STEM in the lab

Inspiring Idaho's future STEM workforce

WIND ANEMOMETER

GRADE LEVELS

This activity is appropriate for grades K-6.

MISSION

Invent an anemometer to record wind speed at your home.

VOCABULARY

ANEMOMETER: an instrument for measuring wind speed.

ENVIRONMENT: the physical surroundings on Earth. The environment includes everything living and nonliving. People, animals, plants, and all other living things rely on the nonliving parts of the environment to survive.

WIND: the movement of air near Earth's surface.

MATERIALS

- Egg carton or other cups (plastic, Dixie, or paper)
- Scissors
- Markers
- 2 long recycled straws or wooden spokes
- Clear tape or stapler
- Pencil with eraser end
- Straight pin
- Stopwatch (or smart phone)

ABOUT THIS ACTIVITY

Have you ever noticed how windy it can be in Idaho? Have you ever wondered how fast the wind is actually blowing?

Meteorologists, physicists, and scientists use wind anemometers to measure the speed of wind. Wind speed is important to know for many reasons including for flying planes or even for Idaho National Laboratory's General Line Ampacity State Solver (GLASS) project, which focuses on the effects the weather and wind speed has on cooling electrical lines. Collecting data and observations from the weather can also tell us about the Earth's environment. In this activity, you can invent an anemometer to record wind speed at your home.

INSTRUCTIONS

1. Cut out four separate egg cups from your egg carton or collect 4 other types of cups.

2. Make a creative design with the markers to mark one of the cups.

? ***Why do you think you only mark one cup?***

3. Make an X with the straws or wooden spokes.

4. Tape the center of the X securely with clear tape.

5. Tape one egg cup or staple other cups to the end of each straw so they all face the same direction.

? ***What would happen if the egg cups or other cups were not facing the right direction?***

6. Grab your pencil with the eraser end.

7. Push the straight pin through the straw or wooden spoke X and into the eraser end of the pencil. The X needs to spin freely.

? ***What is the straight pin's job?***

8. Take your anemometer outside on a windy day. Push the sharp end of the pencil into the ground.

? ***What do you notice about your wind anemometer? Does it move differently in different weather conditions?***

9. The egg cup or other cup with the design is your starting point. Using a stopwatch, count how many times it goes by in one minute. This number tells you the speed of the wind. For example, three revolutions per minute could mean that the wind speed is 3 miles per hour. Record your data in a journal or on a graph.

THE SCIENCE BEHIND IT

Wind is caused by a change in air pressure. The speed of wind can be measured using a tool called an anemometer. A wind anemometer looks like a weather vane. Instead of measuring which direction the wind is blowing with pointers like a weather vane, an anemometer has four cups so that it can more accurately measure the wind speed.

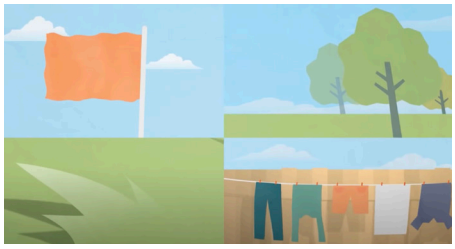
Wind anemometers are used as tools in many different careers. They can show a change in our Earth's atmosphere and weather conditions over time with collected data.

EXTENSIONS

- Record your information on a line graph listing date, time, and number of rotations. What do you think your line graph will tell you about the wind conditions near your home?
- Record the wind speeds at different times of the day. Record the wind speeds in different locations near your home, in the open and in more protected areas.
- Try inventing another anemometer using different materials. Will it still measure the wind speed or do certain materials slow your wind anemometer down?

RESOURCES

- **Computer Assisted Virtual Environment example, used for INL's GLASS project for 6th grade:** https://youtu.be/M16mz8Pc_OM
- **Wind direction and wind speed for K-6th grade:** https://youtu.be/SqbTrbxWT1o
- **Another way to build a wind anemometer for K-6th grade:** https://youtu.be/Af0LB3abBsk
- **Bill Nye the Science Guy on wind for K-3rd grade:** https://youtu.be/uBqohRu2RRk



Wind direction and wind speed for K-6th grade

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