

ecoMentors Lesson Plan Template: Helping kids explore the planet! www.ecomentors.ca

Title: Conservation of Energy

Grade Level(s): 5

Time/Date:

School:

Teacher:

Directions to school, class:

Contact Info:

Ontario Curriculum Connection: Science and Technology, Energy and Control – Conservation of Energy

Vocabulary: Words & Concepts your class may be learning, look these up yourself too!

Renewable - something that can replenish itself naturally over time

Resource - An available supply of something that can be drawn on when needed.

Materials and Equipment: List these before and while you plan and revise so you're prepared.

Sheets of Recycled Paper

What is your class accomplishing?: Learning & Activity Goals, Objectives

- **Demonstrate an understanding of the importance of conservation of energy in relation to the wise use of renewable and non-renewable energy sources**
- **Evaluate the reasons for conserving natural resources**
- **List various sources of energy and identify them as renewable**
- **Identify ways humans use energy, evaluate the economic and environmental costs of each and describe ways to avoid wasting energy**

PROCEDURE

The Spark: Introductions, Demonstrations, Show and Tell, Topic Intro (Break the ice!) ~5-10min

Hi everyone, we are going to talk about conservation of energy today. What do you and your family do to conserve energy? Let students introduce themselves before giving the answer.

Brainstorming, Getting ideas, Connecting ideas (assess their knowledge!) ~10-20min

What is a resource? What do you think a natural resource is? Can you name some examples? Why is it important to conserve these natural resources? What happens when we run out of resources?

*What is renewable energy? Why are coal and gas not considered a renewable energy source? **Coal and gas take millions of years to form, however other energy sources like wind and sun are constant.** Are there any examples of renewable energy in your community?*

Write down two titles on the board '**Renewable Energy**' and '**Non-renewable Energy**'

Ask students to come to the board and write down energy sources under the proper headings. Leave these up.

1. *What are some of the problems around using coal, gasoline and other fossil fuels?*
2. *What are the **personal, community, country-wide and global** effects of using fossil fuels?*

Write down the titles above and brainstorm some ideas on the diverse effects of fossil fuels.

Activity, Game, Exercise, Debate, Puzzles, Problem Solving, Role Play ~10-30mins

The Fossil Fuel Game

Divide the class in 3-5 groups. Ask the teams the questions given below. Let the teams discuss for max. 30 seconds and then write an answer down (count down at 10 seconds for dramatics!). After you've asked all the questions discuss the answers with the class. If they get the answer right, it's one point for their team. Make a score keeping table on the black board. Correct answers are given below in bold. Teams that did not score a point can gain a point by answering a reflection question. These are also worth one point after each question. Write down answers on the board for further use. Have fun!

1. *Fossil Fuels are formed millions of years ago from* A. the chemical reactions of minerals, B. the compression of rock and coal, **C. the decomposition of plant and animal matter**
2. *The burning of fossil fuels creates a chemical compound that creates acid rain. Is it* **A. Sulfur Dioxide (SO₂)**, B. Methane (CH₄), C. Carbon Dioxide (CO₂)
3. *What is the name of gas-electric hybrid car made popular by celebrities such as Leonardo Dicaprio?* **The Prius**
4. *What does the word petroleum mean?* A. Wood Oil, **B. Rock Oil**, C. Rock Juice
5. *For coal to be made from plant materials, it takes* A. 4.4 million yrs **B. 440 million yrs**, C. 440 Billion yrs

6. Which province uses the most coal? A. Ontario, B. Quebec, **C. Alberta**
7. There are CFL Light bulbs. CFL means A. Compact Fluoride, B. Carbon Fiber Ligament, **C. Compact Fluorescent**
8. Name sources of renewable energy. One for each point, 60 seconds! **Solar, Wind, Geothermal, Hydro, Biomass, ..**
9. The greenhouse effect causes the surface of the earth to be warmer than it would have been in the absence of an atmosphere, because a) the atmosphere behaves like a greenhouse. b) the atmosphere works like a blanket. c) the greenhouse gases trap heat. **d) the surface is warmed by radiation from both the air and the sun.**
10. The basic cause of the greenhouse effect is a) the burning of fossil fuels. b) forest clearing in the Amazon. c) both of the above **d) none of the above**

Reflection Questions:

1. Are there fossil fuels that are being formed right now? Can we use those?
 2. What are some visible effects of acid rain?
 3. Can celebrity power help to make the environment 'cool'?
 4. Name 3 out of the top 5 oil-producing countries (**Saudi Arabia, Russia, United States, Iran, China**)
 5. What sector of the U.S. economy consumes most of the nation's petroleum? a) residential b) commercial c) industrial **d) transportation**
 6. Why does Alberta use the most coal? **Because they have plenty of it!**
 7. Today, which renewable energy source provides North America with the most energy? a) wind b) solar c) geothermal **d) hydropower**
 9. Why is this process called the Green house effect? **The greenhouse effect is the name applied to the effect which causes the surface of the earth to be warmer than it would have been in the absence of an atmosphere,** like a greenhouse gets warmer because of the glass.
 10. If you got this one wrong, I have succeeded in trapping you in the popular confusion between the greenhouse effect and global warming. It may be that global warming is attributable to things such as the burning of fossil fuels and forest clearing, but the greenhouse effect, which the earth has enjoyed for millions of years, is not. Global warming is the name applied to the change in magnitude, of the greenhouse effect which is expected to further increase the average temperature of the earth's surface.
- Greenhouse gases cause climate change by A. Dissolving clouds, **B. Trapping heat near the Earth's surface,** C. Allowing more heat to enter our atmosphere

Activity, Game, Exercise, Debate, Puzzles, Problem Solving, Role Play(Pt. II or Cont...) ~10-30mins

Where do people waste the most energy? What would it take to make people conserve energy?
 Explain to the class that they will get a small assignment. They have to write a couple sentences down.
 If you were Prime Minister of Canada, What kind of laws would you pass to make people conserve energy? Make one law that punishes people and another that rewards them. Write these down on paper. After the assignment ask students to share. Ask other students: Why would this law work well? Why might this law not work?

Contingency, Plan B, extra game or activity (Back up plan) ~5-10mins

Create two teams by splitting the class in half.
 Ask one side to name a household activity that uses energy. The other side must come up with a way to conserve energy for this activity.

Presentation of Findings ~5-15mins

Design a home or other device that is powered with renewable energy.

Review, Conclusion and steps towards continued action ~5-10mins

Why is it important to conserve energy and even renewable energy?
 How can we conserve energy at home?

References

- <http://www.ems.psu.edu/~fraser/Quizzes/Met1Quiz/quiz-solution.cgi>
- <http://www.libraryjournal.com/article/CA106234.html>
- <http://www.eia.doe.gov/kids/energyfacts/index.html>

Great work ecoMentor! After use of Lesson Plan revise, add ideas and repeat!