

## **Minor Challenge Set #3**

**STEM Field:** Civil Engineering

**Level:** Intermediate

**Challenge Name:** Make Your Own Anemometer

**Project Cost:** 0-20 USD

### **Materials Required:**

- 5x paper or plastic cups (paper cups are recommended)
- 2x straws
- 1x pin
- Stapler
- Pencil with eraser
- Scissors, or paper hole punch, or a sharpened pencil
- Timer (optional)
- Fan with different speeds (optional)

### **Safety:**

- Be careful when handling sharp objects.

### **Duration:**

- The challenge takes approximately 1 hour to finish, however, the time guideline is an estimation only, and students and mentors can complete the tasks around their schedules.

## **Introduction:**

Grab your notebook - we are making a weather journal! In this project, we will build our own anemometer. An anemometer is a device used to measure wind speed. Our anemometer will be made up of five cups, one cup being the central axis, and the other four cups are used to

measure the wind speed. The faster the wind, the faster the cups spin the axis. How fast can your anemometer whirl?

## Instructions:

- 1) Use a pair of scissors, paper hole punch, or tip of a sharpened pencil to create four holes in the cups just below the rim. You should have two pairs of holes opposite each other.
- 2) Press two straws through the holes. They should form a “+” shape.



- 3) Use a pair of scissors, paper hole punch, or tip of a sharpened pencil to create a hole in the centre of the bottom of the same cup.



- 4) Create two adjacent holes in each of the other four cups. The holes should be about halfway along the cup's height.
- 5) Push the end of a straw through the two holes in each one of the cups. Make sure all the cups are facing in the same direction. If the cups twist easily on the straw, use some tape to secure them.



- 6) Push the eraser end of the pencil through the hole in the bottom of the central cup.
- 7) Press the pin lightly through both of the straws and into the eraser. Do not press the pin into the eraser all the way, as there will be too much friction and your anemometer will not spin.



- 8) Your anemometer is ready to use! Try blowing gently straight into one of the four open cups for a few seconds, then blow harder. What do you notice about the turns?
- 9) You can take the anemometer outside on a windy day and try to measure the wind speed. Alternatively, take the anemometer to different locations. Compare the wind speed in those places.

## Extension

Hold the anemometer in front of the fan. Count the number of times one cup completely turns around for 1 minute.

Repeat this step while keeping the anemometer in front of the fan at the same distance, but change the speed of the fan. Count the number of times one cup completely turns around for 1 minute.

If you don't have a fan that turns at different speeds, hold the anemometer at different distances from the fan. What do you notice about the turns?

## Reflection Questions:

- Are there any improvements you would make to this challenge?
- Were you able to see wind make the cups on the anemometer spin around? How does the turn change as the wind speed changes?
- From your own research, how is wind made? If you have been to the beach, you may notice that it is often windy. Why do you think this is the case?

## Submission Guidelines:

- Submit a photo of the experiment setup. Include a short summary that addresses the reflection questions.

Note: Remember, if you want to upload pictures of your Minor Challenge that also include you, please check if it is OK with your parent or guardian first.

- The submission form is on the Minor Challenges page:  
<https://sciencechallenge.org.au/index.php/minor-challenges/>  
Fill out the details and make sure you upload your submission.

# Bibliography:

- *How does a wind meter work?: Stem activity* (no date) *Science Buddies*.  
Available at:  
<https://www.sciencebuddies.org/stem-activities/how-does-a-wind-meter-work> (Accessed: May 8, 2023).