

What's the Big Idea?

You will learn:

- how energy is classified.
- how energy changes form.

Lesson 2

What Forms of Energy Do You Use?

On your mark. Because of a form of energy, you can see the other runners. Get set. Because of a form of energy, you can hear. **GO!!** As you run, your muscles use a form of energy to make your body move.

Glossary

Glossary

sound energy, energy of vibrations carried by air, water, or other matter

radiant (rā/dē ənt) **energy**, energy that travels as waves and can move through empty space

Classifying Forms of Energy

You learned about potential and kinetic energy. Both can exist in many different forms. Turning on a light, running, and listening to music all use some form of energy. Study the photos on these two pages and read the captions. Think of ways you have used each of these seven forms of energy.



Sound energy is the energy of vibrations carried by air, water, or other matter. When you listen to a rock band or shout to a friend, you're using sound energy. ▼



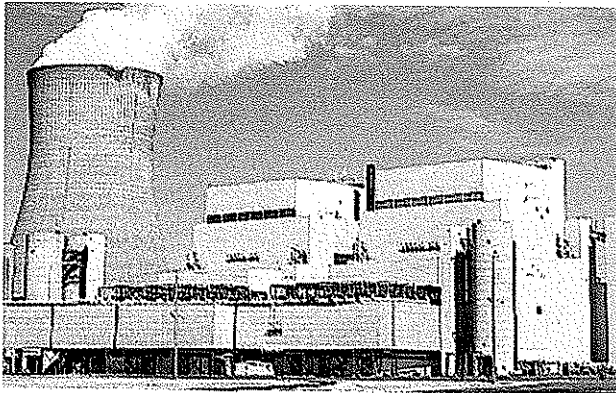
◀ **Radiant energy** is energy that travels as waves and can move through empty space. Scientists classify energy, such as light, X rays, and infrared rays, as radiant energy. Energy from the sun travels to the earth as radiant energy. A restaurant may use a heat lamp to shine infrared rays on your food to keep it warm until it is served.



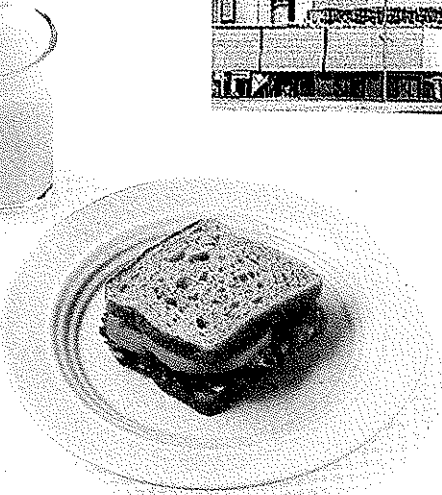
◀ **Electrical energy** is energy carried by electricity. When you play a tape, electrical energy is used to make sound.



Mechanical energy is energy an object has due to its motion, position, or condition. A person running, a bicycle stopped on top of a tall hill, and a wound spring in a windup toy all have mechanical energy. ▶



▲ **Nuclear energy** is energy produced when an atom splits apart or when two atoms join to form one atom. Nationwide, nuclear energy supplies about 14% of the electrical energy people use.



▲ **Chemical energy** is energy stored in the connections among atoms. When your body chemically changes your food, it releases the chemical energy stored in it. Your muscles use this energy when you run. In fact, your body uses this energy for all life functions.

Thermal energy is the energy of the movement of atoms and molecules. The more rapidly they move, the greater their thermal energy. When the thermal energy of this ice sculpture gets too great, the ice melts. ▶

Glossary

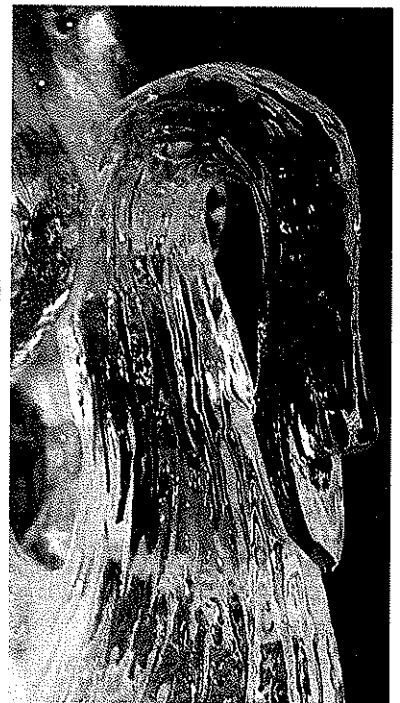
electrical (i lək'trə kəl) **energy**, energy carried by electricity

mechanical (mə kan'ə kəl) **energy**, energy an object has due to its motion, position, or condition

nuclear (nü'klē ə) **energy**, energy produced when an atom splits apart or when two atoms join to form one atom

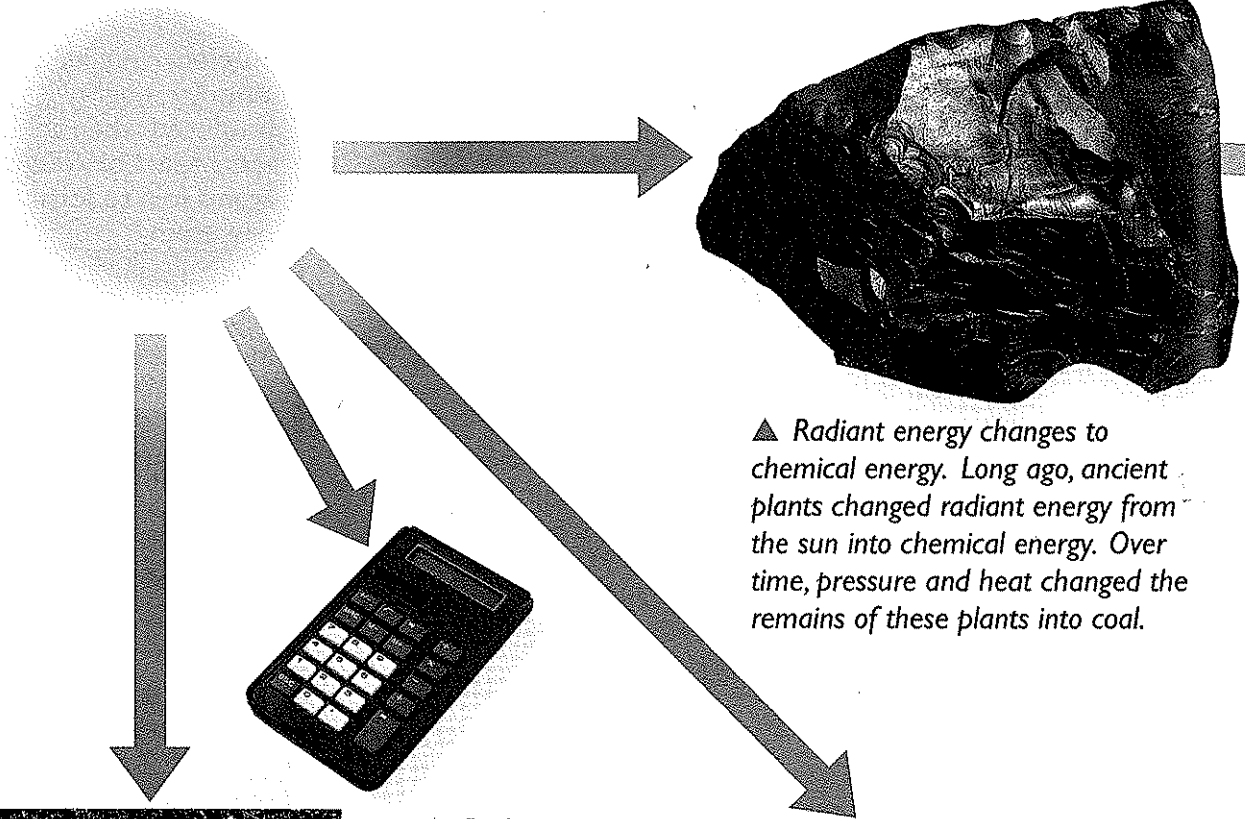
chemical (kem'ə kəl), **energy**, energy stored in the way atoms are connected to each other

thermal (thér'məl), **energy**, energy of the movement of atoms and molecules

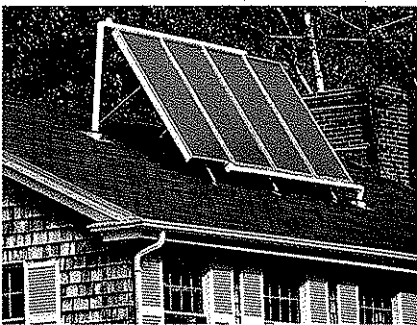


How Energy Changes Form

Energy can change form. When you use energy, you often change its form. For example, your solar-powered calculator can change radiant energy from the sun into electrical energy. Find some examples of how energy changes form in the pictures on these two pages.



▲ Radiant energy changes to chemical energy. Long ago, ancient plants changed radiant energy from the sun into chemical energy. Over time, pressure and heat changed the remains of these plants into coal.

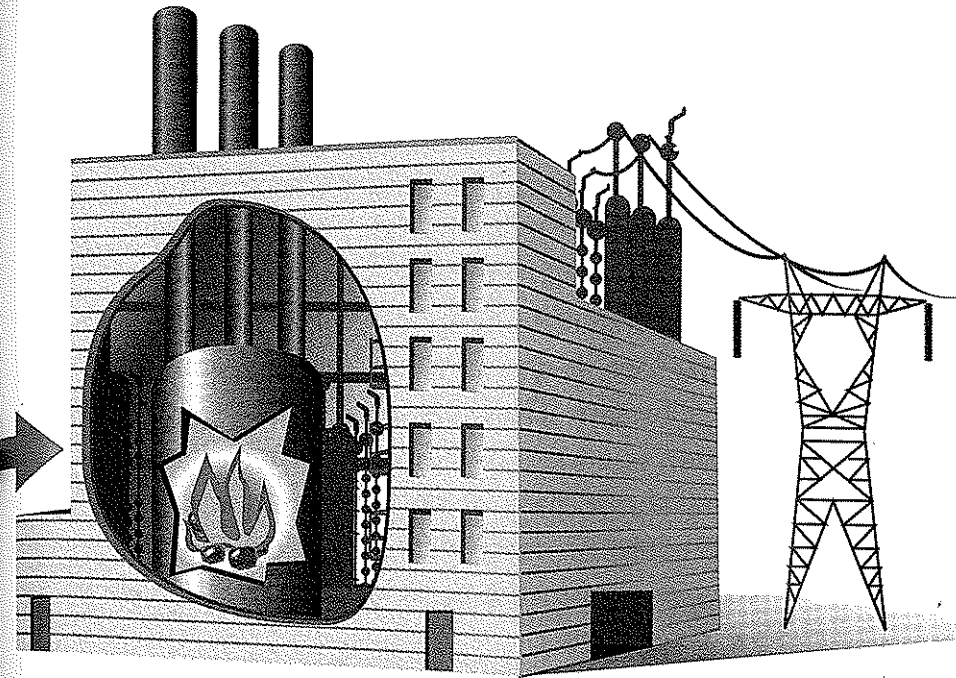


▲ Radiant energy changes to thermal energy. You may have seen a house with panels like the ones on this house. The panels change the radiant energy from the sun into thermal energy to heat the home.

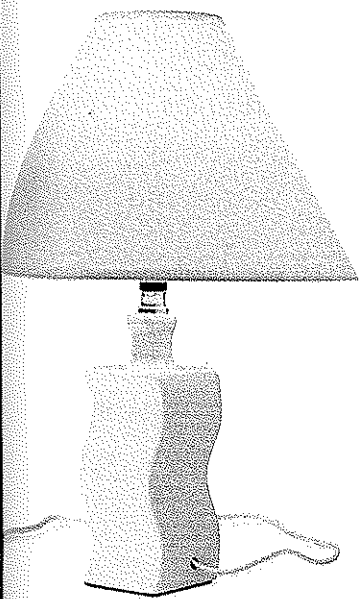
▲ Radiant energy changes to electrical energy. Your calculator may change radiant energy into the electrical energy it uses for its power.



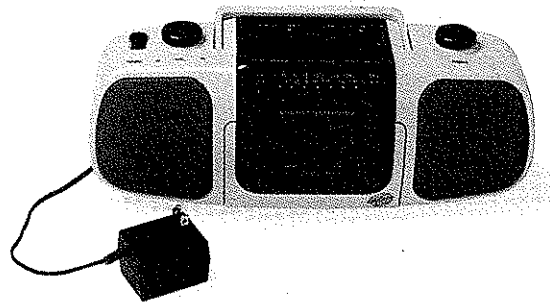
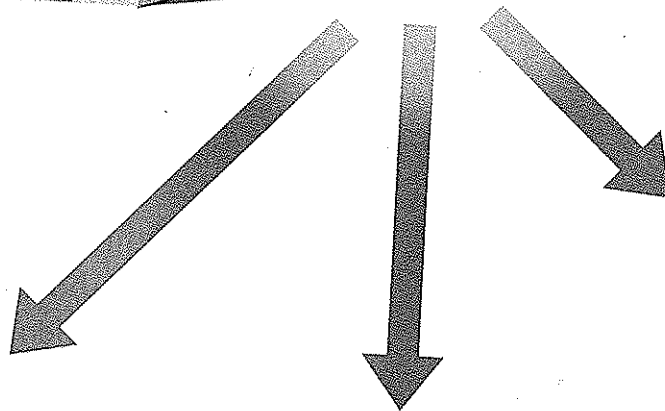
▲ Radiant energy changes to chemical energy. Plants change radiant energy from the sun into chemical energy.



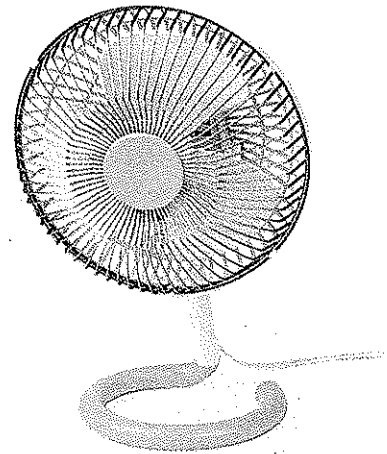
◀ Chemical energy changes to thermal energy, then to mechanical energy, and finally to electrical energy. Power plants change the chemical energy from coal into thermal energy. Then they change the thermal energy into mechanical energy to turn a generator. Finally, the generator changes the mechanical energy into electrical energy.



▲ Electrical energy changes to radiant energy. When you turn on a light, electrical energy changes into radiant energy.



▲ Electrical energy changes to sound energy. When you play a tape, electrical energy changes into sound energy.



▲ Electrical energy changes to mechanical energy. When you use a fan you change electrical energy into mechanical energy.

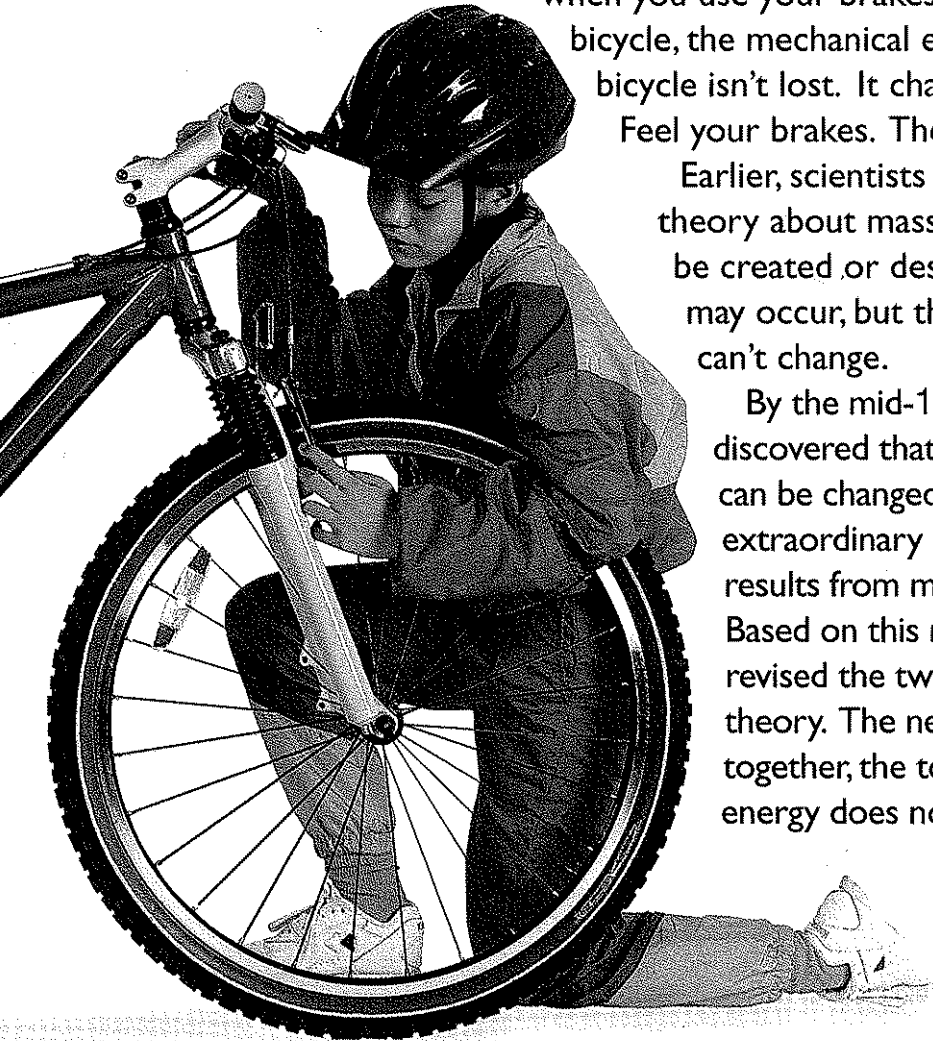


In the examples you've studied, energy changed from one form to another.

No energy was lost. Based on careful observation and many experiments, scientists in the 1800s developed a theory about energy. It stated that energy can change forms but that it can't be created or destroyed. For example, when you use your brakes to stop your speeding bicycle, the mechanical energy of your moving bicycle isn't lost. It changes into thermal energy. Feel your brakes. They're warm!

Earlier, scientists had developed a similar theory about mass. It said that matter can't be created or destroyed. Chemical changes may occur, but the total amount of matter can't change.

By the mid-1900s, scientists had discovered that energy and matter can be changed into each other under extraordinary conditions. Nuclear energy results from matter changing into energy. Based on this new evidence, scientists revised the two theories into one new theory. The new theory says that, taken together, the total amount of matter and energy does not change.



Lesson 2 Review

1. List seven forms of energy.
2. What are three forms of energy into which radiant energy can change?

3. Draw Conclusions

Will a solar powered calculator work in a dark room?