Twirling in the Breeze

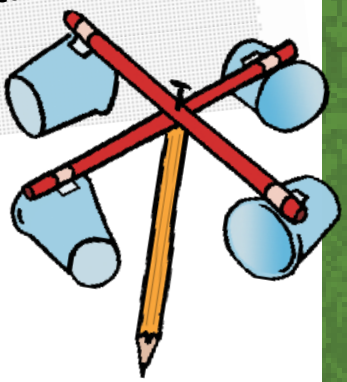
Build a Device to Measure How Fast the Wind is Blowing.

You may have heard a weather reporter warn, "Wind gusts are up to 30 mph!" Scientists measure wind speed using a weather instrument called an anemometer, which relies on cups attached to freely rotating arms to catch the wind and make the arms spin. The device then records the number of revolutions in a given time period and translates this into miles per hour (mph).

You'll Need (per small group)

45 Minutes

- 1 unsharpened pencil (with eraser)
- 6 straws
- 10 T-pins (office supply stores)
- 4 small paper or plastic cups
- 4 large paper or plastic cups
- 2' of masking or transparent tape
- 1 fan (or one for the whole room to share)
- stop watches or clock with second hand
- paper and pencils



BE ECO-FRIENDLY! Reduce, reuse, recycle, and compost activity materials whenever possible!

1. Identify problem. Divide youth into small groups[5] then deliver the **SciGirls Challenge:** Build a device that can spin in front of a fan, allowing you to count the number of times it rotates in 1 minute. Discuss why it might be important to know wind speeds.[1] (The placement of wind turbines is one example.)

Watch the SciGirls use an anemometer in **Blowin' in the Wind** (Data Collection.)

Special thanks to the Franklin Institute for being the inspiration behind this activity. The Franklin Institute in Philadelphia has been a pioneer in science experiences for youth and families since the late 1980s. The Franklin Institute and SciGirls partnered together to establish SciGirls' Museum Affiliates Program, uniting museum educators nationwide in an effort to provide quality, gender sensitive programs supported by training, monthly conference calls, and an online community.

Twirling in the Breeze

2. Brainstorm and build. Remind groups that the weather instrument they create does not have to use all of the materials provided. It just must spin when placed in front of the fan. Give groups 10 minutes to brainstorm and agree on a design before building their anemometers.[2]

POINTER: If a group is struggling encourage them. Suggest using the pencil as the base or pushing a T-pin through the middle of a straw and into the pencil's eraser as a way to attach arms.[3] (See left)

3. Redesign. Once the youth have constructed their first design, encourage groups to exchange ideas as they test and redesign their prototypes.[2,5]

4. Collect data. With a successful design accomplished, have each group find the wind speed by counting the number of times the anemometer revolves in 1 minute, or revolutions per minute (rpm). The youth should make sure the anemometer is always the same distance from the fan and that they can tell when there's been a complete rotation.

5. Experiment. Have youth measure wind speed at different fan settings, distances, or positions (for example, centered on the fan or off to the side). Encourage creativity![2] How do the wind speeds compare?

6. Continue exploring. Consider taking the youth outside to find the place with the best wind speeds in your community.[1]

Challenge Stereotypes

Introduce youth to diverse role models to help counter stereotypes.[4,6] Mallory Peper is a geographic information system (GIS) specialist whose job is to figure out where to put wind farms. She goes to a location, gathers data, and analyzes it for optimum wind power conditions. Mallory became interested in wind energy after interning at the National Weather Service, but her love of STEM started when she was a kid watching sci-fi shows!

Watch Mallory discuss her career path in **Blowin' in the Wind** (Mentor Moment.)