8th Grade Science

MONDAY 3/23	- Students will quickly read through Chapter 5 - Lesson 3 and will fill-in the Lesson Outline. - Students will also be asked to read Energy Transfers and Transformations NewsELA Article and answer the corresponding questions.
TUESDAY 3/24	- Students will be asked to complete worksheet page 45 and the MiniLab worksheet.
WEDNESDAY 3/25	- Students will be asked to complete worksheet pages 49 and 50. - They will also be asked to complete worksheet pages 51 and 52 where they will be asked to write a letter.
THURSDAY 3/26	- Students will be asked to read the NewsELA Article about Apple and their response to combating the overuse of nonrenewable resources. - Students will also be asked to complete the questions that correspond to the reading.
FRIDAY 3/27	- Students will be asked to complete worksheet pages 57 and 58.

Name _____ Date _____ Class _____

Lesson Outline **LESSON 3**

Energy Resources

A. Sources of Energy

1. Most of the energy that we use every day originally came from the _____.
2. A small amount of energy that reaches Earth's surface comes from _____.

B. Electric Power Plants

1. _____ produce most of the energy people use in their daily lives.
2. The three main sources of energy used in electric power plants are _____, _____ energy in uranium, and _____ power from falling water.

C. Nonrenewable Energy Resources

1. A(n) _____ is an energy source that is used much faster than it is replaced or is available in limited amounts.
2. _____ are the remains of ancient organisms that can be burned as an energy source.
   - **a.** Fossil fuels take _____ of years to form, and they are being used up much faster than they can be replaced.
   - **b.** _____ and natural gas form from microscopic marine organisms whose remains are subject to increasing temperature and pressure for millions of years.
   - **c.** _____ forms on land from remains of ancient plants that come under strong pressure.
   - **d.** Most of the _____ burned in the United States is used to generate electricity in power plants.
   - **e.** Most of the _____ burned in the United States is used to heat buildings.
   - **f.** Burning natural gas produces less _____ than burning other fossil fuels does.

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Lesson Outline continued

g. Burning fossil fuels releases substances that can mix with water in the atmosphere and form _____, which can damage the environment.

h. Burning fossil fuels releases carbon dioxide, which causes _____, a rise in Earth's average temperature.

3. People can transform nuclear energy from uranium _____ into thermal energy.

a. Uranium is a(n) _____ energy resource because it is no longer being formed inside Earth.

b. Nuclear power plants do not release _____ into the air.

c. Nuclear power plants produce wastes that are _____ and can cause great damage to living things.

D. Renewable Energy Resources

1. A(n) _____ is an energy resource that is replaced as fast as or faster than it is used.

2. In a(n) _____ power plant, the kinetic energy from falling water is converted into electrical energy.

3. _____ is radiant energy from the Sun.

4. A(n) _____, such as solar energy, is one that can't be used up.

5. Solar cells convert solar energy into _____ energy.

6. Wind is a(n) _____ energy resource that can be used to generate electricity.

7. Thermal energy produced inside Earth is called _____.

8. Materials from plants and animals that people burn are called _____.

9. In the United States, the most common biofuel used in cars is _____.

E. Conserving Energy Resources

1. About 86 percent of the energy used in the United States comes from _____, a nonrenewable energy resource.

2. _____ energy is one way to make our natural resources last longer.

Energy transfers and transformations

By National Geographic Society, adapted by Newsela staff on 09.12.19
Word Count **906**
Level **1120L**

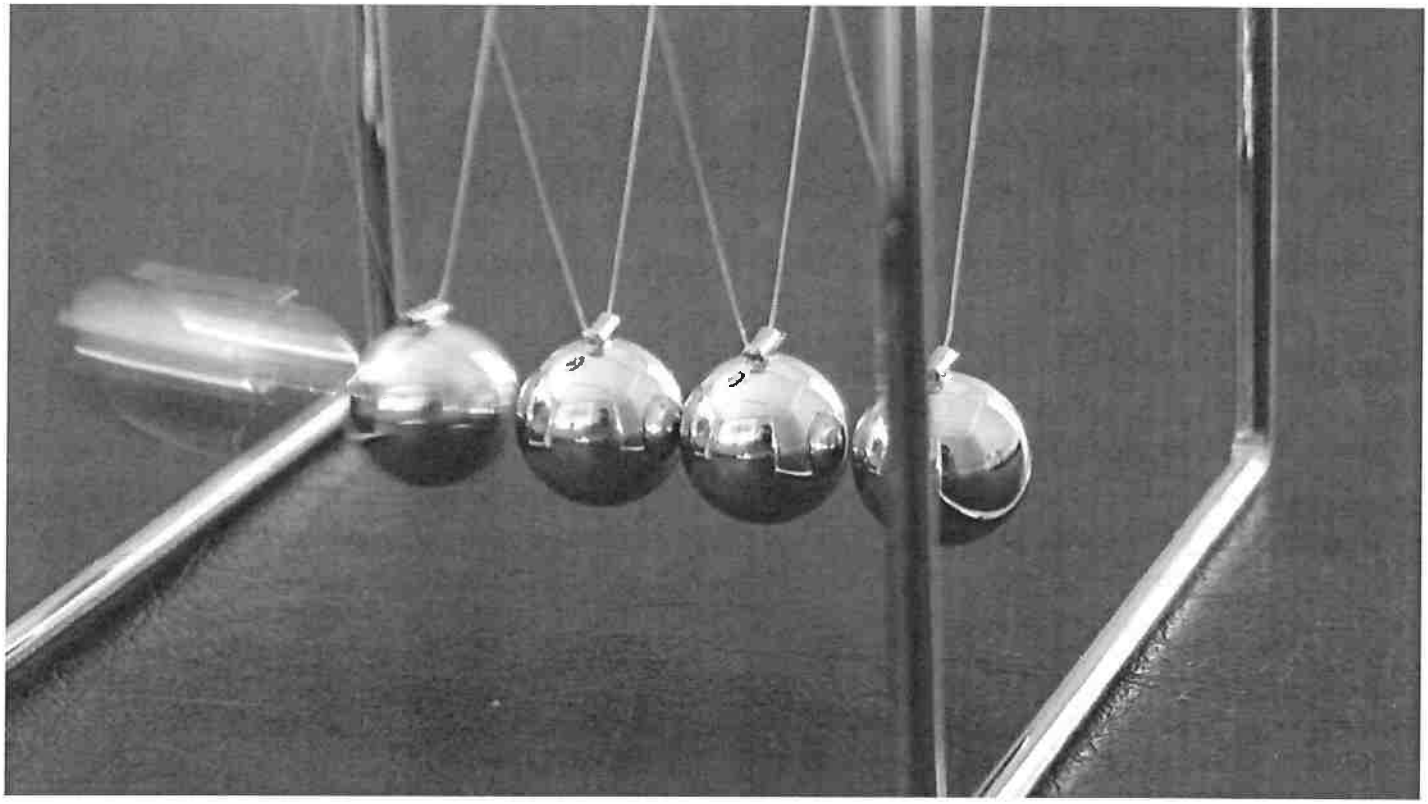


Image 1. Newton's cradle is a device that demonstrates the transfer of kinetic energy. Photo from: Wikimedia Commons

Energy cannot be created or destroyed, meaning that the total amount of energy in the universe has always been and will always be constant. However, this does not mean energy is unchangeable. It can change form and even transfer between objects.

A common example of energy transfer is the transfer of kinetic energy — the energy associated with motion — from one moving object to a stationary object via work. In physics, work is a measure of energy transfer. It refers to the force applied by an object over a distance. When a golf club is swung and hits a golf ball, some of the club's kinetic energy transfers to the ball as the club does "work" on the ball. In this type of energy transfer, energy moves from one object to another but stays in the same form. A kinetic energy transfer is easy to observe and understand, but other important transfers are not as easy to visualize.

Thermal energy has to do with the internal energy of a system from its temperature. When a substance is heated, its temperature rises because its molecules move faster and gain thermal energy through heat transfer. Temperature measures the "hotness" or "coldness" of an object, and

the term heat is used to refer to thermal energy being transferred from a hotter system to a cooler one. Thermal energy transfers occur in three ways: through conduction, convection and radiation.

When thermal energy is transferred between molecules that are in contact with one another, this is called conduction. If a metal spoon is placed in a pot of boiling water, even the end not touching the water gets very hot. This happens because metal is an efficient conductor. That means that heat travels through the material with ease. The vibrations of molecules at the end of the spoon touching the water spread up the spoon, until all the molecules are vibrating faster (i.e., the whole spoon gets hot). Some materials, such as wood and plastic, are not good conductors. That is, heat does not easily travel through the material. They are known as insulators.

Convection And Radiation

Convection only occurs in fluids, such as liquids and gases. When water is boiled on a stove, the water molecules at the bottom of the pot are closest to the heat source and gain thermal energy first. They move faster and spread out, creating a lower density of molecules, or quantity of molecules in that volume, at the bottom of the pot. These molecules rise to the top of the pot. They are replaced at the bottom by cooler, denser water. The process repeats, creating a current of molecules sinking, heating up, rising, cooling down and sinking again.

The third type of heat transfer — radiation — is critical to life on Earth. With radiation, a heat source does not have to touch the object being heated. Radiation can transfer heat even through the vacuum of space. Nearly all thermal energy on Earth comes from the sun and radiates to the surface of our planet, traveling in the form of electromagnetic waves. Electromagnetic waves, such as visible light, are waves of energy. Materials on Earth absorb these waves to be used for energy or reflect them back into space.

In an energy transformation, energy changes form. A ball sitting at the top of a hill has gravitational potential energy, which is an object's potential to do work due to its position in a gravitational field. Generally speaking, the higher on the hill this ball is, the more gravitational potential energy it has. When a force pushes it down the hill, that potential energy transforms into kinetic energy. The ball continues losing potential energy and gaining kinetic energy until it reaches the bottom of the hill.

In a frictionless universe, the ball would continue rolling forever, since it would have only kinetic energy. On Earth, however, the ball stops at the bottom of the hill due to the kinetic energy being transformed into heat by the opposing force of friction. Just as with energy transfers, energy is conserved in transformations.

Energy Transfer On A Sand Dune

In nature, energy transfers and transformations happen constantly, such as in a coastal dune environment.

When thermal energy radiates from the sun, it heats both the land and ocean. However, water has a high specific heat capacity, so it heats up slower than land. This temperature difference creates a convection current, which manifests as wind.

This wind possesses kinetic energy, which it transfers to grains of sand on the beach by carrying them short distances. If moving sand hits an obstacle, it stops due to the friction created by the

contact and its kinetic energy is then transformed into thermal energy, or heat. Once enough sand builds up, these collisions can create sand dunes, and possibly even an entire dune field.

These newly formed sand dunes provide a unique environment for plants and animals. A plant may grow in these dunes by using light energy radiated from the sun to transform water and carbon dioxide into chemical energy, which is stored in sugar. When an animal eats the plant, it uses the energy stored in that sugar to heat its body and move around, transforming the chemical energy into kinetic and thermal energy.

Though it may not always be obvious, energy transfers and transformations constantly happen all around us and are what enable life to exist.

Quiz

1 Read the following paragraph from the introduction [paragraphs 1-4].

Energy cannot be created or destroyed, meaning that the total amount of energy in the universe has always been and will always be constant. However, this does not mean energy is unchangeable. It can change form and even transfer between objects.

Which answer choice BEST supports the idea that energy remains constant during an energy transformation?

(A) They move faster and spread out, creating a lower density of molecules, or quantity of molecules in that volume, at the bottom of the pot.

(B) The process repeats, creating a current of molecules sinking, heating up, rising, cooling down and sinking again.

(C) The ball continues losing potential energy and gaining kinetic energy until it reaches the bottom of the hill.

(D) On Earth, however, the ball stops at the bottom of the hill due to the kinetic energy being transformed into heat by the opposing force of friction.

2 According to the article, life on Earth could not exist without both energy transfer and transformation.

Which paragraph BEST supports the idea outlined above?

(A) Energy cannot be created or destroyed, meaning that the total amount of energy in the universe has always been and will always be constant. However, this does not mean energy is unchangeable. It can change form and even transfer between objects.

(B) Thermal energy has to do with the internal energy of a system from its temperature. When a substance is heated, its temperature rises because its molecules move faster and gain thermal energy through heat transfer. Temperature measures the "hotness" or "coldness" of an object, and the term heat is used to refer to thermal energy being transferred from a hotter system to a cooler one. Thermal energy transfers occur in three ways: through conduction, convection and radiation.

(C) The third type of heat transfer — radiation — is critical to life on Earth. With radiation, a heat source does not have to touch the object being heated. Radiation can transfer heat even through the vacuum of space. Nearly all thermal energy on Earth comes from the sun and radiates to the surface of our planet, traveling in the form of electromagnetic waves. Electromagnetic waves, such as visible light, are waves of energy. Materials on Earth absorb these waves to be used for energy or reflect them back into space.

(D) These newly formed sand dunes provide a unique environment for plants and animals. A plant may grow in these dunes by using light energy radiated from the sun to transform water and carbon dioxide into chemical energy, which is stored in sugar. When an animal eats the plant, it uses the energy stored in that sugar to heat its body and move around, transforming the chemical energy into kinetic and thermal energy.

3 How is energy transfer different from energy transformation?

(A) Energy transfer involves thermal energy and energy transformation involves kinetic energy.

(B) Energy transformation loses energy because of friction, and energy transfer conserves energy perfectly.

(C) Energy transfer moves the same form of energy from one object to another, and energy transformation changes energy from one form to another.

(D) Energy transformation happens constantly in nature, and energy transfer only occurs as heat is radiated from the sun to Earth through space.

4 How does the author distinguish between conduction and convection?

(A) by making a comparison between conduction and a conductor

(B) by using an analogy that compares the two processes

(C) by defining how both processes conserve energy

(D) by describing how molecules behave during both processes

Name _____ Date _____ Class _____

Content Vocabulary

LESSON 3

Energy Resources

Directions: *An analogy is a relationship between two pairs of words. An analogy can be written in the following manner:* a is to b as c is to d. *For example,* apple is to fruit as celery is to vegetable. *In the analogies that follow, one of the terms is missing. On each line, write the term from the word bank that correctly completes each sentence.*

fossil	**fossil fuel**	**inexhaustible energy resource**
nonrenewable energy resource	**nuclei**	**renewable energy resource**

1. Fossil fuel is to _____ as solar energy is to inexhaustible energy resource.

2. Power plant is to power plants as nucleus is to _____.

3. Wind is to _____ as coal is to nonrenewable energy resource.

4. Coal is to _____ as kinetic energy is to energy.

5. Nonrenewable energy resource is to _____ as petroleum is to hydroelectric energy.

6. _____ is to dinosaur skeleton as energy is to the Sun.

Name _____ Date _____ Class _____

Inquiry **MiniLab** **LESSON 3: 20 minutes**

What energy resources provide our electric energy?

The data table below shows how much electric energy comes from different energy resources in the United States.

Data Table	
Energy Resource	**Percentage of Electric Energy Provided**
Petroleum	2
Natural gas	22
Coal	49
Nuclear	19
Hydroelectric	6
Wind, geothermal, and biomass	2

On a sheet of **paper,** make a circle graph of the data in the data table. Label the circle graph *Sources of Electric Energy Used in the United States.*

Analyze and Conclude

1. **Identify** from your circle graph which energy resource provides about half the electric energy used in the United States.

_____

_____

2. **Interpret** Why is your circle graph different from the circle graph in Figure 18 in your textbook?

_____

_____

3. **Key Concept** What percentage of electric energy in the United States do renewable resources provide?

_____

_____

_____

_____

Name _____ Date _____ Class _____

Content Practice A LESSON 3

Energy Resources

Directions: *Circle the term or phrase in parentheses that correctly completes each sentence.*

1. Almost all the energy in foods and fuels can be traced to energy from (inside Earth/the Sun).
2. Most of the electrical energy people use is produced by (electric power plants/solar panels).
3. (Biomass fuels/Fossil fuels) are the remains of ancient organisms that can be burned as an energy source.
4. A (nonrenewable/renewable) energy resource is an energy source that is used faster than it is replaced or is available in limited amounts.
5. A (nonrenewable/renewable) energy resource is an energy source that is replaced as fast, or faster, than it is used.
6. An inexhaustible energy resource is an energy source that (can/cannot) be used up.
7. Fossil fuels are (nonrenewable/renewable) energy resources.
8. Coal, natural gas, and (petroleum/uranium) are three types of fossil fuels.
9. Two inexhaustible energy resources are (biomass and uranium/solar energy and wind energy).
10. A (geothermal/hydroelectric) power plant transforms the kinetic energy in moving water into electrical energy.
11. About 86 percent of the energy used in the United States is from (fossil fuels/nuclear power).
12. Conserving energy (increases/reduces) the rate at which all energy resources are used.
13. A disadvantage of using (fossil fuels/nuclear energy) is air pollution.
14. Using fossil fuels results in an (decrease/increase) in the average temperature of Earth's atmosphere.

Name _____ Date _____ Class _____

Content Practice B **LESSON 3**

Energy Resources

Directions: *Answer each question or respond to each statement on the lines provided.*

1. **List** the three main energy sources used in electric power plants. For each source, name the form of energy used to produce electrical energy.

   a. _____

   b. _____

   c. _____

2. **Define** the following terms:

   a. nonrenewable energy resource

   _____

   _____

   b. fossil fuel

   _____

   _____

   c. renewable energy resource

   _____

   _____

   d. inexhaustible energy resource

   _____

   _____

3. What are three types of fossil fuels? **Explain** why they are nonrenewable energy resources.

   _____

   _____

   _____

   _____

4. What are five renewable energy resources?

   _____

   _____

Name _____ Date _____ Class _____

Language Arts Support LESSON 3

Writing Activity: Write a Letter

Learning the Skill

Telephones and e-mail have replaced writing letters in many situations. However, sometimes letters might be the most appropriate way to communicate information. Because writing a letter is more formal than a telephone call or e-mail, care must be taken when writing it. There are five main parts to the structure of a letter.

- **Heading** The heading is usually located in the upper-right corner. The heading contains your name and address. In a business letter, the address of the business is added on the left below your address.
- **Salutation** The salutation, or greeting, begins with the word *Dear* and is followed by the name of the person who receives the letter. A comma or colon is placed after the person's name.
- **Body** The body is the main part of the letter, where you present the information or ideas that you want to express.
- **Closing** The closing is written below the body of the letter. Common closings are *Sincerely, Thank you,* and *Best regards.* The first letter of the closing phrase is capitalized, and the phrase is followed by a comma.
- **Signature** The final part of the letter is your signature. If the letter is to a friend, your first name might be enough; if the letter is more formal, use your full name.

A common reason for writing a letter is to submit a letter to the editor of a newspaper or magazine. These letters often are written to complain, compliment, clarify, or seek additional information. Use the following guidelines for writing these types of letters:

- Clearly explain the problem or situation.
- State your opinion about a cause or an issue and suggest possible solutions.
- Support your opinion with facts and examples.
- Suggest ways to change or improve the situation.

When writing a formal letter, it is often helpful to write a draft of the letter and then make changes, or revisions. You can improve the organization of the letter and support your opinions with facts. Revisions also help ensure that the letter is clearly written.

Name _____ Date _____ Class _____

Language Arts Support **LESSON 3**

Writing Activity: Write a Letter

Practicing the Skill

Directions: *Read the following letter to the editor of the* Sunny City Newspaper. *Then answer each question on the lines provided.*

Keisha Smith
1234 Electric Ave.
Sunny City, USA

Hello Ms. Kim,

Yesterday, I read the article about the new coal-burning power plant that is planned for construction in our town. I understand that we need a greater energy supply for our growing town. However, I am concerned about the effects of burning more fossil fuels. Has the possibility of pursuing hydroelectric power on the nearby Rushing River been investigated? Hydroelectric power could provide electricity without emitting air pollution. I recently learned about geothermal energy. Is geothermal energy a possibility for our town?

Best regards,
Keisha Smith

1. Are the heading and salutation written correctly in this letter? What changes, if any, would you make?

_____

_____

2. What is another change or revision that Keisha could make to improve her letter?

_____

_____

_____

Applying the Skill

Directions: *Write a letter to the editor of your town or city newspaper. Describe what you think is important about conserving or using more energy resources in your town. Be sure to consider all energy resources described in Lesson 3. On a separate piece of paper, write a draft letter to help you organize and support your thoughts. Then write a complete letter to the editor, being sure to include all five parts of a letter.*

Apple and its suppliers commit to clean and renewable energy sources

By Washington Post, adapted by Newsela staff on 04.19.19
Word Count **736**
Level **1060L**

Workers install panels at a solar station in Hongyuan, China, in June 2015. Photo by: Jie Zhao/Corbis via Getty Images

Earlier this month, Apple announced that 21 manufacturers who work on its products have made a new pledge. They plan to obtain all their electricity from cleaner renewable sources, such as wind and solar power.

These manufacturers are companies that make parts for Apple products. Overall, the plan would increase renewable energy usage to more than 40 percent for Apple and its suppliers, the company said.

Last year, Apple said it had purchased enough renewable energy to cover all of its own operations. It also purchased enough renewable energy to cover many of the needs of its suppliers.

A Goal To Reduce Greenhouse Gas Emissions

Apple's greater goal is to reduce what its products contribute to greenhouse gas emissions. Scientists have linked these gases to a rise in average global temperatures and climate change.

Apple acknowledged that nearly three-fourths of its carbon footprint comes from manufacturing. It relies on outside companies to manufacture almost all of its products.

A company's carbon footprint is all emissions of greenhouse gases, particularly carbon dioxide, that result from the company's activities.

A majority of Apple's suppliers are based in China, said Lisa Jackson. She is Apple's vice president of environment, policy and social initiatives.

"We're super excited about the fact that this program has taken off the way it has," she said. "In doing all of this, we based it on our belief that companies would join us if we could show that it was economically feasible and doable."

The U.S. Withdrew From The Paris Climate Accord

The announcement from Apple comes at a welcome time. The maker of iPhones, iPads and laptop computers is one of the wealthiest companies in the world. People who invest money and customers are increasingly asking top companies to step into the leadership void left by the U.S. government under President Trump. Last year, his administration withdrew from the Paris climate accord. This international agreement seeks to reduce greenhouse gas emissions worldwide. Nearly every country in the world is part of it.

Jackson joined Apple after serving as President Barack Obama's Environmental Protection Agency administrator. Obama had helped craft the Paris climate accord. She mentioned that U.S. withdrawal from the agreement as a motivation for the computer giant. Apple felt it was important for U.S. businesses to show they care about addressing climate change, and that they see their responsibility to act.

A Leader In Tech Promotes Climate-Related Projects

Apple is one of the wealthiest companies in the United States and the world. More of the powerful tech companies are taking steps toward getting more of their energy needs from carbon-free sources.

Sometimes, the power and wealth of big firms mean they can contribute in ways other companies cannot. Google, for example, has launched an initiative to help local political leaders identify sources of carbon pollution. Apple, too, has an online platform to help suppliers find renewable energy sources.

Apple said it has also used $2.5 billion in "green bonds." These bonds raised money for use in promoting renewable energy and climate-related projects. The projects funded have covered 66 percent of Apple's own electricity needs. The company contributed to 40 environmental projects. They have ranged from solar rooftops in Japan to water conservation in Oregon.

Old Devices Become "E-Waste"

At the same time, environmentalists have pointed to Apple's mountains of "e-waste." They blame the company's endless cycle of new products. Consumers contribute to this waste by abandoning old devices for new ones. For example, Apple's decision to frequently change the design of charging ports on its cellphones and laptops leads to many abandoned power cords.

Jackson said Apple is "absolutely working on" the charger question. At the same time, it has identified higher priorities regarding a goal it set two years ago. The company is committed to using recycled materials in all of its devices to reduce the impact of mining.

Using Recycled Aluminum Is Another Big Step

Last October, Apple took a step with a relatively easy metal to recycle: aluminum. The company committed to using recycled aluminum in its MacBook Air and Mac mini computers.

Jackson said the company is changing how it accesses materials for its products, including "conflict materials." These are materials that are mined and sold to fund warfare. Recycling also can reduce the amount of energy needed to make some materials. Jackson noted that aluminum smelting remains a large source of carbon emissions.

Quiz

1 Which section from the article BEST explains how traditional manufacturing practices contribute to climate change?

(A) "A Goal To Reduce Greenhouse Gas Emissions"

(B) "A Leader In Tech Promotes Climate-Related Projects"

(C) "Old Devices Become "E-Waste"

(D) "Using Recycled Aluminum Is Another Big Step"

2 Read the list of sentences from the article.

1. *Apple acknowledged that nearly three-fourths of its carbon footprint comes from manufacturing.*
2. *Sometimes, the power and wealth of big firms mean they can contribute in ways other companies cannot.*
3. *Apple, too, has an online platform to help suppliers find renewable energy sources.*
4. *The company committed to using recycled aluminum in its MacBook Air and Mac mini computers.*

Which two sentences provide the BEST evidence to support the idea that Apple is taking steps to protect the environment?

(A) 1 and 3

(B) 2 and 4

(C) 1 and 2

(D) 3 and 4

3 How did the Trump administration's withdrawal from the Paris climate accord affect Apple?

(A) The amount of greenhouse gases produced by Apple in the United States increased.

(B) Apple's leadership publicly condemned President Trump's decision to ignore climate change.

(C) The decision encouraged Apple to step up and show it cares about fighting climate change.

(D) Investors in the company demanded that Apple change its manufacturing practices.

4 According to the article, why is Apple's announcement about renewable energy important?

(A) The announcement will help Apple make more money in the United States, because more people buy only sustainable products.

(B) The decision will lower Apple's climate footprint, help protect the planet and encourage other companies to act as well.

(C) The decision will prove to the public that renewable energy is easier to use and less expensive than non-renewable sources.

(D) The announcement by Apple will help push the Trump administration to take climate change seriously and rejoin the Paris climate accord.

Name _____ Date _____ Class _____

Key Concept Builder **LESSON 3**

Energy Resources

Key Concept What are renewable energy resources?

Directions: *Answer each question on the lines provided.*

1. How are a renewable energy resource and an inexhaustible energy resource the same? How are they different?

2. How is radiant energy from the Sun converted into electricity?

3. How is wind energy converted into electrical energy?

4. How can geothermal energy underground be used to produce electricity?

5. What is the most common use of biomass energy?

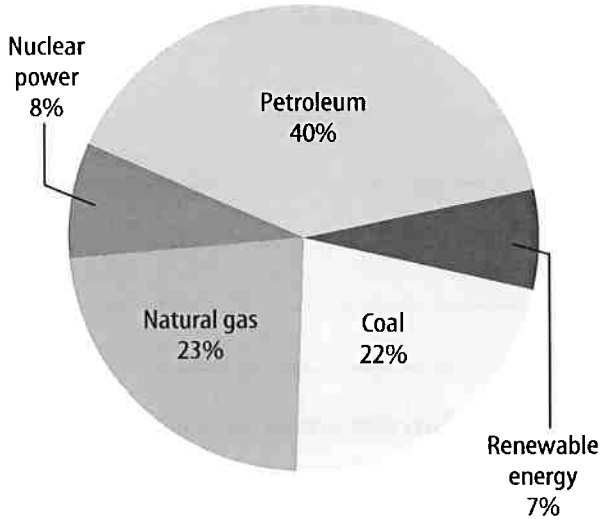
Name _____ Date _____ Class _____

Key Concept Builder **LESSON 3**

Energy Resources

Key Concept Why is it important to conserve energy?

Sources of Energy Used in the U.S. in 2006



Directions: *Use the diagram to answer each question or respond to each statement.*

1. **List** the specific sources of nonrenewable energy used in 2006.

_____

2. What percentage of the energy used was from fossil fuels? _____

3. Why do you think the sources of energy used could be a problem?

_____

_____

_____

_____

4. **Explain** how conserving energy could help the problem.

_____

_____

_____

_____