



How to Test Wind Energy at Home

Adapted from GM's Electrifying Engineering Series

1-2 HOURS | INDOOR ACTIVITY | AGES 7+



SUMMARY

General Motors' Telva McGruder demonstrates the power of wind energy with a paper windmill you can make at home.

OBJECTIVES

Students will

- Construct a working windmill out of household materials
- Identify and explain the functional parts of a windmill



MATERIALS

- construction paper
- pencil
- ruler
- string (at least 12 in)
- (2) straws - one small and one large if possible
- (2) paper cups - one large, one small
- tape - electrical or household
- notebook
- consistent access to the internet
- scissors and tape
- binder clip or paper clips
- 4 pennies

ESSENTIAL QUESTIONS

1. How and where do we get our power?
2. What are the advantages and disadvantages of making power from nonrenewable resources such as coal and natural gas and renewable resources such as solar and wind?
3. How do windmills work?

Lesson – How and where do we get power?

INTRODUCTION

From where do we get our power?

Most energy companies in the United States make power from coal or natural gas. This means that when these sources are burned for energy, they create pollution that is emitted into the atmosphere. This pollution or emissions are partially responsible for climate change.

A car factory requires an enormous amount of power. Car factories are the size of 88 football fields and use 65,000 lightbulbs! GM facilities use 7,500 GWh per year, on average, which is the same energy used to power 900,000 US homes.

GM is committed to sourcing 100% of its energy from renewable sources by 2030 in the US and 2040 abroad. That is why we are looking into renewable energy such as solar and wind, which do not create emissions. Today we will be building a windmill to demonstrate wind power.



Activity – Making a Windmill

PREPARATION

Before beginning, you will need to clear a space in your home – e.g., kitchen counter or dining table.

SAFETY NOTE: Ask an adult for help when handling scissors as making holes can be difficult.

BUILD A WINDMILL



PART 1

- Watch the *Electrifying Engineering* video, “How to Test Wind Energy at Home.” <https://youtu.be/D8CAab815CM>
- Create a paper square that measures 6.6 in x 6.5 in and cut it out.
- Mark the middle of the square with a pencil.
- Cut four lines diagonally, starting at each corner and cutting toward the mark you made with your pencil in the center of the square.

PART 2

- Use your scissors to cut a small hole (size of your small straw) by gently twisting the scissors into the pencil mark at the center of your square.
- Make a circle on **every other** corner of your square paper in the same place.
- Make small holes in each of these four corners by gently twisting your scissors.
- You now have a total of five holes in your square.

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PART 4

- Cut your large straw so that it is equal to the diameter of the **bottom** of your large cup.
- Tape the piece of large straw you just cut to the bottom of the cup.
- Take the windmill and place the small straw through the large straw on the bottom of the cup.

PART 3

- Place the straw into the center hole of your paper.
- Fold each corner hole individually over your straw, going in order of each corner.
- Squeeze and pinch your windmill at the center and ensure the front and back of the windmill measure 1 inch.
- Tape your windmill together but do not tape it to the straw. It should spin freely.

PART 5

- Take the small cup and make two small holes along the top and across from each other by gently twisting your scissors.
- Cut a piece of string (about 6 inches) and tie it through the holes creating a “bucket handle.”
- Tie then tape the small cup to the end of the small straw that’s holding your windmill.
- Use the small binder clip to fully secure the string at the end of the small straw (windmill).

PART 6

Now it’s time to test. You want to see if the windmill is able to do the work—lifting the small cup. Blow into one of the curved spaces of your windmill to provide the energy needed. Record your observations.