

# Alliance to Save Energy's Green Schools Program

## High School Lesson Plans

By Terry Blanke, Eisenhower High School

Rialto Unified School District, California

**Title:** Energy Efficiency Ambassadors

**Subject:** Science, English and Technology

**Grades:** 9-12

### **Brief Description**

Students research energy conservation devices, build a demonstration project (light efficiency) incorporating a device or apparatus, and display and present it at an elementary science fair night for parents.

### **Objectives**

- Students identify updated information on energy conservation
- Students identify techniques and practical applications for conservation
- Students develop a list of practical applications
- Students will build or display an apparatus or energy efficient device that demonstrates its practical application for energy conservation and/or efficiency
- Students will convey information and ideas from primary and secondary sources accurately and coherently
- Students will make distinctions between the relative value and significance of specific data, facts, and ideas
- Students will report information and convey ideas logically and correctly

**Materials Needed** (May vary due to student's selection of topic and how they wish to create their project)

- Internet access
- Spreadsheet software
- Word processing software
- Covered box 11" x 17"
- 2 Surge strips
- Fluorescent bulb
- Incandescent bulb
- Tape
- Light meter
- Poster board

## **Lesson Plan**

- Brainstorm with students how energy is wasted and how they might stop the waste. Students research on the Internet current methods recommended for energy efficiency and conservation. Students may also contact local energy specialists in the community and interview them for methods or apparatus that would reduce energy waste and save money. These specialists may also provide testing equipment for the project.
- Form small groups of students (2-3 per group). Each group selects a method or apparatus to display and demonstrate energy efficiency. The project must have a display showing testing with the apparatus and a poster chart showing the projected saving over a set period of time. The chart should be created using a spreadsheet program and enlarged to poster size.
- A journal detailing the science project must accompany the project following all the requirements for entry into the science fair including statement of the problem, documented research, data collection, analysis and results.
- The group must create a script from which each member is able to explain the project, how it works and the significance of the results to energy efficiency and conservation.
- Each group is responsible for participating in an evening science fair for parents. They must set up the display and demonstrate to the parents the importance of the project. They must also dismantle the project at the end of the evening.
- The case study describes a simple project on lighting. Other projects can be more complex depending upon the students. A more complicated demonstration would be the value of window shades. Students could research the type available, how they work and explain how energy transfers through an entire window assembly. A more advanced project would be an exterior watering conservation program that incorporates satellite imaging data and local weather reports to tailor water usage for landscaping.

## **Source**

A team of teachers at my school developed this project and nothing was used from another source.

## **Case Study**

- I received a call from an elementary teacher asking if my students would help at a parent science fair night designed to help parents understand simple science projects. My students were asked and several volunteered to participate.
- The students formed a group and decided they would demonstrate lighting efficiency. They researched the same size (60 watt) florescence and incandescent light bulbs. A spreadsheet chart was created showing the potential watts used and cost over the life of each bulb. The chart was made into poster size and mounted on poster board. They took a lidded cardboard box and cut out a square on one side for viewing. The lid could also be removed to explain the project, but had to be on during the demonstration for purposes of accuracy in measuring light. In one end of the box just enough cardboard was removed in two places to slide

surge bars in and tape them down on the inside. Each type of bulb was inserted into a screw in plug that was then plugged into the surge bar. On the opposite side of the box a light sensor was taped to the inside of the cardboard. The light meter was on the table outside of the box for everyone to see the results of the light output from the two bulbs. First the incandescent bulb was tested and then the fluorescent bulb was tested. The students were able to show approximately a \$45 saving using the fluorescence bulb.

- At the science fair students demonstrated their project and explained the saving to parents and elementary students. They also handed out energy efficient bulbs to each family stopping at the booth. The bulbs were provided by the local electric company.
- District representatives, the local paper, and school officials stopped and were impressed with the display and the student's presentation. Their project was given media coverage in the local paper and throughout the district via the district's publicity email.