What Is This Module About?

Can you imagine yourself living in a world without electricity? Think of the things you won't be able to do without it. What are the things that will disappear along with electricity?

Without electricity, you won't be able to watch TV, use a computer, communicate using a telephone, listen to the radio or have bright lights in dark places. You wouldn't be able to do so many things you are used to doing. Electricity has been so useful and important to us that we can't go on with our daily lives without it.

In this module, you will learn how to use electricity in your home wisely. You will also learn how much electrical power your appliances consume. The safety precautions in using electrical appliances will also be discussed.

This module is divided into three lessons:

Lesson 1 — *The Use and Consumption of Electricity*

Lesson 2 — *Tips on Reducing Electric Consumption*

Lesson 3 — *Playing It Safe With Electricity*

What Will You Learn From This Module?

After studying this module, you should be able to:

- define electricity and describe its uses;
- measure and compute electric power consumption;
- describe ways of conserving electric consumption in the home; and
- practice safety measures in handling electricity and using electric appliances.

Let's See What You Already Know

Before starting with the lessons of this module, take this simple test first. This will determine what you already know about the topic.

A. Answer the following questions.

1. What are electrical conductors and insulators? Give an example of each.

   _____
   _____
   _____
   _____

2. A bedroom has an incandescent bulb, a television and an electric fan. These three appliances are turned on for nine hours. The incandescent bulb has a rating of 100 watts, the television has a rating of 70 watts and the electric fan has a rating of 120 watts. What is the total power consumption of the appliances in kilowatt-hours?

   Solution:

   Total power rating: _____

   Number of hours consumed:_____

   Total power consumed:_____

   Conversion from watt-hours to kilowatt-hours:_____

3. What factors affect electric consumption when using electric appliances?

   _____
   _____
   _____

B. Choose the best answer to the items below. Write the letter of your answer in the space provided before each number.

_____ 1. What is the first thing you should do when a plugged radio falls on a tub full of water?

   a. Get the radio out of the water.
   b. Drain the water from the tub.
   c. Unplug the radio from the electric outlet while your whole body is still wet.
   d. Turn off the electric power from the fuse box or circuit breaker.

_____ 2. What should you do if your television starts malfunctioning?

a. Try to shake and tap the appliance to see if it will work again.

b. Try to open the back panel of the television to see what is wrong with the wiring.

c. Bring the television to the repair shop.

d. Buy another television.

_____ 3. What should you do if you see a man trapped inside a car and there is a live electrical wire near the car?

a. Save the man by trying to get the live wire away from the car.

b. Tell the man to get out of his car and away from the live wire.

c. Tell the man to stay in the car and call the electric company to ask for help.

d. Save the man by helping him get out of the car.

C. Answer the questions below.

1. Give at least three examples of common practices that involve the wastage of electricity.

_____

_____

_____

2. Based on your answers above, how can you avoid wasting electricity?

_____

_____

_____

Well, how was it? Do you think you fared well? Compare your answers with those in the *Answer Key* on pages 48–49 to find out.

If all your answers are correct, very good! This shows that you already know much about the topics in this module. You may still study the module to review what you already know. Who knows, you might learn a few more new things as well.

If you got a low score, don't feel bad. This only means this module is for you. It will help you understand some important concepts that you can apply in your daily life. If you study this module carefully, you will learn the answers to all the items in the test and a lot more. Are you ready?

You may go now to the next page to begin Lesson 1.

The Use and Consumption of Electricity

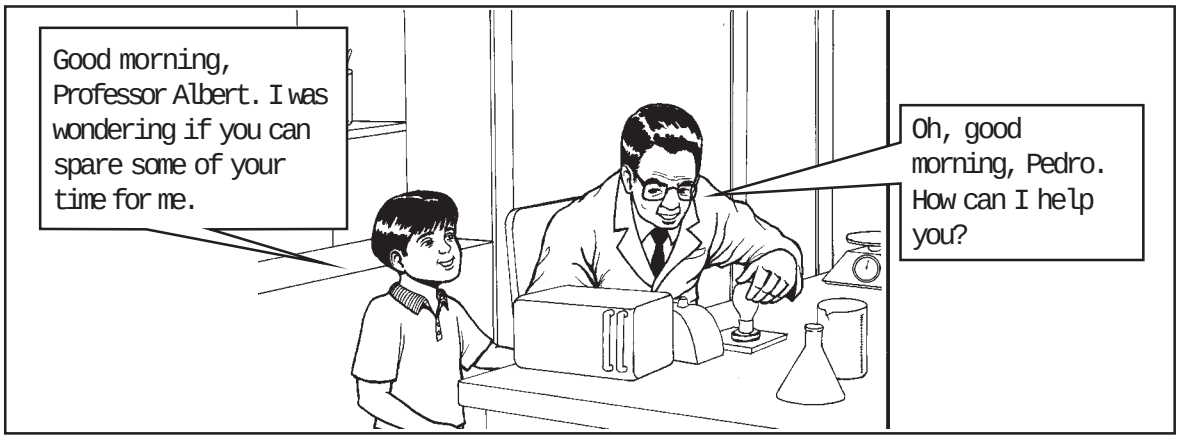
What is electricity? What is it used for? Where does the electricity we use in our homes come from? How do we know how much electricity we consume? All these questions will be answered in this lesson.

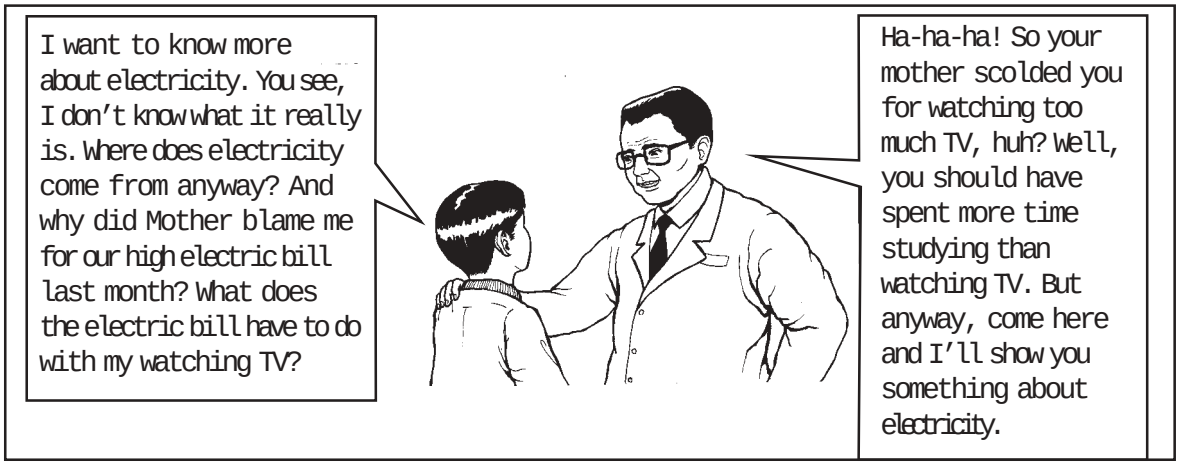
In this lesson, you will learn to appreciate the many things that electricity has brought to mankind. After studying this lesson, you should be able to:

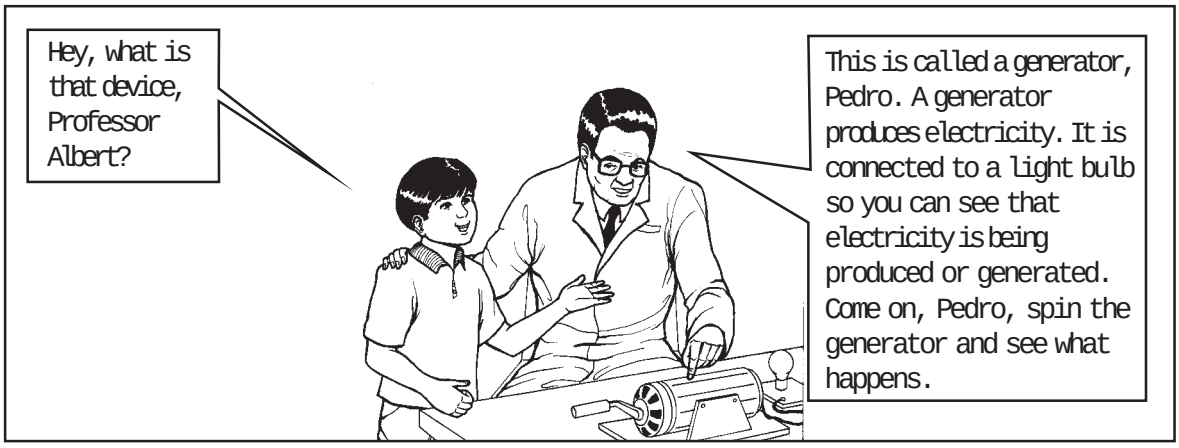
- define electricity and describe its uses;
- identify the power rating or wattage of different electrical appliances; and
- compute the electric power consumption of different appliances.

Let's Read

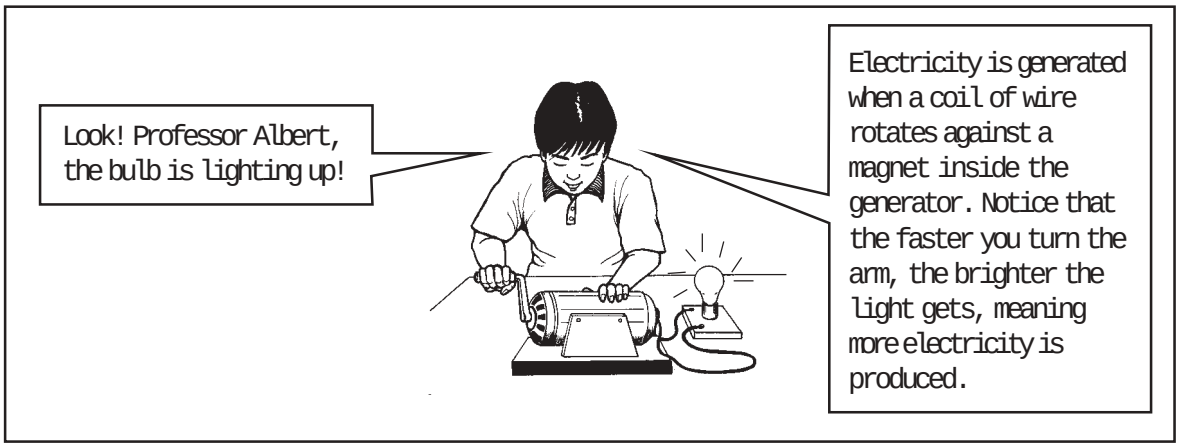
A young boy named Pedro wanted to know about electricity. So he decided to visit his science teacher, Professor Albert, in his laboratory . . . .

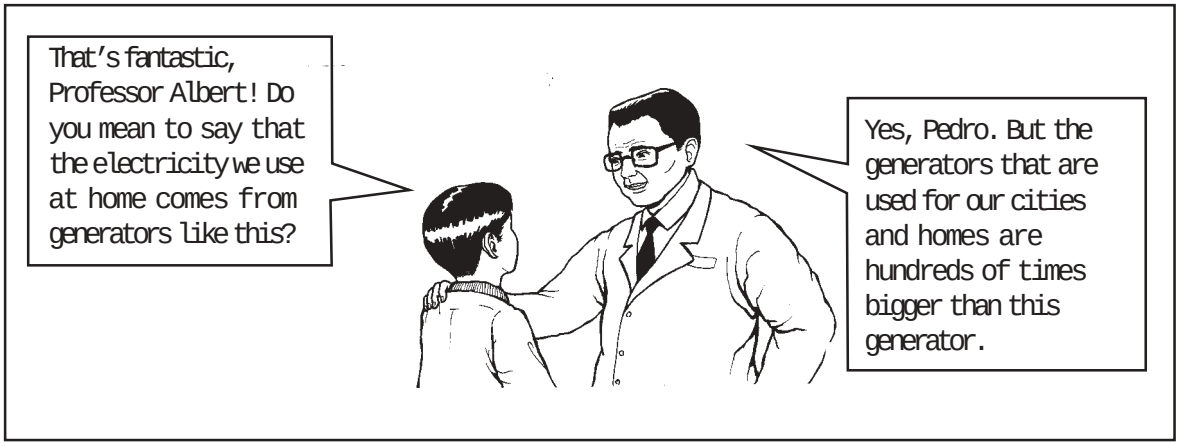


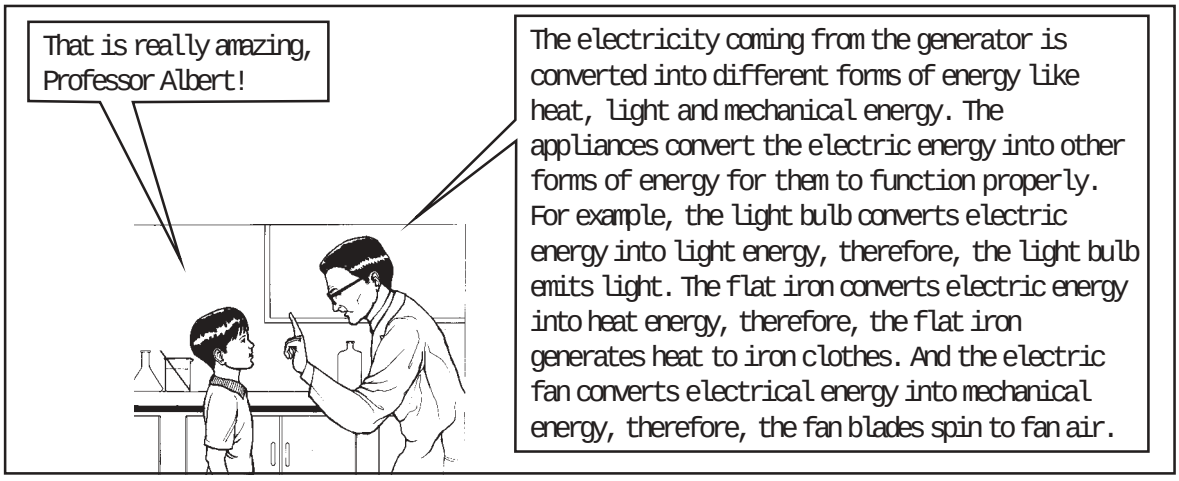




So Pedro spun the generator . . .







Let's Review

How do appliances function with the use of electricity?

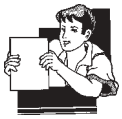
_____

_____

_____

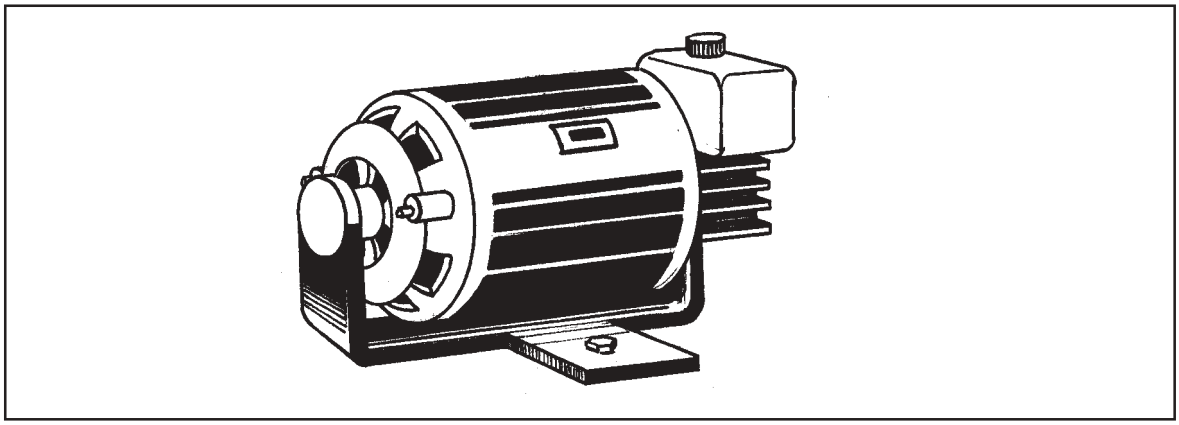
_____

Compare your answers with those in the *Answer Key* on page 49.

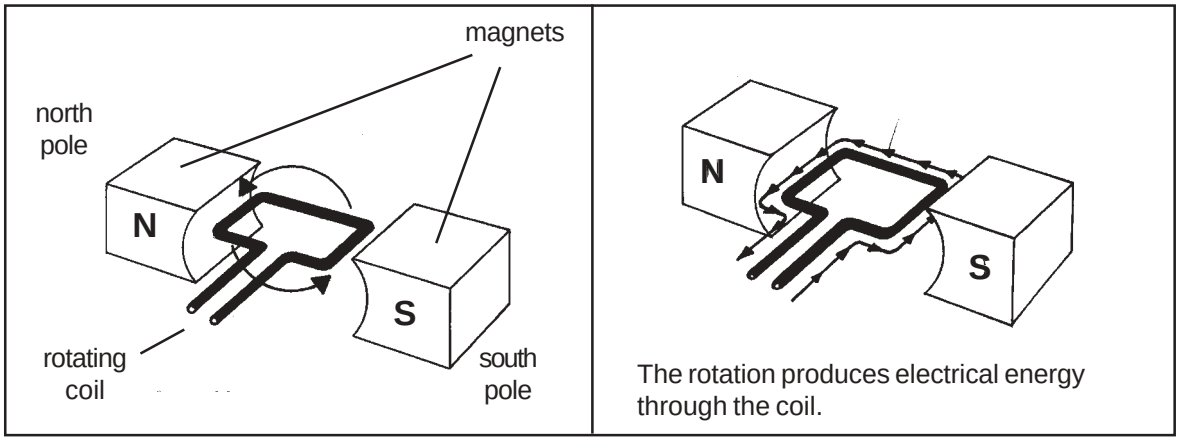


Let's Learn

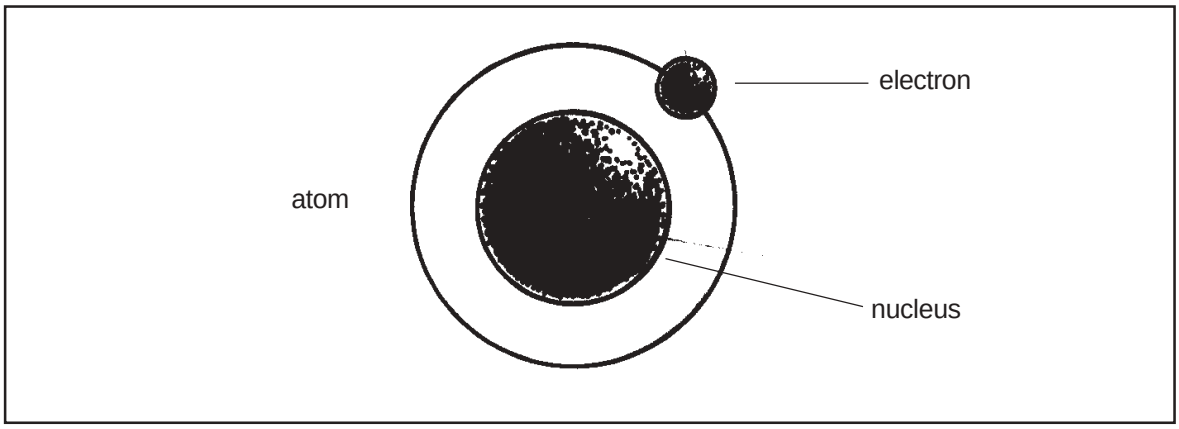
Electricity is a form of energy that has many uses. A device called an **electric generator** can produce electricity. It looks like this:



If you look inside an electric generator, you will see a coil of wire spinning against a pair of magnets.

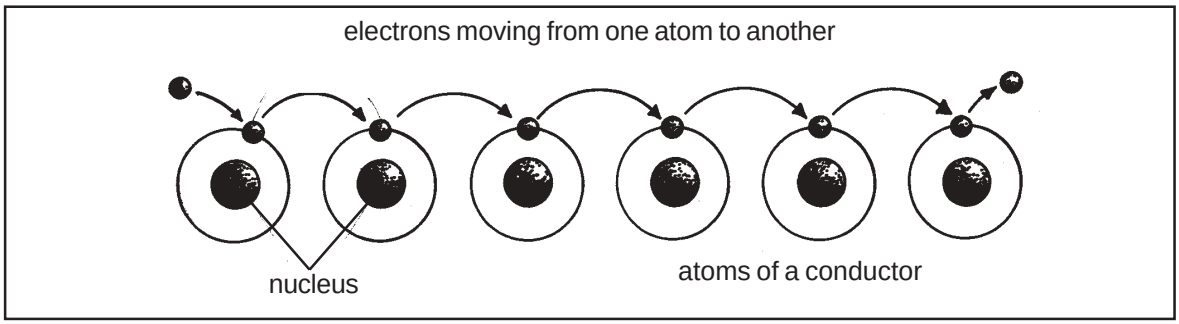


This is where the electricity that people use in their homes comes from. Electricity is produced by the movement of electrons. **Electrons** are very tiny particles found inside atoms.

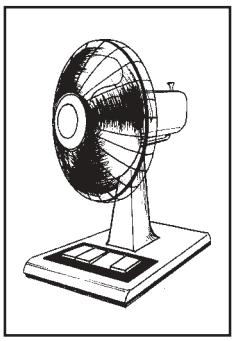


Atoms make up all things. They are very, very small. They cannot be seen by the naked eye.

When electrons jump from one atom to another, electricity is produced. This is what happens in the coil of wire inside the generator.

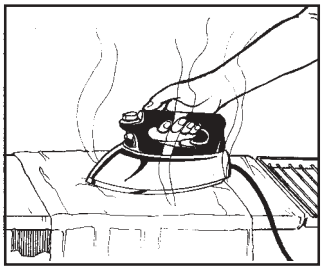


People convert electrical energy to other forms of energy according to what they need. Electrical energy can be converted into:



Mechanical Energy—energy that causes things to move. Electricity is converted to mechanical energy that can turn the fan blades of an electric fan. The fan blades then move and rotate.

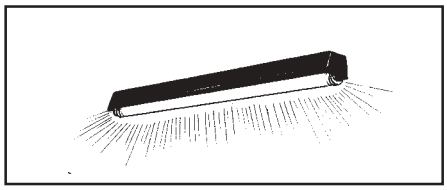
Other appliances that convert electrical energy into mechanical energy are the washing machine and blender.



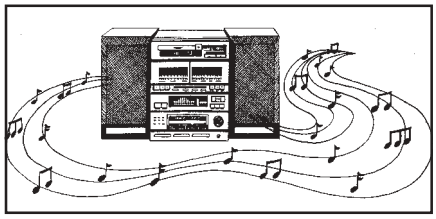
Heat Energy—energy that gives off heat. Electricity is converted to heat that can make the electric iron hot.

Other examples of appliances that convert electrical energy into heat energy are the coffeemaker, rice cooker and water heater.

Light Energy—energy that gives off light. Electricity is converted to light that can make fluorescent lamps glow.



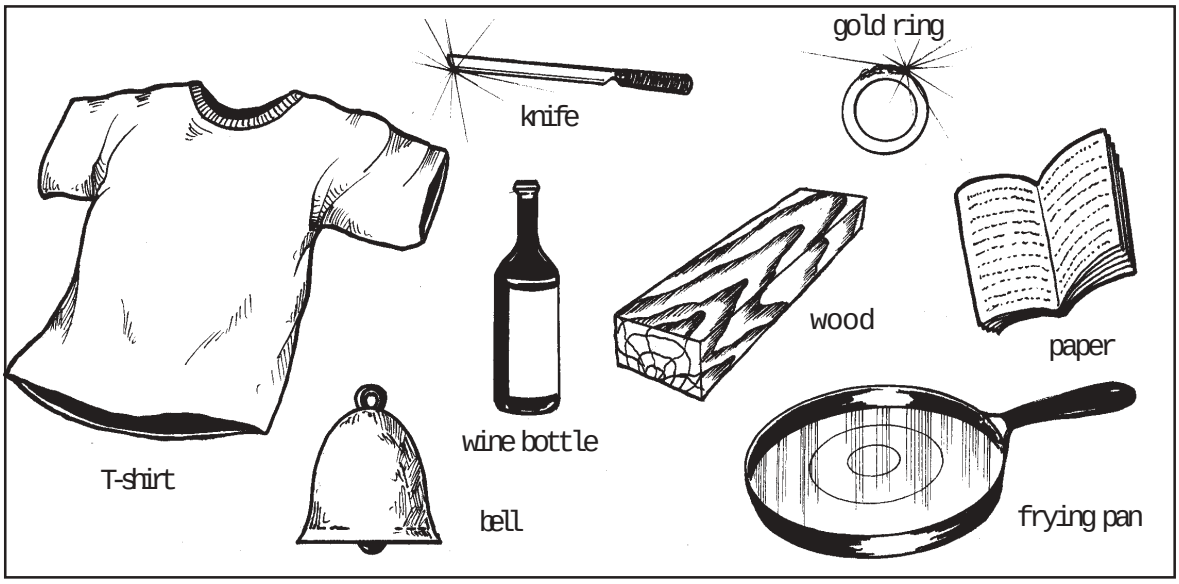
Other examples of appliances that convert electrical energy into light energy are the television and incandescent bulb.



Sound Energy—energy that emits sound. Electricity is converted to sound that can make radios and stereos produce music from their speakers.

Let's Try This

Have you heard of the words **insulators** and **conductors?** Below are pictures of some objects. Can you tell which of them are insulators and which are conductors?

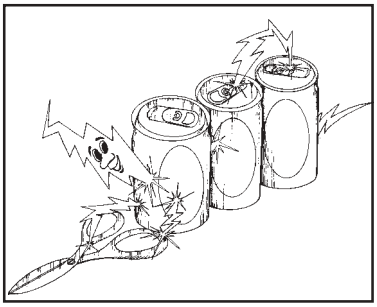


Fill up the table below with the names of objects in the picture above.

Conductors	Insulators

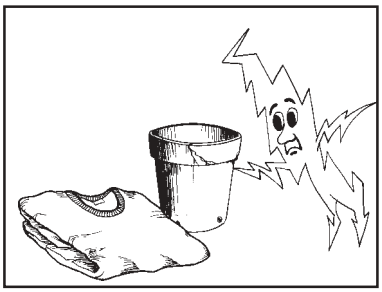
Compare your answers with those in the *Answer Key* on page 50.

Let's Learn



When studying electricity, we come across two types of materials. These are:

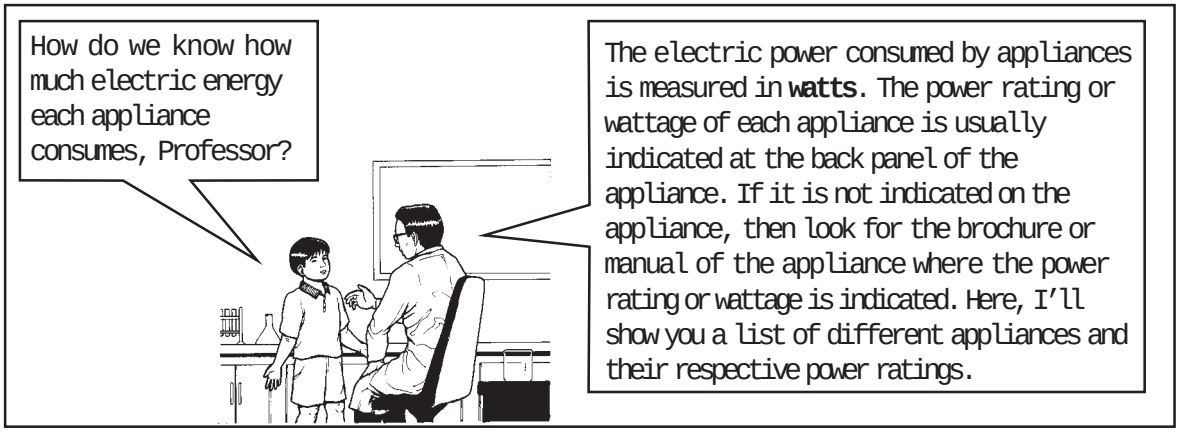
Conductors—materials that allow electricity to pass through them. Conductors are used to transmit electricity from one place to another. All metals are good conductors.



Insulators—materials that do not allow electricity to pass through them. Generally, materials that are nonmetallic are insulators. Examples of these are plastics, clothes and ceramics.

Let's Read

Let us continue the story of Pedro and Professor Albert . . ..

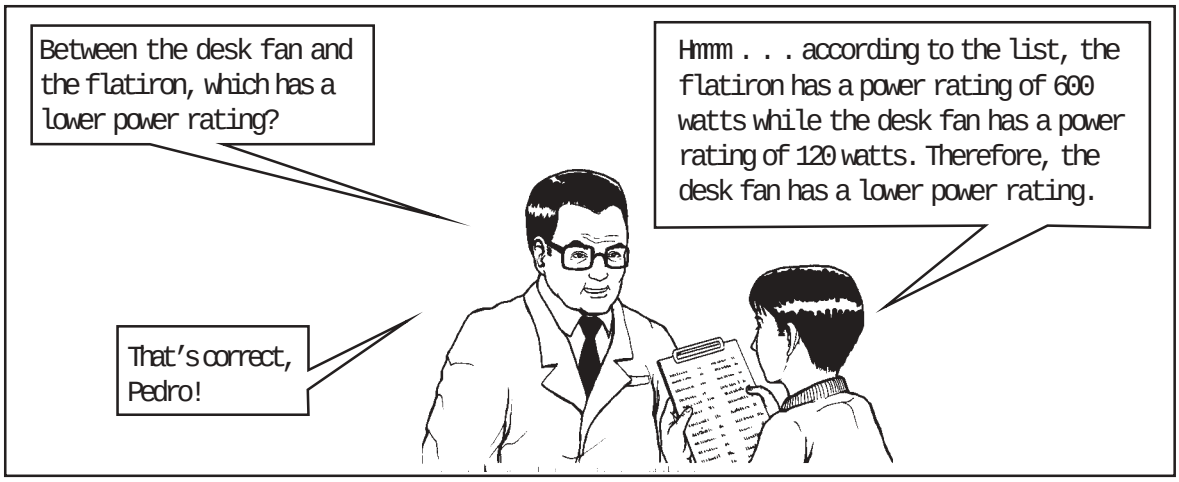


Here is the list that Professor Albert showed Pedro:

Appliances	Wattages	Appliances	Wattages
Air conditioner (1 horsepower)	1420	Box fan (16 inches)	80
Electric thermos	600	Ceiling fan (two blades)	100
Blender	300	Desk fan (18 inches)	120
Toaster (two-way)	800	Desk or wall clock	2
Dryer (clothes)	280	Family Computer	10
Coffeemaker	600	Fluorescent lamp (21 inches)	20
Computer (with monitor)	225	Fluorescent lamp (28 inches)	35
Computer printer	175	Incandescent bulb	25

Appliances	Wattages	Appliances	Wattages
Flatiron (standard)	600	Rechargeable light and fan	12
Hair dryer	320	Refrigerator (6 ft.^{3})	100
Microwave oven	800	Refrigerator (7 ft.^{3})	120
Toaster oven	1500	Refrigerator (8 ft.^{3})	30
Range (two burners)	3300	Sewing machine	75
Range (four burners)	8200	Mini component system	145
Refrigerator (11 ft.^{3})	170	Tape recorder	50
Rice cooker (1 liter)	450	Television (black and white, 14")	36
Component system	380	Television (black and white, 12")	32
Stereo	160	Television (color, 12")	65
Stove (six-inch coil hot plate)	1500	Television (color, 14")	80
Stove (eight-inch coil hot plate)	2200	VHS	45
Turbo broiler	1000	Videotape player	18
Vacuum cleaner	750	Videotape recorder	30
Washing machine (automatic)	585	Videotape rewinder	30
Washing machine (nonautomatic)	280	Water pump (½ horsepower)	373
Water heater (instant portable)	1600		
Water heater	3000		

Source: Meralco

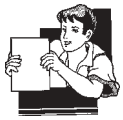


Let's Review

Below is a list of appliances. Using the list on pages 9–10, determine the wattage or power rating of each of the following appliances. Write your answers in the spaces provided.

		Wattage
1.	Television (color, 12 inches)	_____
2.	Hair dryer	_____
3.	Refrigerator (11 $ft.^3$)	_____
4.	Flatiron (standard)	_____
5.	Desk fan (18 inches)	_____
6.	Computer (with monitor)	_____
7.	Washing machine (automatic)	_____

Compare your answers with those in the *Answer Key* on page 50.



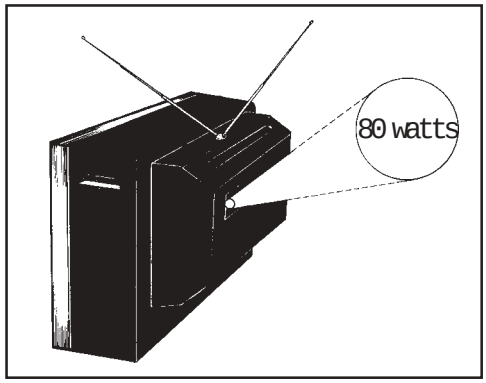
Let's Learn

The power rating of an electric appliance is measured in watts (W) or kilowatts (kw).

1000 watts = 1 kilowatt

Electric power consumption is measured by the power rating of the appliance and the amount of time the appliance was used. It is usually measured in watt-hour (wh) or in kilowatt-hour (kwh).

Example 1



A 14-inch color TV has a power rating of 80 watts. What would be its power consumption if the TV was used for five hours?

Solution:

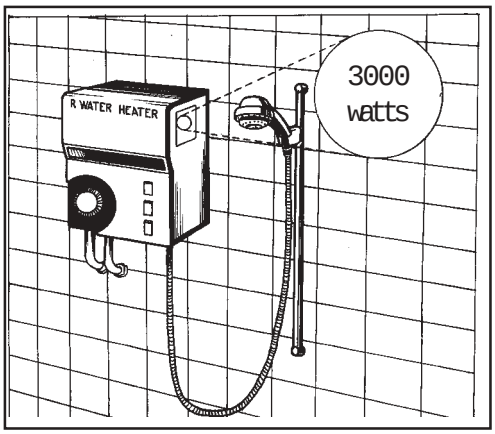
Power rating: 80 watts

Number of hours used: 5 hours

Electric consumption: 80 watts × 5 hours = 400 watt-hours

Example 2

A water heater has a power rating of 3000 watts. What would be its power consumption if the water heater was used for three hours?



Solution:

Power rating:	3000 watts or 3 kilowatts
Number of hours used:	3 hours
Electric consumption:	3000 watts × 3 hours = 9000 watt-hours

Often, we wish to express electric consumption in kilowatt-hours. To do this, we use the conversion factor 1000 watts = 1 kilowatt. In our example, to compute for its equivalent in kilowatt-hours, multiply it by the conversion factor as in:

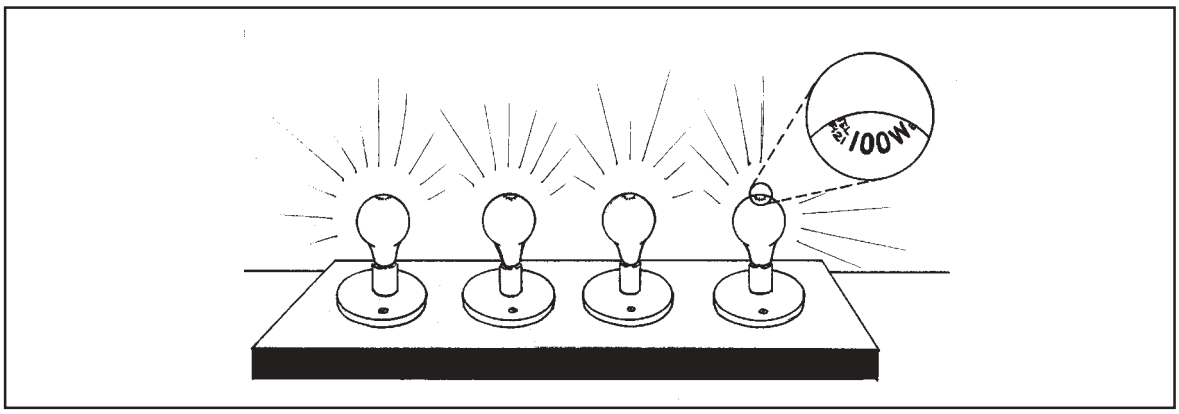
$$9000 \text{ watt-hours} \times \frac{1 \text{ kilowatt}}{1000 \text{ watts}} = 9 \text{ kilowatt-hours}$$

We got this through the process of division as in:

$$\begin{array}{r} 9\text{wh} \\ 1000\overline{)\,9000} \\ -\,9000 \\ \hline \text{x} \end{array}$$

Example 3

Four incandescent bulbs, each with a power rating of 100 W, were used for a duration of 12 hours. What is the total power consumption of the four incandescent bulbs in kilowatt-hours?



Solution:

Power rating of four incandescent bulbs:	100 watts × 4 = 400 watts
Number of hours used:	12 hours
Total power consumption:	400 watts × 12 hours = 4,800 watt-hours

To convert watt-hours to kilowatt-hours, multiply the given by the conversion factor as in:

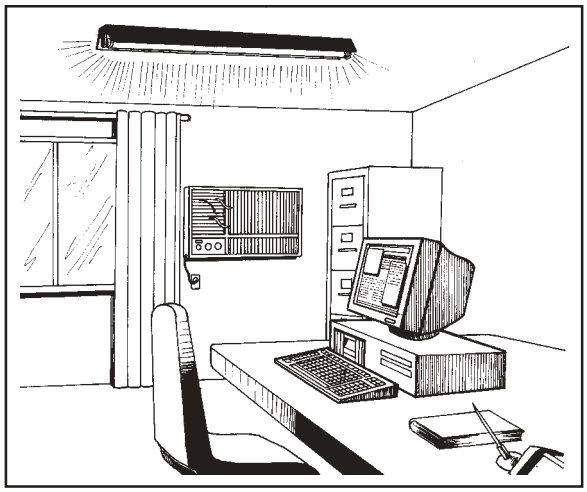
$$4{,}800 \text{ watt - hours} \times \frac{1 \text{ kilowatt}}{1000 \text{ watts}} = 4.8 \text{ kilowatt - hours}$$

$$\begin{array}{r} 4.8 \text{ kwh} \\ 1000\overline{)\,4800.0} \\ -\,4000 \\ \hline 8000 \\ -\,8000 \\ \hline x \end{array}$$

***Note*:** If you are having difficulty understanding long division with decimals, ask help from your older brother or sister or from your Instructional Manager or Facilitator.

Example 4

A small office is run for eight hours. In the office, there is an air-conditioning unit (1400 watts), a computer (220 watts) and a light bulb (100 watts). What would be the power consumption of the office for an eight-hour duration?



Solution:

Total power rating: 1400 W + 220 W + 100 W = 1720 W

Number of hours used: 8 hours

Total power consumption: 1720 W × 8 hours = 13760 watt-hours

Converting watt-hours to kilowatt-hours, we will get:

$$13760\ \cancel{\text{watt-hours}} \times \frac{1\ \text{kilowatt}}{1000\ \cancel{\text{watts}}} = 13.76\ \text{kilowatt-hours}$$

$$\begin{array}{r} 13.76\text{kwh} \\ 1000\overline{)\,13760.0} \\ -\ 1000 \\ \hline 3760 \\ -3000 \\ \hline 7600 \\ -\ 7000 \\ \hline 6000 \\ -\ 6000 \\ \hline x \end{array}$$

These are the things to remember about power consumption:

- Power consumption increases when you use an appliance for a longer period of time.
- Power consumption increases when you use an appliance more often.
- Power consumption is high when the power rating of the appliance used is high.

Let's Solve This Problem

In a kitchen, four appliances are being used for a period of six hours. These are an incandescent bulb (100 W), a radio (20 W), a refrigerator (120 W) and an electric fan (80 W). Solve for the total power consumption in kilowatt-hours.

Solution:

Total power rating: _____

Number of hours used: _____

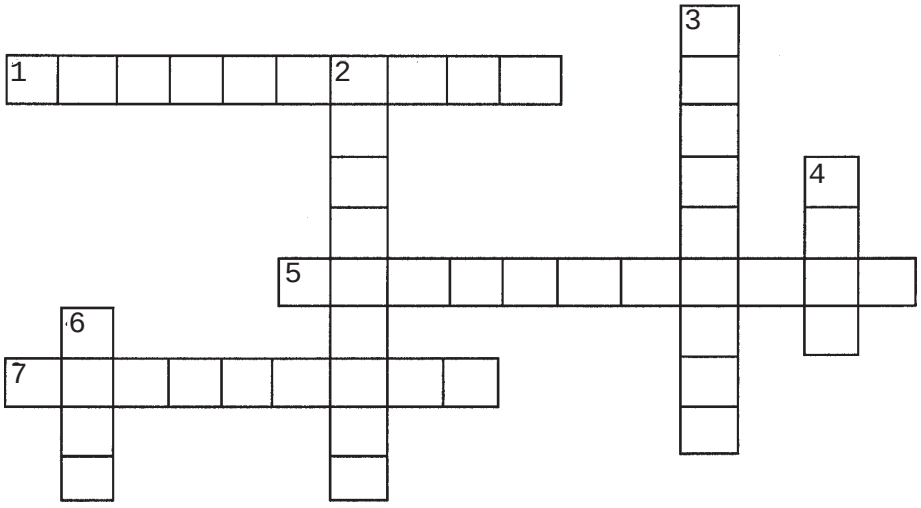
Total power consumed: _____

Conversion from watt-hours to kilowatt-hours: _____

Compare your answer with that in the *Answer Key* on page 50.

Let's See What You Have Learned

A. Solve the crossword puzzle below.



Across

1. The electric fan converts electrical energy into this form of energy.
5. A phenomenon involving the movement of very tiny particles called electrons
7. A device that produces electricity

Down

2. Material that doed not allow electricity to pass through it
3. Material that allows electricity to pass through it
4. Unit of measure for electrical power rating
6. The oven converts electrical energy into this form of energy

B. Solve the math problems below.

1. A computer (250 W) is used for five hours. What is the total power consumption in kilowatt-hours? (5 points)

   Solution:

   Total power rating: _____ (1 pt.)

   Number of hours used: _____ (1 pt.)

   Total power consumption: _____ (1 pt.)

   Conversion from watt-hours to kilowatt-hours:

   _____ (2ts.)

2. In an office, there are four appliances operating for a period of three hours. The appliances are two fluorescent lamps (60 W each), an air conditioner (1420 W), and a computer (250 W). What is the total power consumption in kilowatt-hours? (5 points)

   Solution:

   Total power rating: _____ (1 pt.)

   Number of hours used: _____ (1 pt.)

   Total power consumption: _____ (1 pt.)

   Conversion from watt-hours to kilowatt-hours:

   _____ (2ts.)

So, how did you find the test? Were the computations difficult to do? Don't worry, you can still develop your mathematical skills through practice. Now, compare your answers with those in the *Answer Key* on page 51. If your score is:

15 – 17 Excellent! You have understood this lesson very well. You may now study the next one.

11 – 14 Good! Review the items which you did not get correctly.

6 – 10 Review the topics which you did not understand.

0 – 5 You should study this lesson again.

Let's Remember

- Electricity is a form of energy. Appliances convert electrical energy to other forms of energy useful to people.
- The watt and kilowatt are units of measure used for the power rating of appliances.
- The watt-hour and the kilowatt-hour are units of measure used for the power consumption of appliances.
- Electric consumption is high when the appliance used has a high power rating.
- Electric consumption increases when you use an appliance for a longer period of time.
- Electric consumption increases when you use an appliance more often.

Tips on Reducing Electric Consumption

Do you think you paid too much for your electric bill last month? Were there times when you were surprised that you were changed too much for your electric bill was too high? What can you do about this? We will answer these questions in this lesson.

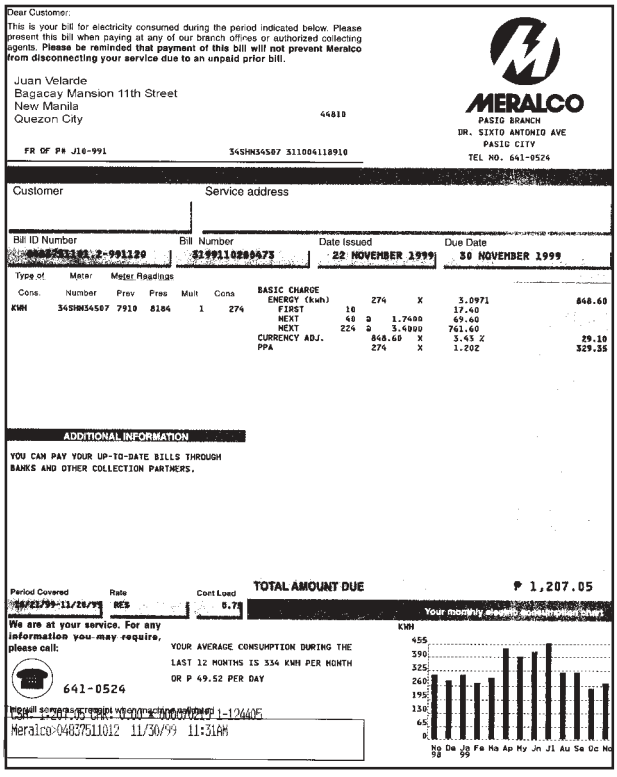
We have learned about electric consumption in the first lesson. In this lesson, we will use this knowledge to find ways to cut down on our electric power consumption.

After studying this lesson, you should be able to:

- describe how to avoid wasteful practices regarding electric power consumption;
- apply energy-saving tips in the use of common electric appliances; and
- compute wasted electric power from the misuse of appliances.

Let's Try This

Look for your two most recent electric bills. They may look something like this:



Dear Customer:
This is your bill for electricity consumed during the period indicated below. Please present this bill when paying at any of our branch offices or authorized collecting agents. **Please be reminded that payment of this bill will not prevent Meralco from disconnecting your service due to an unpaid prior bill.**

Juan Velarde
Bagacay Mansion 11th Street
New Manila
Quezon City

44810

FR OF P# J10-991 34SHN34507 311004118910

MERALCO
PASIG BRANCH
DR. SIXTO ANTONIO AVE
PASIG CITY
TEL NO. 641-0524

Customer | Service address

Bill ID Number	Bill Number	Date Issued	Due Date
[illegible]-991120	3199110288475	22 NOVEMBER 1999	30 NOVEMBER 1999

Type of Meter Reading

Cons.	Number	Prev	Pres	Mult	Cons
KWH	34SHN34507	7910	8184	1	274

BASIC CHARGE					
ENERGY (kwh)			274	X	3.0971	848.60
FIRST	10	@	1.7400		17.40	
NEXT	40	@	1.7400		69.60	
NEXT	224	@	3.4000		761.60	
CURRENCY ADJ.			848.60	X	3.45 X	29.10
PPA			274	X	1.20Z	329.35

ADDITIONAL INFORMATION

YOU CAN PAY YOUR UP-TO-DATE BILLS THROUGH BANKS AND OTHER COLLECTION PARTNERS.

Period Covered	Rate	Cont Load	TOTAL AMOUNT DUE	₱ 1,207.05
[illegible] 11/28/99	RE5	0.78		

Your monthly [illegible]

We are at your service. For any information you may require, please call:
641-0524

YOUR AVERAGE CONSUMPTION DURING THE LAST 12 MONTHS IS 334 KWH PER MONTH OR P 49.52 PER DAY

KWH
455
390
325
260
195
130
65
0
No De Ja Fe Ma Ap My Jn Jl Au Se Oc No
98 99

[illegible] 1-124405
Meralco>04837511012 11/30/99 11:31AM

Label the older bill as Bill # 1 and the more recent bill as Bill # 2. Fill the following tables according to the information given on the bill.

Bill # 1	
Electric power consumed (kwh)	
Total amount due	

Bill # 2	
Electric power Consumed (kwh)	
Total amount due	

Compare the information in the two tables. Which bill has a higher electric power consumption?

_____

_____

Why do you think there are times when the charges for the electric bill are high and times when they are low?

_____

_____

To know if your answers are right, just read on.

Let's Study and Analyze

When Aling Rosa received her electric bill for the month of June, her total electric power consumption was 200 kilowatt-hours. If the electric power company charges ₱3.15 per kilowatt-hour, how much was Aling Rosa's electric bill?

Solution:

Power consumption for the month: 200 kilowatt-hours

Charge per kilowatt-hour: ₱3.15/kilowatt-hour

Amount of electric bill:

$$200 \cancel{\text{kilowatt - hours}} \times \frac{₱3.15}{\cancel{\text{kilowatt - hours}}} = ₱630.00$$

After one month, Aling Rosa received her electric bill for the month of July. Her total electric power consumption was 271 kilowatt-hours. She was surprised with the cost of her electric bill. How much was Aling Rosa's electric bill for the month of July if the electric company charges a flat rate of ₱3.15 per kilowatt-hour?

Solution:

Power consumption for the month: 271 kilowatt-hours

Charge per kilowatt-hour: ₱3.15/kilowatt-hour

Amount of electric bill:

$$353 \cancel{\text{kilowatt - hours}} \times \frac{₱3.15}{\cancel{\text{kilowatt - hour}}} = ₱853.65$$

Aling Rosa computed how much more she paid for the month of July than for the month of June and she got:

Difference in payment: ₱853.65 – ₱630 = ₱223.65

Aling Rosa's monthly bill increased by ₱223.65. She wondered why her electric bill increased so much. Then she remembered the times when her husband started to watch television to put himself to sleep. Her husband usually fell asleep without turning the television off until he woke up in the morning.

She also remembered that their electric fans were often left turned on even if there was nobody in the room or even when the weather was cool. Aling Rosa also noticed that her daughter started studying with the light turned on in her room. There were also times when she forgot to turn off the flatiron in her hurry.

She immediately understood why her electric bill increased.

Let's Solve This Problem

Let us help Aling Rosa compute for the added monthly power consumption due to the use of the television (0.08 kw), light bulb (0. kw), flatiron (1.5 kw) and electric fan (0.12 kw). The television was used for 250 hours, the light bulb for 180 hours, the flatiron for 15 hours and the electric fan for 200 hours for the month of July.

Solution:

Power consumption for television: 0.08 kW × 250 hours = 20 kilowatt-hours

1. Power consumption for light bulb: _____
2. Power consumption for flatiron: _____
3. Power consumption for electric fan: _____
4. Total added power consumption: _____
5. Amount to be paid for added power consumption:

   ₱3.15/kwh × total added power consumption

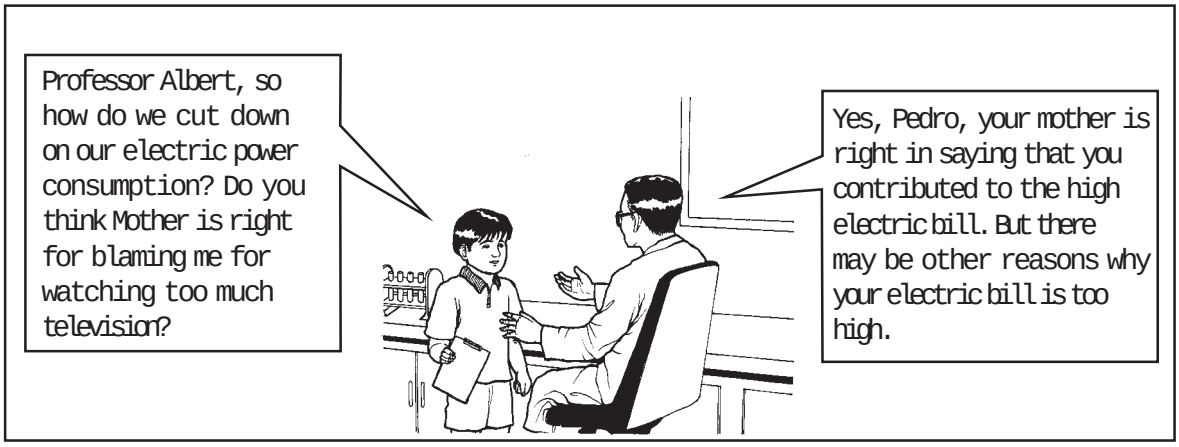
   _____
6. What do you think Aling Rosa and her family should do about their situation? How can they cut down on their electric power consumption?

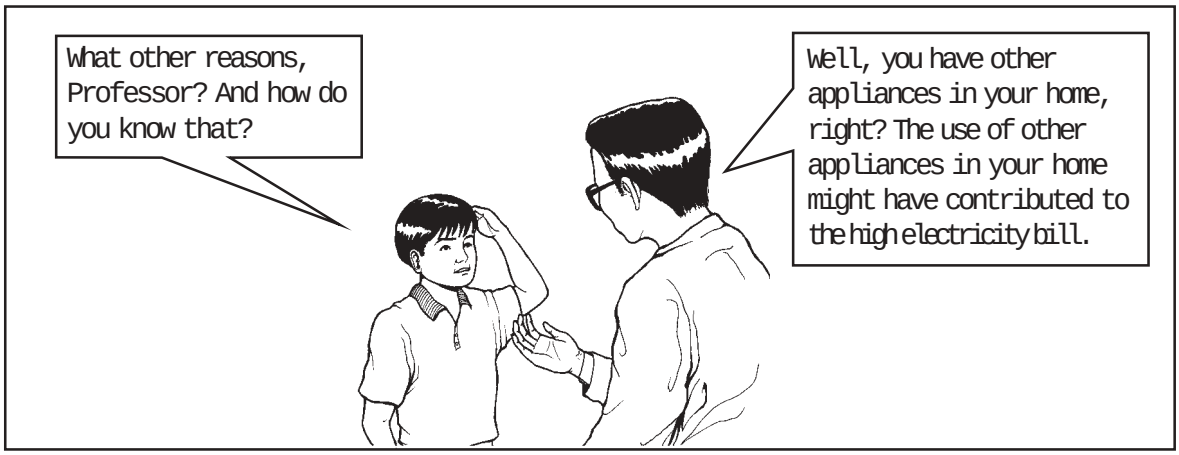
   _____
   _____
   _____
   _____

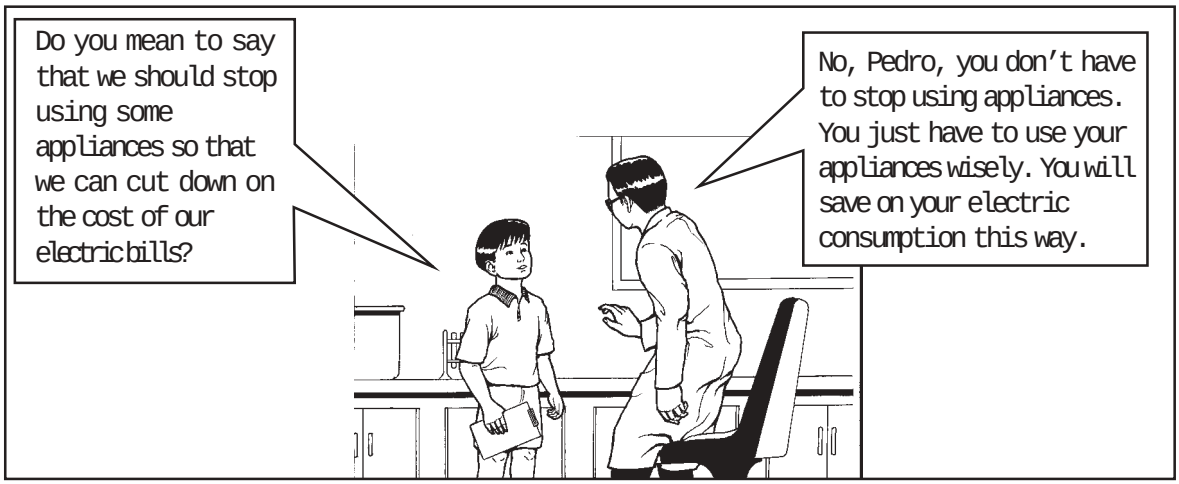
Compare your answers with those in the *Answer Key* on page 52.

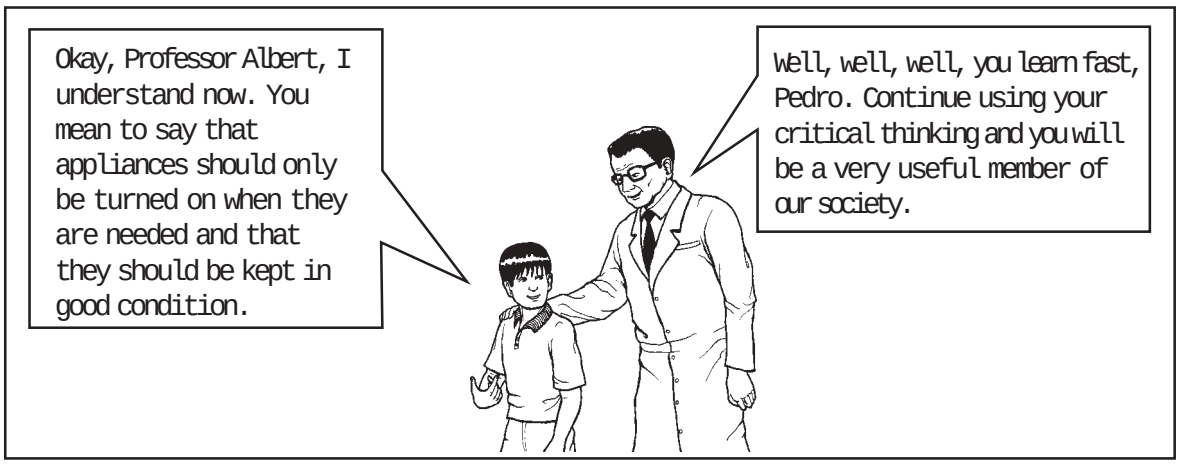
Let's Read

Let us continue with the story of Pedro and his teacher, Professor Albert . . ..




What other reasons, Professor? And how do you know that?
Well, you have other appliances in your home, right? The use of other appliances in your home might have contributed to the high electricity bill.


Do you mean to say that we should stop using some appliances so that we can cut down on the cost of our electric bills?
No, Pedro, you don't have to stop using appliances. You just have to use your appliances wisely. You will save on your electric consumption this way.

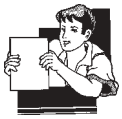

Okay, Professor Albert, I understand now. You mean to say that appliances should only be turned on when they are needed and that they should be kept in good condition.
Well, well, well, you learn fast, Pedro. Continue using your critical thinking and you will be a very useful member of our society.

Let's Review

What can you do at home to cut down on your electric power consumption?

_____
_____
_____
_____
_____

Compare your answer with the one in the *Answer Key* on page 52.



Let's Learn

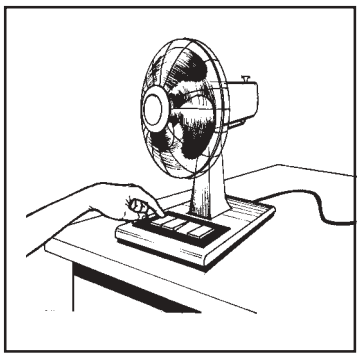
Electric appliances should be used wisely to save on electric consumption. From Lesson 1, we should remember these things:

- Electric consumption increases as you use your appliances longer.
- Electric consumption increases as you use your appliances more often.
- Electric consumption is high when the wattage or power rating of an appliance you use is high.

There are three general rules to follow to cut down on electric consumption when you use electric appliances:

Rule # 1. Turn off your electric appliances when they are not in use.

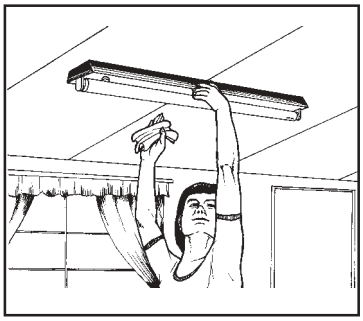
When you do not turn the lights out in a room that is not being used or if you leave an electric fan turned on even if nobody is in the room, you are wasting electricity. You are paying for electricity that you do not even use. It will be a big help for your household if you turn off all appliances that are not in use. Turn off all appliances after you use them.



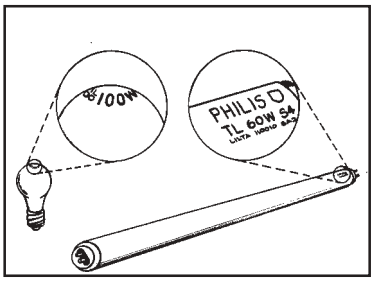
Rule # 2. Keep your electric appliances in good working condition.

Most appliances need cleaning and maintenance according to the instructions in their manuals or brochure.

Make sure you maintain your appliances in good working condition so they can function efficiently. This can help you save on electric consumption.



Rule # 3. Choose the electric appliances that you buy wisely.

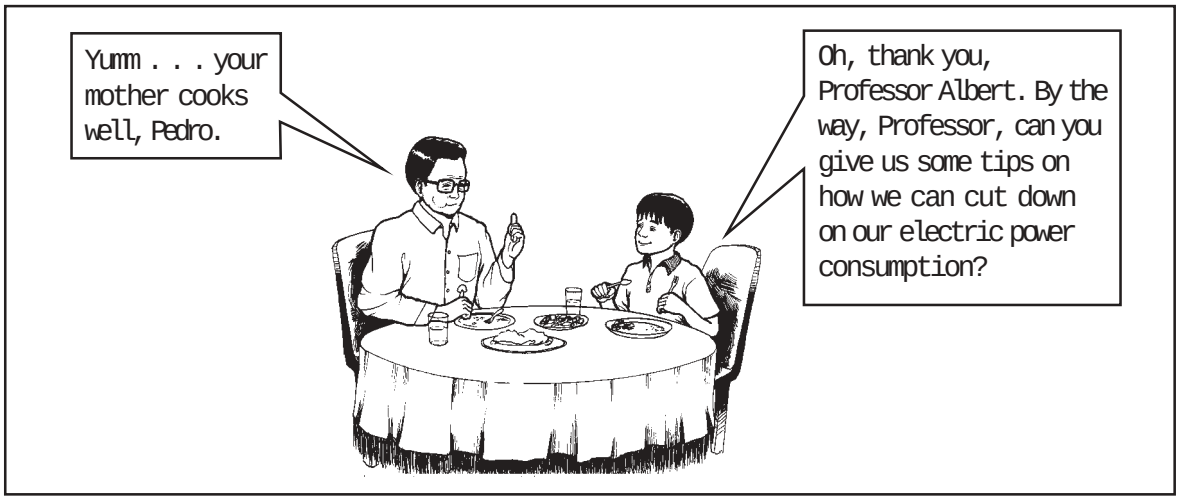


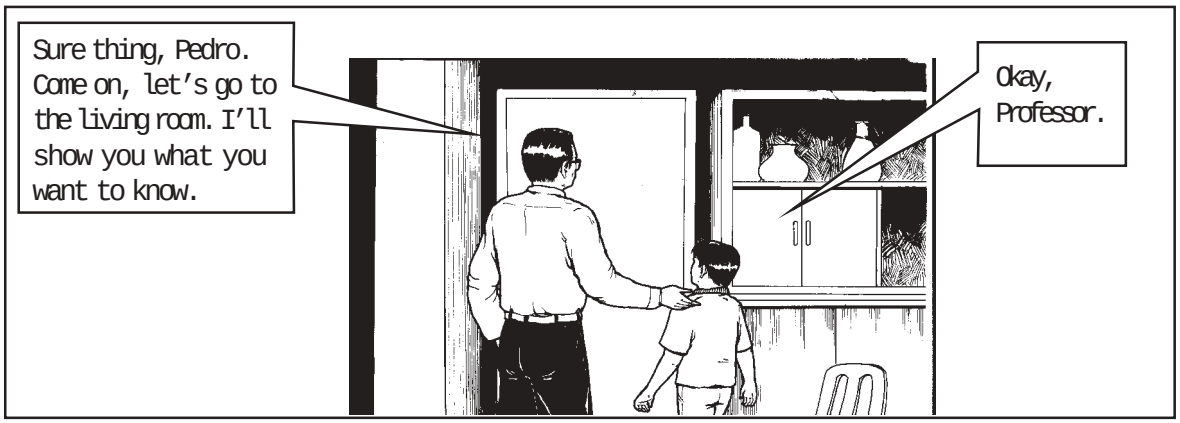
You should inspect the power rating of each appliance you plan to buy. Generally, you should buy brands or types that have lower power ratings than others.

An example is choosing fluorescent lamps over incandescent bulbs. Fluorescent lamps give brighter light than incandescent bulbs even though they have the same power rating. Also, consider buying alternatives to electric appliances to save on electric consumption. You may consider buying a gas range rather than an electric range. Using gas is much cheaper than using electricity when cooking.

Let's Read

Let us continue with the story of Pedro and his teacher, Professor Albert. Pedro invited his teacher over for lunch at his home . . ..

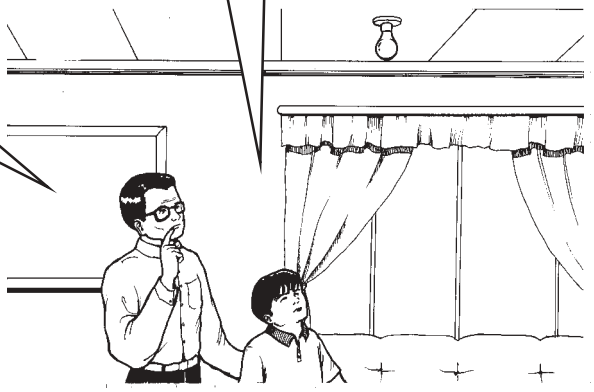




They went to the living room and Professor Albert looked around . . ..

Hmmm . . . I can see your family uses incandescent bulbs for lighting. You can instead use fluorescent lamps because they give off brighter light at the same power rating. You can replace your 100-watt incandescent bulb with a fluorescent lamp with a rating of 80-watt or lower and still have bright light.

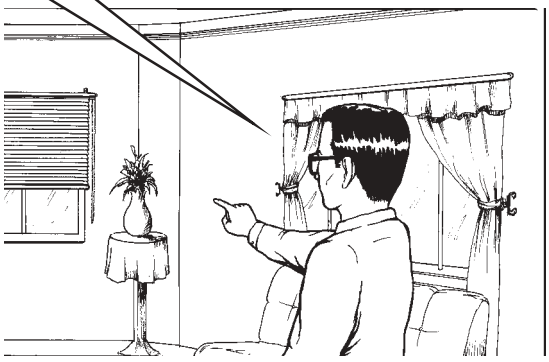
I'll tell my father about that, Professor Albert.

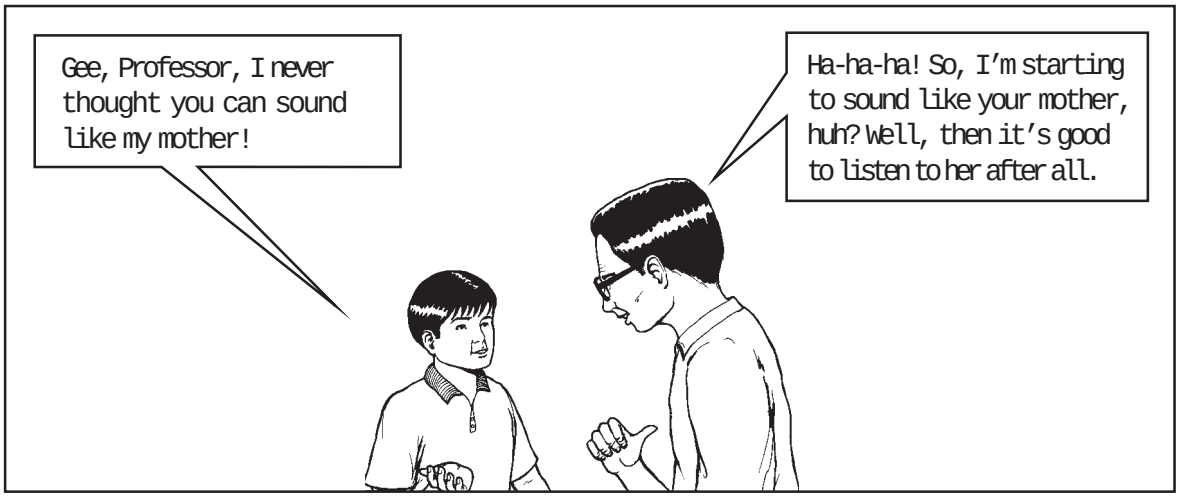


I also noticed that the dust is gathering on your light bulbs. This reduces the amount of light radiating in the room. You will then have a tendency to use more lights to brighten the room. I suggest that you clean your light bulbs and lamps regularly. You should also remove dust from the light fixtures because dust particles are insulators that prevent the proper flow of electricity in your light bulb.

I'm embarrased that you found out we're not cleaning our lights, Professor Albert. So, what else can you suggest about lighting?

You can also paint the walls inside the house a lighter shade. Light colors reflect more light and make rooms look brighter. You will therefore need less light to brighten the room. Also, open the window blinds and curtains to let the sunlight in the room during the day. This way, you won't need to open the lights during the day.





Let's Review

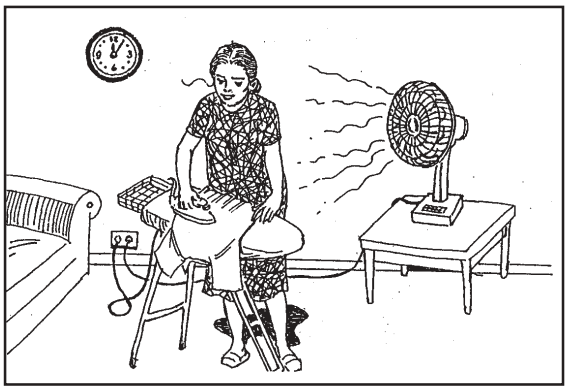
How can you cut down on your electric consumption?

_____
_____
_____
_____

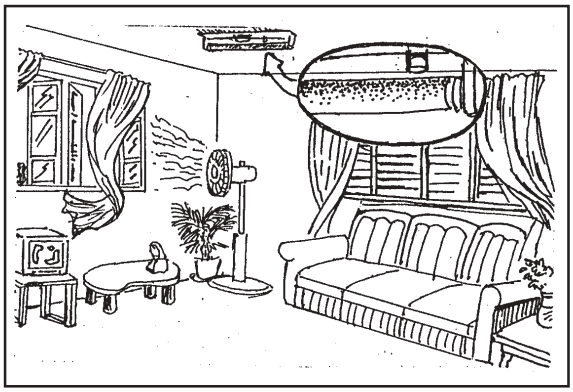
Compare your answer with the one in the *Answer Key* on pages 52–53.

Let's Read

Discuss how electricity is wasted as shown in the two pictures. Discuss how electricity can be conserved in the two situations too.

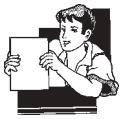


1. _____
_____
_____
_____
_____
_____



2. _____
_____
_____
_____
_____
_____

Finished? See if your answers are right by reading the next section.



Let's Learn

Other Tips on Conserving Electricity

Tips on Ironing

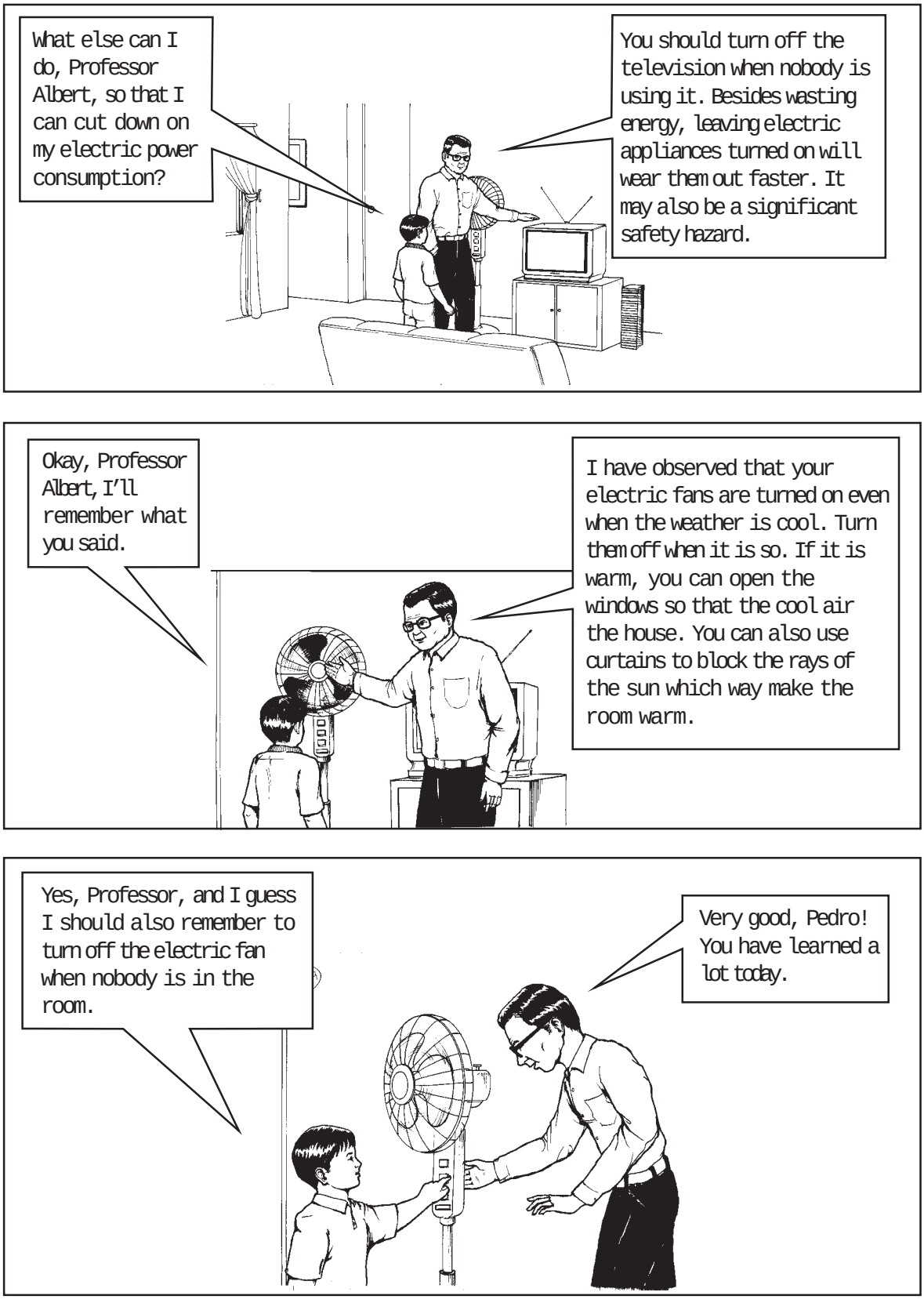
- Schedule the ironing of clothes; do not iron clothes one or a few pieces at a time.
- Unplug the flatiron when you are already about to finish ironing. The remaining heat of the flatiron can still be used for the unpressed clothes.
- Iron clothes in the morning when it is cooler. This way, you won't need an electric fan while working.
- Sprinkle only enough water when ironing clothes. Do not get the clothes too wet because higher ironing temperatures are needed to iron wet clothes.

Tips on Using Washing Machines

- Most clothes need a 10- to 15-minute wash cycle to get cleaned. Do not wash clothes longer than this.
- Try washing clothes in the washing machine in full-load capacity so that you'll have fewer batches of clothes to wash.
- Clean the lint filter regularly for more efficient washing.
- Do not spin dry your clothes too long. This can damage your clothes aside from consuming more electricity.

Let's Read

Let us go back to the story of Pedro and his teacher, Professor Albert.



Let's Review

Listed below are some common electric appliances used at home or in the office. Describe how each appliance should be used in order to cut down on your electric consumption.

a. televisions and computers

_____
_____
_____

b. air conditioners/electric fans

_____
_____
_____

Compare your answers with those in the *Answer Key* on page 53.

Let's See What You Have Learned

At last, you have finally come to the final part of the lesson. Did you understand our discussions well? Take the test below to determine how much you have learned from the topics we discussed.

1. List down at least two energy-saving tips involving the use of the following electric appliances:

   a. Refrigerator (2 points)

   _____
   _____

   b. Flatiron (2 points)

   _____
   _____

   c. Washing machine (2 points)

   _____
   _____

   d. Electric fan (2 points)

   _____
   _____

   e. Light bulbs and flourescentlamps (2 points)

   _____
   _____

2. The electric company charges ₱3.50 per kilowatt-hour consumed. Mang Badong works as a clerk in an office. He is usually the last one out of their office. Mang Badong often forgets to put out the four flourescent lamps (0.06 kw each), the air-conditioning unit, (1.4 kw) and sometimes the stereo (0.3 kw). Mang Badong left the four flourescent lamps turned on for 200 hours, the air-conditioning unit for 150 hours and the stereo for 100 hours within the period of one month. How much will this cost the office? (5 points)

   Solution:

   Electric power consumed by the television: _____ (1 pnt.)

   Electric power consumed by the air conditioning unit: _____ (1 pnt.)

   Electric power consumed by the stereo: _____ (1 pnt.)

   Total electric power consumed: _____ (1 pnt.)

   Cost of the electric power consumed: _____ (1 pnt.)

That wasn't so difficult, was it? Now, compare your answers with those in the *Answer Key* on pages 53–54. If your test score is:

13 – 15 Excellent! You have understood the lesson well. You may now go on to the next one.

10 – 12 Good! Study only the items you missed.

5 – 9 Review the parts of the lesson which you did not understand.

0 – 4 You should study this lesson again.

Now you know how you can save electricity. Turn the page for the next lesson.

Let's Remember

- Turn off electric appliances that are not in use.
- Keep your electric appliances in good working condition. Electric consumption will be minimized if your electric appliances are working efficiently.
- Choose the electric appliances that you buy wisely.

Playing It Safe With Electricity

Electricity is a powerful form of energy. It makes our lives easier and more comfortable with the use of appliances that help us do our chores effectively and efficiently. Appliances help us do our daily chores like washing clothes, baking cakes or cleaning the house more easily.

But using electricity comes with risks that you need to know about. Using electricity carelessly can hurt or even kill you. That is why it is important to know how to deal with electricity to make sure your home and family are safe.

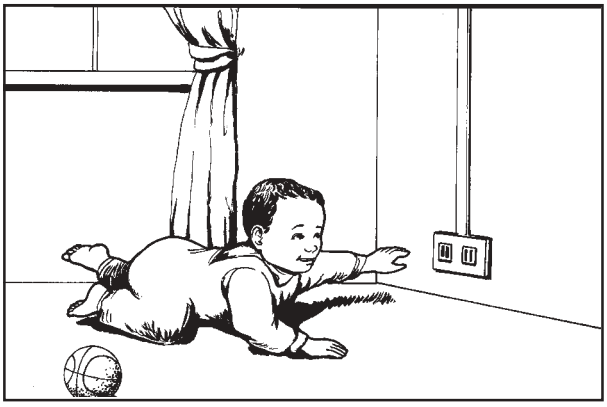
In this lesson, you will learn safety measures involving the use of electricity and electric appliances. You will also learn how to avoid electrical accidents and what to do when they occur. After studying this lesson, you should be able to:

- apply safety measures involving the use of electricity and electric appliances;
- know how to avoid electrical accidents; and
- explain what to do when electrical accidents occur.

Let's Study and Analyze

Look at the following pictures. Answer the questions based on what you see in them.

1.

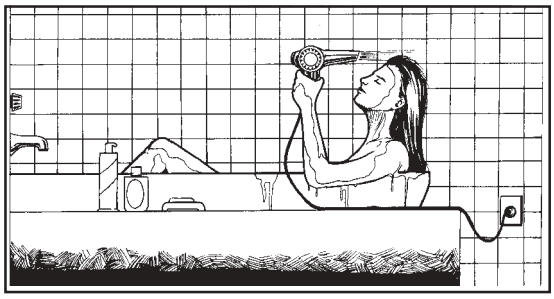


What do you think the parents of the baby in th picture should do?

_____

_____

2.

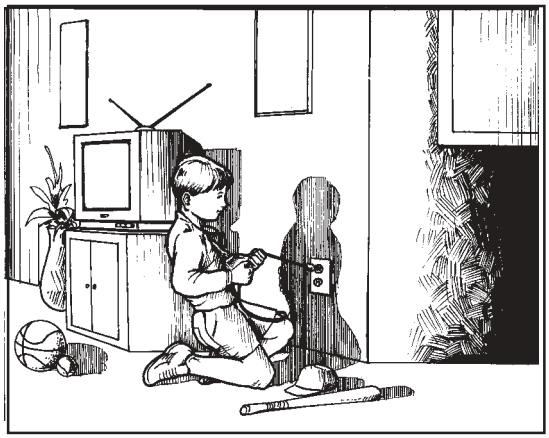


What should the girl do to avoid an electrical accident?

_____

_____

3.

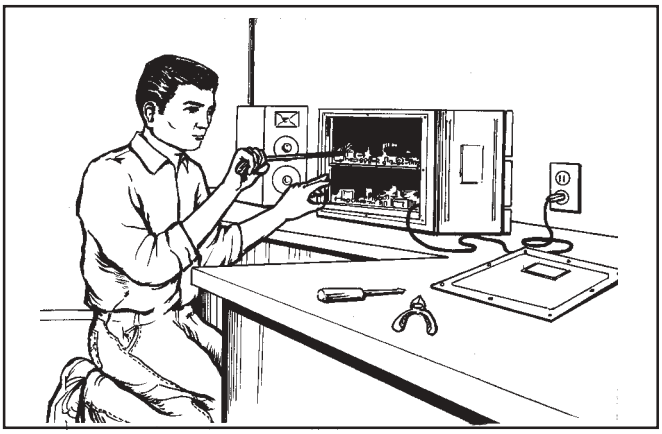


What should the boy do to avoid an electrical accident?

_____

_____

4.

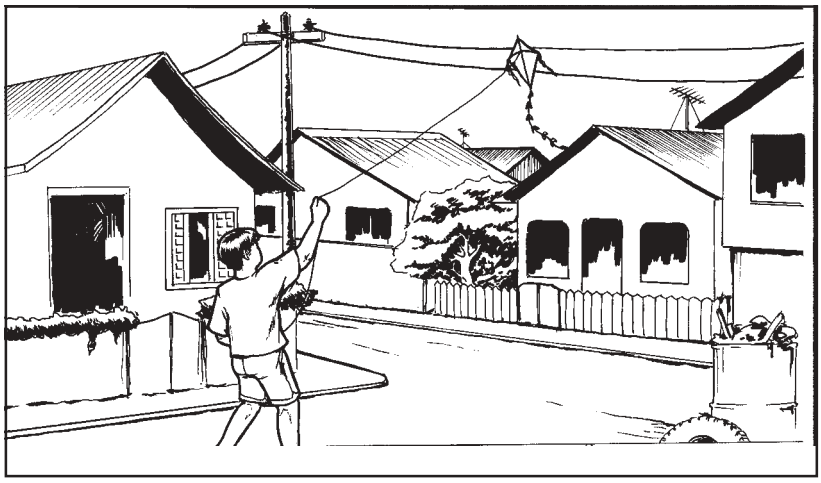


What should the man do to avoid an electrical accident?

_____

_____

5



What should the boy do to avoid an accident?

_____

_____

Each of the persons in the pictures are in danger of being electrocuted because they are not practicing safety measures when handling electric appliances.

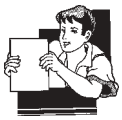
In the first picture, a baby is left unattended while he is near an electric socket. The baby is in danger of being electrocuted.

In the second picture, a person is drying her hair. If the hair dryer falls into the tub of water, she will get electrocuted.

In the third picture, a boy is pulling the cord of a television. The wires in the plug might get pulled apart, resulting in a short circuit and causing an electric explosion. This may electrocute the boy or cause fire.

In the fourth picture, a man is trying to fix a broken stereo set while it is still plugged in. He might get electrocuted because he is not wearing gloves to protect himself from electrocution. He should first unplug the appliance before trying to fix it too. He should not try to fix it if he is not trained to repair electric appliances in the first place.

In the fifth picture, a boy is flying a kite near electric wires outside the house. If the string of the kite gets entangled with the high-voltage electrical wires, the boy might get electrocuted.



Let's Learn

Before we discuss safety measures in handling electric appliances, you need to review what conductors and insulators are. Knowing about them can help you avoid electrical accidents. As you have learned in the first lesson:

1. Electric conductors are materials that let electricity flow through them. These include water and all metallic objects such as spoons, knives, blades, iron bars and copper wires.

   As a rule, you should avoid handling conductors near electric appliances.

2. Electrical insulators are materials that do not let electricity flow through them. These include materials made of plastic, rubber, dry wood, paper, glass and dry cloth.

   As a rule, insulators protect you from electrical accidents because they prevent electricity from reaching your body.

3. Knowing how to differentiate electrical conductors from insulators is very important. Safety measures concerning electricity rely much on differentiating conductors and insulators.

Electrical Accidents

These are the things that might occur during electrical accidents:

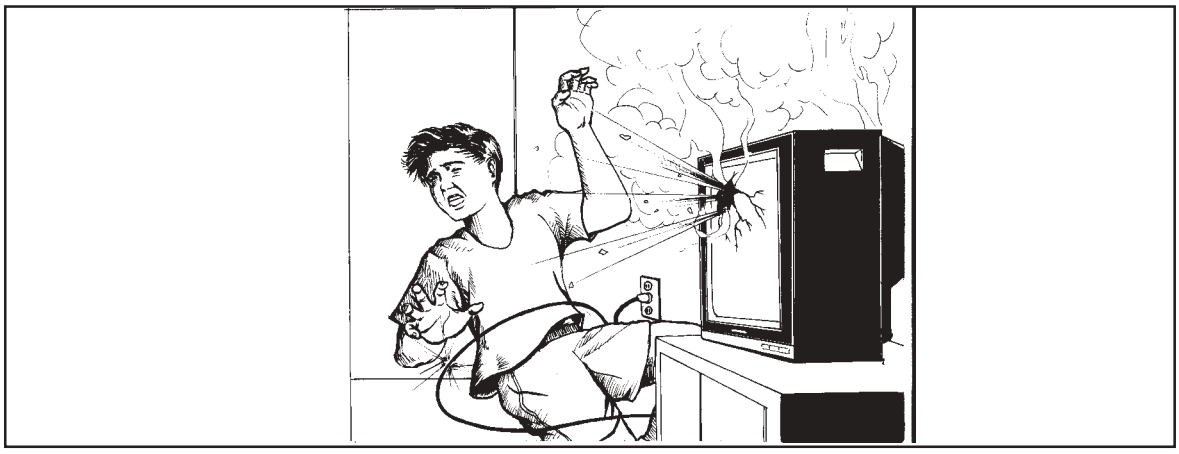
Electrocution

People or animals get electrocuted when they come in direct contact with electricity. People who get electrocuted experience pain in the area of electrocution and they get burned

During electrocution, the muscles in the body may become paralyzed. This is why, in some cases, people can't move their bodies while being electrocuted. Electricity can change the normal functioning of the heart, brain and other organs in the body. In severe cases, electrocution can result in death.

Short Circuits and Electrical Fires

When the two coupled electric wires are made to touch each other, a short circuit happens and this causes an electric explosion. The electric explosion may injure a person or cause a fire. A short circuit may damage the appliance.

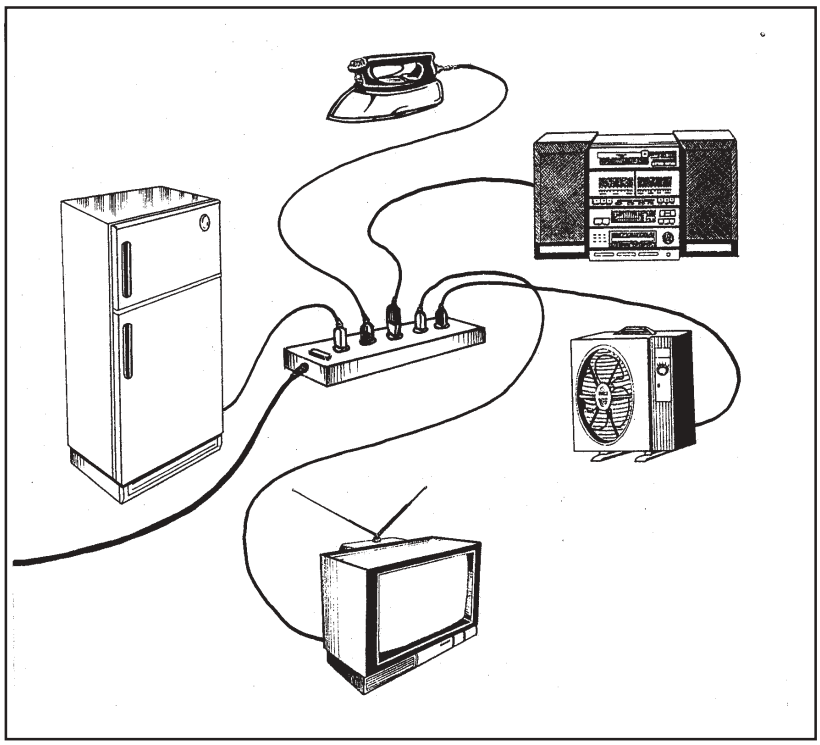


Explosion or Combustion of Appliances

Appliances may have either of two voltage ratings: 110 volts or 220 volts. Appliances with a rating of 110 volts should only be plugged in a 110-volt electrical outlet. Appliances with a rating of 220 volts should only be plugged in a 220-volt electrical outlet.

Appliances with 110-volt rating that are plugged into 220-volt outlets will become overloaded and explode. This can damage the appliance or wors.

When too many appliances are plugged into one outlet, the outlet power line may become overloaded too. This will result in the overheating of the power line which may then burst into flames. Don't plug too many appliances into one outlet.

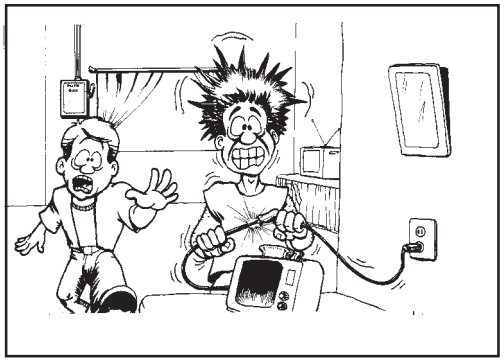


Plugging in too many appliances into one outlet is dangerous.

Let's Read

What should you do when someone is electrocuted?

Look at the picture below.



If you are near a person being electrocuted, what should you do?

_____

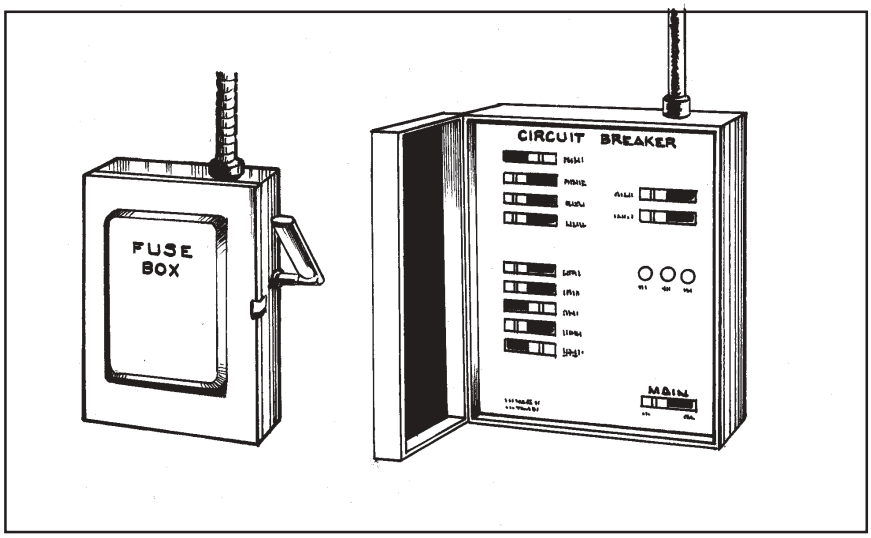
_____

_____

_____

Let's Learn

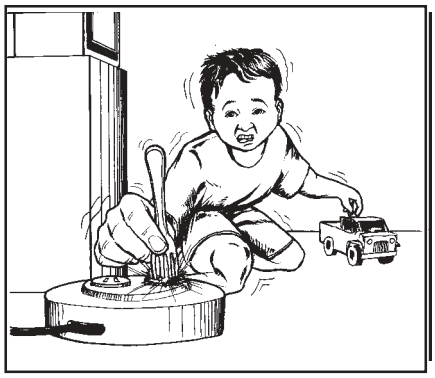
When the victim is electrically shocked, do not touch or try to remove the person away from the electrical source with your bare hands. You could get electrocuted yourself! Unplug the appliance from the socket or if this is not possible, turn off the electricity in your house from the fuse box or circuit breaker. Everyone in your house should know where the fuse box or circuit breaker is and how it can be turned off.



Bring the victim to the hospital for treatment. Even if the person doesn't look hurt, make sure he or she sees a doctor. There may be electric burns inside the victim's body. An electric shock can also damage someone's heart without him or her feeling it right away.

Let's Review

A child gets electrocuted when he or she plays with an electric socket using a fork. He or she will not be able to move then. What should you do if you are there?



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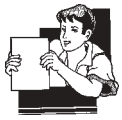
Compare your answer with the one in the *Answer Key* on page 55.

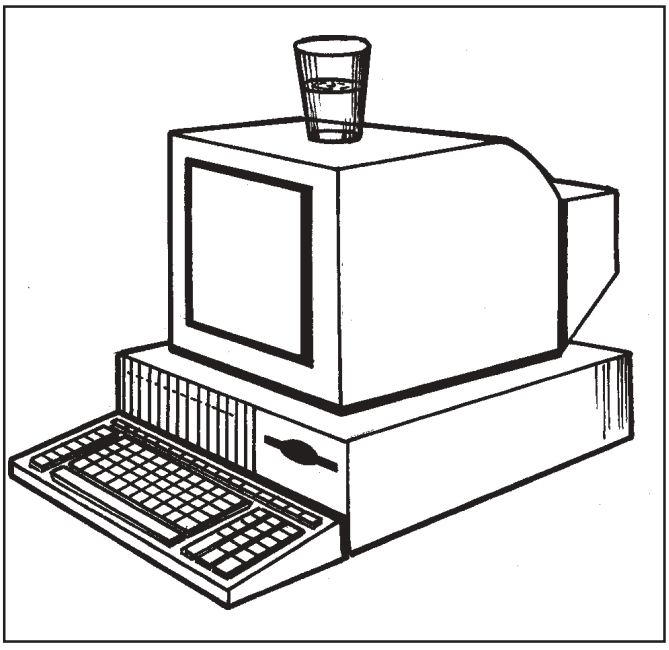


Let's Learn

Below are seven general rules to follow to avoid electrical accidents:

1. **Keep electrical conductors away from eelectrical appliances.**

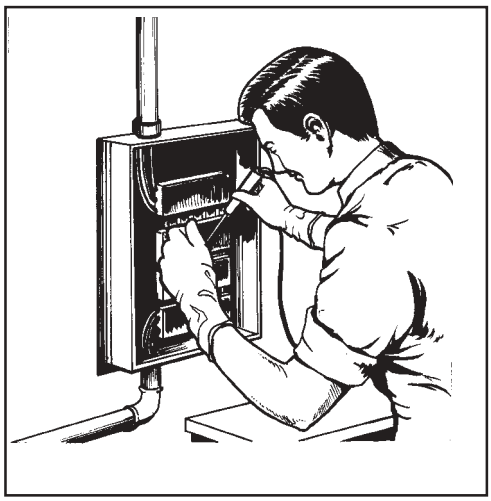
   - Water is the most common conductor that can cause electrical accidents. Keep water away from electric appliances.



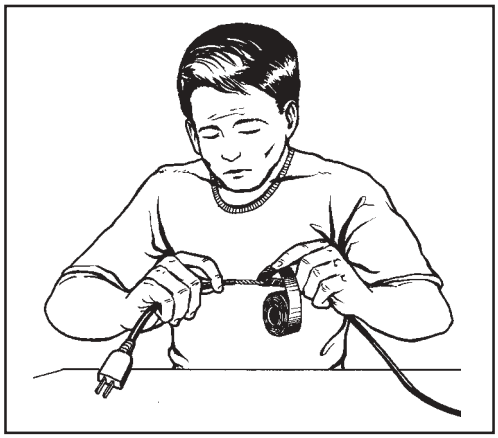
- Do not poke the insides of electric appliances with metallic objects. A short circuit can occur which could cause an explosion or electrocute the person using the appliance.

2. **Use electrical insulators to protect yourself from electrocution .**

- When fixing an electrical appliance or replacing faulty wiring, always wear protective gloves to insulate your hands from electricity.



- Cover exposed electrical wirings with electric tape to avoid electric shock or short circuits.

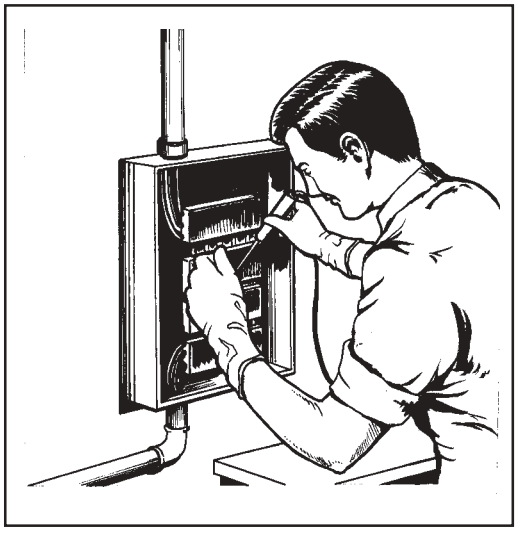


3. **Unplug electrical appliances after using them.**

   - Some appliances can have faulty electrical wirings and may short-circuit even while they are not in use or turned off. It is best to just unplug the appliance after using it.
   - When there is a baby around, put safety caps on the electrical outlets when the appliances are unplugged.

4. **Do not attempt to fix broken electric appliances if you are not properly trained.**

   - Bring your broken electric appliance to a service center or to a qualified technician. It is dangerous to try to fix broken electric appliances even when they are unplugged. Appliances such as the television store electrical energy inside. This electrical energy can kill a person!



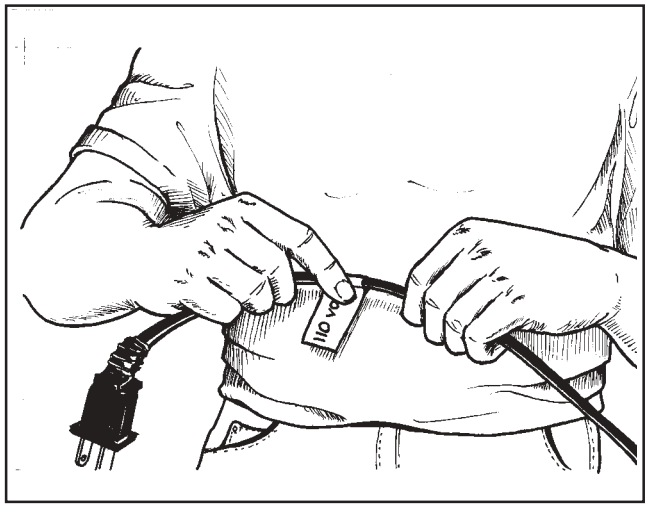
   - If you are trained to fix appliances, always wear protective gloves while fixing an appliance.

5. **Use electric appliances properly.**

   - Use the appliance according to its instruction manual.
   - Read all instructions and warnings and follow them.

6. **Determine the voltage rating of the appliance.**

- Before plugging in an appliance, check if the voltage rating is 220 volts or 110 volts.
- Indicate the voltage rating of every appliance cord. This will help prevent electric explosions and accidents from occuring.



7. **Know the telephone numbers of the proper authorities to call in case of electrical accidents and other emergencies.**

- List the emergency phone numbers and place them near your telephone.
- Teach your kids to dial these numbers in case of an emergency.

Here are some emergency telephone numbers to call in Metro Manila:

a. Association of Volunteer Fire Chiefs and Firefighters of the Philippines, Inc. 2416836

b. Association of Philippine Volunteer Fire Brigades, Inc. 2444141, 2444545, 2445151

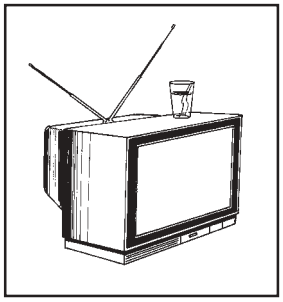
c. Meralco 6311111

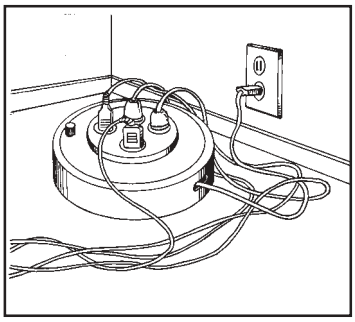
Remember that these numbers cover the Metro Manila area only. For those in the provinces, ask your barangay officials what agencies to contact in case of electrical accidents.

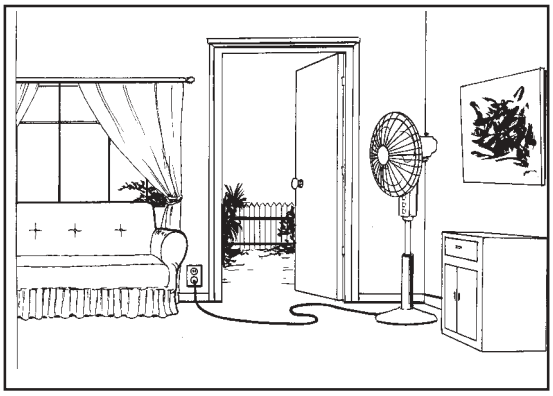
Let's See What You Have Learned

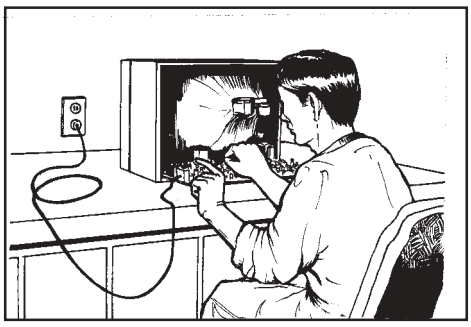
Finally, we have come to the last part of the lesson. We will now see how much you have understood from our discussions. Answer the following test questions. Good luck!

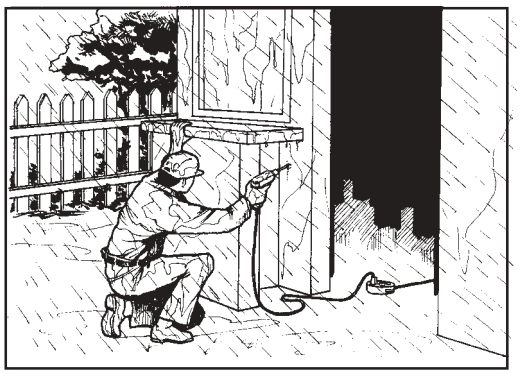
Tell what is wrong with the following pictures and suggest what should be done to correct the problem. Write your answers in the spaces provided. (2 pts. each)

1. 

2. 

3. 

4. 

5. 

_____

_____

_____

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_____

That wasn't so hard, was it? Now let's check how well you performed in the test. Compare your answers with those in the *Answer Key* on page 55. If your test score is:

8–10 Excellent! You have understood the lesson well.

4–7 Review the parts of the lesson which you did not understand.

0–3 You should study this lesson again.

Let's Remember

- Know the safety precautions to avoid electrical accidents.
- Know what to do in case somebody gets electrocuted.
- Know the contact numbers of agencies that can help in cases of electrical accidents.

Let's Sum Up

- Electricity is a very useful form of energy used to operate appliances to make life easier and more comfortable.
- Electric consumption is usually measured in watt-hours or kilowatt-hours.
- The electric consumption of appliances increases as the following increase: time of use, frequency of use and power rating of appliance.
- Turn off your electric appliances when they are not in use.
- Know the safety precautions to avoid electrical accidents.

What Have You Learned?

Congratulations for making it this far! You have reached the last part of the module. All you need to do is take one last test. This will determine how much you understood from the module. Do your best. Good luck!

A. In a living room, there is an electric fan (120 W), a stereo (380 W), a television set (80 W) and a VHS player (45 W). If all these appliances are turned on for 12 hours, what will be the total power consumption in kilowatt-hours? How much will the power consumption cost if the electric company charges ₱3.00 for each kilowatt-hour? (5 points)

Solution:

Total power rating: _____ (1 point)

Number of hours used: _____ (1 point)

Total power consumption: _____ (1 point)

Conversion from watt-hours to kilowatt-hours: _____ (1 point)

Cost of power consumption: _____ (1 point)

B. Answer the questions below.

1. What is electricity? (1 point)

   _____
   _____

2. How does electricity make appliances work? (1 point)

   _____
   _____

3. What are the three general rules on conserving electricity when using appliances? (1 point)

   _____
   _____
   _____

C. Choose the best answer to each of the following items. Write the letter of the correct answer in the space provided before each number.

____ 1. What is the first thing you should do when you see a person get electrocuted and become paralyzed from a faulty appliance?

   a. Grab his arm and move him away from the faulty appliance.
   b. Push him away from the faulty appliance using a metal rod.
   c. Call the paramedics for help.

d. Switch off the electric power in your house from the fuse box or circuit breaker.

e. Splash the victim with water to prevent electric burns.

____ 2. What is the first thing you should do when a faulty appliance explodes and catches fire?

a. Put out the fire using water.

b. Put out the fire using a fire extinguisher and turn off the main power from the fuse box.

c. Get all your valuable things and run away from the house.

d. Call the fire department for help.

e. Cover the burning appliance with a wet blanket to put out the fire.

____ 3. The electric fan converts electrical energy into what useful form of energy?

a. heat energy

b. mechanical energy

c. sound energy

d. light energy

e. magnetic energy

____ 4. Which of these is a unit of measure for the power rating of an appliance?

a. kilowatt-hour

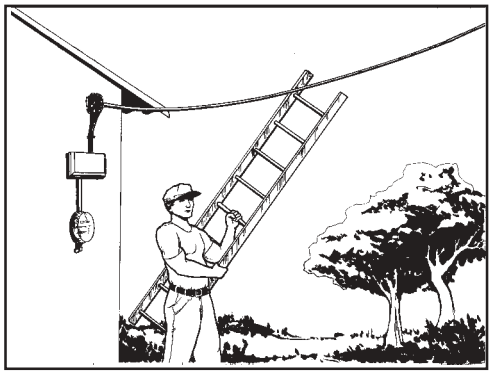
b. volt

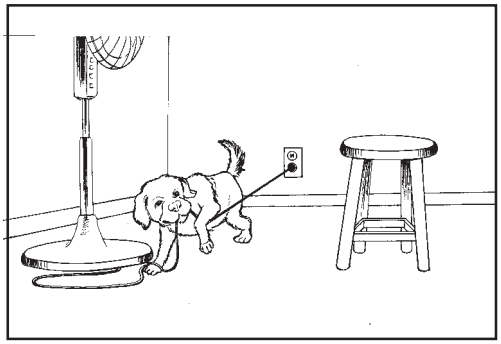
c. kilowatt

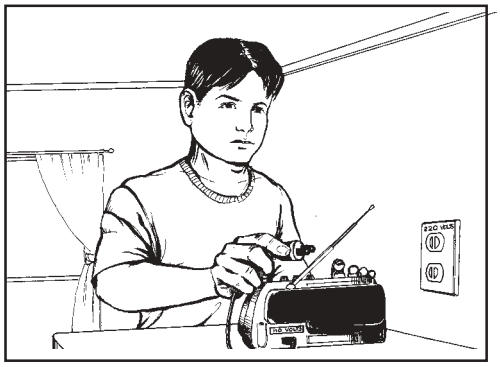
d. watt-hour

e. ampere

D. Tell what is wrong with each of the pictures below and suggest ways to correct the problem.

1. 

2. 

3. 

Compare your answers with those in the *Answer Key* on pages 56–58.

If your score is:

13 – 15 Excellent! You have understood this module very well. You may now study the next one.

9 – 12 Good! Review only the items which you did not get correctly.

5 – 8 Review the lessons which you did not understand.

0 – 4 You have to study this module again.

Answer Key

A. Let's See What You Already Know *(pages 2–3)*

A. 1. Electric conductors are materials that allow electricity to flow through them. Examples of these are water and metal objects such as spoons, electric wires and coins. Electric insulators are materials that do not allow electricity to flow through them. Examples of these are objects made of rubber, plastic, dry wood, dry cloth, and glass.

2. Total power rating: 100 W + 70 W + 120 W = 290 W

Number of hours consumed: 9 hours

Total power consumed: 290 watts × 9 hours = 2,610 watt-hours

Conversion from watt-hours to kilowatt-hours:

$$2610\ \cancel{\text{watt-}}\text{hours} \times \frac{1\,\text{kilowatt}}{1000\ \cancel{\text{watts}}} = 2.61\,\text{kilowatt-hours}$$

3. The factors which affect electric consumption are:

a. The length of time that the appliance was used.

b. The number of times the appliance was used.

c. The wattage or power rating of the appliance.

B. 1. (**d**) The right thing to do when an appliance accidentally falls in the water is to turn off the electric power from the fuse box or circuit breaker. Do this before trying to remove the appliance from the water to avoid electric shock.

(a) and (b) are incorrect because it is dangerous to touch the water where the radio fell. You will be in danger of being electrocuted.

(c) is also incorrect because it is dangerous to unplug electric appliances while your hands or body are/is wet. Water easily conducts electricity and you run the risk of being electrocuted.

2. (**c**) The television should only be repaired by a trained technician.

(a) is incorrect because shaking or tapping the television may only cause more damage to it.

(b) is incorrect because it is very dangerous to open the back panel of a television. There is stored electrical energy in the television even when it is unplugged. You run a great risk of being electrocuted and even killed!

(d) is a weak answer because you should first determine whether the television has a minor or major damage. Unless the technician suggests that you buy another television set, then that's the time to buy one.

3. (**c**) It is wise to call the electric company for help during these types of accidents. Trying to fix a high-voltage wire or trying to save the victim near it can just endanger both of your lives.

   (a) is incorrect because it is unwise to try and handle a high-voltage live wire. The electric shock from this wire can kill you.

   (b) is incorrect. It is unwise to tell the man to get out of the car. Upon holding the metal parts of the door when getting out, he might get electrocuted and killed. The man inside the car should stay there and not touch anything until professional help arrives.

   (d) is incorrect. You might feel heroic and brave and try to save the poor person trapped inside the car. But this will only worsen the situation because you are putting the victim and yourself in great danger. Both of you might get electrocuted and killed!

C. 1. These are possible answers; you may have thought of others.

   These are some common practices that involve the wasting of electricity.

   - Forgetting to turn off the lights when the room is unoccupied.
   - Leaving the electric fan turned on even when no one is in the room.
   - Watching senseless TV shows.

2. People should turn off appliances that are not being used or are not necessary. The electric fan can be turned off when the weather is not very warm and instead the windows can be opened to let the cool air in. Instead of turning on the TV when there is no good show, I can just be with my family or spend time with my friends.

B. Lesson 1

Let's Review (page 6)

Electric appliances convert the electrical energy into another form of energy that can be used to perform the appliance's function. For example, the incandescent bulb converts electrical energy into light energy; the electric oven converts electrical energy into heat energy; and the electric fan converts electrical energy into mechanical energy.

Let's Try This (page 8)

Conductors	Insulators
knife	wine bottle
gold ring	wood
bell	T-shirt
frying pan	paper

Let's Review (page 11)

1. 65 watts
2. 320 watts
3. 170 watts
4. 600 watts
5. 120 watts
6 225 watts
7. 585 watts

Let's Solve This Problem (page 15)

Solution:

Total power rating:

100 W + 20 W + 120 W + 80 W = 320 W

(light bulb) (radio) (refrigerator) (electric fan)

Number of hours used: 6 hours

Total power consumed:

Total power rating × Hours used

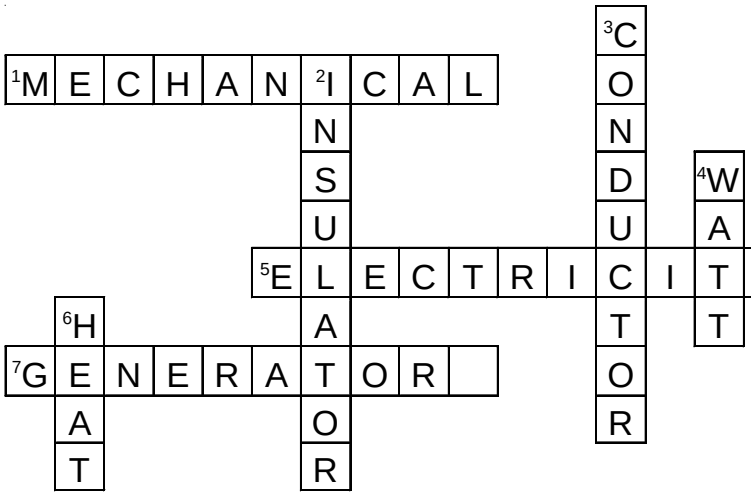
320 W × 6 hours = 1920 watt-hours

Conversion from watt-hours to kilowatt-hours:

$$1920 \text{ watt-hours} \times \frac{1 \text{ kilowatt}}{1000 \text{ watts}} = 1.92 \text{ kilowatt-hours}$$

Let's See What You Have Learned (pages 15–16)

A.



B. 1. *Solution:*

Total power rating: 250 watts

Number of hours used: 5 hours

Total power consumption: 1250 watt-hours

Conversion from watt-hours to kilowatt-hours:

$$1250 \text{ watt-hours} \times \frac{1 \text{ kilowatt}}{1000 \text{ watts}} = 1.25 \text{ kilowatt-hours}$$

2. *Solution:*

T otal power rating:

60 W + 60 W + 1,420 W + 250 W = 1,790 W

(f. lamp) (f. lamp) (air-conditioner) (computer)

Number of hours used: 3 hours

Total power consumed:

Total power rating × number of hours

1790 W × 3 hours = 5370 watt-hours

Conversion from watt-hours to kilowatt-hours:

$$5370 \text{ watt-hours} \times \frac{1 \text{ kilowatt}}{1{,}000 \text{ watts}} = 5.37 \text{ kilowatt-hou}$$

C. Lesson 2

Let's Solve This Problem (page 21)

1. Power consumption for light bulb:

   0.1 kw × 180 hours = 18 kilowatt-hours

2. Power consumption for flatiron:

   0.6 kw × 15 hours = 9 kilowatt-hours

3. Power consumption for electric fan:

   0.12 kw × 200 hours = 24 kilowatt-hours

4. Total added power consumption:

   20 kwh (TV) + 18 kwh (light bulb) + 9 kwh (flatiron) + 24 kwh (electric fan) = 71 kwh

5. Amount to be paid for added power consumption:

   ₱3.15/kwh × 71 kwh = ₱223.65

6. Aling Rosa should discuss with her family their problem of wasting electricity. She and her family members should turn off appliances that are not being used or are not necessary.

Let's Review (page 23)

This is a possible answer:

I can help conserve electric consumption by turning off the lights when no one is using them. I will remind other family members to do the same. I will remember to turn off electric appliances like the electric fan, television and stereo when they are not in use.

Let's Review (page 26)

This is a possible answer:

I will help clean the light bulbs and lamps and also clean the light fixtures every week. Cleaning the light bulbs and lamps will remove the dirt and dust that reduce the light given off by the bulb or lamp. Cleaning the light fixtures will remove the dust and dirt that prevent electricity from going through the bulb or lamp. I will suggest to family that we replace the incandescent bulbs with fluorescent lamps with lower power rating. I will ask my family members to always turn off the lights when no one is in the room.

When we redecorate the house, I will suggest to other family members to use light colors on the walls. During the day, I will just make use of the sunshine coming in from the windows to light the rooms instead of turning on the lights.

Your answer may have included other ways to reduce electric power consumption from electric lights. You may want to show your answer to your Instructional Manager or Facilitator for additional feedback.

Let's Review (page 30)

Here are some some possible answers:

a. Turn off the television and computer when they are not in use.

When there are no good TV programs, turn the TV off and do more productive activities. You can instead spend some time with family members or meet with friends.

Also, limit your playing of computer games.

b. Don't set the air-conditioning unit too high. The cooler its setting, the more electricity is consumed in order to maintain a cold temperature.

Turn off the electric fan and the air conditioner when people leave the room. Turn them off also when you can open the window to allow cool air into the room.

Let's See What You Have Learned (pages 30–31)

1. Here are some possible answers:

a. Don't set the refrigerator too high.

Minimize your trips to the refrigerator. Think of all the things that you will get inside before opening the refrigerator door.

Inspect the gaskets and latches on the refrigerator door for leaks.

b. Iron clothes in the morning or when it is cool so that you don't need to use an electric fan to cool yourself while working.

Iron clothes in batches, instead of one at a time.

Turn off the flatiron when only a few clothes are left to iron. The remaining heat will be sufficient to iron the rest of the clothes.

c. Wash clothes in full loads to maximize the capacity of the washing machine.

Do not wash clothes too long. A 10- to 15-minute wash is enough to clean the clothes.

Clean the lint filter to make the washing machine more efficient in cleaning clothes.

d. Turn off the electric fan when no one is using it.

Open the windows to allow cool air inside the room whenever you can.

e. Clean the bulbs and lamps regularly to remove the dust.

Clean the fixtures so that the flow of electricity through the light bulb or lamp is continuous.

Replace incandescent bulbs with fluorescent lamps for more efficient lighting.

2. *Solution:*

Electric power consumed by the four fluorescent lamps:

$4 \times 0.06 \text{ kw} = 0.24 \text{ kw}$

$0.24 \text{ kw} \times 200 \text{ hours} = 48 \text{ kilowatt-hours}$

Electric power consumed by the air-conditioning unit:

$1.4 \text{ kw} \times 150 \text{ hours} = 210 \text{ kilowatt-hours}$

Electric power consumed by the stereo:

$0.38 \text{ kw} \times 100 \text{ hours} = 38 \text{ kilowatt-hours}$

Total electric power consumed:

48 kwh (4 f. lamps) + 210 kwh (air conditioner) + 38 kwh (stereo) = 296 kwh

Cost of the electric power consumed:

296 kwh × ₱3.50/kwh = ₱1036.00

C. Lesson 3

Let's Review (page 38)

I will immediately look for the fuse box or circuit breaker to turn off the electricity in the house. I will call for an ambulance or paramedics to help the victim or if they are not available, I will rush the victim to the nearest hospital and have him or her inspected even if the victim looks alright and does not feel anything bad.

Let's See What You Have Learned (pages 40–43)

1. Water and liquids should not be placed on top of or near electrical appliances. Water that is spilled on an appliance might cause a short circuit, resulting in an explosion, a fire or possibly an electrocution of a person nearby.

2. An extension cord should not be used as an electric source for too many appliances at a time. The power line may become overload and overheat causing fire, especially when the appliances plugged into the extension cord have very high wattages.

3. Electrical wirings should be properly laid out away from walkways to avoid people from tripping over. People might get electrocuted if they step on electrical wirings and sockets.

4. A person should not try to fix electrical appliances if he/she is not trained to do so. He/She should also wear protective gloves to protect himself/herself from electrocution and he/she should use the proper tools.

5. People should not use electrical appliances in the rain. Water might reach the electric circuits and cause short circuits, explosions and the electrocution of a person nearby.

D. What Have You Learned? *(pages 45–47)*

A. Total power rating:

120 W + 380 W + 80 W + 45 W = 625 W

(electric fan) (stereo) (TV) (Vhs player)

Number of hours used: 12 hours

Total power consumption:

Total power rating × number of hours

625 W × 12 hours = 7500 watt-hours

Conversion from watt-hours to kilowatt-hours:

$$7500\,\text{watt-hours} \times \frac{1\,\text{kilowatt}}{1000\,\text{watts}} = 7.5\,\text{kilowatt-hours}$$

Cost of power consumption:

7.5 kwh × ₱3.00/kwh = ₱22.50

B. 1. Electricity is a useful form of energy used by human beings to help them with their work. Electricity makes appliances work. It gives energy to make electric fans turn its blades or energy for the light bulb to emit light.

2. Appliances work by converting electrical energy into other forms of energy. For example, the flat iron converts electricity into heat for it to smooth out wrinkles on clothes. Another example is the electric fan which converts electrical energy into mechanical energy that makes the fan blades rotate and circulate air around the room.

3. Answers can be in any order:

- ♦ Turn off your electrical appliances when they are not in use.
- ♦ Keep your electrical appliances in good working condition.
- ♦ Choose the electric appliances that you buy wisely.

C. 1. (**d**) is the best answer. This is the safest way you can get the victim out of danger without endangering yourself.

(a), (b) and (e) are incorrect because these put you in danger of getting electrocuted yourself. Electricity can be conducted from body to body, metal to body and water to body.

(c) Although this answer seems correct, this is not the first thing to do when a victim is experiencing electric shock. You should immediately make sure to save the victim from harm by turning off the electricity from the fuse box or circuit breaker. Only after stopping the electrocution should you call the paramedics or rush the victim to the hospital.

2. (**b**) is the best answer. The fire should be put out with a fire extinguisher, sand or baking soda. Water as an electric conductor should not be used as it may electrocute people nearby. The fuse box or circuit breaker should then be turned off and the appliance unplugged.

   (a) and (e) are incorrect because water is an electric conductor and is dangerous to use in this situation as this can electrocute people nearby.

   (c) is incorrect because the fire is just starting and can be extinguished easily. Do not allow the fire to burn down your whole house when you can still do something about it.

   (d) is a poor answer because although it is right to call the fire department for help, this is not the first thing you should do. While the fire is still small, you should properly extinguish it using a fire extinguisher, sand or baking soda.

3. (**b**) is the correct answer. Electric fans convert electrical energy into mechanical energy to turn the fan blades and circulate air in the room. All the other answers are incorrect.

4. (**c**) is the correct answer. The power rating of appliances are measured in watts kilowatts.

   (a) and (d) are incorrect since kilowatt-hour and watt-hour are units of measure for electric power consumption.

   (b) is also incorrect since volt is a measure of electric potential.

   (e) is incorrect. This is a measure of the electric current.

D. 1. The person should be careful and watch where he is going and what he might hit with the ladder. He might get electrocuted if the metal ladder touches an electrical wiring while he is still holding the ladder.

2. Pet dogs should not be left unattended inside the house. Dogs can chew on electrical wiring. When these wiring get damaged, electrocution may occur. This can also cause short circuits which can lead to fires. Electrical wirings should be neatly kept to prevent pets from chewing them.

3. People should be careful when plugging appliances in. They should first determine the voltage rating of each appliance. Appliances with a rating of 110 volts that are plugged into 220-volt outlets may short- circuit and explode. This can cause fire.

Glossary

Circuit breaker It is the main switch that turns on or off the electric power in the entire house. It automatically shuts off when a short circuit occurs.

Electric conductor A material that allows electricity to pass through it

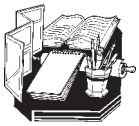
Electric insulator A material that does not allow electricity to pass through it

Electrocution This happens when electricity passes through a victim's body. In this event, the person may not be able to move his or her body to keep away from the electric shock. The person's body may experience electric burns which can damage internal organs like the heart.

Fuse box It is the main switch that turns the electric power in the entire house on or off. It automatically shuts off when a short circuit occurs. However, unlike the circuit breaker, the fuse will have to be replaced when a short circuit occurs.

Short circuit A connection of comparatively low resistance accidentally or intentionally made between points on a circuit between which the resistance is normally much greater

Watt A unit used for measuring electric power



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