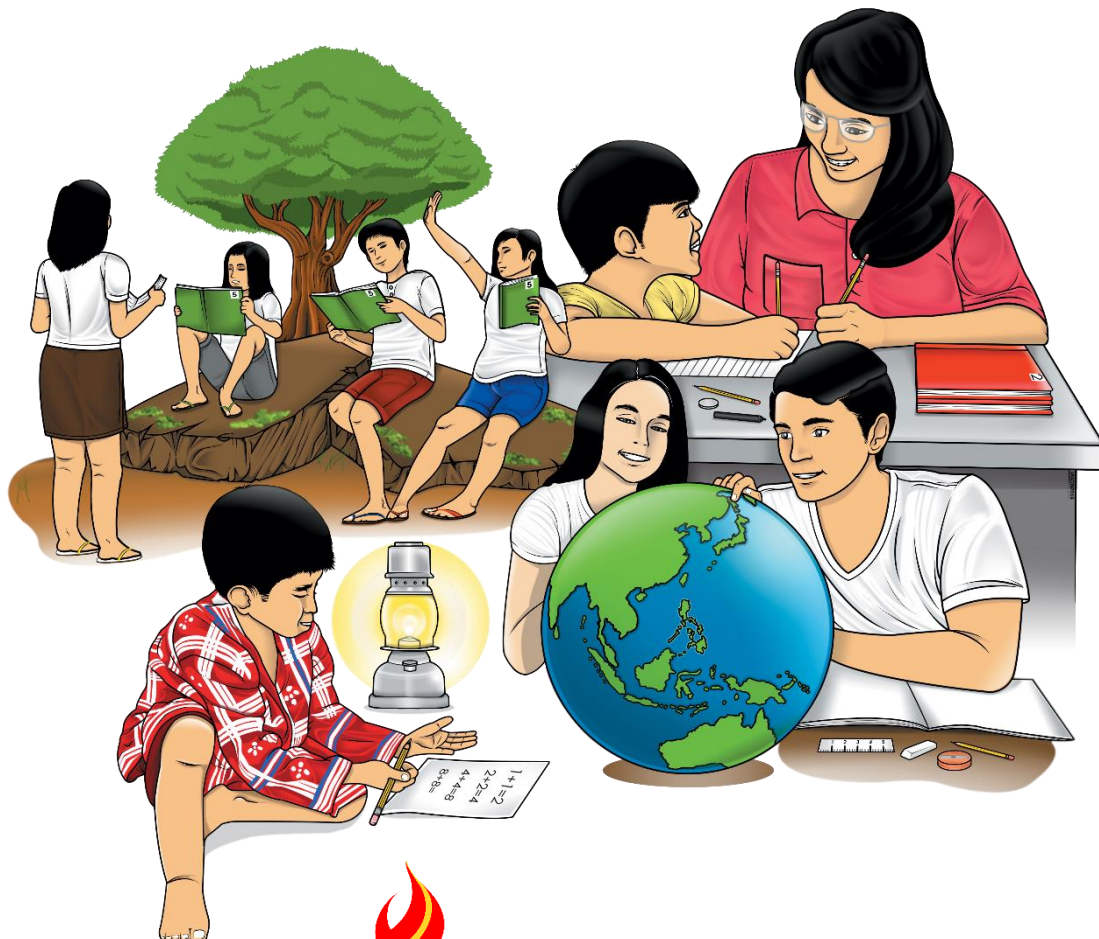


# Science

## Quarter 3 – Module 2: Energy Transformation



**Science – Grade 6**  
**Alternative Delivery Mode**  
**Quarter 3 – Module 2: Energy Transformation**  
**First Edition, 2020**

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# Science

## Quarter 3 – Module 2: Energy Transformation

## **Introductory Message**

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



## ***What I Need to Know***

This module was designed and written with you in mind. It is here to help you demonstrate how sound, heat, light, and electricity can be transformed (**S6FEIIIId-f-2**). The scope of this module allows you to use it in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

This module is divided into the following lessons:

- Lesson 1: Forms of Energy
- Lesson 2: Energy Transformation

After going through this module, you are expected to

1. describe the different forms of energy;
2. cite some forms of energy present in various activities;
3. trace energy transformation; and
4. realize the importance of the different forms of energy in daily living.



## ***What I Know***

**Direction:** Read each item carefully. Write the letter of the correct answer.

1. Which form of energy does a moving object possess?
  - A. light energy
  - B. sound energy
  - C. chemical energy
  - D. mechanical energy
2. Which form of energy is transferred from one object to the other?
  - A. Heat energy
  - B. light energy
  - C. sound energy
  - D. mechanical energy

3. Which device uses chemical energy to produce sound?
  - A. generator
  - B. television
  - C. radio
  - D. microwave oven
4. Which example has chemical energy present in it?
  - A. electric circuit
  - B. light bulb
  - C. medicine
  - D. television
5. What form of energy can travel through a vacuum or an empty space?
  - A. electrical energy
  - B. light energy
  - C. mechanical energy
  - D. sound energy
6. Which of the following shows that electrical energy is changed to light energy?
  - A. hot iron
  - B. lighted fluorescent bulb
  - C. switching on the radio
  - D. a boy running after drinking water
7. Which energy transformation occurs in a flat iron?
  - A. electrical energy to heat
  - B. mechanical energy to light
  - C. chemical energy to sound energy
  - D. chemical energy to electrical energy
8. How does energy transform when strumming a guitar?
  - A. electrical energy to light energy
  - B. chemical energy to light energy
  - C. chemical energy to sound energy
  - D. mechanical energy to sound energy
9. Which of the following gives the correct order of energy transformation in a burning candle?
  - A. chemical – light– light
  - B. chemical – light – heat
  - C. heat – chemical – light
  - D. heat – light – chemical
10. What is always produced when there is energy transformation?
  - A. chemical
  - B. electricity
  - C. heat
  - D. light

## Lesson

# 1

# Forms of Energy

**Energy** is everywhere and it can do a lot of things. Energy is invisible. But, how can we tell when energy is there? If you see children running on the street and a light from the lampshade, hear a sound from the radio, or feel the heat of the sun, you can be sure that energy is in action.

All living and non-living things need energy. It warms our planet enough to make life possible. It enables people to do household chores or work in school. It illuminates every home, operates appliances, and moves cars.

In Physics, energy is described as the ability to do work or make changes in certain conditions. Energy can be classified in two types: kinetic and potential energy. Potential energy is energy stored in an object at rest while Kinetic energy is an energy in motion.

In this lesson, you will learn the different forms of energy such as mechanical energy, heat energy, light energy, sound energy, and electrical energy.



## *What's In*

Study the illustrations below. Identify which activity involves the use of energy.



Jogging



Cleaning



Sitting



Walking



Cooking



Sleeping

Which activities involve the use of energy? Explain why.

Photo credit to <https://www.canva.com>



## What's New

### Activity 1: FORMS OF ENERGY

Energy is everywhere. It comes in many forms such as mechanical energy, heat energy, thermal energy, light energy, chemical energy, sound energy, and electrical energy. Let us learn the different forms of energy by doing the activity below.

- A.** Prepare the materials listed below and follow the steps to understand more about energy.

**Materials:** Pail of water, Stone

**Procedures:**

1. Fill the pail with water until almost full.
2. Throw the stone into the pail of water.
3. Observe what form of energy is present when you threw the ball and when it hit the water.

**Analysis Questions:**

1. What gave you ability to throw the stone in the pail?  
\_\_\_\_\_
2. What form of energy is present when you threw the stone and it moved?  
\_\_\_\_\_
3. What happened when the stone fell into the water? What form of energy is it?  
\_\_\_\_\_
4. If you kept on throwing the stone into the pail several times, how would that make you feel? What form of energy would it be?  
\_\_\_\_\_

**B: Picture Analysis**

Analyze and describe what you would see, hear, and feel based on the picture below.



Figure 1: Television set turned on  
Photo Credit to <https://www.publicdomainpictures.net>



Answer the questions below.

1. Use the picture above or the actual TV. What can you see and hear when the TV is switched on?

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2. Touch the back part of the TV. What can you feel?

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3. What forms of energy are present in watching TV? Choose the answers from the list inside the box.

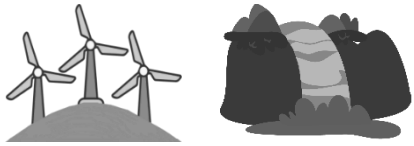
chemical energy	electrical energy
heat (thermal energy)	light energy
mechanical energy	sound energy



## What is It

### Forms of Energy

The activity that you just performed represents different forms of energy. You got the energy you needed to perform the activity from the chemical energy in food. You were able to throw the stone into the water because your body converts chemical energy into energy for movement (mechanical energy). You probably heard a sound of splash when the stone hit the water. This is called the sound energy. Had you kept doing the activity, you would notice that your body feels hot which would make you sweat. This is heat or thermal energy. Read about the different forms of energy, their characteristics and examples below.

Form of Energy	Characteristics	Examples
<b>Mechanical Energy (ME)</b>	It is the sum of energy in motion and stored motion by an object. All moving objects possess mechanical energy.	windmills, falling water, dancing, playing, doing exercises, and moving cars, etc.  <i>Illustrated by Ryan Oliver S. Arellano</i>







<p><b>Electrical Energy (EE)</b></p>	<p>It is the energy possessed by moving electrons that lights the bulb, works all appliances.</p>	<p>electric circuit, lightning, transmission lines, turned on appliances</p> 
<p><b>Chemical Energy</b></p>	<p>It is an energy stored in bonds of chemical compounds, like atoms and molecules.</p>	<p>batteries, food, fuel, matchsticks, fireworks, medicines</p> 
<p><b>Heat Energy</b></p>	<p>It is an energy in transit (transferred from one body to another).</p>	 <p>The spoon becomes hot when put in hot soup.</p> <p>The pork becomes cooked after placing near the fire.</p>
<p><b>Thermal Energy</b></p>	<p>It is an energy due to the movement of molecules.</p>	 <p>Sun</p> <p>hot stove</p>
<p><b>Sound Energy</b></p>	<p>It is an energy produced by vibrating objects</p>	<p>radio, television, cell phones, musical instruments</p> 
<p><b>Radiant or Light Energy</b></p>	<p>It is a form of electromagnetic radiation produced by hot objects that can be seen by the human eye. It travels through a medium or empty space.</p>	<p>sun, lighted bulb ,candle, laser, fire, and flashlight</p> 

Photo credit to <https://www.canva.com>







Illustrated by Ryan Oliver S. Arellano



## What's More

### Activity 1: Forms of Energy

Match the form of energy in column **A** with the examples in column **B**. Write the letters only.

Form of Energy	Objects which possess Energy
_____ 1. Mechanical Energy	A. 
_____ 2. Electrical Energy	B. 
_____ 3. Chemical Energy	C. 
_____ 4. Light Energy	D. 
_____ 5. Sound Energy	E. 
_____ 6. Heat Energy	F. 

*Illustrated by Ryan Oliver S. Arellano and Raymond Michael A. Gayatin*



## ***What I Have Learned***

Choose the answer for each item from the words inside the box.

Energy	Chemical	Electrical	Heat
Sound	Light	Mechanical	Thermal

I learned that:

1. \_\_\_\_\_ is the ability to do work.
2. \_\_\_\_\_ energy is the sum of energy in motion and stored energy in objects.
3. \_\_\_\_\_ energy is possessed by moving electrons.
4. \_\_\_\_\_ energy is stored in molecules or atoms.
5. \_\_\_\_\_ is an energy in transit (transferred from one body to another).
6. \_\_\_\_\_ is the energy due to the movement of molecules.
7. \_\_\_\_\_ energy is produced by vibrating objects.
8. \_\_\_\_\_ energy is a form of electromagnetic radiation that travels through empty space.



## ***What I Can Do***

Thomas Alva Edison invented the electric light bulb. Think about what life was before the invention of the light bulb. How does this invention make our life convenient today? How would your life be if the light bulb was not invented? Write your answer in a paragraph form.

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## Assessment

**Direction:** Write the letter of the correct answer.

- Which of the following possesses mechanical energy?
  - a flat iron
  - a dancing girl
  - a glass of water
  - a lighted bulb
- Which forms of energy is/are produced by a candle?
  - Heat
  - Electrical
  - Light
  - Sound
  - I and II
  - I and III
  - II and III
  - III and IV
- Which form of energy is present when the television is turned on?
  - light
  - electrical energy
  - sound energy
  - all of the above
- Which form of energy is stored in medicines?
  - light
  - sound energy
  - chemical energy
  - electrical energy
- Which of the following are forms of energy?
  - Heat
  - Light
  - Shadow
  - Atom
  - Electrical
  - I and III
  - I, II, and V
  - II, III, and IV
  - III, IV, and V
- A form of energy that moving bodies possess.
  - heat
  - sound energy
  - electrical energy
  - mechanical energy

7. Which form of energy is stored in a battery?
  - A. Light energy
  - B. Sound Energy
  - C. Chemical Energy
  - D. Mechanical Energy
  
8. Which of the following does NOT possess mechanical energy?
  - A. pushing a cart
  - B. pedalling a bike
  - C. tapping the drums
  - D. a lighted bulb
  
9. How is light energy different from sound energy?
  - A. Light energy moves slower than sound.
  - B. Light helps you see while sound lets you hear.
  - C. Light energy uses vibrations while sound does not.
  - D. None of the above.
  
10. All the following objects produce sound. Which one does not?
  - A. drum
  - B. guitar
  - C. light bulb
  - D. radio



## ***Additional Activities***

### **Sources of Energy**

In the previous activity, you have learned that you can obtain energy from the food you eat. Food, however, is not the only source of energy. The table below shows the different forms of energy. Write at least 2 possible sources of each form of energy. An example is given as your guide for this task.

<b>Forms of Energy</b>	<b>Possible Sources</b>
1. Light	Candle
2. Sound	
3. Heat	
4. Electrical	
5. Mechanical	
6. Chemical	

## Lesson

# 2

# Energy Transformation

The food that you eat provides you the energy to do work. You can run, walk, swim, or do your homework and chores because of the chemical energy you get from food. Even sleeping, breathing, and eating require some energy from your body. It is important to note that the chemical energy that you get from food is not lost or used up when you do those activities. It is simply changed into another form of energy. The cells in your body break down the chemical bonds in the food and release the energy from those bonds. You then use this energy to keep your body organs working, move your muscles, ride your bike, or toss a ball. You might have observed that you feel hot and start sweating after running, biking, or playing. This is because some of the energy is transformed into heat.

The Law of Conservation of Energy states that energy cannot be created or destroyed. It may be transformed from one form into another, but the total amount of energy never changes. Energy can be changed from one form to another such as chemical energy into mechanical energy, heat energy, and many more.

Energy transformation occurs everywhere always. It can be observed at sunrise. As the light of the sun reaches the Earth, plants absorb it to make their own food. Light energy from the sun is transformed into chemical energy stored in plants. In cooking, the chemical energy of the Liquefied Petroleum Gas (LPG) is transformed into light and heat to cook food. Other examples where energy conversion takes place are in a battery-operated car, waterfalls, roller coaster, cleaning the house, walking, running, watching television, eating or chewing food, calling through cellular phones, driving a car, and many more.



## *What's In*

Tell what form of energy is illustrated in the following pictures. Choose from the options provided

Thermal Energy

Heat Energy

Chemical Energy

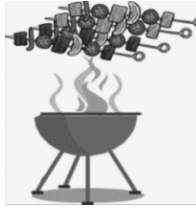
Light Energy

Mechanical Energy

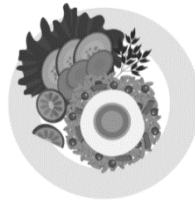
Sound Energy

Electrical Energy

1.



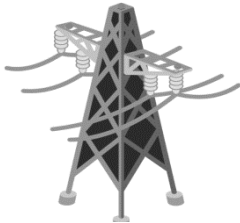
2.



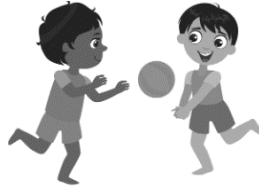
3.



4.



5.



Illustrated by Ryan Oliver S. Arellano  
Photo credit to <https://www.canva.com>



## What's New

### Activity: Not wasted, Just transformed.

Energy transformations occur everywhere. Let us find out more about energy transformation in this activity.

#### Option A: Do This Activity

1. Get a flashlight. Make sure the battery is placed in it as shown in Figure 1.
2. Turn on the flashlight. See Figure 2.
3. Observe the flashlight using your different senses.

#### Option B: Picture Analysis

Without a flashlight, analyze and describe what you would see and feel based on the picture below.

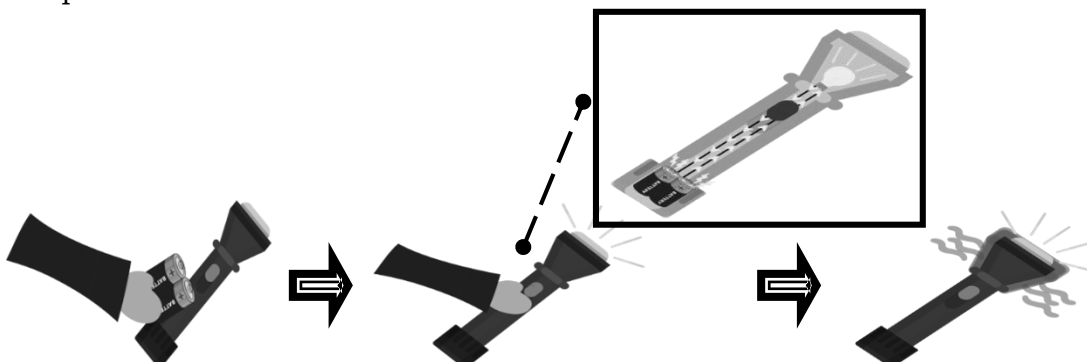


Figure 1. Battery is placed inside the flashlight.

Figure 2. Flashlight is turned on.

Figure 3. Flashlight lights and warms up minutes after it was turned on.

Illustrated by Ryan Oliver S. Arellano



Answer the questions below.

1. When the flashlight is turned on, what energy transformation happened from the battery to the bulb? Fill in the blanks with forms of energy.

\_\_\_\_\_ energy to \_\_\_\_\_ energy to \_\_\_\_\_ energy and \_\_\_\_\_ energy

Based on the activity, what is energy transformation?

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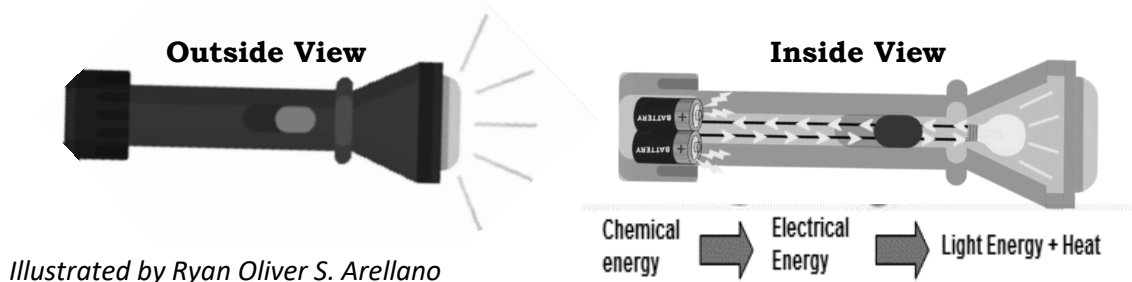
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## What is It

In the activity, you have observed how energy is transformed from one form to another. Transformation of energy occurs in the flashlight. The illustration below shows the outside and inside view of the flashlight.

**Figure 4: The outside and inside view of the flashlight.**



When the flashlight is switched on, the chemical energy from the battery is transformed into electrical energy through the circuit, and then transformed into light energy and heat released to the surroundings.

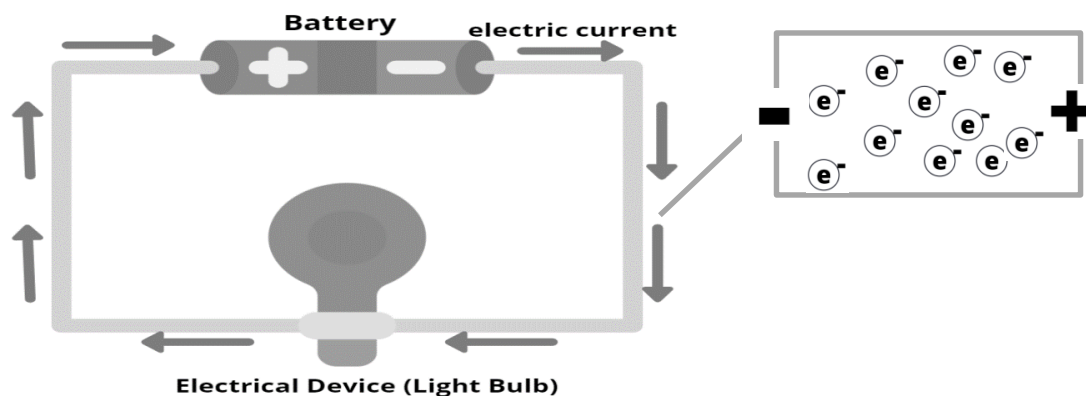


Figure 5. Flow of electric current in a circuit.

Modified from <https://www.canva.com>

In a simple circuit, the source of energy is the chemical energy from a battery. Chemical energy present in a battery generates electricity as shown in figure 5. The electrons are allowed to flow through the wire that creates an electric current. Electric current that carries electric energy flows from the negative terminal towards the positive terminal of the battery thus giving energy to the load (light bulb).

Fossil fuels (coal, natural gas, petroleum) are all derived from the bodies of plants and/or animals. In a power plant, these carbon-based fuels are burned to generate steam or heat that turn the turbines. Turbines are large wheels that rotate when pushed by steam, water, wind, or pressure. The turbines then drive the generators to produce electrical energy. The electrical energy produced by the generators is distributed to homes which is used to power our electrical appliances. Hence, energy is not produced or made in power plants. Instead, it is simply an energy that transforms from **chemical** (plants and animals) to **heat** to **mechanical** (turbines and generators) to **electrical** to **sound** when we turn on our radio or TV, **heat** when we use the flat iron, or **mechanical** energy when we switch on the electric fan.

Aside from carbon-based fuels, there are other alternative sources of energy. These are classified as either *renewable* or *non-renewable* energy sources (Table 1). It is important to conserve energy because the fossil fuels that we use are limited and emit harmful pollutants.

**Table 1. Sources of Energy**

<b>Renewable Energy</b>	<b>Nonrenewable Energy</b>
Wind Energy	Fossil Fuel ( coal, petroleum, natural gas, oil)
Water	
Geothermal Energy	
Biomass Energy (Biomass Fuel)	Nuclear energy
Tidal Energy (Tides)	
Solar Energy	

Transformation of energy may also be observed by simply doing household chores. When hammering the nail, mechanical energy is turned into sound energy and heat energy as you continue hitting the nail. When ironing clothes, the electrical energy from the source or outlet is transformed into heat that makes the iron hot. In a boiling water, the chemical energy from the LPG tank is transformed into light energy and heat that makes the water boil. At home, we use different appliances like TV, electric fan, air condition, refrigerator, electric lamp, etc. All these devices transform one energy to another form and release heat to the surroundings. The end product of energy transformations is heat wasted. Heat is collected in the surroundings and results in the warming of the environment.



## What's More

Name the energy transformations for each illustration below. You may use the words in the box as many times as needed.

chemical	electrical	heat
light	mechanical	sound


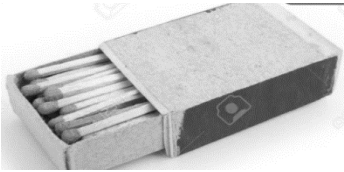
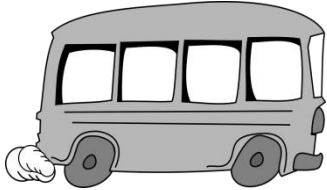
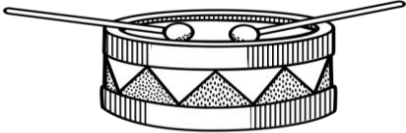

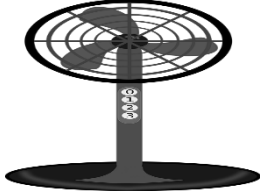
Activity	Energy Transformation Taking Place
Example: 	Electrical Energy to Light + sound energy + heat
1. 	
2. 	
3. 	
4. 	
5. 	

Photo Credit to <https://www.publicdomainpictures.net> and <https://pixabay.com/>



## ***What I Have Learned***

I learned that energy transformation is \_\_\_\_\_  
\_\_\_\_\_.



## ***What I Can Do***

### **A. Conserving Energy**

Electricity plays a significant role in everyday life. Some of the sources of electrical energy currently used are fossil fuels. Burning the fossil fuels to provide electricity causes air pollution or landscapes to be changed or destroyed. It is important to conserve electricity to lessen the bad effects it brings upon the environment. Put a check on the items below which show (/) the different ways to conserve energy and (x) to those that do not.

- \_\_\_\_\_ 1. Use a large heating pan at all times when cooking.
- \_\_\_\_\_ 2. Turn off unnecessary appliances when not in use.
- \_\_\_\_\_ 3. Avoid frequent opening of the refrigerator.
- \_\_\_\_\_ 4. Refrain from using air conditioner during cool or rainy season.
- \_\_\_\_\_ 5. List down all things needed before going to the grocery store.

### **B. Scenario**

Car, buses, motorcycles, and other fuel-powered vehicles are our means of going to school or work, buying food and supplies, and many others that require us to go to distant places. But these vehicles are also the primary cause of air pollution around the world. They give off toxic materials that can harm our health and environment. They also release carbon dioxide gases which cause the warming of the earth's atmosphere.

Imagine that you live in the near future when fossil fuels are no longer available. Can you suggest other sources of electrical energy? What would be the consequences of using those other (alternative) sources of energy? You can draw your vision of an alternative energy source of electrical energy.

\_\_\_\_\_  
\_\_\_\_\_



## Assessment

Write the letter of the correct answer.

- Which shows that chemical energy is changed to mechanical energy?
  - tapping the drum
  - plucking the guitar
  - switching on the light bulb
  - a horse running after eating grass
- Which energy transformation takes place when running?
  - mechanical energy to light
  - mechanical energy to sound energy
  - chemical energy to electrical energy
  - chemical energy to mechanical energy
- How does energy transform when tapping a drum?
  - electrical energy to light energy
  - chemical energy to heat energy
  - chemical energy to sound energy
  - mechanical energy to sound energy
- Which is always produced when there is energy transformation?
  - heat
  - light energy
  - chemical energy
  - electrical energy
- What form of energy is transformed to electrical energy if the powerplant uses wind as its resource?
  - light energy
  - sound energy
  - chemical energy
  - mechanical energy
- Maria used her cell phone to call her mother. After a few minutes, she felt the phone getting warm. Which diagram correctly shows the energy transformation that took place?
  - chemical  $\longrightarrow$  light and sound
  - chemical  $\longrightarrow$  electrical and heat
  - chemical  $\longrightarrow$  light  $\longrightarrow$  sound
  - chemical  $\longrightarrow$  electrical  $\longrightarrow$  sound and heat
- Which of the following energy conversions occur in a solar-powered light?
  - heat to chemical energy
  - heat to electrical energy
  - light energy to electrical energy
  - light energy to chemical energy

8. It is the conversion of energy from one form to another.
- Energy Saving
  - Energy Formation
  - Energy Conservation
  - Energy Transformation
9. Which energy transformation takes place when gasoline is burned in a car?
- chemical → heat and sound
  - chemical → mechanical and heat
  - heat → electrical and mechanical
  - mechanical → chemical and electrical
10. Which energy transformation takes place when you light a candle?
- chemical → light and heat
  - electrical → light and heat
  - mechanical → light and heat
  - chemical → electrical and heat



## ***Additional Activities***

Arrange the pictures in the correct order to show energy transformation. Write numbers 1 to 3.



Sound Energy



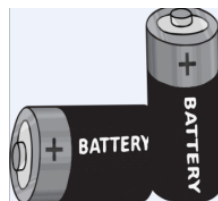
Thermal energy



Chemical Energy



Electrical Energy

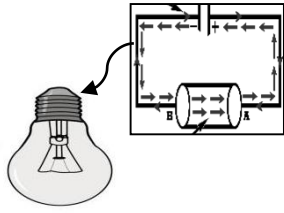


Chemical Energy



Light Energy

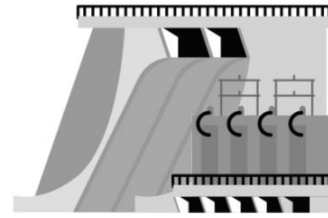
3.



Electrical Energy



Light Energy



Mechanical Energy

4.



Chemical Energy

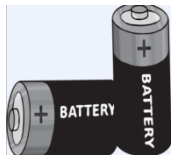


Mechanical Energy



Chemical Energy

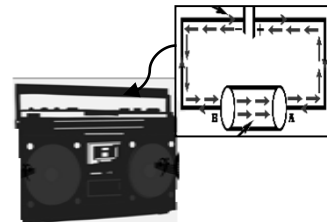
5.



Chemical Energy



Sound Energy



Electrical Energy

*Illustrated by Ryan Oliver S. Arellano and Raymond Michael A. Gayatin*

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# Answer Key

## Lesson 1: Forms of Energy

<p><b>Assessment</b></p> <p>1. B 2. B 3. D 4. C 5. B 6. D 7. C 8. D 9. B 10. C</p> <p><b>Additional Activities</b></p> <p><b>Act. 1</b></p> <p>A. (in no particular order and other possible answers could be given)</p> <p>1. Sun, light bulb, candle 2. Radio, guitar, drums, violin, television 3. Candle, bon fire, sun Nuclear power plants, fossil fuels, solar energy, biomass, geothermal, hydroelectric energy 5. Water falls, wind mill, flowing river 6. Wood, coal, gasoline</p>	<p><b>What I know</b></p> <p>1. D 2. A 3. C 4. B 5. F 6. E</p> <p><b>Activity 1</b></p> <p>1. D 2. A 3. C 4. B 5. F 6. E</p> <p><b>What I have Learned</b></p> <p>1. Energy 2. Mechanical 3. Electrical 4. Chemical 5. Heat 6. Thermal 7. Sound 8. Light</p> <p><b>What's More</b></p> <p>1. Light comes out of the screen with moving pictures in it and sound comes out of the speakers. 2. The back of the television feels warm. 3. Electrical energy, light energy, sound energy, heat (thermal energy)</p>	<p><b>What I know</b></p> <p>1. D 2. A 3. C 4. C 5. B 6. B 7. A 8. D 9. B 10. C</p> <p><b>What's In</b></p> <p>Jogging, cleaning, walking and cooking are activities that use energy because it involves movement of muscles. It can be observed when you usually get tired, sweat out or heat up after engaging in these activities.</p> <p><b>What's New</b></p> <p><b>Activity 1: Forms of Energy</b></p> <p>A. 1. Energy gave me the ability to move. 2. Mechanical energy 3. When the stone fell into the water, it moved and made a sound. This form of energy is sound energy. 4. Doing the activity repeatedly made me feel hot and sweaty. It is heat or thermal energy.</p>
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**What's In**

1. Heat Energy
2. Chemical Energy
3. Sound Energy
4. Electrical energy
5. Mechanical Energy

**What's New**

- Activity
1. chemical energy to electrical energy to light and heat energy

Energy transformation is a process of changing energy from one form to another.

**What's More**

1. Chemical + light + heat
2. Chemical+electrical+mec
3. hnical+heat
4. Mechanical+sound+heat
5. Electrical+light+heat
6. D
7. C
8. D
9. B.
10. A

**What I have Learned**

I have learned that energy transformation is a process of changing energy from one form to another.

**What Can I Do**

A.  
1. x  
2. /  
3. /  
4. /  
5. /

B. (there are other possible answers)  
Other sources of energy are hydroelectric, geothermal, wind, tidal, solar and biomass energy. However using these alternative sources are costly to set up, also requires big amount of spaces to put up and may not be enough for the demand of increasing population.

**Assessment**

1. D
2. D
3. D
4. A
5. D
6. D
7. C
8. D
9. B.
10. A

**Additional Activities**

1. 3,2,1
2. 2,1,3
3. 2,3,1
4. 2,3,1
5. 1,3,2

**Lesson 2: Energy Transformation**

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