652-1020 (05-030) Wind Vane

Parts List:

- Substantial case base and support pillar with large red letters denoting North, South, East and West
- Vane assembly on sensitive cone bearings

Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear.

How to Teach with Wind Vane:

Concepts Taught: Weather, wind, directions.
Curriculum Fit: Weather, force and motion, air and air pressure.

Additional Materials Recommended:

- Compass (**657-4010 Science First®**)
- Anemometer (**652-1010 Science First®**)
- Stopwatch (**657-4110 Science First®**)

Theory:

What is weather? It can be defined as: *the atmospheric state at a given place and time (e.g.,* temperature, moisture, wind velocity, and barometric pressure).
What is a wind vane? It can be defined as: *a mechanical device that determines the direction from which the wind is blowing*
What is a compass? It can be defined as: *a magnetized needle, mounted on a pivot, which points in a north direction.*
What is air pressure? It can be defined as: *pressure that results from the weight of the atmosphere.*

Experiment 1: Wind Direction
Kit Components Needed: Wind vane

Additional Items Needed: Compass

Procedure:

1. Designate an unobstructed fairly windy area outside the building where the wind vane may be placed (i.e., so that the vane assembly can rotate freely).
2. Position the wind vane so that the "N" corresponds with north. Use the compass to locate north. If you do not have a compass, follow the rule that the sun rises in the east and sets in the west. This will help you position the wind vane correctly.
3. At the same time every day observe the direction that the wind is blowing. Create a table that lists date and wind direction. Record data over the course of a month. At the end of this time frame, make a pie chart (direction that wind blew) using the data in the table. Analyze the data (i.e., did the wind blow in one direction more than the others; was the direction affected by the day of the week). It may be appropriate to discuss local weather patterns and other mitigating factors (e.g., windiest month on record in your town, state, county, etc.; west to east flow of weather across the USA).

Optional Experiment: Wind Speed

Additional Items Needed: Anemometer, stopwatch

Procedure:

1. Designate an unobstructed fairly windy area outside the building where the anemometer may be placed (i.e., where it can rotate freely).
2. Measure the distance from the cup center (red cup) to the center of the shaft. It is about 16 cm.
3. Have one person use the stopwatch to time exactly one minute, while the other person counts how many times the red plastic cup goes by in that time period. This is the number of revolutions per minute (RPM). Record this value below.
   RPM = _____
4. When the cup makes one full revolution, it covers a distance equal to the perimeter of a circle of radius 8 cm. Therefore, it covers a distance equal to $2\pi r$, which is 2 x 3.1416 x 8 cm, or 50.3 cm.
5. Calculate the speed of the anemometer as follows: Speed of anemometer = $\times RPM$ distance covered in one revolution (50.3 cm)
   Speed of anemometer = _____
6. Convert the anemometer speed into km/hr using the following calculation:

   $(RPM \times 50.3cm) \times \left(\frac{60\ \text{min}}{\text{hr}}\right) \times \left(\frac{1\text{km}}{100{,}000\ \text{cm}}\right)$

   km/hr = _____

7. Calculate the wind velocity. The anemometer moves only 1/6 as fast as the wind.

   $(6) \times \left(\frac{\#\ \text{km}}{\text{hr}}\right)$

   Wind velocity = _____

   Discussion:
   By performing both experiments, students will gain a better understanding of how different wind variables play a role in how quickly a storm or weather system will travel to other areas of the country.