Remember When

Student Objective
The student:
- understands that electric energy use has increased through the years
- understands how technology has changed our everyday lives.

Materials:
- Science Journal

Key Words:
interview

Time:
Outside of class: 15 - 20 minutes for interview
Follow up: 1 class period

Procedure - before interviews
1. Explain to students that they will be interviewing an older person about their electric energy use, both at present and also what their electrical use was as a child.
2. Go over the questions to be asked in the interview, and explain to the students how they should record their data.

Procedure - follow up day
1. On the follow up day, lead a discussion encouraging students to share the information they gathered. Graphs and charts can be created using the class data.
2. Lead a discussion on how energy use has changed through the years. Points to include:
   - many homes have multiples of an item (i.e. television, stereo) where one per house used to be the norm
   - our use of electric appliances is growing; many things that we used to do manually now are done with electricity
   - our dependancy on electric appliances and gadgets is growing. Most students can not imagine doing without many of these electric 'wonders'
   - battery power is stored electrical power.
3. Discuss with the students the problems caused by our escalating energy use. Points to include:
   - most of our electricity is made with non-renewable resources such as coal and natural gas. Reserves of these energy sources will run out sometime in the future
   - production of electricity from coal and natural gas produces air pollution which is a growing problem in our country
   - the United States has 10% of the world's population and yet uses 25% of the world's resources. This unfair situation can not continue as more countries become modernized
   - simple ways that each of us can make a difference are conservation and recycling

- switching to renewable energy sources whenever practical is important on a small scale (such as a family) as well as a large scale (such as power plants and industry).

4. Students may be interested in making predictions of future electrical energy use.

Further Research

1. Create a skit of how energy use has changed in the past 50 years and what your predictions are for the next 50 years.
2. Draw pictures of your vision of transportation 50 years from now.
3. Draw a picture of what you think the bedroom of someone your age will look like 50 years from now. Include all the gadgets and toys you think the child of the future will want.
4. Draw a picture of the kitchen of the future. Include food preparation, storage and clean-up features in your design.

Related Reading

- ***The Light Bulb and How It Changed the World*** by Michael Pollard (Facts on File, 1995)
  This book first reviews the electric inventions that preceded Edison's lightbulb—the battery, the telegraph, and the telephone—and then explains how electricity has been generated, supplied, and used ever since.
- ***What Was It Like Before Electricity?*** By Carolyn Scrace & Paul Bennett (Raintree Steck-Vaughn Publishers, 2000)
  Simple explanations of the natural world and introductions to different times and places. On a visit to great-grandmother, a boy and his friends learn about daily life and mechanical power before the availability of electricity.

Internet Sites

http://www.energyquest.ca.gov/
California Energy Commission's Energy Quest site. Includes history, science projects, famous scientists, how things work, enegy conservation, and more.

http://www.miamisci.org/af/sln/frankenstein/index.html
Miami Museum of Science. Part of their website on energy presented by famous gothic characters, in this case Frankenstein presents information about various forms of electricity and electrical safety.

http://www.mos.org/sln/toe/toe.html
Museum of Science Boston. Find out the truth about Franklin's kite experiment, learn about Tesla Coils and more.

Remember When

	600 BC
600 B.C.	Thales of Miletus writes about amber becoming charged by rubbing - he was describing what we now call static electricity
	1600s
1600	English scientist, William Gilbert first coined the term "electricity" from the Greek word for amber. He also first used the terms electric force, magnetic pole, and electric attraction.
1660	Otto von Guericke invented a machine that produced static electricity.
1675	Robert Boyle discovered that electric force could be transmitted through a vacuum and observed attraction and repulsion.
	1700s
1729	Stephen Gray's discovery of the conduction of electricity.
1733	Charles Francois du Fay discovered that electricity comes in two forms which he called resinous(-)and vitreous(+). Benjamin Franklin and Ebenezer Kinnersley later renamed the two forms as positive and negative.
1745	Georg Von Kleist discovered that electricity was controllable. Dutch physicist, Pieter van Musschenbroek invented the "Leyden Jar" the first electrical capacitor. Leyden jars store static electricity.
1752	Ben Franklin figured out that static electricity and lightning were the same.
1786	Italian physician, Luigi Galvani demonstrated the electrical basis of nerve impulses.
	1800s
1800	First electric **battery** invented by Alessandro Volta
1816	First energy utility in U.S. founded
1820	Relationship of electricity and magnetism confirmed
1821	First electric **motor** (Faraday)
1826	Ohms Law (G.S. Ohm)
1831	Principles of electromagnetism, induction, generation and transmission (Faraday)
1837	First industrial electrical motors
1839	First **fuel cell**
1860s	Mathematical theory of electromagnetic fields published. Maxwell created a new era of physics when he unified magnetism, electricity and light. One of the most significant events, possibly the very most significant event, of

	the 19th century was Maxwell's discovery of the four laws of electrodynamics ("Maxwell's Equations").
1876	Alexander Graham Bell invents the **telephone**
1877	Thomas Edison invents the **phonograph**
1878	Edison Electric Light Co (U.S.) and American Electric and Illuminating (Canada) founded
1879	Thomas Edison demonstrates his **incandescent lamp** in Menlo Park, New Jersey
1880	First commercial **power station** opens in San Francisco, uses Brush generator and arc lights
1882	Edison's Pearl Street Station opens First hydroelectric station opens in Wisconsin Electric **fan** invented
1883	**Transformer** invented
1884	**Steam turbine** invented
1886	Stanley develops transformer and alternating current electric system Edison markets a talking doll
1887	First successful electric **trolley** is installed
1891	First functional U.S. electric **car**
1893	The phonograph hits the home market
1897	Electron discovered by J. J. Thomson

1900s

1900	**Photocopier** invented
1901	Mercury vapor lightbulb invented
1903	First successful **gas turbine** (France) Electric **vacuum cleaner** invented Electric **washing machine** invented Lightweight electric **iron** invented
1907	First practical home vacuum cleaner marketed
1909	Electric **toaster** invented
1911	**Air conditioning** invented
1913	First electric **refrigerator** for the home is invented Electric **dishwasher** invented
1917	First electric **range** marketed
1919	Electric 'pop-up' **toaster** invented
1920	Federal Power Commission (FPC) formed Safety standards for electric outlets and plugs are established
1921	Albert Einstein receives the Nobel Prize for his work on the photoelectric effect
1922	Electric **blender** is invented
1924	**Fax machine** invented
1927	Kitchen **garbage disposal** invented
1928	Construction of Boulder Dam begins

1930	**'Automatic' washing machine** is invented that can wash and then spin the excess water out of clothes
1931	Birds Eye frozen foods go on sale throughout the U.S.
1934	At the Chicago Exhibition, Westinghouse showcases an electric **garage door opener**
1935	First night baseball game in major leagues **Clothes dryer** invented
1945	Raytheon Corporation invents the magnetron which is the precursor to the **microwave oven**
1947	**Transistor** invented First top loading automatic washing machine is marketed
1952	Electric **coffeepot** is marketed
1953	Construction of the first nuclear power station begins
1954	Bell Labs announce the creation of the first practical photovoltaic cell
1955	Mass production of **television** begins
1963	Clean Air Act GE introduces the **self-cleaning oven**
1965	Northeast Blackout
1967	First **microwaves** are marketed
1969	National Environmental Policy Act of 1969
1970	Environmental Protection Agency (EPA) formed Water and Environmental Quality Act Clean Air Act of 1970
1971	First commercial **microprocessor** is introduced ARPA net, the precursor of the internet is started First **pocket calculator**
1972	Clean Water Act of 1972 First mass produced **video game** (Pong)
1973	First **cell phone** call
1975	Brown's Ferry nuclear accident First **personal computer**, the Altair 8800, is available
1977	New York City blackout Department of Energy (DOE) formed First **VCR** is marketed
1979	Three Mile Island nuclear accident Sony introduces the Walkman
1980	First U.S. windfarm
1982	**CD**s are introduced
1983	First usable **notebook computer**
1984	Annapolis, N.S., tidal power plant–first of its kind in North America (Canada)
1986	Chernobyl nuclear accident (USSR)
1990	Clean Air Act amendments mandate additional pollution controls New refrigeration system based on hydrogen is developed
1992	National Energy Policy Act

	The World Wide Web is demonstrated and browser software becomes available
	The Energy Star program is introduced by the Environmental Protection Agency
1994	RCAs digital satellite broadcasting system begins operation
1996	First **dvd** players go on sale
1997	**Robotic vacuum cleaner** is invented
1998	MP3 music file format invented
1999	**TiVo** introduced

2000s

2001	Apple **iPod** introduced
2003	GE introduces an oven that uses a combination of thermal, convection and microwave energies

Remember When

			.1	.2	.3	.4	.5	.6
Energy	**Standard 1**	**SC.B.1.2-**			**X**	**X**		
	Standard 2	**SC.B.2.2-**						
Force and Motion	**Standard 1**	**SC.C.1.2-**						
	Standard 2	**SC.C.2.2-**		**X**	**X**			
Processes that Shape the Earth	**Standard 1**	**SC.D.1.2-**						
	Standard 2	**SC.D.2.2-**	**X**					
Social Studies benchmarks:	**SS.A.1.2.2, SS.B.2.2.3, SS.B.2.2.4**							

Benchmark SC.B.1.2.3 - The student recognizes various forms of energy.
Grade Level Expectations
The student:
Fourth
- knows that there are a variety of sources for electricity.

Benchmark SC.B.1.2.4 - The student knows that many ways in which energy can be transformed from one type to another.
Grade Level Expectations
The student:
Fourth
- knows ways that energy can be transformed.

Benchmark SC.B.2.2.2 - The student recognizes the costs and risks to society and the environment posed by the use of nonrenewable energy.
Grade Level Expectations
The student:
Third
- knows ways natural resources are important
- classifies resources as renewable or nonrenewable

Fourth
- understands the reasons for energy conservation
- knows the risk factors associated with the use of nonrenewable energy sources.

Benchmark SC.B.2.2.3 - The student knows that the limited supply of useable energy sources places great significance on the development of renewable energy sources.

Grade Level Expectations

The student:

Third

- knows that alternate energy sources are being explored using natural and mechanical processes

Fifth

- knows that the limited supply of usable energy sources places great significance on the development of renewable energy sources.

Benchmark SC.D.2.2.1 - The student knows that reusing, recycling, and reducing the use of natural resources improve and protect the quality of life.

Grade Level Expectations

The student:

Third

- knows that reusing, recycling, and reducing the use of natural resources improve and protect the quality of life

Fourth

- knows ways in which people can conserve natural resources
- knows ways misuse of natural resources affects the quality of life for all species

Fifth

- extends and refines knowledge of ways people can reuse, recycle, and reduce the use of resources to improve and protect the quality of life.

Benchmark SS.A.1.2.2 - The student uses a variety of methods and sources to understand history and knows the difference between primary and secondary sources.

Grade Level Expectations

The student:

Fourth

- knows different types of primary and secondary sources.

Benchmark SS.B.2.2.3 - The student understands how human activity affects the physical environment.

Grade Level Expectations

The student:

Fifth

- understands ways human activity has affected the physical environment in various places and times in the United States.

Benchmark SC.D.2.2.1 - The student understands how factors such as population growth, human migration, improved methods of transportation and communication, and economic development affect the use and conservation of natural resources

Grade Level Expectations

The student:

Fifth

- Content addressed in SS.B.2.2.3.

Remember When

interview - A conversation, such as one conducted by a reporter, to gather information about a subject.

Remember When

Name of person you interviewed: _____

Your relationship to the person you interviewed: _____

Interview Questions:

Age: (check one)

- ☐ 20 - 29
- ☐ 30 - 39
- ☐ 40 - 49
- ☐ 50 - 59
- ☐ 60 - 69
- ☐ 70 - 79
- ☐ 80 - 89
- ☐ 90 - 99
- ☐ 100 +

Where did you live when you were young?

- ☐ in the country
- ☐ in the city
- ☐ in the suburbs

Where are you from?

_____

How many people live in your house now? (include yourself)

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ more than 10

How many people lived in your house when you were a child? (include yourself)

- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ more than 10

Check the first box if the person you interview currently has that electrical appliance in their home. If they have more than one of the item, place that number in the box. Do the same thing for the second box if they had the item in their home as a child. If they did not have that item, find out what they used instead, and put it in the third box.

Electrical Appliance	In your home now	In your home as a child	Used instead
Entertainment			
Television			
Radio			
Stereo/record player			
CD player			
VCR			
DVD player			
Computer			
Video game			
Portable music player			
Answering machine			
Cordless phone			
Cell phone			
Video/movie camera			
Digital camera			

Electrical Appliance	In your home now	In your home as a child	Used instead
Heating and Cooling			
Radiator			
Space heater			
Hot water heater			
Electric blanket			
Window air conditioner			
Central air conditioner			
Cooking			
Toaster/toaster oven			
Microwave oven			
Electric stove			
Electric oven			
Electric can opener			
Blender			
Food processor/mixer			
Coffee maker			
Electric grill			
Refrigerator			
Cleaning			
Vacuum			
Iron			
Washing machine			

Electrical Appliance	In your home now	In your home as a child	Used instead
Clothes dryer			
Dishwasher			
Steamer/carpet cleaner			
Vacuum for pool			
Personal Items			
Hairdryer			
Electric curlers			
Electric clock			
Electric shaver			
Electric toothbrush			
Curling iron			