

SCHOOL ENERGY REVIEW

LIGHTING

This assignment gives you the opportunity to learn more about the things that consume energy in your school. Your team will be reviewing your school's lighting by following these steps:

1. Read all the information and instructions for this assignment before beginning your review, filling out the table on page 4, and answering the presentation questions.
2. Determine the rooms your team will review.
3. Complete the review and record your findings in the provided table.
 - **Your group will use a light meter to complete your section.**
 - If you have permission from your teacher, take photos during your review. They can be added to your presentation to help your classmates better understand your points and make your presentation more visual.
4. Complete any necessary additional research.
5. Revisit and answer the questions in the "For your presentation" section on page 3 to prepare a presentation for your class. In this presentation, you'll include recommendations to reduce the electricity needed for the lighting in your school.

HELPFUL INFORMATION

LIGHTING TYPES

Some lights use less electricity and are more efficient than others. Your school has probably switched to LED lights, which are the most energy-efficient option. It can be hard to tell a type of light just by looking at it, but you might still see some older types of lights that haven't been changed yet. If you think you spot any of these older lights during your review, make a note of them, because upgrading them could save energy.

Here are some different types of lighting:



Light emitting diodes (LEDs):

LEDs last 25 times longer and are up to 80% more efficient than incandescent lights.



Incandescent, compact fluorescent (CFL), and halogen bulbs:

These types of lights are used in places that don't need to be very bright, like hallways, bathrooms, and closets. Incandescent and halogen bulbs waste a lot of energy by producing heat, while CFLs are more efficient (though less efficient than LEDs) but have small amounts of mercury.



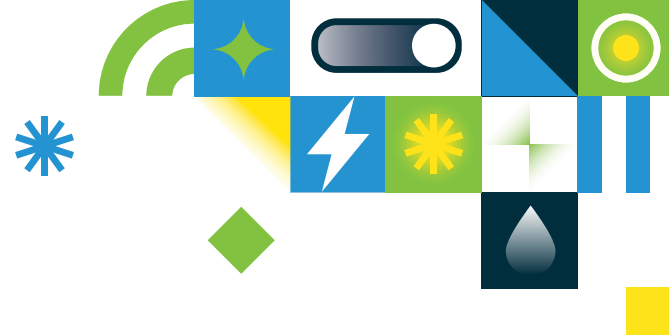
Fluorescent tubes: These were the most common types of lights used in schools before LEDs. They give off bright and even light but sometimes flicker or buzz. They're more efficient than incandescent bulbs but still use more energy than LEDs.



High-intensity discharge (HID) lamps:

These lights are used in gyms and give off bright white light. They take some time to reach full brightness when you turn them on.

If it's hard to tell what type of lighting is being used, ask your custodian for help. They might know which type of lighting is typically found in each type of fixture in your school.



LIGHTING CONTROLS

Using lighting controls is a great way to save even more energy. Here are some common lighting controls that you might find throughout your school:



Dimmers: Dimmers allow you to adjust how bright the light is, saving energy when full brightness isn't needed. You may have dimmers on some light switches at home.



Occupancy/vacancy sensors: Occupancy sensors turn lights on automatically when movement is detected and off when a space is unoccupied. Vacancy sensors require you to manually turn the lights on, but will automatically turn them off when no movement is detected. Both occupancy and vacancy sensors are usually set to turn off lights after a space is unoccupied for 20 minutes. These sensors can be wall-mounted, ceiling-mounted, or right in the fixtures.



Daylight sensors: Daylight sensors dim and brighten lighting based on how much natural daylight is available. They can look very similar to occupancy sensors. One way to check if a room has daylight sensors is to check if the lights that are closer to windows seem dimmer than the rest of the lights.



Lighting zones: Rooms may be divided into different lighting zones, where separate areas have independent switches. This allows you to only turn on lights in areas where it's needed instead of the entire room.

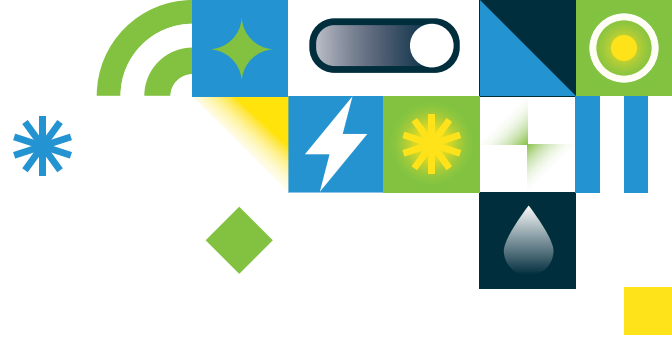
LIGHTING LEVELS

Lighting levels are measured in lux (metric) and foot-candles (imperial). Different areas of a school require different brightness levels for safety and comfort. Energy savings can be found in places that are brighter than they need to be by installing controls such as dimmers.

Use the light meter in your kit to measure lighting levels.

- Hold the light meter at waist height and compare the results to the recommended levels in the table below.
- Remember to “zero” or calibrate your light meter by covering the detector at the top of the meter with its cover between readings. This will help you get the most accurate measurements.
- You may notice the reading on the light meter will fluctuate. In that case, wait until the reading has more or less stabilized before writing down a measurement.

Space type	Recommended lux	Recommended foot-candles
Classroom/office	300-500 lux	28-46 fc
Hallway/stairwell	100-200 lux	9-19 fc
Gymnasium	300-500 lux	28-46 fc
Bathroom	150-300 lux	14-28 fc
Storage room	100-200 lux	9-19 fc



FOR YOUR PRESENTATION

After your review, use these questions to help summarize your data and prepare your presentation:

1. What type of lighting is used most throughout the school?
2. Are there rooms or spaces that are overlit? If so, how could this be fixed?
3. Do classrooms have occupancy sensors and/or motion detectors?
4. To your knowledge, are most lights off when a room is empty?
5. Is there enough natural light in most rooms to turn off some lights during the day?
6. What else did you notice about lighting throughout the school?
7. Based on the collected data, what specific changes could be made in your school to reduce the electricity required for lighting?

SCHOOL ENERGY REVIEW

LIGHTING

Room/area					
How many lights were on vs. off when you entered?	On Off	On Off	On Off	On Off	On Off
Are there multiple switches to provide lighting zones?	Yes No	Yes No	Yes No	Yes No	Yes No
Are there light control sensors?	Yes No	Yes No	Yes No	Yes No	Yes No
Are there dimmers on the lights?	Yes No	Yes No	Yes No	Yes No	Yes No
Number of windows in the room					
Is there enough daylight to turn the lights off?	Yes No	Yes No	Yes No	Yes No	Yes No
Is the room overlit or underlit? (use the light meter!)					
Are the window coverings open or closed?	Yes No N/A	Yes No N/A	Yes No N/A	Yes No N/A	Yes No N/A

If you don't have enough room in your table, add additional notes and observations below!

Date:	Team members:
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