

Summary: Students inspect their classroom to see where energy is being used and conserved.



Is Your Classroom Energy Efficient?

Grade Level: K–12

Subject Areas: Family and Consumer Science, Mathematics, Science, Social Studies

Setting: Classroom

Time:

Preparation: 15 to 30 minutes

Activity: one 50-minute period

Vocabulary: Compact fluorescent light bulb, Daylighting, Efficient, Electronic ballast, Energy conservation, HVAC, Inefficient, Occupancy sensor, Phantom load, Recycle, Unit ventilator

Major Concept Areas:

- Quality of life
- Management of energy resource use

Related KEEP Activities:

Have students expand on the idea of identifying the appliances in their classroom that use electricity by conducting the activity “School Appliance Inventory.”

Objectives

By the end of this activity, students will be able to:

- identify where energy is being used in their classroom; and
- identify where energy is being conserved in their classroom.

Rationale

Analyzing how even small energy costs add up to major expenses helps students appreciate the need to take personal steps to save energy at home and at school.

Materials

Copies of the *Is Your Classroom Energy Efficient? Checklist*

Background

A typical classroom requires a lot of energy to keep it running. Lights, computers, aquariums, TV/DVD players, personal refrigerators, fans, LCD projectors, desk lamps, and other items all require energy to operate.

Many of these classroom devices use electricity even when they are turned off, called phantom load. Equipment with electronic clocks, timers, or remote controls, portable equipment, and office equipment with large box-shaped wall plugs all have phantom loads.

Refer to *Classroom Energy Users* for more information about specific classroom energy users.

Procedure

Orientation

Ask students if they have ever been told to turn off the lights or conserve energy either at home or at school. Ask students to share examples.

Steps

1. Ask students the following questions:
 - How many rooms are in your house?
 - How many rooms do you think are in the school?
 - Do you think the school spends a lot of money for their energy needs?
 - What things in the classroom need energy to function?
2. Pass out the *Is Your Classroom Energy Efficient? Checklist*. Ask students to complete the handout (either in groups or individually).
3. When they are finished, go over the list as a class and make sure the answers are correct.

Closure

Have students brainstorm ways they could conserve energy in their own classroom.

Assessment

Formative

- Did students complete the *Is Your Classroom Energy Efficient? Checklist* correctly?
- Can students list items in the classroom that require energy to function?
- Can students describe how they could conserve energy in the classroom?

Summative

Have students describe how they could conserve energy at home.

Classroom Energy Users

Projectors, SMART Boards® and other appliances with remote controls should be plugged into a power strip and the power strip turned off to eliminate the phantom load they draw when not being used. These appliances are often searching for a signal from the remote control, using electricity even when they are turned off. If the appliance has a clock, it uses electricity to power that function as well.

Battery chargers also draw a phantom load when they are plugged in and not being used.

Printers and photocopiers should be placed in shared locations such as hallways or the office rather than in individual classrooms to save energy. ENERGY STAR® models are 30 percent more efficient than standard models. By entering low-power “sleep” modes when inactive, and using efficient power supplies, an ENERGY STAR® certified copier saves energy when it is in use and when it is not.



Personal refrigerators, microwaves, and coffee pots use a lot of energy to either heat or cool food and drinks. If these appliances are available in the teachers’ lounge, removing them from individual classrooms would save the school a lot of energy.

Aquarium lights and pumps should be unplugged when not needed. If the animals in the tank do not require light 24 hours a day, try installing a timer to save electricity. If there is nothing living in the tank or aquarium, unplug the pump and any lights.



Computers should be set to go into sleep or hibernation mode after 15 minutes of non-use and shut down at the end of every day and over the weekends. A working computer with an LCD screen uses an average of 103 watts per hour. A computer

in sleep mode uses less than half that amount of energy. In one week, a typical computer that is used for six hours/school

day, asleep for four hours/school day, and turned off the remainder of the time uses approximately \$0.50 per week. If the computer is left on for the whole school year, about 36 weeks, one computer would use approximately \$18.00 per year. Multiply \$18.00 by the number of computers in your school or school district to calculate the potential savings by just shutting down computers at the end of each day.

Device charging stations for student laptops and tablets should be unplugged overnight and on weekends. Consider putting these carts on a timer and power strip to unplug after devices are fully charged. Charging stations continue to consume power even after devices are fully charged and powered off.

Classroom lights should be used at a minimum. When no one is using the classroom, the lights should be turned off. If you have windows that provide enough light, do not use your overhead lights. Opening window shades will allow sunlight into the classroom, called daylighting. This is preferred as long as light levels are adequate for the task. Listening to a lecture requires less light than creating an art project. If you must use overhead lights, try to use half or one third, depending on the task. Many classrooms are over lit and have known to cause headaches and hyperactivity in some students.

High Performance (HPT8s or HPT5s) fluorescent lighting and light emitting diode (LED) light fixtures are recommended for overhead classroom lighting. They are more efficient, provide a more natural light, and have a longer life span reducing the amount of maintenance needed. Older T12 fluorescent lamps with magnetic ballasts and visible flicker should be replaced immediately.

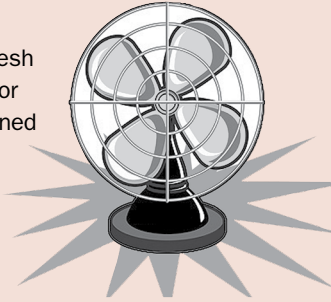
Occupancy sensors are often installed in classrooms where teachers and students don’t turn the lights off when they leave. The sensors will automatically turn off the lights if there is no movement detected over a set span of time. Some teachers find occupancy sensors bothersome because the lights will turn off when they are grading papers quietly. Sensitivity levels can be raised on occupancy sensors to reduce this problem.

Light emitting diode bulbs (LEDs) should be used in all desk lamps. An LED with the light output of a 60-watt incandescent bulb only uses 9 watts of energy. That means that the same light is produced using 15% the amount of energy. LEDs will fit in standard fixtures.

Classroom Energy Users

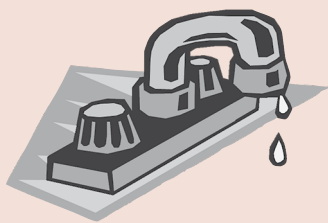
Windows should be properly sealed. If you feel a strong draft when you stand near the windows in your classroom, contact your facility manager. You may want to make a window quilt or cover the windows during the cold months to save on heating expenses. Using window shades especially at night will keep the warm air in the building and require less energy to heat it back up in the morning.

If windows are operable, limit the use of **electric fans**. Fresh air is free and much quieter (unless you are in an urban or high traffic area). However, windows should never be opened if heating or cooling systems are in operation. This temporary solution wastes energy and costs money. If your classroom's temperature is uncomfortable, contact your facility manager.



Many classrooms have **unit ventilators** or radiators that distribute heat during the cold months. These units should be free and clear of any papers, jackets, posters, plants, etc. If something is blocking the intake or output vent, the unit will not work properly. If wet mittens are placed on top of a unit ventilator, any germs on the mittens will be sent through the air as the heat pushes through them.

If there is a classroom **door vent**, it should be kept free and clear of obstructions. Hanging posters over the vent blocks the air flow and prevents the heating, ventilating, and air conditioning (HVAC) system from working properly.



A **sink** that drips can waste up to 35 gallons of water a week. Energy is used to pump and treat all the water used in the building. If the hot water is leaking, the hot water tank wastes energy to heat water that is going down the drain.

Recycling paper, plastic, metal, and glass is a great way to save energy. Energy is used to mine and transport raw materials. Recycling metals in particular limits the amount of land disruption caused by mining.



For more information about ENERGY STAR® certified products visit: energystar.gov/products.

Is Your Classroom Energy Efficient? Checklist

Name _____

Date _____

- The projector and SMART Board® are plugged into a power strip which is turned off when not in use.
- Fans are turned off when windows can be opened instead to cool the classroom.
- The unit ventilator (where the heat comes from) is free and clear of books, papers, plants, etc.
- The vent on the classroom door is unobstructed (e.g., no posters are blocking air flow).
- There are no personal refrigerators, microwaves, or coffee makers in the room if they are available in the teachers' lounge.
- The aquarium pumps and lights are only running when necessary.
- Battery chargers are not left plugged into the wall when they are not being used.
- LED bulbs are used in all lamps in the room.
- Printers and photocopiers are located in common areas outside the classroom.
- The window shades are open to allow sunlight into the classroom, instead of using overhead lights, when possible.
- Computers are shut down at the end of the school day and on weekends.
- Classroom lights are turned off when no one is in the classroom.
- Occupancy sensors automatically turn the lights off when no one is using the classroom.
- Classroom windows are not drafty.
- Window shades are closed at night during cold months.
- The light fixtures in your classroom are LED or high performance fluorescent.
- If there is a sink in your classroom, it does not drip or leak.
- There are recycling containers for paper, plastic, metal, and glass in the classroom.

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