Project Build:

Power From Nature

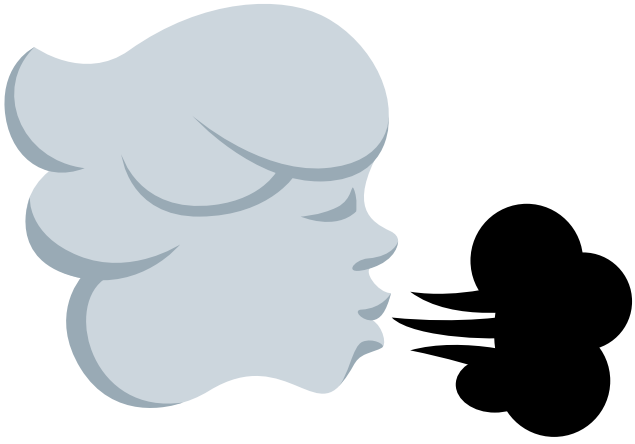
Activity Station Signs

PUFF MOBILES

Build a wind-powered car using **ONLY:**

- 4 wheels (Life Savers)
- 3 straws
- 2 paper clips
- 1 piece of paper

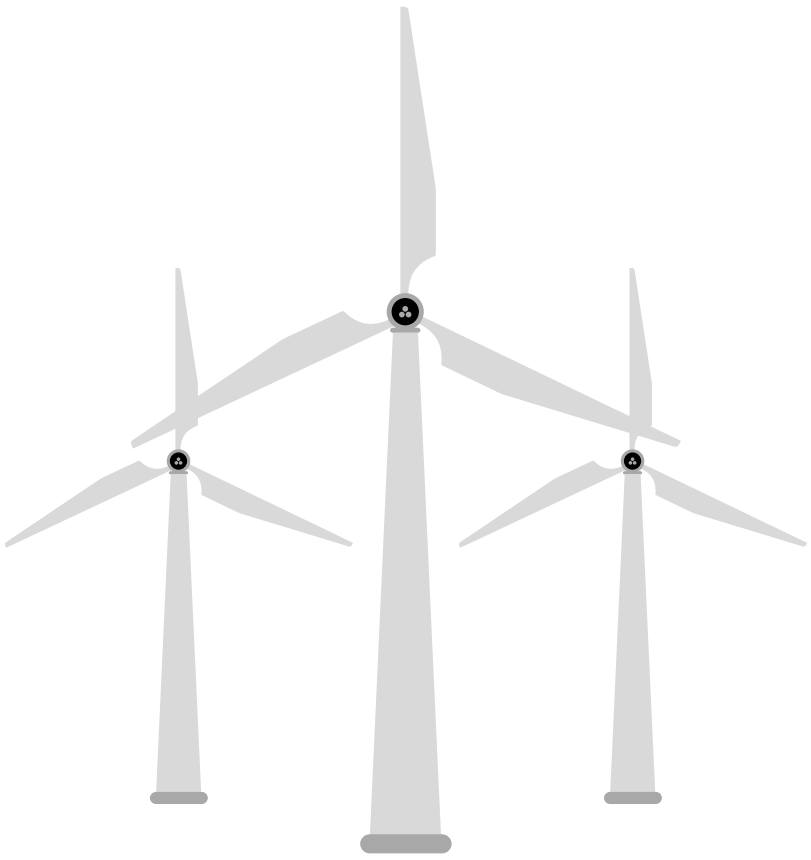
The car should travel from the starting line to the finish line using as few puffs of air as possible.



RELEVANT TERMINOLOGY

Kinetic energy: Energy of motion. Cars moving from the wind are using kinetic energy.

Renewable resource: A natural resource that can't be used up. Solar energy and wind are both renewable resources.



WHAT IS THE SCIENCE?

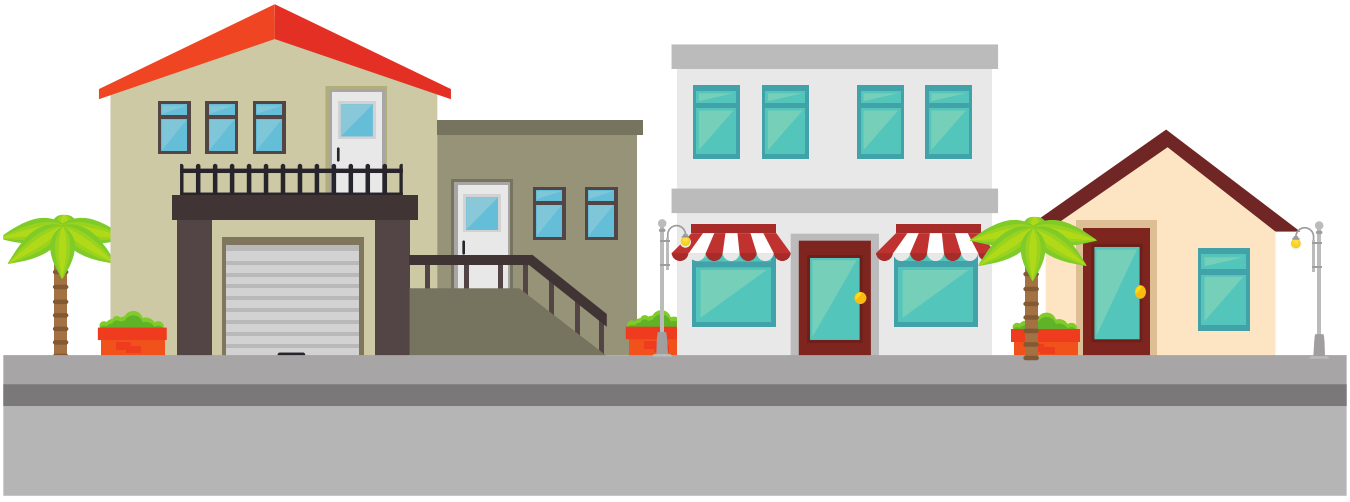
- Wind power has been used by people around the world for thousands of years. Ancient engineers built ships that used the power of wind to push them to points around the globe. The Dutch began to build windmills nearly 600 years ago that could crush and process grain. Today, engineers are looking to use wind even more to meet global energy needs. Large wind turbines are being used to generate clean electricity, which is electricity that doesn't create pollution.

QUESTIONS TO ASK:

- What are some ways that we use wind power to do work?
- How can we use wind power for transportation?
- What were the challenges in trying to move your car with the power of breath?
- If you were given a variety of materials to choose from, what material would you use for your wheels and why?

SQUISHY CIRCUITS

Your goal: Create structures for a model neighborhood using conductive and insulating dough, LEDs, and hand-crank generators.



THINGS TO NOTE

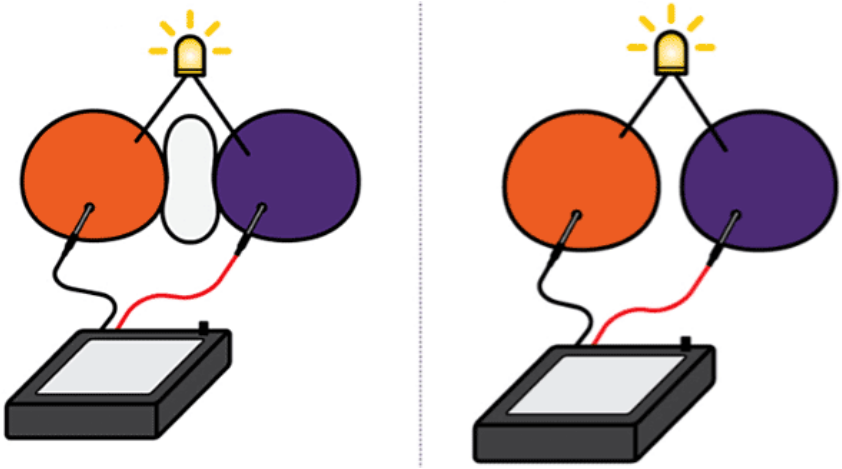
1) Keep safe!

- Connect metal to dough, NOT metal to metal.
- Keep the wires/terminals of the hand crank from touching each other.
- Do not connect LEDs directly to hand cranks.

2) There are TWO types of dough:

- **Conductive dough**: lets electricity flow through it.
- **Insulating dough**: stops electricity from flowing.

3) Connect the dough, an LED, and a power source together so that electricity can flow in a loop.



Remember: Conductive dough cannot be touching, so make sure to use insulating dough or leave plenty of space!

LEDS NOT LIGHTING UP?

- Try connecting the LED in the opposite direction. LEDs have one "leg" that is slightly longer than the other; this longer leg must be connected to the dough with the red wire from the power source.

- Keep pieces of conductive dough from touching each other. If the two pieces of conductive dough touch, they **short circuit**.

- Try turning the hand crank generator in the opposite direction.

DAYLIGHT IN A BOTTLE

Explore how a water bottle can help you read a secret message from a friend, or light up a room with free, clean energy from the Sun!

Supplies:

- Large paper bag
- Scissors
- Flashlight
- Clear plastic bottle

INSTRUCTIONS

Step 1: Open the grocery bag and have a friend make a secret message or drawing on the bottom, in a corner.

Step 2: Cut a small hole in the bottom of the bag--at the opposite corner.

Step 3: Find a dark location. Shine your flashlight into the bag and look inside the bag for your friend's secret message or drawing.

Step 4: Next, try using the water bottle. Put the water bottle inside the bag and shine the flashlight through it. Is it easier to see your friend's secret message or drawing?

Step 5: Think of how this could relate to the outside world and how you can capture daylight.

WHY IT WORKS

The water bottle solves the problem of glare from the flashlight. The water scatters, or spreads, the light all over the inside of the bag so that you can see better.

HOW ENGINEERS USE IT

Engineers design structures to let in as much natural light as possible. This is called "**daylighting**."

The My Shelter Foundation installs water-filled recycled bottles inside the roofs of homes in the Philippines. The families can't afford electric lights but the water bottles give them free, clean light inside.