

WIND POWER

You can't see air but you know it's there!

You can't see it, but you can feel it! You can feel the air blow on you, see it move trees, your clothes on the washing line, flags and lots more!

It is the moving force that lets us use the wind to power all kinds of things.

The wind can power windmills, like in Amsterdam, Holland. The windmills can be used for lots of things, such as pumping water, grinding wheat and corn to make flour and bread, and like here in your school, for making electricity.

Why Does Wind Blow?

The wind blows because air has weight. Cold air weighs more than warm air, so the pressure of cold air is greater. When the sun warms the air, the air expands, gets lighter, and rises. Cooler, heavier air blows to where the warmer and lighter air was, or in other words, wind

usually blows from areas of high air pressure to areas of low pressure. If the high pressure area is very close to the low pressure area, or if the pressure difference (or temperature difference) is very great, the wind can blow very fast.

Wind Power for Electricity!

As you may know, here in Seaton Primary, we are producing electricity from wind power.

Right now, most of our energy comes from sources that will eventually run out, and that also damage the earth.

So to produce electricity from wind is good, because it will never run out, and doesn't harm the world in which we live, BRILLIANT!

The only problem is building all the windmills!

How Fast Is Wind?

You can estimate wind speed with the Beaufort Scale. It was developed in 1805 by a Navy admiral to measure wind at sea. But we can also use it to measure wind on land.

Miles Per Hour	Effects
<1	Smoke rises straight up, no motion
1-3	Smoke drifts slowly, tree leaves barely move
4-7	Leaves rustle, wind felt on face
8-12	Leaves and twigs move, dust raised from ground
13-18	Small branches move, dust and paper blown away.
19-24	Small trees and large branches sway
25-31	Big branches move a lot, wind whistles, umbrellas turn inside out.
32-38	Whole trees sway, hard to walk
39-46	Tree twigs break, very hard to walk
47-54	Branches, roof tiles blown down
55-63	Trees uprooted, severe building damage

64-72

Widespread building damage	
73+	Severe destruction

ACTIVITY

How to Measure the Wind

You can make your own wind speed measuring device, here is how:

INCLUDEPICTURE "http://www.geocities.com/thesciencefiles/anemometer/anemometertit.gif" * MERGEFORMATINET

<p>What are the materials and tools you will need for this project?</p> <p>INSTRUCTIONS: The plans for a simple hand-held anemometer that can be used on a calibration table, ready to use! If you need it as a monitor, it should give readings accurate to about 5%.</p> <p>MERGEFORMATINET</p> <p>You will need the following items for each anemometer you build:</p> <ul style="list-style-type: none"> 1 table tennis ball 50 cm of 2 lb test fishing line 1 protractor 1 wooden dowel (about 40 cm long) 1 small screw 1 small 'stick-on' spirit level <p>In addition, you will need some red nail polish, a small sewing needle (at least as long as the diameter of the ball), a penknife, some matches and some super glue.</p> <p>Note that you must use a regulation table tennis ball, in order to ensure that its weight is correct. The spirit level can be obtained at a DIY store or model/toy shop.</p> <p>Here's what the finished anemometer will look like:</p>	<p>The dowel is attached to the protractor along its baseline using a screw. You'll need to start a hole first in the plastic protractor with the penknife.</p> <p>Attach the stick-on spirit level on the other side. It must align exactly with the baseline of the protractor.</p> <p>(Test this later by making sure the</p>

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www.geocities.com/thesciencefiles/
anemometer/anemometer2.JPG" *
MERGEFORMATINET

To prepare the **table tennis ball**, heat the needle again and carefully poke a small hole on each side of the ball. Then thread the free end of the fishing line through the holes.

The **length of the fishing line** from its attachment point on the protractor to the top of the ball must be **30 cm**. Tie a knot in the line that protrudes through the bottom of the ball, and seal it with a small amount of glue. Then cut off any excess line and glue.

Finally, use a small amount of the red nailpolish to colour the fishing line at the place it passes by the scale on the protractor. This will make it easier to see.

Using the Anemometer:

It will help if you have one person holding the anemometer, and another person reading the scale on the protractor.

Hold the anemometer level, parallel to the direction of the wind, and well in front of you. (The reason for the long dowel handle is to minimize turbulence from your body, which could affect the reading.)

Your partner can read the angle of displacement at the bottom of the protractor. This can range anywhere from 90 degrees (no wind) to 20 degrees or less (lots of wind).

Of course, several measurements should be made, and the results averaged.

Use the table on the next page to determine the wind speed:

Angle
km/h

90

0

89

4.4

88

5.9

87

7.2

86

8.3

85

9.3

84

10.2

83

11.0

82

11.8

81

12.5

80

13.2

79

13.8

78

14.5

77

15.1

76

15.7

Tip:

If you need to change the wind speed from **kph** (kilometres per hour) to **mph** (miles per hour), then you can use this formula:

$$\text{mph} = \text{kph} \times 0.625$$

e.g. to work out 45 kph in mph, times the 45 by 0.625

$$45 \times 0.625 = 28 \text{ mph}$$

(Your umbrella will turn inside out at this speed!!!!)

SHAPE * MERGEFORMAT

Here is a part of the world, this shows the wind and some of it's movements.