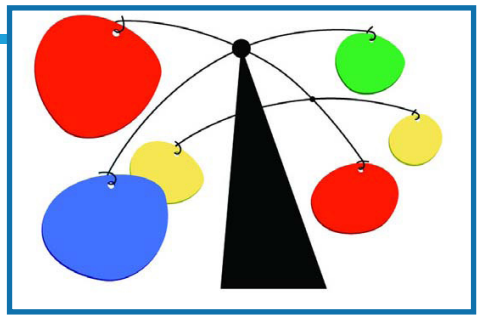
60 minutes

Grades 3–5, 6–8

Kinetic Sculpture

Design a sculpture that moves in the wind but doesn't get blown over.



Instructions

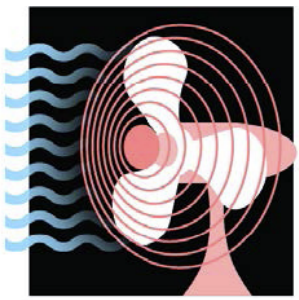
This activity combines art and engineering: students build a sculpture that meets specific design criteria and yet will not blow over.

1. Place students in groups and describe their challenge: to design a sculpture that stands at least 6" high, that has 2 parts that move in the wind, and that will not blow over.

2. Show students the materials they will work with and the testing apparatus (the fan). Give them time to draw designs and choose one. They can also name their sculpture—something poetic, mysterious, funny, or accurate.

3. Instruct students to design their sculpture.

4. Test each sculpture to see if it meets the criteria by placing it a reasonable distance from the blowing fan. If the sculpture falls over or doesn't have two parts that move in the wind, tell the groups to redesign and retest, watching for where the weight of their sculpture is so that it can stand without blowing over or away.



Materials

PER CLASS:

- ☐ Electric fan

PER SMALL GROUP:

- ☐ Ruler
- ☐ Cardboard
- ☐ Markers
- ☐ Ping-pong balls
- ☐ Poster putty
- ☐ Paper cups of different sizes
- ☐ Scissors
- ☐ Wooden skewers
- ☐ Strips of colored paper or fabric
- ☐ String
- ☐ Masking tape

Engineering & Science Connections

- The fan creates a pushing force on the structure via wind. The structure must resist this force so that it does not tip over, but also must use the energy from the wind to turn the movable parts.
- A wind turbine is an example of one type of structure that students may have created. Wind turbines are used to convert the wind energy to electricity. The largest wind turbine is 722 feet tall (twice the length of a football field!) and has blades with a diameter of 538 feet.
- Engineers grapple with making very tall structures that can withstand wind. One of the tallest buildings in the world, the Taipei Tower in Taiwan, can withstand typhoons—winds that are at least 74 mph! The tower is much wider at the base than at the top and is made of strong, flexible steel, among other special materials.
- Wind tunnels are large tubes with wind moving inside. They are used to test the strength of various structural shapes and materials. Buildings and other structures must be designed to safely withstand the extreme forces of wind from hurricanes and tornados.

Guiding Questions ?

Where does the weight of the sculpture need to be located to make the structure stable in the wind?

What role does balance play in making the sculpture move in the breeze?

What would happen if your sculpture were taller? Had another moving part? Had to withstand a stronger wind?