



Energy: *Renewable Energy Sources*

ESSENTIAL QUESTION: How can a renewable energy source, such as wind, help decrease our dependence on nonrenewable sources of energy?

Engage: Refer to the following website for information on sources of renewable energy. http://www.nrel.gov/learning/re_basics.html

What are the sources of renewable energy available in Oklahoma?

How can wind energy be transferred into usable energy to replace or supplement current energy practices?

Explore >> Materials: construction paper, cardstock, printer paper, plastic straws, string, paperclip, tape, scissors, glue, wooden skewers, hole punch

Procedure:

1. Cut out a square of each type of paper.
2. Draw an X, from corner to corner, on each one.
3. Use a hole punch to make a hole in the center large enough for the straw to fit through.
4. Cut along each line; stop about half an inch from the hole.
5. Bring each free corner down to where the cut stops near the center of the paper and secure it with glue. This will create the 'sails' for your windmill.
6. Insert a straw through the center of each windmill, this will serve as the axis.
7. Insert a wooden skewer through the straw so it can rotate freely.
8. Towards the end of the straw, tape one end of a piece of string to the straw. Tie or tape the other end of the string to a paperclip.
9. Hold the ends of the wooden skewer and blow on the sails of your windmill model or place your model in front of a fan. What happens?

Activity and picture from:

http://www.education.com/sciencefair/article/engineering_windmill/

Explain: Identify at least two forms of energy you observed while testing your project.

How does your windmill transfer energy?

Expand: Change the design of your 'sails' (ex: number, size, shape) and observe the results.

What affect does this design change have on your windmill?

Why is 'sail' design important?

Application: Wind turbines, like windmills, catch the wind using propeller-like blades. The spin of the blades turns a rotor, which in turn spins a shaft connected to a generator to produce electricity.

What are the advantages of wind energy?

What are the disadvantages associated with wind energy?

Return to and answer the essential questions

Evaluate: Explain the difference between renewable and nonrenewable energy sources and how a source such as wind produces electricity.