



4th - 5th GRADE
WRITING LESSON
*HOW WIND BECOMES
ELECTRICITY*

50 MINUTES

Google

HOW WIND BECOMES ELECTRICITY

WRITING WITH GOOGLE EARTH

GOOGLE EARTH USAGE OVERVIEW:

Teachers will **engage** students in the topic of wind farms using the Voyager Story, [How Wind Becomes Electricity](#). Students will **use evidence** from the story to **write an opinion essay** supporting the use of wind farms.

LESSON SUMMARY:

- In this writing exercise, students will **explore** the concept of wind farms and their benefits using the Voyager Story, [How Wind Becomes Electricity](#).
 - Students will **participate in a discussion** of the pros and cons of wind farms.
 - Students will **craft an opinion essay** in response to the following prompt: The mayor of x town thinks that wind farms are ugly to look at and for that reason, opposes them. Write an opinion essay outlining the benefits of using wind farms to generate energy. Use specific evidence from the Voyager Story to support your thinking.
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LEARNING OBJECTIVES:

- Students will **refer to information presented in a text and video** to identify the pros and cons of using wind farms to generate electricity.
 - Students will **write an opinion essay referring to specific evidence** from text and video sources.
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SUGGESTED STANDARDS

GRADES 4th - 5th

4th GRADE:

[CCSS.ELA-LITERACY.W.4.1](#)- Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

[CCSS.ELA-LITERACY.RI.4.1](#)- Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

[CCSS.ELA-LITERACY.RI.4.2](#)- Determine the main idea of a text and explain how it is supported by key details; summarize the text.

[CCSS.ELA-LITERACY.RI.4.3](#)- Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

5th GRADE:

[CCSS.ELA-LITERACY.W.5.1](#)- Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

[CCSS.ELA-LITERACY.RI.5.1](#)- Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

[CCSS.ELA-LITERACY.RI.5.2](#)- Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

[CCSS.ELA-LITERACY.RI.5.3](#)- Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

HOW WIND BECOMES ELECTRICITY

WRITING WITH GOOGLE EARTH

LESSON OUTLINE WITH
ESTIMATED TIME ALLOTMENT:

Introduce- 1 minute
Explore- 5 minutes
Engage- 5 minutes
Extend- 15 minutes

MATERIALS NEEDED:

- Access to Google Earth Voyager Story, [How Wind Becomes Electricity](#).
 - Access to YouTube videos embedded in the Voyager Story, [How Wind Becomes Electricity](#).
 - (Optional) Student copies of supporting texts and opinion essay template OR teachers can share documents with students using [Google Classroom](#).
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VOCABULARY:

Wind Farm (noun) ([reference here](#))

1. a wind farm is a group of wind turbines in the same location used to produce electricity.

Wind Turbine (noun) ([reference here](#))

1. a wind turbine is a device that converts the wind's kinetic energy into electrical energy.

Anemometer (noun) ([reference here](#))

1. an instrument for measuring the speed of the wind, or of any current of gas.
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LESSON PLAN

INTRODUCE (1 minute)

Today we will apply opinion essay writing skills to the topic of wind farms (see definition above).

EXPLORE (5 minutes)

1. Explore the topic of wind farms using the Voyager Story, [How Wind Becomes Electricity](#). Provide students with a copy of the text included in the story (below).
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ENGAGE (5 minutes)

1. **Turn and Talk:** What are the pros and cons of using wind farms to generate energy?
 2. After students have discussed with a classmate, allow time for students to share their thoughts with the class.
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EXTEND (15 minutes)

1. Present students with the following writing prompt:

The mayor of x town thinks that wind farms are ugly to look at and for that reason, opposes them. Write an opinion essay outlining the benefits of using wind farms to generate energy. Use specific evidence from the Voyager Story and text to support your thinking.

2. Students work independently to respond to the writing prompt.
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OPINION ESSAY RUBRIC

EXCEEDING:

- Clearly stated claim that fully addresses prompt.
 - 3 or more pieces of evidence to support claim.
 - Interpretation of all evidence clearly relates to claim.
 - Information is organized in a purposeful, logical way.
 - Strong connection between ideas.
 - Use of a variety of linking words or phrases.
 - Use of domain specific vocabulary.
 - Strong command of conventions.
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MEETING:

- Clearly stated claim that fully addresses writing prompt.
 - 3 pieces of evidence supporting claim.
 - Interpretation of 2 pieces of evidence clearly relates to claim.
 - Information is loosely organized.
 - Connection between some ideas, but not all.
 - Adequate use of linking words or phrases.
 - Use of domain specific vocabulary.
 - Adequate command of conventions.
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APPROACHING:

- Clearly stated claim.
 - 2-3 pieces of evidence loosely supporting claim.
 - Interpretation of evidence does not relate to claim.
 - Weak connection among ideas.
 - Inconsistent use of linking words or phrases.
 - Unclear use of domain specific vocabulary.
 - Partial command of conventions.
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BEGINNING:

- Claim is unfocused or does not address the writing prompt.
 - Evidence is minimal, absent, or irrelevant.
 - Interpretation of evidence is absent.
 - Little or no organizational structure.
 - No use of linking words or phrases.
 - No use of domain specific vocabulary.
 - Lack of command of conventions.
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RESOURCES

ADDITIONAL RESOURCES:

Supporting Texts on Wind Farms:

- <https://www.nationalgeographic.com/environment/global-warming/wind-power/>
 - <https://www.kidsdiscover.com/teacherresources/whats-good-whats-bad-wind-energy/>
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OPTIONS FOR DIFFERENTIATION:

- Create a T-Chart outlining the pros and cons of using wind farms to generate energy.
 - Provide students with a graphic organizer to plan their writing (below).
 - Introduce an additional source for students to refer to in their writing (see additional resources above).
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CREDITS:

Written by Sarah Schwartz Johnson in collaboration with Jason Wallis, Dennis Puhr, Kevin Graham, and Kelley O'Connor.

*Note - this template is designed for teachers to modify for use with their grade level and standards.

TEXT, “HOW WIND BECOMES ELECTRICITY”

What is a Wind Farm?- North Sea

Welcome to the North Sea. You're looking at one of Europe's largest wind farms, a place where a vast natural force is harnessed and turned into clean, renewable power.

But why build a wind farm out at sea, instead of on land? First, it's consistently windy here – which means the 80 turbines in the wind farm will produce energy all day, every day. Second, building offshore means the wind farm can be larger than those on land, maximising the amount of energy it harnesses.

What are Wind Turbines?- North Sea

As you can see, wind turbines are enormous structures. At 150 meters tall, those in front of us are taller than the Statue of Liberty, while the blades attached to their front are 120 meters in diameter – which is wider than a 747 jumbo jets' wingspan.

You may have seen traditional windmills before, with wooden or cloth blades that are turned by the wind. Modern wind turbines use the same principle, but are designed to harness much more wind than their forebears. The larger their blades, the more energy they can create.

How Wind Turbines Work- North Sea

Wind turbines have to face in the right direction in order to capture the wind efficiently. So, on top of each one, there is an instrument called an anemometer. It measures the speed and direction of the wind, and lets every turbine in the wind farm pivot independently to its neighbors in order to harness as much energy as possible. Together, the 80 turbines around us create enough clean energy every day to power more than 300,000 households.

Creating Clean Energy

Wind turbines are purpose-built to turn moving currents of wind into electricity. To do this, they use a process called electromagnetic induction. While it sounds technical, the process is straightforward: Each turbine contains two very important parts, a rotating ring of magnets and another ring of stationary copper plates. When the wind rotates the turbines' blades, the magnets are rotated around the copper plates. This causes electrons to flow through them – which is what creates the electricity you're using in your home right now.

TEXT, "HOW WIND BECOMES ELECTRICITY"

Why We Need Clean Energy- Arctic Circle

For centuries, humans have been burning fossil fuels like coal, gas and oil because they release so much energy. But they also release a lot of air pollution – including carbon dioxide (CO₂). CO₂ has always been a part of our ecosystem, but higher concentrations in the atmosphere from burning fossil fuels are causing global temperatures to rise with increasingly devastating consequences, from more extreme weather to rising sea levels and melting ice caps. Polar bears, living in the Arctic, are especially threatened: Diminishing sea ice is making it harder for them to get around, hunt, and feed their young. This dramatic sight, among many others, may be just an early sign of climate change.

The Future of Energy

When you look at the planet from a distance, it's easy to understand the importance of keeping it in good condition. Moving into the future, our use of renewable energy will play a big part in this. But the natural world gives us many more ways to generate renewable energy than just wind. Solar power, from sunlight, is also clean and completely limitless, while the rising and falling tides, powerful currents and crashing waves of the ocean are what give us hydroelectric power. There is even energy underground: Geothermal power uses natural heat from deep-lying steam or water reservoirs to drive generators on the surface.

OPINION ESSAY WRITING TEMPLATE

Introduction:

Claim:

Evidence from text or video:

How does this evidence show that wind farms are beneficial? Explanation:

Evidence from text or video:

How does this evidence show that wind farms are beneficial? Explanation:

Evidence from text or video:

How does this evidence show that wind farms are beneficial? Explanation:

Conclusion: