Grade: 3-5

Where Does Energy Come From? Lesson #2A: Wild Wind

Time: 1 class period

Overview: Students construct a pinwheel to demonstrate a model of a working wind machine.

Essential Questions:
Can moving air and water run machines?

Contents:

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Source: Adapted from AMEREF curriculum

Wild Wind

Grades 3-5
1 class period

Overview: Students construct a pinwheel to demonstrate a model of a working wind machine.

Essential Questions:

- Can moving air and water run machines?

Assessment:
Can students
- Invent a machine or device that uses wind to do something useful?

Alaska Standards Addressed:

Science GLEs

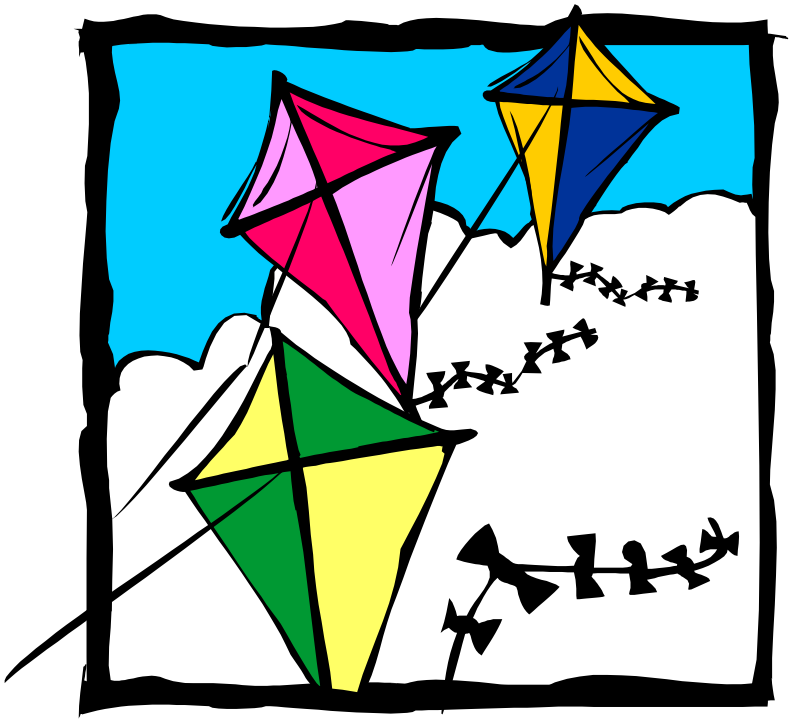
The student demonstrates an understanding of:
. the processes of science by [3]SA1.2 observing and describing the student's own world to answer simple questions, [4]SA1.2 observing, measuring, and collecting data from explorations and using this information to classify, predict, and communicate [5]SA1.2 using qualitative and quantitative observations to create inferences and predictions

Technology

E1) evaluate the potentials and limitations of existing technologies;

Vocabulary

- Wind turbine
- Vertical
- Horizontal
- Axis
- Rotate



Teacher Information and Procedure

Prior knowledge for students: none

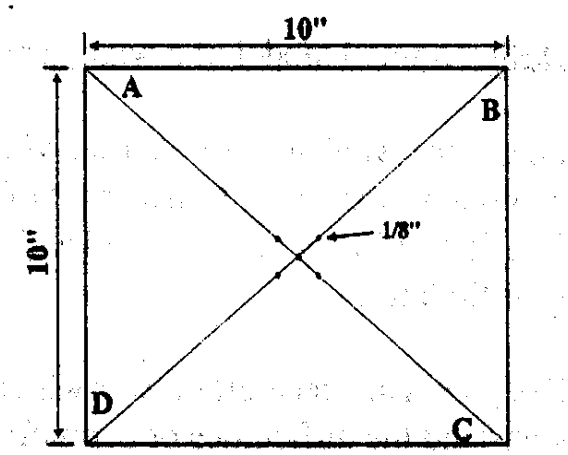
Materials needed:
Pinwheel (per student):
- Small push pin or nail - 1
- pinwheel pattern - 10”x10” - 1
- pencil with full eraser - 1
- tape
- paper and crayons or colored pencils

What to do in advance:
Cut out 10” x 10” tag board paper squares. Cut arrows out of tag board which will spin freely on a brad.

What to do during the lesson:
Gear up:
Watch a video clip of a windstorm if you have one. Or, have students share some stories about the strongest wind they ever experienced.

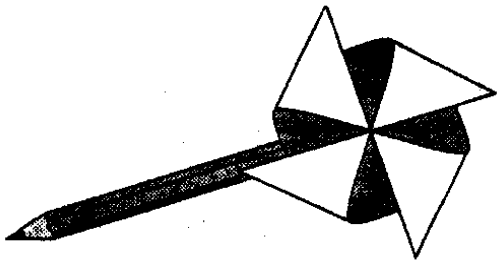
Ask the students – What does wind do?
Brainstorm a list that might include: flies kites, moves things, distributes seeds, destroys things, runs windmills, cools things off, sails boats
Develop the idea that wind can be used to run things. Show some pictures of wind machines. Explain what turbines are.

Explore:
1. Discuss the difference between different kinds of wind turbines (see background). Show pictures of wind turbines in Kotzebue or other Alaska locations.
2. Show an example of a pinwheel. Ask which type of turbine it best represents.
3. Predict which way the pinwheel will rotate and why. Discuss from which direction the wind should blow to best turn the pinwheel and why.
4. Mark a line from corner to corner of the 10”x10” piece of construction paper. Mark a dot 1/8” from the center point on each line. Label each corner, to the right of the line (clockwise) with a number. Cut each line to the dot 1/8” from the center.



5. Fold the labeled corners into the center in a clockwise pattern. Use a small piece of tape to attach each corner to the center of the piece of paper.
6. Turn the pinwheel over and place it on the eraser. Note the exact center of the piece of paper. Hold the small nail on the center dot. Gently push it through the paper and into the eraser. Make sure the pinwheel spins freely, but not loosely.

7. Students blow on their own pinwheel to make it turn. Try blowing from different directions and with different amounts of force.



Generalize:

Discuss how a big device like this could be used to pump water, grind grain or do other useful things. Discuss the type of wind conditions needed for a pinwheel turbine. Would a pinwheel type wind machine work in the town where you live? What would be the best place in town for a wind machine?

Assess:

Students write about and draw an imaginary new machine or device that uses the wind for a practical purpose. They answer the questions: What is the name of my "wind invention"? What is it made of and how would you build it? What does it do that is useful?

Note: If you also do the "Water Power" activity, combine the assessments and have the students create a wind or water invention.

Related Resources in the AMEREF Kit

- NEED CD Elementary Energy Info book 2005 p. 26-27

Extensions, adaptations, and more resources:

http://www.eere.energy.gov/kids/wind.html Dr. E's Energy lab USDOE

http://www.kidwind.org/materials.html Lots of educational resources and activities related to wind power.

http://www.sciencefriday.com/kids/sfkc20030620-1.html has a radio program about wind and links to wind activities and resources.