



Energy Section Supplementary Guide

The energy supplementary guide was created to help you complete the energy section of the Green and Healthy School program. This guide aims to answer some of the questions you may have regarding energy efficiency for specific types of lighting, building materials, and appliances, and it will give you a better idea of the energy assessment requirements. Moreover, this supplementary guide will offer you tips on integrating energy education into your current curriculum.*

A. Classroom Energy Assessment

- The individual classroom energy assessments help to ensure that energy education reaches every student.
- The teacher may consider having his or her students write an energy policy for their individual classroom.
- The teacher might consider appointing energy monitors (students) to help enforce the energy policy. Energy monitors could change on a weekly or bi-weekly basis.
- The school could order desk lamps for teachers to use while working during non-school hours. An Energy Star desk lamp uses fewer Kilowatt hours than overhead lighting (Energy Star is a voluntary partnership between the US Department of Energy, the US Environmental Protection Agency, product manufacturers, local utility companies, and retailers).
- Note: The classroom energy assessment for individual classrooms is a separate PDF document from the energy assessment.

B. General Information

- Questions 1-3 are aimed at discovering what type(s) of energy the school receives and the school's energy cost (Question 3 tip: Contact your school district building services director or business manager to obtain this information).
- These questions help the students to gain a better understanding of how and where energy originates and the financial costs associated with energy consumption.
- Energy Education: Teachers may consider lessons on renewable and non-renewable energy sources or math lessons on calculating or converting watt-hours, kilowatt hours and energy cost of operation.

C. Building Information

- Questions 1-3 help the students understand that the age of a building may be related to its energy efficiency due to trends in building, technology and age of materials, or lack of insulation or sealants.
- Question 3 addresses how the addition or replacement of carpeting, windows, etc. can influence the energy efficiency of a building. Lighting upgrades can refer to the installation of LED exit lights or by changing to more energy efficient light bulbs. Variable frequency ventilation motor controls refer to a device that reduces energy consumption during periods when less energy is needed.

* In an effort to conserve paper, please print double-sided whenever possible

- Energy Education: Science lessons on heat exchange or a history unit on the trends of home and commercial buildings. Students can also participate in hands-on activities by doing home energy assessments.
- Questions 4-6 focus on your school's Heating Ventilation and Air Conditioning (HVAC) system. HVAC systems are one of the main energy consumers in commercial buildings. A well-maintained HVAC system can lower utility costs, reduce replacement costs, and benefit the health of building occupants (occupants' health is covered in the Indoor Air Quality section).
- For increased energy efficiency and indoor air quality, ventilation filters should be replaced every 1-6 months.
- Question 7: Different exterior materials hold varying R-values (R-value is the effectiveness of a building material to resist the flow of heat, the higher the R-value, the better the insulation capacity), which in turn affects the energy efficiency of a building.
- Questions 8-9: The different types of windows and insulation will help determine the energy efficiency of a building. Like exterior materials, windows can also be graded on their R-value. To learn more about windows and energy efficiency click on the Virginia Energy Savers Handbook <http://www.mme.state.va.us/de/hbchap4.html>. To learn more about different types of insulation visit the US Department of Energy at http://www.ornl.gov/sci/roofs+walls/insulation/ins_05.html
- Question 10: Units in the shade require less energy to run.
- Questions 11-12: Action opportunity: Students could plant a tree to help celebrate Arbor Day, Earth Day, or another event while simultaneously helping to shape the school landscape and lower the energy bill.

D. Temperature

- Questions 1-4 focus on who controls the temperature in your school and how it is controlled (some schools use energy management software to control individual school and classroom lighting, ventilation, and motor controls).
- A teacher has an added responsibility in energy conservation if he or she controls the classroom thermostat. Ideally, classroom thermostats should be set at 68 degrees during the heating season and at 78-80 degrees when the air conditioning system is operating (note: each school can vary based on its unique conditions).
- If teachers control their own thermostat, they should consult with their buildings and maintenance staff to see how low they should be setting the thermostat in their classroom at the end of each day. When school is not in operation, thermostats should be set to the lowest temperature possible while still sufficiently heating the building.
- Programmable thermostats can be desirable in taking the thought out of lowering temperatures at the end of each day.

E. Lighting

- Incandescent Lights: The original light bulb created by Thomas Edison over 100 years ago. Incandescent light bulbs are inefficient light sources because of the amount of heat generated (90%) compared to the amount of light generated (10%). Incandescent light bulbs last about 750-1,000 hours and they start to dim with age. The advantage to incandescent bulbs is that the initial cost is low (however, the consumer should factor in their life span relative to more energy efficient light bulbs) and they work well with dimmers, however, dimmable fluorescents are now available (make sure the label says dimmable).
- Fluorescent Lights: Fluorescent lights are energy efficient lights that have a long life. Fluorescent lights do require some form of ballast (light ballast: an electrical device for starting and regulating fluorescent and discharge lamps).
- Compact Fluorescent Lights (CFLs): CFLs are the combination of the energy efficient fluorescent lights with the convenience of the incandescent lights. CFLs are designed

to replace many of the incandescent bulbs. CFLs have a lifetime of 10,000 hours and they produce a similar light to that of incandescent bulbs.

- High Intensity Discharge (HID) Lights: HID are the most energy efficient light sources available today. They are typically used in parking lots and sport arenas. Like fluorescents, special ballasts are needed for HID lights.
- Question 5: Daylighting is using natural light to illuminate buildings. Daylighting is free, so it can save a school a bundle of money and provides natural lighting that can improve student performance (according to the Energy Center of WI). Teachers and staff can take better advantage of daylighting and energy conservation by paying close attention to the scheduling of events:
 - Schedule events during daylight hours.
 - Match the appropriate room for the meeting or event. Small group activities should not be scheduled in large areas.

F. Appliances/Machines

- When appliances need replacement, switch to energy efficient designs.
- Question 3: According to Energy Star, refrigerator coils should be cleaned twice a year to maximize energy efficiency.

G. Curriculum and Community

- Many local energy companies offer “how to” workshops that include invaluable energy saving tips and tricks.
- Wisconsin K-12 Energy Education Program (KEEP) offers a variety of professional development opportunities. Please consult their website for specific courses offered: <http://www.uwsp.edu/CNR/wcee/keep/ProfessionalDevelopment/>

H. Renewable Energy

- Many classroom lesson ideas can focus on renewable energy sources, i.e. Global Warming issues, wise energy choices, and sustainable development.
- Check out the resource pages on the Green and Healthy School web site for lesson plan ideas: <http://dnr.wi.gov/org/caer/ce/greenschools/resourcesEnergy.htm>.