

Build an Anemometer

by Steven R. Wills

A comedian walks out on stage and grabs the mike. "I just got back from Antarctica," he says. "Boy, was it windy!"

"How windy was it?" the audience screams.

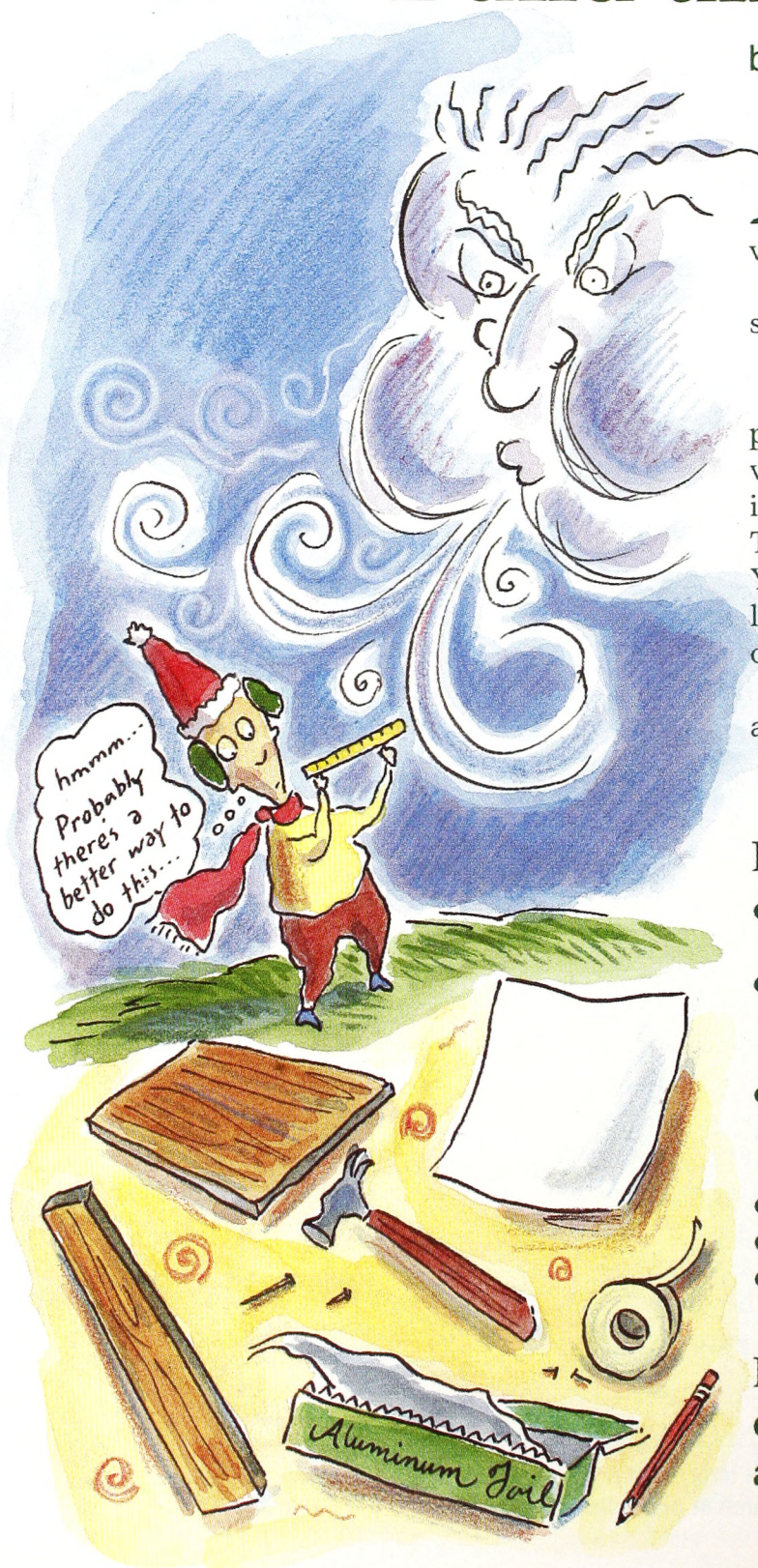
Maybe the comedian had a great punch line for that, but to really find out wind speed, you need an *anemometer*, an instrument that measures wind speed. There are several types of anemometers. You may have seen the kind that looks like three or four cones, twirling around on the bottom of a weathervane.

A different kind is called a fan anemometer, and you can build one.

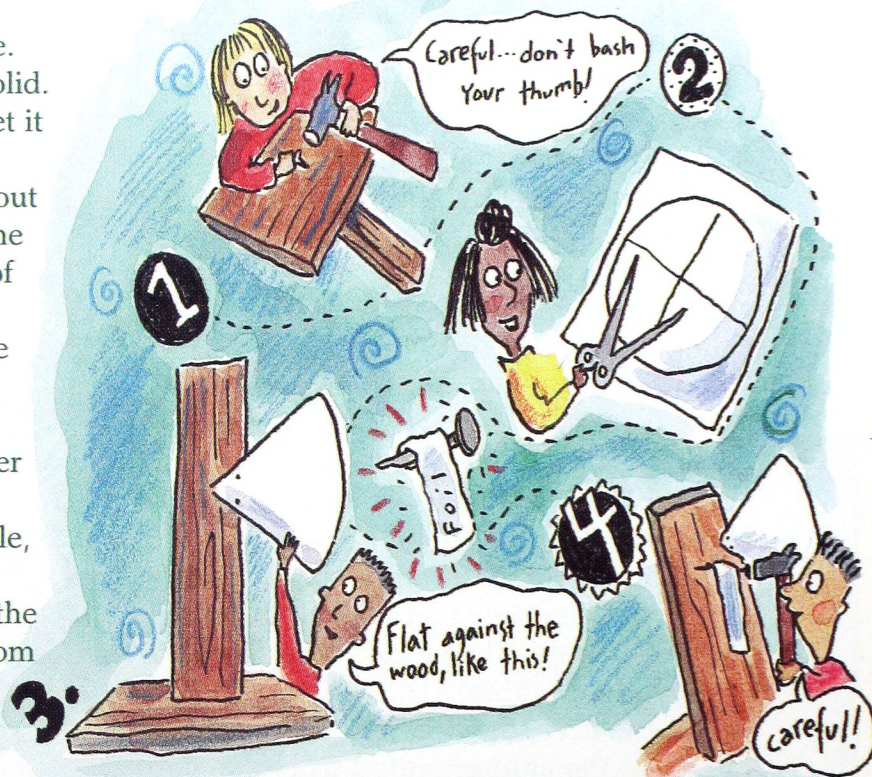
Here's what you'll need:

- a flat piece of wood for a base, about 25 centimeters square
- a tall piece of wood for the pole, 25 centimeters tall and with at least one flat side
- a hammer and two nails; one of the nails should be about 6 centimeters long
- a piece of posterboard
- some aluminum foil and masking tape
- two tacks and a pencil

Now follow the next steps carefully to build your fan anemometer!



1. Nail the pole to the center of the base.
(Some glue might help keep things solid. But if you use glue, make sure you let it set overnight before continuing.)
2. Draw a circle on the posterboard, about 30 centimeters in diameter. Divide the circle into quarters and cut out two of the quarters.
3. Use the two tacks to attach one of the quarters to the pole, as shown in the picture at right.
4. Now fold a strip of aluminum foil over the long nail and tape it in place.
Carefully tap the long nail into the pole, as shown. (Rest the pole against the edge of a table when you do this, or the hammer will knock the pole loose from its base.)



Beaufort Wind Scale

Beaufort Force	Wind Speed (in kph) 10 m Above Ground	Description
0	Less than 1	Calm: Smoke rises vertically.
1	1-5	Light Air: Not enough to move a wind vane, but smoke drifts with the wind.
2	6-11	Light Breeze: Wind felt on face, leaves rustle, and wind vane moves.
3	12-19	Gentle Breeze: Leaves and small twigs move and light flags extend.
4	20-28	Moderate Breeze: Raises dust and loose paper. Small branches move.
5	29-39	Fresh Breeze: Small trees in leaf sway.
6	40-50	Strong Breeze: Large branches move. Difficult to use an umbrella.
7	51-61	Near Gale: Whole trees sway. Uncomfortable to walk against the wind.
8	62-74	Gale: Twigs break off trees. Difficult to walk against the wind.
9	75-88	Strong Gale: Slight damage to buildings. May blow shingles off roof.
10	89-102	Storm: Trees uprooted. Considerable damage.
11	103-117	Violent Storm: Widespread damage.
12	118 and over	Hurricane: Very rare inland. Violent destruction.

It might not look like much yet, but your anemometer is almost done. All it needs is calibrating. Anything that measures something must be calibrated, or marked off, to show the measurements.

On a calm day, have mom (or dad) drive slowly down the street. As she drives at a steady 8 kph, hold the anemometer out the window so that the aluminum foil flaps in the breeze. Mark how far the foil moves on the quarter of posterboard. That indicates a wind speed of 8 kph. Do the same for 16 kph, 24 kph, and 32 kph. You have calibrated your anemometer for light wind speeds.

Remember the other quarter of posterboard? Remove the tacks from the quarter you just calibrated and replace it with the new piece. Set the first piece aside. Remove the aluminum foil from the nail and set it aside.

Now cut a rectangular piece of posterboard from your scraps and wrap it in



aluminum foil. Tape the ends together and tape it to the nail. This flap will be heavier than the first one and will be useful for measuring stronger winds. Calibrate your second anemometer just as you did the first, but for stronger winds.

You now have two anemometers: One for lighter breezes and one for stronger winds. Set them up in an open place, where they will not be protected from the wind by a tree or your house. Tack whichever anemometer you want to use in place and face the aluminum flap into the wind.

You can even check on the local meteorologist to see how accurate he or she is at predicting wind speeds.

The Beaufort Wind Scale is used by meteorologists to measure the force of winds. That scale appears on page 19. Have fun! (Until your anemometer reads a force-8 wind on the Beaufort Scale. Then GET INSIDE!)

