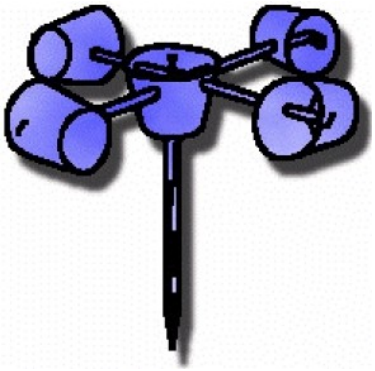
Simple Anemometer

Overarching question – How can I make an instrument that measures wind speed?



Materials Needed:

- **five 3 oz. plastic cups**
- **two plastic soda straws**
- **one pencil (with unused eraser)**
- **single-hole paper punch**
- **scissors**
- **tape**
- **one push-pin**
- **permanent magic marker**

Step 1

Take four of the plastic cups and punch one hole in each, about 1/2 inch (1.5 cm) below the rim.

Step 2

Take the fifth cup and punch two holes in it, directly opposite from each other, about 1/2 inch (1.5cm) below the rim Now punch two more holes in the cup, each 1/4 inch (1cm) below the rim that are equally-spaced between the first two holes.

Step 3

Using the push-pin and the scissors, make a hole in t1le center of tt1e bottom of the cup with four holes in it. The hole should be large enough that the pencil can fit easily through it.

Step 4

Slide one of the straws through the hole in one of the cups that has only one hole in it. Bend the end of the straw that is inside the cup about 1/2 inches (1.5 cm) and tape it to the inside of the cup.

Step 5

Place the other end of the straw through two of the holes in the fifth cup and then through the hole in one of the other cups. Tape the end of the straw to the inside of the cup as you did earlier, making sure that the openings of the two cups face opposite directions.

Step 6

Repeat steps 4 and 5 with the remaining two cups, sliding the straw through the remaining two holes in the fifth cup. Make sure that the opening of each cup faces the bottom of the cup next to it (in other words, no two openings should be facing each other). Each of the four cups should be facing sideways.

Step 7

Insert the pencil with the eraser facing up through the bottom of the fifth cup. Carefully push the pin through the two straws and into the eraser on the pencil.

Step 8

Take the permanent magic marker and draw a large X on the bottom of one of the cups. Your anemometer is now ready to use! Take it outside and hold it in front of you in an open area where the wind is blowing.

Look at the X on the bottom of the cup as it spins around. Count the number of times it spins around (revolutions) in 10 seconds. Use the table below to estimate the wind speed.

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

Resource - The Southeast Regional Climate Center
http://www.sercc.com/education_files/anemometer.pdf

Levels of Inquiry

Confirmation – Provide the students with the overarching question and the procedure. Place several instrument artifacts around the room so that students can check their progress.

Structured - Provide the students with the overarching question and the procedure. Allow students to discover the finished product on their own.

Guided – Provide the students with the overarching question and materials. Students are to create and write their own procedures and determine which materials to utilize. Allow students to discover the finished product on their own.

Open - Students are given a scenario where the instrument is needed, but not identified. From this scenario, students are to generate an overarching question. From that point, students are to create and write their own procedures and determine which materials to utilize. Allow students to discover the finished product on their own.

Possible scenario – Todd is planning to set off his homemade rocket. He knows that the best time to set off the rocket is when the wind is between 0 – 10 miles per hour. Create an overarching question that can guide you to help Todd set off his rocket.

Extensions

Idea One – Create a class weather station with handmade anemometers, rain gauges, barometers, and wind vanes. Monitor the weather and collect data at the same time of day. With the data, create charts and graphs, either by hand or by graphing software, such as Excel. (T)

Idea Two – Create a class blog that details the weather conditions for the school, including the weather data collected from the class weather station. (T)

Common Core (Grades 6-8)

L6-8RST3: Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
L6-8RST7: Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
L6-8WHST2: Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.
d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
e. Establish and maintain a formal style and objective tone.

f. Provide a concluding statement or section that follows from and supports the information or explanation presented.

Georgia Performance Standards

S6E4. Students will understand how the distribution of land and oceans affects climate and weather.

a. Demonstrate that land and water absorb and lose heat at different rates and explain the resulting effects on weather patterns.