

Photo Description



This image shows several large white wind turbines standing in a flat agricultural field on a clear, sunny day. The turbines have tall towers and spinning blades that catch the wind to make electricity. Power lines run across the landscape, connecting the turbines so they can send the energy they create to homes and communities.

Scientific Phenomena

Anchoring Phenomenon: Wind turbines convert invisible wind energy into electrical energy that powers our homes and schools.

Why This Happens: Wind is moving air that has energy. When wind pushes the large blades on a turbine, it makes them spin very fast. Inside the tower, this spinning motion turns a generator—similar to how a bicycle's spinning wheel can power a light. The generator converts the motion energy into electrical energy that travels through power lines to people's homes.

Core Science Concepts

- * **Energy Transfer and Transformation:** Wind (moving air) has energy that can be transferred to the spinning blades, which then transforms into electricity through the generator.
- * **Renewable Energy Sources:** Wind is a natural resource that doesn't run out and doesn't create pollution, making it sustainable energy for the future.
- * **Forces and Motion:** The force of wind pushes the blades, causing them to rotate. This demonstrates how forces cause objects to move and change direction.
- * **Human Design and Engineering:** Humans designed turbines to capture wind energy efficiently, showing how we can solve problems by understanding science.

Pedagogical Tip:

Third graders understand cause-and-effect relationships well. Frame the wind turbine lesson using explicit "because" statements: "The blades spin BECAUSE the wind pushes them" and "Electricity is made BECAUSE the spinning creates a generator." This helps students connect the observable phenomenon (spinning blades) to the cause (wind force) to the outcome (electricity).

UDL Suggestions:

To support diverse learners, provide multiple means of engagement and representation: (1) Create a physical model using a pinwheel that students can feel the wind push directly, (2) Use a visual diagram showing the path from wind to spinning blades to generator to electricity, and (3) Allow students to express understanding through drawing, writing, or dramatic play (pretending to be wind, blades, or electricity). This addresses kinesthetic, visual, and creative learners.

Discussion Questions

1. What do you think makes the turbine blades spin? (Bloom's: Remember | DOK: 1)
2. How is a wind turbine similar to a fan you use at home, and how is it different? (Bloom's: Compare | DOK: 2)
3. Why do you think people build wind turbines in windy areas instead of places where there isn't much wind? (Bloom's: Analyze | DOK: 3)
4. If we wanted to make electricity with wind turbines, what would happen if there was no wind at all for several days? (Bloom's: Evaluate | DOK: 3)

Extension Activities

1. Pinwheel Wind Catcher: Students design and build paper pinwheels, then test them outside to observe how different wind speeds make the pinwheels spin faster or slower. This provides direct, hands-on experience with how wind force causes rotation and relates to the turbine concept.
2. Wind Energy Investigation: Set up a simple fan at different speeds in the classroom. Students predict and measure (using a ruler or marked tape) how far small objects can be pushed by different wind forces. Record findings on a chart to show that stronger wind = more force.
3. Energy Journey Story: Students create a comic strip or picture book showing the journey of energy from "Wind" ! "Spinning Blades" ! "Generator" ! "Electricity" ! "Lights in Your Home." This scaffolds understanding of energy transformation in sequence.

NGSS Connections

Performance Expectation: 3-PS2-1. Plan and conduct an investigation to provide evidence that balanced and unbalanced forces on an object change its speed or direction of motion.

Disciplinary Core Ideas:

- * 3-PS2.A Forces and Motion—Wind exerts a force on the turbine blades, causing them to move and spin.
- * 3-ESS2.A Earth's Systems—Wind is part of Earth's weather system and atmosphere.

Crosscutting Concepts:

- * Energy and Matter Energy from wind is transformed into electricity.
- * Cause and Effect Wind causes the blades to spin; spinning blades cause electricity to be generated.

Science Vocabulary

- * Wind: Moving air that pushes things and has energy we can use.
- * Turbine: A machine with blades that spin to create electricity from wind.
- * Energy: The power to make things move or work.
- * Generator: A machine inside the turbine tower that turns spinning motion into electricity.
- * Renewable Energy: Energy that comes from nature and doesn't run out, like wind and sun.
- * Power Lines: Metal cables that carry electricity from turbines to homes and schools.

External Resources

Children's Books:

Energy* by Emily Hutchinson Porter (simple introduction to different energy types)

What Is Energy?* by Jennifer Boothroyd (uses familiar examples for young learners)

Wind* by Seymour Simon (clear photos and age-appropriate explanations of wind and its uses)

YouTube Videos:

* "How Do Wind Turbines Work?" by National Geographic Kids — A 4-minute video showing how turbines capture wind energy with engaging visuals. <https://www.youtube.com/watch?v=BI9vHCq5p9E>

* "The Kids Guide to Wind Power" by TED-Ed — An animated explanation of renewable energy and wind turbines designed for elementary students. <https://www.youtube.com/watch?v=uvfQ1mzXEQw>