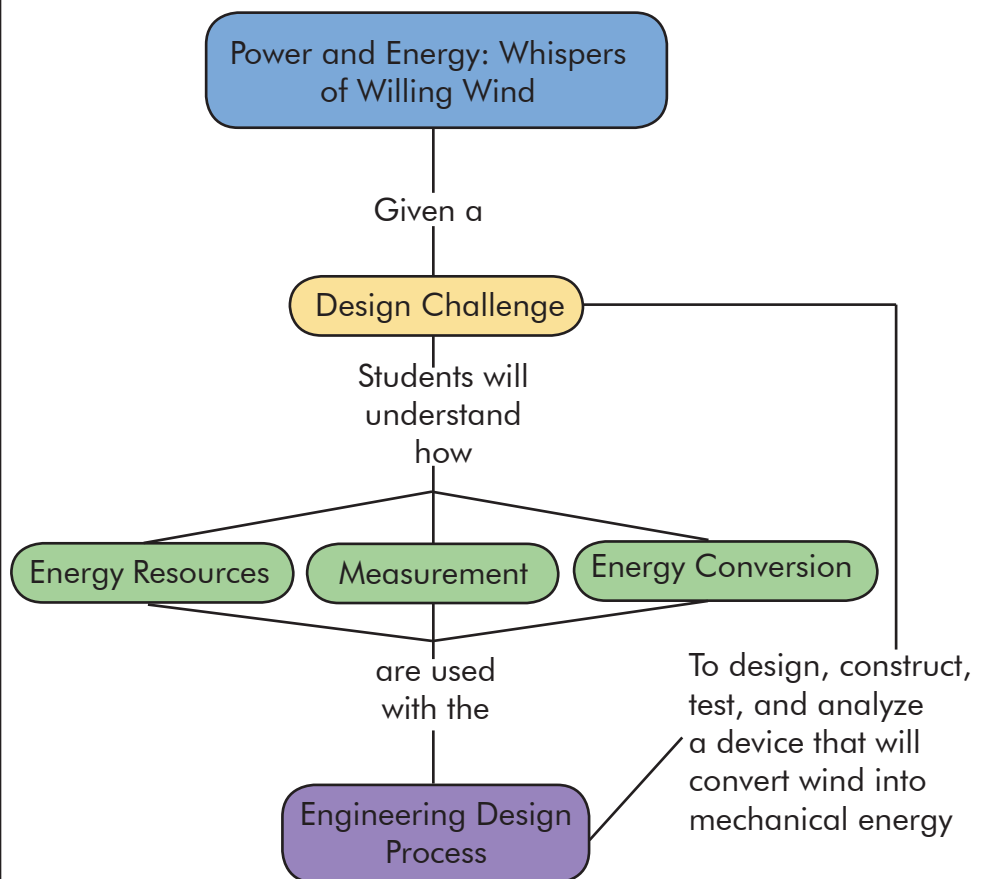


Power and Energy: Whispers of Willing Wind

This unit integrates the study of technology, science, and mathematics through the design and development of a device to convert wind energy into mechanical energy.



Conducting the Unit

Notes:

There are three main topics in this unit. Each topic varies in length and scope depending on the schedule and length of the teaching time.

Topic I: Living in a Technological World (2-3 hours)

1. Divide the class into groups of two or three students.
2. Assign each group one of the following energy resources used to produce electricity for the home:
 - a. Geothermal
 - b. Natural gas
 - c. Petroleum
 - d. Nuclear
 - e. Solar
 - f. Hydro
 - g. Wind
 - h. Fuel cell
3. Distribute *Energy in a Technological World* worksheet (page 30).
4. Help explain the assignment by using the coal cycle flowchart. Although the students are not creating flowcharts, this will help them see the characteristics and pros and cons of the different energy resources. To help in the presentation:
 - a. Use *Coal Energy Flow Chart* transparency (page 25).
 - b. Visit <http://getwise.org> or www.eia.doe.gov/kids/ for information on energy processes or use posters or handouts.
5. Have the students complete their worksheet by:
 - a. Researching their energy form.
 - b. Preparing a energy poster for their energy resource.
 - c. Answering the questions on page two of the worksheet.
6. Have the class identify which energy sources are most environmentally friendly to use. (Use a comparing organizer here. Teachers should use overheads of the energy cycles for this part.)
7. Have the students compare the energy resources using the Energy Resource Comparison worksheet. (Page 32)



Topic II: Energy In the Home (2-4 hours)

Most of this activity will be homework; however, students should work through several examples with the teacher so they understand the process.

Renewable Energy News

Design Contest Announced

Background

The local community has decided to begin to reduce its dependency on outside power-generating stations.

To set this process in motion the community leaders have announced a design contest. Persons who enter the contest must design a windmill model that can be used in neighborhoods to generate mechanical energy from wind energy. The winner's design will be sent to engineers to develop working wind turbines.

Design Challenge

Competitors must design and construct a working model of a windmill that can pull water from a deep well in a bucket. These turbines are intended for use in both residential and rural neighborhoods so they must be both functional and pleasing to view. Also, windmills must be able to withstand hurricane force winds because your windmill will be tested in a hurricane!

Competitors must show evidence that they researched different designs and choose the one they think is the best for recovering water from a well and still look good in the neighborhood. Submissions will only be accepted from teams of designers.

The designers must present their entry to the board of commissioners who will decide the winner.

Constraints

- The tower may not exceed 12" in height.
- The tower base may not exceed 6" on any side.
- The turbine must be smaller than 5" in diameter

Energy

Independence

The future is in your hands.

Can It Be For Me?



Since the industrial revolution, the earth's atmospheric carbon dioxide levels have risen by about 25%. It is estimated that carbon dioxide emissions could grow still higher. Over a pound of carbon dioxide is emitted for each kilowatt hour of electricity generated in the U.S. Every 1.5 Megawatts (MW) a wind turbine generator put into service will eliminate over five million tons of carbon dioxide per year.

Wind is a great energy source because it is clean and inexhaustible. However it is not windy everywhere. In some places there isn't enough wind to turn the blades of a turbine to generate electricity.





Whispers of Willing Wind

Identify the Challenge

Name: _____

Date: _____

In your own words, restate the problem and what needs to be done to solve the problem.

Problem

Challenge

What are some countries around the world that use wind energy to produce electricity?

Why do you think your community leaders might want to use wind turbines to make electricity rather than other electricity-producing systems?
