



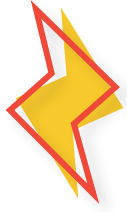
**ENERGY  
EFFICIENCY *vs*  
CONSERVATION**



**ENERGY  
EDUCATION**

**TOOL KIT**

**BY INSIDE EDUCATION**



# ENERGY EFFICIENCY VS CONSERVATION

## GUIDING QUESTIONS

- What is the difference between energy efficiency and energy conservation?
- How much electricity do different items use?
- How do we practice energy efficiency and energy conservation?

Producing energy takes a lot of work and we don't want it to go to waste!

In Alberta, most of the energy produced comes from burning fossil fuels. Anytime we do this, we are releasing greenhouse gases like carbon dioxide. By conserving energy, we can reduce the amount of greenhouse gases produced and reduce our impacts on climate change. One way to conserve energy is to limit how much energy by limiting how much we use electronic devices and unplugging them (*or turning them off*) when not in use. An energy meter tells us how much electricity an electronic device uses. Energy used in your home is measured in kilowatt hours (*kWh*).

Anytime we plan to use a device that relies on energy, it is important to think about how we can use that energy as efficiently as possible - how can we accomplish our task using less energy?

## ENERGY EFFICIENCY

Finding ways to produce the same result while using less energy.

*Example:*  
using an LED bulb vs an incandescent bulb

## ENERGY CONSERVATION

Changing behaviours to make an effort to reduce the amount of energy used

*Example:*  
turning off devices when they're not in use.

## MEASURING ELECTRICITY

### Watt (W)

A unit used to measure amounts of power (*or electrical energy*) used. One watt is a very small amount of electricity.

### Kilowatt (kW)

One kilowatt is equal to 1000 watts.

### Kilowatt hour (kWh)

A unit that measures how much energy is used by 1000 W working for one hour.

*For example, a 1000 W clothes dryer running for one hour would use 1 kWh.*

# WHY ENERGY EFFICIENCY?

Often we don't have an option to conserve (*like when it's dark out and we need light inside*). Instead, we can use less energy by replacing inefficient **fluorescent** or **incandescent** lights with **LED** lights.

When an incandescent bulb is used to make light, it also produces a lot of heat (*and gets very hot!*). That heat is just wasted energy. An LED is much more efficient, producing minimal heat and using a lot less energy to make the same amount of light. We can actually measure light output in lumens (*the amount of light emitted per second*).

Replacing old light bulbs with LED bulbs, means you'll pay less each month for electricity, while still getting the same amount of light in your home. One LED bulb lasts as long as 50 incandescent bulbs!

Use a notebook to record your observations in a chart like the one below.

Incandescent



Light emitting diode (LED)



Other electronic device

TOOL USED TO TEST

	Incandescent	Light emitting diode (LED)	Other electronic device
<b>Energy required (Watts)</b>	Energy meter		
<b>Estimate the time used per day</b>	# of hours/day		
<b>Total electricity used (kWh)</b>	Divide the energy required by 1000, then multiply by the number of hours		
<b>Total cost of electricity</b>	Multiply the total electricity used in kWh by 6.8¢/kWh for the total cost in ¢		
<b>Light produced (Lumens)</b>	<b>Lux meter</b> Light Bulb Output = Total light ( <i>bulb is on</i> ) - Ambient measurement ( <i>bulb is off</i> )		
<b>Temperature of bulb (°C)</b>	<b>Infrared thermometer</b>		
<b>Notes &amp; observations</b>	1000 hours	50,000 hours	

## MATERIALS FROM KIT:

- Energy meter
- LED light bulb
- Incandescent light bulb
- Infrared thermometer
- Lux meter

## MATERIALS FROM CLASSROOM:

- Additional electronic devices  
(*laptop, toaster, pencil sharpener, etc.*)
- Power bar
- Table lamp

## TRY THESE ACTIVITIES

- **Screw the LED light bulb into the lamp and then use the Energy meter, infrared thermometer and Lux meter to measure the output. Record your results in a table like the one on the inside page**
- **Repeat with the incandescent light bulb and an electronic device from your classroom.**

**CAUTION:** Do not touch the incandescent bulb with your bare hands while the bulb is lit up or just after turning it off. The hot bulb may cause burns.

## CONSIDER ...

We can conserve energy by using appropriate levels of lighting depending on what we're doing. What activities can you do with less lighting in your classroom? Which ones might require more? What are some ways that you can conserve energy in your classroom and at home?

## CONNECT ...

The appliances in our homes have a rating from the EnerGuide - this label tells us how much energy an appliance uses compared to other ones you can buy. The lower the energy rating, the more efficient it is. A handy way to know if you have an efficient appliance or device is to look for the Energy Star label. Remember that saving energy is a good habit to develop that conserves our natural resources and reduces pollution!

## LEARN MORE ...

One important reason to save energy is to reduce the amount of carbon dioxide ( $CO_2$ ) we release into the atmosphere. You can reduce the amount of carbon you produce by doing an energy audit like the one in topic 8 of this energy tool kit.

