

Lesson Plan

Measuring and Recording Wind Speed



In this lesson each student will learn:

1. How to build an anemometer.
2. How to measure the speed of the wind per minute.
3. How to present data on a graph.
4. How to comment on their findings.
5. How to calculate the average wind speed for the month.
6. How to use the Beaufort scale to understand wind speed.

How do we measure wind speed?

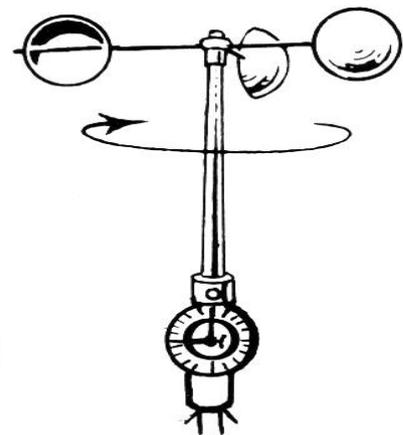
We use an instrument called an **anemometer** to measure wind speed.

The cup anemometer is the simplest type.

It consists of four hemispherical cups mounted on the end of four horizontal arms (see picture).

The speed at which the cups rotate is proportional to the speed of the wind.

So, by counting the number of turns over a set time, we can work out the average wind speed.



Experiment 1: Recording and measuring wind speed

Materials needed:

- Two strips of stiff cardboard of the same size
- Four small paper cups
- Scissors
- Pen
- Ruler
- Stapler
- Drawing pin
- Pencil with a rubber on the end
- Stopwatch
- Graph paper
- Notepad

Method:

Part 1: Building an anemometer

1. Make a cross with the cardboard strips using a stapler.
2. Cut off the rim of the cups to make them lighter, and easier to staple to the cardboard cross.
3. Mark one cup with the pen.
4. Staple the cups to the ends of the cross with the mouth of one cup facing the bottom of the other around the cross.
5. Hold the pencil under the centre of the cardboard cross and push the drawing pin through the cross and into the eraser to attach the cross to the pencil.
6. This is now your anemometer.

Part 2: Recording data

1. Place the anemometer outside to see if the wind will spin it around.
2. Using the watch, count the number of times the marked cup spins around in one minute.
3. Repeat this everyday for a month.
4. Record the data on the notepad.
5. Choose one month in winter and one in summer to show differences.
6. After a month of recording, draw a graph to represent the data.
7. Plot the days along the horizontal axis and the wind speeds (turns per minute) along the vertical axis.
8. Join the dots.

Part 3: Analysing results

1. Ask the following questions:
 - Has the wind speed changed over the month?
 - Are there any differences between winter and summer months?
 - What was the windiest day?
 - What was the calmest day?
2. Calculate the average (mean) wind speed for the month by adding up the wind speed recorded on each day and dividing your result by the total number of days in the month.
3. Repeat the experiment in different locations to record and compare the wind speed.
4. Try to explain why there might be variations.

The Beaufort Scale

The Beaufort scale was devised by Sir Francis Beaufort from Navan, County Meath.

It is a way of estimating the wind strength according to the appearance of the sea or land.

It was created more than 200 years ago but it is still used across the world today.

Wind force 0 is calm.

Wind force 12 is a hurricane.

Category	Description
0	Calm - Smoke rises vertically.
1	Light air- Direction of wind shown by smoke but not by wind vanes.
2	Light breeze- Wind felt on face, leaves rustle.
3	Gentle breeze - Leaves and small twigs in constant motion.
4	Moderate breeze - Raises dust and loose paper, small branches are moved.
5	Fresh breeze - Small trees in leaf begin to sway, crested wavelets form on inland waters.
6	Strong breeze - Large branches in motion, whistling heard in telegraph wires, umbrella used with difficulty.
7	Near gale - Whole trees in motion, inconvenience walking against the wind.
8	Gale - Breaks twigs off trees, generally impedes progress.
9	Strong gale- Slight structural damage occurs (chimney pots and slates removed).
10	Storm - Seldom experienced inland, trees uprooted, considerable structural damage occurs.
11	Violent storm - Very rarely experienced, accompanied by widespread damage.
12	Hurricane.