Wind Can Do Work

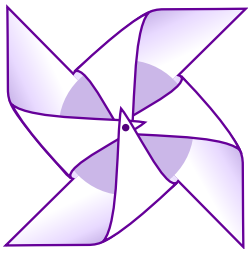
HOW MANY PAPER CLIPS CAN BE LIFTED TO THE TOP?

People have been using wind to do different kinds of work for centuries. This experiment gives you a chance to build your own wind turbine and use it to do the work of lifting paper clips.

How many paper clips do you think your turbine will be able to lift?

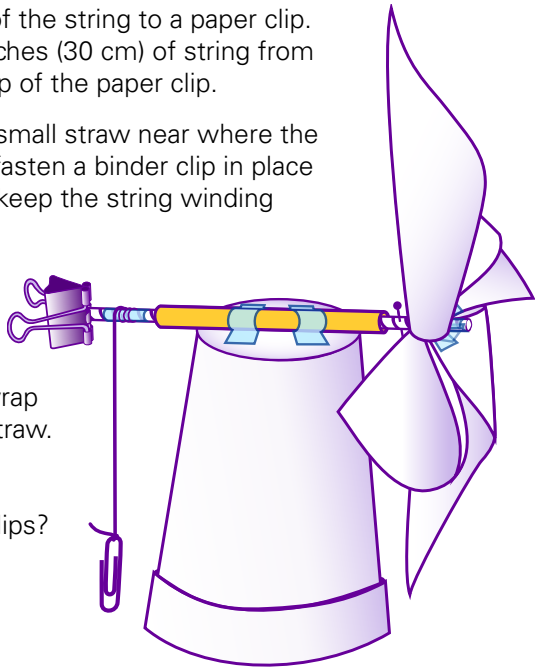
TRY THIS

1. Turn the cup upside down. The bottom is now the top.
2. Cut the large straw so that you have a piece that is slightly longer than the width of the bottom of the cup (now the top). Tape the straw to the center of the bottom (top) of the cup, so that it is centered.
3. Prepare the turbine blades using the 4-Blade Turbine Template. (included with this experiment.)

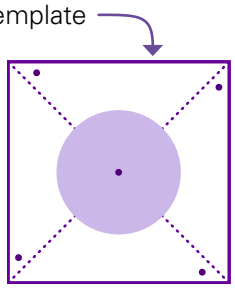


4. Measure .5 inch (1.3 cm) from the end of the small straw and make a mark. Insert a pin through the small straw at this mark. This is the front of the straw.
5. Slide the straw through the turbine blades until the back of the blades rest against the pin. Gently slide each blade over the end of the straw. Tape the blades to the straw to be sure they are securely attached.
6. Insert the small straw into the larger straw on the cup.
7. Tape the string to the end of the small straw. Tie the other end of the string to a paper clip. Have at least 12 inches (30 cm) of string from the straw to the top of the paper clip.
8. On the end of the small straw near where the string is attached, fasten a binder clip in place for balance and to keep the string winding around the straw.
9. Use the fan to make the turbine blades turn.
10. Watch the string wrap around the small straw.

    Does the turbine pull up the paper clips?



THINGS YOU NEED



- 4-Blade Turbine Template
- 1 Small straw
- 1 Large straw
- Tape
- Paper clips
- 1 Tall foam cup
- 1 Straight pin
- 1 Binder clip
- 20 inch (50 cm) string
- Fan
- Ruler
- Hole punch
- Marker
- Scissors

POWER WORDS

Rotor is the part of a wind turbine that attaches the blades to the nacelle.

Lift turns the blades of a wind turbine. They are designed to split the wind. Air moving on top goes faster and weighs less. Air moving below moves slower and pushes up. That creates upward pressure, or lift.

WHAT DO YOU THINK?

Keep adding paper clips one at a time to determine what is the maximum number that can be lifted all of the way to the top. Record your data.

How could you change the design of your turbine to produce more work from the system?

Based on content prepared for **The NEED Project**.
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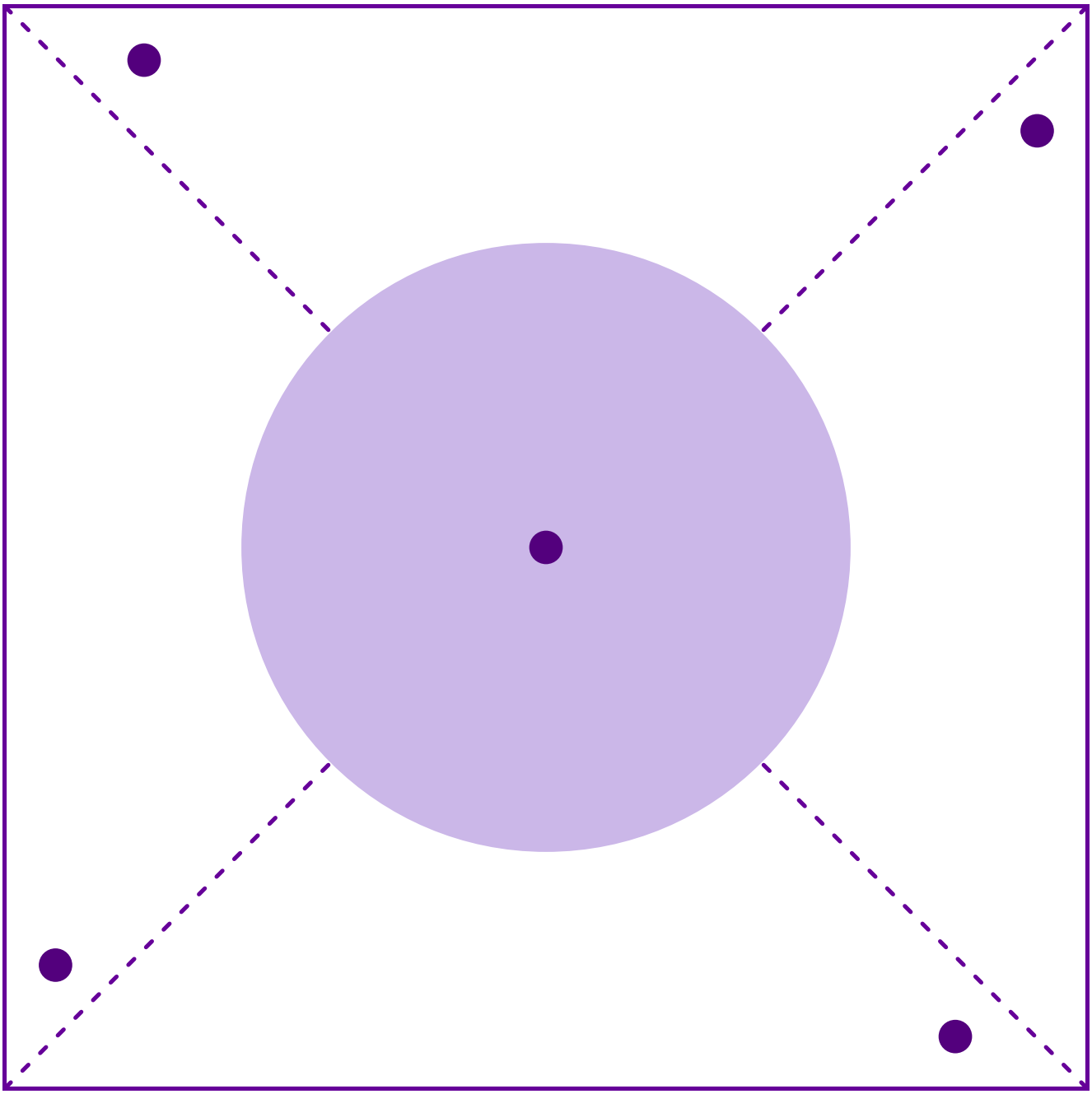
4-Blade Turbine Template

HOW DO TURBINE BLADES WORK?

HOW TO MAKE THIS TURBINE.

1. Cut out the square.
2. Punch out the 5 black holes: 1 in the center, and 4 along the edges. Be careful to not rip the edges.
3. Cut on the dotted, diagonal lines, up to the edge of the circle.
4. Follow the directions in the "Wind Can Do Work" experiment to complete the turbine.



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