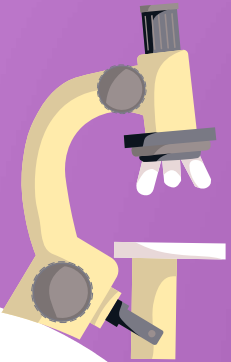
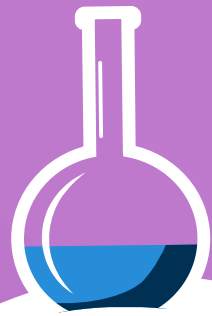


# BNExplorer S T E M

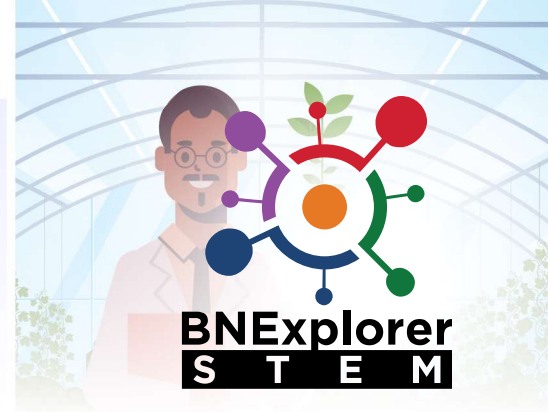


## MISSION RENEWABLE ENERGY



K-4





# SPARK



Before watching the video write down what you already know about non-renewable and renewable energy.

Next, please watch this video:  
<https://youtu.be/1kUE0BZtTRc>



Photo from the website:

<https://www.nrdc.org/stories/renewable-energy-clean-facts>

# IMAGINE

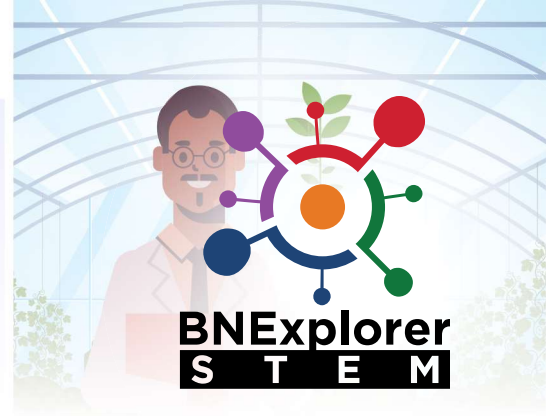
Before the activity of the experiment, let's think about our impact on climate change. Discuss with your parents what factors in YOUR life contribute to the negative impact of climate change. Now let's think about all the ways your community has contributed to the positive impact of controlling climate change.

Watch this video to learn more about climate change  
<https://youtu.be/NjvnAg6k20I>.

In the world, and fortunately in the town of Bloomington-Normal, wind energy is an example of renewable energy used to control climate change. Today, we will build a homemade wind turbine that shows how natural resources can make our Earth a little more green!

Let's watch this video to see the power of wind energy!  
<https://youtu.be/vrN9QcJyCI>





How do you think the homemade wind turbine will show the power of renewable energy?

Write your hypothesis:

My hypothesis is \_\_\_\_\_

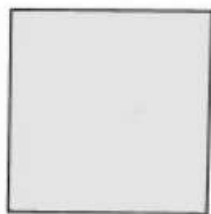
because \_\_\_\_\_

## CHALLENGE

This website ( <http://stem-works.com/external/activity/562> ) shows an example experiment of creating a homemade wind turbine to demonstrate the power of wind energy as renewable energy.

### Material needed:

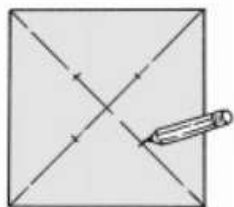
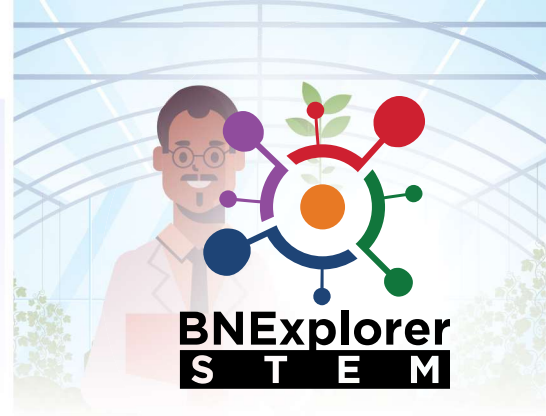
- square piece of paper (size does not matter)
- pencil
- scissors
- pin
- dowel rod
- 2-3 beads



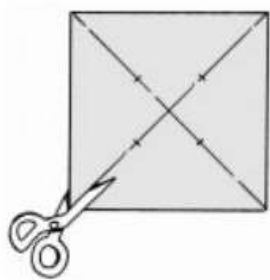
1. Begin with a square piece of paper.



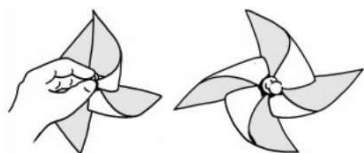
2. Fold your square corner to corner, then unfold.



3. Make a pencil mark about one third of the way from the center.



4. Cut along fold lines, and stop at pencil marks.



5. Bring every other point into the center, and stick the pin through all four points.



6. Turn your pinwheel over- make sure the pin pokes through the exact center.

7. Roll the pin around in little circles to enlarge the hole. This makes sure your pinwheel will spin freely.

8. Stick the pin in the dowel rod.

**Hint:** Separate your pinwheel from the dowel rod with two or three beads. Stick your pin through the beads first then the dowel rod.



9. Finally to demonstrate the power of the wind turbine with its movements, use a fan or hairdryer (as shown above in the left picture) to make the blades and shaft turn, winding up the string!

- What do you observe happening?
- How does this experiment show that wind is a renewable energy?

## CHALLENGE QUESTION

Why is renewable energy important in our world? How does renewable energy compare non-renewable energy? Specifically, how does wind energy play a part in renewable energy?

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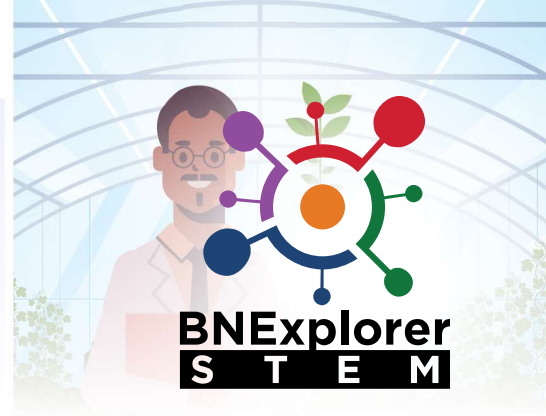
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# EXPLORE

If you want to see renewable energy in the real world, in Normal-Bloomington, IL, Twin Groves Wind Farm is a great place to check out!

<https://www.edpr.com/north-america/twin-groves-wind-farm>



Check Out Our Visit to Twin Groves Wind Farm!



# CAREERS

We talked with Angie Luginbuhl from Legacy Solar Systems about renewable energy.





## FUN FACT

– “In 2009, renewable sources accounted for about 10 percent of U.S. electricity generation.”

• From this website:

<https://www.aps.org/policy/reports/popa-reports/integelec-facts.cfm>

### WIND POWER:

– “Wind Turbines are big. Wind turbine blades average over 190 feet long, and turbine towers average 295 feet--about the height of the State of Liberty.”

– “Human civilization has harnessed wind power for thousands of years. Early forms of windmills used wind to crush grain or pump water. Now, modern turbines use wind to create electricity.”

• From this website:

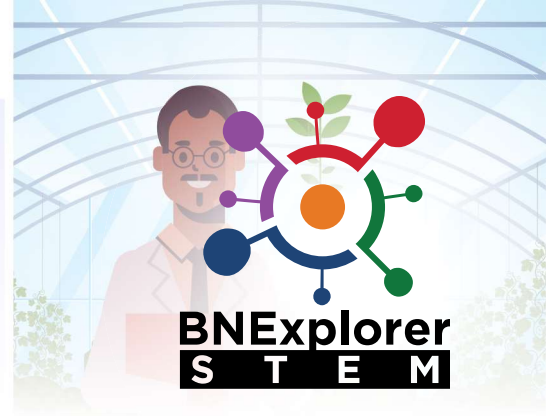
<https://www.energy.gov/eere/wind/articles/top-10-things-you-didnt-know-about-wind-power>

## EXTEND YOUR KNOWLEDGE:

If you are interested in learning more about wind energy watch this video of a recording of the reading of *The Boy Who Harnessed the Wind*. In this story you will learn about a young boy who was inspired to use wind -a renewable energy source- as energy in his village.

<https://youtu.be/RHEGYEziw4>





You can play a game called Power Up! on the NASA website that allows you to capture energy from the wind to try to power the town. See how much energy you can generate by keeping your wind turbine moving and your solar panels in the sun.

<https://climatekids.nasa.gov/power-up/>

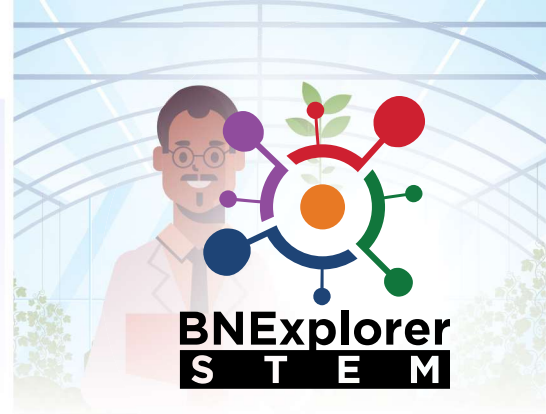


## THINK ABOUT OUR WORLD:

Making small changes can make a large impact on the environment.

- **What is one change you can make in your daily life that will decrease the amount of non-renewable resources you use?**





**BNExplorer**  
**S T E M**

# EXPERIMENT NOTES