Learning About Energy: Wind

30 minutes | INDOOR OR OUTDOOR ACTIVITY | AGES 5-7

SUMMARY

Building a foundation for learning about energy concepts -- this activity focuses specifically on wind energy.

OBJECTIVES

Students will

- Make observations about the wind outside.
- Use a toy windmill to explore wind energy.
- Connect wind outside to the energy needed to power a commercial wind turbine.

MATERIALS

- toy windmill
- timer
- pencil
- Handouts: *Exploring Wind Energy Using a Toy Windmill* and *Making Energy-Wind Energy*
- Optional: fan with multiple settings | The activity uses one's breath, but a fan could be used instead and or to test additional questions.
- Optional: Check out and read one or more of the following picture books.
    - The Boy Who Harnessed the Wind-Picture Book Edition, William Kamkwamba
    - When the Wind Blows, Linda Booth Sweeney
    - When the Wind Blows, Stacy Clark
    - Spinner the Winner, Mike Ormsby
- Optional: scissors
- Optional: science notebook

ESSENTIAL QUESTIONS

1. What are things you have observed wind do when you are outside?
2. Does wind speed or duration impact how long the windmill spins?
3. How do windmills work? Use this video to help students visualize the large turbine system, https://youtu.be/X3XgIueu4xk (view from the beginning to second 43).

Activity – Wind Energy

INTRODUCTION

What is wind energy?

The wind can blow your hat off, rustle the trees, and even power your television. For thousands of years, people have used windmills to grind grain and pump water. Today, modern machines called wind turbines are used to make electricity. To produce a lot of electricity, many wind turbines can be placed together on wind farms. Good sites for wind farms are often found on windy hilltops, open plains, and shorelines.

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 – Observing the Wind

PREPARATION

- Before beginning, you will need to clear a space in your home – e.g., kitchen counter or dining table. Then, review the materials list and gather items.
- Choose a breezy or windy day for this activity.

WHAT TO DO

1. Before going outside, explain or review your senses and what we use them to do (We use our senses to understand our environment better.)
2. Go outside and find a safe place to sit quietly for one minute.
3. Using your senses, observe the wind.
4. After one minute, talk about or write what you observed the wind doing.
    - How did you feel while you were observing the wind?
    - What did you see?
    - What did you feel?
    - What did you smell?
    - What did you hear?
    - What did you taste?

Activity – Exploring Wind Energy Using a Toy Windmill

PREPARATION

Before beginning, you will need to clear a space in your home – e.g., kitchen counter or dining table. Then, review the materials list and gather items.

WHAT TO DO

1. Fill in the datasheet and answer the questions as you conduct different tests with your windmill.

Activity – How Does a Wind Turbine Work?

PREPARATION

- This activity requires an internet connection.
- Check out one or more of the books listed in the *Materials* section.

WHAT TO DO

1. Watch how a wind turbine works, https://youtu.be/X3XgIueu4xk. Watch from the beginning to second 43. After viewing, answer the following questions aloud, with a friend, or in your science notebook.
    - What is a question you have about wind turbines?
    - True/False. Wind is a form of energy.
    - True/False. Wind energy makes the turbine blades move, like when you blew air over the toy windmill blades.
2. Use the worksheet *Making Energy-Wind Turbines*. Cut out each step and put them in the correct order.
3. Read and learn more about wind energy by checking out the books listed under *Materials*. Our favorite is The Boy Who Harnessed the Wind, picture book edition by William Kamwamba.

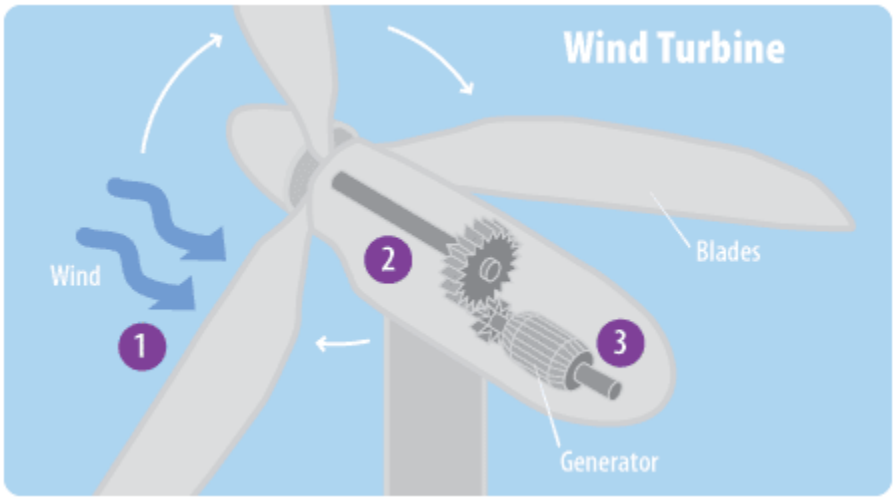
EXPLORING WIND ENERGY USING A TOY WINDMILL

- **Find a partner to be your timekeeper.**
- **Fill out the datasheet as you test your toy windmill.**
- **Note: start the timer after you finish blowing air over the blades.**
- **When you are finished, cut it out, and tape the datasheet in your science notebook.**

TESTS	VARIABLE (What you do.)	TIME (seconds) (Record when windmill stops.)
1	Blow on the windmill blades **1 time** as hard as you can.	
2	Blow on the windmill blades **3 times** as hard as you can.	
What did you observe? Write or share with someone else.		
3	Blow on the windmill blades with **1** short breath.	
4	Blow on the windmill blades with **3** short breaths.	
What did you observe? Write or share with someone else.		
5	Blow on the windmill blades with **1** long steady breath.	
6	Blow on the windmill blades with **3** long steady breaths.	
What did you observe? Write or share with someone else.		

MAKING ENERGY-WIND TURBINES

Take time to make observations about the wind turbine diagram. What do you see?



1.

2.

3.

Cut out each of the steps to generating energy from a wind turbine. Then, put each step in order under the diagram.

The rotating blades turn a shaft that is connected to a generator.

As the wind blows over the blades of a wind turbine, it causes the blades to lift and rotate.

The generator creates electricity as it turns.

ANSWER KEY.
(1) As the wind blows over the blades of a wind turbine, it causes the blades to lift and rotate. (2) The rotating blades turn a shaft that is connected to a generator. (3) The generator creates electricity.