

Lesson 7.1

Full of Energy

geothermal heat, relating to Earth's internal heat, volcanoes, geysers, and hot springs are examples of geothermal activity

hydroelectric: producing electricity using the energy of water power

Scientists are constantly looking for new and renewable sources of energy. A team of researchers at the University of Massachusetts-Amherst have figured out how to convert garbage into something useful. They invented a battery that runs on bacteria. As the bacteria feed off a sugar solution, they produce electrons that power the battery. Someday, your laptop computer may be running on bacteria power.

Fossil fuels did not become widely used until the Industrial Revolution when factories required large quantities of efficient fuel to produce energy.

Does the history of energy hold promise for the future?

Energy used as power comes in two forms—renewable and nonrenewable. Renewable energy is produced by water, wind, geothermal activity, and the sun. These resources can be replenished, or built up again. Nonrenewable energy, like fossil fuels, have a limited supply, and when they start to dwindle, new sources of energy will have to be found.

- The sun was the earliest and most obvious form of energy. It provided light and heat so people could hunt and survive. Once human beings discovered fire, they were able to stay in one location, survive harsh conditions, and cook their food. Another early form of energy came from animal power. Animals were used to transport people and goods, pump water, and even power machines that could saw wood.
- Around 5,500 years ago, the ancient Egyptians learned that the wind provided energy. Using sails and wind energy permitted people to travel to areas they couldn't access by land. About 2,000 years ago, it was discovered that windmills could harness wind power. The energy created can be used to pump water or produce electricity.
- In hydropower, energy comes from the force of falling water. The heavier the water is, the more inertia it has to produce energy. Ancient Greeks harnessed the power of water by building water wheels to grind wheat into flour. The first hydroelectric dam was built in Appleton, Wisconsin in 1882. Hydro plants can be built where a natural waterfall occurs, or an artificial dam can create a waterfall.
- Geothermal energy is trapped beneath Earth's surface. Scientists drill into Earth's crust, and the heat escapes as steam. The steam rotates a turbine, which makes electricity. Geothermal energy is limited to locations near the sources of heat.
- Energy also comes from burning nonrenewable resources like the fossil fuels—crude oil, natural gas, and coal. Because they formed over millions of years, fossil fuels are not easily replaceable. As early as 1100 B.C., the Chinese burned coal to heat their homes. Today, fossil fuels are burned to light and heat our homes and power our cars.
- Nuclear energy comes from the energy released when the nuclei of uranium isotopes, a nonrenewable resource, are split apart. The energy produced from nuclear fission is used to heat water and create steam to power turbines.



Chapter 7 Lesson 1

NAME _____

Match each form of energy to its description. Write the letter of your answer on the line.

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|----------------------------|--|
| 1. _____ geothermal energy | a. produced when uranium nuclei are split apart |
| 2. _____ hydropower | b. nonrenewable sources, like coal and crude oil |
| 3. _____ nuclear fission | c. the use of Earth's internal heat |
| 4. _____ wind energy | d. the force of falling water |
| 5. _____ fossil fuels | e. renewable source, harnessed by sail and mills |

Write your answers on the lines below.

- How did the discovery of fire as an energy source change the way human beings lived?

- What is the difference between renewable and nonrenewable sources of energy? Give one example of each.

- What is "bacteria power"?

- How did the Industrial Revolution influence the usage of fossil fuels? Why?

- Why do you think that renewable sources of energy tend to be "cleaner" sources than fossil fuels?

What's Next?

Do some research on some sources of alternative energy. What are their strengths and drawbacks? How many of these sources are currently being used today? What will it take to make more of them available to wider populations of people?