document camera or can be enlarged to poster size to be completed as a whole-class activity.

Closure and Evaluation

Ask students:

1. What caused the vane on your wind vane model to turn or swivel?
2. Did your weather vane continue to point the same direction all day? If not, what caused it to change direction?
3. What was the dominant wind direction for the 2 weeks?
4. Did you notice any change in the wind direction and change in weather as a result? What were those changes?
5. Were you able to forecast the next day's weather due to charting the wind direction?
6. How does using a wind vane help you to predict the coming weather?

Suggested Follow-Up Activities

- Go to a weather website such as www.weather.com or your local television website to see the forecasted wind directions for the 5-day forecast. Then use your wind vane over the next 5 days to confirm the prediction.
- Visit your local television station to interview the meteorologist (weather person) and watch the weather report being presented. If a field trip is not possible, many meteorologists will come to the classroom.
- Give a weather report to the school each morning over the school intercom.
- Chart the average wind and weather condition for each of the 10 days on a large class poster/chart by taking the majority reading for each day. This can be done daily or as a culminating activity. Do you notice any patterns?

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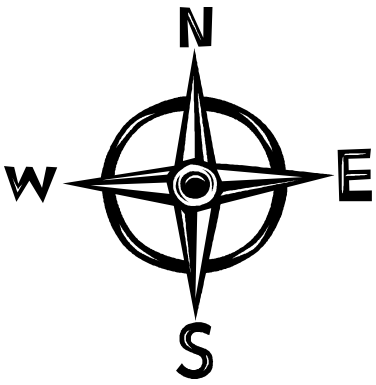
Name:_____

Date:_____

Title:_____



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Instructions

Three times a day, record the direction of the wind according to your wind vane. Write: North, South, East, West, or combinations of the directions in each box. Also write the general weather condition. Sunday is given as an example. At the end of two weeks compare your chart to your classmates' charts.

Day **Time**

	9:00 AM		Noon		3:00 PM	
	Wind Direction	Weather Condition	Wind Direction	Weather Condition	Wind Direction	Weather Condition
Example: Sunday	*North*	*Sunny*	*Northeast*	*Partly Cloudy*	*West*	*Rain*
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						