



## **Energy Conservation**

### **NS 696 V: Weather and Climate for Educators**

Intended Grade Level – Freshman but could be used for 7<sup>th</sup> and 8<sup>th</sup> graders.

Science Standards –

Standard 1: Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.

Standard 2: Students know and understand common properties, forms, and changes in matter and energy.

Standard 5: Students understand that the nature of science involves a particular way of building knowledge and making meaning of the natural world.

Materials required: (Electricity Usage Monitor) You can order these online at amazon.com or homedepot.com. They range in price from \$15 - \$25 for a used one at amazon.com, or you can get a new one for around \$40.

You will also need to bring some of your own electrical devices such as a hair dryer, radio, toaster, or any other electrical device you have laying around the house.

Background Information Assumed: Students should know that many electrical devices may still use power even though they are not turned on. So, even though their devices may not be turned on they are still using energy and therefore could still be polluting the atmosphere.

Objective: To educate students, their families, and communities about energy conservation measures and how they can help to save energy.

Theory: Energy conservation is very important because of the limited amount of nonrenewable energy sources on earth. About 71.5 percent of the electricity in the U.S. is generated from nonrenewable resources and the average family's energy use generates over 11,200 pounds of air pollutants each year. So, what can we do as citizens of our community to help prevent all of these air pollutants from going into the air? We could start by seeing which electrical devices use energy even when they are not being used. We can do this by using the Kill-A-Watt, which is a Electricity Usage Monitor.

I used the following website for some of the information above <http://www.epa.gov/reg5rcra/wptdiv/p2pages/energy.pdf>

Vocabulary:

1 kWh = Kilowatt-hour – one kilowatt of electricity over one hour. One kilowatt-hour of electricity is the amount of energy it takes to burn a 100 – watt light bulb for 10 hours. The average cost of one kilo-watt hour of electricity for residential customers in the U.S. is about nine cents. The average cost for commercial customers, such as schools, is about eight cents.

Electricity = the energy of moving electrons (measured in kilowatt-hours – kWh)

(These definitions were used from the following Website <http://www.need.org/needpdf/MonitorMentorStudent2008.pdf>)

### Energy Conservation

Engage – Engage the students by showing them how much electricity it takes to run your computer when you are using it, when it is in hibernating mode, and when it is shut down. Discuss the results with the students.

Explore – Have students test how much electricity it takes to use some of the electrical devices that you brought in (e.g. Hair dryer, radio, alarm clock, cell phone, toaster, fan, power drill)

Explain – After students have tested each of the devices go over the Theory (above) and definitions of kWh and electricity.

Extend – As an extension activity have students go to other classrooms that you have already prearranged with other teachers and test several different electrical devices used in each room. Make sure the students record all of the data that they collect. Examples the shop and all of the power tools, the band room and their amplifiers and other devices, the science room with their hot plates, and other scientific instruments, or the cooking class and the different cooking devices that they have. After students have went to the different classrooms have them come back to your class.

Evaluate - Have students write up all of their data on the board with what device they tested and how many kWh's it used. Then discuss which rooms use the most power and which ones use the least. Also discuss whether or not the rooms that do use the most power are doing things to help reduce the amount of energy that they use.

*Lesson generated by Joshua Walton*