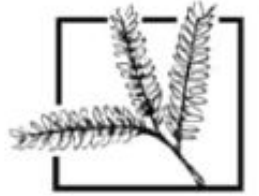




UNITED ARAB EMIRATES
MINISTRY OF EDUCATION



YEAR OF TOLERANCE

TEACHER EDITION

2018 - 2019

McGraw-Hill Education

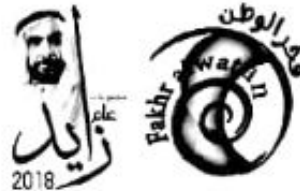
Integrated Science

United Arab Emirates Edition

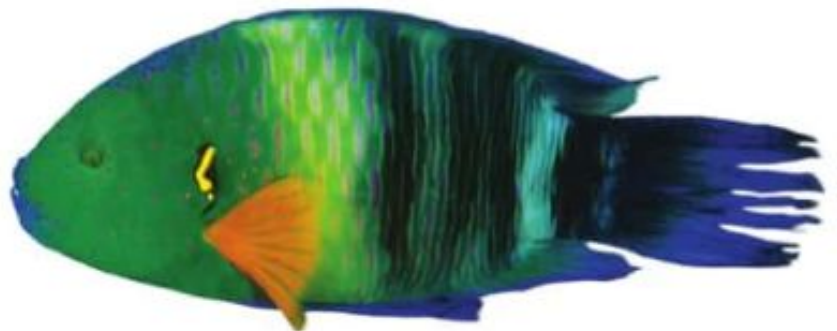


Activity Lab Manual

2019
عام التسامح



مجموعات فخر الوطن وعام زايد



Mc
Graw
Hill
Education

Answer Key

McGraw-Hill Education

Integrated Science

United Arab Emirates Edition

GRADE 6 VOLUME 3

Activity Lab Manual

مجموعات فخر الوطن وعام زايد



Brief Contents

Chapter 1: Methods of Science

Chapter 2: Activities are not available

Chapter 3: Energy, Work, and Simple Machines

Chapter 4: Matter and Atoms

Chapter 5: Matter: Properties and Changes

Chapter 6: Mixtures, Solubility, and Acid/Base Solutions

Chapter 7: Classifying and Exploring Life

Chapter 8: Cell Structure and Function

Chapter 9: Our Planet Earth

Chapter 10: Earth in Space

Chapter 11: Natural Resources

Chapter 12: Environmental Impact

Lesson 1 The Sun-Earth-Moon System

Skim Lesson 1 in your book. Read the headings and look at the photos and illustrations. Identify three things you want to learn more about as you read the lesson. Record your ideas in your Science Journal.

Main Idea

Earth and the Universe



Motions of Earth

Earth's Tilt and Seasons

Details

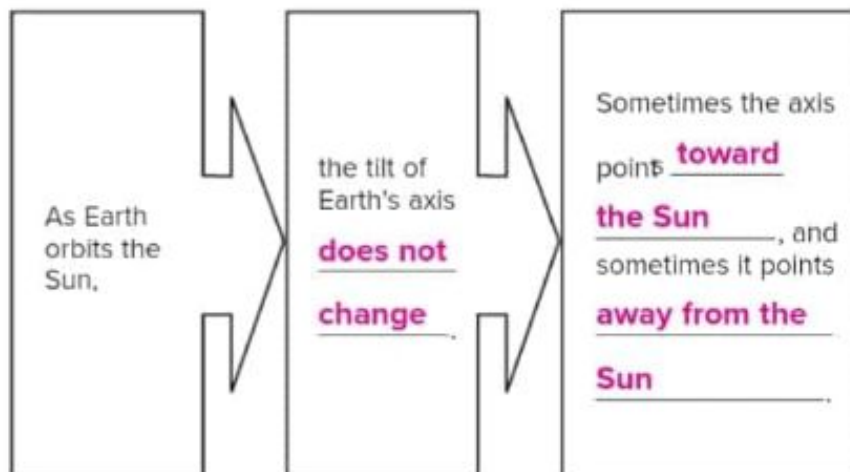
Organize information about objects in the universe.



Differentiate revolution from rotation.

Revolution	Rotation
Definition: the orbit of an object around another object	Definition: the spin of an object around its axis
Effect on Earth: movement around the Sun; one year	Effect on Earth: day and night

Relate the tilt of Earth's axis to Earth's changing seasons.



Lesson 1 | The Sun-Earth-Moon System (continued)

Main Idea

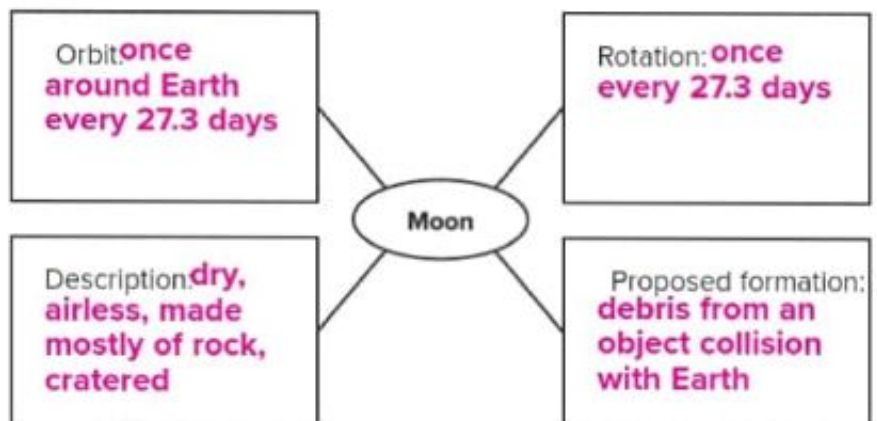
Details

Compare and contrast equinoxes and solstices.

	Equinox	Solstice
Duration	one day	one day
Times per year	2	2
Start of seasons	spring, fall	winter, summer
Months of occurrence	March, September	December, June

Earth's Moon

Characterize the Moon.



Phases of the Moon

Student drawings should correspond to these written descriptions.

Describe the visible moon during each phase. You may use words or draw representative shapes.

New moon not visible	Waxing crescent a sliver that arcs to the right	First quarter the right half of a circle	Waxing gibbous more than a right half-circle, but less than full
Full moon a full circle	Waning gibbous more than a left half-circle, but less than full	Last quarter the left half of a circle	Waning crescent a sliver that arcs to the left

Lesson 1 | The Sun-Earth-Moon System (continued)

Main Idea

Tides

Eclipses


Details

Detail information about tides.


Definition: the daily rising and falling levels of oceans and other large bodies of water

Cause: gravitational pull of the Moon and the Sun


Most influential factor: the Moon

 **Describe** the effects of moon phases on tides.

Moon Phases	Description of Tides
Full moon and new moon	<u>spring</u> tides
	High tides: <u>higher than usual</u>
	Low tides: <u>lower than usual</u>
First quarter and last quarter	<u>neap</u> tides
	High tides: <u>lower than usual</u>
	Low tides: <u>higher than usual</u>

 **Contrast** the moon phases during which solar and lunar eclipses occur.

Solar Eclipse	Lunar Eclipse
<u>only during a new moon</u>	<u>only during a full moon</u>

 **Connect It** Suppose you travel to the beach to view a total solar eclipse. Describe the tides that you witness on that day.

Accept all reasonable responses. Sample answer: A solar eclipse can occur only during a new moon, and spring tides occur during the new moon. On the day of the eclipse, the high tides would be higher than usual, and the low tides would be lower than usual.

Lesson 2 The Solar System

Scan Lesson 2. Read the lesson titles and bold words. Look at the pictures. Identify three facts you discovered about the solar system. Record your facts in your Science Journal.

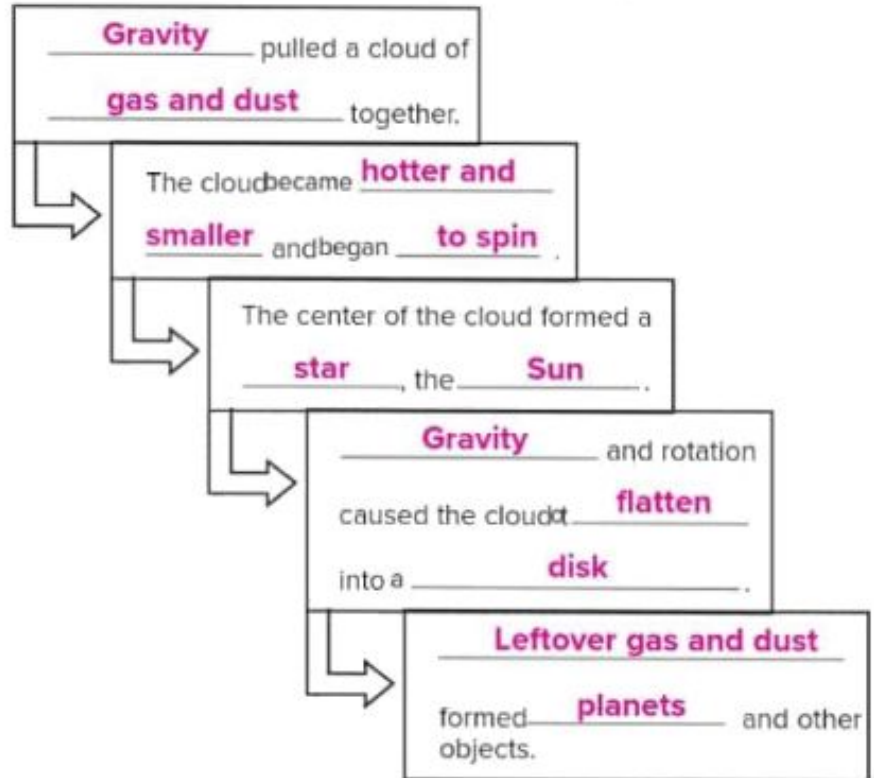
Main Idea

The Solar System



Details

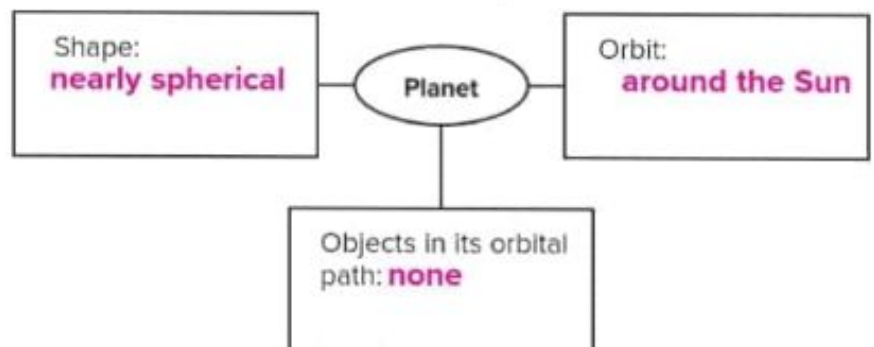
Sequence the formation of the solar system.



Generalize the relationship between a planet's position and its orbit around the Sun.

The closer a planet is to the Sun, the faster it revolves.

Characterize planet in the solar system.



Lesson 2 | The Solar System (continued)

Main Idea

Details



Describe objects in the solar system.

Object	Details
Dwarf planets	Difference from planets: share their orbital paths with other objects of similar size
Moons	Definition: natural satellites that orbit an object other than a star
Asteroids	Description: small, rocky Orbit: around the Sun Location of the asteroid belt: between the orbits of Mars and Jupiter
Comets	Description: small, icy Orbit: around the Sun Difference from asteroids: develop tails as they near the Sun
Meteoroids	Definition: solid bits of debris that travel through the solar system



Classify the planets in the solar system. Circle the planet that is similar in size to Earth.

	Planet	Distance from the Sun
Inner Planets	Mercury	.39 AU
	Venus	.72 AU
	Earth	1 AU
	Mars	1.5 AU
Outer Planets	Jupiter	5 AU
	Saturn	9.5 AU
	Uranus	20 AU
	Neptune	30 AU



Analyze It Summarize the main differences between rocky planets and gas giants.

Accept all reasonable responses. Sample answer: The rocky planets are the inner planets; they generally are smaller and contain heavier elements. The gas giants are the outer planets; they are much larger, contain more gases, and have rings.

Lesson 3 Stars, Galaxies, and the Universe

Predict three facts that will be discussed in Lesson 3 after reading the headings. Record your predictions in your Science Journal.

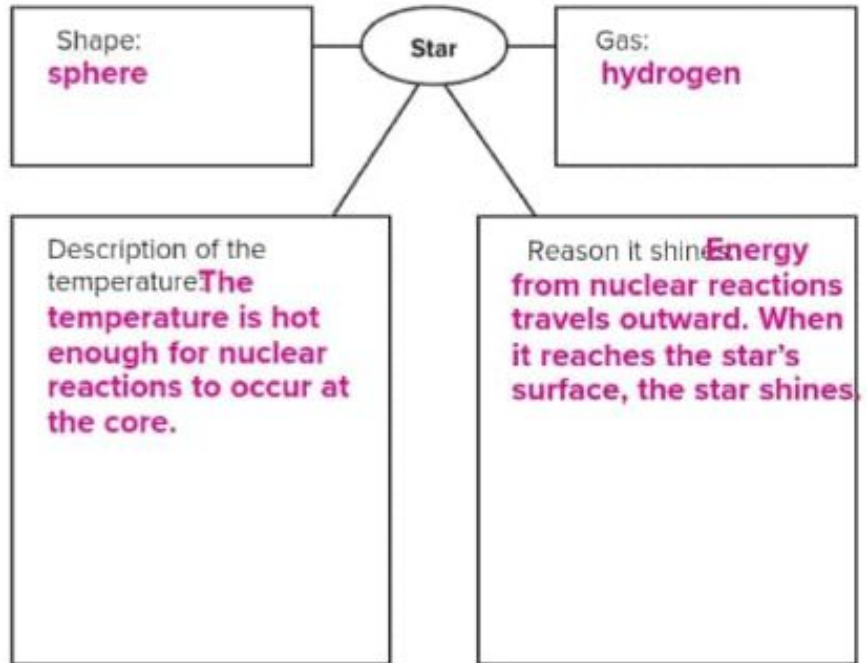
Main Idea

Stars



Details

Characterize stars.



Compare and contrast a light-year and an astronomical unit (AU).

Light-year	Both	Astronomical Unit
the distance light travels in one year	measures of distance in the universe	the distance from Earth to the Sun

Explain why we do not know what the star Proxima Centauri looks like today.

The light that is leaving Proxima Centauri today will not reach Earth for 4.2 years.

Lesson 3 | Stars, Galaxies, and the Universe (continued)

Main Idea

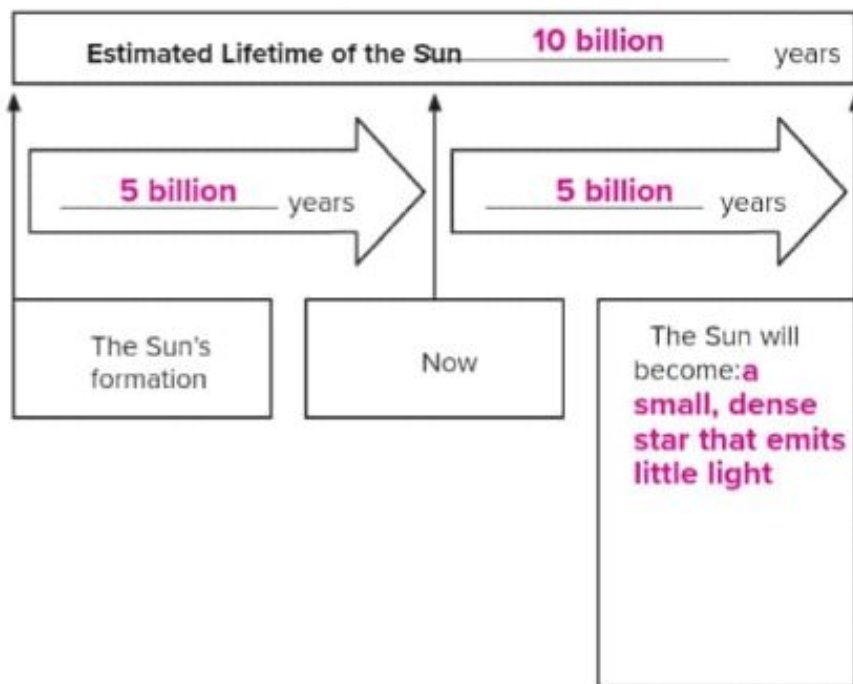
Details



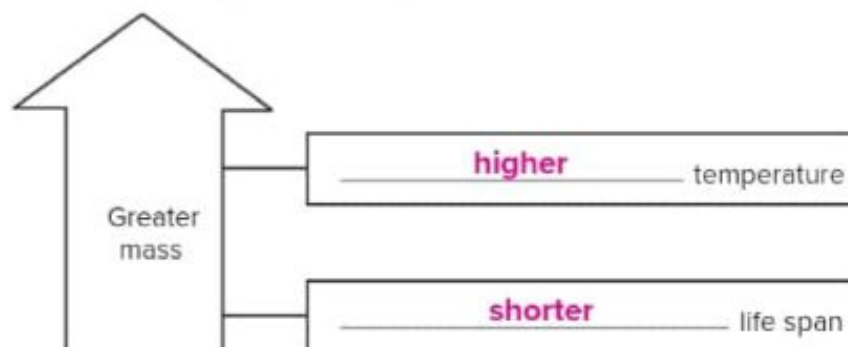
Contrast *the Sun with other stars.*

Color	Size	Arrangement (circle one)
yellow Colors that are cooler: red, orange Colors that are hotter: white, blue	Larger and more massive than: 90% of other stars Tiny when compared with: the most giant stars	<u>Solitary star</u> Part of a binary system Part of a multiple-star system

Complete *the timeline of the Sun's life span.*



Generalize *ways that mass affects a star.*



Lesson 3 | Stars, Galaxies, and the Universe (continued)

Main Idea

Galaxies



Details

Characterize types of galaxies.

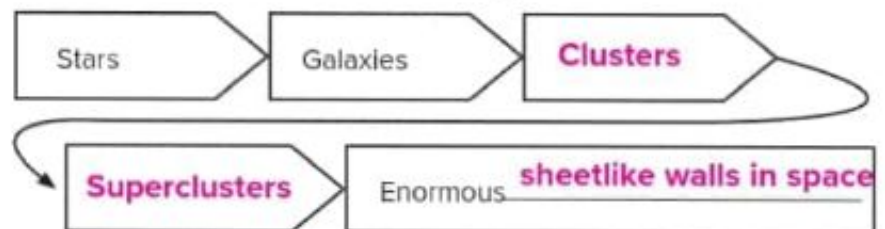
Type	Characteristics
All	huge collections of stars, gas, and dust
Elliptical	Shape: like basketballs or footballs Stars: older, redder stars; few young stars Gas and dust: little
Irregular	Shape: oddly shaped Stars: highest rate of star formation Gas and dust: large amounts
Spiral	Shape: like disks Stars: young stars in bluish arms; older, redder stars in central bulges Gas and dust: in spirals

Describe Earth's position within its galaxy.

The Sun (and Earth orbiting it) is near one of the Milky Way's two major arms, a little more than halfway from the galaxy's center.

The Universe

Relate structures that make up the universe.



Restate the Big Bang theory.

The universe began from one point and has been expanding and cooling ever since.



Synthesize It Based on what scientists know about the structure of the universe and the theories about its origin, describe two ways the universe could change over time.

Accept all reasonable responses. Sample answer: It could continue to expand forever, or gravity could eventually cause it to contract.

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned.

Use this checklist to help you study.

- ☐ Complete your Foldables® Chapter Project.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Reread the chapter, and review the charts, graphs, and illustrations.
- ☐ Review the Understanding Key Concepts at the end of each lesson.
- ☐ Look over the Chapter Review at the end of the chapter.



Summarize It Reread the chapter Big Idea and the lesson Key Concepts. Summarize how gravity relates to the Key Concepts in Lessons 1, 2, and 3.

Accept all reasonable responses. Sample answer: Gravity is the force that keeps Earth in orbit around the Sun and the Moon in orbit around Earth. Scientists theorize that the Moon formed from debris of an object's collision with Earth; the debris was pulled together into a spherical shape by gravity. It is gravity that caused the Sun to form from gas and dust, and gravity holds all the objects in the solar system in their orbits. Gravity causes the formation of all stars, and keeps stars that occur in binary or multiple-star systems in their formations. Gravity pulls collections of billions of stars into galaxies and holds collections of galaxies in clusters and super clusters.

Challenge Of the innumerable objects that orbit the hundreds of billions of stars in the hundreds of billions of galaxies in the universe, only Earth is known to support life. Research to learn about what scientists are doing to investigate the possibility of life elsewhere in the universe. Write a short report about what you learn, and share it with your class.

Lesson 1 Energy Resources

Predict three facts that will be discussed in Lesson 1 after reading the headings. Record your predictions in your Science Journal.

Main Idea

Details

Sources of Energy

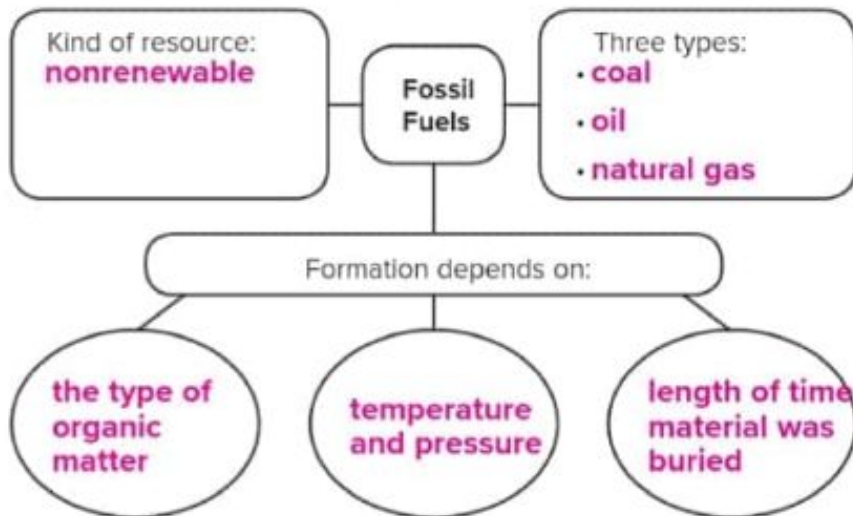
Contrast sources of energy.

Source	Nonrenewable	Renewable
Definition	resources that are used faster than they can be replaced by natural processes	resources that can be replaced by natural processes in a relatively short amount of time
Examples	fossil fuels, uranium	solar, wind, water, geothermal, biomass

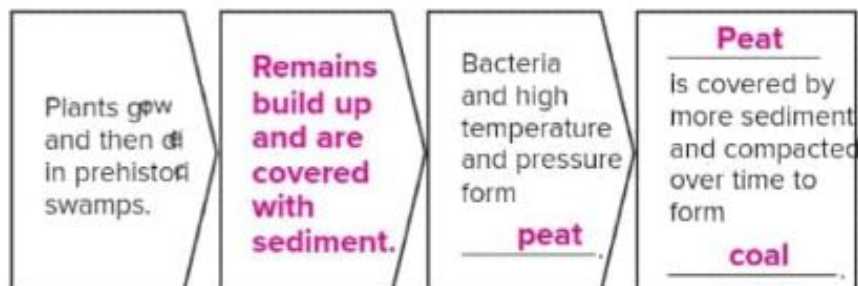
Sample answers are shown.

Nonrenewable Energy Resources

Organize information about fossil fuels.



Sequence the steps in the formation of coal.

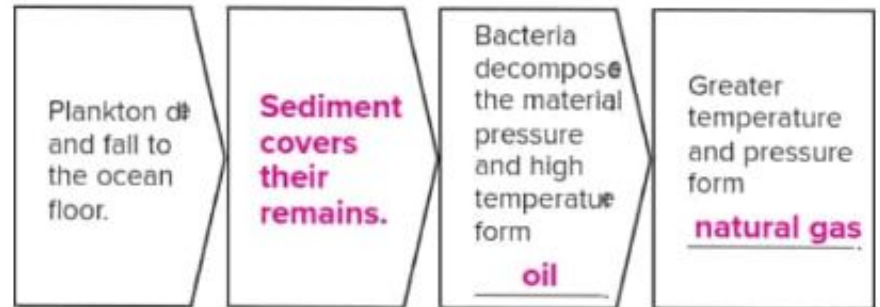


Lesson 1 | Energy Resources (continued)

Main Idea

Details

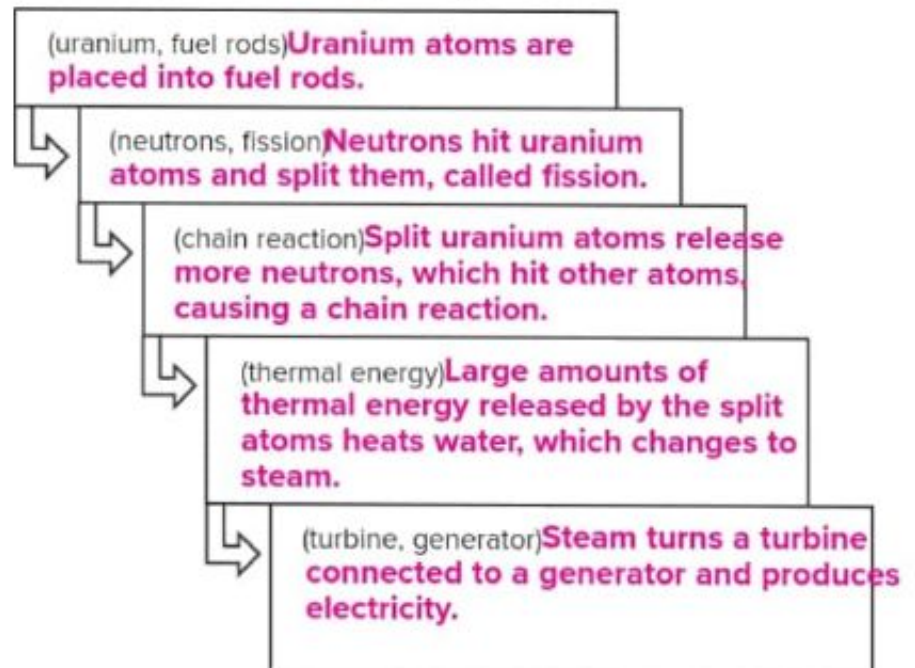
Order the steps in formation of oil and natural gas.



Assess advantages and disadvantages of using fossil fuels.

Advantages	Disadvantages
<ul style="list-style-type: none"> • fairly easy and direct to transform chemical energy to electrical energy • relatively inexpensive • relatively easy to transport 	<ul style="list-style-type: none"> • limited supply • habitat disruption • pollution from mining and from burning

Sequence the steps that occur in a nuclear power plant. Use the word(s) in parentheses in your explanation.




Main Idea

Managing Nonrenewable Energy Resources

Sample answers are shown.

Details

 **Assess** advantages and disadvantages of nuclear energy.

Advantages	Disadvantages
<ul style="list-style-type: none"> • A small amount of uranium produces large amount of energy. • A well-run plant does not pollute air, soil, or water. 	<ul style="list-style-type: none"> • Uranium is nonrenewable. • An out-of-control chain reaction can release harmful substances into the environment. • Nuclear waste is radioactive and dangerous for thousands of years.


Contrast the population of the United States with its percentage of the world's energy usage.

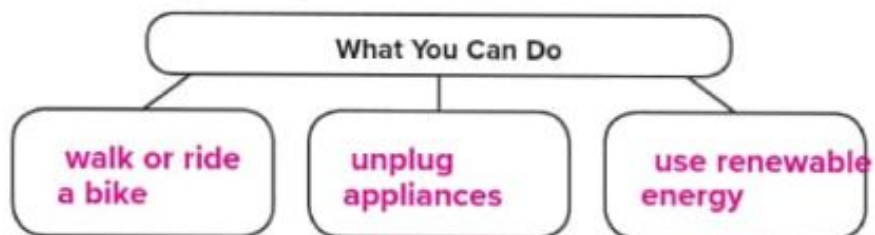
Percent of the world's population: 4.5


Percent of the world's energy use: 22

Explain reclamation.

Mined land is recovered with soil and replanted with vegetation.

 **Identify** three ways individuals can help manage nonrenewable resource usage wisely.



 **Connect It** If you were choosing to move to a new town based on energy management, what kind of power plant would you look for to produce your electricity? Why?

Accept all reasonable responses. Sample answer: I would want to live in a town with a well-run nuclear power plant because nuclear energy is relatively efficient and its production doesn't pollute as badly as power plants that use fossil fuels.

Lesson 2 Renewable Energy Resources

Scan Lesson 2. Read the lesson titles and bold words. Look at the pictures. Identify three facts you discovered about renewable energy resources. Record your facts in your Science Journal.

Main Idea

Renewable Energy Resources



Advantages and Disadvantages of Renewable Resources

Details

Describe how people make use of renewable energy.

Type	Description of Its Use
Solar energy	Solar cells capture light energy from the Sun and convert it to electrical energy.
Wind energy (Wind farms)	Wind turns groups of wind turbines that produce electricity.
Hydroelectric power	Dams across powerful rivers produce electricity from flowing water.
Tidal power	Flowing water between high and low tides turns turbines that produce electricity.
Geothermal energy	Thermal energy from Earth's interior produces steam that turns turbines to produce electricity.
Biomass energy	Organic material can be burned or converted into fuel for vehicles.

Classify renewable energy resources by their advantages.

Advantage	Renewable Resources
Nonpolluting	solar, wind, water
Available in the United States	solar, wind, water, geothermal, biomass
Relatively inexpensive	wind
Produces little pollution	geothermal
Reduces organic material in landfills	biomass

Lesson 2 | Renewable Energy Resources (continued)

Main Idea

Details

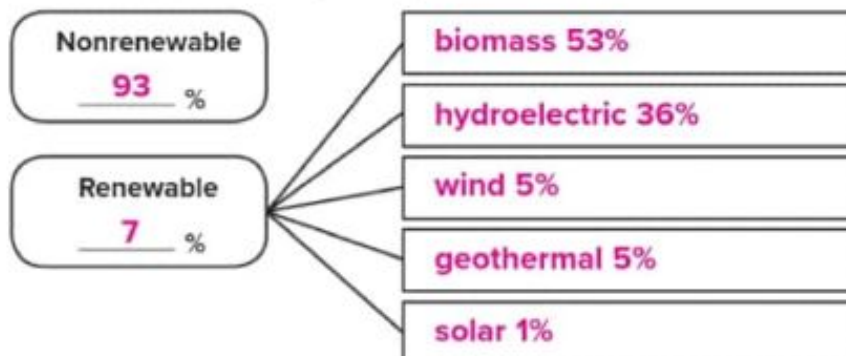


Categorize *renewable resources by their disadvantages.*

<ul style="list-style-type: none"> • affected by long periods of no rainfall • negative impact on aquatic ecosystems • limited to areas with fast-flowing rivers or great tidal differences 	water
<ul style="list-style-type: none"> • air pollution • less efficient than fossil fuels 	biomass
<ul style="list-style-type: none"> • best sites are far from urban areas • limited to areas with strong, steady wind • potential impact on bird populations 	wind
<ul style="list-style-type: none"> • habitat disruption from drilling • limited to tectonically active areas 	geothermal
<ul style="list-style-type: none"> • high cost • less energy produced on cloudy days • no energy produced at night • requires large surface area 	solar

Managing Renewable Energy Resources

Evaluate *proportions of energy resources in the United States.*



Sample answer

Identify *one way to encourage use of renewable energy resources.*

Buy products that are made using renewable energy resources.



Analyze It *How does the turbine enable us to use renewable energy resources?*

Accept all reasonable responses. Sample answer: The turbine is the essential tool in the conversion of energy from many renewable resources into electricity. Motion from wind and water (in both rivers and tides) moves turbines, which powers generators. Geothermal energy and the burning of biomass can also produce steam, which moves turbines and powers generators.

Lesson 3 Land Resources

Skim Lesson 3 in your book. Read the headings and look at the photos and illustrations. Identify three things you want to learn more about as you read the lesson. Record your ideas in your Science Journal.

Main Idea

Land as a Resource

Forests and Agriculture



Details

Rank uses of land in the United States.

Approximate Percentage	Use
4	urban
20	agriculture
22	miscellaneous
26	grassland and pasture
28	forest

Characterize the change to land in the eastern United States from 1860 to the present.

1860 mostly forest	1920 forests mostly cut down	Why? wood for fuel and products; land cleared for development and agriculture	Now Some forests are regrown, but they are not as tall or complex.
-----------------------	---------------------------------	--	---

Describe mineral resources, and circle the category that comes from ores. **Sample answers**

Mineral Resource	Examples and Uses
Metallic	aluminum in refrigerators • iron in nails
Nonmetallic	sulfur in paint • fluorite in paint pigment

Lesson 3 | Land Resources (continued)

Main Idea

Advantages and Disadvantages of Using Land Resources

Sample answers are shown. Students might also note as a disadvantage that minerals can take millions of years to form.

Sample answers are shown.

Managing Land Resources

Sample answers are shown.

Details



Assess advantages and disadvantages of using land resources. Write two of each.

Advantages	Disadvantages
<ul style="list-style-type: none">• Soil and forests are widely available.• Crops and trees are renewable.	<ul style="list-style-type: none">• Deforestation leads to soil erosion and loss of habitat.• Pollution is caused by runoff from mines.

Elaborate on three problems associated with deforestation.

1. leads to soil erosion
2. leads to loss of animal habitat
3. can affect global climates

Identify three ways governments manage land resources.

1. preserve forests and other ecosystems
2. restore land mined for mineral resources
3. manage land to conserve soil and increase yield



Express three things individuals can do to help manage land resources wisely.

1 recycle	2 compost	3 community gardening
--------------	--------------	--------------------------



Synthesize It Explain some of the issues that must be debated when deciding whether to develop or preserve land.

Accept all reasonable responses. Land is valuable, as it contains both renewable and nonrenewable resources. It not only provides living space and materials that people need to live, but it also provides habitat to countless other species. We must weigh the usefulness and availability of things people need to survive against the consequences to the environment.

Lesson 4 Air and Water Resources

Predict three facts that will be discussed in Lesson 4 after reading the headings. Record your predictions in your Science Journal.

Main Idea

Importance of Air and Water

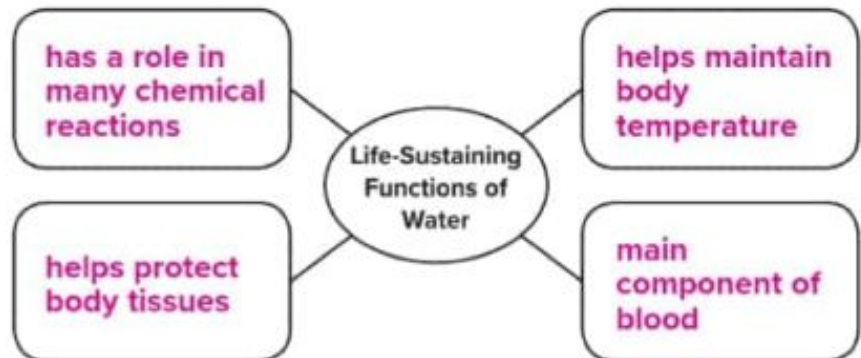


Details

Contrast the importance of different types of natural resources to people and other organisms.

Fossil Fuels and Minerals	Air and Water
These resources make life easier, but you could survive without them.	These are resources organisms cannot live without.

Relate water's functions in the human body.



Describe types of air pollution.

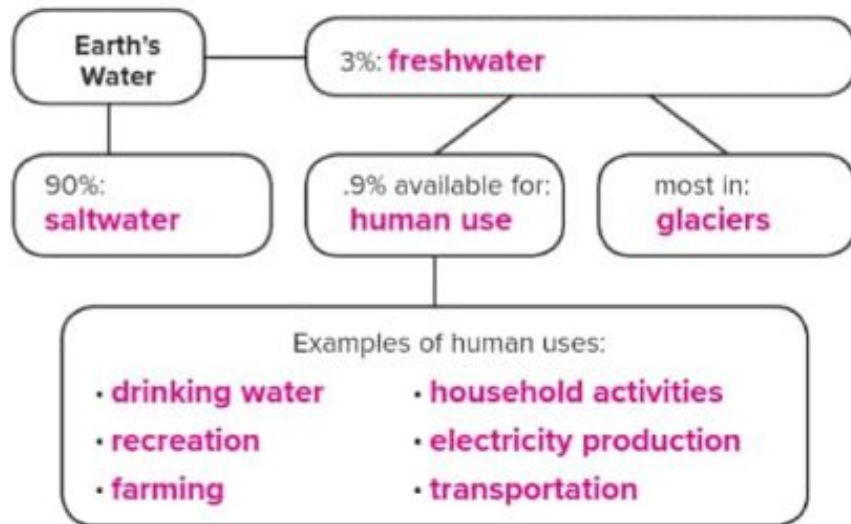
Type	Source	Problem
Photochemical smog	nitrogen compounds from the burning of fossil fuels	irritates respiratory systems; can cause asthma attacks
Acid precipitation	nitrogen and sulfur compounds from the burning of fossil fuels	can harm fish, pollute soil, kill plants, and damage buildings
Dust, gases, and ash	volcanoes and forest fires	health problems similar to those caused by smog

Main Idea

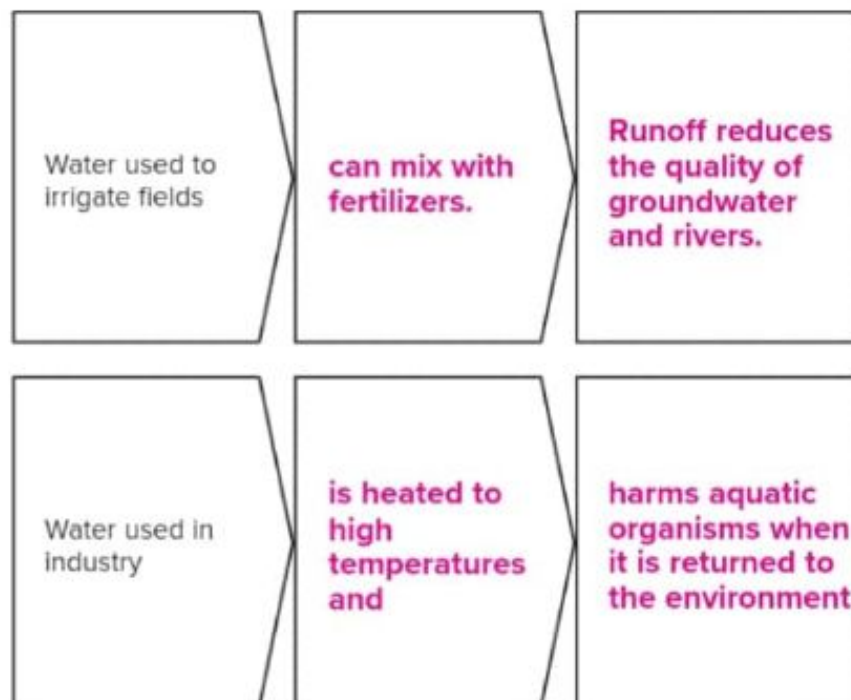
Details



Characterize *Earth's water supply.*



Describe *harmful effects of human activities on water quality.*



Restate *why it is important to manage air and water resources wisely.*

Air and water are used by all living things, not just humans.

Management of these resources must consider both humans and other living organisms.

Managing Air and Water Resources

Main Idea

Details

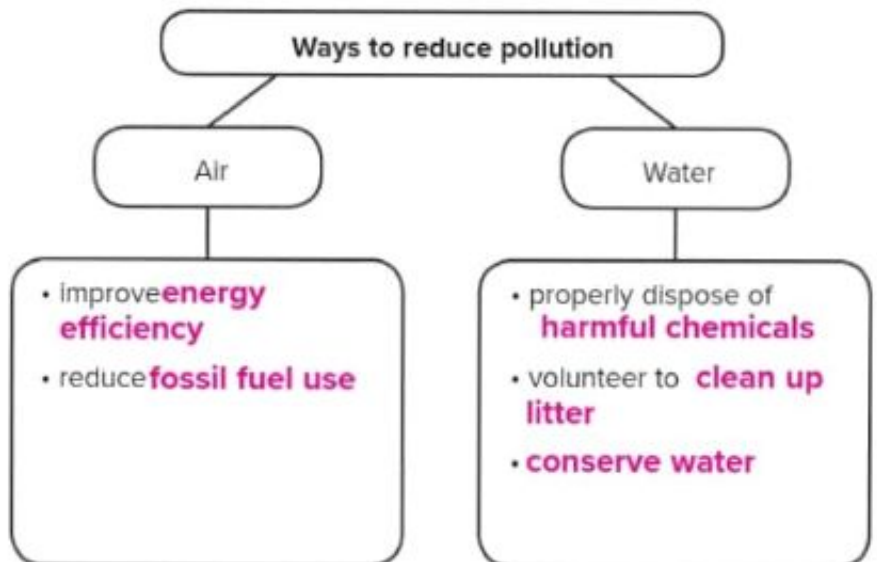
Interpret the effect of the Clean Air Act on sulfur compounds in the atmosphere.

The amount of sulfur compounds in the atmosphere steadily decreased from 1980 to 2005.

Identify two regulations in the United States legislated to maintain water quality.

1. The U.S. Clean Water Act
2. The Safe Drinking Water Act

Express ways that individuals can help manage air and water resources wisely.



Connect It Explain why it is important to conserve water even though the majority of Earth's surface is covered with water.

Accept all reasonable responses. Sample answer: The vast majority of the water on Earth is salt water and can't be used by people or organisms that are not marine animals or plants. Only a small percentage of Earth's water is freshwater, and most of that is trapped in glaciers, leaving even a smaller percentage available to sustain the lives not only of people but also of the plants and animals that are our food sources.

Natural Resources

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned.

Use this checklist to help you study.

- ☐ Complete your Foldables® Chapter Project.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Reread the chapter, and review the charts, graphs, and illustrations.
- ☐ Review the Understanding Key Concepts at the end of each lesson.
- ☐ Look over the Chapter Review at the end of the chapter.



Summarize It Reread the chapter Big Idea and the lesson Key Concepts. Summarize how a steadily increasing human population relates to the topic of renewable and nonrenewable energy and land, air, and water resources.

Accept all reasonable responses. Sample answer: Human beings are the only living organisms that use nonrenewable resources to produce electricity and power vehicles. The more people there are, the more such energy resources we use, and the faster those resources will be used up. We can make decisions to use more renewable energy resources and to rely less on nonrenewable resources, but a larger population uses more resources, making that change a very big job. The more people there are, using more energy sources, the more pollution and environmental impact we collectively cause.

Challenge Do research to learn about international efforts to use more renewable energy resources and reduce pollution to Earth's land, air, and water resources. Choose one initiative, and make a poster about it. Display your poster in your class.

Environmental Impact

Before You Read

Before you read, decide whether you agree or disagree with each statement. On the line before each statement, place an A if you agree or a D if you disagree. As you read this chapter, see whether you change your mind about any of the statements.

Before You Read	Statements	After You Read
	1. Earth can support an unlimited number of people. Disagree; Earth has limited resources and cannot support a population of any species beyond its carrying capacity.	
	2. Humans can have both positive and negative impacts on the environment. Agree; some human activities cause pollution, which can harm the environment. Other human activities help preserve or restore natural systems.	
	3. Deforestation does not affect soil quality. Disagree; deforestation exposes soil to erosion, which reduces overall soil quality.	
	4. Most trash is recycled. Disagree; only about 33 percent of the trash produced in the United States is recycled.	
	5. Sources of water pollution are always easy to identify. Disagree; most water pollution comes from nonpoint sources, which might be difficult to identify.	
	6. The proper method of disposal for used motor oil is to pour it down the drain. Disagree; used motor oil should be disposed of in a safe manner so it does not pollute the environment.	
	7. The greenhouse effect is harmful to life on Earth. Disagree; the greenhouse effect is a natural process that keeps Earth's surface temperatures at an optimal level to support life.	
	8. Air pollution can affect human health. Agree; air pollution can increase the rates of asthma and other respiratory diseases.	

What have you learned?

After you read each lesson, return to this worksheet to see whether you have changed your mind about any of the statements related to that lesson. Place a C after each statement that is correct or an I for those that are incorrect.

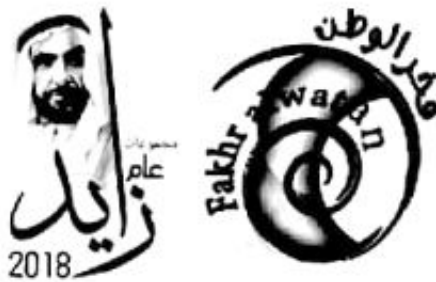
Lesson 1

People and the Environment

Key Concept What is the relationship between resource availability and human population growth?

Directions In the space provided, sketch a line graph showing the overall trend of human population growth over the past 2000 years. Be sure to label the axes of the graph. Then answer each question or respond to each statement on the lines provided.

1. Line graphs should show a J-curve; x-axis should be labeled *Year*; y-axis should be labeled *Population*. The J-curve indicates a relatively steady growth rate for the human population for nearly 1800 years, followed by a sharp increase around 1850.



2. **Summarize** how human population has changed over the past 2000 years.

The human population remained relatively small for much of human history. Around 1850, it increased sharply.

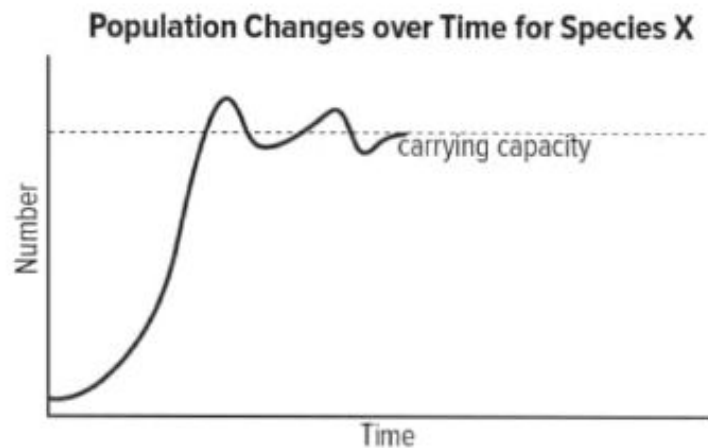
3. Do you think this trend will continue? Why or why not?

Sample answer: I think the population will level off in this century as more people become aware of problems associated with over-population.

Lesson 1 | People and the Environment (continued)

Key Concept What is the relationship between resource availability and human population growth?

Directions Use the graph to answer each question or respond to each statement on the lines provided.



1. **Describe** how the population of Species X changed over time.

The population was small. Then it increased sharply. Following the increase, it has stayed fairly even.

2. What factors might have led to the increase in the population of Species X?

Sample answer: Resources might have been plentiful.

3. What is carrying capacity?

Carrying capacity is the largest number of individuals of a given species that Earth's resources can support and maintain for a long period of time.

4. What happened to Species X when it reached its carrying capacity?

Its population decreased.

5. What likely happened to resource availability when Species X reached its carrying capacity?

Resource availability likely decreased.

6. **Predict** what will happen if Species X exceeds its carrying capacity again. Draw your prediction on the graph.

Its population will drop below its carrying capacity. Student drawings on the graph should show the population of Species X peaking above the carrying capacity line and then dipping slightly below it after a short period of time. Drawings should be similar to the fluctuations currently on the graph.

Lesson 1 | People and the Environment (continued)

Key Concept What is the relationship between resource availability and human population growth?

Directions: Answer each question on the lines provided.

1. What is a population?

A population is all the members of a species living in a given area.

2. What is a population explosion?

A population explosion is a sharp increase in the population of a species.

3. About when did humans experience a population explosion? about 1850

4. What reasons might have led to the population explosion?

Medical and sanitary improvements led to the population explosion.

5. How many people live on Earth today? about 6.7 billion

6. Does Earth have enough resources to support the human population? Explain.

Sample answer: No, there are not enough resources to go around. Some people do not have enough clean water or food.

7. How does carrying capacity relate to resource use?

If too many resources are used, Earth might not be able to support a particular species, and it might reach its carrying capacity.

8. What might happen to the amount of resources on Earth if humans exceed their carrying capacity?

The amount of resources on Earth would go down.

Lesson 1 | People and the Environment (continued)

Key Concept How do daily activities impact the environment?

Directions: Complete the chart by making a list of your daily activities that impact the environment. Classify the impacts as helpful or harmful. Then share the list with a partner. Discuss the impacts on lists. Use the questions below the chart to guide your discussion.

1. Daily Activities	
Helpful Impacts	Harmful Impacts
Lists will vary. Students might include helpful impacts such as recycling and biking to school. They might include harmful impacts such as leaving the television on when no one is watching or taking long showers.	

2. How do my daily activities affect air, water, and soil quality?

Answers will vary but should relate to the items on students' lists.

3. What can I do to reduce some of the harmful impacts of my daily activities?

Answers will vary but should relate to the items on students' lists.

4. What do I currently do that helps the environment?

Answers will vary but should relate to the items on students' lists.

5. Are my ideas realistic? Can they easily be implemented, or will they take time and resources?

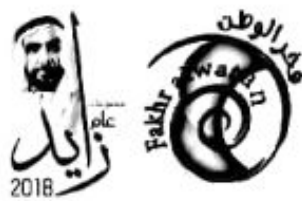
Answers will vary but should relate to the items on students' lists.

Lesson 2 Impacts on Land

Key Concept What are the consequences of using land as a resource?

Directions Draw a sketch showing how land is used as a resource in the space provided. Include labels in your drawing.

Drawings should show land being used for forest resources, mining, roadways, living space, recreation, agriculture, and waste management. Labels should identify each use.



Directions Summarize the land uses shown in your drawing on the lines provided. Be sure to mention the products or benefits of using land in a certain way.

Summaries should describe the land uses shown in the drawing in more detail. For example, summaries should mention that trees are cut down to make wood and paper products. Mines are created to obtain minerals and coal. Farms are used to produce food.

Lesson 2 | Impacts on Land (continued)

Key Concept What are the consequences of using land as a resource?

Directions Complete the concept map with the correct terms from the word bank. Some terms may be used more than once.

disruption of nitrogen cycle

forest resources

habitat destruction

increased runoff

living space

water pollution

Land is used for ...
agriculture
roadways
mining
1. forest resources
2. living space



Deforestation can lead to ...
3. disruption of nitrogen cycle
4. increased runoff or habitat destruction
Urban sprawl can lead to ...
5. habitat destruction or water pollution
Soil erosion can lead to ...
6. disruption of nitrogen cycle
7. increased runoff or habitat destruction
8. habitat destruction or water pollution
9. increased runoff or habitat destruction

Lesson 2 | Impacts on Land (continued)

Key Concept How does proper waste management help prevent pollution?

Directions: On each line, write the term from the word bank that correctly completes each sentence.

EPA	harmful substances	landfills
liners	motor oil	soil

1. landfills are areas where trash is buried.
2. Trash is covered by soil to keep it from blowing away.
3. Special liners help keep pollutants from leaking into the soil and contaminating groundwater supplies.
4. Hazardous waste cannot be placed into landfills because it contains harmful substances that can affect the health of humans and other living things.
5. Examples of hazardous wastes include motor oil and batteries.
6. The EPA works with state and local agencies to help people properly dispose of hazardous waste.

Directions: Use the data to draw a circle graph showing the approximate percentage of each trash disposal method in the space provided. Be as accurate as possible.

Trash Disposal in the United States

55% = landfills
31% = recycled and composted
14% = burned

7.

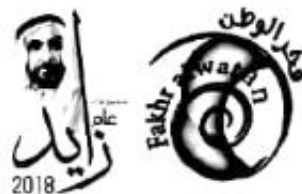
Students' circle graphs should show the approximate percentage of each trash disposal method: landfills = 55%; recycled and composted = 31%; burned = 14%.

Lesson 2 | Impacts on Land (continued)

Key Concept What actions help protect the land?

Directions Complete the chart by filling in the consequences of each positive action.

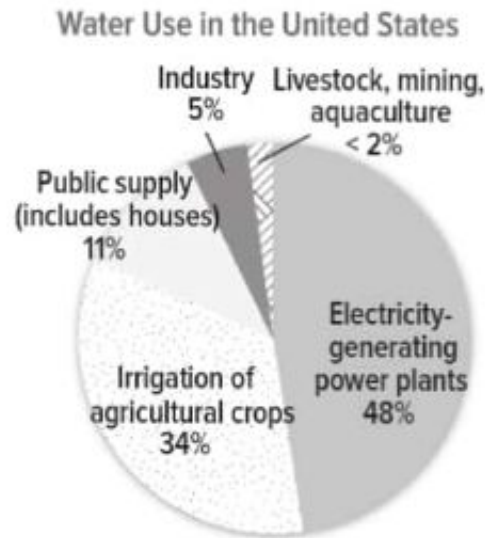
Positive Action	Consequence
Governments preserve land	1. Safe habitats are created for wildlife.
Governments regulate waste management.	2. Fewer pollutants from trash and hazardous wastes enter the environment.
Governments regulate mining.	3. Water pollution decreases.
Logging company reforests an area.	4. The area experiences less soil erosion.
Mining company reclaims an area.	5. Wildlife can move back into the area.
City creates urban park.	6. Urban runoff is reduced.
Girl recycles paper.	7. Less trash is disposed of in landfills.
Farmer composts food scraps.	8. The soil is naturally enriched by the compost.
Boy turns off lights when he leaves a room.	9. Energy resources are conserved.



Lesson 3 Impacts on Water

Key Concept How do humans use water as a resource?

Directions Use the graph to answer each question on the lines provided.



1. Which source uses the most water in the United States?

electricity-generating power plants

2. How does use of water by the public compare with use of water by industry?

Use of water by the public makes up about 11 percent of U.S. water use. Use of water by industry makes up about 5 percent of U.S. water use.

3. How is water used by agriculture? Which agricultural use consumes the most water?

Water is used by agriculture in aquaculture, irrigation, and raising livestock. Irrigation uses the most water.

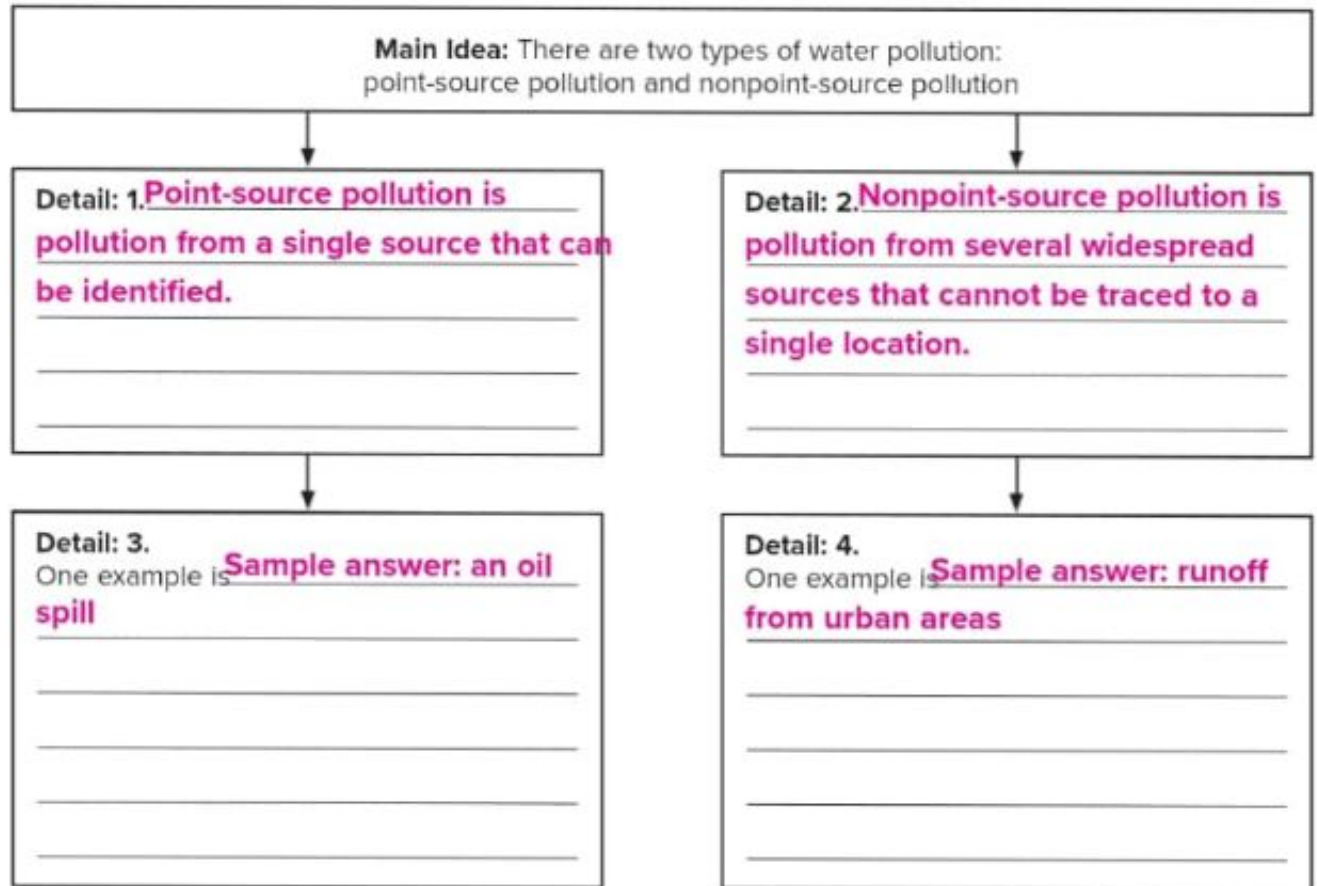
4. How do you use water on a typical day?

Students' lists might include drinking water, cooking, cleaning, washing hands, brushing teeth, flushing a toilet, taking baths, and taking showers. Accept all reasonable lists.

Lesson 3 | Impacts on Water (continued)

Key Concept How can pollution affect water quality?

Directions Complete the graphic organizer by filling in the supporting details about different types of water pollution.



Directions Describe one way that water pollution can enter the environment.

5. Sample answer: A person can spill motor oil on a driveway. Rain can fall. The motor oil can seep into the ground or run off into a nearby stream.

Lesson 3 | Impacts on Water (continued)

Key Concept How can pollution affect water quality?

Directions In the space provided, write the phrase that correctly completes each sentence.

Cause	Effect
Runoff from mines can be acidic and contain metals, which ...	1. can contaminate surface water and groundwater drinking supplies and affect the growth and reproduction of aquatic organisms.
Oil spills can cover the surface of the water, which ...	2. can expose aquatic organisms to toxic chemicals and reduce the amount of oxygen in the water.
Runoff from construction sites can contain excess sediments, which ...	3. can make water in streams and rivers cloudy, reducing the amount of sunlight available for photosynthetic organisms.
Runoff from farms can contain fertilizers, which ...	4. can upset the balance of nutrients in lakes, oceans, and other bodies of water.
Industrial waste can contain toxic chemicals, which ...	5. can harm aquatic organisms.
Runoff from urban areas can contain pesticides and fertilizers from lawns, oil and gasoline from vehicles, and bacteria and viruses from waste, all of which ...	6. can reduce the quality of surface water and groundwater.

Copyright © McGraw-Hill Education

Lesson 3 | Impacts on Water (continued)

Key Concept What actions help prevent water pollution?

Directions On each line, write the term from the word bank that correctly completes each sentence. Some terms may be used more than once or not at all.

Clean Water Act	compost	conserve water
fertilizers	hazardous waste	international cooperation
Lake Erie	national initiatives	prevention
Safe Drinking Water Act	waste management agency	

1. You can help conserve water by taking shorter showers and turning off water when you brush your teeth.
2. The Safe Drinking Water Act protects supplies of drinking water throughout the United States.
3. People can reduce their use of fertilizers on gardens and laws to help improve water quality.
4. Your local waste management agency helps for safe disposal of wastes.
5. Water pollution is difficult to remove from the environment, so most efforts to reduce water pollution focus on prevention rather than cleanup.
6. In the United States, the Clean Water Act regulates sources of water pollution, including sewage systems.
7. You should never pour motor oil or other hazardous waste into drains, onto the ground, or directly into rivers or lakes.
8. The cleanup of Lake Erie is an example of international cooperation between the United States and Canada.
9. Use of compost can enrich soils without negatively impacting water quality.

Lesson 4

Impacts on the Atmosphere

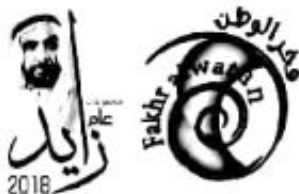
Key Concept What are some types of air pollution?

Directions Complete the paragraph by writing the correct term from the word bank on each line. Some terms may be used more than once or not at all.

acid precipitation	burning fossil fuels	carbon monoxide
CFCs	nitrogen compounds	ozone molecules
particulate matter	photochemical smog	sunlight
UV rays	volcanic eruptions	water
wood-burning stoves		

Air conditioners and refrigerators made before 1996 can release

1. CFCs into the air. These compounds react with sunlight and destroy
2. ozone molecules. This allows more harmful 3. UV rays
- to reach Earth's surface, causing increased rates of skin cancer. Another kind of air pollution,
4. particulate matter, is a mix of solid and liquid particles in the air. It can be
- caused by natural events such as 5. volcanic eruptions. It can also be caused by
- human activities such as 6. burning fossil fuels. A third type of air pollution,
7. carbon monoxide, is a gas released from vehicles, industrial processes, and
- forest fires. Indoor sources of this gas include 8. wood-burning stoves. A fourth type
- of air pollution is a brownish haze in the sky called 9. photochemical smog. It occurs
- when carbon compounds and 10. nitrogen compounds react with sunlight and form
- new substances. The last type of air pollution, 11. acid precipitation, forms when
- rain or snow has a lower pH than normal rainwater. It is also caused by
12. burning fossil fuels to generate electricity or to run vehicles.



Lesson 4 | Impacts on the Atmosphere (continued)

Key Concept How are global warming and the carbon cycle related?

Directions: Answer each question below on the lines provided.

1. What is the greenhouse effect?

The greenhouse effect is the natural process that occurs when certain gases in the atmosphere absorb and reradiate thermal energy from the Sun.

2. How is carbon dioxide related to the greenhouse effect?

Carbon dioxide is a greenhouse gas, or one of the gases that helps trap heat from the Sun.

3. What is global warming?

Global warming is an increase in Earth's surface temperatures.

4. How is global warming related to the greenhouse effect?

Global warming can occur when the level of greenhouse gases in the atmosphere increases.

5. What is the carbon cycle?

The carbon cycle is the movement of carbon through Earth's systems.

6. How is the carbon cycle related to global warming?

The amount of carbon that cycles through the carbon cycle is affected by global warming.

Lesson 4 | Impacts on the Atmosphere (continued)

Key Concept How does air pollution affect human health?

Directions Draw a human figure in the space provided. Use arrows and captions to show the effects of air pollution on the parts of the body.

1.

Student drawings will vary but should show that air pollution can cause irritation of the eyes, throat, and lungs. It can cause respiratory problems, such as reduced lung function, increased asthma attacks, chest tightness, and shortness of breath. It can also cause headaches, fatigue, nausea, and vomiting.

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

2. What is the Air Quality Index (AQI)?

The Air Quality Index (AQI) is a scale that ranks levels of ozone and other air pollutants.

3. Why does the EPA issue the AQI?

The EPA issues the AQI to make people aware of air pollution levels.

4. Give an example of how you could use the AQI to protect your health.

Sample answer: I could check the AQI for the day and use it to decide whether it would be safe to take a hike outdoors.

Lesson 4 | Impacts on the Atmosphere (continued)

Key Concept What actions help prevent air pollution?

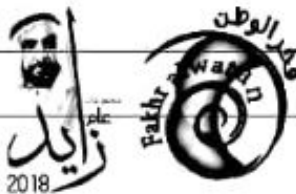
Directions Complete the table by describing actions that have been taken to reduce air pollution.

1.

	What is it?	Who is involved?	How does it help reduce air pollution?
Montreal Protocol	agreement to phase out use of CFCs	countries around the world	reduces ozone depletion
Kyoto Protocol	agreement to reduce emissions of greenhouse gases	countries around the world	reduces global warming
Clean Air Act	sets limits on the amounts of certain pollutants that can be released into the air	United States government	has significantly reduced levels of air pollution in the United States

Directions Describe actions people can take on a personal level to help reduce air pollution on the lines provided.

2. Answers will vary. Students may say that people can use renewable energy resources to heat homes. They can use energy-efficient appliances and vehicles. They can turn thermostats down in the winter and up in the summer. They can walk rather than drive to nearby places.



Environmental Impact


Chapter Wrap-Up

Directions: Work with a group to create a plan to reduce the environmental impacts of your school.

- One-third of the group should focus on land, one-third should focus on water, and one-third should focus on the atmosphere.

Land	Water	Atmosphere
<ul style="list-style-type: none"> • How do our school's daily activities impact the land? • What actions could we take to reduce this impact? 	<ul style="list-style-type: none"> • How do our school's daily activities impact the water? • What actions could we take to reduce this impact? 	<ul style="list-style-type: none"> • How do our school's daily activities impact the atmosphere? • What actions could we take to reduce this impact?

- Then, as a group, come up with a step-by-step plan to put your recommendations into effect.

What steps will we take?	What materials do we need?	What resources do we already have?
		

- Obtain permission to implement your plan. Include a way to evaluate whether your plan is reducing your school's impact on the environment.

Plan Requirements:

- organized in logical manner
- includes ways to monitor and evaluate plan
- includes contributions from all group members

Student plans will vary. Possible actions to reduce impact on land include recycling. Possible actions to reduce impact on water include conserving water. Possible actions to reduce impacts on air include biking to school. Make sure students obtain permission from parents and school administrators before they implement their plans.