Solar Ovens

Solar Ovens Lesson 3: Non-renewable Energy/Global Warming/Pollution

AUTHOR: Debbie Abel

DESCRIPTION: This lesson will introduce the students to worldwide problems that we have with energy. (91% of the energy we use is non-renewable, 9% of the energy we use is renewable)

GRADE LEVEL(S): 4 and 5

SUBJECT AREA(S): Science, energy, kinetic, potential, renewable, non-renewable, fossil fuels, global warming, climate change, solar energy, wind energy, hydroelectric power, sources of energy

ACTIVITY LENGTH: 00 hours, 45 minutes

LEARNING GOAL(S): Students will explore why there is a need for energy efficiency and renewable energy. Students will determine how non-renewable and renewable energy are a part of our lives. Students will understand how the greenhouse effect and nonrenewable energy sources relate to climate change.

STANDARDS MET:

Next Generation Science Standards:
4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Solar 4R Schools™ is a program of BEF.

BONNEVILLE ENVIRONMENTAL FOUNDATION
240 SW 1st Avenue
Portland OR 97204
503-248-1905
www.b-e-f.org

Student Background:

Energy Lesson 1: What is Energy? Where does it come from?
Energy Lesson 2: Vocabulary

Educator Background:

ABCD for Scientific Drawings:
A: Accurate
B: Big
C: Colorful
D: Detailed

Materials List:

- Access to Website: A Student's Guide to Global Climate Change http://www.epa.gov/climatechange/kids/
- Solar Energy Student Workbook
- Vocabulary Card: Greenhouse
- Car Greenhouse Effect Demonstration Cards

Vocabulary:

- Non-renewable energy sources: Energy from resources that cannot quickly or easily be made.
- Fossil fuels: Fuels that come from dead organisms buried for millions of year. They are non-renewable because they cannot quickly or easily be made. They also create pollution when they are burned. Oil, natural gas and coal are all example of fossil fuels.
- Global warming: The increase in Earth's temperature due to air pollution created by humans, mostly from the burning of fossil fuels.
- Pollution: Things that humans put into the Earth's land, water and soil that are bad for it.

Lesson Details:

NOTE: This lesson may be done as a whole class lesson, or students can work individually or in groups. If students are working individual or in groups, they will need access to computers or tablets with Internet access.

- Question of the Day/Exit Slip: Is most of the energy we use renewable or non-renewable? List 2 reasons why that is a problem.

- STEP 1: Ask students if they remember where most of the energy we use comes from. Remind them that it is from fossil fuels. Explain to them that fossil fuels are very good sources of energy but that there are some problems. First, they are non-renewable which means there is a limited supply. Second, they create a lot of pollution, which is leading to climate change.
- STEP 2: Play the video, "The Greenhouse Effect", from the website A Student's Guide to Global Climate Change. http://www.epa.gov/climatestudents/basics/index.html
- Pause on the diagram of the greenhouse effect and let the students use it to create their own diagram on page 7 in their student energy workbooks.
- STEP 3: Show the Car Demonstration of the Greenhouse Effect Cards. Have the students do a scientific drawing of the Greenhouse effect on page 8 of their Solar Energy Student Workbooks. You may provide the option to delve deeper into electromagnetic radiation to further explain this process.
- STEP 4: Show the information under the tab, See the Impact, from the website A Student's Guide to Global Climate Change
- STEP 5: Under the tab, Be Part of the Solution, show students the information on renewable energy. Explain to the students that one thing that they can do to help is choose to use renewable energy.
- **Possible extension:** Students can design a pizza box solar oven to describe different pieces of the greenhouse effect represented by parts of the oven. See construction process here: http://www.scientificamerican.com/article/sunny-science-build-a-pizza-box-solar-oven/