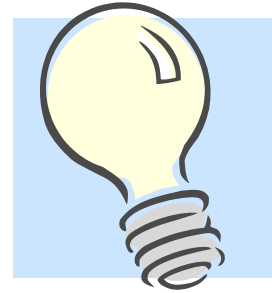


Light Up Your Life Lesson — Lighting in My Classroom Survey

Vocabulary

- Efficiency** How well a resource is used; for lighting, *efficiency* is a way to look at how much light we get for the amount of energy we have to use.
- Lamp** The technical term for a light bulb.
- Luminaire** The technical term for the light fixture. *Lamps* are put into *luminaires*.
- Nominal** A number used to describe something when your description only needs to be close and not exact. Something that is 2 1/8" long could be considered 2" long *nominally*. A *nominal* 6" wide circle could actually be 5 9/16" wide.
- Wattage** The amount of power that it takes to make each *lamp* work.



Types of Lamps: There are general types of *lamps* that you may find in your classroom.

- Fluorescent** These are the *lamps* that look like long tubes. These are normally used in classrooms, offices and other places where *efficiency* is a goal. There are usually three different *diameters* of those tubes that you may find: 5/8", 1" or 1 1/4". These tubes may also come in different *nominal* lengths of 2', 3' or 4'.
- CFL** CFL stands for "compact fluorescent." These lamps work the same way as *fluorescent*, but they may not be long straight tubes. Instead, the tubes may curl around, be shaped like a U or be shaped like a circle.
- Incandescent** These are the standard old-fashioned type of *lamps* that you likely have in your house. They screw into the *luminaire* and can get hot.
- LED** LEDs are the newest and most efficient kinds of *lamps*. LEDs are little computer parts, and are used in a lot of electronics including computer and television monitors. LEDs are also really expensive, so you may not see many of these.

Types of Luminaires: *Luminaires* are generally described by the way that they are mounted or used in the space.

- Recessed** A recessed *luminaire* is mounted so that the whole thing is above the ceiling, in the wall, or in the floor.
- Suspended** A suspended *luminaire* is hung from the ceiling using chains, cables or poles.
- Surface** A surface *luminaire* is mounted on the ceiling, wall or floor, but is actually in the room.

Survey Procedures

Step 1: Survey Classroom

To survey your classroom lighting, walk around the classroom and record information about the lighting. First, identify how many *luminaires* are in your classroom that look the same (are mounted in the same way, have the same type of *lamps* and have the same number of *lamps*).

For each type of *luminaire* that looks the same, write down information in the table below:

In Column A, describe the *luminaire*.

In Column B, count how many of those same *luminaires* you find.

In Column C, describe the type of *lamp* (fluorescent, CFL, incandescent or LED).

In Column D, count how many *lamps* are in each *luminaire*.

In Column E, write down the *wattage* of each *lamp*. (This information is written on each lamp. To read the imprint/label, turn the lights “off,” and use a flashlight to look at the lamp. If the luminaire is up high, have the teacher tell you what wattage (W) is marked on the lamp.

Next, calculate the total *wattage* in your classroom due to that type of lamp, and put that number in Column F. Then, add together all of the total wattages for each luminaire to figure out how much wattage is used in your classroom.

A	B	C	D	E	F
Type of Luminaire	# of these Luminaires	Type of Lamp	Number of Lamps in each Luminaire	Wattage of each Lamp	Total Wattage of this Luminaire Type = B x D x E
TOTAL → (add together all values in Column F)					

Step 2: Calculate Energy Use

Now that we know the *total wattage* of the lighting in our classroom, let’s figure out how much energy we use and how much that energy costs the school. To do this, we’ll need to get a bit more information.

Cost of Energy Ask your teacher how much energy costs in your state (s/he has provided with a website to get this information). The cost is given as the dollars per kilowatt-hour, or \$/kWh. Basically, your school gets charged a certain amount for each kilowatt (or 1000 watts) used for one hour.

Operating Hours You need to figure out how much time the lights are on in your school (count the total number of hours that school is open on a normal day).

Name: _____ Date: _____

$$\text{Yearly Cost} = \frac{\text{_____}}{\text{(Total Wattage)}} \div 1000 \times \frac{\text{_____}}{\text{(Hours/day)}} \times (250 \text{ days/year}) \times \frac{\text{_____}}{\text{(\$kWh)}} = \text{_____} \text{ \$/year}$$

Does that seem like a lot or a little amount per year on energy used on lighting your classroom? How much does the school pay *per student* for that lighting?

Step 3: Become Energy Efficient

There are a few ways that you can save the energy used for lighting in your classroom.

1. *Occupancy control* — Turn off the light when there is no one in the room. *Occupancy* controls can be automatic, with special equipment that knows whether or not there is anyone in the room, or manual where students and teachers make sure to turn the lights off when they leave the room.
2. *Daylighting control* — Turn the lights off when there is enough light coming in from the windows.
3. *Tuning* — Turn off some of the lights in the room if they are not all needed or turn the lights down if there is a dimmer.

So, let's figure out how much energy you can save from *Occupancy* controls!

Occupancy Controls — If you could turn the lights off when there is no one in the room, how much energy could that save?

To figure this out, we first need to figure out how many hours this classroom is actually used, not just how many hours per day that the school is open. Ask your teacher to help you figure out how many hours per day there is a class in your classroom. Do not forget to exclude times like lunch, assembly and classroom switching, etc., when no one is in the room.

$$\text{Savings} = \frac{\text{_____}}{\text{(Occupied hours/Day)}} \div \frac{\text{_____}}{\text{(Hours/Day)}} \times \frac{\text{_____}}{\text{(\$ /year Total)}} = \text{_____} \text{ \$/year}$$