

Chapter 3 Energy and Resources

Introduction

Energy sources and conservation are discussed in Chapter 3. **Fossil fuels** are the energy sources used most commonly throughout the world. Unfortunately, there are numerous disadvantages associated with using fossil fuels, which include the fact that their limited supplies are running out and their by-products are polluting the environment. There are alternative sources of energy: **wind, nuclear, solar, and hydroelectricity**. Each of these alternative energy sources has both advantages and disadvantages.

Eventually, the use of alternative energy sources will be necessary to maintain current levels of productivity as fossil fuels become scarce. Methods of **conservation**, such as reducing consumption, recycling materials, and reusing materials are ways to reduce our dependence on energy sources.

Students Should Understand the Following Concepts

- Our main source of energy is fossil fuel, which comes from the remains of dead plants and animals. Fossil fuels are nonrenewable resources.
- The combustion of fossil fuels releases carbon dioxide and other pollutants that may affect Earth's atmosphere.
- Alternatives to using fossil fuels include nuclear, solar, wind, and hydroelectric power. Each source of energy has positive and negative aspects.
- To make sure we do not run out of energy, we must conserve energy. To do this, we can reduce the amount of energy we use, recycle limited materials, and reuse materials instead of discarding them.

Activities to Develop the Topic

Use one or more of the following activities to help your students review this topic.

Before your class comes in, write "THE WORLD WILL RUN OUT OF GASOLINE IN YOUR LIFETIME" on the chalkboard. After the students have had a chance to read the statement, ask them how they think the world will deal with this problem. List the suggested solutions on the board. Once you have generated a sizeable list, assign each student one alternative energy source to research. Let them use the Internet or library to find out the latest advances in the development of alternative energy sources. Have your students present their findings to the class.

Ask students how cars, trucks, and factories that burn fossil fuels hurt the environment. They should be able to generate a relatively complete list of reasons. Explain to your students that the most damaging by-products of the combustion of fossil fuels are carbon monoxide and carbon dioxide. Introduce the idea of the greenhouse effect by bringing in some articles or videos that deal with the topic. Be sure to explain why fossil fuels are called fossil fuels. Stress the fact that fossil fuels serve as reservoirs of carbon buried million of years ago. By releasing this carbon into the atmosphere, humans are upsetting the balance of gases in the atmosphere, causing Earth's atmosphere to heat up.

Have students walk around the school and identify where energy is being wasted. Tell students to come up with suggestions about how they can cut down on the wasting of energy or other resources. Summarize the suggestions into one document. Have the class or a representative present the document to the school administration.

Name _____

Date _____

Class _____

Review of Chapter 3

- The unit used to measure the energy in food or fuel is the
(1) calorie (3) second
(2) amp (4) watt

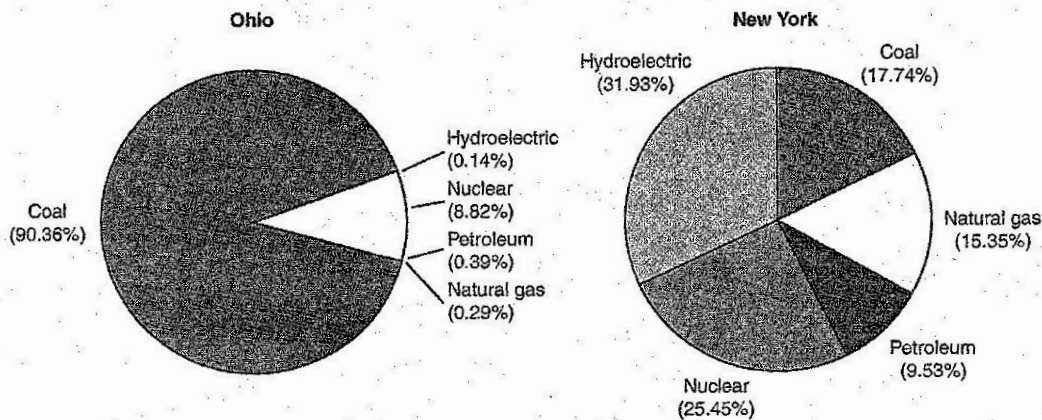
Base your answer to question 2 on the following table.

Some Electrical Devices and Their Wattage

Electric Device	Wattage	Electric Device	Wattage
Hair dryer	1200 watts	Microwave oven	750 watts
Lightbulb	100 watts	Stereo	240 watts
Electric shaver	7 watts	Toaster oven	1400 watts
Small air conditioner	860 watts		

- When compared with a lightbulb, how much more energy does a microwave oven use?
(1) 12 times more (3) 12 times less
(2) 7.5 times more (4) 7.5 times less
- Which of the following is NOT considered to be a fossil fuel?
(1) oil (3) coal
(2) natural gas (4) tar
- Which energy source makes up the largest percentage of fuel used to generate electricity in the United States?
(1) oil (3) coal
(2) gas (4) wood
- Hydroelectric plants generate electricity by converting
(1) the energy of flowing water into electrical energy
(2) the energy contained in the nucleus of atoms into electrical energy
(3) the energy stored in fossil fuels into electrical energy
(4) wind energy into electrical energy
- Which of the following is not a part of a hydroelectric power plant?
(1) cooling pool (3) dam
(2) turbine (4) generator

7. Uranium and plutonium are sources of fuel for
- (1) fossil-fuel-burning power plants
 - (2) hydroelectric power plants
 - (3) nuclear power plants
 - (4) geothermal power plants
8. Based on the graph, what fraction of New York's energy comes from nuclear power?



- (1) $\frac{1}{2}$
 - (2) $\frac{1}{3}$
 - (3) $\frac{1}{4}$
 - (4) $\frac{1}{5}$
9. What caused the energy crisis in California during the years 2000 and 2001?
- (1) The price of fossil fuels skyrocketed.
 - (2) The state did not have enough power plants.
 - (3) Residents ran out of oil after a huge oil spill.
 - (4) The state experienced multiple nuclear accidents.
10. Black lung disease most often effects
- (1) off-shore oil workers
 - (2) firefighters
 - (3) geologists
 - (4) mine workers
11. Lake Mead was created when the Hoover Dam was built during the twentieth century. One drawback of the creation of Lake Mead was that it
- (1) caused widespread floods downriver from the dam
 - (2) wasted a great deal of water that was previously used for irrigation
 - (3) flooded a great deal of land upriver from the dam and drastically changed the local ecology
 - (4) eliminated the ability to control the flow of the river's water
12. Aside from nuclear waste, nuclear power plants also produce
- (1) thermal pollution
 - (2) air pollution
 - (3) soil pollution
 - (4) meteorological pollution

13. The term that describes the saving of natural resources through wise usage is
- (1) transformation
 - (2) consumption
 - (3) conservation
 - (4) conversion
14. People can conserve energy by
- (1) purchasing larger cars with larger engines
 - (2) leaving the water running while brushing their teeth
 - (3) carpooling to work with others going to the same place
 - (4) discarding materials after they have used them once
15. An example of a company that is interested in conservation is a
- (1) car dealership that offers rebates on sports utility vehicles
 - (2) fast-food restaurant that packages its food in foam containers
 - (3) publisher that uses brand new paper to print its daily newspaper
 - (4) supermarket that offers a discount to customers who bring their own bags
16. What material cannot be recycled?
- (1) produce
 - (2) paper
 - (3) glass
 - (4) aluminum
17. What is one argument against recycling paper?
- (1) It helps to decrease air pollution by sending less waste paper to be incinerated.
 - (2) It is too expensive to recycle paper; it is cheaper to use new material for paper.
 - (3) Recycling decreases the amount of solid waste going into landfills
 - (4) Trees provide habitats for wildlife and soak up CO₂ from the atmosphere.
18. Which resource can be replenished by nature within a relatively short period of time?
- (1) oil
 - (2) coal
 - (3) wood
 - (4) natural gas
19. What is one advantage of using nuclear power to generate electricity?
- (1) It is very inexpensive.
 - (2) It is 100 percent safe; accidents never happen.
 - (3) It is renewable.
 - (4) It does not produce air pollution.
20. Why is solar power not used in place of fossil fuels?
- (1) Solar power is currently more expensive than fossil fuels.
 - (2) Technology does not currently exist to convert sunlight into electricity.
 - (3) Fossil fuels are renewable whereas solar power is not.
 - (4) Solar power is not as friendly to the environment as fossil fuels.