

Pinwheels & Wind Energy

Create a pinwheel and explore how wind turbines generate renewable energy. Use your knowledge of wind speed and direction to make your pinwheel spin as fast as possible!

TEKS:

SCI 3.6 A: The student is expected to explore different forms of energy, including mechanical, light, sound, and thermal in everyday life.

SCI 3.8 D: The student is expected to demonstrate that air is all around us and observe that wind is moving air.

SCI 6.7: The student is expected to research and discuss the advantages and disadvantages of using coal, oil, natural gas, nuclear power, biomass, wind, hydropower, geothermal, and solar resources.

SCI 8.10 A: The student is expected to recognize that the sun provides the energy that drives convection within the atmosphere and oceans, producing winds.

Materials:

- Biodegradable straw
- Markers (optional)
- Masking tape
- Pinwheel pattern, printed on colored paper (attached below)
- 1-2 pony beads
- Scissors
- Scotch tape
- 1-inch T-pin

How To:

1. Cut out the square from the Pinwheel Template. Cut along the four dotted lines towards the center.
2. Place a rolled-up piece of scotch tape (sticky side out) on the center dot of the pinwheel.

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3. Fold the corners marked with X's towards the center, and align them over the center dot. Press firmly to the tape.
4. Push the T-pin through the center of the pinwheel. **Safety: an adult should assist with this step.**
5. Add 1-2 Pony beads onto the T-pin.
6. Stick the T-pin through the side of the straw, 1 inch from the end. Then, secure the back with masking tape to make sure the pin doesn't poke through the straw. **Safety: an adult should assist with this step.**
7. Now, blow on your pinwheel, or take it outside, and watch it spin!

STEM Explanation:

Wind is air in motion. As the sun warms Earth's surface, the atmosphere warms too. Some parts of Earth receive direct rays from the sun all year and are always warm. Other places receive indirect rays, so the climate is colder. Warm air, which is less dense than cold air, rises. Then, cool air moves in and replaces the rising warm air. This movement of air is what makes the wind blow. Pinwheels can be used to help us see how fast the wind is moving.

Wind power, as an alternative to fossil fuels, is plentiful, renewable, widely distributed, clean, and produces no greenhouse gas emissions. Most wind power is collected at wind farms—groups of wind turbines used to produce electricity. Wind rotates the blades of wind turbines and this causes a generator inside the turbine to rotate as well. As a result, a coiled wire in the generator rotates around a magnet and creates an electrical current. Since energy is neither created nor destroyed, the greater the energy input, the greater the energy output will be. Therefore, the more mechanical energy you start with—the faster the blades turn—the more electrical energy the turbine creates.

Career Connection:

Wind energy engineers design wind turbines and analyze operations of wind farms. They create models to determine layouts of wind farm roads, structures, and equipment. Wind energy engineers also ensure that wind farms are constructed properly and have little impact on the environment.

Resources:

<http://www.vies.vi/docs/default-source/resources/pinwheel.pdf?sfvrsn=2>

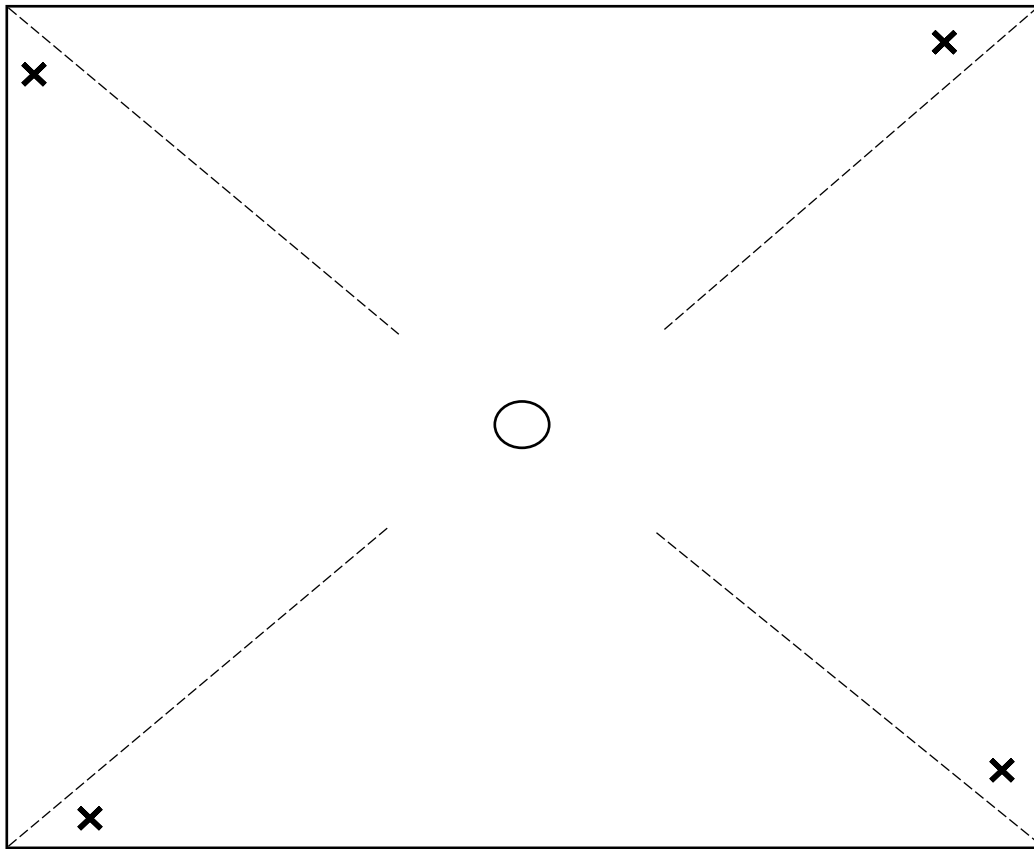
<http://www.sciencekids.co.nz/sciencefacts/energy/windenergy.html>

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Pinwheel Template



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