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Title: Electricity

Grade Level(s): 6

Time/Date:

School:

Teacher:

Directions to school, class:

Contact Info:

Ontario Curriculum Connection: Energy and Control - Electricity

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

Renewable energy - energy from existing flows of energy, from *on-going natural processes*, such as sunshine, wind, flowing water (hydropower), biological processes, and geothermal heat flows.

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

Pen and paper for the students

25 Pieces of paper with different activities that involve electric appliances, tools or devices, in a hat or bag.

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

- **Identify uses of electricity in the home and community and evaluate the impact of these uses on both our quality of life and the environment**
- **Formulate questions about and identify needs and problems related to the properties or uses of electrical energy, and explore possible answers and solutions**
- **Identify sources of electricity and state whether they are renewable**
- **Identify the different ways electricity is produced**
- **Describe conditions that could affect the consumption of electrical energy in the home and at school**
- **Develop a plan for reducing electricity consumption at home and at school and describe how this could affect our natural resources**

PROCEDURE

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

Hi Everyone, today we are talking about electricity, but first, we're going to do a little warm-up!

Split the class in half. Each student will draw a piece of paper from the hat/bag. You will act out this activity for your own team. Each student has 10 seconds to act out their activity. If your team guesses right, your team will receive one point and get another turn, if your team cannot guess within 10 seconds, the other team gets to guess the activity and win a point. If no team guesses right, the other team still gets the next turn. Play until all students have had a turn or you run out of activities. You can countdown 5-4-3-2-1 aloud for added dramatics.

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

*How is electricity produced? How does this affect us? If the class does not know the term fossil fuels; explain! Can you name some other sources of electricity and if these ways of making electricity are bad for the environment? List all the sources of electricity on the black board in 2 columns; 1 with the title **Harmful to environment**; and 1 with the title **Less Harmful**.*

What does the word renewable mean? Which sources of electricity on the board are renewable?

What are some ways that we use electricity that we don't need? Do people really need electric toothbrushes?

What are some silly ways that we use electricity? Are all these things absolutely necessary?

*What are some ways that we use electricity that we do need? Can we live without any electricity? **Yes, we could live without electricity, but it would affect our quality of life.** Do you know people who live without electricity these days? How are their lives different from ours?*

*What are some ways we can use to encourage people to use less electricity? What are some ways we can punish people for using too much electricity? Pretend that you are local government officials making policies for your city. Make two columns on the board, one with the title **encouragement/rewards**, and the other with the title **Penalties**. Which ones would work best, which ones would not work well?*

People in Ontario use 60% more (per person) electricity than people in New York. Why?

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

Alternative energy sources:¹

Place the students in groups of 4 or 5 to research one of the following energy sources: Solar, Wind, Geothermal, Biomass or Hydropower. Each group has to write a ½ page summary of the energy source and present their findings for the class.

When you work on your summary, include the answers to the following questions (write these on the board).

- 1) How does this technology work?
- 2) How could this energy source be used?
- 3) What are some examples of its current use?
- 4) What are environmental impacts associated with this source of electricity?
- 5) Is this technology widely accepted today? Why? Why not?
- 6) Is it expensive to use this technology? Would this stop people from using it? Why? Why not?

Of course make sure that you know enough background info to be able to help the students with this. Check <http://www.energyquest.ca.gov/story/index.html>.

If the class is lucky enough to have computers, the students can look some info up themselves.

After the presentations ask the class: *What type of the alternative energy sources would be the easiest to implement in a wide spread use? Why?*

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

Town hall vote:

You are all citizens in the same town. Today we have a town meeting in which we will discuss what kind of electricity source we will use to provide our town with electricity. Maintain the groups as they were in the activity above. Each group should defend their electricity source and explain to the town meeting why their source of energy would be the best to use. After all students have defended their electricity source, the students can vote for their preferred power source. Teams are not allowed to vote for their own source. Ask student to raise their hands for each power source. Count raised hands and keep track to see what energy source has the most votes.

Note: to make it more interesting you can assign some students to defend fossil fuels or nuclear energy!

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

Test Your Energy IQ²:

1. *Microwave ovens are currently found in what percentage of all homes?* A. 23% B. 54% **C. 84%**
2. *For which jobs are microwave ovens used most?* A. Defrosting frozen foods **B. Cooking meals**
C. Reheating foods D. Preparing snacks
3. *Ceiling fans are currently found in what percentage of homes?* A. 10 to 15% B. 25 to 30% **C. 50 to 55%**
4. *Switching to fluorescent lighting can save consumers a lot of money. How much money could Americans save collectively each year if we all made the switch to efficient lighting?* A around \$500,000 B. around \$ 1 million **C. around \$750 million**
5. *Energy-efficient lighting can reduce home electricity demand up to what percent?* A. 15% B. 50% **C.75%**
6. *How much does the typical family spend in a year to run its electric home appliances?* A. \$100 to \$300 **B. \$400 to \$1,000** C. \$1,100 to \$1,500
7. *Industry consumes what percent of the total energy used?* **A. 10%** B. 36% C. 57%
8. *Which renewable energy source generates the most electricity?* A. Wind **B. Hydropower** C Solar
9. *What energy source provides more than half of the electricity in North America?* A. Nuclear **B. Coal**
C. Natural gas
10. *Transportation accounts for half of all North America's petroleum consumption.* A. True **B. False**
(Transportation accounts for two-thirds or 65% of petroleum use.)

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

What alternative sources of electricity are there? Which one do you think is best? How could we easily reduce a lot of fossil fuel burning? What could you do to make this happen?

References

1. http://www.sciencenetlinks.com/pdfs/renewable_actsheet.pdf
2. <http://www.energyquest.ca.gov/story/index.html> & http://www.energyquest.ca.gov/games/energy_test/energy_IQ2.html

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