

CONSERVING ELECTRIC ENERGY

STANDARDS:

See summary of National Science Education Standards.

Original: <http://books.nap.edu/readingroom/books/nse/>

Standard Concept	General Standard	Specific Standard	General Standard	Specific Standard	General Standard	Specific Standard
Grade level		K-4		5-8		9-12
Science as Inquiry (A)	Abilities ... to do inquiry		Abilities ... to do inquiry	A.1.8.4	Abilities ... to do inquiry	
				A.1.8.8		
	Understandings about ... inquiry		Understandings about ... inquiry	A.2.8.3	Understandings about ... inquiry	A.2.12.2
Science and Technology (E)	Understandings about ... technology	E.2.4.2	Understandings about ... technology	E.2.8.4	Understandings about ... technology	E.2.12.4
				E.2.8.5		
Science in social perspective (F)			..., resources and environments	F.2.8.1		
				F.2.8.2		
	Types of resources	F.3.4.1				
		F.3.4.2				
	... Technology and local challenges	F.5.4.2	Science and technology in society	F.5.8.3	... hazards	F.5.12.1
				F.5.8.4		F.5.12.2
						F.5.12.4



					... global challenges	F.6.12.2
--	--	--	--	--	-----------------------	----------



CONSERVING ELECTRIC ENERGY

INTRODUCTION

We use energy just by living. Our bodies use the energy contained in food when it reacts with the oxygen in the air. In addition, we use energy in our daily activities by driving cars, turning on lights, using a computer.

PURPOSE:

Students will gain an appreciation for our dependency on electricity and to learn how regulating the rate of energy consumption makes the energy source last longer. In the model, students will analyze and contrast two graphs measuring the consumption of a resource under modified regulations and to understand that regulating the rate of consumption of a resource allows it to last longer.

MATERIALS REQUIRED:

- Pen and paper
- Cookies or crackers (two per student). **Make sure cookies do not have nuts**
- Blackboard or overhead

PROCEDURE:

- 1) Begin a short discussion with the class with questions about what activities they participate in that are dependent on energy, how is electricity generated, how much coal or other natural resources are needed to generate the electricity they use.
 - a) Discuss why the demand for electricity is increasing (more people, microelectronics).
 - b) Start of list of items used that need electricity.
 - c) Explain the difference between renewable and non-renewable resources.
 - d) Is regulation important?
- 2) Model regulation as follows:
 - a) Give each student a cookie or cracker then give them a signal to begin eating and tell them to raise their hand when they are finished.
 - i) Count the hands raised every 15 seconds until all the cookies or cracker are eaten.
 - ii) Create a bar graph indicating how many students finished eating every 15 seconds.
 - b) Give each student another cookie or cracker with instructions that they can only take a bite when you tell them, "Take a bite."
 - i) Do this every 15 seconds and have the students raise their hand when they have finished the cookie.
 - ii) Count the hands raised after every 15 seconds and create a second bar graph to indicate the consumption rates. This graph usually shows that the overall cookie resources last longer.
 - c) Discuss the two graphs,



- i) How are the two graphs the same?
- ii) How are they different?
- iii) Why did the cookie last longer when consumption was regulated?
- iv) Can or should consumption be regulated?
 - (1) If so, by whom?
 - (2) Do individuals have a responsibility in conservation?

EVALUATION

- 1) Have students write a paragraph explaining their opinion about
 - a) conserving energy resources,
 - b) what measures can be taken,
 - c) should the government regulate individual or industrial consumption?

EXTENSION:

- 1) Students could research what regulations are now in place of the consumption of natural resources, including water consumption restrictions during a drought.
 - a) What is being done to increase the amount of available energy resources?

DIFFERENTIATION:

- 1) Encourage students who are drawn to the graphing element of this lesson to graph the consumption data in various types of graphs (pie, line, bar, etc)

TEACHER NOTES

- This activity is also available on line at www.teachcoal.org/lessonplans/conserving_energy.html.
 - This is the website for the American Coal Foundation and they have many other activities available on-line.



GRAPHS OF EATING COOKIES

FREE EATING

	Students Finished Eating Cookies										
	30										
	25										
	20										
	15										
	10										
	5										
	0	15	30	45	60	75	90	105	120	135	
		Seconds									

REGULATED EATING

Students Finished Eating Cookies										
30										
25										
20										
15										
10										
5										
0	15	30	45	60	75	90	105	120	135	
	Seconds									

