Science Notebook

Glencoe Science

Life Science

Consultant
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Douglas Fisher, Ph.D., is a Professor in the Department of Teacher Education at San Diego State University. He is the recipient of an International Reading Association Celebrate Literacy Award as well as a Christa McAuliffe award for Excellence in Teacher Education. He has published numerous articles on reading and literacy, differentiated instruction, and curriculum design as well as books, such as *Improving Adolescent Literacy: Strategies at Work* and *Responsive Curriculum Design in Secondary Schools: Meeting the Diverse Needs of Students*. He has taught a variety of courses in SDSU's teacher-credentialing program as well as graduate-level courses on English language development and literacy. He also has taught classes in English, writing, and literacy development to secondary school students.

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Table of Contents

Dear Science Teacher,

As you begin a new school year, one of the biggest challenges you probably will encounter is getting students to read their textbooks. Informational text can overwhelm students, leaving them less likely to read and more likely to become apathetic about learning. I believe that this* Science Notebook *will help students use their textbooks more effectively as they learn about science.

Note-Taking and Student Success

There is considerable research evidence that addresses how students understand difficult concepts and content in school. Glencoe/McGraw-Hill has developed the *Science Notebook* for science students based upon that research. Evidence indicates that students need to know how to take notes, use graphic organizers, learn vocabulary, and develop their thinking skills by writing in order to achieve academic success.

The ability to take and organize notes predicts how well students will do in school. Peverly, Brobst, Graham, and Shaw (2003) showed that when students use background knowledge and take notes, they are likely to perform well on tests. Pauk (1974) observed that note-taking is a critical skill for college success. Notes serve as an external storage function (meaning on the paper) that builds comprehension and content understanding (Ganske, 1981). This *Science Notebook* is a tool that students can use to achieve this goal. I would like to share some of the features of this *Science Notebook* with you before you begin teaching.

The Cornell Note-Taking System

First, you will notice that the pages in the *Science Notebook* are arranged in two columns, which will help students organize their thinking. This two-column design is based on the **Cornell Note-Taking System**, developed at Cornell University. Faber, Morris, and Lieberman (2000) found that the **Cornell Note-Taking System** improves comprehension and increases test scores.

The column on the left side of the page highlights the main ideas and vocabulary of the lesson. This column will help students find information and locate the references in their textbooks quickly. Students also can use this column to sketch drawings that help them visually remember the lesson's information. In the column on the right side of the page, students will write detailed notes about the main ideas and vocabulary. The notes they take in this column will help them focus on the important information in the lesson. As students become more comfortable using the **Cornell Note-Taking System,** they will see that it is an important tool that helps them organize information.

The Importance of Graphic Organizers

Second, there are many graphic organizers in this *Science Notebook*. Graphic organizers allow students to see the lesson's important information in a visual format. In addition, graphic organizers help students summarize information and remember the content. I hope that you will encourage students to use the graphic organizers because they will help them understand what they are reading.

Research-Based Vocabulary Development

Third, you will notice that vocabulary is introduced and practiced throughout the *Science Notebook*. When students know the meaning of the words used to discuss information, they are able to understand that information better. Also, students are more likely to be successful in school when they have vocabulary knowledge. When researchers study successful students, they find that as students acquire vocabulary knowledge, their ability to learn improves (Martino and Hoffman, 2002). The *Science Notebook* focuses on learning words that are very specific to understanding the content of the textbook. The *Science Notebook* also highlights general academic words that students need to know so that they can understand any textbook. These vocabulary words are based on the Academic Word List (AWL) developed by Averil Coxhead. The AWL includes the most common 570 words found in academic texts, excluding the 2,000 general English words such as *the*, *in*, and *that*. Research indicates that students who master the words on Coxhead's list score significantly higher on standardized tests.

Writing Prompts and Note-Taking

Finally, there are a number of writing exercises included in this *Science Notebook*. Writing is a useful tool that helps students understand the information that is being presented. Writing helps them assess what they have learned. You will see that many of the writing exercises require students to practice the skills of good readers. Good readers *make connections* between their lives and the text and *predict* what will happen next in the reading. They *question* the information and the author of the text, *clarify* information and ideas, and *visualize* what is described in the text. Good readers also *summarize* the information that is presented and *make inferences* or *draw conclusions* about the facts and ideas.

I wish you well as you begin another school year. This *Science Notebook* is designed to help students understand the information in your science class. The guide will be a valuable tool that also will provide students with skills that they can use throughout their lives.

I hope you have a successful school year.

Sincerely,
Douglas Fisher

References

Faber, J. E., Morris, J. D., and Lieberman, M. G. (2000). The effect of note taking on ninth grade students' comprehension. *Reading Psychology*, 21, 257–270.

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Note-Taking Tips

Your notes are a reminder of what you learned in class. Taking good notes can help you succeed in science. These tips will help you take better notes.

- Be an active listener. Listen for important concepts. Pay attention to words, examples, and/or diagrams your teacher emphasizes.
- Write your notes as clearly and concisely as possible. The following symbols and abbreviations may be helpful in your note-taking.

Word or Phrase	Symbol or Abbreviation
for example	e.g.
such as	i.e.
with	w/
without	w/o

Word or Phrase	Symbol or Abbreviation
and	+
approximately	≈
therefore	∴
versus	vs

- Use a symbol such as a star (★) or an asterisk (*) to emphasis important concepts. Place a question mark (?) next to anything that you do not understand.
- Ask questions and participate in class discussion.
- Draw and label pictures or diagrams to help clarify a concept.

Note-Taking Don'ts

- **Don't** write every word. Concentrate on the main ideas and concepts.
- **Don't** use someone else's notes—they may not make sense.
- **Don't** doodle. It distracts you from listening actively.
- **Don't** lose focus or you will become lost in your note-taking.

Using Your Science Notebook

This note-taking guide is designed to help your students succeed in learning science content. Each chapter includes:

Language-Based Activities
Activities cover the content in your science book through vocabulary development, process writing, note-taking tools, analytical application, and real-world problem solving.

Name _____ Date _____

Exploring and Classifying Life

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Exploring and Classifying Life
	• All science takes place in laboratories.
	• All of the changes that take place during an organism's life are called responses.
	• Spontaneous generation is the idea that living things come from nonliving things.
	• Organisms are classified into groups based on their similarities.

FOLDABLES Study Organizer *Construct the Foldable as directed at the begin[illegible] of this chapter.*

Science Journal

List three characteristics that you would use t[illegible]

Students' responses will vary. Chara[illegible]
shape of body, and what they eat.

Anticipation Guide/KWL Charts
Activate students' prior knowledge before beginning a lesson, engage them in active thinking during reading, and diagnose misconceptions.

Science Journal
Students assess what they know through written response.

Exploring and Classifying Life 1

Date _____

Section 1 What is science? (continued)

Main Idea **Details**

Developing Theories

I found this information on page _____.
SE, p. 10
RE, pp. 4–5

Contrast *an* opinion, *a* scientific theory, *and a* scientific law. *Complete the table.* Accept all reasonable responses.

	Opinion	Scientific Theory	Scientific Law
What it is	what a person believes	an explanation that is the result of many observations and experiments	a statement about how things work in nature that seems to be true all the time
[illegible] is	personal beliefs	scientific knowledge, observations, and experiments	scientific knowledge and observations

for each quantity below by listing them.
[illegible]ter, meter, kilometer
[illegible]nne
tant safety practices to follow in a laboratory.
[illegible] protection.
2. Wash your hands after handling materials.

[illegible] p. 15
[illegible], p. 6

Writing Activities
These activities help students process information and make connections between concepts and the real world.

SYNTHESIZE IT A scientist collects data about ducks' migration patterns every year between November and April. After five years, she draws conclusions and publishes a scientific paper. Describe the scientific methods she might have used. State why it was important to wait five years before publishing her results.

Students should indicate that the scientist stated a problem, collected data, and drew conclusions. By waiting five years, she was able to collect more data for making conclusions.

4 *Exploring and Classifying Life*

Academic Vocabulary

[illegible]ge to fit new conditions
[illegible] to make something happen; to have an effect on
annual: plant that completes its life cycle in one year
apparent: readily seen, visible, readily understood or perceived; evident; obvious
area: amount or extent of a surface
attach: to be connected
benefit: to help
capable: able to do things; fit
chemical: made by chemistry
chemical bond: the force holding atoms together in a molecule
code: (noun) set of signals representing letters or numerals, used to send messages; (verb) to put in the form or symbols of a code
complex: composed of two or more parts; complicated
compound: (adjective) made of two or more separate parts or elements
constant: not changing; staying the same
contact: act or state of touching or meeting
convert: to change from one form or function to another
coordinate: to cause to work well together
cycle: a complete set of events or phenomena recurring in the same sequence
decline: to weaken or lessen
definite: having exact limits in size, shape, or number of parts
detect: to catch or discover; to manage to perceive
distribute: to divide among several or many
dominate: to control or rule
energy: capacity to perform some type of work or activity
environment: living and nonliving factors that surround an organism
estimate: (noun) an opinion of the value, quality, size, or cost of something; (verb) to form an opinion by reasoning
external: on, or for use on, the outside of the body
facilitate: to make easy or easier
flexible: able to bend or flex
function: (noun) a specific job or purpose; (verb) to carry out a specific action
fundamental: serving as an original or generating source; primary
generate: to originate or bring into existence
hypothesis: something that is suggested as being true for the purposes of argument or of further investigation
identical: same
individual: separate
insert: to put or fit (something) into something else

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Vocabulary Development
This incorporates the three types of vocabulary words students need to learn to better understand content. The *Academic Glossary* helps students to score higher on standardized tests.

Chapter Wrap-Up

This brings the information together. Revisiting the *Anticipation Guide/KWL Chart* allows another opportunity for teachers to discuss misconceptions. You and your students can assess what they have learned.

Note-Taking Based on the Cornell Two-Column Format

Students practice effective note-taking through the use of graphic organizers, outlines, SQ3R, and written summaries.

Name ______________________ **Date** __________

Section 1 What is science? (continued)

Main Idea	Details
The Work of Science *I found this information on page* ______. SE, p. 6 RE, p. 1	**Define** science *using information from this section.* Science is an organized way of studying things and finding answers to questions.
Solving Problems *I found this information on page* ______. SE, pp. 7–10 RE, p. 2	**Sequence** *the steps scientists use to solve problems. Study the figure in your book, then close your book and try to fill in the figure. Check your work by looking back at your book.* St... the problem → ... information
I found this information on page ______. SE, p. 9 RE, p. 3	**Analyze** *the role of* controls *and* variables *in an experiment. Fill in the missing words.* A control is the standard to which the outcome of a test is compared. A variable is something in an experiment that can be changed. The number of variables that should be changed during an experiment is one.

Exploring and Classifying Life 3

Name ______________________ **Date** __________

Exploring and Classifying Life

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Exploring and Classifying Life	After You Read
• All science takes place in laboratories.	D SE, p. 8 RE, p. 1
• All of the changes that take place during an organism's life are called responses.	D SE, p. 16 RE, p. 8
• Spontaneous generation is the idea that living things come from nonliving things.	A SE, p. 20 RE, p. 12
• Organisms are classified into groups based on their similarities.	A SE, p. 23 RE, p. 16

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each se...n.
- ☐ Look over the Chapter Review at the end of the ch...r.

SUMMARIZE IT List three i...

Accept all reasonable response... questions. 2. Living things ... develop, and reproduce. 3. ...

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Review Checklist

This list helps students assess what they have learned and prepare to study for chapter tests.

Name ______________________ **Date** __________

Section 2 Living Things (continued)

Main Idea	Details
What are living things like? *I found this information on page* ______. SE, pp. 14–17 RE, p. 8	**Organize** *the characteristics that define* living things. *Complete the graphic organizer.* Accept all reasonable responses. Living Things: respond to internal and external stimuli; use energy; reproduce; grow and develop; are made up of one or more organized cells
I found this information on page ______. SE, p. 15 RE, pp. 8–9	**Describe** *the relationship between a* stimulus *and a* response. *Complete the table. Then complete the flowchart to describe* homeostasis.

	What It Is	Example
Stimulus	anything that causes a change in an organism	using a can opener
Response	the reaction to a stimulus	cat comes running

Homeostasis

Stimulus: The conditions in an organism's cells change. → Response: The organism makes internal changes to maintain the proper conditions inside the cells.

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Graphic Organizers

These organizers offer a variety of visual organizers that will help students organize, analyze, and summarize information and remember content.

Name _____ Date _____

Exploring and Classifying Life

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Exploring and Classifying Life
	• All science takes place in laboratories.
	• All of the changes that take place during an organism's life are called responses.
	• Spontaneous generation is the idea that living things come from nonliving things.
	• Organisms are classified into groups based on their similarities.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List three characteristics that you would use to classify underwater life.

Students' responses will vary. Characteristics might include method of movement, shape of body, and what they eat.

Name _____ Date _____

Exploring and Classifying Life

Section 1 What is science?

Scan *the list below to preview Section 1 of your book.*

- Read all section headings.
- Read all bold words.
- Read all charts and graphs.
- Think about what you already know about how to solve problems.

Write *three facts you discovered about* scientific methods *as you scanned the section.* **Accept all reasonable responses.**

1. **Scientists develop hypotheses.**
2. **Only one variable in an experiment should be changed.**
3. **Opinions, scientific theories, and scientific laws are different.**

Review Vocabulary

experiment

Write *a paragraph describing scientific methods. Use all of the vocabulary words in your description. Underline each vocabulary word.* **Accept all reasonable responses.**

New Vocabulary

scientific methods
hypothesis
control
variable
theory
law

Academic Vocabulary

reject

Scientific methods are procedures that scientists use to solve problems. There are many scientific methods, but they often follow these steps. A scientist proposes a hypothesis, which is a prediction that can be tested. The scientist tests the prediction using an experiment. He or she decides which variable to change. The scientist compares changes in the variable to a control, or standard. If the data support the hypothesis, the hypothesis is accepted. If the data do not support it, it is rejected. If the hypothesis is tested many times and is always accepted, it may become a scientific theory. Theories are more likely to change than scientific laws, but less likely to change than hypotheses.

Name _____ Date _____

Section 1 What is science? (continued)

Main Idea | **Details**

The Work of Science

I found this information on page _____.
SE, p. 6
RE, p. 1

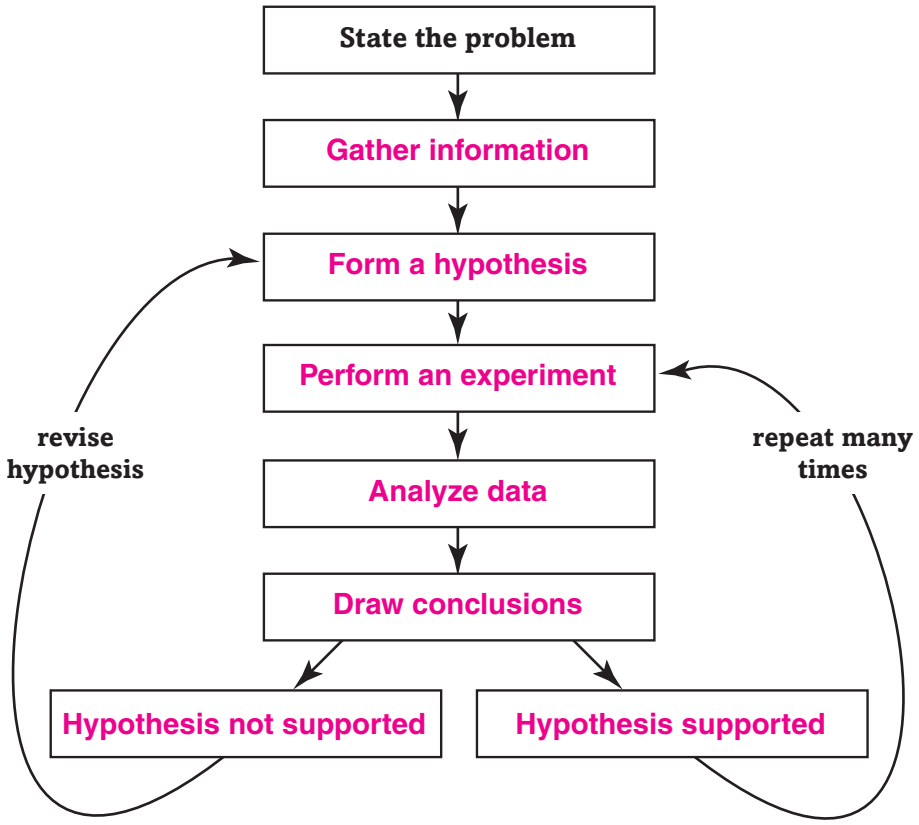
Define science *using information from this section.*

Science is an organized way of studying things and finding answers to questions.

Solving Problems

I found this information on page _____.
SE, pp. 7–10
RE, p. 2

Sequence *the steps scientists use to solve problems. Study the figure in your book, then close your book and try to fill in the figure. Check your work by looking back at your book.*



I found this information on page _____.
SE, p. 9
RE, p. 3

Analyze *the role of* controls *and* variables *in an experiment. Fill in the missing words.*

A control is the standard to which the outcome of a test is compared. A variable is something in an experiment that can be changed. The number of variables that should be changed during an experiment is one.

Name _____ **Date** _____

Section 1 What is science? (continued)

Main Idea

Details

Developing Theories

I found this information on page _____.
SE, p. 10
RE, pp. 4–5

Contrast *an* opinion, *a* scientific theory, *and a* scientific law. *Complete the table.* Accept all reasonable responses.

	Opinion	Scientific Theory	Scientific Law
What it is	what a person believes	an explanation that is the result of many observations and experiments	a statement about how things work in nature that seems to be true all the time
What it is based on	personal beliefs	scientific knowledge, observations, and experiments	scientific knowledge and observations

Measuring with Scientific Units

I found this information on page _____.
SE, p. 12
RE, p. 5

Summarize *the metric units for each quantity below by listing them.*

Length: millimeter, centimeter, meter, kilometer

Volume: milliliter, liter

Mass: gram, kilogram, tonne

Safety First

I found this information on page _____.
SE, p. 13
RE, p. 6

Identify *two important safety practices to follow in a laboratory.*

1. Wear eye protection.
2. Wash your hands after handling materials.

Synthesize It

A scientist collects data about ducks' migration patterns every year between November and April. After five years, she draws conclusions and publishes a scientific paper. Describe the scientific methods she might have used. State why it was important to wait five years before publishing her results.

Students should indicate that the scientist stated a problem, collected data, and drew conclusions. By waiting five years, she was able to collect more data for making conclusions.

Name _____ Date _____

Exploring and Classifying Life

Section 2 Living Things

Predict *what you will learn in Section 2. Read the title and main headings. List three topics that you predict will be discussed in the section.* **Accept all reasonable responses.**

1. **what living things are**
2. **how living things grow and develop**
3. **what living things need**

Review Vocabulary

raw materials

Use raw materials *in a sentence to show its scientific meaning.*

Sample sentence: The raw materials for the new car included aluminum, steel, plastic, and rubber.

New Vocabulary

Find a sentence in Section 2 that uses each vocabulary term. **Possible responses shown.**

organism

Any living thing is an organism.

cell

A cell is the smallest unit of an organism that carries on the functions of life.

homeostasis

Homeostasis is an organism's ability to keep proper conditions inside no matter what is going on outside the organism.

Academic Vocabulary

Use a dictionary to define chemical.

chemical

made by chemistry

Name _____ **Date** _____

Section 2 Living Things (continued)

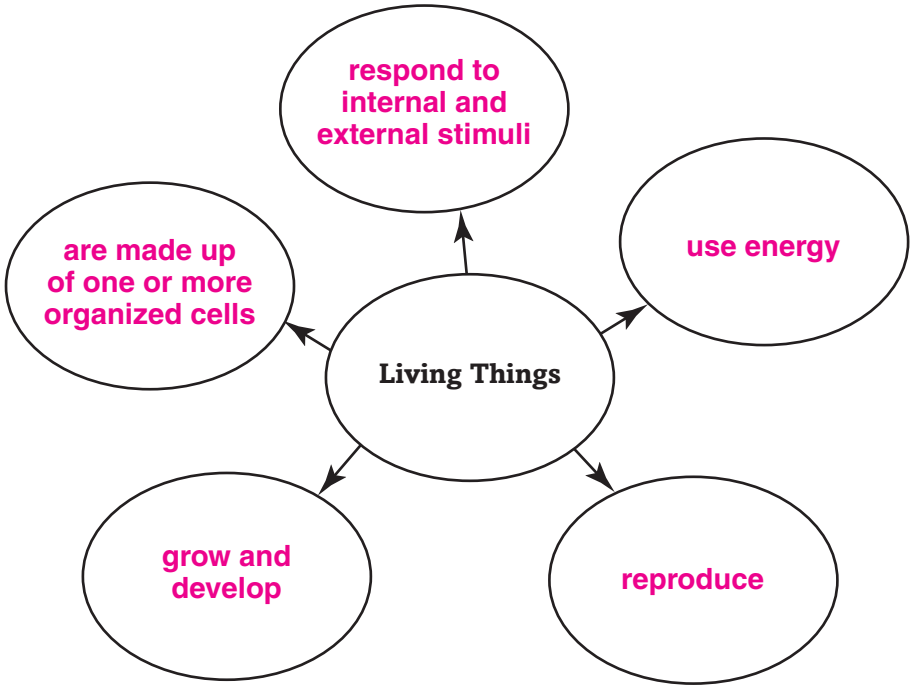
Main Idea

Details

What are living things like?

I found this information on page _____.
SE, pp. 14–17
RE, p. 8

Organize *the characteristics that define* living things. *Complete the graphic organizer.* Accept all reasonable responses.



I found this information on page _____.
SE, p. 15
RE, pp. 8–9

Describe *the relationship between a* stimulus *and a* response. *Complete the table. Then complete the flowchart to describe* homeostasis.

	What It Is	Example
Stimulus	anything that causes a change in an organism	using a can opener
Response	the reaction to a stimulus	cat comes running

Homeostasis

Stimulus	Response
The conditions in an organism's cells change. →	The organism makes internal changes to maintain the proper conditions inside the cells.

Name _____ Date _____

Section 2 Living Things (continued)

Main Idea

I found this information on page _____.

SE, p. 15
RE, p. 9

Details

Contrast *the ways organisms obtain energy in the table.*

Organism	How It Obtains Energy
Plants	from the Sun's energy
Animals	by taking in food, either plants or other organisms that eat plants
Bacteria in places sunlight cannot reach	chemical compounds

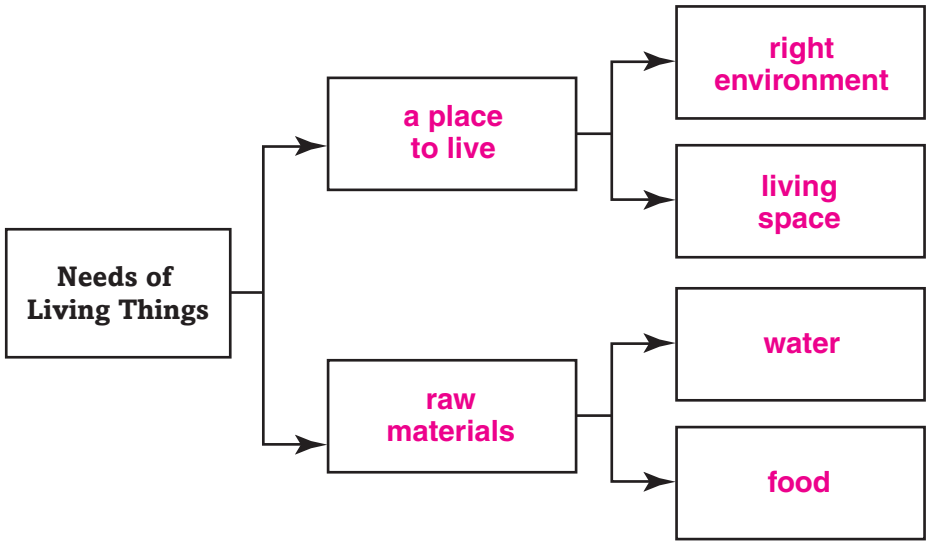
What do living things need?

I found this information on page _____.

SE, pp. 17–18
RE, p. 10

Remind students that some living things have specific needs, such as particular food or living conditions. Encourage students to focus on the needs that all living things share.

Classify *the needs of all living things. Complete the concept map.*



Summarize It

Choose one living thing and one nonliving thing with which you are familiar. Use the five characteristics of living things to explain how you know that each is living or nonliving. Complete the chart to organize your information.

Object	Has cells?	Uses energy?	Grows and develops?	Responds to stimuli?	Reproduces?

Accept all reasonable responses. Students should identify that the living thing has all five characteristics, but the nonliving thing lacks one or more of the characteristics.

Name _____ **Date** _____

Exploring and Classifying Life

Section 3 Where does life come from?

Skim *Section 3, and write three questions that you have.* Accept all reasonable responses.

1. What is biogenesis?
2. How did life start on Earth?
3. Who was Oparin and what was his hypothesis?

Review Vocabulary

Define contaminate *and use it in an original sentence.*

contaminate

to make dirty or pollute

Sample sentence: The trash contaminated the river.

New Vocabulary

Write the vocabulary term that matches each definition.

spontaneous generation

the idea that living things come from nonliving things

biogenesis

the idea that living things come only from other living things

Academic Vocabulary

Use a dictionary to define estimate *as both a noun and a verb.*

estimate

noun: an opinion of the value, quality, size, or cost of something

verb: to form an opinion by reasoning

Name _____ Date _____

Section 3 Where does life come from? (continued)

Main Idea | **Details**

Life Comes from Life

I found this information on page _____.
SE, p. 19
RE, pp. 12–13

Contrast *the theories of* spontaneous generation *and* biogenesis. *Complete the table.*

	Spontaneous Generation	Biogenesis
Source of life	nonliving things, such as mud, rain, and grain	only from other living things

I found this information on page _____.
SE, pp. 19–20
RE, pp. 12–13

Sequence *experiments that were conducted about the theory of spontaneous generation. Complete the time line.*

1800s
Who: Louis Pasteur
What: Experiments disproved the theory of spontaneous generation.

1700s
Who: John Needham and Lazaro Spallanzani
What: Experiments did not show spontaneous generation but also did not entirely disprove it.

1668
Who: Francesco Redi
What: Experiments showed that maggots hatched from fly eggs.

Students using the SE may provide more detailed information about the experiments cited.

Students may be interested to research the experiments of Spallanzani and Pasteur.

Life's Origins

I found this information on page _____.
SE, p. 21
RE, p. 13

Complete *key events in the evolution of life on Earth. Identify the event that scientists hypothesize occurred at each time.*

about 5 billion years ago: The solar system was a whirling mass of gas and dust.

about 4.6 billion years ago: Earth formed.

more than 3.5 billion years ago: The first living organisms evolved.

Name _____ Date _____

Section 3 Where does life come from? (continued)

Main Idea

Life's Origins

I found this information on page _____.

SE, p. 21
RE, p. 13

Details

Organize *information about* Oparin's hypothesis. *Complete the outline.*

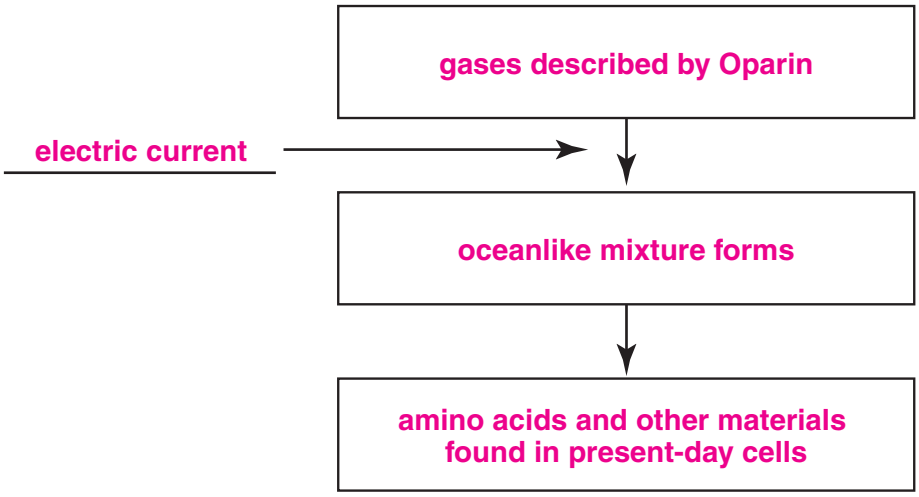
I. Oparin's hypothesis of Earth's early atmosphere composition

- **A.** ammonia
- **B.** hydrogen
- **C.** methane
- **D.** water vapor

II. What happened in the atmosphere

- **A.** Gases combined.
- **B.** Complex compounds found in living things formed.

Complete *the graphic organizer summarizing Stanley Miller and Harold Urey's experiment.*



CONNECT IT

Scientists' theories of the origin of life have changed over time. How do these changes show the use of scientific methods?

Accept all reasonable responses. Scientists developed hypotheses about the origins of life. They tested these hypotheses and rejected those that did not match the results, such as spontaneous generation. They developed and tested new hypotheses that led to the theory of biogenesis.

Name _____ Date _____

Exploring and Classifying Life

Section 4 How are living things classified?

Read *the* What You'll Learn *statements for Section 4. Rewrite each statement as a question. As you read, look for the responses to your questions.* Accept all reasonable responses.

1. How did early scientists classify living things?
2. How are similarities used to classify organisms?
3. What is the system of binomial nomenclature?
4. How can I use a dichotomous key?

Review Vocabulary

Describe *how an organism's common name is different from its scientific name.*

common name

Sample response: A common name is the name used in a particular place and language. A scientific name is the name used by all scientists.

New Vocabulary

Read the definitions below. Write the vocabulary term that matches each definition.

kingdom	first and largest category used to classify organisms
phylogeny	evolutionary history of an organism
genus	group of similar species
binomial nomenclature	two-word scientific naming system

Academic Vocabulary

Define similar *using a dictionary.*

similar

having many but not all qualities in common

Name _____ **Date** _____

Section 4 How are living things classified? (continued)

Main Idea | **Details**

Classification

I found this information on page _____.
SE, pp. 22–23
RE, p. 15

Contrast *historic* classification systems. *Identify the categories or criteria used in each system.*

	Early classification	Aristotle	Linnaeus
Categories or criteria	plants used in medicines; human traits	plant or animal; groups broken into smaller groups according to traits	organisms with similar structures

I found this information on page _____.
SE, p. 23
RE, p. 16

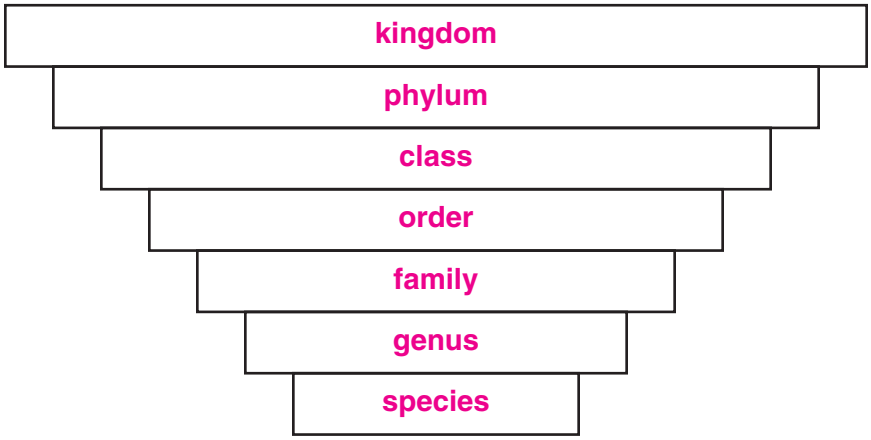
Summarize *the 6 types of information that modern scientists use to determine an organism's* phylogeny.

1. similarities in structure
2. similarities in external and internal features
3. cellular characteristics, such as chromosomes
4. fossils
5. hereditary information
6. early stages of development

I found this information on page _____.
SE, p. 23
RE, p. 16

Label *the groups used to classify organisms from least specific to most specific. Use the word bank to complete the diagram.*

class	genus	order	species
family	kingdom	phylum	



Name _____ Date _____

Section 4 How are living things classified? (continued)

Main Idea	Details

Scientific Names

I found this information on page _____.
SE, p. 24
RE, pp. 16–17

Summarize binomial nomenclature. *Complete the sentences.*

The first word of an organism's scientific name is its genus.

The second word might tell you something about the organism.

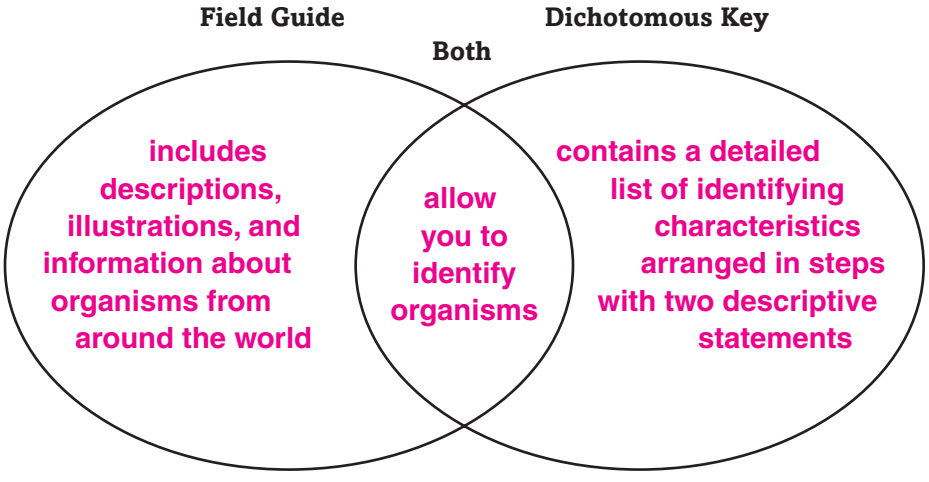
Identify *four reasons the system of binomial nomenclature is useful.*

1. It helps avoid mistakes caused by confusing two organisms.
2. Animals with similar evolutionary histories are classified together.
3. Scientific names give descriptive information about the species.
4. Scientific names allow information about organisms to be organized easily and efficiently.

Tools for Identifying Organisms

I found this information on page _____.
SE, pp. 25–26
RE, p. 17

Distinguish *between a* field guide *and a* dichotomous key. *Complete the Venn diagram.*



SYNTHESIZE IT

Choose five similar plants or animals. Use what you know about their structures and features to develop your own dichotomous key to classify your choices. Use a dictionary to find the scientific name of each plant or animal to include in your key. Accept all reasonable responses.

Name _____ Date _____

Exploring and Classifying Life

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Exploring and Classifying Life	After You Read
• All science takes place in laboratories.	D SE, p. 8 RE, p. 1
• All of the changes that take place during an organism's life are called responses.	D SE, p. 16 RE, p. 8
• Spontaneous generation is the idea that living things come from nonliving things.	A SE, p. 20 RE, p. 12
• Organisms are classified into groups based on their similarities.	A SE, p. 23 RE, p. 16

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

List three important ideas you learned in Chapter 1.

Accept all reasonable responses. 1. Scientists use skills to solve problems and answer questions. 2. Living things are organized, respond to stimuli, use energy, grow and develop, and reproduce. 3. Research into the origins of life is still being conducted.

Name _____ Date _____

Cells

Before You Read

Preview the chapter title, the section titles, and the section headings. List at least one idea for each section in each column.

K What I know	W What I want to find out
Accept all reasonable responses.	

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write three questions that you would ask a scientist researching cancer cells.

Accept all reasonable responses, such as: How did you become a scientist?

How can cancer be treated? When will there be a cure for cancer?

Name _____ Date _____

Cells

Section 1 Cell Structure

Skim *Section 1. Write two questions that come to mind.* Accept all reasonable responses.

1. Why are plant cells different from animal cells?
2. What makes a cell the shape that it is?

Review Vocabulary

Write *sentences using the Review Vocabulary and New Vocabulary words. Use two or more of the vocabulary words in each sentence.*

photosynthesis

Accept all reasonable responses. The cell wall of a plant cell is outside the cell membrane.

New Vocabulary

Organelles, such as the cell's nucleus, are structures within the cytoplasm.

cell membrane

cytoplasm

Chlorophyll in chloroplasts captures light energy needed for the process of photosynthesis.

cell wall

organelle

A mitochondrion is an organelle in which food is broken down and energy is released.

nucleus

chloroplast

mitochondrion

Some ribosomes float freely in the cytoplasm, and others are attached to the endoplasmic reticulum.

ribosome

endoplasmic reticulum

The Golgi body packages materials and moves them out through the cell membrane.

Golgi body

tissue

An organ is a structure made up of two or more different types of tissues that work together.

organ

Academic Vocabulary

Write *sentences using* function *as a noun and as a verb.*

function

Noun: Each cell in the body has a specific function.

Verb: Chlorophyll functions to capture light energy.

Name _____ Date _____

Section 1 Cell Structure (continued)

Main Idea | **Details**

Common Cell Traits

I found this information on page _____.
SE, p. 38; RE, p. 19

I found this information on page _____.
SE, p. 39
RE, p. 20

Define cell *by completing the following statement.*

A cell is the smallest unit that is capable of performing life functions.

Model *a* prokaryotic cell *and a* eukaryotic cell. *Show the difference between the two types.*

Prokaryotic Cell	Eukaryotic Cell
Prokaryotic cells have no membrane-bound structures inside the cell.	Eukaryotic cells contain membrane-bound structures.

Cell Organization

I found this information on page _____.
SE, pp. 39–44
RE, pp. 20–23

Students may work in pairs to complete the table describing the parts of a cell.

Organize *information about eukaryotic cell parts in the table.*

Part	Description
Cell wall	found in plants, algae, fungi, and most bacteria; protects the cell; gives cell shape
Nucleus	usually largest organelle; directs all cell activities; contains DNA
Chloroplast	green organelle in plant cells; contains chlorophyll which captures light energy
Mitochondria	organelles that release energy from food
Ribosomes	small structures that make proteins
Endoplasmic reticulum	series of folded membranes; processes and moves materials
Golgi bodies	stacked, flattened membranes; package proteins in vesicles and move them out of cell
Lysosomes	contain digestive chemicals; break down food, wastes, worn-out cell parts

Name _____ **Date** _____

Section 1 Cell Structure (continued)

Main Idea

From Cell to Organism

I found this information on page _____.

SE, p. 45
RE, p. 23

Details

Sequence *the following terms from simplest (at the top) to most complex in the chart below. Define each term and provide an example.* Accept all reasonable examples.

tissue organism cell organ system organ

Term: cell Example: muscle cell

Definition: the smallest unit that can perform life functions

↓

Term: tissue Example: muscle tissue

Definition: similar cells grouped together to do one job

↓

Term: organ Example: heart

Definition: two or more types of tissue that work together

↓

Term: organ system Example: circulatory system

Definition: group of organs that perform a function

↓

Term: organism Example: human being

Definition: a living thing

Synthesize It

Compare and contrast animal and plant cells.

Both plant and animal cells carry out the functions of life for the organism. They have many of the same organelles. Plant cells have cell walls and chloroplasts, which animal cells do not.

Name _____ Date _____

Cells

Section 2 Viewing Cells

Predict *three things that might be discussed in this section after reading its headings.* Accept all reasonable responses.

1. what early microscopes were like
2. what magnification is
3. what the cell theory is

Review Vocabulary

magnify

Use magnify *in a sentence.*

Accept all reasonable responses. Van Leeuwenhoek's microscope could magnify up to 270 times.

New Vocabulary

cell theory

Find a sentence in Section 2 in which cell theory *is used and write it here.* Accept all reasonable responses.

Virchow's observations and conclusions and those of others are summarized in the cell theory.

Academic Vocabulary

compound

Define compound *as an adjective. Use a dictionary if you need to.*

made of two or more separate parts or elements

Locate and write a sentence in Section 2 in which the word compound *is used as an adjective.*

Accept all reasonable responses. The compound light microscope has two sets of lenses—eyepiece lenses and objective lenses.

Name _____ Date _____

Section 2 Viewing Cells (continued)

Main Idea

Magnifying Cells

I found this information on page _____.
SE, p. 47
RE, p. 25

I found this information on page _____.
SE, p. 50
RE, p. 26

I found this information on page _____.
SE, p. 50
RE, p. 26

Have students work in pairs to complete the Venn diagram.

Details

Summarize *information in your book to describe van Leeuwenhoek's microscope.*

It was a simple microscope with a tiny glass bead for a lens. It could magnify about 270X.

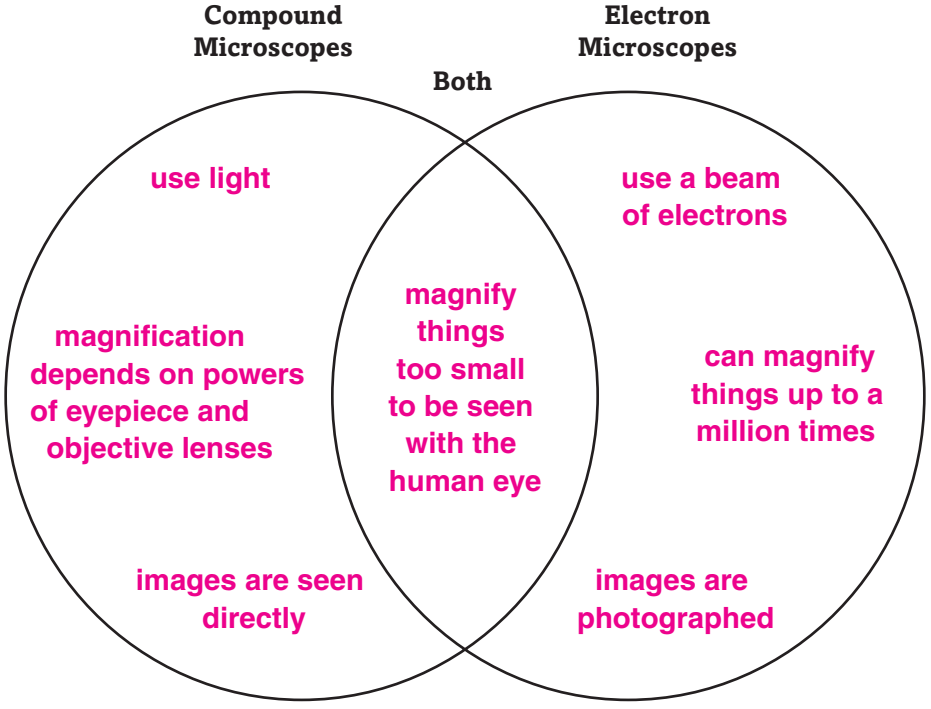
Evaluate *the* total magnification *of a microscope with a 10X eyepiece lens and a 43X objective lens. Write the equation for finding total magnification. Then use it to show your calculation.*

total magnification =

eyepiece lens magnification × objective lens magnification

total magnification = 10X × 43X = 430X

Compare compound microscopes *with* electron microscopes *by completing the Venn diagram with at least seven facts.*



Name _____ **Date** _____

Section 2 Viewing Cells (continued)

Main Idea	Details
Cell Theory *I found this information on page* _____. SE, p. 51 RE, p. 26	**Summarize** *discoveries made by scientists that led to the* cell theory. Accept all reasonable responses. Robert Hooke A sample of cork he looked at under his microscope seemed to be made up of empty little boxes. He named them cells. Matthias Schleiden concluded that all plants are made of cells Theodor Schwann concluded that all animals are made of cells. Rudolf Virchow hypothesized that cells divide to form new cells, and that every existing cell came from another cell.
I found this information on page _____. SE, p. 51 RE, p. 26	**List** *the 3 main principles of the cell theory.* 1. Organisms are made up of one or more cells. 2. The cell is the basic unit of organization in organisms. 3. All cells come from cells.

CONNECT IT

Describe how the development of the cell theory shows that scientific beliefs can change over time. Use specific examples.

Accept all reasonable responses. The development of the microscope allowed observations of cells, which led to the beginnings of the cell theory. The original observations of Robert Hooke were added to by other scientists over many years. Each observation and new hypothesis brought new information, which led to changes in the cell theory.

Name _____ Date _____

Cells

Section 3 Viruses

Scan *Section 3 of this chapter. Write three questions based on headings in the section. Answer the questions as you read.*

1. What are viruses?
2. How do viruses multiply?
3. How do viruses affect organisms?

Review Vocabulary

disease

Define disease *using your book or a dictionary.*

condition that results from the disruption in function of one or more of an organism's normal processes

New Vocabulary

Use your book to define each new vocabulary term.

virus

strand of hereditary material surrounded by a protein coating

host cell

living cell in which a virus can actively multiply or in which a virus can hide until activated by environmental stimuli

Academic Vocabulary

Use a dictionary to define apparent.

apparent

readily seen, visible, readily understood or perceived; evident; obvious

Explain what the following sentence means. Accept all reasonable explanations.

> The virus is still in your body's cells, but it is hiding and doing no *apparent* harm.

The virus is still in the cells, but not doing any harm that you can see or sense.

Name _____ Date _____

Section 3 Viruses (continued)

Main Idea | **Details**

What are viruses?

I found this information on page _____.

SE, p. 52
RE, p. 28

Organize *information about* viruses *by completing the outline.*

Viruses

I. Definition: a strand of hereditary material with a protein coating; lacks nucleus, organelles, or cell membrane

II. Description:

A. Size: too small to be seen with a light microscope

B. Shapes: varied

III. Diseases caused by viruses

A. measles

B. chicken pox

C. flu

D. AIDS

How do viruses multiply?

I found this information on page _____.

SE, p. 53
RE, pp. 28–29

Summarize *what a virus needs to reproduce.*

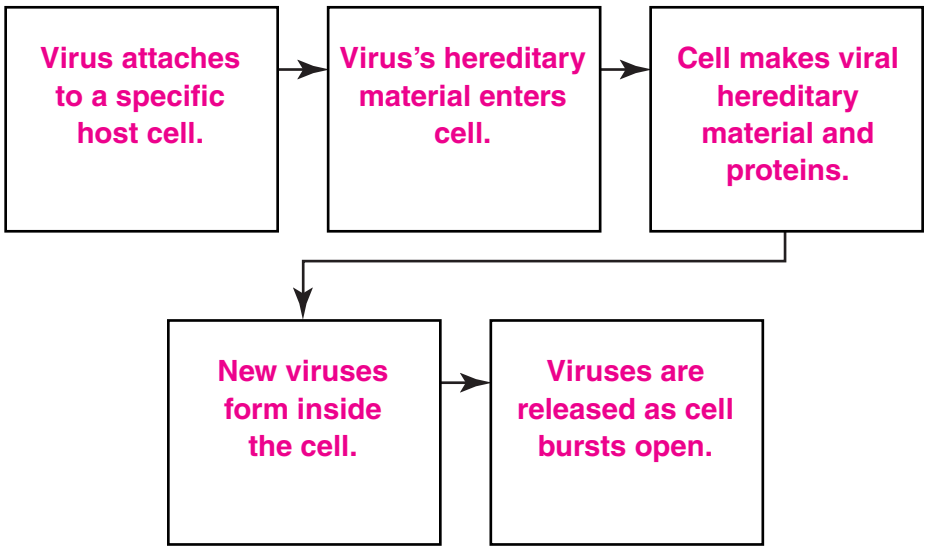
To reproduce, a virus must enter a host cell.

Distinguish *between an* active virus *and a* latent virus.

A(n) active virus enters a host cell, immediately causes the cell to make new viruses, and destroys the cell.

A(n) latent virus enters a host cell, but does not immediately make new viruses or destroy the cell.

Sequence *the events when an active virus enters a* host cell.



Name _____ Date _____

Section 3 Viruses (continued)

Main Idea

Details

How do viruses affect organisms?

I found this information on page _____.

SE, p. 54
RE, p. 30

Define bacteriophage *and explain what it does to a* bacterium.

A bacteriophage is a virus that attaches to a bacterial cell, injects its hereditary material into the cell, and produces new viruses. The process takes about 20 minutes. Each infected cell produces about 100 new viruses.

Fighting Viruses

I found this information on page _____.

SE, pp. 54–55
RE, pp. 30–31

Sequence *the steps by which* interferons *work.*

Interferons are produced rapidly by virus-infected cells.

↓

Interferons move to noninfected cells.

↓

Interferons cause noninfected cells to produce protective substances.

Research with Viruses

I found this information on page _____.

SE, pp. 54–55
RE, p. 31

Summarize *how scientists use viruses in* gene therapy.

Scientists place normal hereditary material into viruses. The altered viruses infect cells that have flawed hereditary material. The normal hereditary material enters the cells and replaces the flawed material.

Connect It

Describe why it is not a good idea to take antibiotics for a cold.

Accept all reasonable responses. It is not a good idea because antibiotics treat infections caused by bacteria, but they do not affect viruses. Colds are caused by viruses, so the antibiotics will not affect them.

Name _____ **Date** _____

Tie It Together

A scientist is researching an unknown disease. After examining the disease-causing agent with a compound microscope and testing it in various ways, she has decided that the disease should be treated with an antibiotic drug to disrupt its membrane and prevent it from reproducing. Describe what is causing the disease and how you know.

Accept all reasonable responses. Students should conclude that the agent is a bacterium and not a virus, because the agent is visible under a compound microscope. If it were a virus, it would be visible only with the help of an electron microscope. In addition, cells have membranes but viruses do not. Antibiotics are not given to treat viral diseases.

Name _____ Date _____

Cells Chapter Wrap-Up

Review the ideas you listed at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know	W What I want to find out	L What I learned
		Accept all reasonable responses.

Review

Use this checklist to help you study.

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- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

What are the three most important ideas in the chapter?

Accept all reasonable responses. 1. Each cell in a many-celled organism carries on its own life functions while depending in some way on other cellsin the organism. 2. The cell theory took hundreds of years to develop and was the result of the work of many people. 3. There are helpful uses for viruses.

Name _____ Date _____

Cell Processes

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Cell Processes
	• Matter is made up of atoms.
	• All substances chemically combine when they are mixed together.
	• Energy is always needed to move material across a cell membrane.
	• Plants can convert light energy into chemical energy.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Describe two ways in which you think plants get food and energy.

Student responses may include from the Sun, from the air, and from the ground.

Name _____ Date _____

Cell Processes

Section 1 Chemistry of Life

Predict *what you will learn in Section 1 after reading the headings and looking at the diagrams.* Accept all reasonable responses.

1. what matter is
2. why water is important for living things
3. how carbohydrates, fats, and proteins work in the body

Review Vocabulary

Define cell *to show its scientific meaning.*

cell

smallest unit of an organism that can carry on life functions

New Vocabulary

Find each term in Section 1 and write the sentence where it is used.

mixture

A mixture is a combination of substances in which individual substances retain their own properties.

organic compound

Organic compounds always contain carbon and hydrogen and usually are associated with living things.

enzyme

Certain proteins called enzymes regulate nearly all chemical reactions in cells.

inorganic compound

Most inorganic compounds are made from elements other than carbon and contain fewer atoms than organic compounds.

Academic Vocabulary

Use a dictionary to define chemical bond.

chemical bond

the force holding atoms together in a molecule

Name _____ Date _____

Section 1 Chemistry of Life (continued)

Main Idea **Details**

The Nature of Matter

I found this information on page _____.
SE, pp. 67–69
RE, p. 34

I found this information on page _____.
SE, pp. 68–69
RE, p. 35

Have students work in pairs to identify the important ideas in this section.

Compare elements *and* compounds *by completing the chart below.*

	Elements	Compounds
Number of types of atom	one	two or more
Example	oxygen	water

Classify *each characteristic of compounds as* **ionic, molecular,** *or* **both.**

ionic — has positively and negatively charged ions

molecular — share outermost electrons to bond

ionic — salt

molecular — sugar

both — involved in many life processes

both — have different properties than the elements from which they are made

Mixtures

I found this information on page _____.
SE, p. 69
RE, p. 36

Compare mixtures, solutions, *and* suspensions. *Complete the statements below.*

A mixture is a combination of substances that do not chemically combine when put together.

Both solutions and suspensions are types of mixtures in which substances are mixed evenly.

In a solution, one substance does not sink to the bottom of the container if it is left standing.

In a suspension, one substance usually will sink to the bottom if the mixture is left standing long enough.

Main Idea

Details

Accept all reasonable responses.

Organic Compounds

I found this information on page _____.
SE, pp. 70–71
RE, pp. 36–38

Summarize *the functions of the 4 main* organic compounds.

Organic Compounds in Living Things	
Compound	**Function**
Carbohydrates	supply energy for cell processes; form plant structures; short-term energy storage
Lipids	store large amounts of energy for the long term; form boundaries around cells
Proteins	regulate cell processes, build cell structures
Nucleic acids	carry hereditary information; used to make proteins

Inorganic Compounds

I found this information on page _____.
SE, pp. 70–71
RE, pp. 36–38

Compare and contrast *characteristics of organic and inorganic compounds by completing the table below.*

Characteristic	Organic	Inorganic
Contains carbon?	yes	sometimes
Role in living things	make up living things, usually come from them	provide elements needed by living things

I found this information on page _____.
SE, pp. 71–72
RE, p. 38

Identify *three ways that water is important to living things.*

1. Living things are more than 50 percent water.
2. Seeds and spores need water to sprout.
3. Chemical reactions in living things take place in water.

Name _____ Date _____

Cell Processes

Section 2 Moving Cellular Materials

Skim *Section 2. List three headings you would use to make an outline of this section.*

1. Passive Transport
2. Active Transport
3. Endocytosis and Exocytosis

Review Vocabulary

cytoplasm

Define cytoplasm *to show its scientific meaning.*

gel-like mixture inside the cell that contains hereditary material and is the location of most of the cell's life processes

New Vocabulary

Write the vocabulary term that matches each definition.

passive transport	movement of substances through a cell membrane without the use of energy
equilibrium	occurs when molecules of one substance are spread evenly throughout another substance
active transport	energy-requiring process in which transport proteins bind with particles and move them through a cell membrane
endocytosis	process by which a cell takes in a substance by surrounding it with the cell membrane
exocytosis	process by which vesicles release their contents outside the cell
diffusion	type of passive transport in which molecules move from where there are more of them to where there are fewer of them
osmosis	type of passive transport that occurs when water diffuses through a cell membrane

Academic Vocabulary

facilitate

Use a dictionary to define the term **facilitate**.

to make easy or easier

Name _____ **Date** _____

Section 2 Moving Cellular Materials (continued)

Main Idea | **Details**

I found this information on page _____.
SE, p. 75
RE, p. 41

Have students work in pairs to describe how diffusion allows for the transport and delivery of oxygen from the lungs to body cells.

Create *a diagram that shows how oxygen diffuses from* air sacs *in the lungs to* red blood cells.

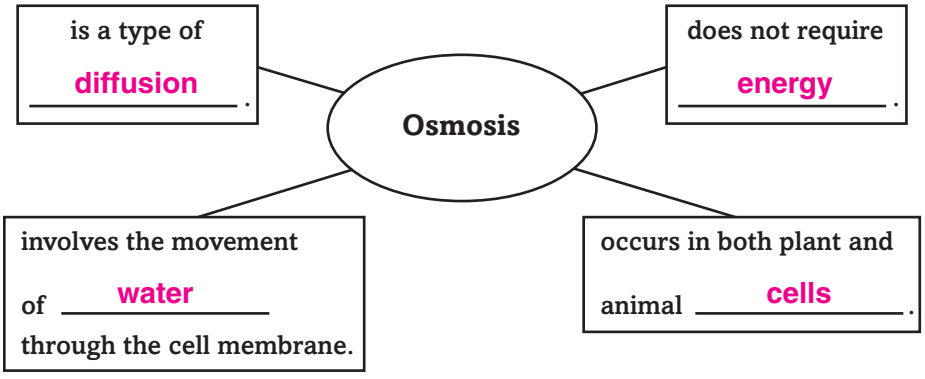
Drawings should show the motion of oxygen from air sacs in the lung to red blood cells.

I found this information on page _____.
SE, p. 76
RE, pp. 42–43

Write a short caption on how oxygen moves from the lungs to toe cells. Accept all reasonable responses.

Oxygen diffuses from the lungs to red blood cells. These red blood cells carry oxygen to cells. The oxygen then diffuses from the red blood cells to toe cells.

Complete *the concept map of* osmosis.



I found this information on page _____.
SE, p. 77
RE, p. 42

List *three facts about* facilitated diffusion. Accept all reasonable responses.

1. used to move large molecules
2. involves transport molecules
3. is a type of passive transport

Name _____ Date _____

Section 2 Moving Cellular Materials (continued)

Main Idea | **Details**

Active Transport

I found this information on page _____.
SE, p. 77
RE, p. 43

Sequence *the process of how* active transport *moves materials into the cell.*

1. The transport protein binds to the needed particle.
2. Energy is used to move the particle through the cell membrane.
3. The particle is released by the transport protein.

I found this information on page _____.
SE, p. 77
RE, pp. 42–43

Compare and contrast *facilitated diffusion and active transport by writing yes or no in each box of the chart.*

	Facilitated Diffusion	Active Transport
Uses transport proteins?	yes	yes
Transports materials across cell membrane?	yes	yes
Requires energy?	no	yes
Able to move materials from an area with less of the material to an area with more of the material?	no	yes

Endocytosis and Exocytosis

I found this information on page _____.
SE, p. 78
RE, p. 43

Complete *the table to identify the processes involved in moving very large particles in and out of cells.*

	Process	Description
Materials entering cell	endocytosis	The cell membrane surrounds the material and pinches off to form a vesicle inside the cell.
Materials being expelled from cell	exocytosis	A vesicle inside the cell that contains material to be released joins with the cell membrane. The material is released outside the cell.

Name _____ **Date** _____

Cell Processes

Section 3 Energy for Life

Scan *Section 3 of your book. Write three things you think you will learn about in this section.* **Accept all reasonable responses.**

1. **How enzymes change molecules.**
2. **What chlorophyll is.**
3. **The difference between fermentation and respiration.**

Review Vocabulary

Define mitochondrion *to show its scientific meaning.*

mitochondrion

cell organelle that breaks down lipids and carbohydrates and releases energy

New Vocabulary

Read the definitions below. Write the vocabulary term that matches the definition in the blank to the left.

respiration

process by which producers and consumers release stored energy from food molecules

fermentation

process by which oxygen-lacking cells and some one-celled organisms release small amounts of energy from glucose molecules and produce wastes such as alcohol, carbon dioxide, and lactic acid

photosynthesis

process by which plants and many other producers use light energy to produce a simple sugar from carbon dioxide and water and give off oxygen

metabolism

total of all chemical reactions in an organism

Academic Vocabulary

Use a dictionary to define **obtain**.

obtain

to get possession of, especially by some effort

Name _____ Date _____

Section 3 Energy for Life (continued)

Main Idea

Details

Trapping and Using Energy

I found this information on page _____.
SE, p. 81
RE, p. 45

Have students work in pairs to diagram a reaction involving enzymes.

Model *a chemical reaction in which an* enzyme *changes two smaller molecules into one larger molecule.*

Drawings should show two small molecules binding to the enzyme and becoming one larger molecule. The enzyme should not change.

I found this information on page _____.
SE, p. 82
RE, p. 46

Complete *the table on the different materials and their roles in* photosynthesis.

Material	Role in Photosynthesis
Water	raw materials for photosynthesis
Carbon dioxide	
Sugar	products of photosynthesis
Oxygen	
Chlorophyll	pigment that captures light energy in plants

I found this information on page _____.
SE, p. 82
RE, p. 47

Analyze *why photosynthesis is important to animals.*

Animals depend on photosynthesis for energy. Sometimes they eat organisms that carry out photosynthesis directly. Other times they feed on other consumers. However, the energy that powers these consumers was originally made by a producer.

Name _____ **Date** _____

Section 3 Energy for Life (continued)

Main Idea

I found this information on page _____.
SE, p. 83
RE, p. 47

Details

Summarize *the process of* respiration. *State what is broken down and what the products are.*

During respiration, food molecules are broken down to release stored energy. Oxygen is used to complete this process. The waste products carbon dioxide and water are produced.

I found this information on page _____.
SE, pp. 83–84
RE, pp. 47–48

Compare fermentation *with respiration.*

Comparing Fermentation and Respiration		
Process	Fermentation	Respiration
What gets broken down?	glucose	glucose
Where does breakdown occur?	in the cytoplasm	in the cytoplasm; in the mitochondria
Is energy released?	yes	yes
What wastes are produced?	if insufficient O_2 in muscle cells: lactic acid; in yeast cells: alcohol and O_2	CO_2 and water

Synthesize It

Describe the relationship between plants and animals. Use the listed terms in your description.

carbon dioxide consumer energy oxygen photosynthesis producer respiration

Accept all reasonable responses. Students should clearly describe producers as organisms that make food that is then broken down by themselves and by consumers.

Name _____ Date _____

Tie It Together

Suppose that you are small enough to be able to move around within the cytoplasm of a cell. Write a story about what it might be like to move through the cell membrane, including the method the cell would use to let you in. Explain why this is the best method.

Accept all reasonable responses. Well, I'm a pretty big molecule, but I like to think I fit nicely inside a cell. Getting inside the cell, though, is always quite a process! In fact, just yesterday I crossed the cell membrane. I was outside the cell when the cell membrane started to surround me. Eventually, I was completely surrounded. The part of the membrane that surrounded me then pinched off. I was inside a vesicle inside the cytoplasm of the cell. This process is called endocytosis. I can't imagine myself crossing the membrane any other way. Some smaller molecules can cross the membrane through transport proteins. I am too big to fit through a transport protein. Even smaller molecules can actually diffuse across the cell membrane. Since I cannot even fit through a transport protein, diffusion directly through the membrane is definitely not the right choice for me!

Name _____ Date _____

Cell Processes Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Cell Processes	After You Read
• Matter is made up of atoms.	A SE, p. 66 RE, p. 33
• All substances chemically combine when they are mixed together.	D SE, p. 69 RE, p. 36
• Energy is always needed to move material across a cell membrane.	D SE, p. 74 RE, p. 40
• Plants can convert light energy into chemical energy.	A SE, p. 82 RE, p. 46

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

List three important ideas in the chapter.

Accept all reasonable responses. 1. Both active and passive transport are used to move things in and out of cells in living things. 2. As consumers, humans depend on plants for both food and oxygen. 3. Respiration takes place in all cells and is the process of breaking down stored food for its energy.

Name _____ Date _____

Cell Reproduction

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Cell Reproduction
	• One-celled organisms reproduce through cell division.
	• Every living organism has a life cycle.
	• All organisms reproduce sexually.
	• Most of the cells formed in your body do not contain genetic material.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write three things that you know about how and why cells reproduce.

Student responses will vary, but may include that cells split into two and that they reproduce so that an organism can grow.

Name _____ Date _____

Cell Reproduction

Section 1 Cell Division and Mitosis

Skim *Section 1 of your book. Read the headings, illustrations, and captions. Write three questions that come to mind as you skim the section.* **Accept all reasonable responses.**

1. **Why do cells divide?**
2. **What is mitosis?**
3. **What is asexual reproduction?**

Review Vocabulary

Define nucleus *to show its scientific meaning.*

nucleus

organelle that controls all the activities of a cell and contains hereditary material made of proteins and DNA

New Vocabulary

Locate sentences in your book that use each of the following terms. Write each sentence here, and give the page on which you found it.

mitosis

Mitosis is the process in which the nucleus divides to form two identical nuclei. SE, p. 98; RE, p. 52

chromosome

A chromosome is a structure in the nucleus that contains hereditary material. SE, p. 98; RE, p. 53

asexual reproduction

In asexual reproduction, a new organism (sometimes more than one) is produced from one organism. SE, p. 101; RE, p. 56

Academic Vocabulary

Use a dictionary to write a scientific definition of the term cycle. *Then find a sentence in this section that defines the* cell cycle, *and write it here.*

cycle

a complete set of events or phenomena recurring in the same sequence; The cell cycle is a series of events that takes place from one cell division to the next.

Name _____ Date _____

Section 1 Cell Division and Mitosis (continued)

Main Idea	Details

Why is cell division important?

I found this information on page _____.

SE, p. 96
RE, p. 51

Identify *the 3 reasons* cell division *is important.*

1. growth
2. replacement
3. reproduction

The Cell Cycle

I found this information on page _____.

SE, pp. 96–97
RE, pp. 51–52

Summarize *information about* interphase in eukaryotic cells *in the following paragraph.*

Interphase is the longest part of the cell cycle. During interphase, cells grow and develop. During interphase, cells that are still dividing copy their DNA and prepare for cell division. Cells no longer dividing are always in interphase.

Mitosis

I found this information on page _____.

SE, pp. 98–100
RE, pp. 52–55

Have students work in pairs to identify the details of the sequence in mitosis.

Sequence *the steps of* mitosis, *and write a short description of what takes place in each phase.*

1. Interphase—Cell prepares for mitosis; chromosomes duplicate.
2. Prophase—Chromatid pairs are visible; spindle is beginning to form.
3. Metaphase—Chromatid pairs line up at the center of the cell.
4. Anaphase—Chromatids separate and start moving to opposite ends of the cell.
5. Telophase—Spindle fibers start to disappear and the chromosomes start to uncoil.
6. Division of the cytoplasm—Two new cells are formed.

Name _____ **Date** _____

Section 1 Cell Division and Mitosis (continued)

Main Idea

I found this information on page _____.
SE, pp. 98–99
RE, pp. 52–54

Details

Compare *mitosis in animals and plants. State if each feature exists in* **plant cells, animal cells,** *or* **both.**

Feature	Cell Type
Centrioles	animal
Spindle fibers	both
Cell plate	plant
Cell wall	plant

I found this information on page _____.
SE, p. 100
RE, p. 55

Organize *important concepts about mitosis.*

1. Mitosis is the division of a cell nucleus.
2. Mitosis produces two new nuclei that are identical both to each other and to the original nucleus.
3. A nucleus with 46 chromosomes that undergoes mitosis will produce two nuclei, each with 46 chromosomes.

Asexual Reproduction

I found this information on page _____.
SE, pp. 101–102
RE, p. 56

Identify *the 3 forms of asexual reproduction described below.*

fission — the method by which bacteria reproduce

budding — new organism growing from body of the parent

regeneration — to regrow body parts that are lost or damaged

Connect It

A strawberry farmer wants to increase her crop without spending large amounts of money for new seeds. How can she take advantage of asexual reproduction to increase her crop? Accept all reasonable responses.

Strawberry plants can reproduce asexually. They grow horizontal stems called runners, which can produce new plants. The farmer could take advantage of these runners. She could let them grow and produce new plants.

Name _____ Date _____

Cell Reproduction

Section 2 Sexual Reproduction and Meiosis

Skim *the headings and illustrations in Section 2. Write three things you think you will learn about in this section.*

1. Accept all reasonable responses.
2. _____
3. _____

Review Vocabulary

Define organism *to show its scientific meaning.*

organism

any living thing; uses energy, is made of cells, reproduces, responds, grows, and develops

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank to the left.

fertilization	in sexual reproduction, the joining of a sperm and egg
zygote	new diploid cell formed when a sperm fertilizes an egg; will divide by mitosis and develop into a new organism
egg	sex cell formed in the female reproductive organs
diploid	cell whose similar chromosomes occur in pairs
meiosis	reproductive process that produces haploid cells
sperm	haploid sex cell formed in the male reproductive organs
haploid	cells that have only half of each pair of chromosomes
sexual reproduction	type of reproduction in which two sex cells join to form a zygote

Academic Vocabulary

Use a dictionary to define **process.**

process

series of steps performed in doing something

Name _____ Date _____

Main Idea

Details

Sexual Reproduction

I found this information on page _____.
SE, pp. 104–105
RE, pp. 58–59

Compare *characteristics of* human diploid *and* haploid cells *in the table below. Give examples of each type of cell.*

Types of Human Cells		
	Diploid	Haploid
Number of chromosomes	46	23
Process that produces them	mitosis	meiosis
Examples	brain, skin, and bone cells	egg and sperm cells

Meiosis and Sex Cells

I found this information on page _____.
SE, pp. 105–109
RE, pp. 59–60

Ask students to discuss the differences and similarities between mitosis and the first division in meiosis.

Model *the 4 stages of* meiosis I *in the spaces below. Use the figure in your book to help you.*

Meiosis I	
Prophase I pairs of duplicated chromosomes together nuclear membrane disappearing spindle is forming	Metaphase I pairs of duplicated chromosomes lined up in center of cell centromeres attached to single spindle fibers
Anaphase I duplicated chromosomes moving to opposite ends of the cell	Telophase I cell cytoplasm beginning to divide one duplicated chromosome from each pair in each half
Diagrams should resemble those in the book. Accept reasonable variations.	

Name _____ **Date** _____

Section 2 Sexual Reproduction and Meiosis (continued)

Main Idea

I found this information on page _____.
SE, pp. 106–107
RE, p. 60

Details

Model *what takes place inside a cell nucleus during* meiosis II *by drawing the 4 phases in the spaces below.*

Meiosis II	
Prophase II pairs of duplicated chromosomes spindle is forming	Metaphase II duplicated chromosomes moving to the center of the cell two spindle fibers attaching to each centromere
Anaphase II The chromatids are separating and moving to opposite ends of the cell.	Telophase II spindle fibers disappearing nuclear membranes forming around the chromosomes at each end of the cell

Diagrams should resemble those in the book. Accept reasonable variations.

I found this information on page _____.
SE, pp. 105–107
RE, pp. 59–60

Summarize *differences between* meiosis I *and* meiosis II *by writing a* number, yes, *or* no *in each box of the chart.*

	Meiosis I	Meiosis II
How many cells result?	2	4
Is a haploid cell formed?	no	yes
Do chromatids separate?	no	yes

SYNTHESIZE IT

Fruit flies have eight chromosomes in their body cells. Mice have 40. How many chromosomes are there in each sex cell of these organisms?

fruit flies–4; mice–20

Name _____ Date _____

Cell Reproduction

Section 3 DNA

Scan *the list below to preview Section 3.*

- Read all section titles.
- Read all bold words.
- Look at all illustrations and their labels.
- Think about what you already know about DNA.

Review Vocabulary

Define heredity *to show its scientific meaning.*

heredity — the passing of traits from parents to offspring

New Vocabulary

Write the correct vocabulary term next to each definition.

DNA — deoxyribonucleic acid; a cell's heredity material; made up of two strands, each consisting of a sugar-phosphate backbone and nitrogen bases: adenine, thymine, guanine, and cytosine

gene — section of DNA that contains instructions for making specific proteins

RNA — ribonucleic acid; type of nucleic acid that contains the sugar ribose, phosphates, and bases adenine, guanine, cytosine, and uracil

mutation — any permanent change in a gene or chromosome of a cell; may be beneficial, harmful, or have little effect on an organism

Academic Vocabulary

The word code *can be used as a noun or as a verb. Write a definition for its use as a noun and as a verb.*

code

Noun: set of signals representing letters or numerals, used to send messages

Verb: to put in the form or symbols of a code

Name _____ Date _____

Section 3 DNA (continued)

Main Idea

Details

What is DNA?

I found this information on page _____.
SE, p. 111
RE, p. 63

I found this information on page _____.
SE, p. 111
RE, p. 62

Identify *the 4* nitrogen bases *found in* DNA.

1. adenine
2. guanine
3. cytosine
4. thymine

Model *a section of a* DNA molecule*, showing its twisted-ladder structure. Label the the* nitrogen bases, sugar, *and* phosphates. *Make sure the nitrogen bases in your drawing are correctly paired.*

Drawings should show twisted ladder structure, with sides made up of sugar-phosphate molecules and rungs showing nitrogen base pairs. Adenine and thymine should be paired, and guanine and cytosine should be paired.

I found this information on page _____.
SE, p. 112
RE, p. 63

Summarize *how DNA copies itself.*

The DNA unwinds and separates. Then, new bases pair with the two separated strands. Two identical DNA molecules are produced.

Genes

I found this information on page _____.
SE, p. 112
RE, p. 64

Complete *the following paragraph on the relationship of proteins and* genes.

Proteins are made up of long chains of amino acids. Genes determine the order of amino acids in a protein. Changing the order of the amino acids makes a different protein.

Name _____ **Date** _____

Section 3 DNA (continued)

Main Idea

I found this information on page _____.
SE, p. 113
RE, p. 65

Details

Complete *the table on the 3 main kinds of* RNA.

Type of RNA	Function
messenger RNA (mRNA)	carries the code to make proteins from the nucleus to the cytoplasm
transfer RNA (tRNA)	brings amino acids to the ribosome
ribosomal RNA (rRNA)	type of RNA contained in ribosomes

I found this information on page _____.
SE, p. 113
RE, p. 65

Have students work in pairs to review the sequence of events in making proteins.

Complete *the steps of* **protein production** *within a cell.*

1. mRNA moves into the cytoplasm.
2. A(n) ribosome attaches to it.
3. tRNA molecules bring amino acids to the ribosomes.
4. Nitrogen bases on the mRNA temporarily match the nitrogen bases on the tRNA.
5. The same process occurs with another tRNA molecule and the next portion of the mRNA molecule.
6. The amino acids attached to the two tRNA molecules bond, beginning the formation of a protein.

Mutations

I found this information on page _____.
SE, pp. 114–115
RE, p. 65

Describe *how* **mutations** *can affect an organism.*

Mutations can be harmful. Some cause death. Others appear to have no effect. Still others can be helpful.

CONNECT IT

A man has a discolored area on the back of his hand. The doctor has assured him it is a harmless body cell mutation. Explain why the mutation probably will not appear in his children.

This is a body cell mutation. If the mutation had appeared in an egg or sperm, a child that developed from the sex cell might show the mutation.

Name _____ **Date** _____

Tie It Together

Draw an animal cell with six chromosomes.
Follow the chromosomes as they go through the steps of meiosis.
Show the chromosomes duplicating and separating, and describe the final end products.
Name each step in the process.
Show one way that a mutation might occur during the process.

Drawings should show all the phases of meiosis I and II.
Centrioles and spindle fibers should be visible.
At the end there should be four haploid cells.
The normal cells should have three chromosomes each; the mutated cells may have more or fewer.

Name _____ **Date** _____

Cell Reproduction Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Cell Reproduction	After You Read
• One-celled organisms reproduce through cell division.	A SE, p. 96 RE, p. 51
• Every living organism has a life cycle.	A SE, p. 96 RE, p. 51
• All organisms reproduce sexually.	D SE, p. 101 RE, p. 56
• Most of the cells formed in your body do not contain genetic material.	D SE, p. 100 RE, p. 55

Review

Use this checklist to help you study.

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SUMMARIZE IT

List three important ideas from this chapter.

Accept all reasonable responses. 1. Mitosis produces two cells with the same number of chromosomes as the original cell. 2. Meiosis produces sex cells with half the number of chromosomes as the original cell. 3. DNA is the molecule that carries the code for making proteins.

Name _____ Date _____

Heredity

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Heredity
	• Offspring of an organism always have the same traits as the parents.
	• There may be more than two forms of a gene.
	• Some traits are determined by more than one gene.
	• Traits from one type of organism can be introduced into another type of organism.

Construct the Foldable as directed at the beginning of the chapter.

Science Journal

Write three traits that you have and how you would determine how those traits were passed to you.

Student responses will vary, but traits may include eye color, hair color, or shape of face. Students may respond that they can determine how traits were passed on to them by looking at their family history of those traits.

Name _____ Date _____

Heredity

Section 1 Genetics

Skim *Section 1 of the chapter. Write two questions that come to mind from reading the headings of this section.* Accept all reasonable responses.

1. How do people inherit traits?
2. Who was Mendel, and what did he study?

Review Vocabulary

Define meiosis.

meiosis — reproductive process that produces four haploid sex cells from one diploid cell

New Vocabulary

Write a paragraph describing heredity. *Use the five vocabulary terms from the left in your paragraph.*

heredity
genetics
allele
dominant
recessive

Heredity is the passing of traits to offspring. The study of how traits are passed is called genetics. In genetics, scientists study alleles, which are the forms of a trait that a gene may have. The forms of a trait can be dominant or recessive. Dominant forms cover over, or dominate, recessive forms.

Write a paragraph describing genotype. *Use the five vocabulary terms from the left in your paragraph.*

Punnett square
genotype
phenotype
homozygous
heterozygous

If an organism has two of the same allele for a gene, it is homozygous. If it has different alleles, it is heterozygous. An organism's alleles determine its genotype, or genetic makeup. The genotype determines the phenotype, or outward appearance. Scientists use a Punnett square to identify possible pairs of alleles that can come from two parents.

Academic Vocabulary

Use a dictionary to define physical.

physical — having to do with the body

Name _____ Date _____

Section 1 Genetics (continued)

Main Idea

Details

Inheriting Traits

I found this information on page _____.
SE, p. 126
RE, p. 67

Summarize *what* alleles *are and how they are inherited.*

The different forms of a trait that a gene can have are called alleles. An organism usually has two alleles for each trait, one from each parent.

Mendel—The Father of Genetics

I found this information on page _____.
SE, p. 127
RE, p. 68

Identify *three things Mendel did that made his work more useful than previous studies of* heredity.

1. He was the first to trace one trait through many generations.
2. He was the first to record how traits pass from one generation to another.
3. He was the first to use the mathematics of probability to explain heredity.

Genetics in a Garden

I found this information on page _____.
SE, pp. 128–129
RE, p. 69

Analyze *one* trait *that Mendel studied.*

- Identify the *dominant* and *recessive* forms of the trait.
- Predict how an organism would look if it had two dominant alleles, two recessive alleles, or one of each allele.

Students may use any trait from their books.

Trait	shape of seeds
Dominant form	round
Recessive form	wrinkled
Two dominant alleles	round
Two recessive alleles	wrinkled
One of each allele	round

Name _____ **Date** _____

Main Idea

Genetics in a Garden

I found this information on page _____.
SE, pp. 130–131
RE, pp. 70–71

Have students work in pairs to complete and interpret the Punnett square.

I found this information on page _____.
SE, p. 132
RE, p. 71

Details

Complete *the* Punnett square *for black and blond fur in a dog.*

		Black dog	
		B	b
Blond dog	b	Bb	bb
	b	Bb	bb

Analyze *the Punnett square to complete the sentences.*

The black dog carries heterozygous black-fur traits. The blond dog carries homozygous blond-fur traits. The chance that the offspring will have black fur is 50 percent, or one in two.

Summarize *Mendel's 3* principles of heredity.

1. Traits are controlled by alleles on chromosomes.
2. An allele's effect is dominant or recessive.
3. When a pair of chromosomes separates during meiosis, the different alleles for a trait move into separate sex cells.

Connect It

A pea plant is *heterozygous* for purple flowers (Rr). A gardener crosses it with another pea plant with the same *genotype*. The recessive gene for this trait causes white flowers. Predict the possible genotypes and *phenotypes* for the offspring. Predict the percentage for each genotype and phenotype.

Possible genotypes: RR, Rr, and rr; Possible phenotypes: purple flowers, white flowers; 25% will be RR, 50% Rr, and 25% rr; 75% will have purple flowers and 25% will have white flowers.

Name _____ Date _____

Heredity

Section 2 Genetics Since Mendel

Scan *the headings and illustrations in Section 2. Write two facts you learned about genetics as you scanned the section.*

1. Accept all reasonable responses.
2. _____

Review Vocabulary

Define gene *to show its scientific meaning.*

gene — section of DNA on a chromosome that contains instructions for making specific proteins

New Vocabulary

Define each vocabulary term.

incomplete dominance — production of a phenotype that is intermediate between the phenotypes of two homozygous parents

polygenic inheritance — occurs when a group of gene pairs acts together to produce a trait

sex-linked gene — allele inherited on a sex chromosome

Academic Vocabulary

Use a dictionary to define intermediate. *Then rewrite the sentence below, using your definition.*

When the allele for white four-o'clock flowers and the allele for red four-o'clock flowers combined, the result was an intermediate phenotype—pink flowers.

intermediate — in the middle or being between; Sample sentence: When the allele for white four-o'clock flowers and the allele for red four-o'clock flowers combined, the result was a phenotype in the middle—pink flowers.

Name _____ **Date** _____

Section 2 Genetics Since Mendel (continued)

Main Idea

Details

Incomplete Dominance

I found this information on page _____.
SE, pp. 134–135
RE, pp. 73–74

Draw *a Punnett square for red and white four-o'clock flowers showing the possible offspring. Use* R *for the allele for red flowers and* R′ *for the allele for white flowers. In each section of the square, write the genotype and phenotype of the offspring.*

		Red four-o'clock	
		R	R
White four-o'clock	R′	RR′; pink	RR′; pink
	R′	RR′; pink	RR′; pink

Summarize incomplete dominance.

Neither allele is dominant in incomplete dominance. The offspring have a phenotype intermediate to that of the parents.

I found this information on page _____.
SE, p. 135
RE, pp. 73–74

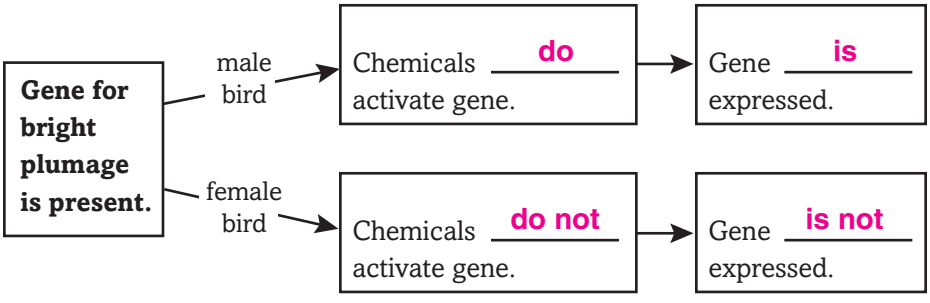
Analyze *how a gene with* multiple alleles *can produce more than three phenotypes. Use blood types as an example.*

A gene with more than two alleles can produce more than three possible combinations. In blood types, there are three alleles: A, B, and O. O is recessive to the other two. There are six possible genotypes: AA, AB, AO, BB, BO, and OO. These produce four phenotypes: A, B, AB, and O.

Polygenic Inheritance

I found this information on page _____.
SE, p. 136
RE, p. 74

Identify *how internal environment can affect the expression of a trait. Complete the flow chart.*



Name _____ Date _____

Section 2 Genetics Since Mendel (continued)

Main Idea | **Details**

Human Genes and Mutations

I found this information on page _____.
SE, p. 137
RE, pp. 74–75

I found this information on page _____.
SE, p. 138
RE, p. 75

Analyze *how* chromosome disorders *occur.*

A chromosome disorder occurs as a result of a mistake in the process of meiosis. It causes an organism to have more or fewer chromosomes than normal.

Model *how two heterozygous parents who do not have a recessive disorder can have a child with the disorder. Use* C *for a dominant allele and* c *for a recessive allele.*

Mother's genotype: Cc

Father's genotype: Cc

Child's genotype: cc

Sex-Linked Disorders

I found this information on page _____.
SE, p. 139
RE, p. 75

Complete *the statements about* sex-linked traits.

Sex-linked disorders usually result from recessive alleles on the X chromosome. A man will have the disorder when his only X chromosome has the recessive allele. A woman will have the disorder when both her X chromosomes have the recessive allele.

Pedigrees Trace Traits

I found this information on page _____.
SE, pp. 139–140
RE, p. 75

Summarize *why* pedigrees *are useful to geneticists.*

Pedigrees allow a geneticist to trace a trait over several generations. Geneticists use them to predict the probability that a baby will have a certain trait and to breed animals.

SYNTHESIZE IT

Choose a trait described in Section 2, such as color-blindness, calico patterns in cats, or cystic fibrosis. Choose genotypes for two parents. Draw a pedigree starting with these parents. Continue your pedigree for two generations. Use Punnett squares to help you predict possible offspring.

Check pedigrees to make sure that the patterns of inheritance are shown correctly.

Name _____ Date _____

Heredity

Section 3 Biotechnology

Preview *the section title and headings. Write three questions that you would ask a modern geneticist after your preview.* Accept all reasonable responses.

1. What is recombinant DNA?

2. How is gene therapy used?

3. What are the uses and risks of genetically engineered plants?

Review Vocabulary

DNA

Use DNA *in an original sentence to show its scientific meaning.*

Accept all reasonable responses. All chromosomes are made of DNA.

New Vocabulary

genetic engineering

Define genetic engineering.

using biological and chemical methods to change the arrangement of DNA that makes up a gene

Academic Vocabulary

insert

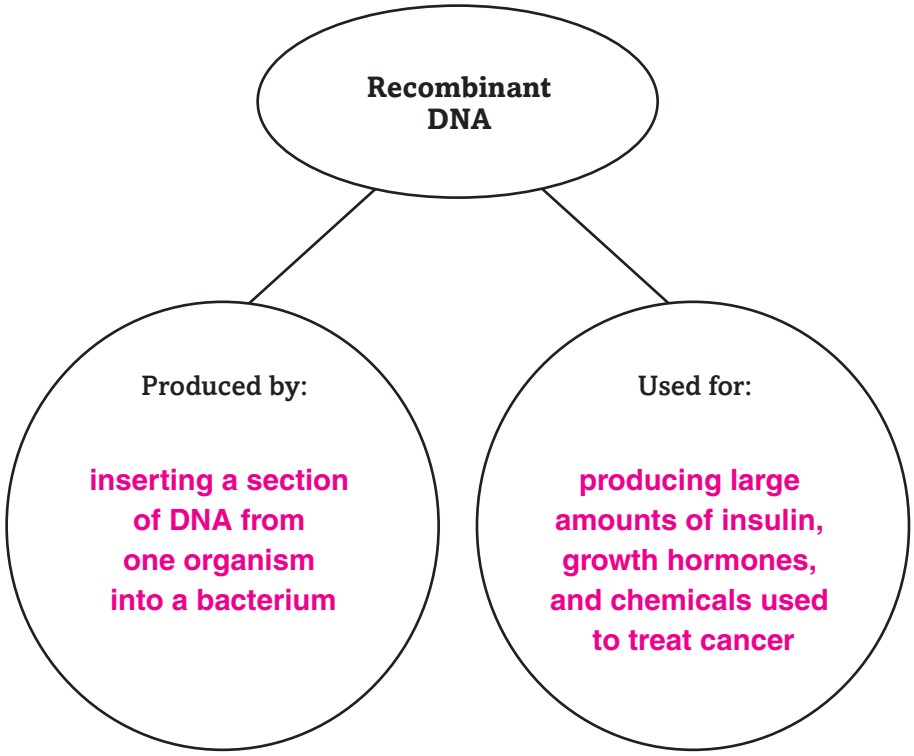
Use a dictionary to define insert *as a verb. Then find a sentence in Section 3 that uses the term or a form of the term.*

to put or fit (something) into something else; Sample sentence: Recombinant DNA is made by inserting a useful section of DNA from one organism into a bacterium.

Name _____ Date _____

Section 3 Biotechnology (continued)

Main Idea	Details
Genetic Engineering *I found this information on page* _____. SE, p. 141 RE, p. 78	**Distinguish** *three uses for* genetic engineering. 1. to produce large amounts of medicines 2. to change how cells perform their normal functions 3. to improve crop production and quality
I found this information on page _____. SE, p. 142 RE, p. 78	**Organize** *information about* recombinant DNA. *Complete the graphic organizer.*



I found this information on page _____. SE, p. 142 RE, p. 79	**Summarize** *how* gene therapy *may be used in the future.* Accept all reasonable responses. Gene therapy may be used to replace defective alleles in human cells with normal alleles. This may be used to treat cystic fibrosis and some types of cancer.

Name _____ Date _____

Main Idea

Genetic Engineering

I found this information on page _____.

SE, p. 142
RE, p. 79

Details

Create *a flow chart about gene therapy. Show how the gene gets into the body and what happens when it reaches the cells.*

Flow charts should show how a normal allele is inserted into a virus. The virus then delivers the normal allele when it infects its target cell. The normal allele replaces the defective one.

Summarize *each step of gene therapy in your model above.*

1. A normal allele is placed into a virus.
2. The virus infects a target cell and delivers the normal allele.
3. The normal allele replaces the abnormal allele in the target cell.

I found this information on page _____.

SE, p. 143
RE, p. 79

Evaluate *the benefits and potential risks of genetic engineering of crop plants.* Accept all reasonable responses.

Benefits	Risks
Plants have desirable characteristics, such as arriving at stores ripe and firm.	The long-term effects of eating genetically engineered plants are not known.

CONNECT IT

Describe how viruses are useful tools in genetic engineering.

Accept all reasonable responses. Viruses inject the DNA they carry into other cells, so scientists can use them to carry desirable DNA into other organisms.

Name _____ **Date** _____

Tie It Together

Suppose that Gregor Mendel came to visit a modern genetics laboratory and you were asked to give him a tour. Write a report describing what you would show him and how you would explain modern genetics. Remember that he does not know the words gene *or* allele, *although he described "factors" that controlled traits.*

Accept all reasonable responses. Students should include descriptions of aspects of modern genetics, including the existence of genes and allele pairs, the process of meiosis, the existence of incomplete dominance and polygenic traits, and modern techniques such as recombinant DNA.

Name _____ Date _____

Heredity Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Heredity	After You Read
• Offspring of an organism always have the same traits as the parents.	D SE, p. 128 RE, p. 69
• There may be more than two forms of a gene.	A SE, p. 135 RE, pp. 73–74
• Some traits are determined by more than one gene.	A SE, p. 136 RE, p. 74
• Traits from one type of organism can be introduced into another type of organism.	A SE, p. 141 RE, p. 78

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

Identify the three most important ideas in this chapter.

Accept all reasonable responses. 1. Most cells in the body have two alleles for every trait. 2. Punnett squares can be used to predict the genotypes and phenotypes of offspring. 3. Recombinant DNA and gene therapy may lead to cures for many diseases and disorders.

Name _____ Date _____

Adaptations over Time

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Adaptations over Time
	• Traits acquired by an organism during its life can be passed on to its offspring.
	• Most evidence of evolution comes from fossils.
	• Organisms with traits best suited to their environment are more likely to survive and reproduce.
	• Humans share a common ancestor with other primates.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Pick a favorite plant or animal and list all the ways it is well-suited to its environment.

Answers will vary. Check that students understand that an adaptation is anything that helps an organism survive and reproduce in its environment. Also note that especially because of humans, many organisms are not well-adapted to their current habitats.

Name _____ **Date** _____

Adaptations over Time

Section 1 Ideas About Evolution

Predict *three things that will be discussed in Section 1 as you scan the headings and illustrations.* Accept all reasonable responses.

1. different theories about how organisms change over time
2. principles of natural selection
3. how fast evolution occurs

Review Vocabulary

Define gene *using your book.*

gene

a section of DNA that contains instructions for making specific proteins

New Vocabulary

Write the correct term next to its definition.

species	group of organisms that share similar characteristics and can reproduce among themselves, producing fertile offspring
evolution	change in inherited characteristics over time
natural selection	process by which organisms with traits best suited to their environment are more likely to survive and reproduce
variation	inherited trait that makes an individual different from other members of its species
adaptation	any variation that makes an organism better suited to its environment

Academic Vocabulary

Use your book or a dictionary to define **hypothesis.**

hypothesis

something that is suggested as being true for the purposes of argument or of further investigation

Name _____ Date _____

Section 1 Ideas About Evolution (continued)

Main Idea	Details

Early Models of Evolution

I found this information on page _____.
SE, pp. 154–155
RE, p. 81

Identify *why Lamarck's theory of* evolution *was not accepted.*

Scientists' data showed that acquired traits were not passed to offspring.

Darwin's Model of Evolution

I found this information on page _____.
SE, pp. 155–156
RE, p. 82

Analyze *Darwin's explanation of the origins of the 13* species *of Galápagos finches. Fill in the missing words.*

The Galápagos finches competed for food. Those that had beak shapes, eating habits that allowed them to get food were able to survive longer and reproduce more. Over time, groups of finches became separate species.

Natural Selection

I found this information on page _____.
SE, pp. 156–157
RE, p. 83

State *5 main principles of* natural selection.

1. Organisms produce more offspring than can survive.
2. Variations occur among individuals.
3. Some variations are passed to offspring.
4. Individuals with helpful variations survive and reproduce better than those without.
5. Over time, offspring of these individuals may become a new species.

Variation and Adaptation

I found this information on page _____.
SE, pp. 158–159
RE, pp. 83–84

Compare and contrast variations *and* adaptations. Accept all reasonable responses.

	Variation	Adaptation
Definition	an inherited trait that makes an individual different from other species members	any variation that makes an organism better suited to its environment
Examples	shape of human hairline, fruit without seeds	color, shape, behavior, camouflage

Name _____ **Date** _____

Section 1 Ideas About Evolution (continued)

Main Idea

Details

Variation and Adaptation

I found this information on page _____.
SE, pp. 158–159
RE, pp. 83–84

Complete *the table explaining factors that can lead to changes in a population.* Accept all reasonable responses.

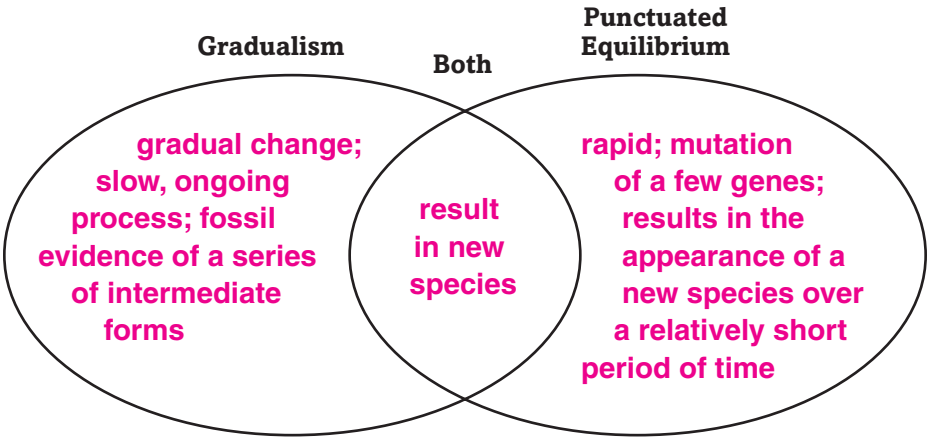
	What Happens	How It Leads to Change
Changes in Gene Sources	Individuals of a species move into or out of an area.	Individuals bring in or remove genes and variations.
Geographic Isolation	Geologic features isolate a small number of individuals from a population.	Over time, variations cause the two populations to become different.

The Speed of Evolution

I found this information on page _____.
SE, pp. 160–161
RE, pp. 84–85

Have students work in pairs to complete the Venn diagram.

Compare and contrast gradualism *and* punctuated equilibrium. *Select ideas from your reading to fill in the Venn diagram.*



Synthesize It

Describe how natural selection can lead to the formation of a new species. Include factors such as migration and geographic isolation.

Responses should accurately reflect the material presented in the section.

Name _____ Date _____

Adaptations over Time

Section 2 Clues About Evolution

Scan *Section 2 of your book. Then write two items in each of the boxes below.*

What I know about fossils	What I want to know about fossils
Accept all reasonable responses.	

Review Vocabulary

Define epoch *using your book.*

epoch

smaller division of geological time than a period; characterized by differences in life-forms that may vary regionally

New Vocabulary

Use your book to help you write the correct vocabulary term next to each definition.

sedimentary rock — a type of rock made from pieces of other rocks, minerals deposited from a solution, or plant and animal matter

radioactive element — element that gives off a steady amount of radiation as it slowly changes to a nonradioactive element

embryology — study of embryos and their development

homologous — similar in structure, origin, or function

vestigial structure — structure that does not seem to have a function and that may once have functioned in the body of an ancestor

Academic Vocabulary

Use a dictionary to define **method.**

method

way of doing something; a process

Name _____ Date _____

Section 2 Clues About Evolution (continued)

Main Idea	Details

Clues from Fossils

I found this information on page _____.
SE, p. 163
RE, p. 87

Create *a concept map to summarize information about the* Green River *formation. Include information about*

- where it is
- what it was in the past
- how fossils formed, and
- what scientists learn from the fossils there.

Accept all reasonable responses.

Types of Fossils

I found this information on page _____.
SE, p. 164
RE, p. 87

Summarize *the types of rock in which* fossils *are commonly found.*

Most fossils are found in sedimentary rock. They are most often found in limestone.

Determining a Fossil's Age

I found this information on page _____.
SE, p. 165
RE, p. 88

Organize *information about how scientists determine the age of fossils. Complete the outline.* Accept all reasonable responses.

I. *Relative* dating

A. Younger rock layers are deposited on top of older rock layers.

B. provides an estimate of a fossil's age by comparing it to layers above and below fossil

II. *Radiometric* dating

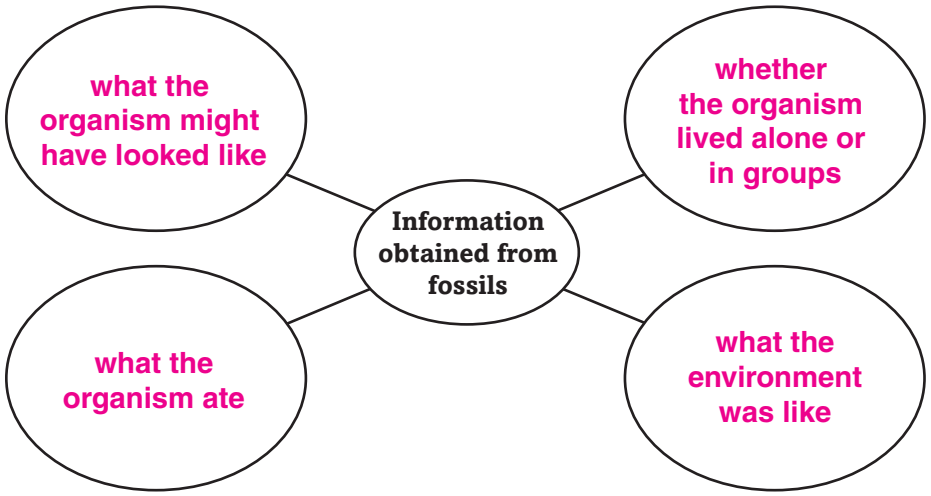
A. uses radioactive elements

B. Scientists estimate age by comparing the amount of radioactive and nonradioactive elements in the rock.

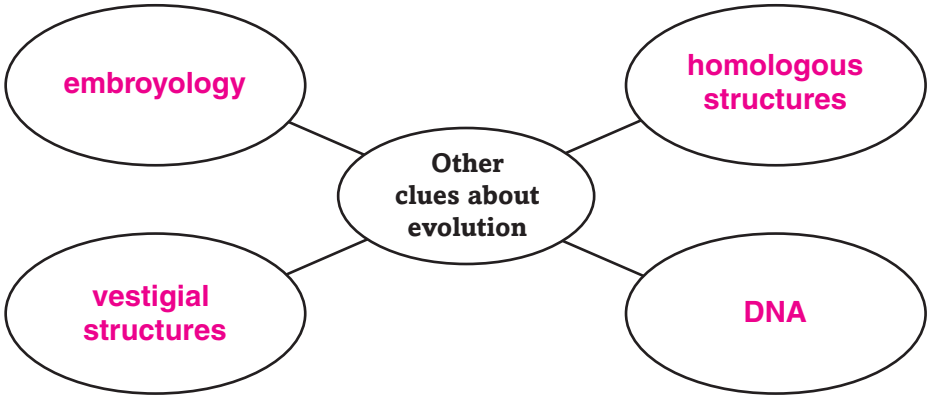
Name _____ Date _____

Section 2 Clues About Evolution (continued)

Main Idea	Details
Fossils and Evolution *I found this information on page _____.* SE, p. 167 RE, p. 88	**Create** *a graphic organizer to identify what scientists learn from fossils.*



More Clues About Evolution *I found this information on page _____.* SE, pp. 167–169 RE, pp. 89–90 Discuss with students how each clue can help scientists identify evolutionary relationships.	**Organize** *information about other clues scientists use to study evolution.*



SYNTHESIZE IT

A scientist discovers a new species of mammal. How could the scientist determine its evolutionary relationships to other animals? Explain how the scientist could use each type of evidence discussed in the section.

Answers will vary, but should reflect accurate use of embryology, DNA, homologous structures, and vestigial structures, and any relevant fossil evidence.

Name _____ **Date** _____

Adaptations over Time

Section 3 The Evolution of Primates

Skim *Section 3 of your book. Read the headings. Write three questions that come to mind.* Accept all reasonable responses.

1. What are hominids?
2. When did early humans first appear?
3. How do Neanderthals and Cro-Magnon humans differ?

Review Vocabulary

Define opposable *using your book.*

opposable — can be placed against another digit of a hand or foot

New Vocabulary

Use your book to define the following terms. Then use each term in a sentence. Accept all reasonable sentences.

primates — group of mammals including humans, monkeys, and apes that share characteristics such as opposable thumbs and binocular vision; Sample sentence: Chimpanzees are primates.

hominid — humanlike primate that ate both plants and meat and walked upright on two legs; Sample sentence: Hominids predated humans.

Homo sapiens — early humans that likely evolved from Cro-Magnons; Sample sentence: Homo sapiens are modern humans.

Academic Vocabulary

Use a dictionary to define similar.

similar — almost, but not exactly the same

Name _____ Date _____

Section 3 The Evolution of Primates (continued)

Main Idea	Details

Primates

I found this information on page _____.
SE, p. 170
RE, p. 92

Analyze *adaptations that are common among* primates *by completing the table below. List three primate adaptations and the functions each allows.*

Adaptation	Function
Opposable thumb	grasping and holding objects
Binocular vision	judging depth and distances
Flexible shoulders	moving from branch to branch

I found this information on page _____.
SE, p. 171
RE, pp. 92–93

Distinguish *three characteristics of* hominids.

1. ate both plants and meat
2. walked upright
3. had a larger brain

I found this information on page _____.
SE, p. 172
RE, p. 93

Sequence *the ancestors of early humans. Create a timeline of hominids in the boxes below. Identify and describe the hominid that lived during each time period.*

Time period: 4–6 million years ago
Hominid: Australopithecus
Characteristics: small brain, humanlike jaw and teeth, walked upright

Time period: 1.5–2 million years ago
Hominid: Homo habilis
Characteristics: larger brains and more human-like features than Australopithecus

Time period: 1.6 million years ago
Hominid: Homo erectus
Characteristics: larger brains and more human-like features than Australopithecus

Name _____ Date _____

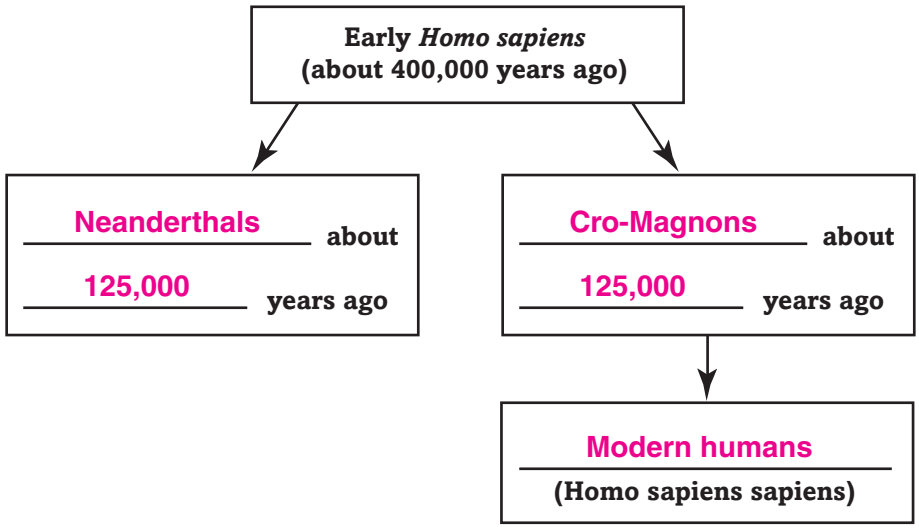
Section 3 The Evolution of Primates (continued)

Main Idea | **Details**

Humans

I found this information on page _____.
SE, pp. 172–173
RE, p. 93

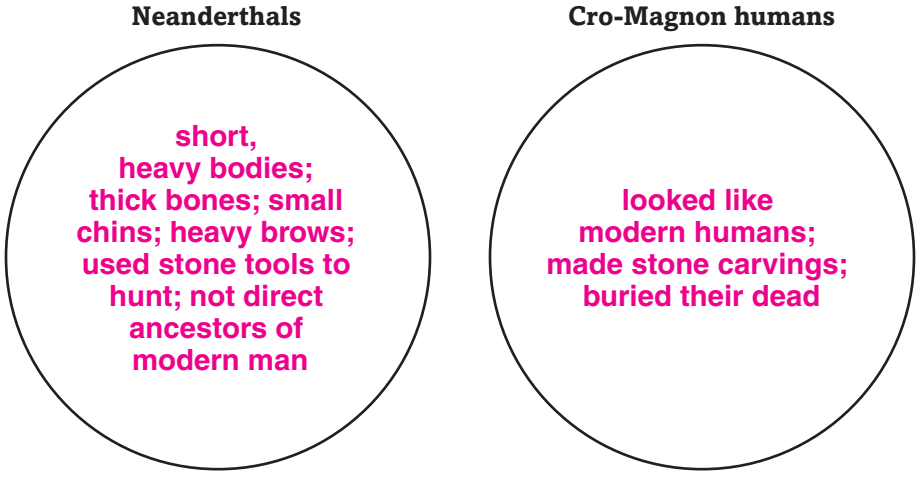
Organize *information about the origins of modern humans. Complete the diagram.*



I found this information on page _____.
SE, pp. 172–173
RE, p. 93

Have students discuss in small groups the significance of art and burying the dead as human characteristics.

Contrast Neanderthals *and* Cro-Magnon *humans by completing the diagram.*



CONNECT IT

Hypothesize how scientists might determine whether Neanderthals are ancestors of modern humans.

Accept all reasonable answers. Students may suggest that scientists would compare the fossils of Neanderthals with the body structures of modern humans. Students aware of the news might suggest DNA testing.

Name _____ **Date** _____

Tie It Together

Make Fossils

With a partner, model a set of fossils that show how organisms can change over time. Draw or model three related organisms. One should be the original organism. The others should be descendants of the original organism. Record the adaptations shown by your fossils. What environmental changes might have led to the adaptations?

Trade fossils with another pair. Describe the fossils that you are given. What adaptations can you find?

Accept all reasonable responses. Students' fossils should show adaptations that helped their creatures better survive, and students should explain the significance of the adaptations. You may wish to establish a specific environment in which the creatures originally lived and changes that might have occurred in the environment that resulted in adaptations.

Name _____ Date _____

Adaptations over Time Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Adaptations over Time	After You Read
• Traits acquired by an organism during its life can be passed on to its offspring.	D SE, p. 154 RE, p. 81
• Most evidence of evolution comes from fossils.	A SE, p. 167 RE, p. 88
• Organisms with traits best suited to their environment are more likely to survive and reproduce.	A SE, p. 157 RE, p. 83
• Humans share a common ancestor with other primates.	A SE, p. 170 RE, p. 92

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about adaptations of organisms over time.

Accept all reasonable responses. 1. Individuals with helpful variations are more likely to survive. 2. Geological isolation can lead to separate species. 3. Scientists can determine the age of rock by measuring the radiation it gives off.

Name _____ Date _____

Bacteria

Before You Read

Preview the chapter and section titles and the section headings. Complete the first two columns of the table by listing at least two ideas for each section in each column.

K What I know	W What I want to find out

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List ways that bacteria can be harmful and ways that bacteria can be beneficial. Which list is longer?

Student responses will vary. Beneficial bacteria include decomposer bacteria, such as thoseused in bioreactor landfills, and bacteria used to make yogurt, cheese, root beer,and other foods. Harmful bacteria include those that spoil food or cause disease.The beneficial list should be longer.

Name _____ Date _____

Bacteria

Section 1 What are bacteria?

Scan *Section 1 of the chapter.*

- Read all headings and bold words.
- Look at all of the illustrations.
- Think about what you already know about bacteria.

Write three facts that you learned while scanning the section.

Accept all reasonable responses.

1. Bacteria contain cytoplasm.
2. Some bacteria have tails.
3. An *aerobe* uses oxygen for respiration.

Review Vocabulary

Define prokaryotic *to show its scientific meaning.*

prokaryotic — type of cell without membrane-bound organelles

New Vocabulary

Read the definitions below. Write the key term on the blank in the left column.

aerobe	organism that uses oxygen for respiration
fission	simplest form of asexual reproduction, in which two new cells are produced that have genetic material that is identical to each other and to the original cell
flagella	whiplike tails that help many bacteria move
anaerobe	organism that is adapted to live without oxygen

Academic Vocabulary

Use a dictionary to define the term **environment.**

environment — living and nonliving factors that surround an organism

Name _____ Date _____

Section 1 What are bacteria? (continued)

Main Idea	Details
Characteristics of Bacteria *I found this information on page* _____. SE, p. 187 RE, p. 95	**Identify** *3 shapes of bacterial cells.* 1. cocci: sphere-shaped 2. bacilli: rod-shaped 3. spirilla: spiral-shaped
I found this information on page _____. SE, p. 188 RE, pp. 96–97	**Summarize** *how the following pairs of words relate to* bacteria. Asexual Reproduction/Sexual Reproduction: Bacteria reproduce asexually by fission. This type of reproduction results in two identical cells. Some bacteria carry out a process similar to sexual reproduction. In this process, two bacteria exchange DNA through a thin tube. Producers/Consumers: Some bacteria are producers. They are able to make their own food. Other bacteria are consumers. They get their food from the environment. Aerobes/Anaerobes: Some bacteria are aerobes. They use oxygen to obtain energy. Some bacteria are anaerobes. They live without oxygen.

Name _____ Date _____

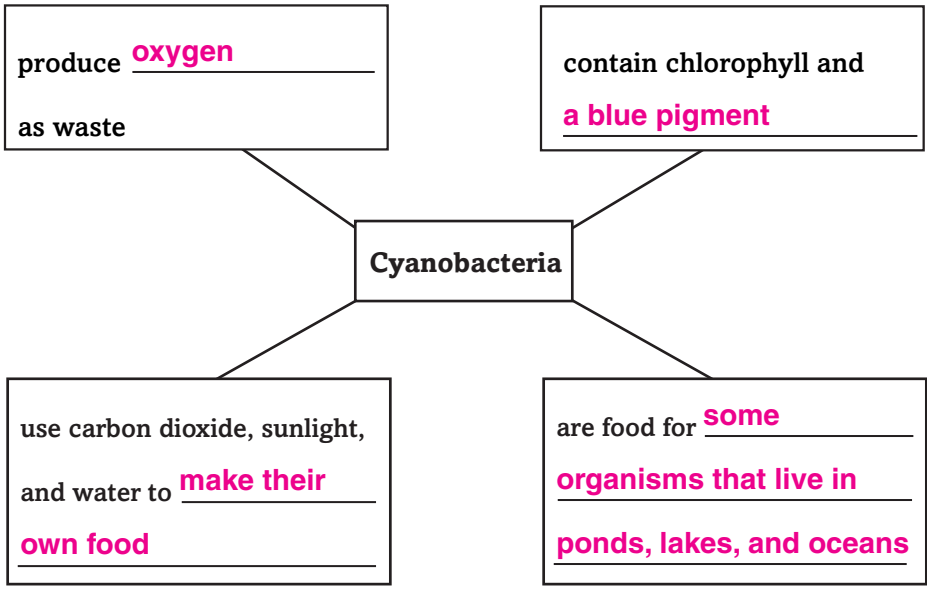
Section 1 What are bacteria? (continued)

Main Idea	Details

Eubacteria

I found this information on page _____.
SE, pp. 189–190
RE, pp. 97–98

Complete *the graphic organizer about the characteristics of* cyanobacteria.



I found this information on page _____.
SE, p. 190
RE, p. 99

Summarize *the different types of* consumer eubacteria.

There are two categories of consumer bacteria: gram-positive and gram-negative. Gram-positive bacteria have thicker cell walls than gram-negative bacteria. Some gram-positive bacteria can be harder to treat with antibiotics than gram-negative bacteria. One group of eubacteria does not have cell walls.

Archaebacteria

I found this information on page _____.
SE, p. 191
RE, p. 99

Identify *three types of extreme environments in which* archaebacteria *can survive.*

Sample response: Archaebacteria can survive in salty, acidic, and hot environments.

I found this information on page _____.
SE, p. 191
RE, p. 99

Summarize *how methane-producing bacteria obtain energy.*

Methane-producing bacteria use carbon dioxide for energy and release methane gas as waste.

Name _____ Date _____

Bacteria

Section 2 Bacteria in Your Life

Skim *the headings in Section 2. What do you think are two major ideas that will be discussed in this section?* Accept all reasonable responses.

1. how bacteria can be harmful
2. how bacteria can be helpful

Review Vocabulary

Define disease *and use it in an original sentence.*

disease

a condition with symptoms that interferes with normal body functions; Sample sentence: The disease that Tommy has affects his ability to breathe.

New Vocabulary

Match the definitions with the appropriate key terms.

antibiotic	chemical produced by some bacteria that is used to limit the growth of other bacteria
saprophyte	organism that uses dead organisms for food and energy
nitrogen-fixing bacteria	bacteria that change nitrogen from the air into forms that plants and animals can use
pathogen	organism that causes disease
toxin	poisonous substance produced by some pathogens
endospore	thick-walled, protective structure produced by some bacteria when conditions are unfavorable for survival
vaccine	preparation made from killed bacteria or damaged particles from bacterial cell walls that can prevent some bacterial diseases

Academic Vocabulary

Use a dictionary to define the term **benefit**.

benefit

to help

Name _____ **Date** _____

Section 2 Bacteria in Your Life (continued)

Main Idea | **Details**

Beneficial Bacteria

I found this information on page _____.
SE, p. 193
RE, p. 101

Analyze *how some bacteria help you. Complete the paragraph.*

Bacteria are helpful in many ways. Without them, you would not be able to stay healthy for very long. Bacteria in the large intestine produce vitamin K which is needed for blood clotting. Some bacteria produce antibiotics. These chemicals slow or stop the growth of other bacteria.

I found this information on page _____.
SE, p. 194
RE, pp. 101–102

Summarize *the roles of* **saprophytes** *and* **nitrogen-fixing bacteria** *in the environment.*

Role of saprophytes: Saprophytes are organisms that use dead organisms as a food source. They help keep balance in nature by breaking down dead organisms.

Nitrogen-fixing bacteria: Nitrogen-fixing bacteria change the nitrogen in the air into forms that plants can use. This helps animals and plants obtain the nitrogen they need.

I found this information on page _____.
SE, pp. 194–195
RE, p. 102

Complete *the table describing some of the ways people use bacteria.*

Human Uses for Bacteria	
Use	**How do the bacteria help?**
Bioremediation	by breaking down wastes and pollutants into harmless compounds
Food Production	by making yogurt, cheeses, buttermilk, sauerkraut, pickles, and soy sauce
Industry	by producing certain medicines, cleansers, adhesives, and methane gas

Name _____ Date _____

Section 2 Bacteria in Your Life (continued)

Main Idea	Details

Harmful Bacteria

I found this information on page _____.
SE, p. 197
RE, pp. 102–103

Analyze *how* pathogens *make you sick. Complete the paragraph.*

Pathogens can enter your body when you inhale/breathe and through cuts in your skin. Once inside the body, they can multiply, damage cells, and cause illness and disease.

I found this information on page _____.
SE, p. 198
RE, p. 103

Complete *the graphic organizer about* pasteurization.

Most harmful bacteria are killed because temperature of the product is increased.

The taste of the food does not change.

Pasteurization

The process is used to prepare these foods: milk, orange juice, apple juice, ice cream, yogurt.

I found this information on page _____.
SE, p. 199
RE, p. 103

Have students work in pairs to research some of the common vaccines and when they are usually administered.

Summarize *information about* vaccines.

Vaccines are made from dead bacterial cells or particles taken from bacterial cell walls. They are injected into a person. This process allows white blood cells to start recognizing the type of bacteria used to make the vaccine. If this type of bacteria enters the body at a later time, white blood cells attack the bacteria.

Summarize It

Explain why it is important to learn about bacteria.

Bacteria can be used for useful purposes, such as cleaning the environment and making foods. Bacteria also can cause diseases. Understanding these bacteria can lead to better treatments and even cures.

Name _____ Date _____

Bacteria Chapter Wrap-Up

Review the ideas that you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column. How do your ideas about what you know now compare with those you provided at the beginning of the chapter?

K What I know	W What I want to find out	L What I learned
		Accept all reasonable responses.

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

Identify three important ideas in this chapter.

Accept all reasonable responses. 1. Bacteria live and survive in many different types of environments. 2. Bacteria can be both helpful and harmful to humans. 3. Bacteria help maintain balance in nature.

Name _____ Date _____

Protists and Fungi

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Protists and Fungi
	• Some protists have roots like those of plants.
	• The oxygen you breathe comes partly from green algae.
	• Protozoans are usually classified by what they eat.
	• Lichens can indicate the pollution level in an area.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

In what ways might fungi benefit other organisms and the environment?

Students' responses will vary. They may include: edible mushrooms, cheese manufacturing (bleu cheese, for example), olive oil industry, and pesticides.

Name _____ **Date** _____

Protists and Fungi

Section 1 Protists

Preview *the* What You'll Learn *statements for Section 1. Rewrite each statement as a question. Look for the answers as you read the section.* **Accept all reasonable responses.**

1. **What characteristics do all protists share?**
2. **How are the three groups of protists similar and different?**
3. **What are examples of the three groups of protists?**
4. **Why are protists difficult to classify?**

Review Vocabulary

Define asexual reproduction *to show its scientific meaning.*

asexual reproduction

reproduction in which only one parent is required to produce a new, genetically identical individual

New Vocabulary

Write the vocabulary word that matches each definition.

protist — one-celled or many-celled eukaryotic organism that lives in moist or wet surroundings

algae — plantlike protists

protozoan — one-celled, animal-like protist

flagellum — long, thin, whiplike structure used for movement

cilia — short, threadlike structures that extend from the cell membrane and help the organism move quickly

pseudopod — temporary extension of cytoplasm that helps some protists move

Academic Vocabulary

Use a dictionary to define **visible.**

visible

able to be seen

Name _____ Date _____

Section 1 Protists (continued)

Main Idea | **Details**

What is a protist?

I found this information on page _____.
SE, pp. 210–211
RE, pp. 105–106

Compare and contrast *the 3 groups of* protists.

	Plantlike	Animal-like	Funguslike
Do they make their own food?	yes	no	no
Is there a cell wall?	yes	no	some have cell walls
Can they move?	no	yes	yes

Plantlike Protists

I found this information on page _____.
SE, pp. 211–213
RE, pp. 107–108

Students may wish to research and draw pictures of the different types of plantlike protists.

Summarize *key information about* plantlike protists.

Diatoms: live in fresh water and salt water; golden-brown pigment covers chlorophyll; form glasslike boxes

Dinoflagellates: move using flagella that cause organism to spin; most live in salt water and have chlorophyll

Euglenoids: have characteristics of both plants and animals; one-celled algae; no cell wall

Red algae: many-celled; have chlorophyll and red pigment; found in salt water up to 200 m deep

Green algae: one- or many-celled; have large amounts of chlorophyll; produce oxygen

Brown algae: many-celled; have chlorophyll and brown pigment; found in cool saltwater environments

Importance of Algae

I found this information on page _____.
SE, p. 214
RE, pp. 108–109

Evaluate *the importance of* algae.

Algae in the Environment	Human Uses of Algae
food source; provide oxygen; can produce toxins that cause other organisms to die	food source; used in cosmetics and other products; used to thicken food

Name _____ Date _____

Main Idea

Details

Animal-Like Protists

I found this information on page _____.
SE, pp. 215–217
RE, pp. 109–111

Classify protozoans. *Summarize key information about each type of protozoan.*

Type	Characteristics
ciliates	move using cilia; usually feed on bacteria
flagellates	move through water with flagella; many live in freshwater; some are parasites
protozoans that use pseudopods	found in freshwater and saltwater environments; some are parasites
other protozoans	do not move on their own; all are parasites

Importance of Protozoans

I found this information on page _____.
SE, pp. 217–218
RE, p. 111

Summarize *the importance of protozoans to other organisms.*

Accept all reasonable responses. Protozoans are a source of food for larger organisms. Some cause diseases such as malaria.

Funguslike Protists and Importance of Funguslike Protists

I found this information on page _____.
SE, pp. 218–220
RE, pp. 111–112

Complete *the prompts with information about* **funguslike protists.**

Funguslike protists produce spores like fungi and must take in food from outside sources. Slime molds use pseudopods to move and live on rotting logs or dead leaves in moist, cool, shady environments. Downy molds and mildews grow as a mass of threads over an organism. Some are parasites; others feed on dead organisms. Funguslike protists in the ecosystem help break down dead organisms. Some are harmful to other organisms.

CONNECT IT

Why is it dangerous to drink water from unknown sources?

Accept all reasonable responses. Many protists can cause disease, and protists live in water or wet environments. Drinking water from an unknown source can bring these protists into a person's body.

Name _____ Date _____

Protists and Fungi

Section 2 Fungi

Skim *Section 2. Predict two topics that will be covered.* Accept all reasonable responses.

1. types of fungi
2. how fungi reproduce

Review Vocabulary

photosynthesis

Define photosynthesis *using your book or a dictionary.*

process by which plants and many other producers use light energy to produce a simple sugar from carbon dioxide and water and give off oxygen

New Vocabulary

Write the correct vocabulary word next to its definition.

hyphae	mass of threadlike tubes forming the body of a fungus
saprophyte	organism that absorbs energy from dead and decaying tissues
spore	waterproof reproductive cell that can grow into a new organism
basidium	reproductive cells produced by club fungi
ascus	reproductive cells produced by sac fungi
budding	form of asexual reproduction in which a new, genetically identical organism forms on the side of its parent
sporangium	case containing reproductive cells produced by some types of fungi
lichen	organism made up of a fungus and a green alga or a cyanobacterium
mycorrhizae	network of hyphae and plant roots that helps plants absorb water and minerals from the soil

Academic Vocabulary

decline

Use a dictionary to define **decline.**

to weaken or lessen

Name _____ Date _____

Section 2 Fungi (continued)

Main Idea

Details

What are fungi?

I found this information on page _____.
SE, pp. 222–223
RE, pp. 114–116

Have students work in pairs to complete information on the characteristics of fungi and how they reproduce.

Complete *the table to describe the characteristics of* fungi.

Structure	Obtaining Food
Body usually consists of many-celled, threadlike tubes called hyphae.	Most fungi are saprophytes, which obtain food by absorbing the dead or decaying tissue of other organisms. Some fungi are parasites, which obtain food directly from living things.
Reproduction	**Differences from Plants**
They can be sexual or asexual. They produce spores, which are waterproof reproductive cells.	They have no specialized tissues and organs and contain no chlorophyll.

Club Fungi, Sac Fungi, Zygote Fungi, and Other Fungi

I found this information on page _____.
SE, pp. 224–225
RE, pp. 116–117

Compare club, sac, *and* zygote fungi.

	Examples	How they reproduce
Club fungi	mushrooms	produce spores in a club-shaped structure called a basidium
Sac fungi	yeasts, molds, morels, truffles	produce spores in a saclike structure called an ascus; yeasts can also reproduce asexually by budding
Zygote fungi	mold on bread or fruit	produce spores in a round spore case called a sporangium

I found this information on page _____.
SE, p. 225
RE, p. 117

Summarize *why some fungi are difficult to classify.*

Some fungi either never reproduce sexually or have never been observed reproducing sexually.

Name _____ Date _____

Section 2 Fungi (continued)

Main Idea

Details

Lichens, Fungi, and Plants

I found this information on page _____.
SE, p. 226
RE, pp. 117–118

I found this information on page _____.
SE, pp. 226–227
RE, p. 118

Identify *three important roles of* lichens.

1. provide food for some animals
2. weather rock and help the process of making soil
3. act as indicator organisms that monitor pollution levels

Model *the beneficial relationship between fungi and plants by completing the diagram.*

Some fungi and plants form a network of hyphae and roots called mycorrhizae.

The fungi help the plants absorb nutrients from soil.	↔ The plants supply food and nutrients to the fungi.

The Importance of Fungi

I found this information on page _____.
SE, pp. 228–229
RE, pp. 118–119

Identify *the importance of fungi in each of these areas.*

Foods	Agriculture	Health and Medicine	Decomposers
used to make cheeses yeasts used in baking some are edible	some cause diseases in plants and animals	some cause diseases some are the source of helpful drugs	break down organic materials serve as nature's recyclers

Connect It

Describe what nature would be like without lichens, mycorrhizae, and decomposer fungi. Accept all reasonable responses.

Without lichens, rock might weather more slowly; without mycorrhizae, plants would not get the nutrients they need; without decomposer fungi, nutrients that plants and animals need would not be returned to the soil.

Name _____ Date _____

Protists and Fungi Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Protists and Fungi	After You Read
• Some protists have roots like those of plants.	D SE, p. 211 RE, p. 107
• The oxygen you breathe comes partly from green algae.	A SE, p. 214 RE, p. 108
• Protozoans are usually classified by what they eat.	D SE, p. 215 RE, p. 109
• Lichens can indicate the pollution level in an area.	A SE, p. 226 RE, p. 117

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading the chapter, write three facts you learned that you did not know before. Accept all reasonable responses.

1. Some protists have characteristics of both plants and animals. 2. Protists are an important food source for many animals. 3. Lichens are made up of both fungi and algae.

Name _____ Date _____

Plants

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Plants
	• In tropical rain forests, there are more than 260,000 known plant species and probably more to be identified.
	• Land plants' ancestors may have been green algae that lived in the sea.
	• Ferns and mosses produce spores rather than seeds.
	• Paper and clothing are made from seed plants.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write three characteristics that you think all plants have in common.

Accept all reasonable responses. Most plants have stems, leaves or leaflike structures, roots or rootlike structures, and chlorophyll, and produce their own food through photosynthesis. All plants are multicellular. All plant cells are surrounded by a cell wall.

Name _____ Date _____

Plants

Section 1 An Overview of Plants

Skim *the headings in Section 1. Then predict three facts you will learn from reading the section.* **Accept all reasonable responses.**

1. **Plant cells have many parts.**
2. **Plants had to adapt to survive on land.**
3. **Plants are classified through a specific naming system.**

Review Vocabulary

Define *the word* species. *Use your book or a dictionary for help.*

species

organisms that share similar characteristics and can mate with one another to produce fertile offspring

New Vocabulary

Use your book to define the following key terms.

cuticle

a waxy protective layer secreted by cells onto the surface of the plant

cellulose

a chemical compound that plants can make out of sugar

vascular plant

plant with tubelike structures that carry water, nutrients, and other substances throughout the plant

nonvascular plant

plant that does not have tubelike structures and uses other ways to move water and substances

Academic Vocabulary

Use a dictionary to define adapt *to reflect its scientific meaning.*

adapt

to change to fit new conditions

Name _____ Date _____

Section 1 An Overview of Plants (continued)

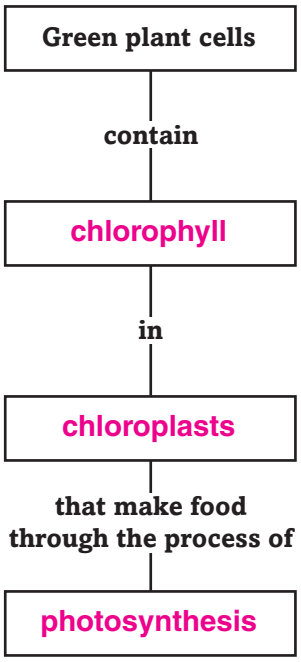
Main Idea	Details

What is a plant?

I found this information on page _____.

SE, pp. 240–241
RE, pp. 121–122

Summarize *how plants make food by completing the concept map below. Use these terms:* photosynthesis, chlorophyll, chloroplasts.



Origin and Evolution of Plants

I found this information on page _____.

SE, p. 241
RE, p. 122

Sequence *the events in the table below. Write the oldest event at the bottom of the table and the youngest event at the top of the table.*

Events

- First cone-bearing plants
- First flowering plants
- First green algae
- First land plants

(Youngest) ↑	First flowering plants
	First cone-bearing plants
	First land plants
(Oldest)	First green algae

Name _____ Date _____

Section 1 An Overview of Plants (continued)

Main Idea	Details

Life on Land

I found this information on page _____.
SE, p. 242
RE, p. 122

Summarize *how land plants made life possible for land animals.*

- More and more plants grew on land.
- More oxygen was added to Earth's atmosphere
- Land animals eventually had enough oxygen to live.

Adaptations to Land

I found this information on page _____.
SE, pp. 242–243
RE, pp. 122–123

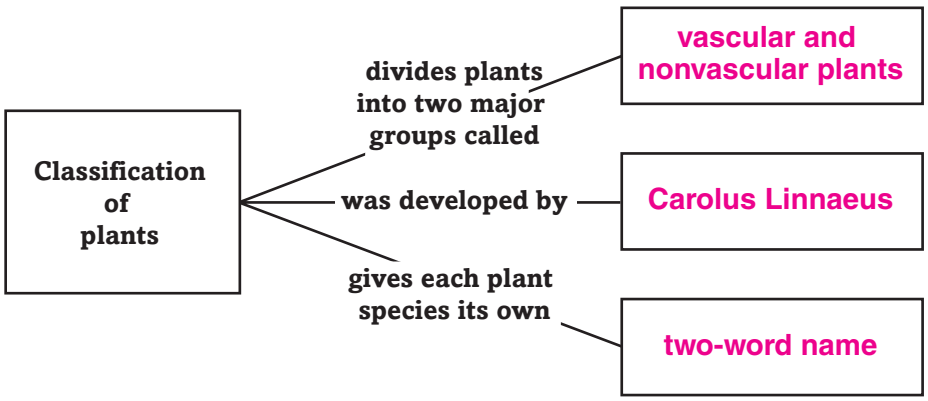
Identify *the four adaptations that make it possible for plants to live on land.*

Plant Adaptations to Land	
Structure	Function
cuticle on surface of plant	slows water loss from leaves
cellulose in plant cell walls	helps provide support
tubelike structures	distribute water and food
waterproof coating on seeds and spores	protects seeds and spores from drying out

Classification of Plants

I found this information on page _____.
SE, p. 245
RE, p. 123

Complete *the concept map below about plant classification.*



Connect It

Suppose that you are working at a greenhouse. While at work, a child asks you, "What's a plant?" Write a short answer to this question.

Responses will vary but may include the concepts of making food, producing oxygen, and specialized reproduction.

Name _____ Date _____

Plants

Section 2 Seedless Plants

Skim *Section 2 of your book. Then write three questions that you have about plants. Try to answer your questions as you read.*

1. How do seedless plants reproduce? Accept all reasonable responses.
2. What does a hornwort look like?
3. What are ferns?

Review Vocabulary

Define spore. *Use your book or a dictionary for help. Write a sentence that reflects its scientific meaning.*

spore

a waterproof reproductive cell; Sample sentence: The spore was blown by the wind and landed in an ideal spot to grow into a new moss plant.

New Vocabulary

Use your book to define the following key terms. Then use each word in a sentence that reflects its scientific meaning.

rhizoid

a threadlike structure that anchors nonvascular plants where they grow; Sample sentence: Rhizoids anchor mosses to the ground.

pioneer species

the first organisms to grow in new or disturbed areas; Sample sentence: After land is burned by forest fire, moss often grows as a pioneer species.

Academic Vocabulary

Use a dictionary to define soil. *Write a sentence that reflects its scientific meaning.*

soil

mixture of weathered rock, organic matter, water, and air that supports the growth of plant life; Sample sentence: Pioneer species help build new soil in which other plants can grow.

Name _____ Date _____

Section 2 Seedless Plants (continued)

Main Idea

Details

Seedless Nonvascular Plants

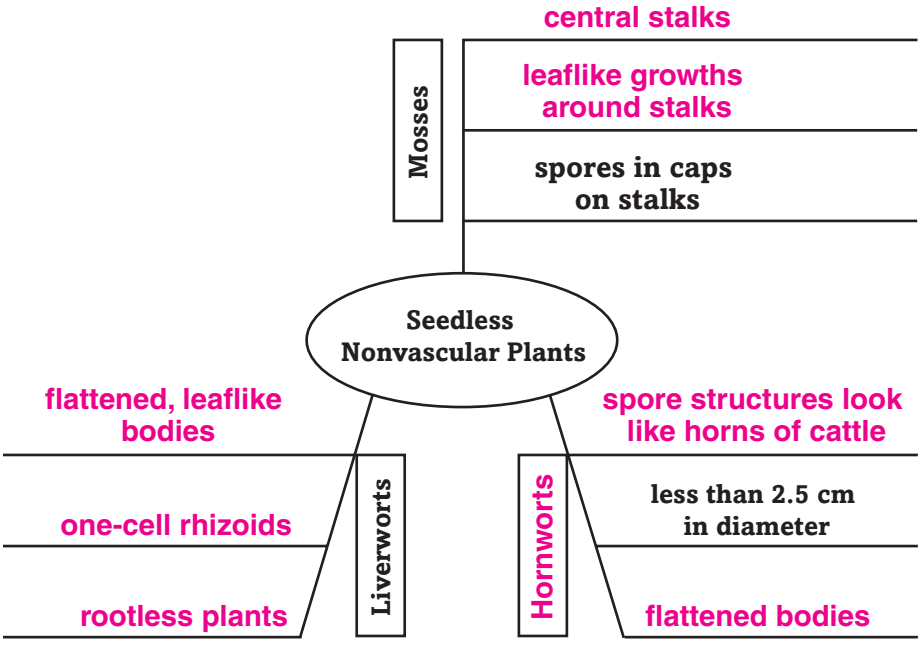
I found this information on page _____.
SE, p. 246
RE, p. 125

Organize *the characteristics of* seedless nonvascular plants *by completing the chart below.*

Characteristics of Seedless Nonvascular Plants	
1.	grow from spores
2.	do not have all of the parts of plants that grow from seeds
3.	are usually only a few cells thick
4.	are usually about 2–5 cm high
5.	most have structures that look like leaves and stems
6.	have rhizoids instead of roots
7.	grow in damp places
8.	absorb water through cell membranes and cell walls

I found this information on page _____.
SE, pp. 246–247
RE pp. 125–126

Complete *the concept map to identify examples and characteristics of seedless nonvascular plants. One example has been listed for you.*



Name _____ Date _____

Section 2 Seedless Plants (continued)

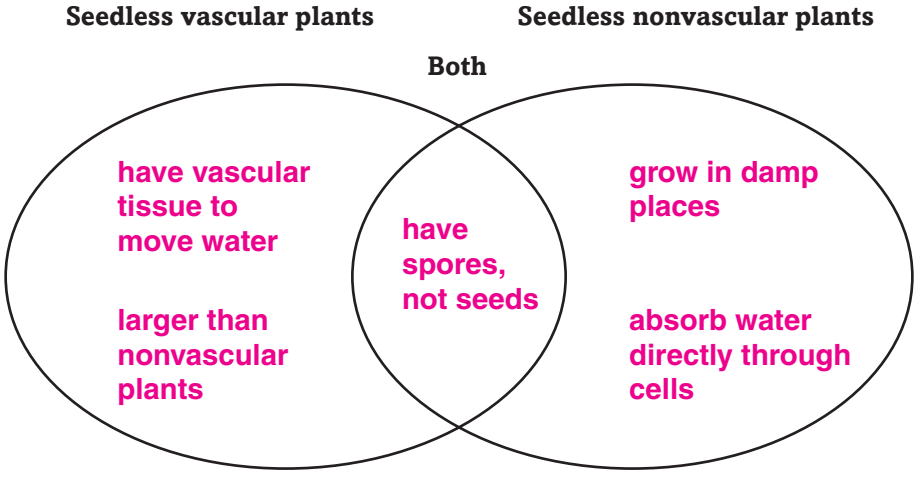
Main Idea

Details

Seedless Vascular Plants

I found this information on page _____.
SE, pp. 248–250
RE, pp. 127–128

Compare and contrast seedless vascular plants *with* seedless nonvascular plants *in the Venn diagram below.*



Importance of Seedless Plants

I found this information on page _____.
SE, pp. 250–251
RE, p. 128

Summarize *the importance of seedless plants in the table below.*

Importance of Seedless Plants	
1.	Ancient seedless plants became coal.
2.	Seedless plants in bogs become peat, a low-cost fuel.
3.	Peat is used to enrich soil.
4.	Ferns are used as houseplants and for landscaping.
5.	Fern rhizomes and fronds can be eaten.
6.	Dried stems of one kind of horsetail can be ground into flour.
7.	Some seedless plants have been used as medicines.

CONNECT IT

Suppose you are a naturalist working in a forest area that has recently burned in a forest fire. Summarize what you would tell visitors about seedless plants and how important they are to the forest's recovery.

Answers will vary, but should include discussion of soil building and its importance for further colonization, ability of seedless plants to survive periods of dryness or other harsh conditions, characteristics of seedless plants.

Name _____ Date _____

Plants

Section 3 Seed Plants

Scan *Section 3 of your book. Write three questions that come to mind as you read the headings and examine the illustrations.*

1. Why are there different layers in a leaf? Accept all reasonable responses.
2. What are the functions of roots?
3. Why do some plants have flowers?

Review Vocabulary

Define seed. *Use your book or a dictionary for help. Then use this word in a sentence that reflects its scientific meaning.*

seed

a plant embryo and food supply in a protective coating;

Sample sentence: The seed grew into a beautiful apple tree.

New Vocabulary

Read the definitions below. Write the correct key term on the blank in the left column. Use your book for help.

gymnosperm — a vascular plant that produces seeds that are not protected by fruit

angiosperm — a vascular plant that flowers and produces fruit with one or more seeds

monocot — a plant with one cotyledon inside its seeds

dicot — a plant with two cotyledons inside its seeds

Academic Vocabulary

Use a dictionary to define annual *as it applies to the length of a plant's life.*

annual

plant that completes its life cycle in one year

Name _____ Date _____

Section 3 Seed Plants (continued)

Main Idea

Characteristics of Seed Plants

I found this information on page _____.
SE, p. 252
RE, p. 130

Have students use colored pencils for their drawings. Students should include a color key to cell structure.

Details

Create *a cross-section of a* leaf *in the space below. Label and describe the purpose of six important features.*

Drawings should resemble the illustration in students' books and include at least six of these features: upper epidermis, palisade layer, spongy layer, lower epidermis, phloem, xylem, vein, guard cells, stoma, or cuticle.

I found this information on page _____.
SE, pp. 252–255
RE, pp. 130–132

Organize *the characteristics of* seed plants *by completing the chart below.*

Structure	Function
Leaves	**photosynthesis**
Stems	**support branches, leaves, and reproductive structures; store food and water**
Roots	**contain vascular tissue that take in water and dissolved substances from the soil; anchor the plant; support parts of the plant that are above ground; store food and water**
Vascular tissue	**Xylem transports water and dissolved substances from roots to the rest of the plant. Phloem moves food from where it is made to other plant parts where it is used or stored. Cambium produces most new xylem and phloem cells.**

Name _____ **Date** _____

Section 3 Seed Plants (continued)

Main Idea

Details

Gymnosperms

I found this information on page _____.
SE, p. 256
RE, p. 132

Complete *the chart below about* gymnosperms *by writing about the characteristic listed in that cell.*

Gymnosperms	
Divisions include conifers, cycads, ginkgoes, and gnetophytes	Seeds not protected by fruit
Flowers not produced	Leaves usually needlelike or scalelike

Angiosperms

I found this information on page _____.
SE, pp. 257–259
RE, pp. 132–133

Complete *the chart below about* angiosperms *by writing about the characteristic listed in that cell.*

Angiosperms	
Division *Anthophyta*	Seeds protected inside a fruit and have one or two cotyledons inside
Flowers reproductive structures that come in different sizes, shapes, and colors; grow into fruit	Fruits form from flower parts; enclose one or more seeds

Importance of Seed Plants

I found this information on page _____.
SE, pp. 259–260
RE, p. 130

Skim *your book for two uses each of* gymnosperms *and* angiosperms.

Gymnosperms:

1. Most wood for building comes from conifers.
2. Resin is used to make soap, paint, and varnish.

Angiosperms:

1. Many foods come from seed plants.
2. fiber for clothes; paper; or wood chairs and tables

Name _____ **Date** _____

Tie It Together

In the space below, draw a sketch of a tree. Label the tree's roots, trunk, and leaves. Next to each label, write the important functions that each of these structures performs. Beneath your sketch, explain why trees are an important part of the environment.

Sample responses:

Leaves	**gas exchange** **water evaporation** **photosynthesis**
Trunk	**provides support** **transports water and food**
Roots	**anchor tree** **absorb water and nutrients from soil**

Sample response: Trees make food using the process of photosynthesis. Many animals, such as squirrels and deer, eat the food that trees produce. Along with other plants and algae, trees also make the oxygen that animals need to breathe.

Name _____ Date _____

Plants Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Plants	After You Read
• In tropical rain forests, there are more than 260,000 known plant species and probably more to be identified.	A SE, p. 240 RE, p. 121
• Land plants' ancestors may have been green algae that lived in the sea.	A SE, p. 241 RE, p. 122
• Ferns and mosses produce spores rather than seeds.	A SE, p. 248 RE, p. 127
• Paper and clothing are made from seed plants.	A SE, p. 259 RE, p. 130

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
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- ☐ Study the definitions of vocabulary words.
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- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about plants.

Accept all reasonable responses. 1. The first plants were probably green algae. 2. There are both vascular and nonvascular plants. 3. Most seed plants have leaves.

Name _____ Date _____

Plant Reproduction

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Plant Reproduction
	• Both humans and plants need water, oxygen, energy, and food to grow.
	• Ferns and mosses reproduce by forming spores.
	• All seeds are produced by flowering plants.
	• Some seeds are spread by gravity.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List three plants that reproduce by forming seeds.

Accept all reasonable responses. All gymnosperms and angiosperms reproduce by forming seeds, with the exception of a few varieties of angiosperms—such as seedless grapes and navel oranges—that have been developed through selective breeding and asexual reproduction to suppress seed production.

Name _____ Date _____

Plant Reproduction

Section 1 Introduction to Plant Reproduction

Scan *Section 1 of your book using the checklist below.*

- ☐ Read all section titles.
- ☐ Read all bold words.
- ☐ Read all charts and graphs.
- ☐ Look at all the pictures and read their captions.
- ☐ Think about what you already know about plant reproduction.

Write three facts that you discovered about plant reproduction as you scanned this section. **Accept all reasonable responses.**

1. **Plants can reproduce sexually or asexually.**
2. **Haploid cells produce spores.**
3. **Fertilization begins the sporophyte stage.**

Review Vocabulary

Define fertilization *in a sentence that shows its scientific meaning.*

fertilization — **in sexual reproduction, the joining of a sperm and an egg**

New Vocabulary

Use your book to define the following terms.

spore — **in plants, a haploid cell that begins the gametophyte stage**

gametophyte stage — **plant life cycle stage that begins with haploid cells (spores) that grow to form plant structures or a new plant**

sporophyte stage — **plant life cycle stage that begins when fertilization occurs**

Academic Vocabulary

Use a dictionary to define identical.

identical — **same**

Name _____ Date _____

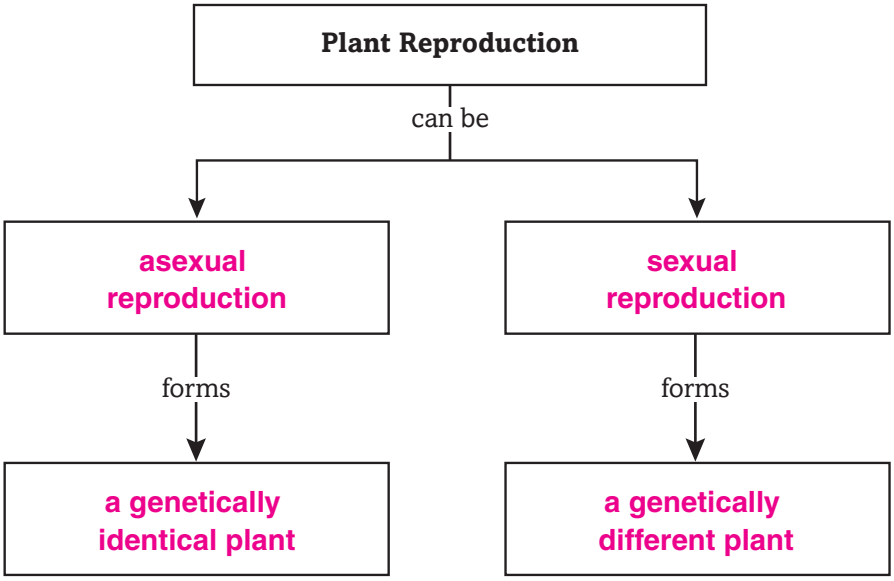
Section 1 Introduction to Plant Reproduction (continued)

Main Idea | **Details**

Types of Reproduction

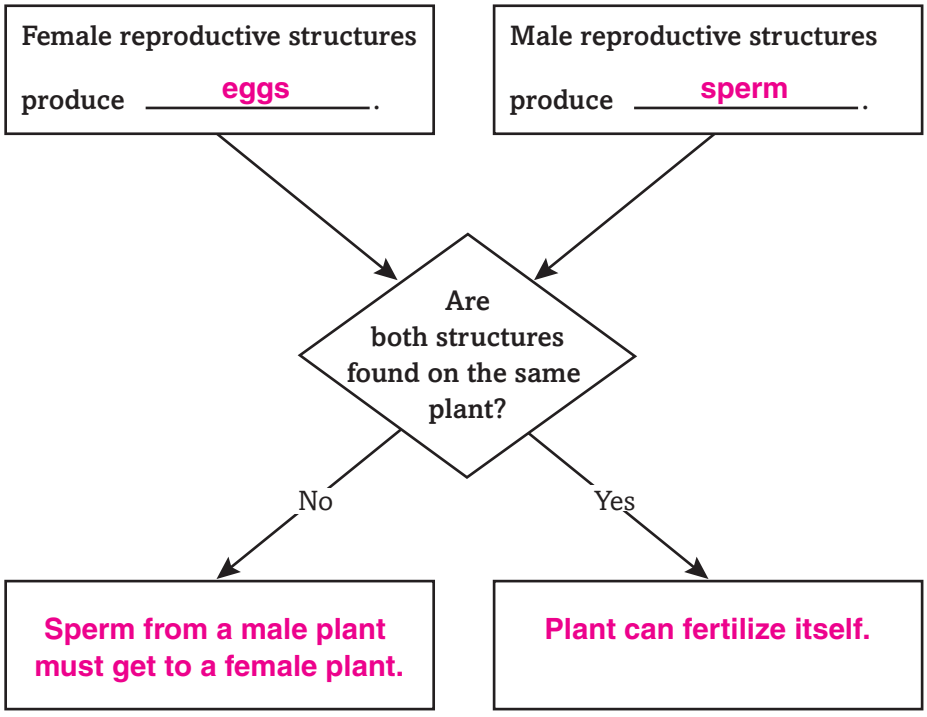
I found this information on page _____.
SE, pp. 272–273
RE, p. 135

Compare and contrast *two ways that plants reproduce.*



I found this information on page _____.
SE, pp. 273–274
RE, p. 136

Sequence *the steps in plant* fertilization. *Complete the flow chart.*



Name _____ Date _____

Section 1 Introduction to Plant Reproduction (continued)

Main Idea

Plant Life Cycles

I found this information on page _____.

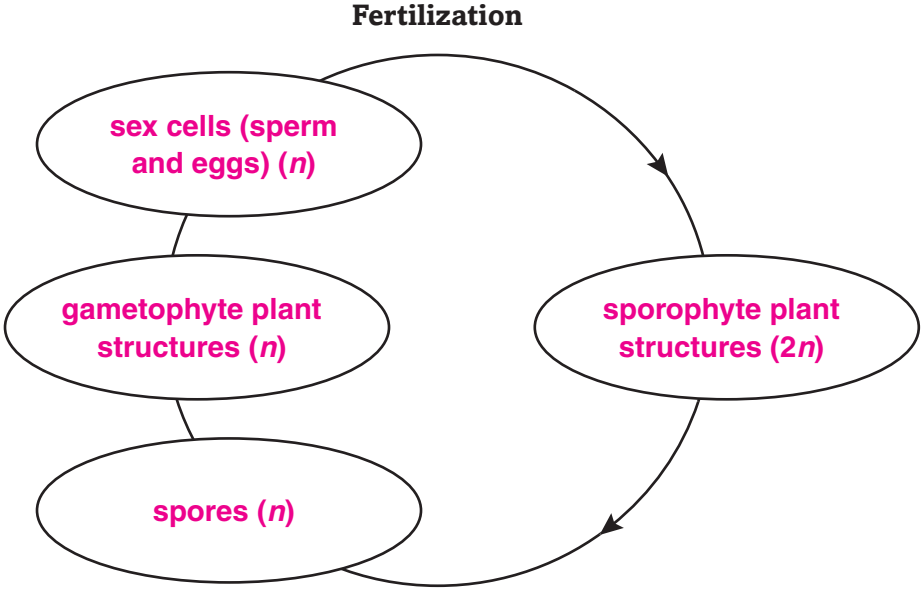
SE, pp. 274–275
RE, p. 136

Have students work in pairs to complete the life cycle diagram and the table.

Details

Model *the two stages of a plant's life cycle by labeling the diagram below with the following terms.*

- gametophyte plant structures (*n*)
- sex cells (sperm and eggs) (*n*)
- sporophyte plant structures (*2n*)
- spores (*n*)



Contrast *the* gametophyte *and* sporophyte stages *of plant development. Complete the table.*

Stage	Cell type	Reproductive cells formed	How reproductive cells form
Gametophyte	haploid	cell division	sex cells
Sporophyte	diploid	meiosis	spores

Connect It

A plant breeder wants to develop new varieties of roses that have different traits from the varieties he already has. Describe the type of reproduction the breeder is most likely to use and why.

Accept all reasonable responses. The breeder will use sexual reproduction because asexual reproduction produces plants that are genetically identical to the parent plant, but sexual reproduction produces genetically different offspring.

Name _____ Date _____

Plant Reproduction

Section 2 Seedless Reproduction

Skim *Section 2 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.* Accept all reasonable responses.

1. How do nonvascular plants reproduce sexually?
2. How do male and female gametophytes differ?
3. How do ferns reproduce?

Review Vocabulary

Define photosynthesis *using your book or a dictionary.*

photosynthesis food-making process by which plants and many other producers use light energy and produce glucose and oxygen from carbon dioxide and water

New Vocabulary

Use your book to define the following terms.

frond leaf of a fern that grows from the rhizome

rhizome underground stem

sori fern structures in which spores are produced

prothallus small, green, heart-shaped gametophyte plant form of a fern that can make its own food and absorb water and nutrients from the soil

Academic Vocabulary

Use a dictionary to define widespread.

widespread widely scattered or prevalent

Name _____ Date _____

Section 2 Seedless Reproduction (continued)

Main Idea | **Details**

The Importance of Spores

I found this information on page _____.
SE, p. 276
RE, p. 138

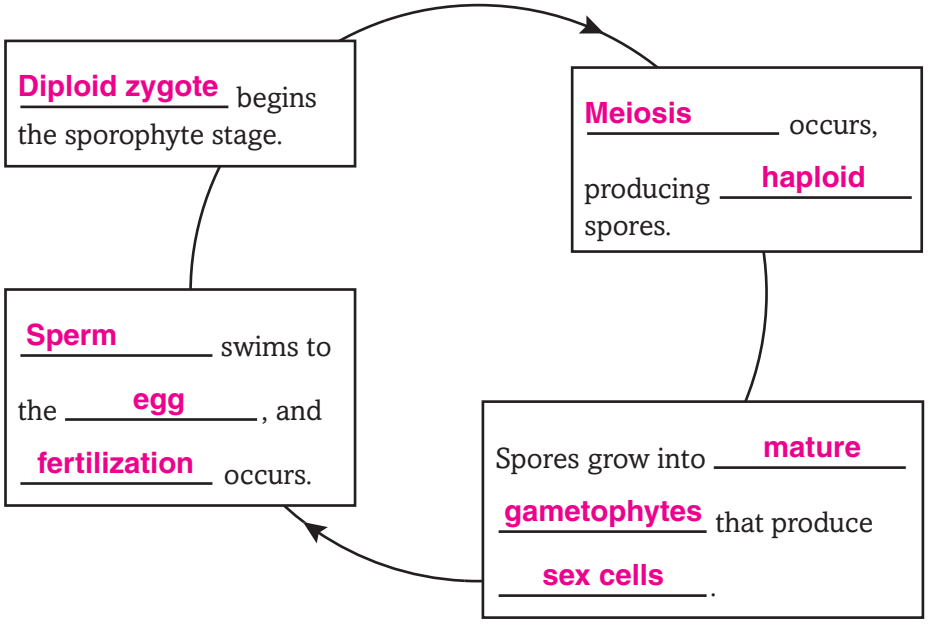
Summarize *the role of* spores *in plant reproduction.*

Spores are used by all nonvascular and some vascular plants to reproduce. The sporophyte stage of the plant produces haploid spores in spore cases. These break open, and the spores are spread by wind or water. The spores grow into plants that can produce sex cells.

Nonvascular Seedless Plants

I found this information on page _____.
SE, p. 276
RE, p. 138

Sequence *the life cycle of a moss. Complete the flow chart.*



I found this information on page _____.
SE, pp. 277–278
RE, p. 139

Distinguish *two ways in which nonvascular plants reproduce asexually.*

Type of Plant	Asexual Reproduction Process
moss	piece of plant breaks off and grows into new plant
liverwort	forms small balls of cells on surface of plant that can be carried away by water and grow into new plants

Name _____ Date _____

Section 2 Seedless Reproduction (continued)

Main Idea

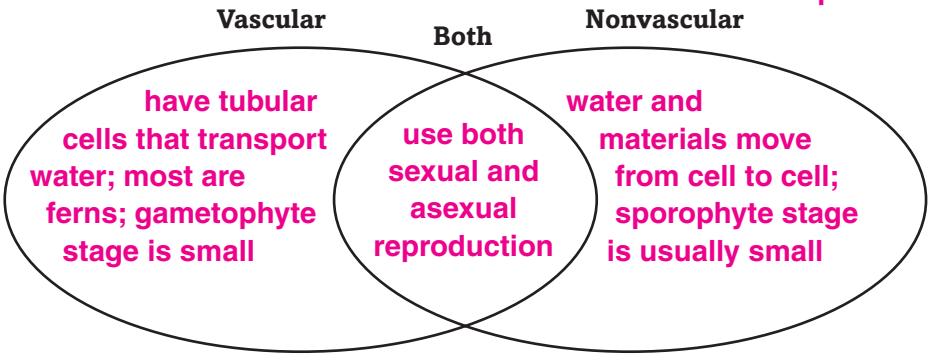
Vascular Seedless Plants

I found this information on page _____.
SE, pp. 276–278
RE, pp. 138–140

Details

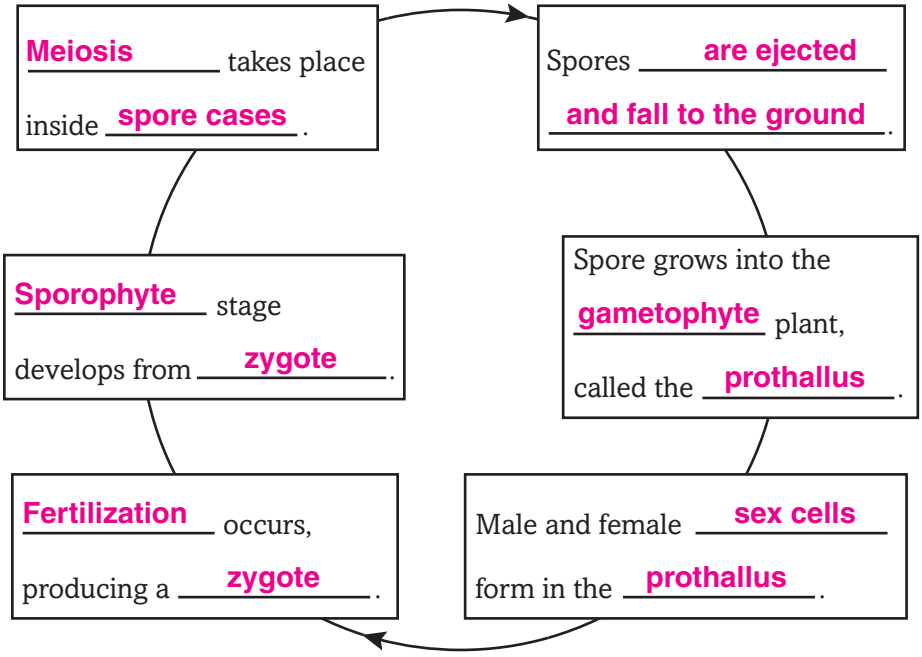
Contrast *vascular and nonvascular seedless plants. Complete the Venn diagram with at least six facts.*

Accept all reasonable responses.



I found this information on page _____.
SE, pp. 278–279
RE, p. 140

Organize *the life cycle of a fern into a flow chart.*



Connect It

Suppose that you are walking through a forest and you see some moss plants and ferns. Describe how you could know the stage of its life cycle each kind of plant is in.

Accept all reasonable responses. The mosses are in the gametophyte stage, and the ferns are in the sporophyte stage; I know because these stages are easily visible. I probably would not notice the opposite stage.

Name _____ **Date** _____

Plant Reproduction

Section 3 Seed Reproduction

Predict *three things that will be discussed in Section 3.* Accept all reasonable responses.

1. How pollen and seeds combine.
2. What seeds need to grow.
3. How pollen spreads.

Review Vocabulary

Define gymnosperms *using your book or a dictionary.*

gymnosperms

vascular plants that do not flower, generally have needlelike or scalelike leaves, and produce seeds that are not protected by fruit

New Vocabulary

Match each vocabulary term to its definition.

pollen grain	small structure produced by the male reproductive organs of a seed plant
pollination	transfer of pollen grains to the female part of a seed plant
germination	series of events that results in the growth of a plant from a seed
ovule	part of a plant that produces the egg
stamen	male reproductive organ in a flower
pistil	female reproductive organ in a flower
ovary	part of a flower in which ovules are found

Academic Vocabulary

Use a dictionary to define **structure** *as it is used in science.*

structure

arrangement of parts or the way parts are arranged

Name _____ Date _____

Section 3 Seed Reproduction (continued)

Main Idea | **Details**

The Importance of Pollen and Seeds

I found this information on page _____.
SE, pp. 281–282
RE, pp. 142–143

Summarize *key facts about* pollen *and* pollination. *Complete the outline.*

Pollen and Pollination in Seed Plants

I. Pollen grains

A. Develop from spores

B. Contain gametophyte parts that can produce sperm

II. Pollination

A. Sperm are carried as part of the pollen grain.

B. Pollen tube forms when the pollen grain reaches the female part of the plant.

I found this information on page _____.
SE, p. 282
RE, p. 143

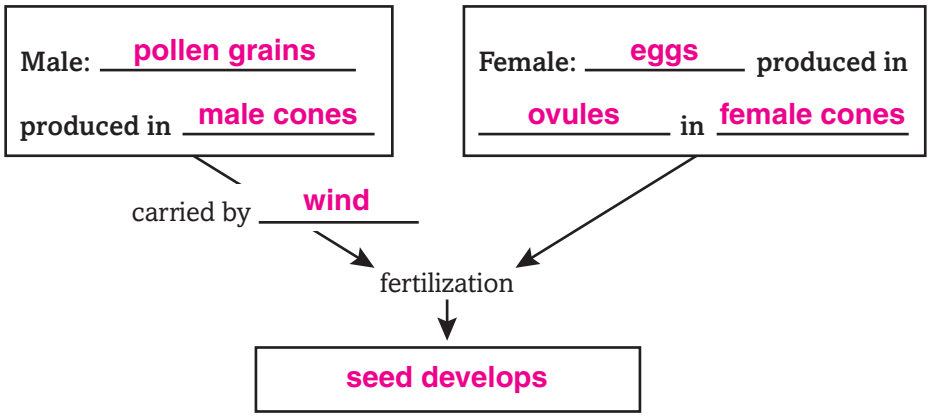
Model *a seed. Draw a seed and label the* stored food, embryo, *and* seed coat. *Identify the role of each part of the seed.*

Drawings should resemble those on SE, p. 282 or RE, p. 143. The stored food provides energy; the embryo becomes the plant; the seed coat protects the seed.

Gymnosperm Reproduction

I found this information on page _____.
SE, pp. 282–284
RE, p. 143

Sequence *steps of* gymnosperm seed formation *in the flow chart.*



Name _____ Date _____

Section 3 Seed Reproduction (continued)

Main Idea

Details

Angiosperm Reproduction

I found this information on page _____.

SE, pp. 284–288
RE, pp. 114–115

If possible, bring in sample flowers and cones so that students can observe reproductive structures.

Model *a flower by drawing and labeling its parts. Then write a brief caption to identify the male and female reproductive organs and to describe how each organ functions during fertilization.*

Students' models should include the parts of the pistil (stigma. style, ovary, and ovule); the stamen (anther and filament), and the sepal.

Captions should identify (1) the stamen as the male reproductive organ and describe how pollen grains form inside the anther by meiosis and the sperm develop in each pollen grain; (2) the pistil as the female reproductive organ and describe how pollen grains land on the stigma and move down the style to the ovary where meiosis occurs to produce gametophyte structures. Eggs are produced in the ovules.

Seed Dispersal

I found this information on page _____.

SE, p. 288
RE, p. 145

Sequence *the events of* fertilization *and* germination *in angiosperms.*

1. Flower is pollinated.
2. Sperm fertilizes egg in the ovule.
3. Zygote grows into plant embryo.
4. Seed is dispersed.
5. Conditions become right for germination.
6. Seed tissues absorb water.
7. Seed coat breaks open.
8. Root grows from seed.
9. Stem and leaves grow.
10. Photosynthesis begins.

Connect It

The seeds of horse chestnut trees are covered with a prickly outer layer. Propose a way that you think these seeds might be dispersed.

Accept all reasonable responses. They are dispersed by animals; the prickly outer layer adheres to animals' fur. As they move, the animals carry the seeds with them.

Name _____ Date _____

Tie It Together

Describe a Plant

Suppose that you are an explorer who has discovered a new species of plant.

- *Draw and describe the plant below.*
- *Be sure to indicate whether your plant is vascular or nonvascular.*
- *If it does reproduce with seeds, identify it as an angiosperm or a gymnosperm.*
- *Include a diagram that shows the plant's life cycle.*
- *Draw a cross-section of the plant that identifies its reproductive structures.*

Accept all reasonable responses.

Encourage accurate drawing rather than artistic merit.

Students' responses should reflect understanding of the reproduction of the type of plant chosen.

Name _____ Date _____

Plant Reproduction Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Plant Reproduction	After You Read
• Both humans and plants need water, oxygen, energy, and food to grow.	A RE, p. 272 RE, p. 145
• Ferns and mosses reproduce by forming spores.	A SE, p. 276 RE, p. 138
• All seeds are produced by flowering plants.	D SE, p. 281 RE, p. 142
• Some seeds are spread by gravity.	A SE, p. 288 RE, p. 145

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about plant reproduction.

Accept all reasonable responses. 1. Plants have two-stage life cycles. 2. Seedless plants include mosses and ferns. 3. Seeds can be dispersed by water, wind, animals, or gravity.

Name _____ Date _____

Plant Processes

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Plant Processes
	• Plants make their own food.
	• Plants break down food to release energy.
	• Plant stems grow away from light.
	• Plants have hormones that control changes in their growth.

FOLDABLES™ Study Organizer

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Describe what would happen to life on Earth if all the green plants disappeared.

Accept all reasonable responses. If students understand that virtually all oxygen in Earth's atmosphere is produced by photosynthesis, they will answer that animal life would be impossible without green plants.

Name _____ Date _____

Plant Processes

Section 1 Photosynthesis and Respiration

Scan *the illustrations in Section 1. Write three questions that you have about plants. Try to answer your questions as you read.*

1. How do plants use water? Accept all reasonable responses.
2. How do plants make food?
3. What is plant respiration?

Review Vocabulary

Define cellulose *using your book. Then write a sentence to illustrate its scientific meaning.*

cellulose chemical compound made of sugar; forms tangled fibers in plant cell walls and provides structure and support

Sample sentence: Cellulose in plants is important to the human diet.

New Vocabulary

Use your book to define the following terms.

stomata small openings that allow raw materials such as carbon dioxide, water vapor, and waste gases to enter and exit a leaf

chlorophyll green pigment found in the chloroplasts of green leaves

photosynthesis process during which a plant's chlorophyll traps light energy and sugars are produced

respiration series of chemical reactions that break down food molecules

Academic Vocabulary

Use a dictionary to define release.

release to set free; to let go

Name _____ Date _____

Section 1 Photosynthesis and Respiration (continued)

Main Idea | **Details**

Taking In Raw Materials

I found this information on page _____.
SE, p. 303
RE, p. 148

Organize *what you know about the different layers of a plant's leaves by completing the table below.*

Structure	Function
Epidermis	outer layer of the leaf; allows some materials, such as carbon dioxide and water vapor, to enter or exit the leaf
Palisade layer	area where most of the plant's food is made
Spongy layer	carbon dioxide and water vapor fill the spaces

I found this information on page _____.
SE, p. 303
RE, p. 148

Summarize *why* stomata *are important structures in a plant leaf.*

Materials enter and exit the leaf through stomata. Stomata can control how much water passes out of the leaf. They close when the plant is losing too much water.

The Food-Making Process

I found this information on page _____.
SE, p. 305
RE, p. 149

Complete *the equation for* photosynthesis. *Identify:*

- the product that is stored as a food source
- the product that is released mostly as waste
- the product made during light-dependent reactions
- the product made during light-independent reactions

$6CO_2$ + $6H_2O$ + light energy → $C_6H_{12}O_6$ + $6O_2$

carbon dioxide

water

Food source: glucose made during light-independent reactions

Waste product: oxygen made during light-dependent reactions

Name _____ Date _____

Main Idea

The Breakdown of Food

I found this information on page _____.

SE, p. 307
RE, p. 150

Details

Define aerobic respiration.

respiration that uses oxygen to break down food chemically

Complete *the equation for aerobic respiration.*

$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O +$ energy

glucose | oxygen | carbon dioxide | water

Comparison of Photosynthesis and Respiration

I found this information on page _____.

SE, p. 309
RE, p. 151

Have students work in pairs to summarize the differences between photosynthesis and aerobic respiration.

Compare *the processes of photosynthesis and aerobic respiration by completing the table.*

	Photosynthesis	Aerobic Respiration
Energy	energy is stored	energy is released
Raw materials	water and carbon dioxide	glucose and oxygen
End products	glucose and oxygen	water and carbon dioxide
Cell structure in which process occurs	chloroplasts	mitochondria

Summarize It

Create a concept map or other diagram to summarize what you learned in this section about plant structure and function.

Encourage students to include detailed information in concise form on their diagrams, and to use sketches to help them remember concepts.

Name _____ Date _____

Plant Processes

Section 2 Plant Responses

Scan *Section 2. Predict three things that you will learn.* Accept all reasonable responses.

1. what tropisms are
2. how ethylene affects plants
3. how darkness affects flowers

Review Vocabulary

behavior

Define behavior *using your book.*

the way in which an organism interacts with other organisms and its environment

New Vocabulary

Write the correct vocabulary term next to each definition. Use your book to help you.

tropism	response of a plant to external stimuli, movement caused by change in growth
auxin	type of plant hormone that causes plant stems and leaves to exhibit positive responses to light
photoperiodism	plant's response to the number of hours of daylight and darkness it receives
long-day plant	plant that generally requires short nights—less than 12 hours of darkness—to begin the flowering process
short-day plant	plant that generally requires long nights—12 or more hours of darkness—to begin the flowering process
day-neutral plant	plant that does not require a specific photoperiod and can begin the flowering process over a range of night lengths

Academic Vocabulary

involve

Use a dictionary to define **involve.**

to include; to have as part of itself

Name _____ Date _____

Section 2 Plant Responses (continued)

Main Idea

Details

What are plant responses?

I found this information on page _____.
SE, p. 311
RE, p. 153

Distinguish *the types of stimuli as internal or external.*

external — **1.** a stimulus that comes from outside the body

internal — **2.** a stimulus that comes from inside the body

Tropisms

I found this information on page _____.
SE, p. 312
RE, pp. 153–154

Complete *the table below. Identify the stimulus for each described response.*

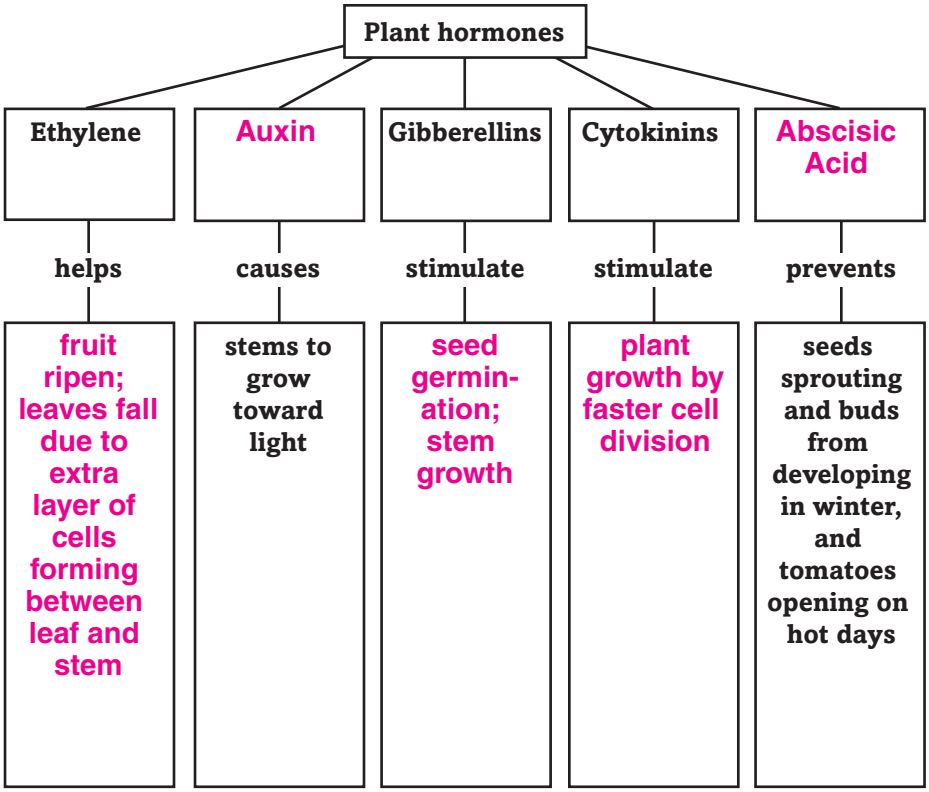
Stimulus	Response
Object touches plant	Plant stem grows faster on one side. Stem bends and twists around object.
Light hits one side of plant	Plant bends toward light. Leaves turn and absorb more light.
Gravity pulls on plant	Roots grow downward. Stems grow upward.

Plant Hormones

I found this information on page _____.
SE, pp. 313–315
RE, pp. 154–155

Encourage students to record detailed notes with reasons as well as observations.

Compare *the effects of different hormones that affect plants.*



Name _____ Date _____

Section 2 Plant Responses (continued)

Main Idea | **Details**

Plant Hormones

I found this information on page _____.

SE, p. 314
RE, p. 154

Create *a diagram to illustrate how auxin causes a stem to grow in response to sunlight. Write a short caption to describe where* auxin *is concentrated in the stem.*

Drawings should show the stem bending toward the light.

Sample caption: Auxin concentrates on the shaded side of the stem.

Photoperiods

I found this information on page _____.

SE, pp. 316–317
RE, p. 155

Complete *the table below to show your understanding of the effects of* photoperiodism *on different types of plants.*

Type of Plant	Hours of Darkness Needed to Flower	Examples
Long-day plants	need less than 12 hours	spinach, lettuce, and beets
Short-day plants	need 12 or more hours	poinsettias, strawberries, and ragweed
Day-neutral plants	do not need a specific amount of light	dandelions and roses

CONNECT IT

Explain plant responses you might see in plants that are growing indoors on a windowsill.

Accept all reasonable responses. Both gravity and light affect the growth of plants indoors. Plants near a sunny window will grow toward the source of sunlight. Their stems will grow upward. Their roots will grow downward.

Name _____ Date _____

Plant Processes Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Plant Processes	After You Read
• Plants make their own food.	A SE, p. 305 RE, p. 149
• Plants break down food to release energy.	A SE, p. 307 RE, p. 150
• Plant stems grow away from light.	D SE, p. 312 RE, p. 153
• Plants have hormones that control changes in their growth.	A SE, pp. 313–315 RE, p. 154

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
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- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT **After reading this chapter, identify three things that you have learned about plant processes.**

Accept all reasonable responses. 1. Plants can take in raw materials and get rid of wastes through their leaves. 2. Some of the chemical reactions that take place during photosynthesis require light, but others do not. 3. Many plants require a specific length of darkness to begin the flowering process.

Name _____ Date _____

Introduction to Animals

Before You Read

Before you read the chapter, think about what you know about the topic. List three things that you already know about animals in the first column. Then list three things that you would like to learn about animals in the second column.

K What I know	W What I want to find out

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List the animals you may find living around a coral reef.

Accept all reasonable responses. Lists may include various corals, fishes, and sea anemones.

Name _____ **Date** _____

Introduction to Animals

Section 1 Is it an animal?

Scan *the headings in Section 1 of the chapter. Identify three topics that are discussed.* Accept all reasonable responses.

1. animal characteristics
2. how animals meet their needs
3. how animals are classified

Review Vocabulary

Define adaptation *using your book or a dictionary.*

adaptation

any variation that makes an organisms better suited to its environment

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank to the left of each definition.

omnivore	animal that eats both plants and animals; mammals with specialized teeth for eating plants and animals
radial symmetry	arrangement of body parts in a circle around a center point
invertebrate	an animal without a backbone
carnivore	animal that eats only other animals or the remains of other animals
bilateral symmetry	arrangement of body parts into halves that are nearly mirror images of each other
herbivore	animal that eats only plants or parts of plants
vertebrate	an animal that has a backbone

Academic Vocabulary

Use a dictionary to define **definite** *to show its scientific meaning.*

definite

having exact limits in size, shape, or number of parts

Name _____ Date _____

Section 1 Is it an animal? (continued)

Main Idea | **Details**

Animal Characteristics

I found this information on page _____.
SE, p. 330
RE, p. 157

Summarize *the* characteristics of animals *by completing the following main points.*

Animals get their food from other living things.

Many animals move from place to place to find food, mates, and/or shelter/places to live.

All animals can reproduce sexually. Some also can reproduce asexually.

Animal cells have a nucleus and other parts inside called organelles.

How Animals Meet Their Needs

I found this information on page _____.
SE, pp. 331–333
RE, pp. 158–160

Compare animal adaptations *by completing the chart.*

How Animals Meet Their Needs		
	Adaptations	**Animal Examples**
Ways to get energy	eat plants	deer, some fishes
	eat animals	lion, hawk, buzzard
	eat plants and animals	bear, robin, human being
Physical features	large size	moose, bison
	mimicry	scarlet king snake
	camouflage	trout, cuttlefish
Behaviors	run away from predators	Thompson's gazelle
	live in groups	herring, wolf

Name _____ **Date** _____

Section 1 Is it an animal? (continued)

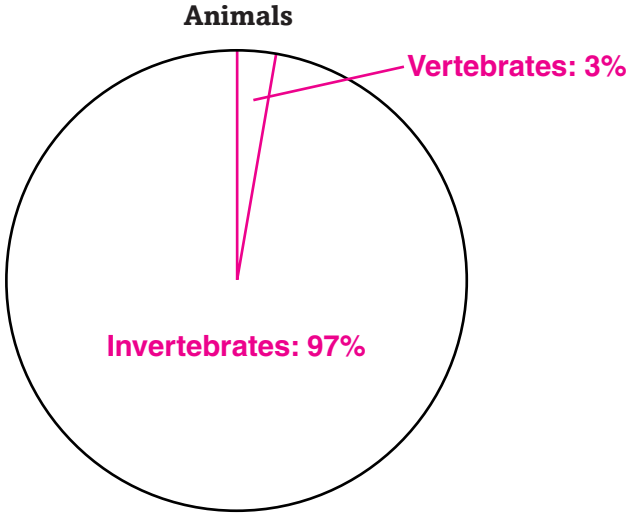
Main Idea

Animal Classification

I found this information on page _____.
SE, pp. 334–335
RE, pp. 160–161

Details

Complete *and label the circle graph to compare the percent of known animals that are vertebrates with the percent of known animals that are invertebrates.*



I found this information on page _____.
SE, p. 335
RE, p. 161

Encourage clear and logical diagrams rather than artistic merit.

Compare *forms of* animal symmetry *by identifying and drawing an example of each below.* Accept all reasonable examples.

Asymmetrical	Radial Symmetry	Bilateral Symmetry
Example: sponge	Examples: sea anemone, sea urchin	Example: lobster, butterfly, human

Summarize It

Analyze the physical or behavioral adaptations of an animal that protect it from predators. Accept all reasonable responses.

Some insects are camouflaged to make it difficult for predators to detect them. Some may mimic another insect that tastes bad or can sting.

Name _____ Date _____

Introduction to Animals

Section 2 Sponges and Cnidarians

Skim *Section 2 of the chapter. Read the headings and look at the illustrations. Predict three things that you will learn.* Accept all reasonable responses.

1. characteristics of sponges and cnidarians
2. how sponges and cnidarians get food and oxygen
3. why living coral reefs are important

Review Vocabulary

flagella

Define flagella *using your book or a dictionary.*

long, thin, whiplike structures that grow from a cell

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank to the left of each definition.

medusa	form of a cnidarian that is bell-shaped and free-swimming
stinging cell	capsule with a threadlike structure containing toxins that help a cnidarian capture food
sessile	organisms that remain attached to one place during most of their life
tentacles	armlike structures that have stinging cells used for getting food
hermaphrodite	animal that produces both sperm and eggs in the same body
polyp	cnidarian body type that is vase-shaped and is usually sessile

Academic Vocabulary

source

Use a dictionary to define source *to show its scientific meaning.*

any person, place, or thing by which something is supplied

Name _____ Date _____

Section 2 Sponges and Cnidarians (continued)

Main Idea | **Details**

Sponges and Characteristics of Sponges

I found this information on page _____.
SE, pp. 336–338
RE, pp. 163–165

Summarize *information about* **sponges.**

Sponges appeared on Earth about **600 million years ago**. Most live in **salt water**. Some have **radial** symmetry, but most are **asymmetrical**. Adult sponges are **sessile**, which means they do not move. Sponges pull **water** into their bodies, where cells filter out **food** and **oxygen**.

I found this information on page _____.
SE, p. 337
RE, p. 164

Model *a* **sponge's body.** *Label the sponge's* **central cavity** *and* **pores.** *Show the* **path** *followed by water into and out of the sponge.*

Sketches should show a sponge as a hollow tube perforated by pores. Water flows in through the pores and out through the end of the central cavity.

Cnidarians

I found this information on page _____.
SE, p. 339
RE, p. 166

Organize *information about the* **two forms of cnidarians** *by completing the chart.*

	Medusa	Polyp
Body Form (shape)	like a bell or an umbrella	like a vase
Mobility	free-swimming; floats along on currents	usually sessile
Examples	jellyfishes for most of their lives	sea anemones, corals, and hydras for most of their lives

Name _____ Date _____

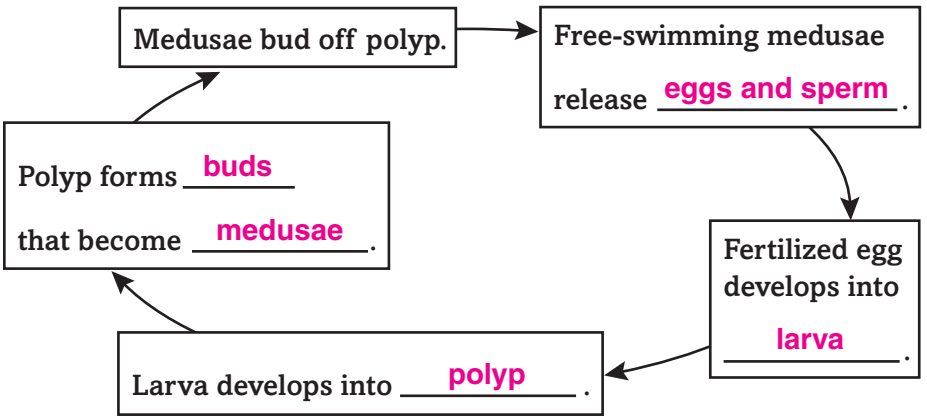
Section 2 Sponges and Cnidarians (continued)

Main Idea	Details

Cnidarians

I found this information on page _____.
SE, p. 341
RE, p. 167

Sequence *the* steps in reproduction of medusa *forms of cnidarians by completing the cycle chart.*



Corals

I found this information on page _____.
SE, p. 342
RE, p. 168

Summarize *key information about* coral reefs *in the outline.*

Accept all reasonable responses.

I. Coral reefs

A. Formation of coral reefs

1. Made of shells or skeletons of polyps
2. Grow as each new generation builds on top of existing coral skeletons
3. Can take millions of years to form

B. Importance of coral reefs

1. Provide habitat for diversity of life
2. Protect beaches and shorelines
3. Provide chemicals used in medical research

SYNTHESIZE IT

Explain how sponges and cnidarians could be mistaken for plants rather than animals. Accept all reasonable responses.

Cnidarians and sponges may seem similar to plants because they are sessile for most of their lives, whereas many animals move from place to place to find food, mates, or shelter. Also, it may not be apparent that they need to get their food from other living things, as all animals do.

Name _____ Date _____

Introduction to Animals

Section 3 Flatworms and Roundworms

Scan *Section 3 of the chapter. Write four questions that come to mind. Look for answers to your questions as you read the section.*

1. What is a worm? Accept all reasonable responses.
2. How are flatworms and roundworms different?
3. How do flukes and tapeworms reproduce?
4. Why are roundworms important?

Review Vocabulary

cilia

Define cilia *using your book or a dictionary.*

short, threadlike structures that aid in locomotion

New Vocabulary

Use your book or a dictionary to define each vocabulary term. Then use each term in a sentence that shows its scientific meaning.

free-living organisms

organisms that do not depend on another organism for food or a place to live; Sample sentence: A planarian is a free-living organism that lives under rocks in freshwater and feeds on small organisms or the dead bodies of larger organisms.

anus

opening at the end of the digestive tract through which wastes leave the body; Sample sentence: Roundworms are thought to be the first animals to have a digestive system with two body openings, a mouth and an anus.

Academic Vocabulary

require

Use a dictionary to define require *to show its scientific meaning.*

to need

Name _____ Date _____

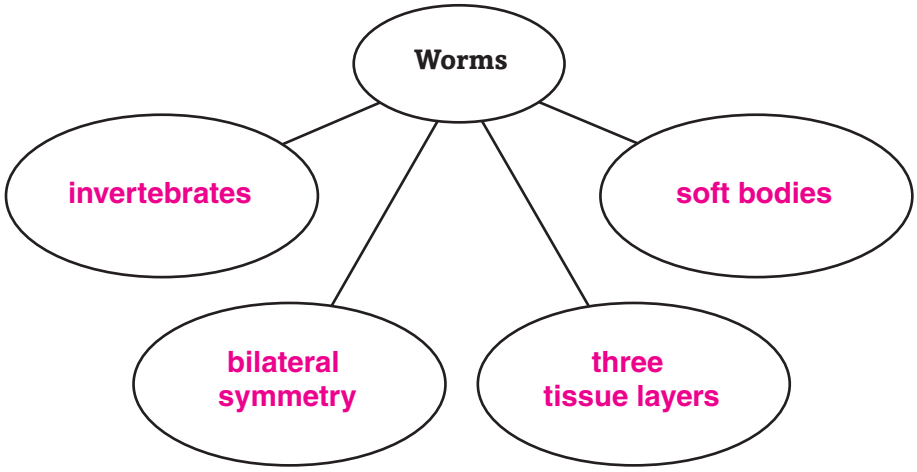
Section 3 Flatworms and Roundworms (continued)

Main Idea	Details

What is a worm?

I found this information on page _____.
SE, p. 344
RE, p. 170

Analyze worms *by identifying four characteristics below.*



Flatworms

I found this information on page _____.
SE, pp. 344–346
RE, pp. 170–172

Compare characteristics of planarians and flukes *by completing the chart below.*

Flatworms		
	Planarians	**Flukes**
How they live	free-living	as parasites
What they eat	small organisms or dead bodies	cells and fluids of host
How they move	cilia; slides along on mucus	carried by host
How they reproduce	asexually and sexually	usually sexually

I found this information on page _____.
SE, p. 346
RE, p. 172

Model *a* tapeworm *by sketching it. Label its* hooks, *its* suckers, *and a* mature segment *with eggs.*

Sketches should indicate that the mature segment is located at the end of a series of segments.

Name _____ Date _____

Section 3 Flatworms and Roundworms (continued)

Main Idea	Details

Origin of Flatworms

I found this information on page _____.
SE, p. 346
RE, p. 173

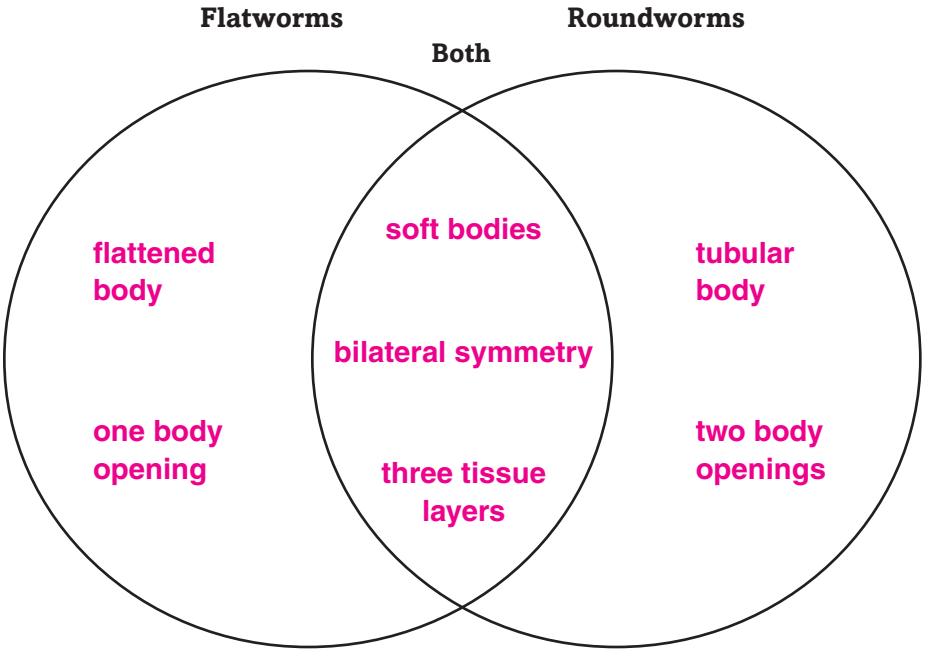
Summarize *what some scientists believe about the* origin of flatworms *by completing the diagram.*

probably the first group of animals to have
- bilateral symmetry
- nerves and senses around the head area
- third tissue layer that develops into organs

Roundworms

I found this information on page _____.
SE, p. 347
RE, p. 173

Compare and contrast roundworms *with* flatworms *by completing the Venn diagram with at least seven facts.*



Connect It

Summarize ways that roundworms are both helpful and harmful.

Accept all reasonable responses. Roundworms are helpful because they can kill other pests and provide nutrients to soil. Roundworms are harmful because they cause disease and damage fiber, agricultural products, and food.

Name _____ **Date** _____

Tie It Together

Preventing Disease

You are working on a public health campaign to inform people of the dangers of parasitic flatworms and roundworms. Create a poster with key information about diseases these organisms can cause and how to avoid them. Use words, pictures, and diagrams to get your message across. **Accept all reasonable responses.**

Students may wish to describe the life cycle of parasitic worms and how people can come in contact with them. Advice may include washing hands with soap and water after using the bathroom, cooking meat thoroughly, drinking only water that has been treated, and understanding how parasites can affect the body's organs.

Name _____ Date _____

Introduction to Animals Chapter Wrap-Up

Review the ideas you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart by filling in the third column.

K What I know	W What I want to find out	L What I learned
		Accept all reasonable responses.

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three main ideas that you have learned about animals. Accept all reasonable responses.

1. Most flatworms are parasites, which depend on another organism for food and a place to live. 2. Flukes can infect the eyes, lungs, liver, and other organs. 3. Roundworms are thought to be the first animal with two body openings.

Name _____ Date _____

Mollusks, Worms, Arthropods, Echinoderms

Before You Read

Before you read the chapter, think about what you know about the topic. List three things you already know about mollusks, worms, arthropods, and echinoderms in the first column. Then list three things you would like to learn about them in the second column.

K What I know	W What I want to find out
Accept all reasonable responses.	

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List three animals from each animal group you will be studying: mollusks, worms, arthropods, and echinoderms.

Student responses will vary. Possible responses: mollusks—snail, slug, squid; worms—earthworm, leech, marine worm; arthropod—butterfly, bee, fly; echinoderms—sea star, sand dollar, sea cucumber

Name _____ Date _____

Mollusks, Worms, Arthropods, Echinoderms

Section 1 Mollusks

Scan *the headings in Section 1 of your book. Identify three topics that will be discussed.* Accept all reasonable responses.

1. characteristics of mollusks
2. different classifications of mollusks
3. value of mollusks

Review Vocabulary

Define visceral mass *using your book or a dictionary.*

visceral mass — contains the stomach and other organs

New Vocabulary

Use your book or a dictionary to define the following terms.

mantle — thin layer of tissue that covers a mollusk's body organs

gill — organ that exchanges carbon dioxide for oxygen in the water

open circulatory system — blood circulation system in which the heart moves blood out into open spaces around the body organs

radula — in gastropods, a tonguelike organ with rows of teeth used to obtain food

closed circulatory system — blood circulation system in which blood containing food and oxygen moves through the body in a series of closed vessels

Academic Vocabulary

Use a dictionary to define relax *as it might be used in science.*

relax — to become inactive and lengthen

Name _____ **Date** _____

Section 1 Mollusks (continued)

Main Idea

Characteristics of Mollusks

I found this information on page _____.
SE, p. 360
RE, p. 175

I found this information on page _____.
SE, p. 360
RE, p. 175

As a quiz or in-class knowledge checkpoint, provide an overhead image of a snail with taglines to parts. Have students identify the parts and describe their functions.

Details

Identify characteristics of mollusks *in the chart below.*

Characteristics of Mollusks	
Type of symmetry	bilateral
Body description	**mantle, usually one or two shells, organs in fluid cavity, gills**
Where they live	**most in water; some on land**

Model *the* body of a mollusk *by sketching a snail and labeling its* shell, mantle, gill, mantle cavity, foot, radula, *and other body parts.*

Sketches should identify the following parts: shell, mantle, gill, mantle cavity, foot, radula; other parts that may be identified include visceral mass, mouth, stomach, heart, and anus.

Name _____ Date _____

Main Idea

Classification of Mollusks

I found this information on page _____.
SE, pp. 361–362
RE, pp. 176–177

Details

Compare and contrast types of mollusks *by completing the chart.*

Types of Mollusks			
Types	**Gastropods**	**Bivalves**	**Cephalopods**
Where do they live?	water and land	water	water
How many shells?	one or none	two	one—an internal shell
Examples	snails, conchs, garden slugs	clams, oysters, scallops	squid, octopuses

Value of Mollusks

I found this information on page _____.
SE, p. 364
RE, p. 178

Organize *the* uses of mollusks *and the* problems they cause *by completing the chart below.* Accept all reasonable responses.

Uses of Mollusks
- Mollusks provide food for fish, birds, and humans.
- Empty shells serve as homes for other invertebrates.
- Shells and pearls are used for jewelry and decorations.

Problems Mollusks Cause
- Land snails and slugs damage plants.
- Shipworms damage underwater wood of docks and boats.
- Some species host parasites that infect humans.

CONNECT IT

Discuss several ways you could protect a boat from being damaged by shipworms. Accept all reasonable responses.

Coat a wooden boat with a chemical that repels shipworms; build the boat from a material other than wood, such as fiberglass or metal; or store the boat when it is not in use.

Name _____ Date _____

Mollusks, Worms, Arthropods, Echinoderms

Section 2 Segmented Worms

Skim *Section 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the section.*

Accept all reasonable responses.

1. What do worms eat?
2. How are leeches used in medicine?
3. Are worms useful to humans?

Review Vocabulary

Define aerate *using your book or a dictionary.*

aerate — to supply with air

New Vocabulary

Use your book or a dictionary to define the following terms. Then use each term in a sentence to show its scientific meaning.

setae — bristle-like structures on the outside of each body segment that segmented worms use to move; Sample sentence: Segmented worms use their setae to move.

crop — digestive system sac in which earthworms store ingested soil; Sample sentence: Ingested soil moves to the earthworm's crop.

gizzard — muscular digestive system structure in which earthworms grind soil and organic matter; Sample sentence: An earthworm's gizzard grinds soil so it can be broken down and used for nutrition.

Academic Vocabulary

Use a dictionary to define survive *as it might be used in science.*

survive — to continue living

Name _____ Date _____

Section 2 Segmented Worms (continued)

Main Idea | **Details**

Segmented Worm Characteristics

I found this information on page _____.
SE, p. 365
RE, p. 180

Identify characteristics of segmented worms *in the chart below.*

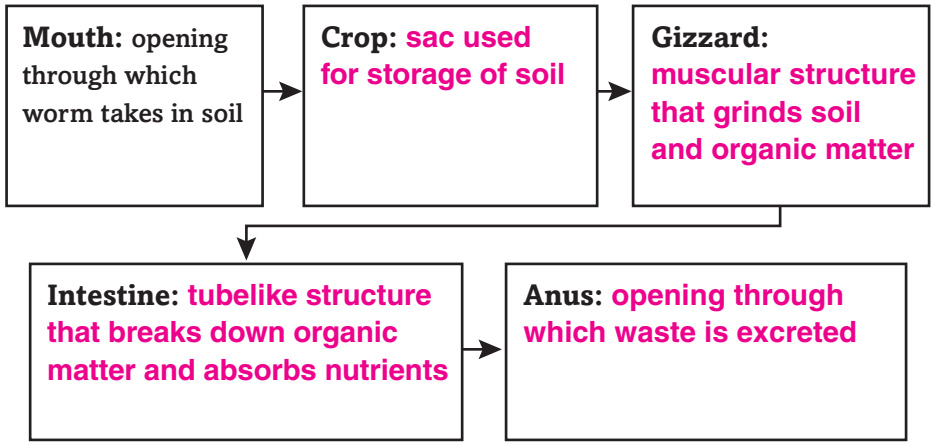
Characteristics of Segmented Worms	
Type of symmetry	bilateral
Body description	tube-shaped; divided into many segments
Where they live	freshwater, salt water, moist soil

Earthworm Body Systems

I found this information on page _____.
SE, p. 366
RE, p. 181

Ask students to explain what organic matter is, and why it may be found in soil. (It is plant and animal material and waste.) The chemical definition of organic is "containing carbon."

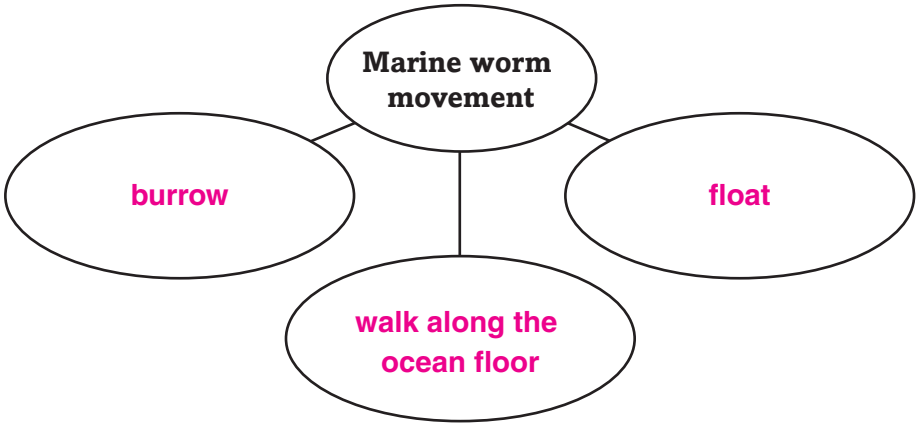
Sequence *and define the* functions of an earthworm's digestive system *by completing the flow chart.*



Marine Worms

I found this information on page _____.
SE, p. 367
RE, p. 182

Identify *three ways that* marine worms move.



Name _____ Date _____

Section 2 Segmented Worms (continued)

Main Idea	Details

Leeches and Leeches and Medicine

I found this information on page _____.

SE, p. 368
RE, p. 182

Summarize *the* process by which leeches feed *on the blood of other animals. Then explain how the process is useful in medicine.*

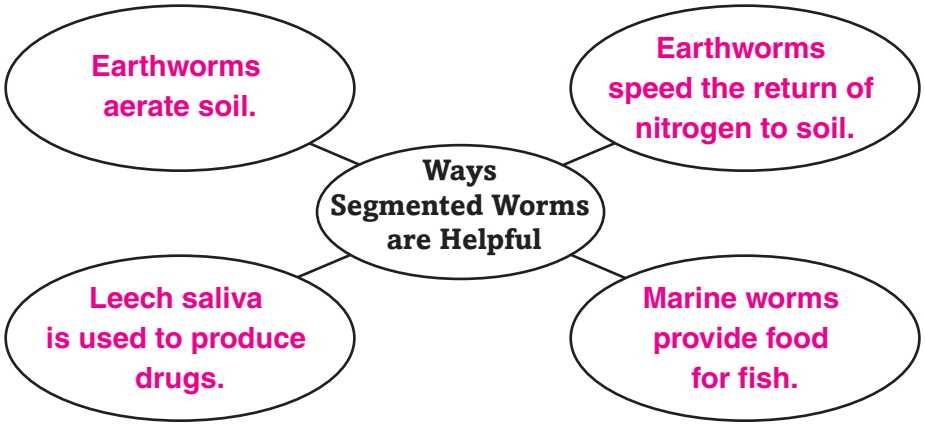
A sucker on each end of a leech's body is used to attach the leech to an animal. The leech bites and sucks out blood. The leech produces several chemicals, including an anesthetic to numb the area. This process is useful after certain types of surgery because the chemicals produced help prevent clotting, dilate blood vessels, and improve blood flow. This helps the area heal more quickly.

Value of Segmented Worms

I found this information on page _____.

SE, p. 369
RE, p. 183

Identify *ways* segmented worms are helpful *in the organizer below.*



Origin of Segmented Worms

I found this information on page _____.

SE, p. 369
RE, p. 183

Compare *three* similarities of mollusks and worms *which suggest that they share a common ancestor.*

- first animals to have a body cavity for organs
- have a one-way digestive system
- larvae are similar

CONNECT IT Explain why there are not many fossils of ancient worms.

Accept all reasonable responses. When worms die, their soft bodies usually decay quickly, leaving no remains to fossilize.

Name _____ Date _____

Mollusks, Worms, Arthropods, Echinoderms

Section 3 Arthropods

Scan *the* What You'll Learn *statements for Section 3 of your book. Identify three topics that will be discussed.* Accept all reasonable responses.

1. characteristics that are used to classify arthropods
2. structure and function of the exoskeleton
3. difference between complete and incomplete metamorphosis

Review Vocabulary

Define venom *using your book or a dictionary.*

venom — toxic fluid injected by an animal

New Vocabulary

Use your book or a dictionary to define the following terms.

appendage — jointed structure of arthropods, such as a leg, a pincer, or an antenna

molting — shedding and replacing of an arthropod's exoskeleton

spiracle — opening in the abdomen and thorax of insects through which air enters and waste gases leave

metamorphosis — process in which many insect species change their body form to become adults

Academic Vocabulary

Use a dictionary to define individual *as it might be used in science.*

individual — separate

Name _____ Date _____

Section 3 Arthropods (continued)

Main Idea | **Details**

Characteristics of Arthropods

I found this information on page _____.
SE, p. 370
RE, p. 185

Complete *the chart below to* identify characteristics of arthropods.

Characteristics of Arthropods	
Type of symmetry	bilateral
Body description	segmented bodies, sometimes fused together; jointed appendages; exoskeleton
Where they live	almost any environment

Insects

I found this information on page _____.
SE, p. 371
RE, p. 186

Organize *information about* body regions of insects *in the outline.*

I. Insect body regions

A. Parts of the head

1. pair of antennae
2. eyes
3. mouth

B. Parts of the thorax

1. three pairs of legs
2. two pairs of wings
3. spiracles

C. Parts of the abdomen

1. reproductive structures
2. spiracles

Arachnids

I found this information on page _____.
SE, pp. 374–375
RE, pp. 188–189

Identify *three* arachnids *and one* unique characteristic *of each.*

Types of Arachnids

Scorpions	Spiders	Ticks
have sharp, venom-filled stinger	cannot chew; release enzyme to digest prey	remove blood from their host with mouthparts

Name _____ **Date** _____

Section 3 Arthropods (continued)

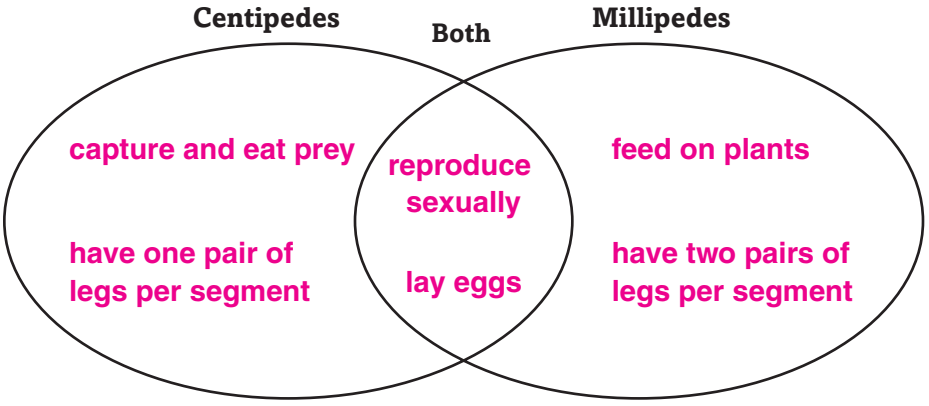
Main Idea

Details

Centipedes and Millipedes

I found this information on page _____.
SE, p. 375
RE, p. 190

Compare and contrast centipedes *and* millipedes *by completing the Venn diagram below with at least six facts.*



Crustaceans

I found this information on page _____.
SE, p. 377
RE, p. 190

Identify *two* functions of crustaceans' swimmerets.

1. help crustaceans move
2. are used in reproduction

Value of Arthropods

I found this information on page _____.
SE, pp. 377–378
RE, pp. 190–191

Have students identify examples of arthropods in each role. Examples: bees pollinate crops; locusts feed on crops

Summarize helpful functions *and* problems caused by arthropods. Accept all reasonable responses.

Helpful Arthropod Functions
- feed animals
- pollinate crops

Problems Arthropods Cause
- feed on crops
- carry disease
- destroy food, clothing, and property

Synthesize It

Analyze one method of controlling insect pests. Support your reasoning. Accept all reasonable responses.

Specific insect pests could be controlled by chemicals that interfere with their reproduction. Targeting a particular pest should not affect other animals too severely.

Name _____ Date _____

Mollusks, Worms, Arthropods, Echinoderms

Section 4 Echinoderms

Scan *Section 4 of your book. Use the checklist below.*

- ☐ Read all the headings.
- ☐ Read all the bold words.
- ☐ Look at the charts, graphs, and pictures.
- ☐ Think about what you already know about echinoderms.

Now, write three things that you want to learn about echinoderms.

1. What does the word *echinoderm* mean? Accept all reasonable responses.
2. Where do echinoderms live?
3. How are echinoderms different from one another?

Review Vocabulary

epidermis

Define epidermis *using your book or a dictionary.*

outer, thinnest layer of skin

New Vocabulary

water-vascular system

tube feet

Write a paragraph that explains the meaning and functions of both of the vocabulary terms.

Sample paragraph: A water-vascular system allows echinoderms to move, to exchange carbon dioxide and oxygen, capture food, and release wastes. The system has thousands of tube feet connected to it. Suction cups at the ends of tube feet push out or pull in as pressure in the feet changes.

Academic Vocabulary

network

Use a dictionary to define network *in a way that it might be used in science.*

a group of related parts

Name _____ Date _____

Main Idea

Echinoderm Characteristics

I found this information on page _____.
SE, p. 380
RE, pp. 193–194

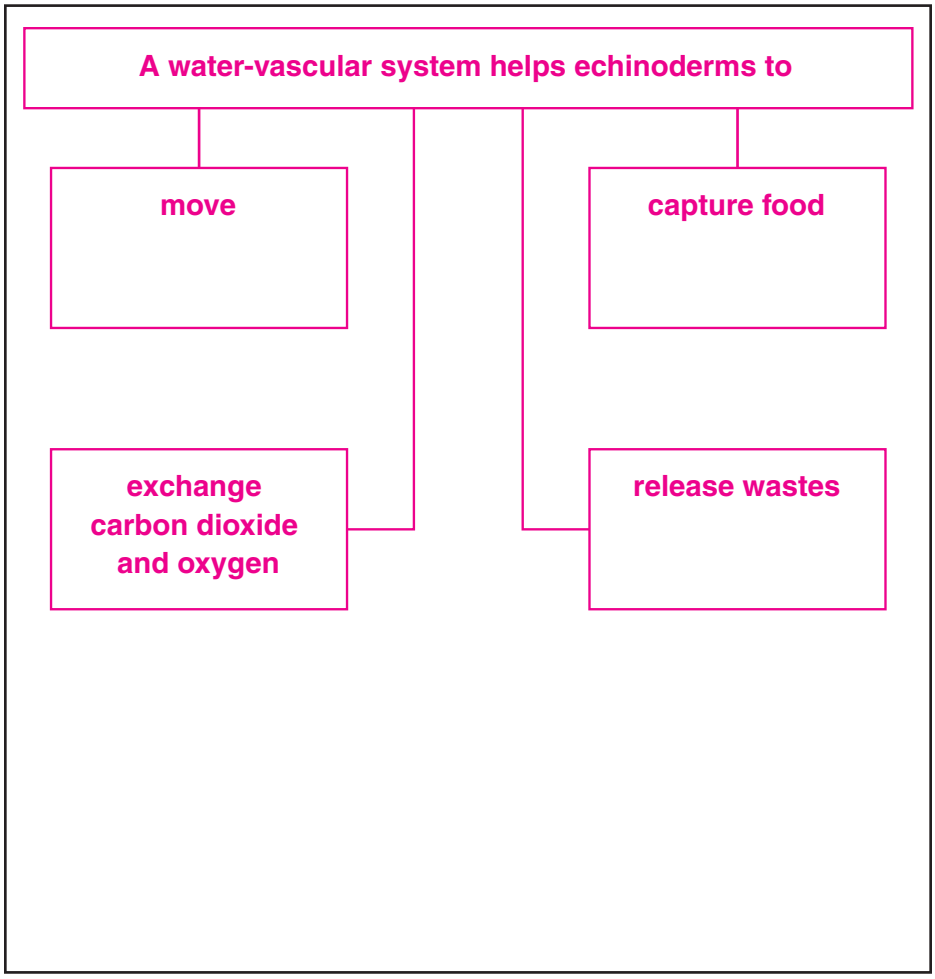
Details

Identify characteristics of echinoderms *in the chart below.*
Accept all reasonable responses.

Characteristics of Echinoderms	
Type of symmetry	radial
Body description	endoskeletons; no head or brain; water-vascular system
Where they live	oceans

I found this information on page _____.
SE, p. 380
RE, p. 194

Create *a graphic organizer to identify the* functions of a water-vascular system. Accept all reasonable responses.



Name _____ Date _____

Section 4 Echinoderms (continued)

Main Idea **Details**

Types of Echinoderms

I found this information on page _____.
SE, pp. 381–382
RE, pp. 194–195

Have students contrast the means by which sea stars and brittle stars are able to move. Encourage them to think of models that they could make out of everyday objects to show each kind of movement.

Classify *the* types of echinoderms, *and identify* one characteristic *of each in the chart below.* Accept all reasonable responses.

Echinoderms	
Type	**Characteristics**
Sea stars	have at least five arms that can regenerate if broken off
Brittle stars	have brittle arms that allow them to escape predators quickly
Sea urchins	have sacs near the ends of their spines that hold toxic fluid
Sand dollars	have a five-pointed pattern on their surface
Sea cucumbers	have a soft body with a leathery covering

Value of Echinoderms

I found this information on page _____.
SE, p. 383
RE, p. 195

Summarize *four reasons that* echinoderms are important *to ocean environments.* Accept all reasonable responses.

1. Echinoderms feed on dead organisms and help recycle materials.
2. Sea urchin eggs and sea cucumbers are used for food.
3. Echinoderms are used in research and are a potential source of medicines.
4. Sea stars are predators that control other animal populations.

CONNECT IT

Predict in what part of the ocean echinoderms probably live. Support your reasoning. Accept all reasonable responses.

Echinoderms probably live on the ocean floor and coastlines, because their adaptations are best suited for moving along a surface or for burrowing.

Name _____ Date _____

Mollusks, Worms, Arthropods, Echinoderms Chapter Wrap-Up

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column.

K What I know	W What I want to find out	L What I learned
		Accept all reasonable responses.

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three main ideas that you have learned that you did not know before. Accept all reasonable responses.

1. Mollusks are a food source for many animals. 2. Earthworms condition and aerate the soil, which helps increase crop yields. 3. Arthropods, such as those that carry diseases and eat crops, affect our lives every day.

Name _____ Date _____

Fish, Amphibians, and Reptiles

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Fish, Amphibians, and Reptiles
	• All vertebrates are chordates.
	• Scales can be used to classify fish.
	• The health of amphibians can indicate the health of the environment.
	• Reptiles must lay their eggs in water.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List two unique characteristics for each animal group you will be studying.

Students' responses will vary, but may include these: fish live and breathe in water, amphibians change forms and live near water, and reptiles lay eggs and breathe air.

Name _____ Date _____

Fish, Amphibians, and Reptiles

Section 1 Chordates and Vertebrates

Scan *the headings in Section 1 of your book. Predict three topics that will be discussed.* **Accept all reasonable responses.**

1. **characteristics of chordates**
2. **characteristics of vertebrates**
3. **types and numbers of vertebrates**

Review Vocabulary

Define motor responses *using your book or a dictionary.*

motor responses

responses that involve muscular movement

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank to the left of each definition.

chordate	animal that at some point in its development has a notochord, postanal tail, nerve cord, and pharyngeal pouches
pharyngeal pouches	pairs of openings between the mouth and the digestive tube found in developing chordates
vertebrae	bones that surround and protect the spinal nerve cord
endoskeleton	internal supportive and protective framework found in all vertebrates
nerve cord	tubelike structure that develops into the brain and spinal cord
postanal tail	muscular structure at the end of a developing chordate
notochord	flexible, firm structure that extends along the upper part of chordate's body
cartilage	tough, flexible tissue that joins vertebrae and makes up all or part of the vertebrate endoskeleton

Academic Vocabulary

Use a dictionary to define **external** *as it might be used in science.*

external

on, or for use on, the outside of the body

Name _____ Date _____

Section 1 Chordates and Vertebrates (continued)

Main Idea	Details
Chordate Characteristics *I found this information on page* _____. SE, pp. 394–395 RE, pp. 197–198	**Model** *a* developing chordate. *Label its* pharyngeal pouches, postanal tail, notochord, *and* nerve cord. Sketches should resemble the illustration in the text and identify the characteristics listed.
I found this information on page _____. SE, p. 395 RE, p. 198	**Summarize** *how the* nerve cord develops *in most chordates.* The front end of the nerve cord forms the brain, and the rest forms the spinal cord. These become the central nervous system.
Vertebrate Characteristics *I found this information on page* _____. SE, p. 395 RE, pp. 198–199	**Distinguish** *vertebrate chordates from nonvertebrate chordates.* *List* characteristics of vertebrates *that nonvertebrates do not have.* 1. internal framework or endoskeleton 2. a backbone with vertebrae that protect the spinal cord 3. a head with a skull that protects the brain 4. most internal organs in the central part of the body 5. skin covering the body 6. sometimes have hair, feathers, scales, or horns

Name _____ Date _____

Main Idea

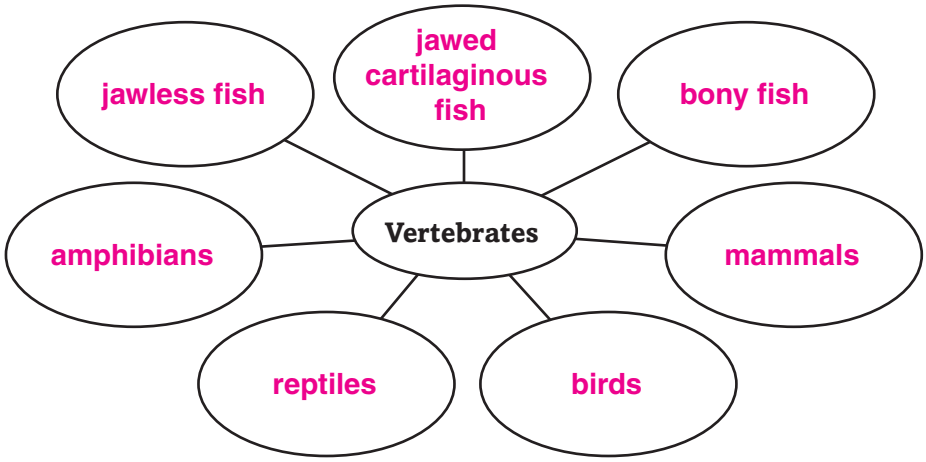
Vertebrate Characteristics

I found this information on page _____.
SE, pp. 396–397
RE, p. 199

Have students create graphs to compare the number of species in each of the seven main vertebrate groups.

Details

Identify *the* 7 main groups of vertebrates.



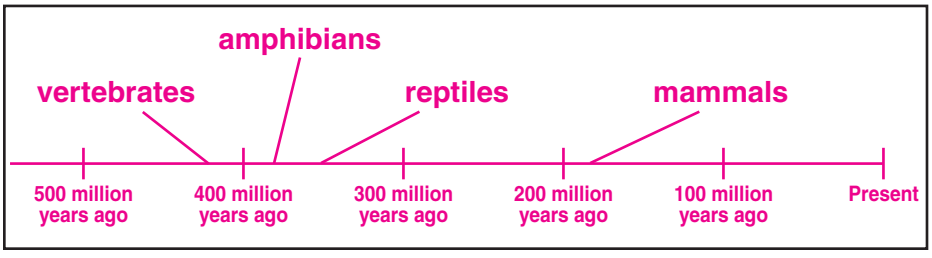
I found this information on page _____.
SE, p. 397
RE, p. 199

Define ectotherm *and* endotherm. *Provide a synonym (or word that means the same) and examples for each.*

Ectotherm	Endotherm
Definition: animal whose internal body temperature changes with the temperature of its surroundings	Definition: animal whose internal body temperature changes little
Synonym: cold-blooded	Synonym: warm-blooded
Examples: Accept all reasonable responses. shark, frog, turtle	Examples: Accept all reasonable responses. eagle, whale, human

I found this information on page _____.
SE, p. 397
RE, p. 199

Create *a timeline to show when* vertebrates, amphibians, reptiles, *and* mammals *first appeared. Use a scale of 500 million years ago to the present time.*



Name _____ Date _____

Fish, Amphibians, and Reptiles

Section 2 Fish

Skim *Section 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the section.*

1. What are scales? Accept all reasonable responses.
2. What are gills?
3. How do fish rise or sink in water?

Review Vocabulary

streamline

Define streamline *using your book or a dictionary.*

formed to reduce resistance to motion through a fluid or air

New Vocabulary

Use your book or a dictionary to define the following terms.

lateral line

shallow canal-like structure that runs the length of the fish's body and is filled with sensory organs

fin

fanlike structure attached to the endoskeleton that helps fish steer, balance, and move

spawning

release of sperm by male fish over eggs that have been released by a female into water; done by most fish

scales

hard, thin plates that cover and protect the skin; used to classify fish

swim bladder

in most bony fish, an air sac that allows a fish to adjust its density in response to the surrounding water

Academic Vocabulary

Use a dictionary to define detect *as it would be used in science.*

detect

to catch or discover; to perceive

Name _____ Date _____

Section 2 Fish (continued)

Main Idea

Details

Fish Characteristics

I found this information on page _____.
SE, p. 399
RE, p. 201

Summarize *information about structures and functions of* fish fins and scales.

Fins are fanlike structures attached to the endoskeleton. Those on the sides allow movement right, left, forward, and backward. Those on the top and bottom provide stability.

Scales are hard, thin plates made of bone that cover the skin and protect the body. They may be tooth-shaped, diamond-shaped, cone-shaped, or round. Scientists use them to classify fish.

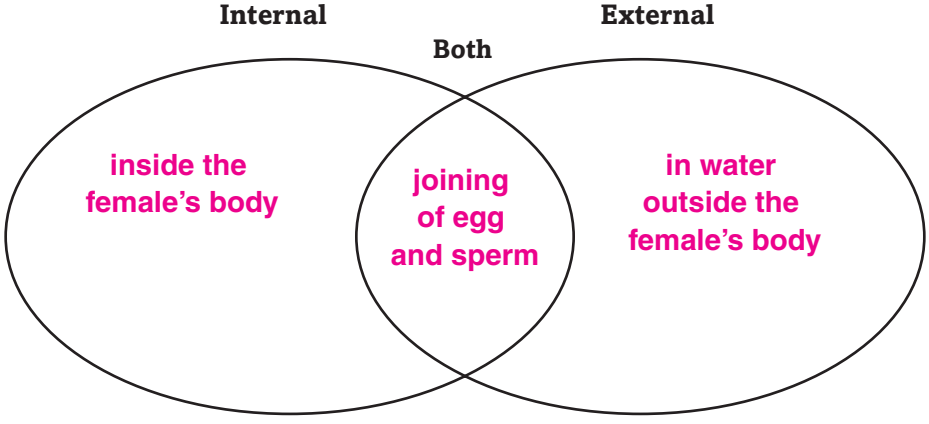
I found this information on page _____.
SE, p. 400
RE, p. 202

Sequence *the steps of* fish respiration *that take place when a fish obtains oxygen and gets rid of carbon dioxide.*

1. A fish takes water into its mouth.
2. Water passes over the gills, which contain many tiny blood vessels.
3. Oxygen from the water is exchanged with carbon dioxide from the blood.
4. Water containing carbon dioxide passes out through openings on the sides of the fish.

I found this information on page _____.
SE, p. 401
RE, p. 202

Compare internal *and* external fertilization *in fish by completing the Venn diagram with at least three facts.*



Name _____ Date _____

Section 2 Fish (continued)

Main Idea

Details

Types of Fish

I found this information on page _____.
SE, pp. 402–405
RE, p. 203–204

Organize *information about the* 3 groups of fish *by completing the chart.*

The Three Groups of Fish		
Group	**Description**	**Examples**
Jawless fish	round, toothed mouths; long, tubelike bodies; slimy skin, no scales; skeletons made of cartilage; earliest fish	lampreys hagfish
Jawed cartilaginous fish	movable jaws; teeth usually well-developed; tiny scales	sharks skates rays
Bony fish	include 95 percent of all fish; skeletons made of bone; bony flap covers gills; have swim bladder to regulate depth	lungfish salmon tuna swordfish

I found this information on page _____.
SE, p. 403
RE, p. 203

Model *the body of a typical bony fish by sketching a cutaway view of one. Label its* nostrils, mouth, gills, brain, heart, liver, stomach, intestine, scales, bony vertebrae, *and* swim bladder.

Sketches should resemble the body structure and include the parts shown in the illustration on SE p. 403 or RE p. 203.

Connect It

Analyze how other organisms in a lake might be affected if all the fish living in it disappeared. Accept all reasonable responses.

There would be no more fishing; wildlife that depend on fish for food would decline; insects and water plants kept in check by fish would increase.

Name _____ Date _____

Fish, Amphibians, and Reptiles

Section 3 Amphibians

Scan *the* What You'll Learn *statements for Section 3 of your book. Identify three topics that will be discussed.* Accept all reasonable responses.

1. amphibian adaptations for land and water
2. characteristics of different kinds of amphibians
3. how amphibians reproduce and develop

Review Vocabulary

Define habitat *using your book or a dictionary.*

habitat

place where an organism lives and that provides the types of food, shelter, moisture, and temperature needed for survival

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank to the left of each definition.

estivation — inactivity in hot, dry months

metamorphosis — developmental process in which most amphibians change their body form to become adults

hibernation — time of inactivity and slowed metabolism during cold weather

biological indicator — species whose overall health reflects the health of the ecosystem in which it lives

Academic Vocabulary

Use a dictionary to define contact *as it might be used in science. Then write a sentence that includes the term.*

contact

act or state of touching or meeting; Sample sentence: Some frogs can poison animals that come in contact with their skin.

Name _____ Date _____

Section 3 Amphibians (continued)

Main Idea | **Details**

Amphibian Characteristics

I found this information on page _____.
SE, p. 407
RE, p. 206

Have students use dictionaries to find and define other words that contain the roots *amphi* or *bios.*

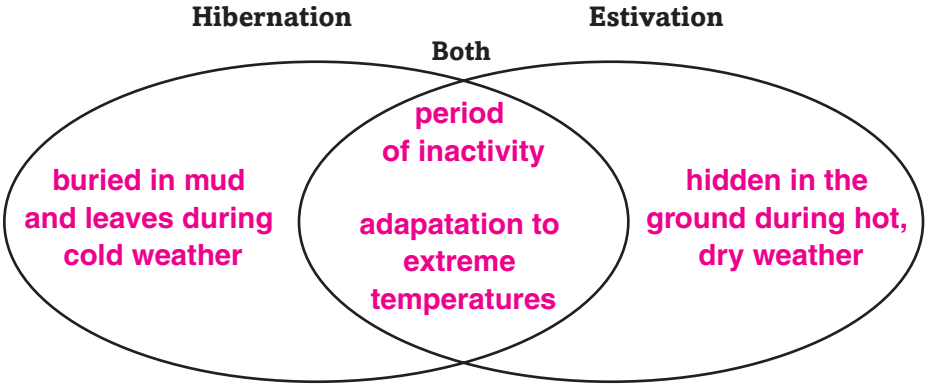
I found this information on page _____.
SE, p. 407
RE, p. 206

I found this information on page _____.
SE, pp. 407–408
RE, pp. 206–207

Complete *the chart about* amphibians.

Amphibians	
Definition	animals that spend part of their lives in water and part on land
Origin of name	from the Greek word *amphibios,* which means "double life" because they live on land and in water
Examples	frogs, toads, salamanders

Compare and contrast amphibian hibernation *with* estivation *by completing the Venn diagram with at least four facts.*



Summarize amphibian respiration and circulation *in the outline.*

I. Gas exchange

A. Skin is thin, moist, and lined with capillaries.

B. Lungs are small and saclike.

II. Three-chambered heart

A. First chamber receives oxygen-filled blood from skin and lungs.

B. Second chamber receives carbon dioxide-filled blood from tissues.

C. Third chamber pumps oxygen-filled blood to tissues and carbon dioxide-filled blood to lungs.

Name _____ Date _____

Main Idea

Details

Amphibian Characteristics

I found this information on page _____.
SE, pp. 408–409
RE, p. 207

Sequence reproduction *and* development in amphibians.

Eggs are laid in **water** and fertilized **externally**.

→ Eggs hatch into **tadpoles** with fins, **gills, and a two-chambered heart**.

→ Tadpoles develop legs, **lungs, and a three-chambered heart**.

→ Adults can live on **land**.

Frogs and Toads and Salamanders

I found this information on page _____.
SE, pp. 409–410
RE, p. 208

Classify amphibians *by completing the chart.*

Amphibian Groups		
	Frogs and Toads	**Salamanders and Newts**
Body structure	short, wide bodies; strong hind legs; large eyes and nostrils	long, slender bodies; short legs
Feeding habits	sticky tongue; eat insects, worms, and spiders	eat worms and insects
Reproduction	external fertilization in water	internal fertilization on land, external fertilization in water

Importance of Amphibians

I found this information on page _____.
SE, pp. 410–411
RE, pp. 208–209

Identify *four ways that amphibians are important to humans.*

Why Amphibians are Important

- control insects
- source of food
- medical research
- biological indicators

Connect It

Think about where amphibians spend their lives. Analyze how this might make them important biological indicators. Accept all reasonable responses. Amphibians spend part of their lives in water and part on land. Because amphibians live in both water and on land, their health will be affected by problems in either or both places.

Name _____ Date _____

Fish, Amphibians, and Reptiles

Section 4 Reptiles

Skim *Section 4 of your book. Write three questions that come to mind. Look for answers to your questions as you read the section.*

Accept all reasonable responses.

1. What is a skink?
2. What are some characteristics of reptiles?
3. How are reptiles important?

Review Vocabulary

bask

Define bask *using your book or a dictionary.*

to warm by continued exposure to heat

New Vocabulary

amniotic egg

Use your book or a dictionary to define the vocabulary term. Then use the term in a sentence that shows its scientific meaning.

egg covered with a shell that provides a complete environment for the embryo's development; for reptiles, a major adaptation for living on land; Sample sentence: The amniotic egg provides food for a developing organism and protects it from drying out with a shell.

Academic Vocabulary

interpret

Use a dictionary to define interpret *as it might be used in science.*

to explain the meaning of; make understandable; to translate

Name _____ Date _____

Main Idea

Details

Reptile Characteristics

I found this information on page _____.
SE, p. 412
RE, p. 211

Summarize reptiles *by completing the chart.*

Characteristics of Reptiles	
Characteristic	**Description or Function**
Skin	thick, dry, waterproof
Scales	reduce water loss
Movement	reptiles with legs: turtles, crocodiles, most lizards; reptiles without legs: snakes, some lizards
Body Temperature	ectotherms; move into or out of the Sun to maintain body temperature
Circulation	more highly developed than amphibians; most have a three-chambered heart; crocodiles have a four-chambered heart
Respiration	breathe with lungs; reptiles that live in water must come to the surface to breathe

I found this information on page _____.
SE, p. 413
RE, p. 212

Model *the structure of the* amniotic egg. *Label the* embryo, shell, yolk sac, egg membrane, *and* air space.

Students' drawings should use the appropriate labels and resemble illustrations on SE p. 413 or RE p. 212.

Name _____ Date _____

Section 4 Reptiles (continued)

Main Idea

Types of Modern Reptiles

I found this information on page _____.
SE, pp. 413–415
RE, pp. 212–213

The Importance of Reptiles

I found this information on page _____.
SE, p. 417; RE, p. 213

Details

Complete *the outline about the* major groups of modern reptiles.

I. Lizards
- **A.** Body:
  - **1.** Jaw has joint that hinges to enlarge mouth
  - **2.** Toes have claws
- **B.** Feeding: eat plants, reptiles, insects, worms, mammals

II. Snakes
- **A.** Jaw:
  - **1.** Has joint that hinges to enlarge mouth
  - **2.** Lower jaw bone used to sense vibrations
- **B.** Have no legs

III. Turtles
- **A.** Body:
  - **1.** Jaw is beaklike to crush food
  - **2.** Shell consists of two hard, bony plates
- **B.** Feeding: eat insects, worms, fish, plants

IV. Crocodilians
- **A.** Body:
  - **1.** Shape is lizardlike.
  - **2.** Head
    - **a.** Crocodile: narrow with triangular snout
    - **b.** Alligator: wide with rounded snout
    - **c.** Gavial: very slender snout; rounded growth on end
- **B.** Feeding: eat large prey, fish, turtles, waterbirds

V. The Importance of Reptiles
- **A.** Snakes eat rats and mice that destroy grain.
- **B.** Some reptiles eat insect pests.

Have students work in pairs to develop lists of reptiles from each group (if any) that live in their area.

SUMMARIZE IT

Identify three reptile adaptations that help them survive on land.

Accept all reasonable responses. Scales reduce water loss and protect reptiles from injury. Reptiles breathe with lungs. The amniotic egg shell keeps eggs from drying out.

Name _____ Date _____

Fish, Amphibians, and Reptiles

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Fish, Amphibians, and Reptiles	After You Read
• All vertebrates are chordates.	A SE, p. 395 RE, p. 198
• Scales can be used to classify fish.	A SE, p. 399 RE, p. 201
• The health of amphibians can indicate the health of the environment.	A SE, p. 411 RE, p. 209
• Reptiles must lay their eggs in water.	D SE, p. 413 RE, p. 212

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three main ideas that you have learned that you did not know before. Accept all reasonable responses.

1. Vertebrates are either ectotherms or endotherms. 2. Most female fish release large numbers of eggs into the water. The eggs are then fertilized when the male releases sperm. 3. One of the most important adaptations that helped reptiles live on land was the development of the amniotic egg.

Name _____ Date _____

Birds and Mammals

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Birds and Mammals
	• A bird has a crop instead of a stomach.
	• Wings are important for nonflying birds.
	• Marsupials are mammals that lay eggs.
	• Bats help pollinate flowers.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List similar characteristics of a mammal and a bird. What characteristics are different?

Student responses will vary. Similar—warm-blooded; live on every continent on Earth; give parental care. Different—birds have feathers; mammals have hair or fur; birds lay eggs and most mammals do not; most birds fly, most mammals do not.

Name _____ Date _____

Birds and Mammals

Section 1 Birds

Scan *the headings in Section 1. Identify three topics that will be discussed.* Accept all reasonable responses.

1. Bird characteristics
2. Body systems of birds
3. Why birds are important

Review Vocabulary

Define thrust *using your book or a dictionary.*

thrust

for an object moving through air, the horizontal force that pushes or pulls the object forward

New Vocabulary

Use your book or a dictionary to define the following terms. Then use each term in a sentence to show its scientific meaning.

contour feather

strong, lightweight feather that gives birds their coloring and shape and that is used for flight; Sample sentence: The bird's contour feathers made flying look easy.

endotherm

vertebrate animal whose internal temperature does not change when the temperature of environment changes; Sample sentence: Birds are able to survive in cold environments because they are endotherms.

preening

process in which a bird rubs oil from an oil gland over its feathers to condition them; Sample sentence: The bird was preening itself to keep its feathers healthy.

Academic Vocabulary

Use a dictionary to define migrate *to reflect its scientific meaning.*

migrate

to move from one place to another place

Name _____ **Date** _____

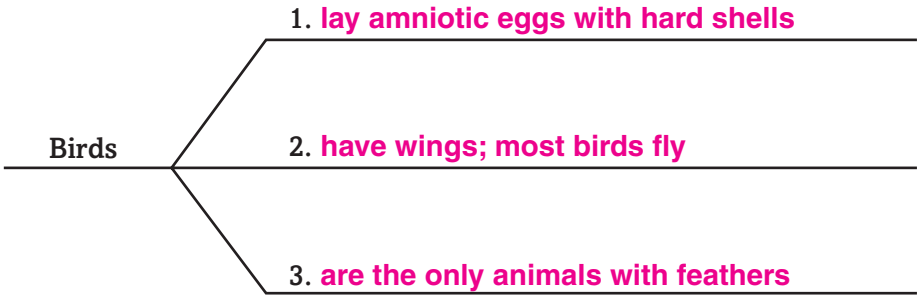
Main Idea

Details

Bird Characteristics

I found this information on page _____.
SE, pp. 428–430
RE, pp. 215–216

Complete *the graphic organizer below with three* common bird characteristics. Accept all reasonable responses.



I found this information on page _____.
SE, pp. 429–431
RE, pp. 215–217

Have students infer why well-developed eyesight is important for both flight and survival (to find prey and to avoid running into obstacles that fast-flying birds may quickly approach).

Summarize *how each structure of a bird's body is* adapted for flight. *Complete the chart.*

Adaptations for Flight	
Adaptation	**Description**
Skeleton	bones are almost hollow some bones are joined together, making them stronger large breastbone supports chest muscles needed for flight
Contour feathers	strong and lightweight give birds their shape tail feathers help steer and balance the bird when flying and landing
Wings	attached to strong chest muscles curved on top, flat on bottom to create lift when flapped, provide power to go forward and to stay in the air

Name _____ Date _____

Main Idea — Details

Body Systems

I found this information on page _____.
SE, p. 432
RE, p. 217

Sequence *the steps in a* bird's digestive process *in the flow chart.*

Food is taken into **mouth**

Enters **crop** unchewed; there it **takes on moisture**

Moves to **stomach**, where it is **partially digested**

Moves to **gizzard**, where it is **crushed by small stones**

Travels through **intestines**, where nutrients **are absorbed into bloodstream**

I found this information on page _____.
SE, p. 432
RE, p. 218

Summarize *how birds'* respiratory *and* circulatory systems *provide muscles with sufficient oxygen.*

Respiratory System	Circulatory System
Inhaled air passes into air sacs.	Heart is large compared to body.
When bird exhales, air passes from air sacs to lungs.	Heart beats rapidly.
Air enters lungs when both inhaling and exhaling.	Blood carrying oxygen is kept separate from blood carrying carbon dioxide.

The Importance of Birds

I found this information on page _____.
SE, p. 433
RE, p. 218

Summarize *three ways birds* positively affect human life.

1. Provide a source of food
2. Control pests
3. Pollinate flowers

Synthesize It

List at least three products used in homes that come from birds.

Accept all reasonable responses. Eggs, meat; feathers for pillows; down for parkas and comforters

Name _____ Date _____

Birds and Mammals

Section 2 Mammals

Skim *Section 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the section.*

1. How do the main types of mammals differ? Accept all reasonable responses.
2. Where do monotremes live?
3. What does "placental" mean?

Review Vocabulary

Define gland *using your book or a dictionary.*

gland — cell or group of cells that releases fluid

New Vocabulary

Use your book to define the following terms.

mammary gland — gland of a mammal; in females, produces milk to feed their young

gestation period — period during which an embryo develops in the uterus; the length of time varies among species

umbilical cord — connects the embryo to the placenta; moves food and oxygen from the placenta to the embryo and removes the embryo's waste products

carnivore — animal that eats only other animals or the remains of other animals

herbivore — animal that eats only plants or parts of plants

omnivore — animal that eats plants and animals or animal flesh

Academic Vocabulary

Use a dictionary to define attach *to reflect its scientific meaning.*

attach — to connect

Name _____ Date _____

Main Idea

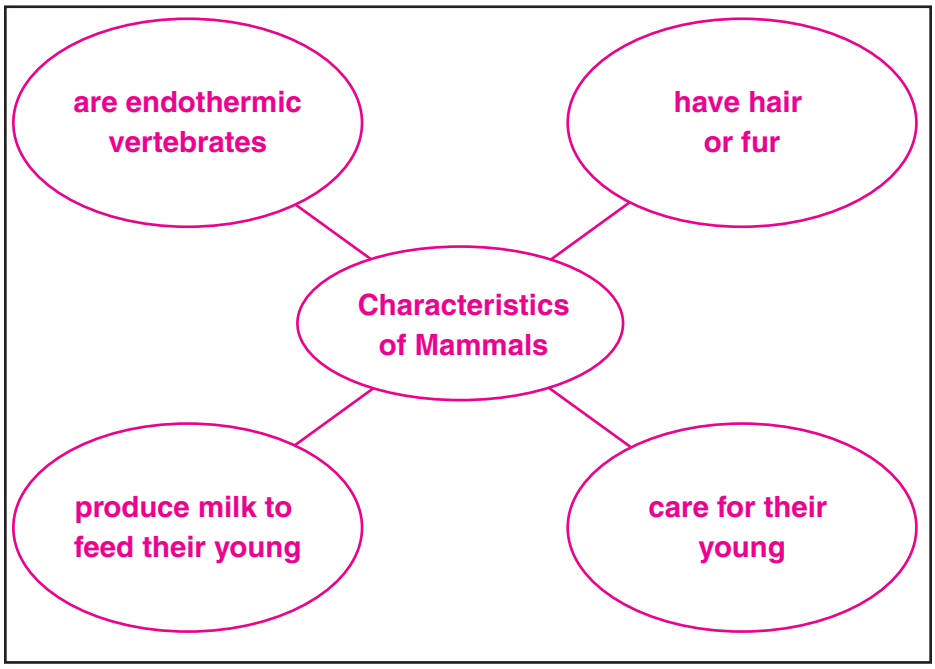
Details

Characteristics of Mammals

I found this information on page _____.

SE, p. 436
RE, p. 220

Create *a graphic organizer to identify at least four characteristics of mammals.* Accept all reasonable responses.



Body Systems

I found this information on page _____.

SE, p. 438
RE, pp. 222–223

Summarize mammal body systems. *Write two facts for each.*

Mammal Body Systems	
System	**Description**
Circulatory	four-chambered heart oxygen-filled blood travels through blood vessels
Respiratory	lungs made up of millions of air sacs sacs allow greater exchange of oxygen and carbon dioxide
Nervous	made up of brain, spinal cord, and nerves brains involved in learning and controlling muscles
Digestive	used to digest food vary depending on the kinds of foods the particular mammal eats

Name _____ Date _____

Section 2 Mammals (continued)

Main Idea

Types of Mammals

I found this information on page _____.

SE, pp. 440–441
RE, pp. 222–223

Have students brainstorm additional examples of each type of mammal.

Details

Compare *the 3 types of mammals by completing the chart below.*

Accept all reasonable responses.

Types of Mammals		
Type	**How Bear Young**	**Example**
Monotremes	lay eggs with leathery shells	platypus
Marsupials	give birth to immature young that usually crawl into pouch on female's abdomen	kangaroo
Placentals	an embryo completely develops inside the female's uterus	human

Importance of Mammals

I found this information on page _____.

SE, p. 444
RE, p. 223

Complete *the outline below.*

A. Mammals help keep balance in the ecosystem

1. Carnivores, like tigers, help control populations of other animals.
2. Bats help pollinate flowers and control insects.

B. Some mammals are in danger

1. Many of their habitats are being destroyed by housing, roads, and shopping centers.
2. Many mammals are left without food, shelter, and space to survive.

Connect It

A drought kills many of the plants upon which the local herbivores rely upon. Might this affect the local carnivores as well? Explain.

Accept all reasonable responses. Students should recognize that a rise or fall in a population that carnivores rely upon will result in a rise or fall in the population of carnivores.

Name _____ Date _____

Birds and Mammals Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Birds and Mammals	After You Read
• A bird has a crop instead of a stomach.	D SE, p. 432 RE, p. 217
• Wings are important for nonflying birds.	A SE, p. 431 RE, p. 217
• Marsupials are mammals that lay eggs.	D SE, p. 440 RE, p. 222
• Bats help pollinate flowers.	A SE, p. 444 RE, p. 223

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three key facts that you have learned that you did not know before. Accept all reasonable responses.

1. Most birds demonstrate structural and behavioral adaptation for flight. 2. Some birds are sources of food and raw materials. 3. Mammals, including humans, have many characteristics in common.

Name _____ Date _____

Animal Behavior

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Animal Behavior
	• A bird must learn how to build a nest.
	• A gosling follows the first moving object it sees after hatching.
	• Some animals may show submissive behavior to prevent another animal from attacking.
	• Many animals move to new locations when the seasons change.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

What behaviors might an animal use to signal that a territory is occupied?

Animals may call, sing, leave scent marks, or display to other animals to indicate the territory is occupied.

Name _____ Date _____

Animal Behavior

Section 1 Types of Behavior

Skim *the* What You'll Learn *statements in Section 1. Predict three topics that you expect will be discussed in this section.* Accept all reasonable responses.

1. examples of innate and learned behavior
2. what reflexes are
3. how imprinting occurs

Review Vocabulary

Define salivate *to show its scientific meaning.*

salivate

to secrete saliva in anticipation of food

New Vocabulary

Read the definitions below. Write the correct vocabulary terms on the blanks in the left column.

behavior	way an organism interacts with other organisms and its environment
innate behavior	behavior that an organism is born with and that does not need to be learned
imprinting	animal's formation of a social attachment to another organism during a specific period following birth or hatching
conditioning	modifying behavior so that a response to one stimulus becomes associated with a different stimulus
insight	form of reasoning that allows animals to use past experiences to solve new problems

Academic Vocabulary

Use a dictionary to define internal *to show its scientific meaning.*

internal

of or on the inside

Name _____ Date _____

Section 1 Types of Behavior (continued)

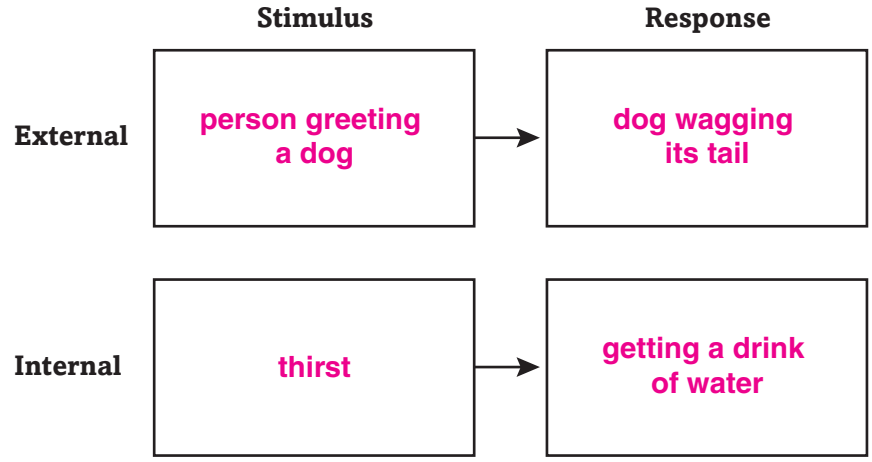
Main Idea | **Details**

Behavior

I found this information on page _____.

SE, p. 456
RE, p. 225

Complete *the flow charts with examples of* internal *and* external stimuli and responses.



Innate Behavior

I found this information on page _____.

SE, pp. 457–458
RE, pp. 225–226

Identify *two types of* innate behavior. *Define them and provide at least two examples of each.*

Innate Behaviors		
Type of Behavior	What It Is	Examples
Reflex	automatic response that does not involve a message from the brain	sneezing, shivering, yawning, jerking hand away from a hot surface, blinking eyes
Instinct	complex pattern of innate behavior	spider spinning a web

Name _____ **Date** _____

Section 1 Types of Behavior (continued)

Main Idea	Details

Learned Behavior

I found this information on page _____.
SE, p. 458
RE, p. 226

Analyze *the importance of* learned behavior *for animals.*

Learned behaviors help animals respond to changing situations. Animals that can learn are more likely to survive than those that cannot. Learned behavior is most commonly found in animals with long life spans.

I found this information on page _____.
SE, pp. 459–461
RE, pp. 227–228

Have students identify and discuss specific examples of each type of learned behavior.

Summarize *four ways behaviors are learned.*

Behavior Name: Imprinting Example: gosling follows first moving object it sees	Behavior Description: An animal forms a social attachment within a short time after birth or hatching.
Behavior Name: Trial-and-error Example: learning to tie shoes	Behavior Description: Behavior changes with experience.
Behavior Name: Conditioning Example: Pavlov's dogs salivating at the sound of a bell	Behavior Description: Behavior changes to link the response to one stimulus to a different stimulus.
Behavior Name: Insight Example: chimpanzee stacking boxes to reach bananas	Behavior Description: An animal uses past experiences to solve new problems.

Connect It

Moths move toward light. Cockroaches move away from it. What type of behavior is this? Would these animals be able to change this behavior?

Accept all reasonable responses. It is instinct. No, they can't change this behavior because these animals do not have complex enough brains to learn a new behavior.

Name _____ Date _____

Animal Behavior

Section 2 Behavioral Interactions

Scan *Section 2 by reading the headings and examining the illustrations. Then write three questions that you hope to answer as you read the section. Look for the answers as you read.*

Accept all reasonable responses.

1. What is social behavior?
2. Which animals show territorial behavior?
3. What is chemical communication?

Review Vocabulary

Define nectar *to show its scientific meaning.*

nectar

sweet liquid produced in a plant's flower that is the main raw material of honey

New Vocabulary

Use your book to define the following terms. Then use each term in a sentence.

pheromone

powerful chemical produced by an animal to influence the behavior of another animal of the same species; Sample sentence: Insects use pheromones to signal each other.

cyclic behavior

behavior that occurs in repeated patterns; Sample sentence: Hibernation during the winter is a cyclic behavior.

migration

instinctive seasonal movement of animals to find food or to reproduce in better conditions; Sample sentence: Birds flying south for the winter is an example of migration.

Academic Vocabulary

Define dominate *to show its scientific meaning.*

dominate

to control or rule

Name _____ Date _____

Section 2 Behavioral Interactions (continued)

Main Idea | **Details**

Instinctive Behavior Patterns

I found this information on page _____.
SE, p. 462; RE, p. 230

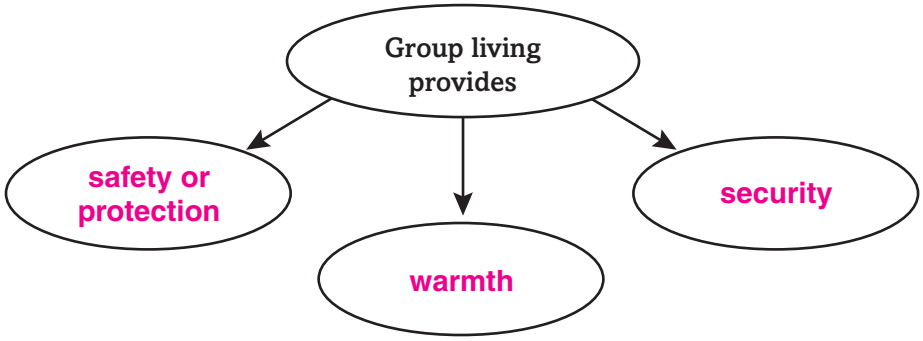
Identify *two* instinctive ritual animal behaviors.

1. courtship
2. mating

Social Behavior

I found this information on page _____.
SE, p. 462
RE, p. 230

Identify *three advantages for animals living in groups.*



I found this information on page _____.
SE, p. 463
RE, p. 231

Summarize *the key features of a* society *in the paragraph below.*

A society is a group of animals of the same species living together in an organized way. Members of societies have specific roles. In societies that are organized by dominance, the top animal controls the other members of the society.

Territorial Behavior

I found this information on page _____.
SE, pp. 463–464
RE, p. 231

Organize *information about* territorial behavior. *Identify how animals mark their territories and why and how they defend them.*

Animal Territories

Identified by:	Why defended:	How defended:
making sounds, leaving scent marks, or attacking other members of the same species	contain food, shelter, and possible mates; instinctive behavior that improves offspring's survival rate	showing aggression to dominate or control another animal

Name _____ Date _____

Section 2 Behavioral Interactions (continued)

Main Idea | **Details**

Communication

I found this information on page _____.
SE, pp. 464–468
RE, pp. 232–233

Encourage students to describe examples of animal communication that they have seen in pets or other animals.

Classify *types of* animal communication. *Complete the table below.*

Type of Communication	What It Is	Example
Courtship behavior	behaviors that allow males and females of a species to recognize and mate with each other	**bird of paradise spreading its tail feathers and strutting**
Chemical communication	**pheromones influence members of the same species; used to mark territory, warn of danger, and attract mates**	**ants leaving trails; dogs urinating on plants and objects**
Sound communication	Animals make sounds to communicate with other animals of the same species.	**crickets rubbing forewings together to make a chirping sound**
Light communication	**bioluminescence gives off light to communicate with other organisms**	firefly giving off a flash of light to attract a mate

Cyclic Behavior

I found this information on page _____.
SE, pp. 468–469
RE, p. 233

Define *each of the following* cyclic behaviors.

circadian rhythm: **24-hour cycle of sleeping and wakefulness**

hibernation: **inactivity during cold temperatures and in response to a limited food supply**

estivation: **reduced activity during a period of heat, lack of food, or drought**

Name _____ **Date** _____

Animal Behavior Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Animal Behavior	After You Read
• A bird must learn how to build a nest.	D SE, p. 457 RE, p. 225
• A gosling follows the first moving object it sees after hatching.	A SE, p. 459 RE, p. 227
• Some animals may show submissive behavior to prevent another animal from attacking.	A SE, p. 463 RE, p. 231
• Many animals move to new locations when the seasons change.	A SE, p. 469 RE, p. 233

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
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- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about animal behavior.

Accept all reasonable responses. 1. Animals can have both innate and learned behaviors.

2. Animals communicate by using chemicals as well as sound and light. 3. Animals can learn through imprinting, conditioning, trial and error, and insight.

Name _____ Date _____

Structure and Movement

Before You Read

Preview the chapter title, section titles, and section headings. Complete the first two columns of the chart by listing at least two ideas for each section in each column.

K What I know	W What I want to find out

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Imagine that your body did not have a support system. Describe how you might perform your daily activities.

Student responses will vary, but may be creative. It would be impossible for humans to exist without structure and movement.

Name _____ Date _____

Structure and Movement

Section 1 The Skeletal System

Skim *the headings in Section 1. Write three questions that come to mind about bones and joints.* Accept all reasonable responses.

1. Why are bones an important part of the body?
2. How is cartilage different from bone?
3. How do joints help the body move?

Review Vocabulary

Define skeleton *to show its scientific meaning.*

skeleton

framework of living bones that supports the body

New Vocabulary

Write the correct vocabulary word next to each definition.

cartilage	smooth, slippery, thick layer of tissue that covers the ends of bones
ligament	tough band of tissue that holds bones together at joints
periosteum	tough, tight-fitting membrane that covers a living bone's surface
skeletal system	all of the bones in the body
joint	place where two or more bones come together

Academic Vocabulary

Use a dictionary to define **transfer** *as a verb.*

transfer

to convey or transport from one place to another

Name _____ Date _____

Section 1 The Skeletal System (continued)

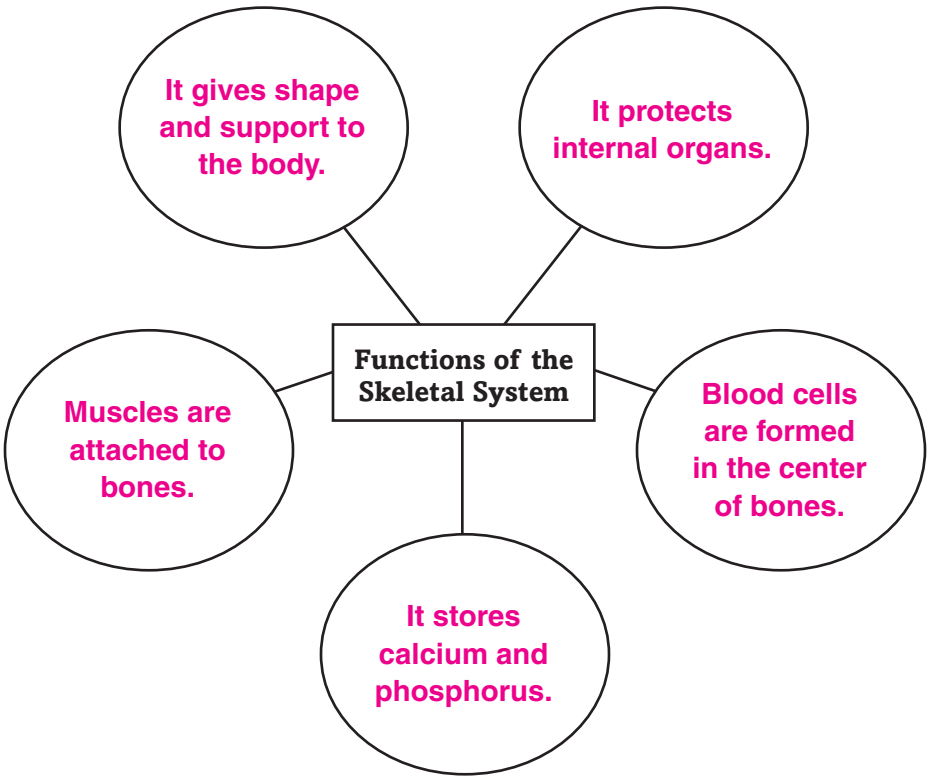
Main Idea	Details

Living Bones

I found this information on page _____.

SE, p. 484
RE, p. 235

Organize *information about the functions of the* skeletal system. *Complete the concept web.*



Bone Structure

I found this information on page _____.

SE, pp. 485–486
RE, pp. 236–237

Summarize *the functions of the following five parts of a bone.*

Periosteum: The periosteum has blood vessels to carry nutrients, cells for growth and repair of bone, and nerves that signal pain.

Compact bone: This bone tissue gives bone strength and makes it hard.

Spongy bone: This tissue makes bones lightweight and holds the marrow cavities.

Marrow cavity: The marrow cavity holds yellow marrow, made up of fat cells, and red marrow, which produces red blood cells.

Cartilage: Cartilage protects joints, absorbs shock, and reduces friction between bones.

Name _____ Date _____

Main Idea

Details

Bone Formation

I found this information on page _____.
SE, p. 486
RE, p. 237

Sequence *the steps of* bone formation.

1. Before birth, the skeleton is made of cartilage.
2. Over time, the cartilage is replaced by bone.
3. Osteoblasts deposit calcium and phosphorus in bones, making them hard.

Joints

I found this information on page _____.
SE, pp. 487–489
RE, pp. 237–238

Classify *the five types of* joints. *Describe and give an example of each.* Accept all reasonable examples.

Type	Description	Example
Immovable	allows little or no movement	joints in the skull
Pivot	one bone rotates in a ring of another bone that does not move	arm
Ball-and-socket	a bone with a rounded end fits into a cuplike cavity on another bone	shoulders
Hinge	back-and-forth movement like that of door hinges	elbows, knees
Gliding	one part of a bone slides over another bone	wrists, ankles

I found this information on page _____.
SE, p. 489
RE, p. 238

Analyze *the role of* cartilage *in bone movement and what happens if bones cannot move smoothly.*

Cartilage allows bones to move more easily by reducing friction. If bones cannot move smoothly, conditions such as arthritis can develop.

Synthesize It

Suppose that the joints in your shoulders were hinge joints. Evaluate how this would change your daily life.

Accept all reasonable responses. Ball-and-socket joints provide a greater range of motion. Hinge jointswould reduce the range of motion available in the shoulders.

Name _____ Date _____

Structure and Movement

Section 2 The Muscular System

Predict *three topics that will be covered in Section 2. Read the section headings, and look at the illustrations to help you make your predictions.* **Accept all reasonable responses.**

1. how the human body moves
2. what the different types of muscle tissue are
3. how muscles work

Review Vocabulary

Define bone *to show its scientific meaning.*

bone

dense, calcified tissue of the skeleton that is moved by muscles

New Vocabulary

Write the correct vocabulary term next to each definition.

cardiac muscle	involuntary striated muscle found only in the heart
voluntary muscle	muscle that can be consciously controlled
skeletal muscle	muscle that moves bones
involuntary muscle	muscle that cannot be consciously controlled
tendon	thick band of tissue that attaches muscles to bones
muscle	organ that can relax, contract, and provide the force to move bones and body parts
smooth muscle	involuntary, nonstriated muscle found in intestines, bladder, blood vessels, and other organs

Academic Vocabulary

Define **flexible** *as an adjective.*

flexible

able to bend or flex

Name _____ Date _____

Section 2 The Muscular System (continued)

Main Idea

Movement of the Human Body

I found this information on page _____.

SE, p. 490
RE, p. 240

Details

Summarize *the role of* muscles *in the body.*

Muscles make all movements possible. They provide the force to move body parts.

Contrast voluntary *and* involuntary muscles. *Complete the chart.*

Muscle Type	Consciously controlled	Examples
Voluntary	yes	muscles in face, hands, arms, and legs
Involuntary	no	muscles that pump blood and move food through the digestive system

Your Body's Simple Machines—Levers

I found this information on page _____.

SE, p. 491
RE, pp. 240–241

Encourage students to work in pairs to draw the types of levers. Provide models that students can use to see how each class of lever moves its load.

Model *the types of levers found in the human body.*

- Draw each type of lever, and label the fulcrum, load, and direction of force.
- Give an example of where the lever is located in the body.

First-class lever

Drawings should resemble the one in the text.

Example: neck and head

Second-class lever

Drawings should resemble the one in the text.

Example: foot and ankle

Third-class lever

Drawings should resemble the one in the text.

Example: shoulder and elbow

Name _____ Date _____

Section 2 The Muscular System (continued)

Main Idea	Details

Classification of Muscle Tissue

I found this information on page _____.
SE, p. 493
RE, p. 241

Compare and contrast *the three types of* muscle tissue.

Type of Muscle	Voluntary or Involuntary	Where Found in the Body
Skeletal muscle	voluntary	attached to bones throughout the body
Cardiac muscle	involuntary	heart
Smooth muscle	involuntary	intestines, bladder, blood vessels, and other internal organs

Working Muscles

I found this information on page _____.
SE, p. 494
RE, p. 242

Summarize *how muscles work in pairs.*

When one muscle of a pair contracts, the other relaxes. Muscles always pull and never push.

I found this information on page _____.
SE, p. 495
RE, p. 242

Sequence *how muscles are fueled by filling in the missing words.*

Blood carries energy-rich molecules to your muscle cells. When your muscles contract, chemical energy from these molecules is converted to mechanical energy and thermal energy. When the supply of energy-rich molecules in the muscle is used up, the muscle becomes tired. As the muscle rests, blood brings more energy-rich molecules to your muscle cells.

Connect It

Suppose a woman began riding her bike more regularly instead of watching TV. Evaluate what kinds of changes in her leg muscles she might start seeing. Explain why this occurs. Accept all reasonable responses.

Her leg muscles will get larger. As she uses her leg muscles to ride her bike, the muscle cells get larger. Also, she gains new muscle cells.

Name _____ Date _____

Structure and Movement

Section 3 The Skin

Preview *the* What You'll Learn *statements for Section 3. Predict three topics that you will study in this section.* Accept all reasonable responses.

1. the difference between the dermis and epidermis
2. what the skin's functions are
3. how the skin protects the body and heals itself

Review Vocabulary

vitamin

Define vitamin *to show its scientific meaning.*

inorganic nutrient needed by the body in small quantities for growth, disease prevention, and/or regulation of body functions

New Vocabulary

Define each vocabulary term.

epidermis

outer, thinnest layer of the skin

melanin

pigment that protects the skin and gives it color

dermis

layer of cells directly below the epidermis

Academic Vocabulary

Use a dictionary to define layer *as a noun. Then find a sentence in Section 3 that uses the term.*

layer

one thickness of something; Sample sentence: Skin is made up of three layers of tissue—the epidermis, the dermis, and a fatty layer.

Name _____ Date _____

Main Idea

Your Largest Organ and Skin Structures

I found this information on page _____.

SE, pp. 496–497
RE, pp. 244–245

Details

Create *a cross-section drawing of the* skin. *Label the following structures.*

- blood vessels
- dermis
- epidermis
- fatty layer
- hairs
- hair follicles
- nerve endings
- oil glands
- sweat gland
- sweat pore

Drawings should resemble the one in the text.

Write *captions summarizing key facts about the* dermis *and* epidermis.

Dermis: The dermis is the layer of cells directly below the epidermis. It contains many blood vessels, nerves, muscles, oil glands, and sweat glands.

Epidermis: The epidermis is the thinnest layer of the skin. Its outermost cells are dead. New cells are made to replace the dead cells.

I found this information on page _____.

SE, p. 497
RE, p. 245

Analyze *the role of* melanin *in the body.*

Melanin protects the skin and gives it color. When the skin is exposed to ultraviolet rays, more melanin is made. This makes the skin darker. The lighter a person's normal skin color, the less protection that person's skin has from the Sun.

Name _____ Date _____

Section 3 The Skin (continued)

Main Idea

Details

Skin Functions

I found this information on page _____.
SE, pp. 497–498
RE, pp. 245–246

Distinguish *the five primary functions of the skin.*

1. protection
2. sensory response
3. formation of vitamin D
4. control of body temperature
5. ridding the body of wastes

Skin Injuries and Repair

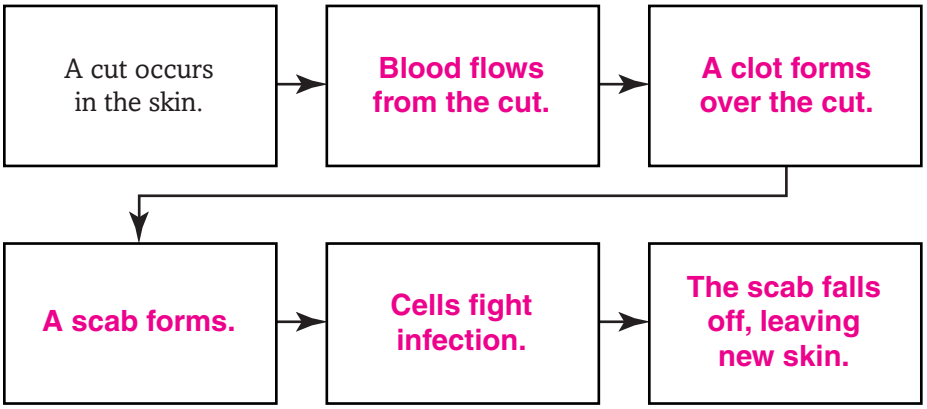
I found this information on page _____.
SE, pp. 499–500
RE, p. 247

Summarize *how bruises form.*

A bruise forms after blood vessels under the skin burst. The cells break down and release hemoglobin, which breaks down into pigments.

I found this information on page _____.
SE, p. 499
RE, p. 247

Sequence *the steps as a cut heals.*



Connect It

Analyze why people with severe burns or other damage to large areas of their skin are especially vulnerable to infections. Explain how skin grafts help prevent infections. Accept all reasonable responses.

The skin of burn patients is too damaged to protect the body from bacteria. This increases the risk of infections. Skin grafts cover the body and prevent bacteria from entering.

Name _____ Date _____

Tie It Together

Structure and Movement

Design a model that shows how the skeletal and muscular systems work together to allow you to bend your elbow. Present your model to the class and explain how it works.

Models should include a rigid framework for the bones in the arm, a representation of muscles in the arm that work in pairs to bend and extend the elbow joint, and a hinge joint to represent the elbow.

Name _____ Date _____

Structure and Movement

Chapter Wrap-Up

Review the ideas you listed in the chart at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the chart by filling in the third column. How do your ideas now compare with those you provided at the beginning of the chapter?

K What I know	W What I want to find out	L What I learned
		Accept all reasonable responses.

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

What are the three most important ideas in this chapter?

Accept all reasonable responses. 1. The skeleton supports the body and allows it to move. 2. Muscles always pull, never push, and they work in pairs. 3. Skin is the largest organ in the body.

Name _____ Date _____

Nutrients and Digestion

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Nutrients and Digestion
	• All foods provide the body with the same amount of energy.
	• What you eat does not affect your health.
	• Sixty percent of your body weight is made up of water.
	• There are bacteria in your digestive tract that make vitamins needed for health.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Make a list of all the organs you think are part of your digestive system.

Student responses should include some or all of the following: mouth, esophagus, stomach, small intestine, large intestine, rectum, and anus.

Name _____ Date _____

Nutrients and Digestion

Section 1 Nutrition

Skim *the headings in Section 1 of this chapter. Write three questions that come to mind.* Accept all reasonable responses.

1. How does each class of nutrients differ from the others?
2. How is each type of nutrient important?
3. What types of food are in each food group?

Review Vocabulary

Define molecule *to show its scientific meaning.*

molecule

the smallest particle of a substance that retains the properties of the substance and is composed of one or more atoms

New Vocabulary

Accept all reasonable responses.

Write a sentence that contains both words in each pair.

nutrient/food group

Eating foods from all five of the food groups provides you with the nutrients you need to be healthy.

protein/amino acid

Proteins are made of amino acids.

carbohydrate/fat

Carbohydrates and fats provide sources of energy for the body.

vitamin/mineral

It is important that your diet contains the vitamins and minerals you need to stay healthy.

Academic Vocabulary

Use a dictionary to define energy *to show its scientific meaning.*

energy

capacity to perform some type of work or activity

Name _____ Date _____

Section 1 Nutrition (continued)

Main Idea

Details

Why do you eat?

I found this information on page _____.

SE, p. 512
RE, p. 249

Define calorie *by completing the statement below.*

Calorie: the amount of heat necessary to raise the temperature of 1 kg of water 1°C.

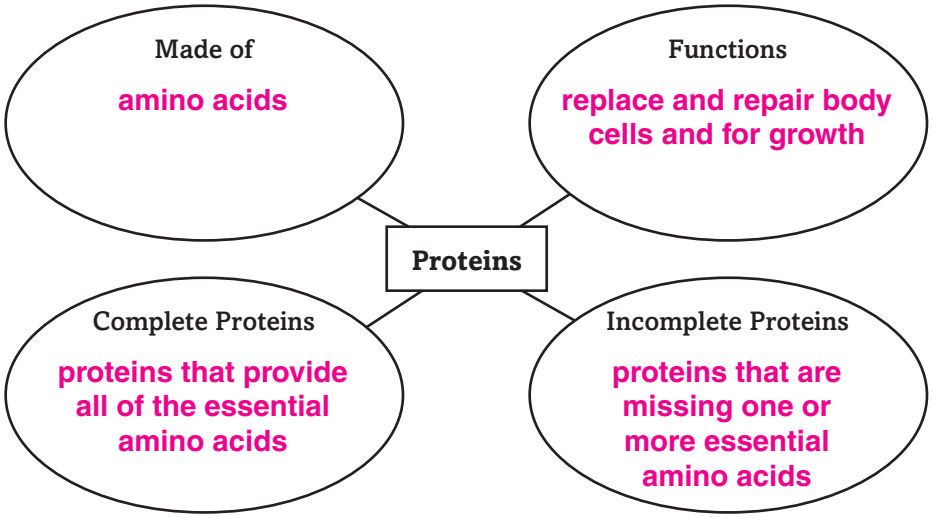
Classes of Nutrients

I found this information on page _____.

SE, p. 513
RE, p. 249

Have students work in pairs to find the most important information about proteins.

Complete *the graphic organizer with key information about* proteins.



I found this information on page _____.

SE, pp. 514–515
RE, pp. 250–251

Compare carbohydrates *and* fats *by completing the chart.*

	Carbohydrates	Fats
Main function(s)	main source of energy for the body	supply energy; help the body absorb vitamins; cushion internal organs
Groups	simple	unsaturated
	complex	saturated
Examples	sugar, starch, fiber	vegetable oils, fats found in meat and animal products

Name _____ **Date** _____

Section 1 Nutrition (continued)

Main Idea | **Details**

I found this information on page _____.
SE, pp. 516–517
RE, pp. 251–252

Classify vitamins *by completing the chart.*

Vitamin	Soluble in	Most Beneficial to
A	fat	eyes and skin
B	water	nervous system and red blood cells
C	water	bones and teeth
D	fat	bones and teeth
E	fat	cell membranes
K	fat	blood

I found this information on page _____.
SE, p. 519
RE, p. 252

Summarize *why* water *is an important nutrient.*

Cell functions require water. Also, many nutrients need to be dissolved in water before your body can use them.

Food Groups

I found this information on page _____.
SE, pp. 520–521
RE, pp. 253–254

Model serving size *for different food categories.*

Group	Servings per Day	Serving Size
bread and cereal	6–11 servings	1 slice of bread 1 oz. ready-to-eat cereal
fruits	2–4 servings	1 medium apple, orange, or banana
vegetables	3–5 servings	1 cup raw vegetables $\frac{1}{2}$ cup cooked or chopped
milk	2–3 servings	1 cup of milk or yogurt
meat, poultry, fish, beans, eggs	2–3 servings	2 oz. of meat, fish, poultry 1 egg

Connect It

What is the purpose of the food pyramid?

Accept all reasonable responses. Its shape helps people to select the foods they need every day for essential nutrients. Those foods that you need a lot of form the base of the pyramid. Those foods that you need only a little of form the upper levels.

Name _____ Date _____

Nutrients and Digestion

Section 2 The Digestive System

Preview *Section 2 by restating the* What You'll Learn *statements as questions. Answer each question as you study.* Accept all reasonable responses.

1. What are the differences between mechanical digestion and chemical digestion?
2. What are the organs of the digestive system, and what takes place in each organ?
3. How is homeostasis maintained during digestion?

Review Vocabulary

bacteria

Define bacteria *to show its scientific meaning.*

one-celled organisms without membrane-bound organelles

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank in the left column.

digestion	process that breaks down food into small molecules
mechanical digestion	breakdown of food through chewing, mixing, and churning
chemical digestion	occurs when chemical reactions break down large molecules of food into smaller ones
enzyme	protein that speeds up chemical reactions in the body
peristalsis	muscular contractions that move food through the digestive tract
chyme	watery liquid released by the stomach to the small intestine
villi	fingerlike projections covering the wall of the small intestine

Academic Vocabulary

area

Use a dictionary to define area *to show its scientific meaning.*

amount or extent of a surface

Name _____ Date _____

Section 2 The Digestive System (continued)

Main Idea

Details

Functions of the Digestive System

I found this information on page _____.

SE, p. 523
RE, p. 256

Identify *the four stages of processing food that occur in the human body.*

1. ingestion
2. digestion
3. absorption
4. elimination

Enzymes

I found this information on page _____.

SE, p. 524
RE, p. 257

Organize *information about* digestive enzymes.

Enzyme	Role in digestion
Amylase	breaks down complex carbohydrates into simpler carbohydrates
Pepsin	helps break down proteins
Pancreatic enzymes	some continue process of breaking down starches; some break down fats into fatty acids; others help break down proteins

Organs of the Digestive System

I found this information on page _____.

SE, pp. 525–529
RE, pp. 257–259

Draw *and label the parts of the* human digestive system.

- Color the organs through which food passes one color.
- Color the accessory organs another color. Include the: tongue, mouth, rectum, small intestine, pancreas, anus, stomach, gallbladder, liver, large intestine, esophagus, *and* salivary glands.

Drawings should show a labeled diagram of the digestive system. The mouth, esophagus, stomach, small intestine, large intestine, rectum, and anus should be colored one color. The rest of the labeled structures should be a different color.

Name _____ Date _____

Section 2 The Digestive System (continued)

Main Idea

I found this information on page _____.
SE, pp. 526–529
RE, pp. 257–259

Have students work in pairs to organize the details of what happens to food in each digestive organ.

Details

Organize *information about what happens in the* **digestive tract.**

- List the sections of the digestive tract in the first column.
- Place a checkmark in the appropriate columns showing what occurs in each section.

Section of Digestive Tract	What Occurs		
	Mechanical Digestion	Chemical Digestion	Absorption
Mouth	✔	✔	
Esophagus			
Stomach	✔	✔	
Small intestine		✔	✔
Large intestine			✔

Bacteria Are Important

I found this information on page _____.
SE, p. 529
RE, p. 259

Complete *the table on two types of essential vitamins made by bacteria in the digestive tract.*

Vitamin	Function in Body
Vitamin K	blood clotting
B vitamins	important for nervous system and other body functions

Analyze It

Choose one organ of the digestive system and describe its role in digestion. Accept all reasonable responses.

Mechanical and chemical digestion occur in the stomach. Peristalsis mixes food in the stomach. This form of mechanical digestion helps break down food. Acids and enzymes in the stomach chemically digest food. The stomach also produces mucus. It makes the food more slippery. This mucus also protects the stomach. Food exits the stomach as a watery liquid called chyme.

Name _____ Date _____

Nutrients and Digestion Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Nutrients and Digestion	After You Read
• All foods provide the body with the same amount of energy.	D SE, p. 512 RE, p. 249
• What you eat does not affect your health.	D SE, pp. 513–521 RE, pp. 249–254
• Sixty percent of your body weight is made up of water.	A SE, p. 519 RE, p. 253
• There are bacteria in your digestive tract that make vitamins needed for health.	A SE, p. 529 RE, p. 259

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
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- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

List three important ideas in the chapter.

Accept all reasonable responses. 1. Water is an important nutrient. 2. The purpose of digestion is to break down food. 3. Enzymes speed up chemical reactions in the body.

Name _____ Date _____

Circulation

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Circulation
	• The human heart has four chambers.
	• Arteries are blood vessels that carry blood to the heart.
	• Platelets are cell fragments that help fight bacteria and viruses.
	• Lymphatic vessels are like veins in that they have valves.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Infer how the circulatory system provides your body with the nutrients it needs to stay healthy.

Student responses may vary, but may include statements about blood, the heart, and the intestines.

Name _____ Date _____

Circulation

Section 1 The Circulatory System

Scan *Section 1 of your book. Read the headings and look at the illustrations. Predict three things that will be discussed.* Accept all reasonable responses.

1. what happens during a heartbeat
2. the functions of arteries, capillaries, and veins
3. blood pressure and cardiovascular diseases

Review Vocabulary

Define heart *using your book or a dictionary.*

heart

organ that circulates blood through the body continuously

New Vocabulary

Read the definitions below. Write the correct vocabulary terms on the blanks in the left column.

atrium	two upper chambers of the heart that contract at the same time
ventricle	two lower chambers of the heart that contract at the same time
coronary circulation	flow of blood to and from the tissues of the heart
pulmonary circulation	flow of blood through the heart to the lungs and back to the heart
systemic circulation	flow of blood from the heart to all of the organs and body tissues, except the heart and lungs, with oxygen-poor blood returning to the heart
artery	blood vessel that carries blood away from the heart
vein	blood vessel that carries blood back to the heart
capillary	microscopic blood vessel that connects arteries and veins

Academic Vocabulary

Use a dictionary to define **transport** *as it would be used in science.*

transport

to carry from one place to another; the act, process, or means of transporting

Name _____ Date _____

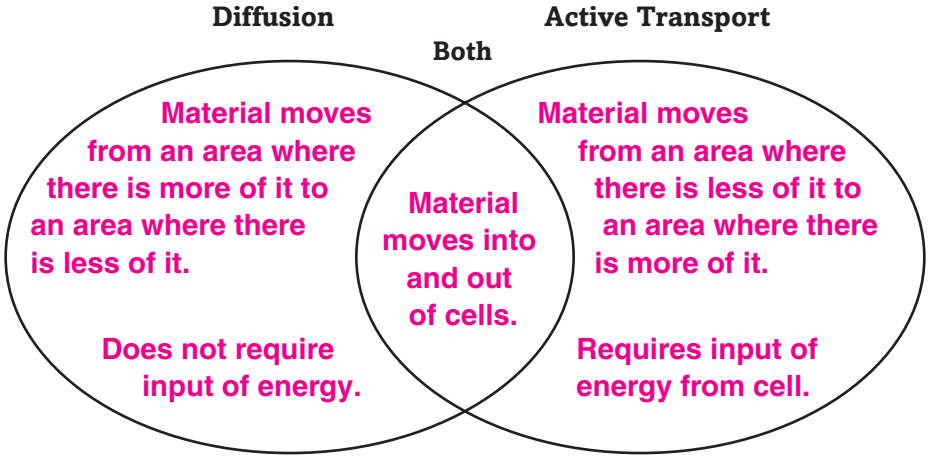
Section 1 The Circulatory System (continued)

Main Idea | **Details**

How Materials Move Through the Body

I found this information on page _____.
SE, p. 540
RE, p. 261

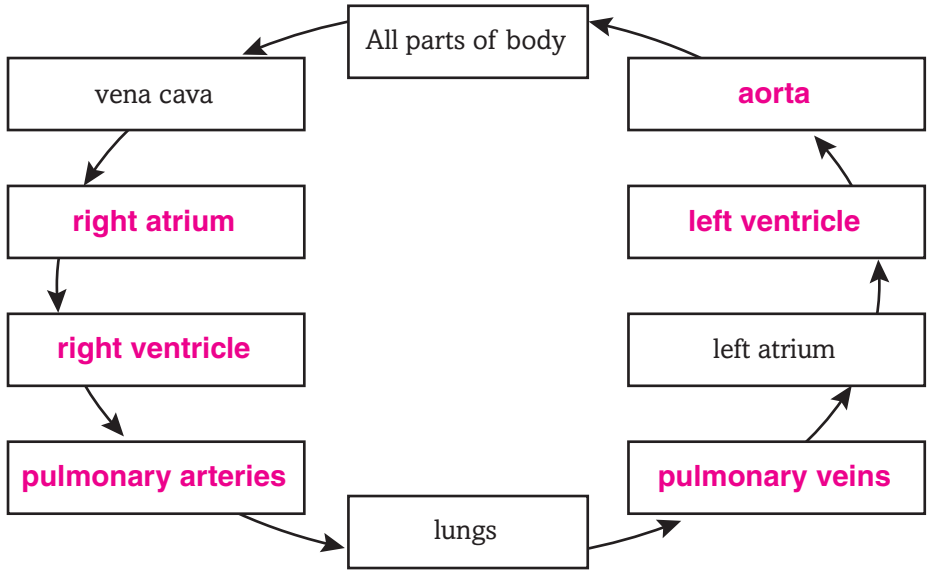
Compare and contrast diffusion *and* active transport *by completing the Venn diagram with at least five facts.*



The Heart

I found this information on page _____.
SE, pp. 541–543
RE, pp. 261–263

Sequence *the stages in* pulmonary circulation *by completing the flow diagram. Include* aorta, pulmonary veins, pulmonary arteries, right atrium, left atrium, *and* right ventricle.



I found this information on page _____.
SE, p. 545
RE, p. 264

Summarize *the exchange that occurs between a* systemic capillary *and the* tissue cells *it serves.*

The blood flowing through the capillary delivers nutrients and oxygen to the tissue cells. These are exchanged for carbon dioxide and wastes which are removed from the tissue cells.

Name _____ Date _____

Section 1 The Circulatory System (continued)

Main Idea

Details

Blood Vessels

I found this information on page _____.
SE, pp. 544–545
RE, pp. 263–264

Classify blood vessels *by completing the chart.* Accept all reasonable responses.

Blood Vessels		
Type	**Function**	**Description**
Arteries	carry blood away from the heart	have thick, elastic walls
Capillaries	connect arteries and veins; deliver nutrients and oxygen to cells and remove wastes	microscopic
Veins	carry blood back to the heart	contain one-way valves that keep blood moving toward the heart

Blood Pressure

I found this information on page _____.
SE, p. 545
RE, p. 264

Define blood pressure *and the two numbers used to measure it.*

Blood pressure is the force of blood on the walls of vessels.

First number measures pressure when ventricles contract and blood is pushed out of the heart.

Second number measures pressure when ventricles fill with blood again.

CONNECT IT

A doctor may advise a patient to make lifestyle changes to help prevent cardiovascular disease. Identify several healthful habits the doctor might suggest. Accept all reasonable responses.

Get more exercise, lose weight, stop smoking, switch to a healthier diet.

Name _____ Date _____

Circulation

Section 2 Blood

Skim *Section 2 of your book. Write three questions that come to mind. Look for answers to your questions as you read the section.*

Accept all reasonable questions.

1. What is plasma?
2. How does blood clot?
3. What do blood types have to do with transfusions?

Review Vocabulary

blood vessels

Define blood vessels *using your book or a dictionary.*

structures that include arteries, veins, and capillaries, which transport blood

New Vocabulary

Use your book or a dictionary to define the following terms.

platelet

irregularly shaped cell fragment that helps clot blood

plasma

liquid part of blood, which is mostly water; contains nutrients, minerals, oxygen being transported to cells, and wastes from cells

hemoglobin

type of molecule in red blood cells that can carry oxygen and carbon dioxide; contains iron, which gives blood its red color

Academic Vocabulary

series

Use a dictionary to define series *as it would be used in science.*

a number of similar things coming one after another

Name _____ **Date** _____

Section 2 Blood (continued)

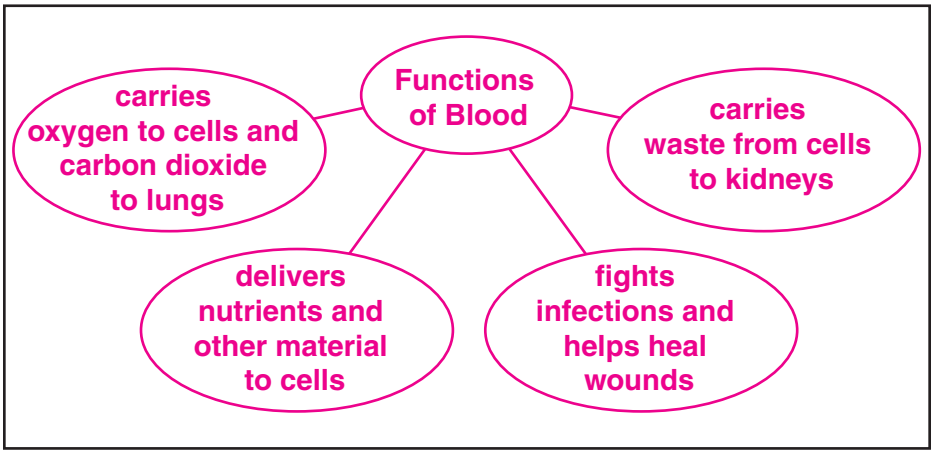
Main Idea

Details

Functions of Blood

I found this information on page _____.
SE, p. 550
RE, p. 267

Create *a graphic organizer with facts about the* functions of blood.



Parts of Blood

I found this information on page _____.
SE, pp. 550–551
RE, pp. 267–268

This is a good pair-up activity.

Summarize *information about the* parts of blood *in the chart below.*

Parts of Blood	
Part	**Function**
Plasma	carries nutrients, minerals, and oxygen to cells; carries waste from cells
Red blood cells	carry oxygen to cells; carry carbon dioxide to lungs
White blood cells	fight bacteria and viruses within tissues; absorb dead cells
Platelets	help clot blood

Blood Clotting

I found this information on page _____.
SE, p. 552
RE, p. 268

Sequence *the steps in* wound healing *by completing the blanks.*

Platelets stick to the wound and release _clotting factors_. Next, _fibrin_ forms a sticky net. The net traps _blood cells_ and _plasma_ to form a clot. The _clot_ forms a _scab_. Then, _skin cells_ form under the _scab_. Finally, the _scab_ falls off.

Name _____ Date _____

Section 2 Blood (continued)

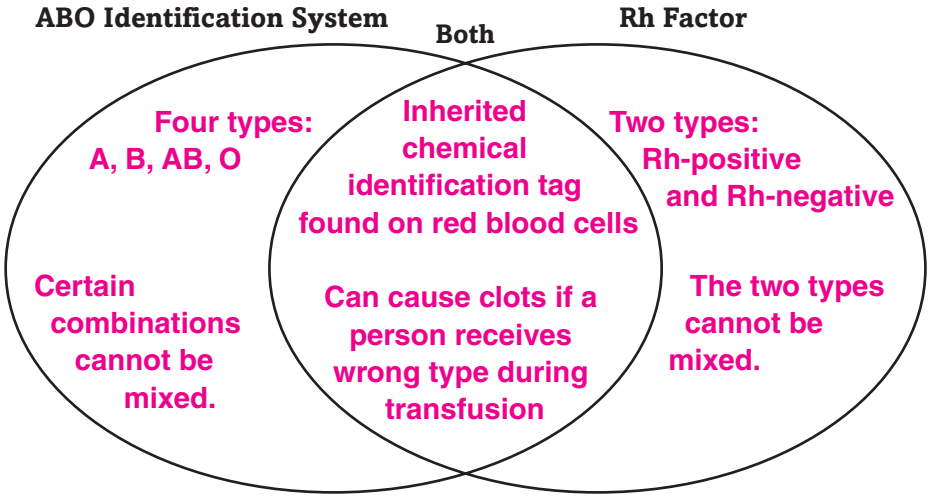
Main Idea

Details

Blood Types

I found this information on page _____.
SE, pp. 553–554
RE, pp. 269–270

Compare and contrast *the 2 sets of* chemical identification tags in blood *by completing the Venn diagram with at least five facts.*



Diseases of Blood

I found this information on page _____.
SE, p. 555
RE, p. 270

Identify *causes and effects of* two diseases of the blood.

	Causes	Effects
Anemia	loss of blood lack of certain vitamins or iron in diet diseases such as sickle-cell anemia	insufficient oxygen to body tissues
Leukemia	excessive numbers of white blood cells	immature cells unable to fight infection well normal blood cells crowded out

Connect It

Almost immediately after being born, a baby received a blood transfusion of Rh+ blood. Predict the mother's Rh factor. Why did the baby need a blood transfusion?

The mother's Rh factor is Rh–. The baby needed a transfusion because it was Rh+. The antibodies passed from the mother would have destroyed the baby's red blood cells without the transfusion.

Name _____ Date _____

Circulation

Section 3 The Lymphatic System

Scan *the* What You'll Learn *statements for Section 3 of your book. Identify three topics that will be discussed.* Accept all reasonable responses.

1. the functions of the lymphatic system
2. where lymph comes from
3. how lymph organs help fight infections

Review Vocabulary

Define smooth muscles *using your book or a dictionary.*

smooth muscles — muscles found in the internal organs and digestive tract

New Vocabulary

Use your book or a dictionary to define each vocabulary term. Then use the term in a sentence that shows its scientific meaning.

lymph — tissue fluid that has diffused into the lymphatic capillaries; Sample sentence: Lymph contains water and other materials.

lymphatic system — system that carries lymph through a network of capillaries and larger lymph vessels; Sample sentence: The lymphatic system has valves that keep lymph from flowing backward.

lymphocyte — type of white blood cell; Sample sentence: Lymphocytes defend the body against disease-causing organisms.

lymph node — bean-shaped organs found throughout the body; Sample sentence: Lymph nodes filter microorganisms and foreign materials that have been attacked by lymphocytes.

Academic Vocabulary

Use a dictionary to define occur *as it would be used in science.*

occur — to take place; to be found

Name _____ Date _____

Section 3 The Lymphatic System (continued)

Main Idea | **Details**

Functions of the Lymphatic System

I found this information on page _____.
SE, p. 556
RE, p. 272

Define tissue fluid *and describe its relationship to the* lymphatic system.

Tissue fluid is the water and other substances found between cells _____.

The **lymphatic system** collects tissue fluid and returns it to the blood. While in the lymphatic system, the fluid is called lymph.

I found this information on page _____.
SE, p. 556
RE, p. 272

Sequence *the stages by which lymph travels through the lymphatic system.*

Tissue fluid enters a network of lymph capillaries.

↓

The lymph capillaries carry lymph to larger lymph vessels.

↓

The lymph vessels drain into large veins near the heart.

I found this information on page _____.
SE, p. 556
RE, p. 272

Summarize *how the* lymphatic system transports lymph. *Discuss the role of smooth muscles and valves.*

Lymph is propelled through the system by the contraction of skeletal muscles and of smooth muscles in lymph vessels. One-way valves in the lymph vessels prevent the lymph from flowing backward.

Name _____ **Date** _____

Section 3 The Lymphatic System (continued)

Main Idea	Details
Lymphatic Organs *I found this information on page* _____. SE, pp. 556–557 RE, p. 273 Encourage students to focus on making clear and logical diagrams rather than beautiful works of art.	**Model** *the* lymphatic system *by drawing it within an outline of the human body. Indicate and label* lymph nodes, lymph vessels, lymphatic duct, thoracic duct, tonsils, thymus, *and* spleen. Diagrams may resemble the one on SE p. 557 or RE p. 273 with correct labels. Accept all reasonable variations.
A Disease of the Lymphatic System *I found this information on page* _____. SE, p. 557 RE, p. 273	**Summarize** *how* HIV *affects the lymphatic system.* Lymph contains lymphocytes, which are white blood cells that make antibodies to fight specific diseases. The HIV virus attacks lymphocytes.

CONNECT IT Analyze why people who have HIV are at higher risk from the flu or pneumonia than people who are HIV-negative? Accept all reasonable responses. Because HIV destroys lymphocytes, people who are HIV-positive may lack the antibodies to fight other diseases. These include diseases that might not place people who are HIV-negative at high risk.

Name _____ **Date** _____

Tie It Together

A Checklist for Health

You know that a healthy lifestyle is important for the health of your cardiovascular system.

- Work with a partner to develop a checklist of daily actions to protect your cardiovascular health.
- List actions that are beneficial and actions that should be avoided.
- Provide concrete examples.
- Then make a poster using your checklist.

Accept all reasonable responses.

Checklists should recommend healthy diets and daily exercise, as well as behaviors to avoid, such as obesity and smoking or exposure to secondhand smoke.

Name _____ Date _____

Circulation Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Circulation	After You Read
• The human heart has four chambers.	A SE, p. 541 RE, p. 261
• Arteries are blood vessels that carry blood to the heart.	D SE, p. 544 RE, p. 264
• Platelets are cell fragments that help fight bacteria and viruses.	D SE, p. 551 RE, p. 268
• Lymphatic vessels are like veins in that they have valves.	A SE, p. 556 RE, p. 272

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

Summarize It

After reading this chapter, identify three main concepts that you have learned about circulation. Accept all reasonable responses.

1. The heart pumps blood throughout the body. 2. Blood carries oxygen and nutrients to cells and carries carbon dioxide and wastes away from cells. 3. The lymphatic system helps the body fight infections.

Name _____ Date _____

Respiration and Excretion

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Respiration and Excretion
	• Breathing is the process in which the body obtains oxygen and releases energy from food.
	• The respiratory system contains structures that allow humans to speak.
	• If wastes are not removed from the body, they can build up and damage organs.
	• The bladder filters wastes from blood.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

How do you think your body adapts to meet your needs while you are playing sports?

Student responses will vary, but may include questions about breathing harder or faster and questions about perspiring.

Name _____ Date _____

Respiration and Excretion

Section 1 The Respiratory System

Skim *the headings of Section 1. Write questions about the respiratory system that you think will be answered in the section.*

1. What are the functions of the respiratory system? Accept all reasonable responses.
2. How do the organs of the respiratory system work together?
3. What are common diseases of the respiratory system?

Review Vocabulary

Define lungs *to show its scientific meaning.*

lungs

saclike respiratory organs that function with the heart to remove carbon dioxide from blood and provide it with oxygen

New Vocabulary

Write four sentences, each containing two of the vocabulary terms. Use each word at least once. Accept all reasonable responses.

pharynx
larynx
trachea
bronchi
alveoli
diaphragm
emphysema
asthma

When you inhale, air passes through the pharynx before the larynx.

As the diaphragm contracts and relaxes, air passes through different respiratory structures, including the lungs and trachea.

Air enters the lungs through the bronchi and eventually makes its way to the alveoli.

Emphysema and asthma are both diseases that affect the respiratory system.

Academic Vocabulary

Use a dictionary to define generate *as a verb.*

generate

to originate or bring into existence

Name _____ Date _____

Section 1 The Respiratory System (continued)

Main Idea | **Details**

Functions of the Respiratory System

I found this information on page _____.
SE, pp. 568–569
RE, pp. 275–276

Classify *each process involved in obtaining, transporting, and using oxygen as* breathing, circulation, *or* respiration.

breathing	Oxygen is supplied to the body.
↓	
circulation	Oxygen is transported to body cells.
↓	
respiration	Body cells use oxygen and release carbon dioxide.
↓	
circulation	Carbon dioxide is transported to lungs.
↓	
breathing	Carbon dioxide waste is expelled.

Organs of the Respiratory System

I found this information on page _____.
SE, pp. 570–571
RE, p. 276

Have students work in pairs to sketch the organs of the respiratory system.

Summarize *respiratory system* structures *and* functions *by completing the chart.*

Structure	Function
Pharynx	food, liquid, and air share this passage after the nose and mouth
Epiglottis	stops food from entering airway
Larynx	directs air through vocal cords
Trachea	provides passageway for air; mucus and cilia in trachea trap dust, bacteria, and pollen
Bronchi	take air into and out of lungs
Alveoli	provide places for oxygen and carbon dioxide to be exchanged between the lungs and the blood

Name _____ **Date** _____

Section 1 The Respiratory System (continued)

Main Idea

Why do you breathe?

I found this information on page _____.

SE, p. 572
RE, p. 278

Details

Model *the processes of* inhaling *and* exhaling *in the boxes below.*

Inhaling	Exhaling
Diaphragm contracts and air is drawn into the lungs.	Diaphragm expands and gases are expelled from the lungs.

Diseases and Disorders of the Respiratory System

I found this information on page _____.

SE, pp. 574–576
RE, pp. 278–280

Summarize *respiratory system diseases and disorders.*

Disease/ Disorder	Description
Respiratory infections	can be caused by bacteria and viruses; include the common cold and pneumonia
Chronic bronchitis	sometimes caused by bacteria; develops when the bronchial tubes are irritated and swell and too much mucus is produced; lasts for a long time
Emphysema	disease in which the alveoli enlarge, causing an enzyme that breaks down alveoli walls to be produced; alveoli do not function well and blood receives less oxygen; causes shortness of breath
Lung cancer	uncontrolled growth of cells in the lungs; can be caused by smoking
Asthma	can cause shortness of breath, wheezing, or coughing; often an allergic reaction

CONNECT IT

Identify respiratory diseases and disorders described in this chapter that are related to smoking. List symptoms of these diseases.

Accept all reasonable responses. Chronic bronchitis, emphysema, lung cancer, and asthma are associated with smoking.

Name _____ Date _____

Respiration and Excretion

Section 2 The Excretory System

Scan *the headings and illustrations in Section 2 to determine three processes that are involved in the urinary system's function.* Accept all reasonable responses.

1. regulation of body fluids
2. filtration in the kidneys
3. urine collection and release

Review Vocabulary

Define blood *to show its scientific meaning.*

blood

tissue that transports oxygen, nutrients, and waste materials throughout your body

New Vocabulary

Write a paragraph using all seven of the new vocabulary terms. Try to use sentences that show the meaning of each term.

urinary system
urine
kidney
nephron
ureter
bladder
urethra

Accept all reasonable responses. The urinary system removes wastes from the blood. The main organs of the urinary system are the kidneys. Special structures inside the kidneys, called nephrons, filter blood. The waste fluid that is left behind after filtration is called urine. Urine flows out of the kidneys and through the ureters to the bladder. It is then released from the bladder and carried by the urethra to the outside of the body.

Academic Vocabulary

Use a dictionary to define remove.

remove

to get rid of

Name _____ **Date** _____

Section 2 The Excretory System (continued)

Main Idea

Functions of the Excretory System

I found this information on page _____.

SE, p. 577
RE, p. 282

The Urinary System

I found this information on page _____.

SE, p. 578
RE, p. 283

Have students refer to their models when completing the sequence exercise on the next page.

Details

Complete *the following statement with the words provided.*

damage illness wastes death toxic

If wastes are not removed from the body, toxic substances build up and damage organs. Serious illness or death may occur.

Model *the* urinary system. *Draw and label the organs of the urinary system.*

Drawings should include the kidneys, renal artery, renal vein, aorta, ureter, bladder, and urethra.

Summarize *how blood is processed in the kidneys. Identify substances that pass through the filter and substances that are left behind. Identify the structures involved in each stage.*

First stage: Water, sugar, salt, and wastes from the blood pass into a cuplike structure in the nephrons. Red blood cells and proteins are left behind in the blood.

Second stage: Liquid in the cuplike structure flows into a narrow tubule. Most of the water, sugar, and salt are reabsorbed and returned to the blood. The liquid left behind flows into the collecting tubules in each kidney.

Name _____ Date _____

Section 2 The Excretory System (continued)

Main Idea

I found this information on page _____.
SE, p. 580
RE, p. 284

Details

Sequence *the structures of the urinary system.*

bladder kidney ureter urethra

1. kidney 2. ureter 3. bladder 4. urethra

Other Organs of Excretion

I found this information on page _____.
SE, p. 581
RE, p. 285

Summarize *other processes of excretion.*

A large amount of liquid waste is lost when exhaling and perspiring. The liver filters the blood and removes or converts some wastes into other substances. For example, hemoglobin from broken-down red blood cells is used to make bile.

Urinary Diseases and Disorders

I found this information on page _____.
SE, p. 581
RE, p. 285

Analyze *the effects of each urinary system problem.*

Salt imbalance →	Kidneys and other organs can be damaged or fail.
Blockage of the ureters and urethra →	kidney damage

I found this information on page _____.
SE, p. 581
RE, p. 285

Identify *information about the diagnoses of urinary diseases.*

Disease	Method of Diagnosis
Urinary tract disease	urine testing
Kidney or liver problems	change in the urine's color
Diabetes	high levels of glucose in the urine
Kidney disease or heart failure	increased amounts of albumin

Connect It

Describe how blood helps rid the body of wastes.

Accept all reasonable responses. Blood collects waste from body cells. Blood then carries this waste to the kidneys, where the waste is filtered out and removed from the body.

Name _____ Date _____

Respiration and Excretion

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Respiration and Excretion	After You Read
• Breathing is the process in which the body obtains oxygen and releases energy from food.	D SE, p. 569 RE, p. 275
• The respiratory system contains structures that allow humans to speak.	A SE, pp. 570–571 RE, p. 276
• If wastes are not removed from the body, they can build up and damage organs.	A SE, p. 577 RE, p. 282
• The bladder filters wastes from blood.	D SE, p. 580 RE, p. 284

Review

Use this checklist to help you study.

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- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

List three processes of excretion described in this chapter.

Accept all reasonable responses. 1. Wastes are filtered from blood by the kidneys. 2. The liver also removes waste from the blood. 3. Undigested material is removed by the digestive system.

Name _____ Date _____

Control and Coordination

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Control and Coordination
	• You are subjected to thousands of stimuli every day.
	• The brain is made up of about 10,000 neurons.
	• You can't control reflexes because they occur before you know what has happened.
	• You can smell food because it gives off molecules into the air.

FOLDABLES™ Study Organizer

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Which senses do you think are involved when you respond to a glass crashing on a tile floor?

Responses may include hearing, sight, and also touch, if parts of the glass or its contents come in contact with the skin.

Name _____ Date _____

Control and Coordination

Section 1 The Nervous System

Scan *the headings in Section 1 of your book. Write three questions that come to mind.* Accept all reasonable responses.

1. Which parts of the brain are responsible for which functions?
2. What is the nervous system?
3. How do nerves transmit signals?

Review Vocabulary

Define response *using its scientific meaning.*

response — reaction to a specific stimulus

New Vocabulary

Use your book to define the following vocabulary terms.

homeostasis — regulation of an organism's internal, life-maintaining conditions

neuron — basic functioning unit of the nervous system, made up of a cell body, dendrites, and axons

synapse — small space across which an impulse moves from an axon to the dendrites or cell body of another neuron

reflex — automatic, involuntary response to a stimulus; controlled by the spinal cord

central nervous system — brain and spinal cord

peripheral nervous system — all the nerves outside the central nervous system

Academic Vocabulary

Use a dictionary to define coordinate *using its scientific meaning.*

coordinate — to cause to work well together

Name _____ Date _____

Section 1 The Nervous System (continued)

Main Idea | **Details**

How the Nervous System Works

I found this information on page _____.
SE, p. 594
RE, p. 287

Define stimulus *and describe the relationship between stimuli and the nervous system.*

A stimulus is any change that brings about a response. The nervous system helps the body adjust to changing stimuli. It is one of the body's control systems that helps keep its internal conditions steady despite changes in the environment.

Nerve Cells

I found this information on page _____.
SE, p. 595
RE, p. 288

Sequence *the passage of an* impulse *through a* nerve cell. *Start with receiving the impulse at a dendrite and end with the part of the nerve cell that carries the impulse to muscles, neurons, and glands.*

dendrite → cell body → axon

The Central Nervous System

I found this information on page _____.
SE, pp. 598–599
RE, pp. 289–290

Organize *information about the parts of the brain and their functions by completing the chart below.*

Part of the brain	Function
Cerebrum	where thinking takes place; interprets the meaning of impulses that come from sensory neurons
Cerebellum	interprets stimuli from the eye, ears, muscles, and tendons
Brain stem	connects the brain to the spinal cord

Describe *the function of the* spinal cord.

Spinal cord: carries nerve impulses to and from the brain and all other body parts

Name _____ Date _____

Main Idea

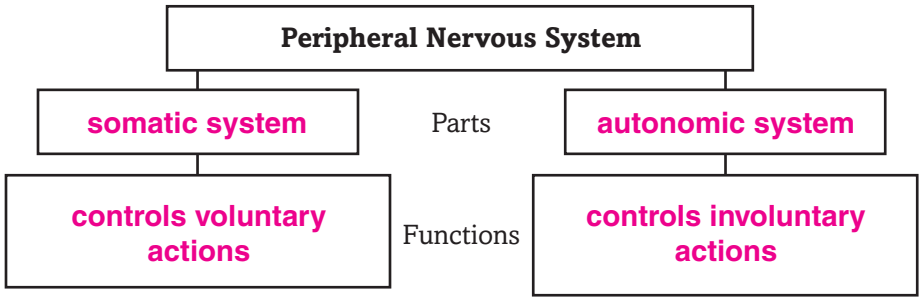
Details

The Peripheral Nervous System

I found this information on page _____.

SE, p. 599
RE, p. 290

Compare and contrast *the two major parts of the* peripheral nervous system *by completing the graphic organizer below.*



Safety and the Nervous System

I found this information on page _____.

SE, p. 601
RE, p. 291

Analyze *the diagram of the* reflex arc *provided in your book. List in order the three neurons involved in the reflex pathway, or arc.*

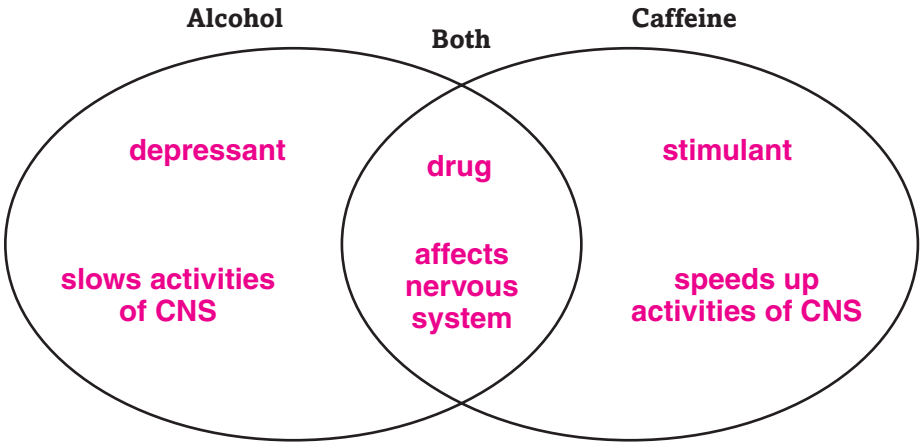
1. sensory neuron
2. interneuron
3. motor neuron

Drugs and the Nervous System

I found this information on page _____.

SE, p. 602
RE, p. 292

Distinguish *between* alcohol *and* caffeine *by completing the Venn diagram with at least two facts for each drug.*



Draw the diagram on the board, and have students add other facts about the two drugs, such as specific responses and sources of each drug.

CONNECT IT

Infer why alcohol is a controlled substance and caffeine is not.

Accept all reasonable responses. Alcohol's effects can include unsafe behavior and lead to serious disease, but caffeine's effects usually do not.

Name _____ Date _____

Control and Coordination

Section 2 The Senses

Skim *the headings of Section 2 to determine the four senses that will be discussed in detail.*

1. vision
2. hearing
3. smell
4. taste

Review Vocabulary

sense organ

Define sense organ *using a dictionary or your book.*

specialized organ that, when stimulated, enables you to keep safe and enjoy your environment

New Vocabulary

Write the correct vocabulary term beside the definition.

retina — light-sensitive tissue at the back of the eye; contains rods and cones

cochlea — fluid-filled structure in the inner ear in which sound vibrations are converted into nerve impulses that are sent to the brain

olfactory cells — nasal nerve cells that become stimulated by molecules in the air and send impulses for interpretation of odors

taste bud — major sensory receptor on the tongue; contains taste hairs that send impulses for interpretation of tastes

Academic Vocabulary

interpret

Use a dictionary to define interpret. *Use the term in a sentence to show its scientific meaning.*

to tell the meaning of; to understand; Sample sentence: The scientist used his data to interpret the results of the experiment.

Name _____ Date _____

Section 2 The Senses (continued)

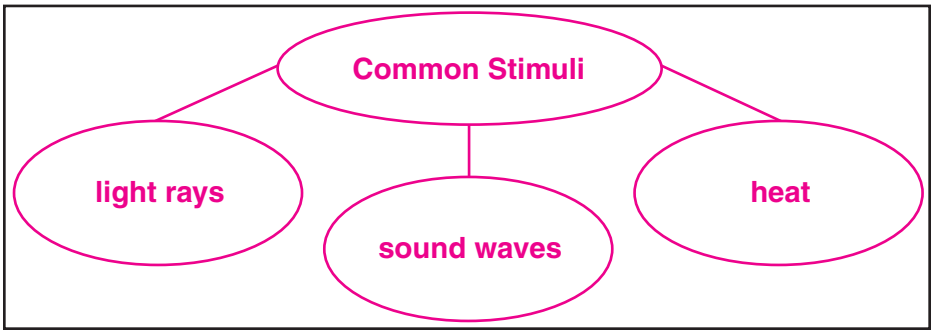
Main Idea

Details

The Body's Alert System

I found this information on page _____.
SE, p. 604
RE, p. 294

Create *a graphic organizer to identify three common* stimuli *that the senses are able to detect.* Accept all reasonable responses.



Vision

I found this information on page _____.
SE, pp.604–605
RE, p. 295

Have students identify the parts of the eye that are responsible for nearsightedness and farsightedness, and ask them to predict which parts are responsible for color blindness.

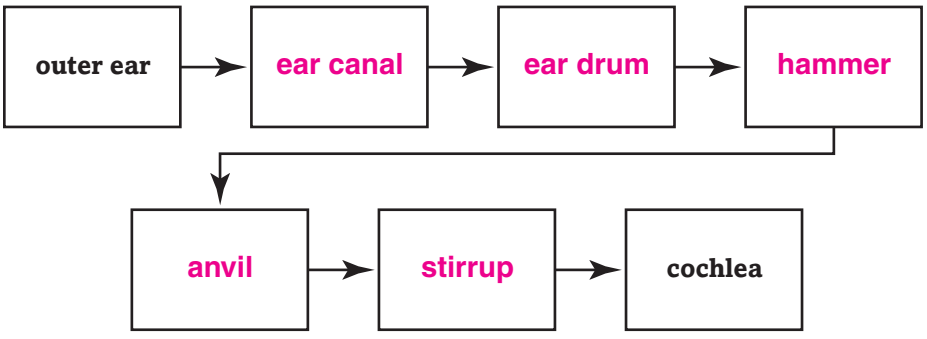
Identify *the functions of each part of the eye.*

Part of Eye	Function
Cornea	refracts light
Lens	directs the light onto retina
Retina	cones—respond to bright light and color; rods—respond to dim light and distinguish shapes and movement
Optic nerve	carries impulses to cortex of brain

Hearing

I found this information on page _____.
SE, pp. 607–608
RE, p. 297

Sequence *the parts of the ear in the order that a signal travels.*



Name _____ Date _____

Section 2 The Senses (continued)

Main Idea	Details

Smell

I found this information on page _____.
SE, p. 609
RE, p. 298

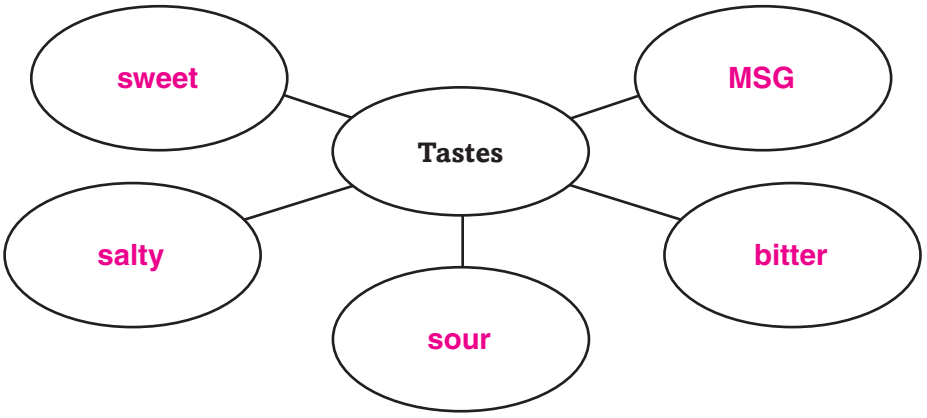
Summarize *how food is smelled by the nose.*

Food gives off molecules into the air. The molecules stimulate the olfactory cells in nasal passages. When the molecules dissolve on the moist olfactory cells, the cells are stimulated and produce impulses. These impulses are sent to the brain to be interpreted.

Taste

I found this information on page _____.
SE, p. 610
RE, p. 299

Distinguish *the five kinds of tastes in the graphic organizer below.*



Other Sensory Receptors in the Body

I found this information on page _____.
SE, p. 611
RE, p. 299

Summarize *the kinds of stimuli to which the receptors in internal organs and in fingertips can respond by listing them below.*

Internal Organs	Fingertips
Touch	rough or smooth
Pressure	hard or soft
Pain	hot or cold
Temperature	

Evaluate It

Identify some advantages of having fingertips and skin with many types of receptors for touch.

Accept all reasonable responses. Answers may address concerns for safety and increased sensitivity to the environment.

Name _____ Date _____

Control and Coordination

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Control and Coordination	After You Read
• You are subjected to thousands of stimuli every day.	A SE, p. 594 RE, p. 287
• The brain is made up of about 10,000 neurons.	D SE, p. 598 RE, p. 289
• You can't control reflexes because they occur before you know what has happened.	A SE, p. 601 RE, p. 291
• You can smell food because it gives off molecules into the air.	A SE, p. 609 RE, p. 298

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
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- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

Describe how your nervous system helps protect you.

Accept all reasonable responses. The stimulus-response actions of the body allow the body to respond in ways that maintain homeostasis and prevent injury.

Name _____ Date _____

Regulation and Reproduction

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Regulation and Reproduction
	• Endocrine glands are tissues that produce hormones.
	• Testosterone is the male sex hormone and sperm is the male reproductive cell.
	• Identical twins are not always the same sex.
	• Adulthood is the final stage of human development.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write a paragraph describing how an emergency call might be handled at a fire station.

Student responses will vary, but may include dispatchers answering an incoming emergency call, dispatching emergency crews to the scene, and monitoring the situation to see if additional help is needed.

Name _____ Date _____

Regulation and Reproduction

Section 1 The Endocrine System

Scan *the headings, charts, and illustrations in Section 1. Find two glands of the endocrine system that are involved in regulating blood sugar levels and two glands that are involved in regulating calcium levels.*

Helps Regulate Blood Sugar Levels	Helps Regulate Calcium Levels
adrenal gland	thyroid
pancreas	parathyroid

Review Vocabulary

tissue

Define tissue *to show its scientific meaning. Then use the word in an original sentence.*

group of similar cells that all do the same work; Sample sentence: Skin is made up of several different tissues.

New Vocabulary

hormone

Define hormone *to show its scientific meaning.*

in humans, chemical produced by the endocrine system, released directly into the bloodstream by ductless glands; affects specific target tissues, and can speed up or slow down cellular activities

Academic Vocabulary

distribute

Define distribute *to show its scientific meaning. Then use the word in an original sentence.*

to divide among several or many; Sample sentence: Blood distributes hormones from the glands that produce them to the tissues that need them.

Name _____ Date _____

Section 1 The Endocrine System (continued)

Main Idea | **Details**

Functions of the Endocrine System

I found this information on page _____.
SE, pp. 623–625
RE, p. 302

Organize *information about the body's control systems by completing the chart below.*

Body System	Function	Body's Response Time
Nervous system	sends impulses to and from the brain and throughout the body	reacts very quickly
Endocrine system	sends chemical messages to different parts of the body	reacts more slowly

Endocrine Glands

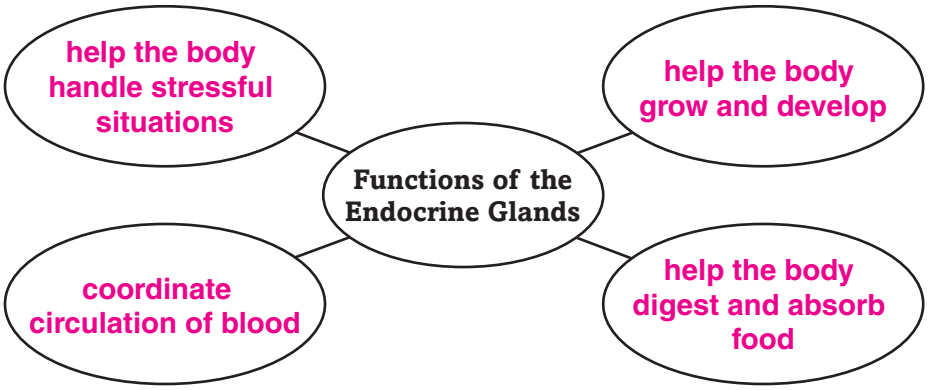
I found this information on page _____.
SE, p. 622
RE, p. 301

Sequence *the events that occur when a* gland *produces a* hormone *and sends it to a* target tissue.

gland releases hormone into the blood → blood transports hormone to other parts of the body → specific body tissue responds to hormone

I found this information on page _____.
SE, p. 623
RE, p. 302

Distinguish *the four main functions of the endocrine glands by completing the graphic organizer below.*



Have students investigate and describe the role of the endocrine system in the "fight or flight" response.

Name _____ Date _____

Main Idea

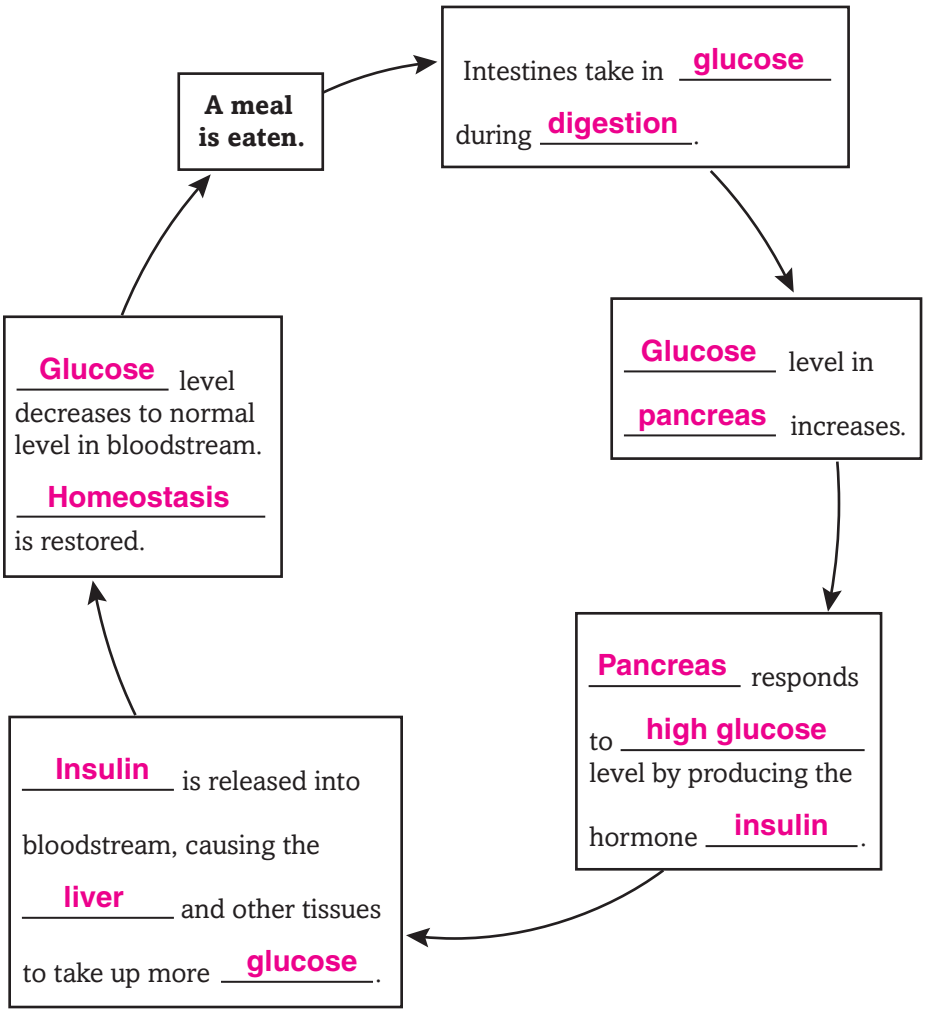
A Negative Feedback System

I found this information on page _____.

SE, p. 626
RE, p. 302

Details

Model *a* negative-feedback system *by completing the cycle chart below.*



Connect It

Draw an outline of the human body on a separate sheet of paper. Label it *male* or *female*. Using information provided in your book, show where endocrine glands are located and then describe their functions.

Glands and their functions should be indicated in the brain, upper chest, below the larynx, on top of each kidney, between the kidneys, and in the scrotum in males or the pelvic cavity in females.

Name _____ Date _____

Regulation and Reproduction

Section 2 The Reproductive System

Predict *three things that might be discussed in Section 2 as you read the headings.* **Accept all reasonable responses.**

1. **how reproduction involves the endocrine system**
2. **the organs and functions of the male reproductive system**
3. **the organs and functions of the female reproductive system**

Review Vocabulary

Define cilia *as it relates to this section.*

cilia — **short, hairlike structures that extend from a cell**

New Vocabulary

Identify the vocabulary terms that match the definitions.

testis	male organ that produces sperm and testosterone
sperm	male reproductive cells
semen	mixture of sperm and a fluid that helps sperm move and supplies the sperm with an energy source
ovary	in humans, female reproductive organ that produces eggs
ovulation	monthly release of an egg from an ovary in a hormone-controlled process
uterus	hollow, pear-shaped, muscular organ in which a fertilized egg develops
menstruation	monthly flow of blood and tissue cells that occurs when the lining of the uterus breaks down and is shed

Academic Vocabulary

Define **respond** *using its scientific meaning. Write a sentence that reflects this meaning.*

respond — **to react in response; Sample sentence: The nervous system helps the body respond to stimuli.**

Name _____ Date _____

Section 2 The Reproductive System (continued)

Main Idea

Details

Reproduction and the Endocrine System

I found this information on page _____.

SE, p. 627
RE, p. 304

Complete *the graphic organizers below to differentiate the role of the* pituitary gland *in females and males.*

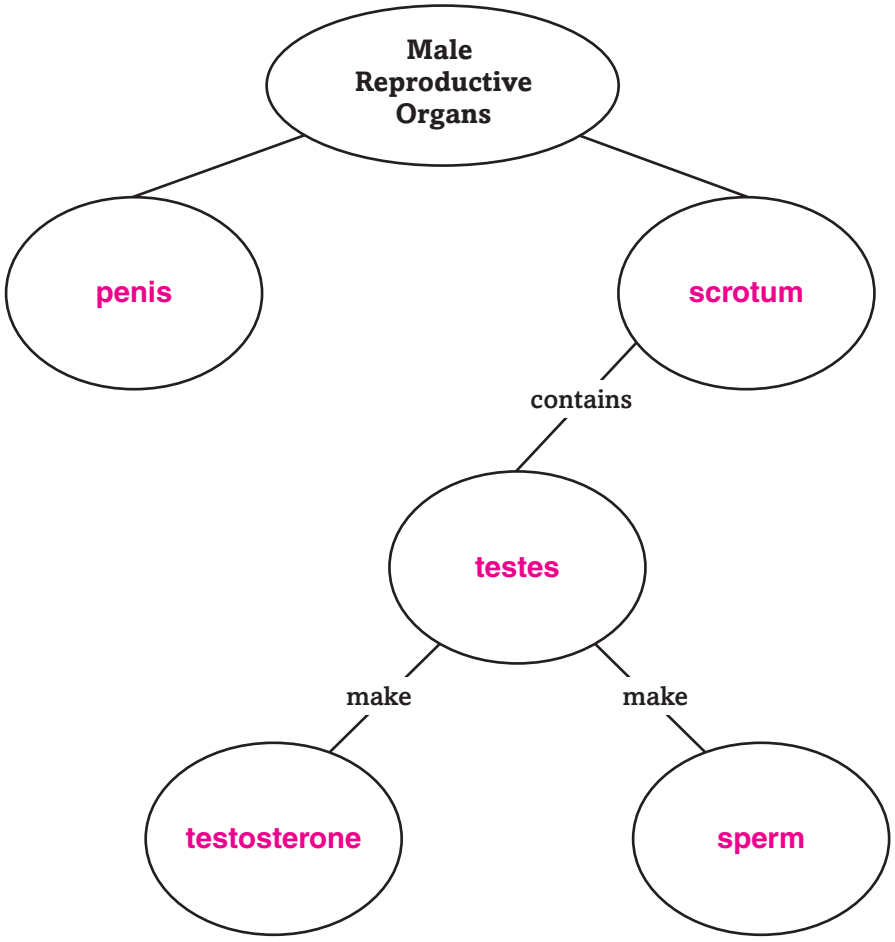
Pituitary Gland in Females →	produces: **female sex hormone** →	stimulates: **egg production in ovaries**
Pituitary Gland in Males →	produces: **male sex hormone** →	stimulates: **sperm production in testes**

The Male Reproductive System

I found this information on page _____.

SE, p. 628
RE, p. 305

Summarize *information about the* male reproductive organs *in the graphic organizer below.*



Name _____ Date _____

Section 2 The Reproductive System (continued)

Main Idea | **Details**

The Female Reproductive System

I found this information on page _____.

SE, p. 629
RE, pp. 305–306

Sequence *the steps through which an egg moves in the* female reproductive system.

The Menstrual Cycle

I found this information on page _____.

SE, pp. 630–631
RE, pp. 306–307

Have students discuss the role of hormones during the menstrual cycle.

Analyze *the* phases of the menstrual cycle, *and then complete the chart below.*

	Description	Duration
Phase 1	Menstruation occurs.	Days 1–6
Phase 2	Lining of uterus thickens. Ovulation occurs about 14 days before menstruation begins.	Days 7–14
Phase 3 (if fertilized egg does not arrive)	Lining of uterus wall continues to thicken and then breaks down.	Days 15–28

CONNECT IT

Describe how the menstrual cycle would differ in phase 3 if the egg were fertilized. Then infer how future cycles would be affected.

Responses should explain that the uterus wall would not break down and would remain to support and nourish the developing embryo, and that the cycle would stop during pregnancy.

Name _____ Date _____

Regulation and Reproduction

Section 3 Human Life Stages

Skim *the headings in Section 3. Then write three questions that you have about human life stages.* Accept all reasonable responses.

1. How does the process of fertilization occur?
2. What are the stages of development before birth?
3. What is cesarean section?

Review Vocabulary

Define nutrient *to show its scientific meaning.*

nutrient substance in food that provides energy and materials for cell development, growth, and repair

New Vocabulary

Define the new vocabulary terms to show their scientific meaning.

embryo fertilized egg that has attached to the wall of the uterus

amniotic sac thin, liquid-filled protective membrane that forms around the embryo

fetus in humans, a developing baby after the first two months of pregnancy until birth

fetus stress can occur during the birth process or after birth as an infant adjusts from a watery, dark, constant-temperature environment to its new environment

Academic Vocabulary

Define capable. *Use* capable *in an original sentence to show its scientific meaning.*

capable able to do things; fit; Sample sentence: People become capable of reproduction during puberty.

Name _____ Date _____

Section 3 Human Life Stages (continued)

Main Idea | **Details**

Fertilization

I found this information on page _____.
SE, p. 633
RE, p. 309

Sequence *the events that result in the* formation of a zygote *by completing the following graphic organizer.*

Sperm enter the vagina and come in contact with chemical secretions in the vagina.

↓

The chemicals cause changes in the sperm that make it possible for them to fertilize the egg.

↓

A sperm that touches the egg releases an enzyme.

↓

This enzyme helps the sperm enter the egg and their nuclei unite to form a fertilized cell called a zygote.

Multiple Births

I found this information on page _____.
SE, p. 634
RE, p. 309

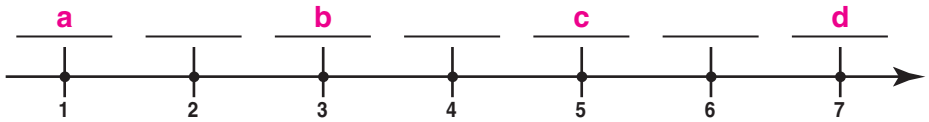
Classify *the following descriptions as applying to either* identical twins *or* fraternal twins. *Write* either *for a description that could fit both categories.*

fraternal twins	Two eggs are released and both are fertilized.
identical twins	A fertilized zygote divides into two separate zygotes.
either	Twins of the same sex are born.
fraternal twins	Twins with different sexes are born.

Development Before Birth

I found this information on page _____.
SE, pp. 634–636
RE, pp. 310–311

Create *a time line to indicate when the following events occur: a) embryo forms; b) amniotic sac forms; c) head forms; d) fingers and toes form. Not all weeks will be filled in.*



Weeks of Pregnancy

Main Idea

Details

The Birthing Process

I found this information on page _____.
SE, p. 636
RE, p. 311

Sequence *the events that occur during the* birthing process. *The first one has been completed for you.*

1.	Contractions increase.
2.	**Amniotic sac breaks.**
3.	**Opening of the uterus gets wider.**
4.	**Forceful contractions push baby through the vagina.**
5.	**More contractions push the placenta out.**

Stages After Birth

I found this information on page _____.
SE, pp. 638–641
RE, pp. 312–313

Summarize *information about the* stages after birth *using the chart below.*

Stage	Period in Life	Changes That Occur
Infancy	**from birth to 18 months**	**learns to coordinate movement; grows rapidly**
Childhood	**18 months to about 12 years**	**learns to control bladder and bowels; develops ability to speak, read, write, and reason**
Adolescence	**about age 12 to age 20**	**experiences puberty; final growth spurt occurs**
Adulthood	**about age 20 until age 60**	**growth of muscular and skeletal system stops**
Older Adulthood	**over age 60**	**may experience overall decline in physical body systems**

Name _____ Date _____

Tie It Together

Synthesize It

Create a journal that reflects your own stages of development. Interview your parents to record information about your size at various ages (including birth weight and length) and when you learned certain skills such as the ability to crawl and walk, when you lost your baby teeth, and so on. Try to find pictures of yourself at various ages to include in your journal.

Journals should chronicle changes that occurred during infancy, childhood, and perhaps adolescence. Ensure the privacy of the content of each student's journal.

Name _____ Date _____

Regulation and Reproduction

Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Regulation and Reproduction	After You Read
• Endocrine glands are tissues that produce hormones.	A SE, p. 622 RE, p. 301
• Testosterone is the male sex hormone and sperm is the male reproductive cell.	A SE, p. 628 RE, p. 305
• Identical twins are not always the same sex.	D SE, p. 634 RE, p. 310
• Adulthood is the final stage of human development.	A SE, p. 640 RE, p. 312

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

Explain how the title "Regulation and Reproduction" fits with the content of this chapter. Accept all reasonable responses.

Regulation relates to the role of the endocrine glands in controlling certain cellular processes. Reproduction relates to the organs and functions of the reproductive systems and the process of fertilization and development.

Name _____ Date _____

Immunity and Disease

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Immunity and Disease
	• Your skin is one of your body's first lines of defense against disease.
	• A vaccine is given to cure a disease.
	• AIDS and HIV are the same thing.
	• You can catch diabetes from another person.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Write a paragraph describing a battle between your white cells and a foreign invader.

Student responses should include a foreign substance invading the blood and being attacked by white blood cells.

Name _____ Date _____

Immunity and Disease

Section 1 The Immune System

Read *the title and headings of the section. Predict two topics that will be discussed in this section.* Accept all reasonable responses.

1. the body's lines of defense

2. specific, active, and passive immunity

Review Vocabulary

Define enzyme *to show its scientific meaning.*

enzyme

type of protein that speeds up chemical reactions in the body

New Vocabulary

Write the vocabulary term that matches each definition.

immune system	complex group of defenses that protects the body against pathogens
antigen	molecule that is foreign to the body
antibody	protein made in response to a specific antigen
active immunity	immunity in which the body makes its own antibodies in response to an antigen
passive immunit	immunity in which antibodies that have been produced in another animal are introduced to the body
vaccination	process of giving a vaccine by injection or by mouth

Academic Vocabulary

Use a dictionary to define specific *to show its scientific meaning.*

specific

exact; particular

Name _____ Date _____

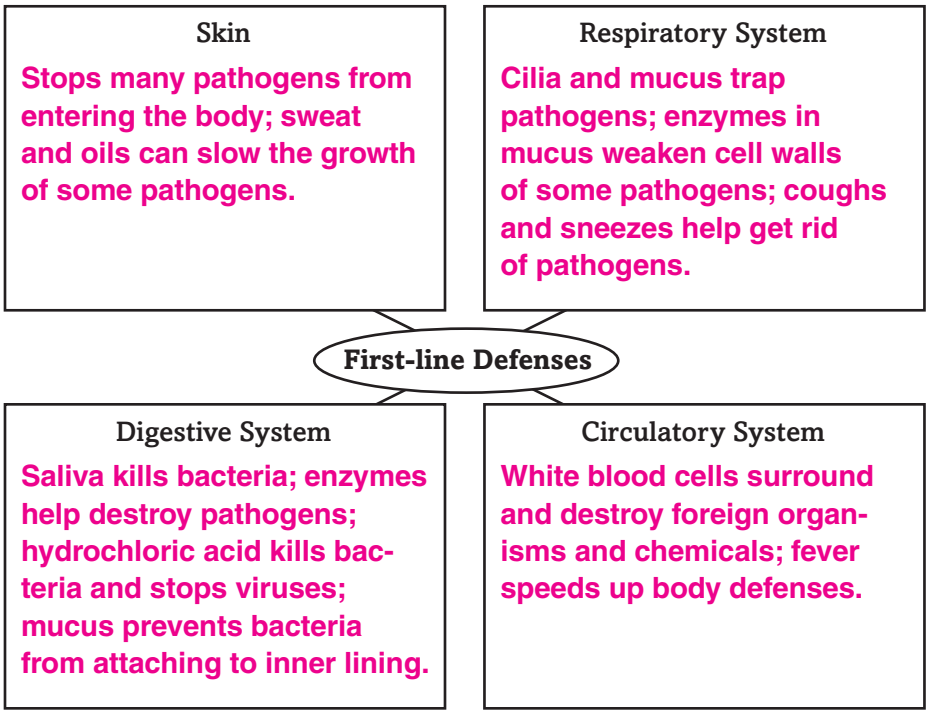
Section 1 The Immune System (continued)

Main Idea | **Details**

Lines of Defense

I found this information on page _____.
SE, pp. 652–653
RE, pp. 315–316

Summarize *your body's* first-line defense strategies.



I found this information on page _____.
SE, p. 654
RE, pp. 316–317

Sequence *what happens when an* antigen *enters the body.*

1. The immune system recognizes an antigen in the body and releases lymphocytes.
2. Killer T cells release enzymes that help destroy antigens.
3. Helper T cells produce B cells.
4. B cells form antibodies, which can attach to the antigen and make it harmless.
5. Memory B cells stay in the blood to destroy the pathogen if it invades the body again.

Name _____ **Date** _____

Section 1 The Immune System (continued)

Main Idea

I found this information on page _____.
SE, p. 655
RE, p. 317

Have students work in pairs to identify the characteristics of each type of immunity.

Details

Contrast active *and* passive immunity. *Complete the chart.*

	Active Immunity	Passive Immunity
What It Is	immunity in which the body produces antibodies in response to an antigen	immunity in which the antibodies are produced in another animal and put into the body
How You Get It	when an antigen enters the body, the immune system produces antibodies	antibodies are produced outside the body and put into the body
How Long It Lasts	can last for a long time	does not last as long as active immunity

I found this information on page _____.
SE, p. 655
RE, p. 318

Summarize *how a* vaccine *helps protect your body against a pathogen. Complete the flow chart.*

A vaccine is injected or given by mouth.

↓

The body forms antibodies against the antigen in the vaccine.

↓

If the antigen later enters the body, the antibodies are already present in the bloodstream.

Connect It

Many schools require children to be vaccinated against diseases such as measles before they begin school. Analyze why the schools might have this requirement. **Accept all reasonable responses.**

If students are vaccinated, the disease cannot spread through the school.

Name _____ Date _____

Immunity and Disease

Section 2 Infectious Diseases

Skim *Section 2. Write three questions you would like to have answered. Then look for the answers as you read.* Accept all reasonable responses.

1. How do microorganisms cause disease?
2. How do surgeons prevent infection?
3. How do diseases spread?

Review Vocabulary

Define protist *using your book or a dictionary.*

protist: one- or many-celled organism that lives in moist or wet surroundings

New Vocabulary

Use your book to define each vocabulary term.

pasteurization: process of heating a liquid to a specific temperature in order to kill most bacteria

virus: tiny piece of genetic material surrounded by a protein coating that infects host cells and multiplies inside them

infectious disease: disease that is spread from an infected organism or the environment to another organism

biological vector: disease-carrying organism

sexually transmitted disease (STD): disease passed from person to person during sexual contact

Academic Vocabulary

Use a dictionary to define complex *using its scientific meaning.*

complex: composed of two or more parts; complicated

Name _____ Date _____

Section 2 Infectious Diseases (continued)

Main Idea | **Details**

Disease in History

I found this information on page _____.
SE, pp. 658–660
RE, pp. 320–321

Distinguish *the important contributions of* Louis Pasteur, Robert Koch, *and* Joseph Lister *to the treatment of infectious diseases.*

Pasteur: discovered that microorganisms spoiled milk and wine; realized that microorganisms could cause disease in the human body; developed process of pasteurization to kill microorganisms

Koch: developed a way to isolate and grow one type of bacterium at a time; developed rules for identifying which organism causes a disease

Lister: identified the relationship between cleanliness and preventing disease; used carbolic acid to wash skin, hands, and instruments

I found this information on page _____.
SE, p. 658
RE, p. 321

Identify *examples of diseases caused by each type of organism.*

Pathogen	Diseases Caused
Bacteria	tetanus, tuberculosis, strep throat
Protists	malaria, sleeping sickness
Fungi	athlete's foot, ringworm
Viruses	colds, influenza, AIDS, measles, mumps

How Diseases Are Spread

I found this information on page _____.
SE, p. 661
RE, p. 322

Identify *four ways in which diseases can be transmitted.*

1. direct contact with an infected organism
2. through water, air, and food
3. by contact with contaminated objects
4. by disease-carrying organisms called biological vectors

Name _____ Date _____

Section 2 Infectious Diseases (continued)

Main Idea | **Details**

Sexually Transmitted Diseases

I found this information on page _____.

SE, p. 662
RE, pp. 322–323

Identify *examples of each type of* sexually transmitted disease *and list its symptoms and possible effects.*

Bacterial

Disease: gonorrhea or chlamydia
Symptoms: pain, sores, discharge
Effects: damages reproductive organs

Disease: syphilis
Symptoms: sores, rash, fever, swollen glands
Effects: damage to body organs; can cause death

Viral

Disease: genital herpes
Symptoms: painful blisters on sex organs
Effects: hides in body for long periods of time and then reappears

Make sure that students understand that HIV is the pathogen and AIDS is the disease caused by the pathogen. A person can have HIV in their body without having AIDS.

HIV and Your Immune System

I found this information on page _____.

SE, p. 663
RE, p. 323

Analyze *how* HIV *harms the immune system. Explain how HIV causes AIDS and what happens when a person has AIDS.*

HIV destroys helper T cells, so the T cells cannot produce B cells. This means that B cells do not produce antibodies. This causes AIDS, in which the immune system cannot fight pathogens.

SUMMARIZE IT

Describe several things that you can do to prevent infections.

Accept all reasonable responses. wash hands and body, brush and floss teeth, exercise, eat healthful foods, get plenty of rest

Name _____ **Date** _____

Immunity and Disease

Section 3 Noninfectious Diseases

Scan *the section headings, bold words, and illustrations in Section 3. Write two facts you discovered as you scanned the section.* **Accept all reasonable responses.**

1. **Allergens are substances that cause allergies.**
2. **Cancer is caused when cells grow uncontrollably.**

Review Vocabulary

Define gene *using your book or a dictionary.*

gene — **a section of DNA on a chromosome that carries instructions for making a specific protein**

New Vocabulary

Use your book to define each vocabulary term.

noninfectious disease — **disease or disorder that is not spread from one person to another**

allergy — **overly strong reaction of the immune system to a foreign substance**

allergen — **substance that causes an allergic response**

chemotherapy — **use of chemicals to destroy cancer cells**

Academic Vocabulary

Use a dictionary to define react. *Then write what you predict* reaction *means. Check your definition in the dictionary.*

react — **to act because something has happened; respond**

A reaction is an action in response to something that has happened.

Name _____ Date _____

Section 3 Noninfectious Diseases (continued)

Main Idea	Details

Chronic Disease

I found this information on page _____.
SE, p. 666
RE, p. 326

Contrast infectious disease *and* noninfectious disease.

Infectious disease is spread from one organism to another or from the environment to an organism. Noninfectious disease does not spread.

Allergies

I found this information on page _____.
SE, pp. 666–667
RE, pp. 326–327

Sequence *what happens during an* allergic reaction. *Then list some typical symptoms of an allergy.*

An allergen enters the body.

↓

The immune system produces antibodies.

↓

The body releases histamines that cause red, swollen tissues.

Typical symptoms: rashes, sneezes, hives; asthma; can cause shock and death

Diabetes

I found this information on page _____.
SE, p. 667
RE, p. 327

Students in your class may have diabetes or allergies. Be sensitive to students' privacy when discussing these topics.

Compare and contrast Type 1 *and* Type 2 diabetes. *Complete the chart. Then list common symptoms of both types of diabetes and the possible long-term effects of the disease.*

	Type 1	Type 2
Cause	too little or no insulin produced	body unable to properly use insulin
Treatment	daily injections of insulin	usually controlled by diet and weight

Symptoms: tiredness, thirst, need to urinate often, tingling in hands and feet

Long-term effects: blurred vision, kidney failure, heart attack, stroke, loss of feeling in the feet, diabetic coma

Name _____ **Date** _____

Section 3 Noninfectious Diseases (continued)

Main Idea | **Details**

Chemicals and Disease

I found this information on page _____.
SE, p. 668
RE, p. 327

Identify *the possible harmful effects of the chemicals listed.*

Asbestos: lung disease

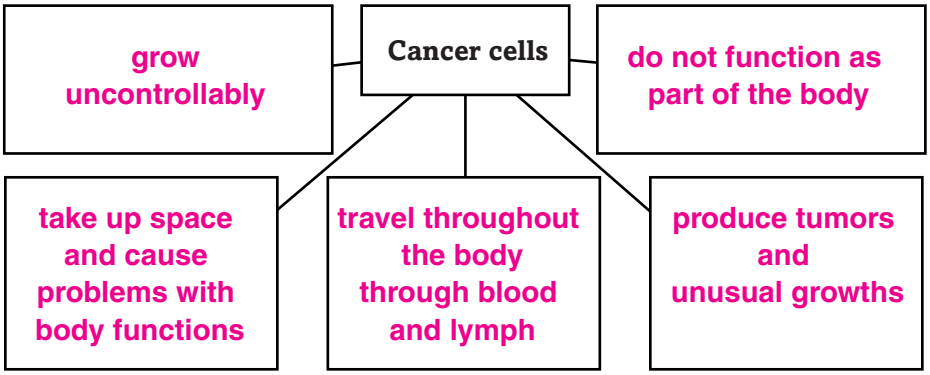
Lead-based paints: damage to central nervous system

Alcohol: birth defects when consumed during pregnancy

Cancer

I found this information on page _____.
SE, p. 669
RE, p. 328

Summarize *information about* cancer cells *below.*



I found this information on page _____.
SE, pp. 669–670
RE, pp. 328–329

Summarize *the causes, warning signs, and treatments of cancer. Complete the chart.* Accept all reasonable responses.

Causes	carcinogens such as asbestos, cleaning products heavy metals, tobacco, alcohol, home and garden products; exposure to X rays and radiation; genetics can increase risk
Warning Signs	changes in bowel movements; a sore that does not heal; unusual bleeding or discharge; thickening or lump in the breast; difficulty in digesting or swallowing food; changes in a wart or mole; cough or hoarseness that will not go away
Treatments	surgery, radiation, chemotherapy

CONNECT IT

A friend's family has a history of lung and skin cancer. Evaluate some steps your friend could take to reduce his risk of getting these diseases.

Accept all reasonable responses. My friend could avoid using tobacco, eat a healthful diet, and wear sunscreen.

Name _____ **Date** _____

Tie It Together

Immunity and Disease

Every winter, many students miss school as a result of colds, influenza, and other infectious diseases. Plan a campaign for your school to teach other students how to reduce their risk of catching these diseases. You might design posters, plan an assembly, or use other ways to get the information out. Outline your plan below. **Accept all reasonable responses.**

Encourage creative responses. Students should include tips about handwashing and healthful eating. If possible, have students follow through on their plans and produce materials for the school.

Name _____ Date _____

Immunity and Disease Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Immunity and Disease	After You Read
• Your skin is one of your body's first lines of defense against disease.	A SE, p. 652 RE, p. 315
• A vaccine is given to cure a disease.	D SE, p. 655 RE, p. 318
• AIDS and HIV are the same thing.	D SE, p. 663 RE, p. 323
• You can catch diabetes from another person.	D SE, p. 667 RE, p. 327

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

What are the three most important ideas in this chapter?

Accept all reasonable responses. 1. Washing your hands is an important way to prevent the spread of pathogens. 2. Eating a healthful diet can reduce the risk of some types of disease. 3. Not all diseases are caused by the same kinds of organisms.

Name _____ Date _____

Interactions of Life

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Interactions of Life
	• The community includes the top part of Earth's crust, water that covers Earth's surface, and Earth's atmosphere.
	• In nature, most competition occurs between individuals of the same species.
	• Plants and microscopic organisms can move from place to place.
	• Living organisms do not need a constant supply of energy.

FOLDABLES™ Study Organizer

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Describe how a familiar bird, insect, or other animal depends on other organisms.

Student responses will vary, but may include feeding relationships, such as birds eating fruit or nuts from trees, or other relationships, such as trees providing nesting sites for birds or insects.

Name _____ Date _____

Interactions of Life

Section 1 Living Earth

Skim *through Section 1 of your book. Read the headings and look at the figures. Write three questions that come to mind.* Accept all reasonable responses.

1. What is an ecosystem?
2. What is a population?
3. How is population different from a community?

Review Vocabulary

Define adaptation *using your book or a dictionary.*

adaptation — any variation that makes an organism better suited to its environment

New Vocabulary

Define each new vocabulary term using your book.

biosphere — part of Earth that supports life

ecology — study of the interactions that take place among organisms and their environment

population — all of the organisms that belong to the same species living in a community

community — all of the populations of different species that live in an ecosystem

habitat — place where an organism lives

Academic Vocabulary

Define interact *using a dictionary.*

interact — to act on one another

Name _____ Date _____

Section 1 Living Earth (continued)

Main Idea | **Details**

The Biosphere

I found this information on page _____.
SE, p. 684
RE, p. 331

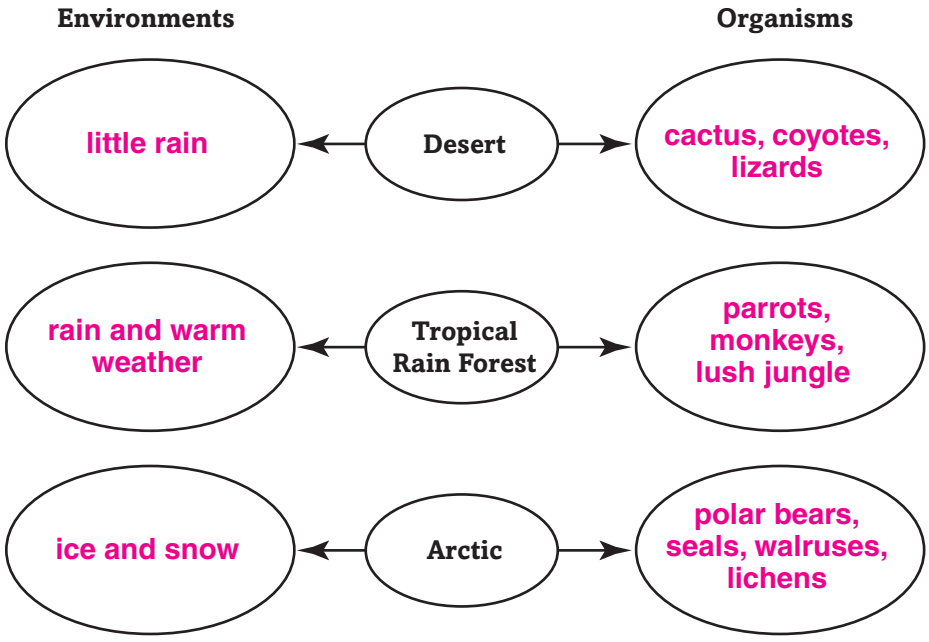
Complete *this chart to identify three parts of the* biosphere.

Parts of the Biosphere		
top portion of Earth's crust	all of the waters that cover Earth's surface	the atmosphere that surrounds Earth

I found this information on page _____.
SE, p. 684
RE, p. 331

Contrast *the organisms found in different environments as you complete the concept map. Provide examples of both plants and animals.* Accept all reasonable responses.

Encourage students to suggest other environments with which they are familiar and the organisms found there.



I found this information on page _____.
SE, p. 685
RE, p. 331

Analyze *the amount of solar energy that makes Earth the only planet known to support life. Explain why other planets are not suitable for life.*

The amount of energy that reaches Earth is neither too much nor too little to support life. Other planets are too close or too far from the Sun to have conditions that allow life.

Name _____ **Date** _____

Section 1 Living Earth (continued)

Main Idea

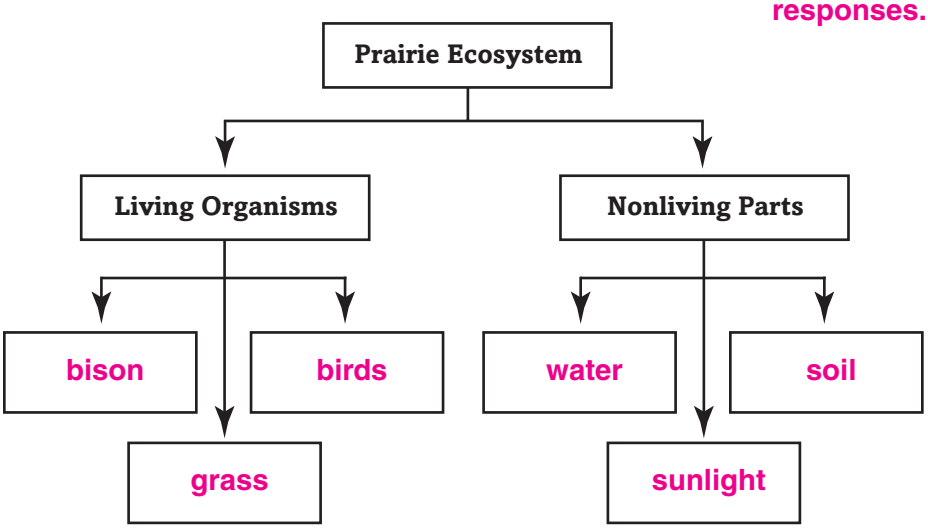
Details

Ecosystems

I found this information on page _____.

SE, p. 685
RE, p. 332

Organize *the parts of a prairie ecosystem. List three living organisms and three nonliving parts of the ecosystem.* Accept all reasonable responses.



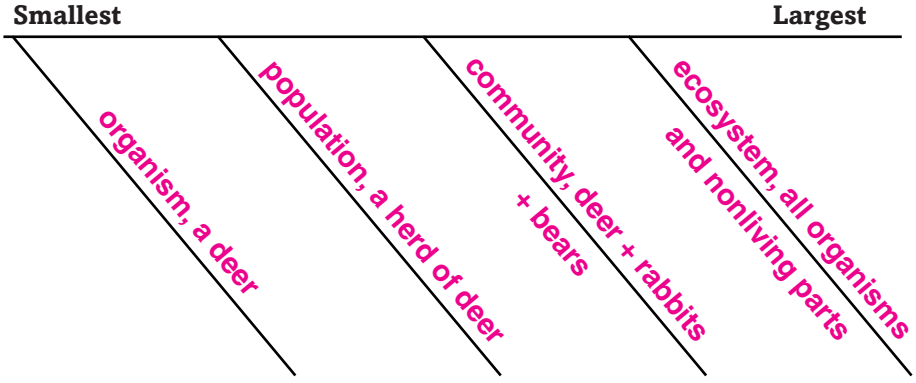
Populations

I found this information on page _____.

SE, p. 686
RE, p. 332

Sequence *the four levels of organization of living organisms from smallest to largest. Then write an example of each one.*

community organism ecosystem population



Synthesize It

Write about your own life. Use the terms habitat, community, population, and ecosystem to describe your every day interactions.

Accept all reasonable responses. Students may discuss getting food from a garden, interacting with their family and animals, or friends at school. Responses should include information about the student's habitat, community, population, and ecosystem.

Name _____ Date _____

Interactions of Life

Section 2 Populations

Predict *Read the headings in Section 2. Predict three topics that you think will be discussed in this section.* Accept all reasonable responses.

1. how competition can affect a population
2. how to measure a population in a given area
3. how a population can change over time

Review Vocabulary

Define natural selection *using your book or a dictionary. Then use it in a sentence to show its scientific meaning.*

natural selection

the hypothesis stating that organisms with traits best suited to their environment are more likely to survive and reproduce

Sample sentence: Birds with long, narrow beaks survived in the woodlands when other birds did not because of natural selection.

New Vocabulary

Create an original sentence using each vocabulary term to show its scientific meaning.

limiting factor

Sample sentence: The lack of rain was a limiting factor to plant growth and reproduction.

carrying capacity

Sample sentence: The carrying capacity of the swamp limited the number of alligators that could live there.

Academic Vocabulary

Define resource *using a dictionary. Then write a sentence related to the topic of Section 2 using the term.*

resource

something used for help or support

Sample sentence: Competition for a particular resource, such as a place to live, can drive many animals from an area.

Name _____ Date _____

Main Idea

Details

Competition

I found this information on page _____.
SE, p. 688
RE, p. 334

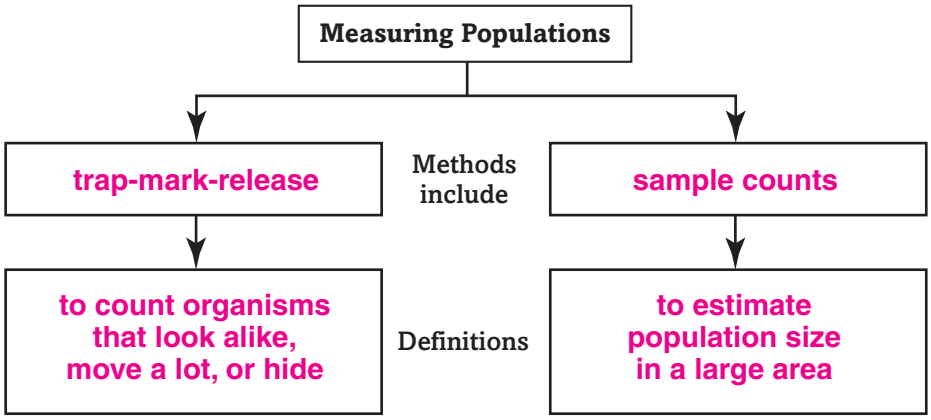
Complete *the chart below to identify how competing for certain limited resources can affect population growth.*

Limited Resource	Why It Limits Population Growth
Space	Some organisms will not have a place in which to raise their young.
Food	Some organisms may not survive to reproduce.

Population Size

I found this information on page _____.
SE, p. 689
RE, p. 335

Compare *the two ways of measuring* populations *by filling in the graphic organizer below.*



I found this information on page _____.
SE, pp. 691–692
RE, p. 336

Contrast carrying capacity *and* biotic potential. *Then identify one factor that can limit each.*

	What It Is	Limiting Factor
Carrying capacity	the largest number of individuals of a species that an ecosystem can support	limited resources, such as space
Biotic potential	the highest rate of reproduction under ideal conditions	the number of offspring that can be produced by parent organisms

Name _____ Date _____

Main Idea

Details

Changes in Populations

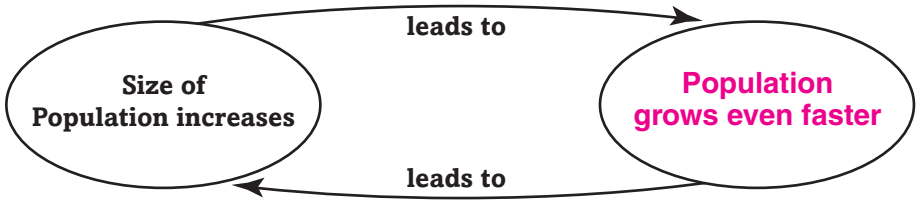
I found this information on page _____.
SE, p. 692
RE, p. 336

Compare *the effect of differing* birth rates *and* death rates *on population growth as you complete the chart below.*

Population Growth	
Birth Rate Compared to Death Rate	Change in Population
much higher	rapid increase
slightly higher	slow increase
lower	decrease

I found this information on page _____.
SE, p. 695
RE, p. 337

Evaluate *the effects of* exponential growth *on a population.*



Summarize *the environmental effects of the exponential growth of a population.*

Accept all reasonable responses. Population growth causes competition for resources, such as crowded living conditions. This can lead to the spread of disease.

Synthesize It

A field is crowded with mice. A new group of mice migrate into the field. Describe how the crowded conditions could affect the mice.

Accept all reasonable responses. Students should indicate that competition for food and space would likely cause the mouse population to decrease as mice die or migrate.

Name _____ Date _____

Interactions of Life

Section 3 Interactions Within Communities

Scan *the* What You'll Learn *statements for Section 3. Rewrite each statement as a question. As you read the section, try to answer your questions.* **Accept all reasonable responses.**

1. **How do organisms obtain energy for life?**
2. **How do organisms interact?**
3. **What is a niche, and how does an organism occupy it?**

Review Vocabulary

Define social behavior *using your book or a dictionary.*

social behavior — **interactions among members of the same species**

New Vocabulary

Label each definition with the correct vocabulary term.

producer — *an organism that can use an outside energy source like the Sun to make energy-rich molecules*

consumer — *an organism that cannot make its own energy-rich molecules*

symbiosis — *any close relationship between species*

niche — *an organism's role in its environment*

Academic Vocabulary

Define constant *as an adjective. Then use it in a scientific sentence.*

constant — **not changing; staying the same; Sample sentence: The boy is in a constant state of hunger.**

Name _____ Date _____

Section 3 Interactions Within Communities (continued)

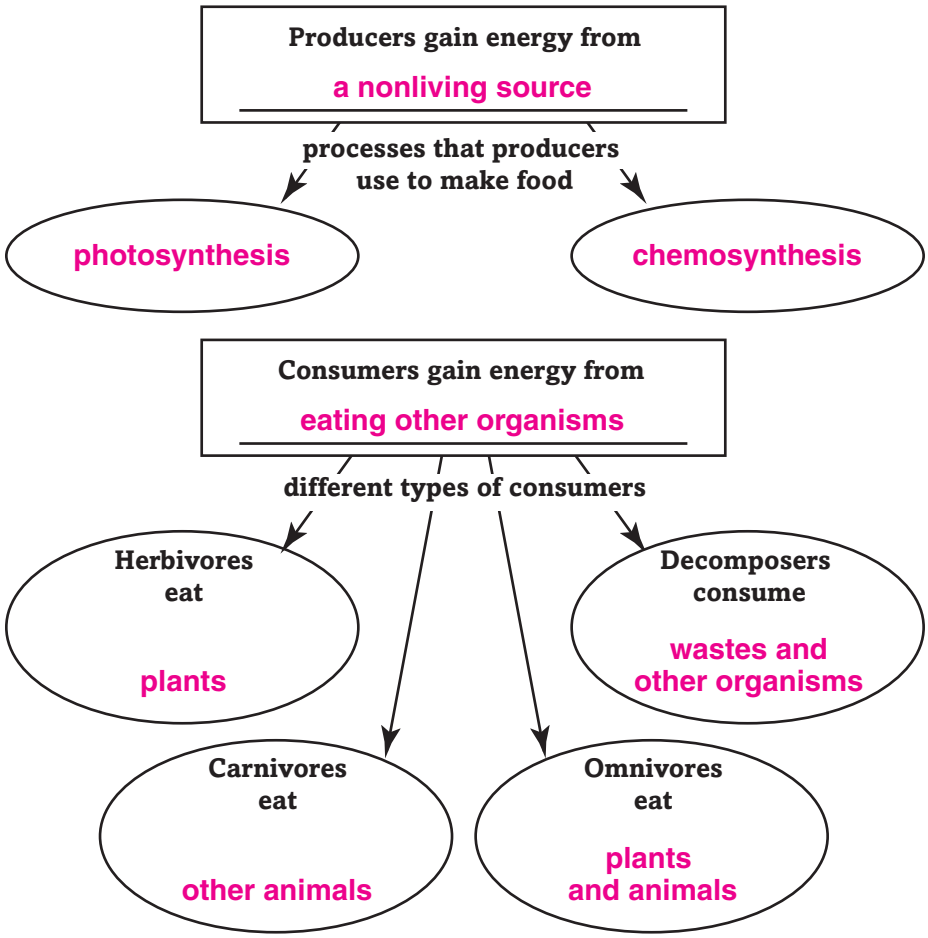
Main Idea | **Details**

Obtaining Energy

I found this information on page _____.

SE, pp. 696–697
RE, pp. 339–340

Compare and contrast producers *and* consumers *by describing the processes by which each group gets the energy it needs.*



Symbiotic Relationships

I found this information on page _____.

SE, p. 698
RE, pp. 340–341

Classify *examples of* symbiosis *by completing the chart below.*

Type of Symbiosis	Who Benefits?	Example
mutualism	both species benefit	alga and fungus forming lichen
commensalism	one organism benefits and the other is not affected	clown fish protected by a sea anemone
parasitism	one organism benefits but the other is harmed	roundworms within a cat or dog

Name _____ **Date** _____

Section 3 Interactions Within Communities (continued)

Main Idea | **Details**

Niches

I found this information on page _____.

SE, p. 699
RE, p. 341

Have students work with a partner to compile a list of foods they eat. Have them identify which come from producers and which come from consumers.

Organize *important points about* niches *by creating an outline of your reading.* Accept all reasonable responses.

I. A niche is an organism's role in its environment.

- **A.** how it obtains food
- **B.** how it obtains shelter
- **C.** how it finds a mate
- **D.** how it cares for its young
- **E.** how it avoids danger

II. Special adaptations that improve survival can be part of a niche.

- **A.** Example: Poison in milkweed plants stops many insects from eating them.
- **B.** Example: Monarch butterfly caterpillars have an adaptation to eat the milkweed plant. Caterpillars become poisonous. Birds avoid eating them.

SYNTHESIZE IT

Draw and label organisms that are in your food chain. Include at least three organisms. Then show how each of these organisms can get the energy it needs.

Student responses should demonstrate knowledge of energy transferred from the Sun, through producers, to consumers, using a variety of organisms.

Consumers may include:
Herbivores, Carnivores, Omnivores, and Decomposers

Producers may include:
plants and other organisms that make their energy from the Sun.

Name _____ **Date** _____

Tie It Together

Observation

Observe the behaviors of a species of animal (for example, squirrels in a park) for at least 15 minutes. Use the chart below to take notes on your observations.

Species:	Encourage students to record and describe
Date and time of observation:	their observations carefully and thoroughly.
Number of individuals observed:	
Interactions within species:	
Food sources observed:	
Habitat:	
Special adaptations of species:	
Interactions observed with other species:	

Name _____ Date _____

Interactions of Life Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Interactions of Life	After You Read
• The community includes the top part of Earth's crust, water that covers Earth's surface, and Earth's atmosphere.	D SE, p. 686 RE, p. 332
• In nature, most competition occurs between individuals of the same species.	A SE, p. 688 RE, p. 334
• Plants and microscopic organisms can move from place to place.	A SE, p. 693 RE, p. 337
• Living organisms do not need a constant supply of energy.	D SE, p. 696 RE, p. 339

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about interactions among living organisms. Accept all reasonable responses.

1. Competition limits population size. 2. If a population begins to exceed the environment's carrying capacity, some individuals will die because of lack of resources. 3. One habitat might contain hundreds or even thousands of species.

Name _____ Date _____

The Nonliving Environment

Before You Read

Preview the chapter title, the section titles, and the section headings. List at least two ideas for each section in each column.

K What I know	W What I want to find out
Accept all responses at this time.	

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List all the nonliving things that you might see in a picture of a beach, in order of importance. Explain your reasoning for the order you choose.

Student responses may include water, sand, rocks, and sunlight. Order of importance and explanations will vary.

Name _____ Date _____

The Nonliving Environment

Section 1 Abiotic Factors

Preview *the* What You'll Learn *statements for Section 1. Rewrite each statement into a question.* Accept all reasonable responses.

1. What are the common abiotic factors in most ecosystems?
2. What components of air are needed for life?
3. How does climate influence life in ecosystems?

Review Vocabulary

Define environment *to show its scientific meaning.*

environment everything, such as climate, soil, and living things, that surrounds and affects an organism

New Vocabulary

Define the following terms to show their scientific meanings.

biotic describes features of the environment that are alive, or were once alive

abiotic describes nonliving, physical features of the environment

atmosphere the air that surrounds Earth

soil mixture of mineral and rock particles, the remains of dead organisms, water, and air

climate an area's average weather conditions over time

Academic Vocabulary

Use a dictionary to define fundamental *as an adjective.*

fundamental serving as an original or generating source; primary

Name _____ Date _____

Section 1 Abiotic Factors (continued)

Main Idea | **Details**

Environmental Factors

I found this information on page _____.
SE, p. 712
RE, p. 343

Classify *seven* environmental factors *as* biotic *or* abiotic.

Factors needed for life	
Biotic	Abiotic
1. plants	1. air
2. animals	2. water
	3. sunlight
	4. temperature
	5. climate

Air

I found this information on page _____.
SE, p. 713
RE, pp. 343–344

Compare and contrast *how gases are used during* photosynthesis *and* respiration.

	Photosynthesis	Respiration
Gas used	carbon dioxide	oxygen
Gas released	oxygen	carbon dioxide
Purpose	make food with energy from sunlight	release energy from food

Water and Soil

I found this information on page _____.
SE, pp. 713–714
RE, p. 344

Summarize *how organisms use water and soil. Complete the sentences.*

Most organisms are 50 to 95 percent water. Processes such as respiration, digestion, and photosynthesis need water to occur. Environments with plenty of water usually have a greater variety and larger number of organisms than environments with little water. Organisms also need soil. Bacteria, fungi, insects, and worms all live in soil. The type of soil influences the types of plants that can grow in a region.

Name _____ **Date** _____

Section 1 Abiotic Factors (continued)

Main Idea	Details
Sunlight *I found this information on page* _____. SE, p. 715 RE, p. 344	**Label** *the diagram to show the flow of energy through living things. Label* consumers, producers, *and* sunlight. sunlight → producers → consumers
Temperature *I found this information on page* _____. SE, pp. 715–716 RE, pp. 344–345	**Analyze** *how* latitude *and* elevation *affect temperature.* **Latitude:** Places near the equator have warmer temperatures than areas near the poles because the sun strikes those areas at more direct angles. **Elevation:** The atmosphere is thinner at higher elevations, so it holds less heat. Thus areas at higher elevations are cooler than areas at lower elevations.
Climate *I found this information on page* _____. SE, p. 718 RE, p. 346	**Sequence** *steps to explain the* rain shadow effect. Accept all reasonable responses.

1.	Moist air is forced upward by a mountain.
2.	As the air rises, it cools.
3.	When air cools, the moisture it contains condenses and falls as rain or snow.
4.	The other side of the mountain receives much less precipitation.

Connect It

Describe the climate of your community. Identify its latitude, elevation, temperature, and precipitation characteristics.

Student responses will vary depending on community, but should reflect an understanding of the factors that affect the local climate.

Name _____ Date _____

The Nonliving Environment

Section 2 Cycles in Nature

Skim *the headings and illustrations in Section 2. List three kinds of cycles you will learn about in the section.*

1. water cycle
2. nitrogen cycle
3. carbon cycle

Review Vocabulary

Define biosphere *to show its scientific meaning.*

biosphere — the part of the world in which life can exist

New Vocabulary

Read the definitions below. Write the correct vocabulary term on the blank to the left.

carbon cycle — model describing how carbon molecules move between the living and the nonliving world

condensation — process that takes place when a gas changes to a liquid

nitrogen fixation — process in which some types of bacteria in the soil change nitrogen gas into a form of nitrogen that plants can use

evaporation — process that takes place when a liquid changes to a gas

water cycle — model describing how water moves from Earth's surface to the atmosphere and back again through evaporation, condensation, and precipitation

nitrogen cycle — model describing how nitrogen moves from the atmosphere to the soil, to living organisms, and then back to the atmosphere

Academic Vocabulary

Define **model** *as it is used in the definitions above. Use a dictionary to help you.*

model — a tool used to help visualize something that cannot be directly observed

Name _____ Date _____

Main Idea

Details

The Cycles of Matter

I found this information on page _____.
SE, p. 720
RE, p. 348

Summarize *the importance of* cycles *to life on Earth.*

Earth has only a certain amount of water, carbon, nitrogen, oxygen, and other materials needed for life. These materials are constantly cycled to provide a continuous supply.

The Water Cycle

I found this information on page _____.
SE, pp. 720–721
RE, p. 349

Model *the* water cycle *in a drawing.*

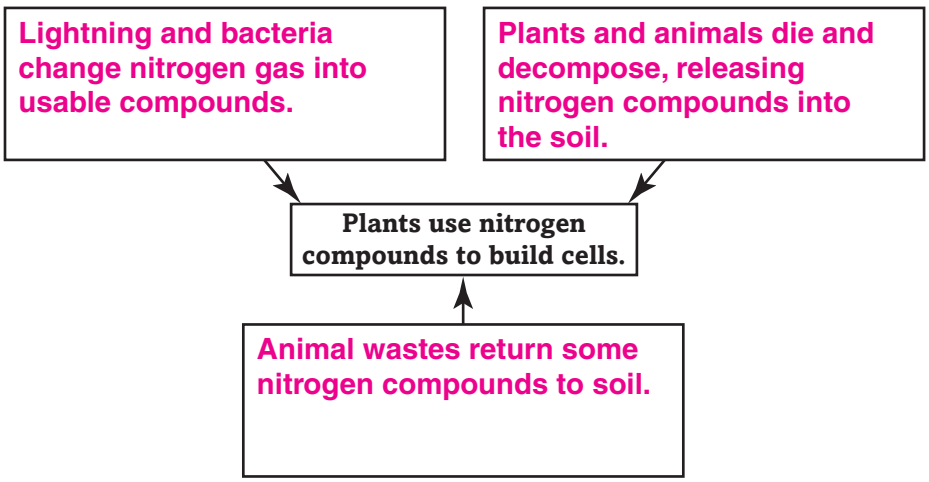
- Label phases of the cycle including evaporation, transpiration, condensation, and precipitation.
- Label the sources and forms the water takes.
- Use arrows to show the direction in which water is moving at each part of the cycle.

Drawings should include information about the following processes: evaporation (water changing to gas); transpiration (water evaporating from plant leaves); condensation (water vapor changing to liquid water); and precipitation (water falling to Earth in various forms).

The Nitrogen Cycle

I found this information on page _____.
SE, p. 722
RE, p. 350

Identify *the three ways that* nitrogen *is made available to plants.*



Name _____ **Date** _____

Section 2 Cycles in Nature (continued)

Main Idea

I found this information on page _____.
SE, p. 723
RE, p. 351

Details

Describe *how harvesting removes soil nitrogen and how fertilizer and nitrogen-fixing crops can increase the amount of nitrogen in soil.*

Harvesting: removing all plant material prevents it from decaying and returning nitrogen to the soil

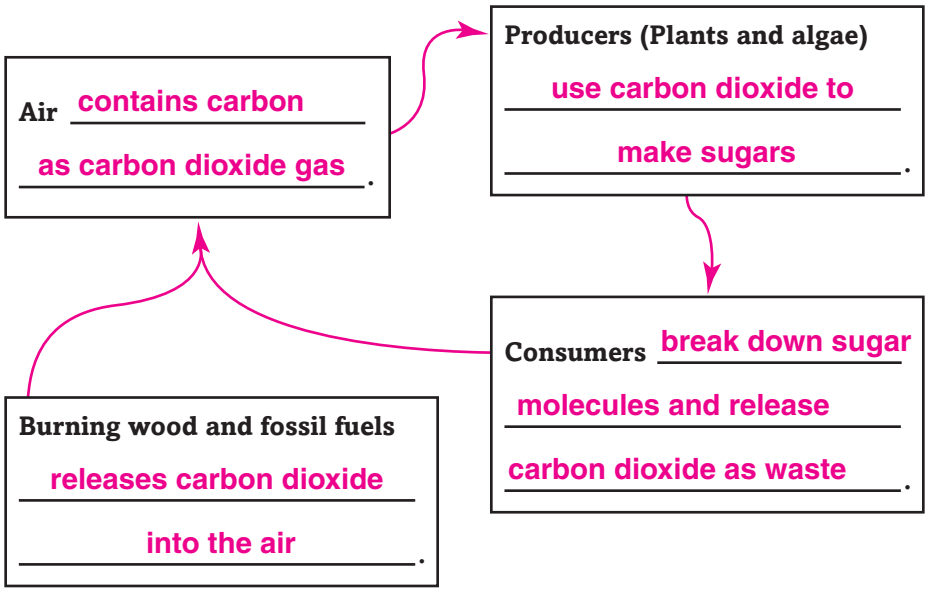
Fertilizer: contains nitrogen compounds that plants need for growth; can be added to increase soil nitrogen and fertility

Nitrogen-fixing crops: crops on which nitrogen-fixing bacteria live; bacteria supply nitrogen compounds to the plants and the soil

The Carbon Cycle

I found this information on page _____.
SE, p. 725
RE, p. 351

Model *the* carbon cycle. *Identify the role of each item shown in the cycle. Draw arrows showing the flow of carbon through the system.*



Connect It

Choose an organism. Explain its role in the water, nitrogen, and carbon cycles.

Student responses will vary depending on organism chosen. A tree uses water and releases it as water vapor through transpiration. It takes nitrogen compounds from the soil and uses the compounds for its processes. It uses carbon dioxide for photosynthesis and releases oxygen into the air.

Name _____ **Date** _____

The Nonliving Environment

Section 3 Energy Flow

Skim *Section 3 of your book. Read the headings and look at the illustrations. Write three questions that come to mind.* Accept all reasonable responses.

1. What is chemosynthesis?
2. What is a hydrothermal vent?
3. How are food webs different from food chains?

Review Vocabulary

Define energy *to show its scientific meaning.*

energy — the ability to cause change

New Vocabulary

Define the following terms to show their scientific meanings.

chemosynthesis — process in which producers make energy-rich nutrient molecules from chemicals

food web — model that shows the complex feeding relationships among organisms in a community

energy pyramid — model that shows the amount of energy available at each feeding level in an ecosystem

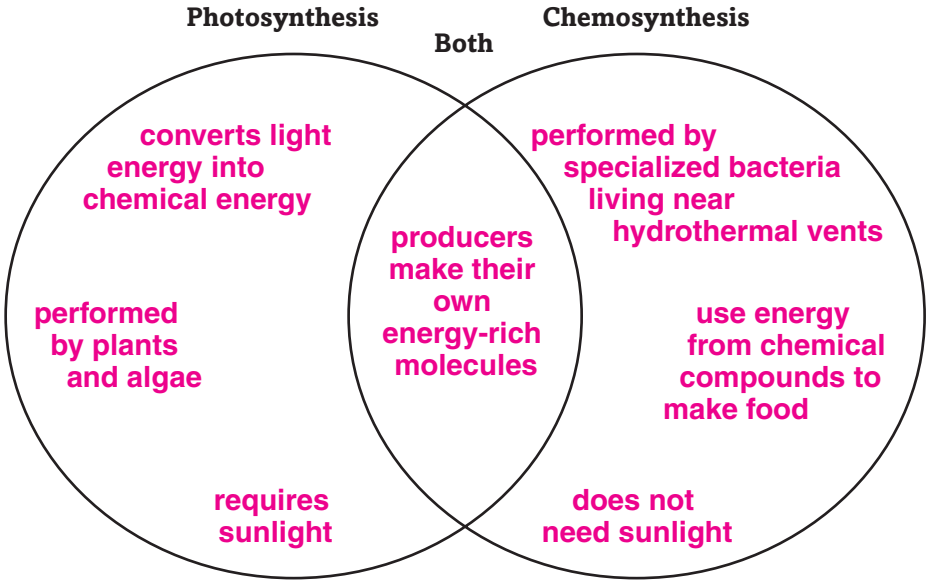
Academic Vocabulary

Use a dictionary to locate the scientific meaning of convert. *Write a sentence using that scientific meaning.*

convert — A power plant converts energy from fossil fuels into electrical energy.

Name _____ Date _____

Section 3 Energy Flow (continued)

Main Idea	Details
Converting Energy *I found this information on page _____.* SE, pp. 726–727 RE, pp. 353–354 Encourage students to be as detailed as possible. Students with the SE may be able to provide more detail than students with just the RE.	**Compare and contrast** photosynthesis *and* chemosynthesis. *Complete the Venn diagram with at least seven points of information from your book.* Accept all reasonable responses. 
Energy Transfer *I found this information on page _____.* SE, p. 727 RE, p. 354	**Create** *an example of a* food chain. • Include and label a producer, a herbivore, and a carnivore or omnivore that eats the herbivore. • Use arrows to show the transfer of energy. Drawings should show plant or bacterial producers, first level consumers, and second-level consumers, and should indicate that energy and matter are transferred up the chain from producers through first-level consumers to second-level consumers.

Name _____ **Date** _____

Section 3 Energy Flow (continued)

Main Idea

I found this information on page _____.
SE, p. 728
RE, p. 355

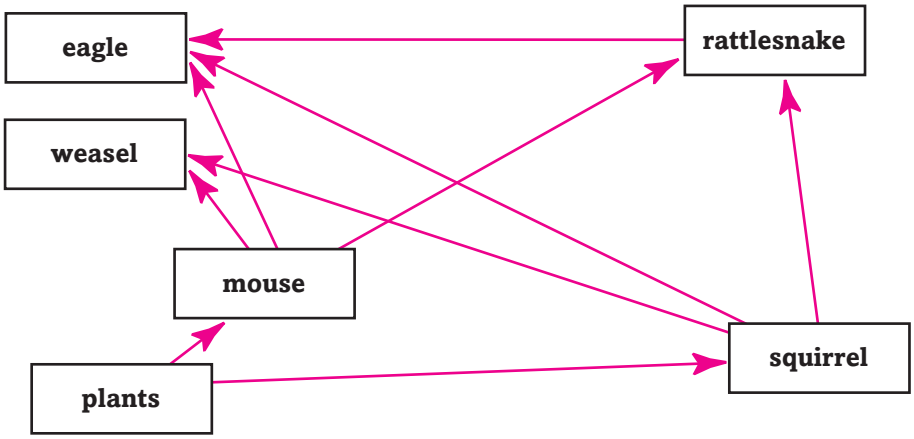
Some students may need assistance identifying some feeding relationships in the web. Encourage them to use books or other resources to identify each organism's food.

Energy Pyramids

I found this information on page _____.
SE, p. 729
RE, p. 355

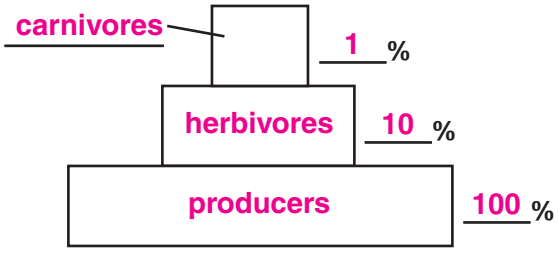
Details

Synthesize *information about* food webs. *Draw arrows to show the energy transfers in the food web shown.*



Sequence *the levels of an* energy pyramid.

- Label each level as containing carnivores, herbivores, or producers.
- Label each level with the percentage of total energy that is available at that level.



Synthesize It

Describe the flow of matter and energy in a food chain made up of grasses, mice, and hawks, and what might happen to the food chain if a fire destroyed much of the grass. Accept all reasonable responses.

Matter and energy will move from the grasses to the mice to the hawk. When fire burns off some grass, the mice will not have enough food to survive and the population will decline. The hawks will then not have enough food, and that population will decline.

Name _____ **Date** _____

Tie It Together

A developer wants to build homes on land near your community and wants to know how the environment will affect the people who live in the homes, and how the homes will affect the environment.

Prepare an environmental study for the developer, including information about

- the abiotic factors in the area that could affect the people in the home
- how the new homes might affect natural cycles and food webs in the area

Use paragraphs and/or pictures to help you explain your points.

Accept all reasonable responses. Encourage students to research local ecosystems to find out more about the water, soil, organisms, and climate found there.

Name _____ Date _____

The Nonliving Environment

Chapter Wrap-Up

Review the ideas you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column, then complete the table by filling in the third column. How do your ideas compare with those you provided at the beginning of the chapter?

K What I know	W What I want to find out	L What I learned
		Accept all reasonable responses.

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

Write three things that you learned while studying this chapter.

Accept all reasonable responses. 1. Living organisms depend on one another for food and energy. 2. Matter is recycled through Earth's biosphere. 3. Energy can be converted from one form to another and transferred from one organism to another.

Name _____ Date _____

Ecosystems

Before You Read

Think about the terms and descriptions below. Infer which term most closely matches the description and write it on the line.

	biome ecosystem estuary intertidal zone
ecosystem	community of living organisms interacting with each other and their physical environment
intertidal zone	part of the shoreline that is under water at high tide and exposed to the air at low tide
biome	a large geographic area with an interactive environmental community and similar climate
estuary	extremely fertile area where a river meets an ocean; contains a mixture of freshwater and saltwater and serves as a nursery for many species

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

What traits might plants on a burning hillside have that enable them to survive and reproduce? **Accept all reasonable responses.**

Traits of trees would include thick bark and high branches. Shrub traits would include rhizomes and root systems that sprout after they've been burned back.

Name _____ Date _____

Ecosystems

Section 1 How Ecosystems Change

Skim *through Section 1 of your text. Write three things that might be discussed in this section.* Accept all reasonable responses.

1. succession
2. new soil
3. forest fires

Review Vocabulary

Define *the following key terms using your book or a dictionary.*

ecosystem

community of living organisms interacting with each other and their physical environment

New Vocabulary

climax community

stable, end stage of ecological succession in which balance exists in the absence of disturbance

pioneer species

first organisms to grow in new or disturbed areas; break down rock and build up organic material so that other plants can grow

succession

natural, gradual changes in the types of species that live in an area; can be primary or secondary

Academic Vocabulary

stable

firmly established; not changing or fluctuating

Name _____ Date _____

Section 1 How Ecosystems Change (continued)

Main Idea

Ecological Succession

I found this information on page _____.
SE, p. 740
RE, p. 357

I found this information on page _____.
SE, pp. 740–741
RE, pp. 357–358

Have students work with a partner to complete the comparison chart on primary and secondary succession.

Details

Sequence *the steps in the succession of a lawn to a* climax community. *The first one has been completed for you.*

	Succession of a Lawn to Climax Community
1.	The grass would get longer.
2.	It would look like a meadow.
3.	Animals and wind would carry seeds into the area.
4.	Plants would grow from the seeds.
5.	Trees might sprout.

Organize *the information from your book to compare* primary succession *with* secondary succession.

	Primary Succession	Secondary Succession
	Lava from a volcano	Fire consumes a forest
Land consists of	barren rock	dead trees, ash-covered soil
Starts with	Lichens break down rock and decay, adding organic material.	Soil contains seeds.
Animals and wind carry	seeds	more seeds
Plants add	organic material	organic material
Wildlife	moves in	moves in

Name _____ **Date** _____

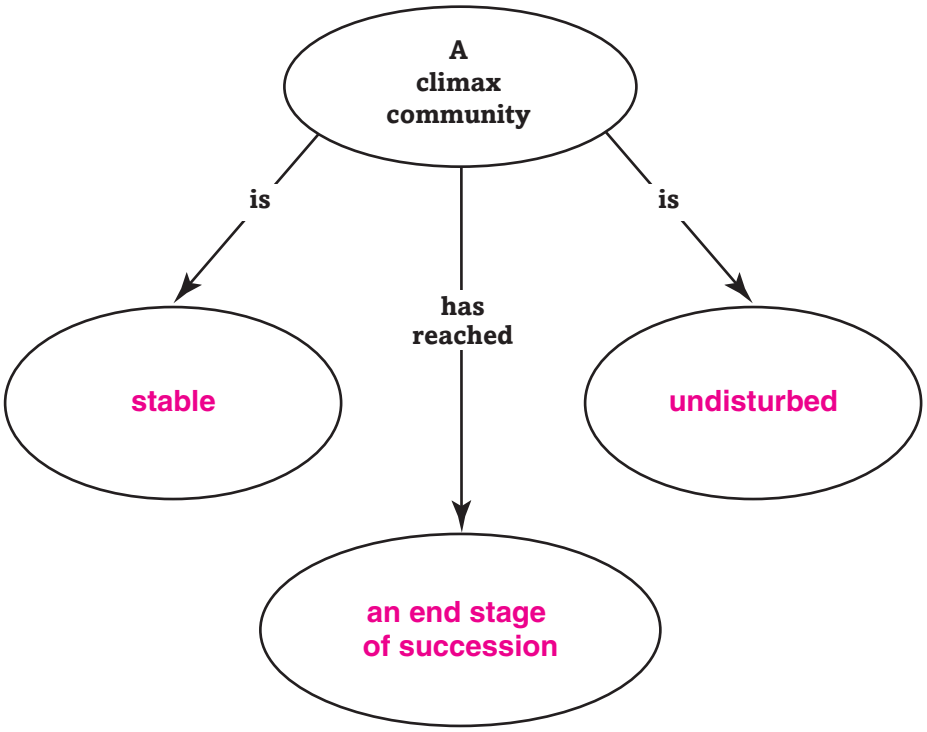
Section 1 How Ecosystems Change (continued)

Main Idea

I found this information on page _____.
SE, p. 743
RE, p. 358

Details

Complete *the graphic organizer to better understand the characteristics of a climax community.*



I found this information on page _____.
SE, p. 743
RE, p. 358

Identify *the three main characteristics of a forest climax community.*
Accept all reasonable responses.

1. community remains stable
2. new trees grow when old trees die
3. few changes of species occur

Connect It

Use the information you have learned about succession to predict the growth of a community in a flooded river basin. Hypothesize whether the succession would be primary succession or secondary succession. Support your answer with facts from your book. Accept all reasonable responses.

Secondary succession would occur. Seeds and soil would already be present. Animals and wind carry in more seeds. Pioneer species grow and wildlife moves in.

Name _____ Date _____

Ecosystems

Section 2 Biomes

I found this information on page _____.
SE, p. 744
RE, p. 361

Analyze *Look at the world map of the seven major land biomes in your book. Infer two factors you think scientists might use to classify biomes of the world.* Accept all reasonable responses.

1. topography
2. similar climate

Review Vocabulary

climate

Use the word **climate** *in a scientific sentence.*

The climate of a region partly determines the types of organisms that can live in it.

New Vocabulary

Define *Read the definitions below. Write the key terms on the blanks in the left column.*

tropical rain forest	most biologically diverse biome
grassland	ideal biome for growing crops and raising cattle and sheep
temperate deciduous forest	biome usually having four distinct seasons
tundra	cold, dry, treeless biome with a short growing season and permafrost
desert	biome with thin soil where organisms are adapted to survive extreme conditions
taiga	biome containing cone-bearing evergreen trees and dense forests

Academic Vocabulary

mature

Use a dictionary to define **mature** *as a verb.*

to become fully developed or ripe

Name _____ **Date** _____

Main Idea — Details

Major Biomes

I found this information on page _____.

SE, pp. 744–751
RE, pp. 360–364

Complete *the comparison chart using the world map of seven biomes.*

	Physical Description	Average Precipitation	Temperature	Location	Plant and Animal Life
Tundra	permafrost, cold, dry, treeless	less than 25 cm per year	average daily temperature: −12° C	South and North Poles, and on high mountains	Plants: lichens, grass, moss, shrubs Animals: mice, reindeer, musk ox, birds
Taiga	cold forest region	35–100 cm per year	temperature range: −54°C to 21°C	50°N–60°N latitude, N. America, Northern Europe, Asia	Plants: cone-bearing evergreen trees Animals: variety of species
Temperate Deciduous Forest	deciduous trees; four distinct seasons	75–150 cm per year	temperature range: 0°–30°C	eastern US, Europe, parts of Asia and Africa	Plants: deciduous trees Animals: variety of species; white tail deer
Temperate Rain Forest	dense forest with a variety of plants and animals	wet, 200–400 cm per year	average temperature; 9°–12°C	New Zealand, Chile, Pacific northwest of U.S.	Plants: lichens, mosses, tall trees Animals: variety of species, black bear and bobcats

Students may not be aware that ecosystems consist of parts, subsystems, and many interactions between biotic and abiotic factors.

Name _____ Date _____

Section 2 Biomes (continued)

Main Idea — **Details**

	Physical Description	Average Precipitation	Temperature	Location	Plant and Animal Life
Tropical Rain Forest	warm, wet weather, dense plant growth	more than 200 cm per year	average temperature: 25°C	near equator	4 zones of plant and animal life **Plants:** lush plant growth **Animals:** variety of species
Desert	bare ground, sand or thin soil	less than 25 cm per year	extreme heat and cold	western US and S. America, Africa, parts of Australia and Asia	**Plants:** few plants, spaced far apart **Animals:** kangaroos, snakes
Grasslands	lack of forests, dominated by grasses	dry season, 25–75 cm per year	mild to hot	prairies—N. America, steppes—Asia, savannas—Africa pampas—S. America	**Plants:** grasses **Animals:** kangaroos, zebras, impalas

Students may not understand that the majority of deserts are hot, dry places, but a few deserts are cold.

CONNECT IT

Analyze the information you recorded about biomes. Compare and contrast the tundra with the desert. Accept all reasonable responses.

Both the tundra and the desert have very little soil. Animal and plant species are limited. Both biomes have extreme temperatures and little precipitation. However, the tundra is very cold, while the desert is hot during the day and often cold at night.

Name _____ Date _____

Ecosystems

Section 3 Aquatic Ecosystems

Read the What You'll Learn *objectives of Section 3. Write questions that come to mind from reading these statements.*

1. What is the difference between freshwater and standing freshwater ecosystems? Accept all reasonable responses.
2. What lives in a freshwater ecosystem?
3. What lives in a saltwater ecosystem?

Review Vocabulary

Define *the key terms using your book or a dictionary.*

aquatic — growing or living in water

New Vocabulary

coral reef — structure formed from the calcium carbonate shells secreted by corals

wetland — a land region that is wet most or all of the year; swamp, bog

Academic Vocabulary

promote — to contribute to the growth of; to help bring into being

Freshwater Ecosystems

I found this information on page _____.

SE, p. 753
RE, p. 367

Organize *the four important factors that determine how well a species can survive in an* aquatic environment.

1. water temperature
2. amount of sunlight present
3. amount of dissolved oxygen in the water
4. amount of salt in the water

Name _____ Date _____

Section 3 Aquatic Ecosystems (continued)

Main Idea **Details**

Freshwater Ecosystems

I found this information on page _____.
SE, p. 753
RE, p. 367

Compare *fast-moving streams with slower-moving streams as you complete the sentences below about* freshwater environments.

Fast-moving Streams

Currents quickly wash loose particles downstream _____.

As water tumbles, air mixes in with it _____.

These streams have clearer water _____ and higher oxygen levels _____.

Slow-moving Streams

Water moves slowly and debris settles to the bottom _____.

These environments have higher nutrient levels _____, more plant growth _____, and organisms not well-adapted to swiftly moving water _____.

I found this information on page _____.
SE, p. 754
RE, p. 368

Classify *each statement as a characteristic of* **pond ecosystems, lake ecosystems,** *or* **both.** *Mark* **P** *for pond,* **L** *for lake, or* **B** *for both ecosystems.*

B more plants than flowing water environments

L deeper water and colder water temperatures

L larger body of water

B plankton floating near the surface

P ecosystem high in nutrients

P small, shallow body of water

L lower light levels at depth limit types of organisms

L plant growth limited to shallow water near shore

B water hardly moves

Name _____ **Date** _____

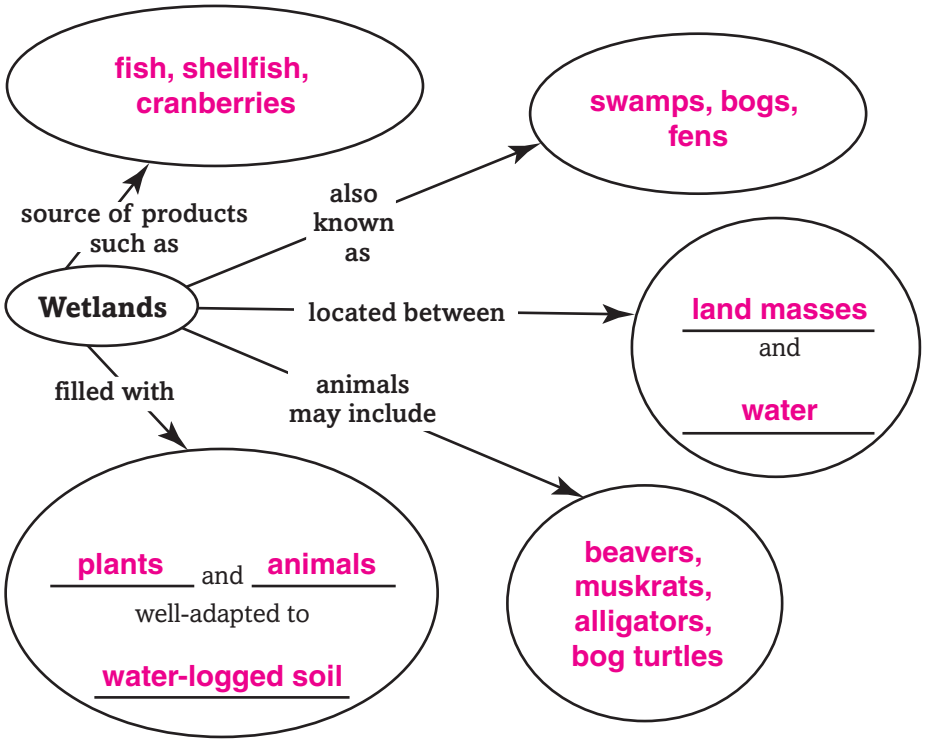
Section 3 Aquatic Ecosystems (continued)

Main Idea | **Details**

Freshwater Ecosystems

I found this information on page _____.
SE, p. 755
RE, p. 368

Organize *information about* wetlands *in the concept map.*



Saltwater Ecosystems

I found this information on page _____.
SE, pp. 757–759
RE, p. 369

Complete *the outline about* saltwater ecosystems.

I. Coral Reef ecosystems are systems that include the areas that surround a reef.

- **A.** reefs formed by calcium carbonate shells of coral
- **B.** damaged by run-off, sewage, sediment

II. Seashores

- **A.** affected by tides and wave action
- **B.** intertidal zone organisms must adapt to temperature, moisture, and salinity changes

III. Estuaries

- **A.** contain a mixture of fresh and salt water
- **B.** are important for seafood, and nurseries for ocean fish

Name _____ **Date** _____

Tie It Together

Interactions within Ecosystems

Select one of the ecosystems discussed in this chapter. You might choose a tundra ecosystem, a rain forest ecosystem, a coral reef ecosystem, or one of the other ecosystems. Take notes about your ecosystem on the lines below. Then, draw a picture of your ecosystem with its animal and plant inhabitants. Show any interactions that you described in your picture.

My ecosystem is a/an _____.

It includes these plants:

_____

_____

It includes these animals:

_____

_____

Its environment includes these conditions:

_____

_____

_____

Interactions between organisms include these:

_____

_____

_____

Interactions between organisms and the environment include these:

_____

_____

_____

_____

Sketch of My Ecosystem
Accept all reasonable responses.

Name _____ Date _____

Ecosystems Chapter Wrap-Up

Think about the terms and descriptions below. Write the term that most closely matches the description on the line in front of the description. Compare your previous responses with these.

	biome ecosystem estuary intertidal zone
ecosystem	community of living organisms interacting with each other and their physical environment
intertidal zone	part of the shoreline that is under water at high tide and exposed to the air at low tide
biome	a large geographic area with an interactive environmental community and similar climate
estuary	extremely fertile area where a river meets an ocean; contains a mixture of freshwater and saltwater and serves as a nursery for many species

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about ecosystems. **Accept all reasonable responses.**

1. Ecosystems change over time. 2. There are seven types of land biomes on Earth.

3. Human impact on ecosystems can be destructive.

Name _____ Date _____

Conserving Resources

Before You Read

Before you read the chapter, respond to these statements.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Before You Read	Conserving Resources
	• There is an unlimited supply of fossil fuels.
	• Sun, wind, and heat within Earth's crust can be used to generate power.
	• Acid precipitation washes nutrients from the soil.
	• The ozone layer emits radiation that can harm living cells.

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

List some resources, other than water, air, and fossil fuels, that we depend on and describe how we use them.

Wood, food crops, and soil are examples. Wood can provide shelter and home furnishings, food crops are needed for our own consumption and by other animals, and soil filters water and is needed by farmers to produce crops.

Name _____ Date _____

Conserving Resources

Section 1 Resources

Predict *the topics that will be discussed in Section 1 after reading the headings and looking at the illustrations.* Accept all reasonable responses.

1. what natural resources are
2. what fossil fuels are
3. alternatives to using fossil fuels

Review Vocabulary

Define geyser *to show its scientific meaning.*

geyser — a spring that emits intermittent jets of heated water and steam

New Vocabulary

Define the following terms to show their scientific meanings.

natural resource — parts of the environment that are useful or necessary for the survival of living organisms

hydroelectric power — electricity that is made when the energy of falling water is used to turn the turbines of an electric generator

nuclear energy — energy that is released when atomic nuclei are split apart

geothermal energy — heat energy contained in Earth's crust

Academic Vocabulary

Define modify. *Then use it in an original sentence to show its scientific meaning.*

modify — to undergo change; Sample sentence: Ozone depletion will modify the earth's atmosphere.

Name _____ Date _____

Section 1 Resources (continued)

Main Idea — **Details**

Natural Resources

I found this information on page _____.
SE, pp. 770–771
RE, pp. 371–372

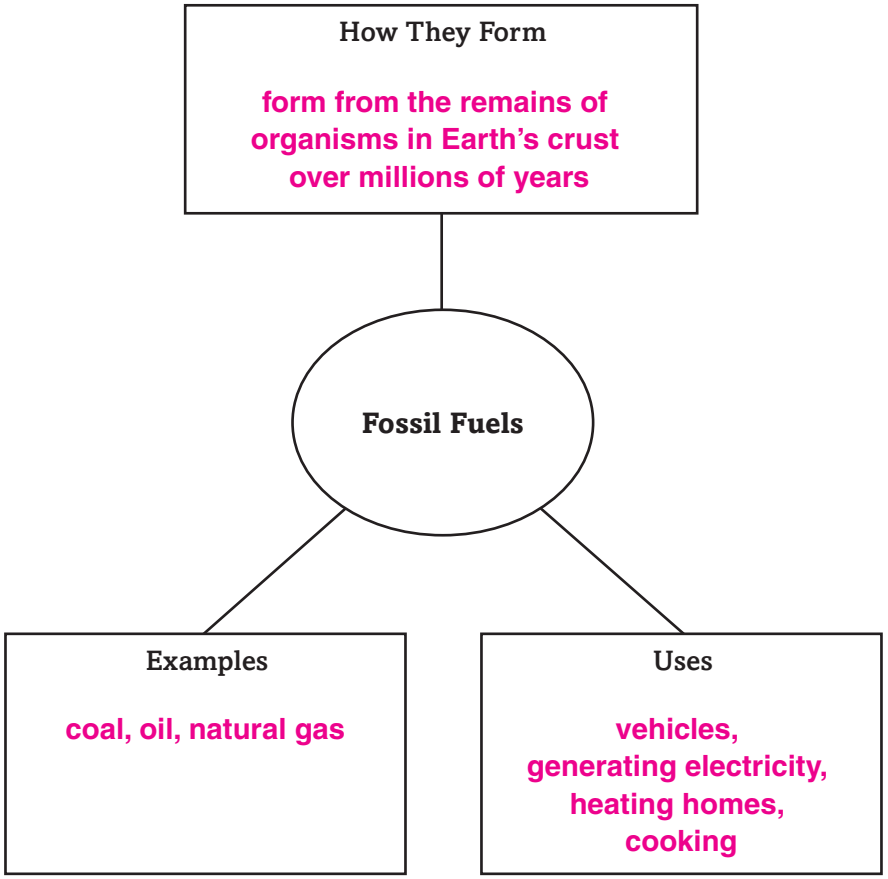
Compare renewable *and* nonrenewable resources *by completing the chart below.*

Type of Resource	Description	Examples
Renewable	resource that is recycled or replaced constantly by nature	sunlight, water, wind, air, plants
Nonrenewable	resource that is used up more quickly than it can be replaced by natural processes	minerals, petroleum

Fossil Fuels

I found this information on page _____.
SE, p. 772
RE, p. 372

Organize *information about* fossil fuels *in the concept web below.*



Name _____ **Date** _____

Section 1 Resources (continued)

Main Idea

I found this information on page _____.
SE, p. 772
RE, p. 372

Alternatives to Fossil Fuels

I found this information on page _____.
SE, pp. 773–776
RE, pp. 373–374

Have groups of students do research to determine regions where renewable sources might be good alternatives.

Details

Summarize *three reasons that fossil fuels need to be conserved.*

1. Supply is limited.
2. Ecosystems can be damaged.
3. Air pollution can be reduced.

Organize *information about* alternative energy resources *below.*

Alternative Energy Resource	Important Information
Hydroelectric power	kinetic energy of falling water turns a turbine; dam must be built; can cause environmental problems, such as flooding land; does not cause air pollution
Wind energy	wind turns blades of turbine that powers an electric generator; nonpolluting; limited by availability of steady wind
Geothermal energy	heat beneath Earth's surface is energy source; can be used only where volcanoes or geysers exist
Nuclear power	uranium nuclei are split; released heat is used to make steam that turns a generator; disadvantage is the need to dispose of radioactive wastes
Solar energy	photovoltaic cells are used to produce electricity from the energy of sunlight; only produce electricity when lighted

SUMMARIZE IT

Examine the circle graph in your book showing energy usage in the United States. Explain why so much of the United States' energy comes from fossil fuels in spite of the fact that fossil fuels cause pollution and are limited in supply.

Many alternative energy sources, such as wind and flowing water, can be used only in some regions. Using nuclear energy creates radioactive waste, and solar technology is still developing. Fossil fuels also are comparatively cheap.

Name _____ Date _____

Conserving Resources

Section 2 Pollution

Skim *the headings of Section 2 to determine three main types of pollution that will be discussed.*

1. air pollution
2. water pollution
3. soil pollution

Review Vocabulary

Define atmosphere *to show its scientific meaning.*

atmosphere

the whole mass of air surrounding Earth

New Vocabulary

Read each definition below. Write the correct vocabulary term in the blank to the left.

pollutant	substance that contaminates the environment
acid precipitation	precipitation that has a pH below 5.6
greenhouse effect	trapping of heat from the Sun by Earth's atmosphere
hazardous wastes	waste materials that are harmful to human health or poisonous to living organisms

Academic Vocabulary

Define affect *to show its scientific meaning.*

affect

to make something happen; to have an effect on

Name _____ Date _____

Main Idea

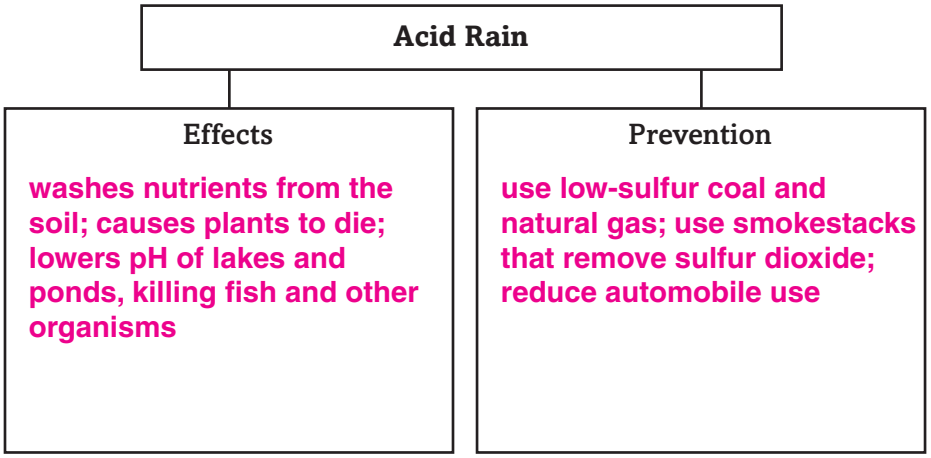
Details

Acid Precipitation

I found this information on page _____.

SE, p. 779
RE, p. 377

Complete *the graphic organizer below to identify the effects of* acid rain *and ways to prevent acid rain.*



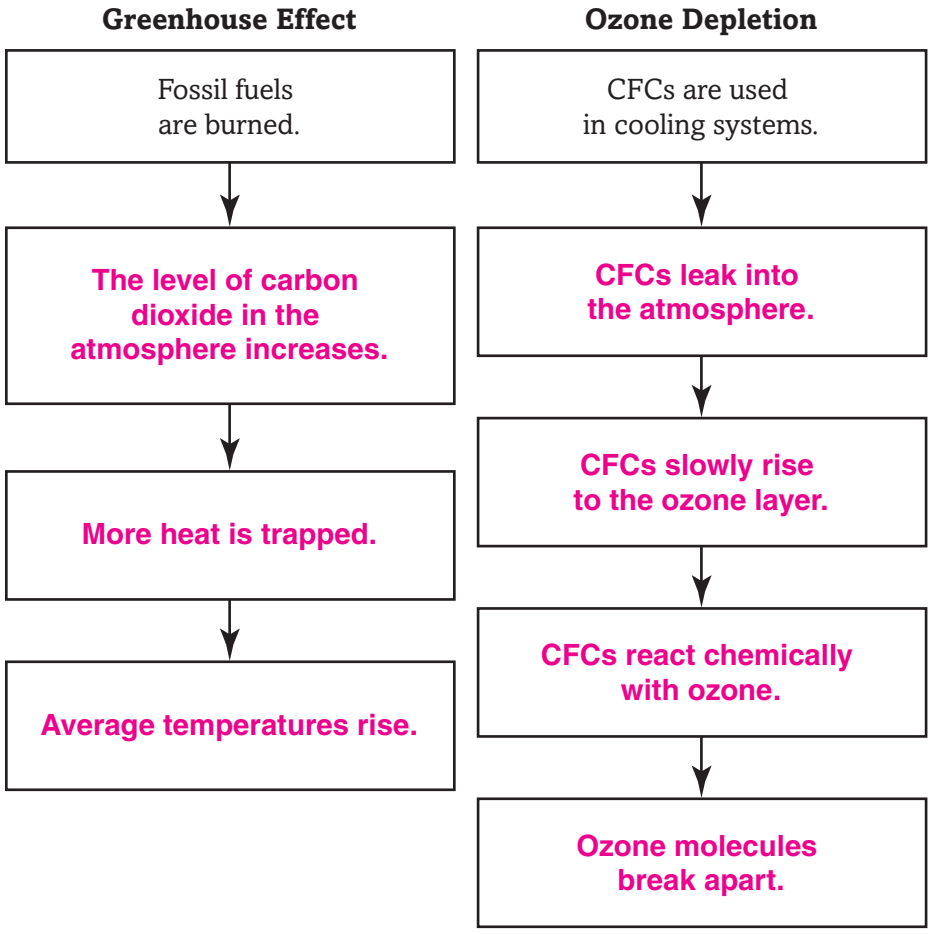
Greenhouse Effect and Ozone Depletion

I found this information on page _____.

SE, pp. 780–781
RE, pp. 377–379

Have students discuss the impact that the greenhouse effect and ozone depletion have on Earth's flora and fauna populations.

Sequence *the events that cause the* greenhouse effect *and* ozone depletion *by completing the following graphic organizers.*



Name _____ Date _____

Section 2 Pollution (continued)

Main Idea

Details

Indoor Air Pollution

I found this information on page _____.
SE, p. 782
RE, pp. 379–380

Compare and contrast *carbon monoxide and radon as sources of* indoor air pollution *by completing the following chart.*

Gas	Source	Effect
Carbon monoxide	burning of fuels such as charcoal and natural gas	can cause illness, even death
Radon	given off by some types of rocks and soils	can cause lung cancer

Water Pollution

I found this information on page _____.
SE, p. 783
RE, pp. 380–381

Identify *causes of the following three examples of* water pollution.

Accept all reasonable responses.

1. Surface water pollution: Pesticides can wash into lakes and streams.
2. Ocean water pollution: Oil spills can cause ocean pollution.
3. Groundwater pollution: Pollutants in soil can pollute aquifers.

Soil Loss and Soil Pollution

I found this information on page _____.
SE, pp. 785–786
RE, p. 381

Analyze *causes of* soil loss *and* soil pollution.

A. Causes of soil loss
1. Topsoil is blown away by wind and washed away by rain.
2. Some human activities increase the rate of erosion.

B. Causes of soil pollution
1. Pollutants move from water into the soil.
2. Air pollutants fall to the ground.

CONNECT IT

Explain in one sentence why people are concerned about pollution.

Accept all reasonable responses. Six billion people living on Earth put a strain on the environment.

Name _____ Date _____

Conserving Resources

Section 3 The Three Rs of Conservation

Scan *the headings of Section 3. List the* three Rs of conservation *below.*

1. reduce
2. reuse
3. recycle

Review Vocabulary

Define *the following terms. Then write a paragraph that includes the scientific meaning of all three terms.*

reprocessing

to subject to a special process or treatment in preparation for reuse

New Vocabulary

recycling

form of reuse that requires changing or reprocessing an item or natural resource

Academic Vocabulary

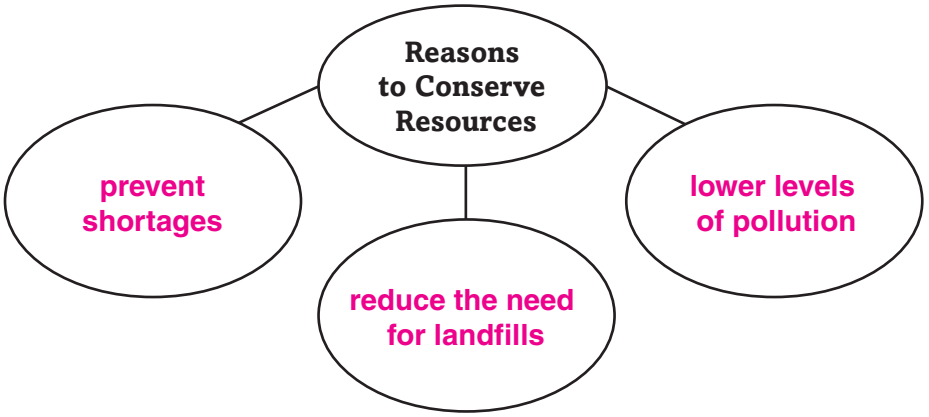
participate

to take part

Paragraph: Accept all reasonable responses. We can all participate in practicing conservation. For example, by reprocessing certain waste materials, we can save natural resources. By participating in recycling, we can reuse materials and decrease the burden on our landfills.

Name _____ Date _____

Section 3 The Three Rs of Conservation (continued)

Main Idea	Details
Conservation *I found this information on page _____.* SE, p. 788 RE, p. 383	**Identify** *reasons for conserving resources by completing the graphic organizer below.* 
Reduce *I found this information on page _____.* SE, p. 788 RE, p. 383	**Summarize** *four ways to reduce your own use of natural resources.* Accept all reasonable responses. 1. Walk instead of riding in a car. 2. Buy only the things I need. 3. Buy products that use less packaging. 4. Buy products that use recycled materials.
Reuse *I found this information on page _____.* SE, p. 788 RE, p. 383	**Define** reusing an item. *Then identify at least two examples of ways to reuse items.* **Definition:** to use an item more than once without changing it or reprocessing it **Examples:** Accept all reasonable responses. reusable canvas bags to carry home your purchases; donating outgrown clothes to charity; taking reusable plates and utensils on picnics instead of disposable paper items.

Name _____ **Date** _____

Section 3 The Three Rs of Conservation (continued)

Main Idea

Recycle

I found this information on page _____.

SE, pp. 789–791
RE, pp. 384–385

Have students investigate current levels of recycling as provided by the EPA.

Details

Summarize recycling *in the following chart.* Accept all reasonable responses.

Recycling	
Definition: form of reuse in which items or materials are reprocessed into new items	
Items that can be recycled	aluminum, glass, metals, paper, yard waste
Advantages of recycling	conserve resources; save space in landfills; in some cases, save money
How recycling is done	materials are picked up at curbside or otherwise collected, taken to reprocessing plants, eventually made into new products

Analyze *the graph that describes the recycling rates of key household items. Then complete the statements.*

The percentages of yard waste, old newsprint, and steel cans being recycled increased from 1990 to 2000.

The percentages of aluminum cans, plastic soda bottles, and glass containers being recycled decreased from 1995 to 2000.

Synthesize It

In a small group, discuss why some people do not recycle. Summarize your discussion in the space below. Accept all reasonable responses.

Students may suggest that sorting materials for recycling takes more time than throwing things away, or that recycling programs are not available in all places.

Name _____ **Date** _____

Tie It Together

Conservation

Brainstorm ways to increase the level of conservation practiced in your school. Set a conservation, reuse, or recycling goal. Write a plan to change the school's behavior to meet your goal. If new resources would be needed to implement your plan, hypothesize how you could raise money for what you need.

- Decide which method of conservation you are most concerned about.
- Describe the benefits of practicing that method of conservation in your school.
- Identify practical ways that students can practice conservation.

Accept all reasonable responses. Students should present reasonable plans for conservation. Encourage students to prepare posters or brochures explaining their plans to be displayed in the school library.

Name _____ Date _____

Conserving Resources Chapter Wrap-Up

Now that you have read the chapter, think about what you have learned and complete the table below. Compare your previous answers with these.

1. Write an **A** if you agree with the statement.
2. Write a **D** if you disagree with the statement.

Conserving Resources	After You Read
• There is an unlimited supply of fossil fuels.	D SE, p. 772 RE, p. 372
• Sun, wind, and heat within Earth's crust can be used to generate power.	A SE, p. 773 RE, p. 373
• Acid precipitation washes nutrients from the soil.	A SE, p. 779 RE, p. 377
• The ozone layer emits radiation that can harm living cells.	D SE, p. 781 RE, p. 378

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
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- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, identify three new ways you could practice conservation. Accept all reasonable responses.

1. Walk places instead of riding in a car. 2. Turn off lights when I leave a room or hallway.

3. Recycle cans and bottles instead of throwing them away.

Academic Vocabulary

adapt: to change to fit new conditions

affect: to make something happen; to have an effect on

annual: plant that completes its life cycle in one year

apparent: readily seen, visible, readily understood or perceived; evident; obvious

area: amount or extent of a surface

attach: to be connected

benefit: to help

capable: able to do things; fit

chemical: made by chemistry

chemical bond: the force holding atoms together in a molecule

code: (noun) set of signals representing letters or numerals, used to send messages; (verb) to put in the form or symbols of a code

complex: composed of two or more parts; complicated

compound: (adjective) made of two or more separate parts or elements

constant: not changing; staying the same

contact: act or state of touching or meeting

convert: to change from one form or function to another

coordinate: to cause to work well together

cycle: a complete set of events or phenomena recurring in the same sequence

decline: to weaken or lessen

definite: having exact limits in size, shape, or number of parts

detect: to catch or discover; to manage to perceive

distribute: to divide among several or many

dominate: to control or rule

energy: capacity to perform some type of work or activity

environment: living and nonliving factors that surround an organism

estimate: (noun) an opinion of the value, quality, size, or cost of something; (verb) to form an opinion by reasoning

external: on, or for use on, the outside of the body

facilitate: to make easy or easier

flexible: able to bend or flex

function: (noun) a specific job or purpose; (verb) to carry out a specific action

fundamental: serving as an original or generating source; primary

generate: to originate or bring into existence

hypothesis: something that is suggested as being true for the purposes of argument or of further investigation

identical: same

individual: separate

insert: to put or fit (something) into something else

Academic Vocabulary

interact: to act on one another

intermediate: in the middle or being between

internal: of or on the inside

interpret: to tell the meaning of; to understand

involve: to include; to have as part of itself

layer: one thickness of something

mature: to become fully developed or ripe

method: way of doing something; a process

migrate: to move from one place to another place

model: a description used to help visualize something that cannot be directly observed

modify: to undergo change

network: a group of related parts

obtain: to get possession of, especially by some effort

occur: to take place; to be found

participate: to take part; share

physical: having to do with the body

process: series of steps performed in doing something

promote: to contribute to the growth of; to help bring into being

react: to act because something has happened; respond

reject: to refuse to accept or use

relax: to become inactive and lengthen

release: to set free; to let go

remove: to get rid of

require: to be in need of

resource: something used for help or support

respond: to react in response

series: a number of similar things coming one after another

similar: almost, but not exactly the same

soil: mixture of weathered rock, organic matter, water, and air that supports the growth of plant life

source: any person, place, or thing by which something is supplied

specific: exact; particular

stable: firmly established; not changing or fluctuating

structure: arrangement of parts or the way parts are arranged

survive: to continue living

transfer: to convey or transport from one place to another

transport: to carry from one place to another; the act, process, or means of transporting

visible: able to be seen

widespread: widely scattered or prevalent