

Whole World in our Hands: Experiential Activities

Renewable Energy

Renewing Hope Across the World

Theme:

Renewable Energy on an International Scale

Prerequisite:

Knowledge of traditional and renewable energy sources and related issues such as environmental degradation, feasibility of renewables, political and economic ties to energy extraction and use, environmental justice, etc.

Curriculum Entry Points:

All social studies, Grade 12 World Issues

Overview:

This lesson plan will encourage independent research and allow students to pass on what they've learned to a younger student. This will help students to consider how ideas are communicated, how knowledge is shared and how important it is to maintain a global perspective when considering energy issues. Students are asked to research a source of renewable energy and find an example of its use in another part of the world. They then create a lesson plan for middle school students using this information.



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Main Concepts and Vocabulary:

ENERGY: The capacity for doing work. People get energy from food. Toasters and ovens get their energy from electricity. Forms of energy include thermal, mechanical, electrical, and chemical. Energy may be transformed from one form into another. It is never created or destroyed.

RENEWABLE ENERGY: Energy taken from sources that are inexhaustible (eg wind, solar and geothermal energy). Since it is impossible to deplete the source (sun & wind) these forms of energy are considered to be forever renewable.

ENVIRONMENTAL JUSTICE: Describes the ideal of equal and fair access to a healthy environment; equal enforcement of environmental regulations; and a movement to protect marginalized people and communities from environmental hazards. It is usually these people and communities who receive the worst effects of environmental degradation through resource exploitation and none of the benefits received by the consumers of that resource.

FOSSIL FUELS: Formed in the ground from the remains of dead plants and animals. It takes millions of years to form fossil fuels. Oil, natural gas, and coal are fossil fuels, and all are carbon based. Since it takes so long to form these types of fuel, once they are used they cannot be recreated, and are considered non-renewable.

Objective:

To have high school students develop creative lesson plans for middle school students that will promote the idea of renewable energy. The lesson plans will focus on examples from other countries to expand students awareness; energy issues aren't only North American.



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Classroom Activity:

International Lessons

Time required:

Two 60 minute periods

Materials:

pens and paper, visual aids created by students

Background:

Each form of energy generation is a reflection of the scientific ideas of the time. When oil seemed wholly abundant, there were good grounds to use it for generating power. Unfortunately its source is not endless, and as we are seeing atmospheric pollution has resulted in global warming and an increase in smog in our cities. Nuclear power offered other possibilities of large scale energy production, however some similar problems were found : supply is not endless; leaking radiation from nuclear power plants, like smoke from coal or oil plants, cannot be completely limited, nor could the effects of a slight increase in the temperature of the water near the plant are known to be completely devastating to aquatic ecosystems. Renewable forms of energy will lessen the impact on the environment and produce a more stable and reliable supply of energy.

Opening Questions

1. How do we use energy in our lives? Do you think this pattern of energy use is similar all over the world?
2. Is learning about energy important? Why?
3. What do middle school students need to know about energy?
4. Does our energy consumption need to change?

Activity Instruction

1. The week before beginning this lesson plan ask students to research a form of renewable energy and a country where this form of energy is used (i.e. wind power in Denmark, Biogas in India etc.) Check that the numbers are approximately equal for each energy source. Each student should return to class on the assigned day with a one page outline of the energy source and the example of its application.
2. Ask the opening questions. Have the class divide into groups according to which form of renewable energy they researched (wind, solar, geothermal, biogas, biodiesel etc.). Each group should have a few minutes to discuss their research and application findings.
3. Have each group create a lesson plan for middle school students based on their research. Each lesson plan should contain the same headings, but otherwise students are encouraged to be creative in their planning. Handouts, references and sources and background information should also be included in the final product.
4. Once the plans have been created spend one period sharing them as a class. Each group should have a few minutes to present their lesson plan.



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Community Activity

1) USING THE LESSON PLANS: Students should have a chance to present their lesson plans to middle school classes if possible. Have the lesson plans reviewed by the appropriate teacher beforehand to make sure they are suitable for the class, then set up a presentation day.

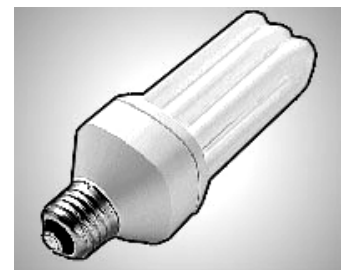
Compile the lesson plans into an educational resource for the local middle schools. This can be done simply by photocopying the plans and binding them together, having them printed at a print store, or even creating an online version of the assignments and burning them onto CD's.

2) Organize a "Pollution Free Day" at your school and get students and teachers to bike or walk to school; bring reusable containers for their lunch and any other neat ideas to reduce pollution locally.

3) **Watts Up!** Watts are the units used to measure power. You can find out how much energy is being used in your home, classroom, and school.

Most appliances and even light bulbs will list their wattage. Write down all the watts of all the things that use energy in your room then beside each write down how many hours you use each item. Then multiply the Power (in watts) by the Time (in hours) and divide all by 1000 (which transforms watts into kilowatts) and voilà! You now will know the amount of kilowatt hours used by anything from your computer to your outside light.

By changing your light bulbs to energy saver light bulbs you can save energy and money. By doing these calculations in your home and your school you can show your parents and principals how much they can save on their energy bill and at the same time become more responsible energy users!



Resources

Conservation Council of New Brunswick: www.web.net/~ccnb

Go to the "What's Hot" link on their page and find a paper called "Kyoto and Beyond". This gives practical ways that Canada can not only meet its Kyoto target but go beyond to a 50% reduction in emissions using technology that is all currently available. Also find out how New Brunswick's new Energy Bill may soon allow home owners and small industry to sell green energy (like solar or wind power) back to the electricity grid.

Environment Canada Climate Change Website at www.ec.gc.ca/climate

Bilingual site with general climate change information as well as the Canadian government's commitments to Kyoto and Canada's Action Plan on Climate Change.

The David Suzuki Foundation: www.davidsuzuki.org/Climate_Change

A great place to find up to date information on the Kyoto Protocol, the science behind Climate Change and its impacts; as well a comprehensive list of practical solutions to reduce emissions and energy use.

The Pembina Institute: http://www.pembina.org/climate_change.asp

The Pembina Institute was started in 1986 by six concerned high school teachers in response to the Lodgepole sour gas blowout, which killed two people and fouled the air in central Alberta for weeks. They have worked to improve safety standards and forever change the awareness and manner in which oil and gas companies conduct business. This is a good site for [teaching resources on climate change](#) and information on cleaner solutions for people, communities and industry.