Hemingway Name:

Sustainable Energy Use

Toaster vs Washing machine

- In pairs, from the list given try to determine which appliances use electrical energy at a faster rate

Sustainable use of electrical energy begins with understanding how its use is measured.

- Electrical energy is _____ in two main ways:
  - Watts and Kilowatts
  - Kilowatt-Hours

Electrical Power: Watts and Kilowatts

- **_____**: The rate at which electrical energy is used by a load
  - Load: Usually an appliance (washing machine, TV)
  - Measured in watts (W) or kilowatts (kW)
  - 1 kW = _____ watts

Power Ratings of Appliances

- Appliances are labelled with a _____ (the rate they use energy)
  - Light bulb: 100 W
  - Iron: 1000 W
  - If light bulb and iron are on for the same length of time, the iron uses ____times more energy

Table 3.2 Typical Power Ratings of Appliances

Appliance	Typical Power Rating (kW)
Clock	0.0050
Clothes dryer	5.0
Washing machine	0.50
Coffee maker	1.0
Computer	0.20
Dishwasher	1.8
Freezer	0.34
Microwave oven	1.5
Toaster	1.1
Vacuum (portable)	1.6

Kilowatt-Hours

- Electrical energy used by an appliance over time is measured in _____ (kWh)
  - kWh: Combines the units for_____ and time
  - If you use an appliance rated at 1 kW for one hour, you will have used 1 kWh of electrical energy

Measuring Electrical Energy Use in Homes and Businesses

- **_____:**An electrical energy meter that measures how energy use changes in a building over the course of the day
  - _____ is sent to the utility company wirelessly

- Can encourage “smart” behaviour since it allows consumers to _____ their electrical energy usage

Discussion Questions

1. What is electrical power and how is it measured?

2. Describe one benefit of smart meters.

Making informed choices helps you use electrical energy sustainably

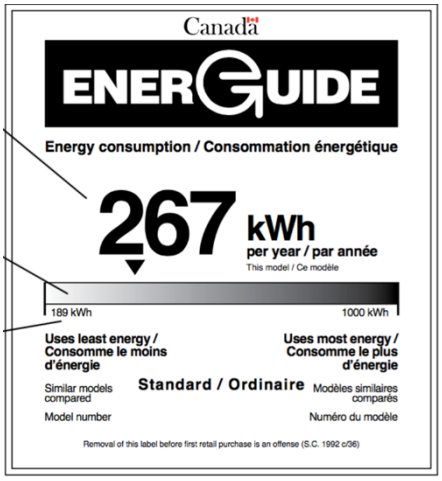
- Some appliances use _____electrical energy than others
- Appliances have labels that tell you how much energy they use.

Two types of labels used in Canada are:

- _____labels
- ENERGY STAR® labels

Understanding EnerGuide Labels

- **EnerGuide label**: A label that gives details about the amount of energy that an appliance uses in _____ of normal use
  - _____ number: Shows how much energy is used in one year of normal use
  - Shaded bar: Shows how the appliance_____ with similar ones on the market
  - Numbers on the shaded bar: Gives a _____of efficiency for yearly energy use



Understanding ENERGY STAR® Labels

- **ENERGY STAR® label**: Identifies a product as meeting or exceeding certain standards for energy efficiency
  - Appliances with this label use _____ less energy compared with a standard product in the same category

Phantom Loads

- **Phantom load**: Electrical energy a device uses when it is turned_____

- Appliances in _____ mode (TVs, computers) are actually "on" and have phantom loads
- Phantom loads account for about 900 kWh of energy use each year in the average home

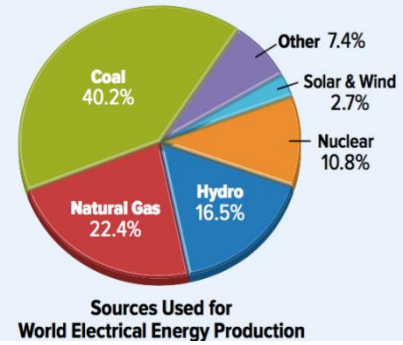
Discussion Questions

1. If a family goes away on vacation, why might electrical energy still be consumed in their home?

Renewable energy sources provide sustainable options for generating electrical energy

Electrical energy is always generated from another source of energy. The sources can be:

- Nonrenewable energy sources
- Renewable energy sources



Nonrenewable and Renewable Energy Sources

Nonrenewable energy source: An energy source that is _____ in a human lifetime

- Examples: _____, natural gas, uranium (nuclear reactions)

Renewable energy sources: An energy source that is available on a _____ basis

- Examples: Sunlight, _____, river flow, tides and waves, geothermal sources, biomass

Renewable and Nonrenewable Energy Sources in British Columbia

WAC Bennett Dam (Peace River)

- Generates 2730 MW(megawatt-1 million watts) of electrical energy
- Provides most _____ electrical energy
- Large-scale hydroelectric dam

Bear Mountain Wind Park (Dawson Creek)

- Generates 144 MW of electrical energy
- _____wind turbines

The Klemtu Small-scale Hydro and Solar Project

- Hydro generates 1.7 MW of energy
- Solar generates 0.023 MW of energy

- Solar project has photovoltaic cells on the top of the Kitasoo Community School
- These projects reduce the community's reliance on _____ generators

Moving Toward a Sustainable Future

Sustainable energy system: A sustainable way of perceiving, producing, and using energy

Characteristics of the system include:

- Ensuring that the extraction, production, and use of energy have _____on environmental and human health
- Less reliance on nonrenewable sources
- Ensuring the availability of renewable and reliable energy sources for _____ generations
- Providing access to _____ energy for Earth's entire population

First Peoples Ecosystem Based Management

Many characteristics of a sustainable energy system are in line with First Peoples Ecosystem Based Management (EBM):

- **_____ and Responsibility** (making decisions that respect the natural world; responsible use of resources)
- **Intergenerational Knowledge** (listening to Elders and sharing knowledge between generations)
- **Balance and _____**(balance makes sure future generations are considered; interconnectedness takes many relationships with an ecosystem into consideration)
- **Giving and Receiving** (giving thanks for natural resources recognizes their value; benefits of resources are shared in a community)

Discussion Questions

1. Explain why coal is a nonrenewable energy source and why moving water is a renewable energy source.

2. Identify the four main characteristics of **a)** a sustainable energy system and **b)** First Peoples Ecosystem based Management.