

Naturally Occurring Sources of Energy

Strand	Earth Resources
Topic	Renewable resources
Primary SOL	3.11 The student will investigate and understand different sources of energy. Key concepts include b) sources of renewable energy.
Related SOL	3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which c) objects with similar characteristics or properties are classified into at least two sets and two subsets; j) inferences are made and conclusions are drawn; m) current applications are used to reinforce science concepts.

Background Information

Sunlight, moving water, and wind are naturally occurring sources of energy which are renewable. They are available on a perpetual basis. Some energy sources can be replaced over relatively short periods of time. These include wood and other biomass.

Water: Hydropower is used to make electricity where rivers have been dammed to create reservoirs or lakes. Gates on the dam open and gravity pulls the water through a pipe that leads to a turbine. The water turns the large blades of a turbine; which is attached to a generator above it by way of a shaft. As the turbine turns, so do a series of magnets inside the generator. Giant magnets rotate past copper coils, producing electricity.

Sun: Solar energy creates electricity from photovoltaic cells. As light strikes the cell, some of it is absorbed within a semiconductor, such as silicon. The energy knocks electrons loose, allowing them to flow freely. Flowing electrons is electric current.

Wind: Wind energy is made by wind turning the blades of a turbine. The blade is connected to a shaft, which in turn is connected to an electrical generator. The mechanical energy of the turning blades is changes into electricity.

Materials

- Encyclopedias
- Books (at various reading values) with information about naturally occurring sources of energy
- Materials for making posters
- Pictures from old magazines
- Internet access

Vocabulary

hydropower, solar power, wind power, renewable energy

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Use a three column chart to find out what students already know about sources of energy, specifically, sun, water, and wind.
2. Divide students into pairs and have students identify the three naturally occurring sources of energy — sunlight, moving water, and wind. Write these terms on the board, overhead, or a large chart. Explain that energy from the sun is also referred to as “solar energy.” Write this term below “sunlight.” Continue this discussion with water and wind energy.

Procedure

1. Divide students into three groups, and assign each group one of the three naturally occurring energy sources. Explain that each group will do research about uses of its assigned, naturally occurring energy source and then make a poster to present their finding.
2. Have each group collaboratively research ways the energy source is used, including how it is used to produce electricity. Allow time for each team to brainstorm what its task is, how to go about performing the task, and how to present what is learned. Have the groups meet together to share their plans, and make plan modifications as necessary. Make encyclopedias, other books, and the Internet available to the students, and assist with identifying key terms to use to access information.
3. Give the students the planning sheet to complete to be sure they have all the information needed.
4. After finishing their research, have the groups prepare their poster showing three to five ways the energy source is used. They should include how it is used to produce electricity, as well as the other important information they found on the planning sheet. The posters should be neatly and clearly titled and should be illustrated with pictures. Encourage the groups to be creative.
5. Have students make a four-column chart by folding paper in half lengthwise, and then in half lengthwise again. Have them open the paper and use the fold lines to draw pencil lines. Label the first column “Uses,” “Advantages,” and “Disadvantages,” the second “Solar Energy,” the third “Water Energy,” and the fourth “Wind Energy.” Have them then write in the columns, based on the group presentations.

	Solar Energy	Water Energy	Wind Energy
Uses			
Advantages			
Disadvantages			

6. Have the groups present the posters to the class. In a class discussion, have the students compare the information presented to determine which sources of energy are used in the same ways and which are used in different ways.

Conclusion

1. Discuss reasons why one naturally occurring energy source is used instead of the others in

specific places and for specific purposes. For instance, waterpower is more frequently used to produce electricity in the Pacific Northwest because there are many lakes and rivers there.

Assessment

- **Questions**
 - Identify at least three possible energy sources.
 - What kind of power source do you think someone who lives in a desert environment would probably use? Why?
- **Journal/writing prompts**
 - You are part of a planning team for your town. Your team is responsible for determining the best source of power to use for a new power plant that will be built in your town. Pick the name and location of your town. Describe the environment in which your town is located. Describe the type of power source your team has decided will be the best for your town. Write the presentation that your team will give to the town council defending your choice.
- **Other**
 - Assess students' use of the Naturally Occurring Sources of Energy sheet below.

Extensions and Connections (for all students)

- Have each group design and create a model to demonstrate how its energy source is used to make electricity.
- Have the groups research other natural sources of energy.

Strategies for Differentiation

- When researching, provide books and resources at a variety of reading levels and a guided Internet search.
- Preteach the terms *advantages* and *disadvantages*: provide a reference symbol (e.g., smiley face/checkmark for advantages and sad face/X for disadvantages) to be used when completing the four column chart in Step 5.
- Provide pictures for the terms on “Naturally Occurring Sources of Energy” sheet.
- Divide students into pairs or small discussion groups and allow them to prepare for whole group discussion.
- Provide access to images and pictures for posters and charts of various sources of energy.
- Have a panel discussion on which is the most efficient of the naturally occurring sources of energy.
- Divide the class into groups of 3 or 4 to create a commercial to promote their naturally occurring energy sources.
- Use graphic organizing software to create an electronic version of KWL, and other data collecting charts.
- Provide activities that allow the students to use their senses to explore naturally occurring resources (example: hand under water faucet).

- Use video clips or video to show how natural sources of energy are used to power our nation.

Naturally Occurring Sources of Energy Planning

Group Names: _____ Date: _____

Name of your energy-source:

Uses of _____	How can _____ be used to produce electricity?
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Advantages of using _____ energy	Disadvantages of using _____ energy
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Naturally Occurring Sources of Energy

Directions: Write “Sun,” “Wind,” or “Water” next to each example of different types of energy

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|-----|---|-------|
| 1. | growing crops | _____ |
| 2. | paddleboat | _____ |
| 3. | moving a sailboat | _____ |
| 4. | windmill | _____ |
| 5. | solar panels on the roof of a house | _____ |
| 6. | whitewater rafting | _____ |
| 7. | natural light | _____ |
| 8. | kayaking | _____ |
| 9. | drying clothes outside on a clothesline | _____ |
| 10. | pinwheel | _____ |
| 11. | leaves falling off trees | _____ |
| 12. | a turbine in a canal | _____ |

List one advantage and one disadvantage for each type of natural energy-source below.

<p>Sun _____</p> <p>Wind _____</p> <p>Water _____</p>	<p>Sun _____</p> <p>Wind _____</p> <p>Water _____</p>
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Poster Rubric

- _____ poster adequately describes uses of energy-source (10 pts.)
- _____ poster adequately describes how energy-source can be used to produce electricity (10 pts.)
- _____ poster adequately describes advantages of energy-source (10 pts.)
- _____ poster adequately describes disadvantages of energy-source (10 pts.)
- _____ poster is neatly presented (5 pts.)
- _____ students use proper grammar (5 pts.)

- 46 – 50 pts. = A
- 42 – 45 pts. = B
- 39 – 41 pts. = C
- 36 – 38 pts. = D
- 0 – 35 pts. = F