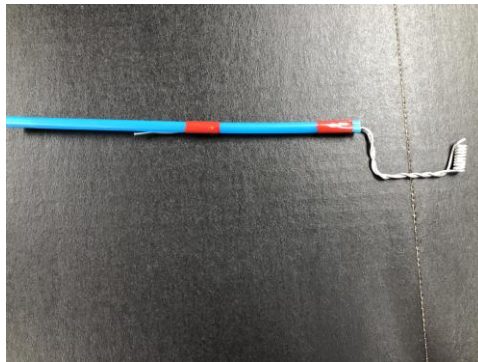


2. Insert the piece of wire hanger so that it is perpendicular through the middle of the smoothie straw, and slide the straw to the center of the wire hanger piece.
3. Measure 1 inch away from the wire on both sides of the straw and make a mark. Make a cut in the top layer of the straw on both of the marks. Do not cut all the way through the straw!
4. Pull both ends of the straw toward one end of the wire hanger piece, forming a triangular shape. While keeping both ends of the straw open, tape the straw around the wire hanger. Set this aside; this will be your sprinkler.



5. Wind the center of the 18-inch piece of stiff wire tightly around the wooden skewer, covering about 0.5 inches of the skewer. You should wrap the wire around the skewer at least 10 times to make a spring.
6. Twist the loose pieces of the stiff wire together all the way to its ends. Bend the twisted wire into a 'Z' shape.
7. Tape the end of the wire about one-third of the way down the outside of the second straw half. You can remove the skewer by sliding it out of the wire spring.

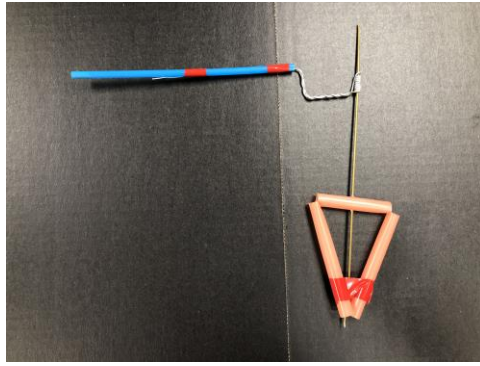


8. Insert the spring onto the end of the wire hanger piece opposite of the sprinkler. Set this aside.

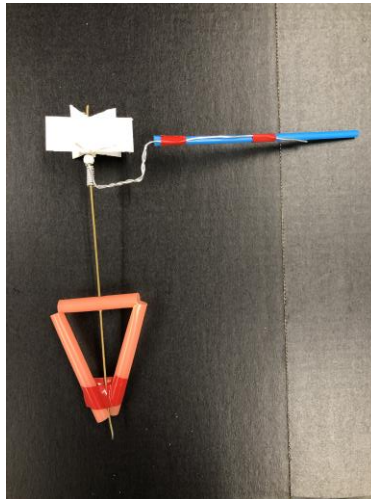
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9. Cut a piece of cardstock to 10 x 0.5 inches. Fan fold the strip of cardstock by folding one end about 0.5 inches in and alternating each fold until you reach the other end of the strip. This will be your turbine.
10. Use a glue stick to apply glue to one side of the cardstock strip and glue the folds down. Stick the ends together to complete the turbine.
11. Place a bead onto the wire hanger so that it rests on top of the spring.
12. Slide the center of the turbine onto the end of the wire hanger and Gorilla glue it to the wire. **Safety: An adult should assist when using Gorilla glue.**



13. The turbine is ready to be used. Blow through the regular straw to see the sprinkler rotate. Dip the base of your smoothie straw into water and blow to see your turbine and sprinkler in action!

STEM Explanation:

Wind power is an alternative resource of energy that can create usable energy power, like electricity, without causing pollution. Additionally, wind is a reusable resource because it does not get "used up" and there is always wind made on its own due to the earth's atmosphere. Wind turbines convert kinetic energy of wind into mechanical power. When you blow through the straw, the blades of your turbine rotate causing the water to climb up the slants of the straws of the spinning sprinkler to squirt water around. This same idea is used in large windmills around farms, ranches, and shorelines to generate electricity from the renewable energy.

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Career Connection:

Wind energy engineers design wind farm collector systems and analyze operations of wind farms. They ensure that wind farms are constructed properly and have little impact on the environment. Many wind energy engineers use turbines as a source of renewable energy to generate power.

Resources:

<http://www.arvindguptatoys.com/toys/Turbinesprinkler.html>

https://www.ducksters.com/science/environment/wind_power.php

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