

Simple Anemometer

Materials

Five 85-ml (3-oz) plastic cups
Two plastic soda straws
One pencil (with unused eraser)
Single-hole paper punch
Thumbtack or pushpin
Permanent magic marker
Stopwatch or wristwatch
with a second hand



Simple Anemometer

An anemometer is a device used to determine wind speed. Cups or fins that are activated by the wind are placed around a rotating axis. This causes the axis to rotate at different speeds as the wind increases and decreases. Perhaps the anemometer is the most difficult weather instrument to build accurately. However, the principles upon which an anemometer is based can be shown by the construction of this simple one.

Procedure for Constructing a Simple Anemometer

Punch one hole about 1.5 cm (0.5 in.) below the rim of each of four plastic cups. Punch two holes in the fifth cup directly opposite from each other, about 1.5 cm (0.5 in.) below the rim. Next, punch two more holes in this cup, each .75 cm (0.25 in.) below the rim and making sure that these holes are equally spaced between the first two holes.

Using the pushpin and the scissors, carefully make a hole in the bottom center of the cup that has the four holes. Ensure that this newly created hole is large enough for the pencil to easily fit through.

Next, slide one of the straws through one of the one-hole cups. Bend the end of the straw that is inside the cup about 1.5 cm (0.5 in.) from its end and tape it to the inside of the cup. Place the other end of the straw through the two holes in the four-hole cup. Bend and tape (as you did earlier) this end of the straw to the inside of another one-hole cup, making sure that the openings of the cups are pointing in opposite directions. Next, complete this same procedure for the remaining two one-hole cups. Make sure that the opening of each cup faces the bottom of the one next to it. No two openings should face each other. The completed anemometer should look like the one in Figure 15-3.



Figure 15-3. Completed anemometer.

Using the permanent magic marker draw a large X on the bottom of one of the one-hole paper cups.

The anemometer is now ready for testing. If the wind is blowing, take it outside to an open area. If there is no wind, place it in front of a small fan that is turned to a low setting. Position yourself so that you can see the X on the bottom of the cup as it spins around. Count the number of revolutions in 10 seconds. Use Table 15-1 on this page to estimate the wind speed. See Appendix VIII for the Beaufort Scale of Wind Speed.

Table 15-1. Estimated Wind Speed

Revolutions in 10 seconds	Wind Speed in kilometers per hour (km/h)	Wind Speed in miles per hour (mph)
2-4	2	1
5-7	3	2
8-9	5	3
10-12	6	4
13-15	8	5
16-18	10	6
19-21	11	7
22-23	13	8
24-26	14	9
27-29	16	10
30-32	18	11
33-35	19	12
36-37	21	13
38-40	23	14
41-43	24	15
44-46	26	16
47-49	27	17
50-51	29	18
52-54	31	19
55-57	32	20

Pitfalls

The importance of this anemometer construction activity is to understand the operating principles of an anemometer. This anemometer is not designed to measure very accurate wind speeds. However, the more carefully this simple anemometer is constructed, the more accurate will be the readings of wind speeds. It should be kept in mind that there may be some problems in getting accurate counts of the rotation of the cup as well. The numbers in the chart are used to convert the rotation to wind speed. These are rough approximations.

Extensions of This Activity

If a more sophisticated anemometer can be secured, comparisons can be made between wind speeds obtained by the simple and more sophisticated anemometers.

The learner can be challenged to make modifications in the simple anemometer to improve on the accuracy of the wind speeds that are obtained.