About the Consultant

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<td>Section 38-3</td>
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<td>Section 39-1</td>
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<td>Section 39-2</td>
<td>383</td>
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<tr>
<td>Chapter 39 Wrap-Up</td>
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</table>
Using Your Science Notebook

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

- **Note taking tools** based on the Cornell Note-Taking System.
- **K-W-L Charts** help you assess what you already know about a concept and identify what you would like to find out.
- **Science Journals** help you make connections to the concepts in the chapter.
- **Vocabulary** helps you understand information better.

**A View of the Cell**

Section 7.1 The Discovery of Cells

**Main Idea**

<table>
<thead>
<tr>
<th>Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

**Vocabulary**

<table>
<thead>
<tr>
<th>Use your book to define each term.</th>
</tr>
</thead>
<tbody>
<tr>
<td>cell theory</td>
</tr>
<tr>
<td>compound light microscope</td>
</tr>
<tr>
<td>electron microscope</td>
</tr>
<tr>
<td>eukaryote</td>
</tr>
<tr>
<td>nucleus</td>
</tr>
<tr>
<td>organelle</td>
</tr>
<tr>
<td>prokaryote</td>
</tr>
</tbody>
</table>

**Academic Vocabulary**

Define the following term.

function

**Review Vocabulary**

Use your book to define the following term.

organization
Section 7.1 The Discovery of Cells (continued)

Main Idea

Two Basic Cell Types

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summarize information about electron microscopes by listing an example.</td>
</tr>
<tr>
<td>Creep and flex the extracellular matrix in the form of DNA.</td>
</tr>
<tr>
<td>Considerable information about electron microscopes by listing an example.</td>
</tr>
<tr>
<td>Whole cell types include bacteria, archaebacteria, and eukaryotes.</td>
</tr>
<tr>
<td>Bacteria are prokaryotic cells; eukaryotic cells are eukaryotic cells.</td>
</tr>
<tr>
<td>Eukaryotic cells are eukaryotic cells.</td>
</tr>
</tbody>
</table>

Synthesize

Explain how some physiological techniques have allowed scientists to expand their knowledge of cells.

Writing activities help you understand the information being presented and make connections between the concepts and the real-world.

Graphic Organizers help you summarize information in a visual format.

The Chapter Wrap-Up helps you assess what you have learned in the chapter and prepare for chapter tests.

A View of the Cell chapter Wrap-Up

In the "What I Wanted to Find Out" column, copy the questions you found in the chapter preview. In the "What I Learned" column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
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<tr>
<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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</tbody>
</table>

Use this checklist to help you study:

- Review daily homework assignments.
- Review Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned.

- | - |
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</table>
Note-Taking Tips

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

• Before class, ask what your teacher will be discussing in class. Review mentally what you already know about the concept.

• Be an active listener. Focus on what your teacher is saying. Listen for important concepts. Pay attention to words, examples, and/or diagrams you teacher emphasizes.

• Write your notes as clear and concise as possible. The following symbols and abbreviations may be helpful in your note-taking.

<table>
<thead>
<tr>
<th>Word or Phrase</th>
<th>Symbol or Abbreviation</th>
<th>Word or Phrase</th>
<th>Symbol or Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>for example</td>
<td>e.g.</td>
<td>and</td>
<td>+</td>
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<tr>
<td>such as</td>
<td>i.e.</td>
<td>approximately</td>
<td>~</td>
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<tr>
<td>with</td>
<td>w/</td>
<td>therefore</td>
<td>:</td>
</tr>
<tr>
<td>without</td>
<td>w/o</td>
<td>versus</td>
<td>vs</td>
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</tbody>
</table>

• 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.

• When working out an example, write what you are doing to solve the problem next to each step. Be sure to use your own words.

• Review you notes as soon as possible after class. During this time, organize and summarize new concepts and clarify misunderstandings.

Note-Taking Don’ts

• Don’t write every word. Concentrate on the main ideas and concepts.

• Don’t use someone else’s notes as 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.
Biology: The Study of Life

Before You Read

Use the “What I Know” column to list three things you know about biology. Then list three questions you have about biology in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
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</thead>
<tbody>
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<td>1.</td>
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Animals, plants, and even bacteria and viruses are considered living things. But what do we mean when we say that an organism is a living thing? In the space below, describe two characteristics that are common to all living things.
Biology: The Study of Life

Section 1.1 What is biology?

Main Idea

Details

Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. ____________________________
2. ____________________________
3. ____________________________

New Vocabulary

adaptation biology development energy environment evolution growth homeostasis organism organization reproduction response species stimulus

Use your book to help you write the correct vocabulary term in each blank.

The study of life that seeks to provide an understanding of the natural world is called ________. A(n) ________ is anything that possesses all the characteristics of life. A(n) ________ is a group of organisms capable of interbreeding and producing fertile offspring in nature.

The gradual change in a species through adaptations over time is called ________. The ________ is the surroundings to which an organism must adjust; it includes air, water, weather, temperature, organisms, and many other factors. A ________ is anything in the environment that causes an organism to react. An organism’s reaction to a change in its environment is called a ________. A(n) ________ is the evolution of a structure, behavior, or internal process that enables an organism to respond to environmental factors and survive to produce offspring.

There are several characteristics of living things. ________ is the orderly structure of cells in an organism. ________ refers to changes in an organism resulting in an increase in the amount of living material and the formation of new structures, and ________ refers to the changes that take place during an organism’s life. ________ is the production of offspring by an organism. Organisms have ________, or the ability to control their internal environment to maintain conditions suitable for survival. Organisms use ________, or the ability to cause change, to perform biological functions.
Section 1.1 What is biology? (continued)

(Main Idea) __________

The Science of Biology

I found this information on page __________.

(Biologists Study the Diversity of Life)

I found this information on page __________.

(Characteristics of Living Things)

I found this information on page __________.

(Details) __________

List four kinds of information you learn about living things when you study biology.

1. ________________  3. __________________
2. ________________  4. __________________

Describe one way that human beings depend on plants and one way that humans depend on animals.

_________________________________________________________________________

_________________________________________________________________________

Explain why it is impossible to study one living thing without studying other living things.

_________________________________________________________________________

_________________________________________________________________________

Complete the graphic organizer about living and nonliving things by writing the correct term in each blank.

Living and Nonliving Things

__________________________ can have one or more _________ of life, but it is necessary to have all of the characteristics of life to be considered ____________.

Things that have all the characteristics of life are known as ____________.

All organisms are made of one or more ____________.

Each cell contains the ____________ that has the information needed to control the ________________ of the organism.
Main Idea

Characteristics of Living Things
I found this information on page ________.

Details

Consider the picture in your book of the students studying organisms. Considering the environment the students are searching in, list four organisms that they might find.

1. __________________________________________
2. __________________________________________
3. __________________________________________
4. __________________________________________

Create Read the information in your book about reproduction and species. Then construct two review questions that can be answered from the given information.

Question: ______________________________________
______________________________________________
Answer: _______________________________________  
______________________________________________

Question: ______________________________________
______________________________________________
Answer: _______________________________________  
______________________________________________

Describe two examples of adaptation using the graphic organizers below.

1. Adaptation
2. Adaptation
Characteristics of Living Things

I found this information on page ___________.

Summarize Complete the outline of the characteristics of living things.

I. Structure or Organization
   A. 
   B. 

II. Reproduction
   A. 
   B. 

III. Growth and Development
   A. 
   B. 

IV. Environmental Adjustments
   A. 
   B. 
   C. 

COMPARE How is biology similar to and different from other sciences you have studied, such as Earth science?


Biology: The Study of Life  5
Scan the titles, boldfaced words, pictures, figures, and captions in Section 2. Write two facts you discovered about the methods of biology as you scanned the section.

1. 

2. 

Use your book to define each term.

control

data

dependent variable

experiment

hypothesis

independent variable

scientific methods

theory
Section 1.2 The Methods of Biology (continued)

Main Idea

Observing and Hypothesizing

I found this information on page __________.

Experimenting

I found this information on page __________.

Details

Summarize the relationship between observations and hypotheses by completing the graphic organizer. Write each of the following in the correct locations:

- an explanation for a question or problem that can be tested
- helps scientists decide what questions to ask
- hypothesis
- observation

Contrast Define control group and experimental group. Then give an example of each from your book.

Control Group: ____________________________________________

Experimental Group: ________________________________________

Classify each of the following as a dependent variable or an independent variable. Write dependent or independent next to each description.

the plant produces more seeds ________________

giving a plant extra water ________________

the plant grows taller ________________

limiting the sunlight a plant receives ________________

planting seeds in sand ________________

the plant dies ________________

planting seeds in clay ________________
Complete the pyramid diagram to help you review scientific methods. Arrange the steps used in scientific research in the order that they usually take place. Place the letter next to each step in the correct order in the pyramid.

a. conduct experiments
b. form a hypothesis
c. observe and identify a problem to solve
d. study results data to see if hypothesis is supported

I found this information on page __________.

Summarize why it is important for information about experiments to be published in scientific journals and computer databases.

Explain the difference between a hypothesis and a theory.

Suppose you conduct an experiment in which one group of plants receives extra fertilizer and another group receives extra water. Is your experiment controlled or uncontrolled? Explain.
Biology: The Study of Life
Section 1.3 The Nature of Biology

Main Idea

Details

Skin Section 3 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. __________________________________________

2. __________________________________________

3. __________________________________________

4. __________________________________________

Review Vocabulary

Use your book to define the following term.

experiment

New Vocabulary

Use your book to define each term.

ethics

technology

Write a paragraph that tells how ethics influence the ways that people use technology. Give an example.

__________________________________________

__________________________________________

__________________________________________

__________________________________________

Academic Vocabulary

Define the following terms.

principle

qualitative
Kinds of Information

Classify each of the following examples as quantitative data, qualitative data, or neither. Write the letter for each example in the correct column. Then write your own example of each type of data on the lines below the table.

a. how birds build nests    | Quantitative
b. how long it takes a student to finish his/her homework | Qualitative
c. how wasps gather mud | Quantitative
d. if a movie is good | Qualitative
e. the number of ants that live in an ant colony | Quantitative
f. whether kittens are cute | Qualitative

Quantitative data: ________________________________
______________________________

Qualitative data: ________________________________
______________________________

Real-World Connection

Suppose you were on a committee to decide whether to spend research money on pure science or on new technology. Which choice would you support? Explain.

_________________________________________________________________

_________________________________________________________________
Formulate Suppose your friend tells you that a car can be characterized as a living thing because it possesses organization—all of its parts work together in an orderly system. Construct a response using the four characteristics of living things to disprove your friend’s statement.

Research a case where an introduced species has caused damage to a native species and/or the environment. Find a case that is not discussed in your book.

Create your own sketch of an example of a stimulus and response that an organism might experience. Use your book for ideas, but create your own unique sketches.
Biology: The Study of Life Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

☐ Study your Science Notebook for this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Reread the chapter and review the tables, graphs, and illustrations.
☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

After reading this chapter, list three things you have learned about biology.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Chapter Wrap-Up
## Principles of Ecology

### Before You Read

Use the “What I Know” column to list three things you know about ecology. Then list three questions you have about ecology in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

**Science Journal**

Organisms such as birds get what they need to survive from their environment. Hypothesize why it is important for birds to be able to fly long distances.
Principles of Ecology
Section 2.1 Organisms and Their Environment

Main Idea

Skim Section 1 of your book. Write two questions that come to mind from the headings and illustration captions.

Details

Use the vocabulary words in the left margin to complete the graphic organizer below. List the biological levels from largest to smallest.

New Vocabulary

abiotic
biological community
biosphere
biotic
commensalism
ecology
ecosystem
habitat
mutualism
niche
parasitism
population
symbiosis

Levels of Organization

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
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<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Compare the terms in the tables by defining them side-by-side.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>habitat</td>
<td>niche</td>
</tr>
<tr>
<td>abiotic</td>
<td>biotic</td>
</tr>
<tr>
<td>symbiosis</td>
<td></td>
</tr>
<tr>
<td>commensalism</td>
<td>mutualism</td>
</tr>
<tr>
<td></td>
<td>parasitism</td>
</tr>
</tbody>
</table>

Define the prefix eco- and the suffix -logy using your book.
Section 2.1 Organisms and Their Environment (continued)

**Main Idea**

Sharing the World

*I found this information on page __________.*

**Details**

Identify the abiotic and biotic factors in this sequence. Write abiotic or biotic in each square.

1. lack of rainfall
2. dry soil
3. certain plants die
4. rivers dry up
5. animals do not reproduce
6. the population of a species diminishes

Describe the environment in a journal entry. Imagine that you are an ecologist. Choose one plant or animal in nature and write four observations of that organism.

**Journal Entry**

Organism __________________________

1. __________________________
   __________________________
   __________________________
   __________________________

2. __________________________
   __________________________
   __________________________
   __________________________

3. __________________________
   __________________________
   __________________________
   __________________________

4. __________________________
   __________________________
   __________________________
   __________________________

Classify each level of organization that is described.

__________ a group of organisms all the same species
__________ interacting populations
__________ an individual living thing made of cells
__________ all the different populations in a community

Biosphere

*I found this information on page __________.*

Levels of Organization

*I found this information on page __________.*
Organisms in Ecosystems, Symbiosis

I found this information on page _________.

Model a community with several organisms. Show two organisms occupying the same niche. Below your sketch, explain why those two organisms cannot usually occupy the same niche for very long.

Write your own example of mutualism, commensalism, and parasitism.

1. ____________________________

2. ____________________________

3. ____________________________

CONNECT

Bacteria live inside our bodies. Discuss good, neutral, and harmful things that bacteria do while living in our bodies. Incorporate the terms parasitism, mutualism, habitat, and niche in your discussion.

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________
Principles of Ecology
Section 2.2 Nutrition and Energy Flow

Main Idea

Organize As you read this section, make a list of the ways in which organisms obtain energy.

Details

Review Vocabulary

Use your book to define the following term. Then name the ultimate source of energy for Earth.

energy

New Vocabulary

Use your book to fill in vocabulary terms in this paragraph about food chains. Then make a sketch to illustrate at least five of the terms.

In a __________, matter and energy move from __________ to __________ to __________. A food chain is made of many steps; each organism in the food chain represents a step called a __________. A model that shows all the possible feeding relationships at each trophic level is called a __________. If you were a scientist and you wanted to determine the weight of living matter at a certain trophic level, you would measure the __________.

Academic Vocabulary

Define the following terms.

annual
community
How Organisms Obtain Energy/Flow of Matter and Energy in Ecosystems

I found this information on page __________.

Summarize three ways that organisms get energy by completing the table.

<table>
<thead>
<tr>
<th>Type of Organism</th>
<th>Autotrophs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Other name(s) for this type</td>
<td>consumers, herbivores, carnivores, scavengers, omnivores</td>
<td>no other name</td>
</tr>
<tr>
<td>Food comes from</td>
<td>1. or 2. or 3.</td>
<td></td>
</tr>
<tr>
<td>Chemical reactions that occur</td>
<td>the organisms that are eaten are turned into energy and molecules for the consumer’s body</td>
<td></td>
</tr>
</tbody>
</table>

Describe your own example of cycling.

Contrast a food chain with a food web.

State two things that an ecological pyramid shows that food webs and food chains do not show.
Section 2.2 Nutrition and Energy Flow (continued)

Cycles in Nature

I found this information on page _______.

Create mini-models for each cycle of matter in nature. Use words or pictures to sketch a simple cycle or two for each type to show the movement of matter.

A. The Water Cycle

B. The Carbon Cycle

C. The Nitrogen Cycle

D. The Phosphorus Cycle
   (short-term and long-term)

CONNECT

Describe current farming practices that are designed to make the best use of energy flow in ecosystems and cycles of matter.
Principles of Ecology  Chapter Wrap-Up

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<tbody>
<tr>
<td><strong>What I Wanted to Find Out</strong></td>
<td><strong>What I Learned</strong></td>
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<tr>
<td>1.</td>
<td>1.</td>
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<tr>
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- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

Summarize

After reading this chapter, list three things you have learned about ecology.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
Communities and Biomes

Before You Read

Use the “What I Know” column to list three things you know about communities and biomes. Then list three questions you have about communities and biomes in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Know</td>
<td>What I Want to Find Out</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
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<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

“Organisms in a community reflect the resources and climate of that community.” Give some examples to illustrate this statement.

<table>
<thead>
<tr>
<th>Science Journal</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>“Organisms in a community reflect the resources and climate of that community.” Give some examples to illustrate this statement.</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>---</td>
</tr>
</tbody>
</table>
Communities and Biomes
Section 3.1 Communities

Main Idea

Observe and Infer List changes that occur in your neighborhood in a year. Include changes that you have observed in plants, temperatures, or rainfall. Explain how your neighborhood is an ecological community.

Details

Use the new vocabulary terms to complete the following sentences.

climax community is the orderly and natural change that takes place in communities over time.

The colonization of barren land by pioneer organisms is ____________________________.

The sequence of changes that take place after a community is disrupted by natural disasters or human actions is called ____________________________.

A stable community that undergoes little or no change is a ____________________________.

Any factor that restricts the existence, numbers, reproduction, or distribution of an organism is a ____________________________.

If an organism is able to survive and thrive in a changing environment it is showing ____________________________.
Life in a Community

I found this information on page _______.

Describe the community you can see outside a window of your classroom. List three abiotic and three biotic factors that contribute to that community.

<table>
<thead>
<tr>
<th>Biotic Factors</th>
<th>Abiotic Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Describe four limiting factors that cause trees not to grow above the timberline.

1. __________________
2. __________________
3. __________________
4. __________________

Analyze the effect of drought as a limiting factor on producers, herbivores, and carnivores in a community. Use a specific example.

Sketch a standard bell curve similar to the one in the Limits of Tolerance figure in your book; include the Optimum range label. Below your figure, place the following in the correct location on the standard bell curve.

- right amount of sunlight
- not enough water
- too much water
- right amount of water
- too much sunlight
- not enough sunlight
Section 3.1 Communities (continued)

Main Idea

Succession: Changes Over Time

I found this information on page _______.

Details

Explain the difference between primary succession and secondary succession. Give an example of each.

Create a concept map or diagram about succession with the words below.

climax community  grass  lichens  soil
fire  lava  pioneer species  trees

Sequence changes that might occur over one hundred years in a meadow.

1. Grass grows freely.
2. ________
3. ________
4. ________
5. ________
6. ________
7. ________
8. ________
9. ________
10. ________
Communities and Biomes

Section 3.2 Biomes

**Main Idea**

**Details**

*Skim* Section 2 of your book. Write two questions that come to mind from reading the headings and the illustration captions.

1. 

2. 

**New Vocabulary**

*Use your book to define each term.*

- biome
- desert
- estuary
- grassland
- intertidal zone
- photic zone
- plankton
- taiga
- temperature/deciduous forest
- tropical rain forest
- tundra
**Section 3.2 Biomes (continued)**

**Main Idea**

**Aquatic Biomes**

I found this information on page ________.

**Details**

Describe the adaptations an animal in an intertidal zone needs to survive.

List three examples of plankton and explain why they live in the photic zone.

Compare a marine biome, a freshwater biome, and an estuary. Identify the following in the rows of the table. Some boxes have been done for you.

1. an example of each type of body of water
2. characteristics of the water
3. where most of the organisms are located
4. examples of types of organisms
5. how nutrients are passed along and/or decay occurs

<table>
<thead>
<tr>
<th>Marine Biome</th>
<th>Freshwater Biome</th>
<th>Estuary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. open ocean</td>
<td>no salt in the water</td>
<td>in thick grasses</td>
</tr>
<tr>
<td>2. cold in deeper waters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 3.2 Biomes (continued)

**Main Idea**

**Terrestrial Biomes**

I found this information on page ________.

**Details**

**Compare** examples of vegetation and animals in each terrestrial biome by completing the table below.

<table>
<thead>
<tr>
<th>Biome</th>
<th>Animal</th>
<th>Vegetation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a few grasses and small plants, dwarf shrubs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>elk, deer, moose</td>
</tr>
<tr>
<td>desert</td>
<td></td>
<td>grasses, wildflowers, grains</td>
</tr>
<tr>
<td></td>
<td></td>
<td>monkeys</td>
</tr>
<tr>
<td>temperate forest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Describe** the biome in which you live.

Describe adaptations that allow three particular organisms of your choice to survive in their biome.

CONNECT

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In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ________________________</td>
<td>1. ________________________</td>
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<td>__________________________</td>
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<td>2. ________________________</td>
<td>2. ________________________</td>
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<tr>
<td>3. ________________________</td>
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- Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about communities and biomes.

______________________________
______________________________
______________________________
## Population Biology

### Before You Read

Use the “What I Know” column to list three things you know about population biology. Then list three questions you have about population biology in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
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<td>3.</td>
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</tbody>
</table>

**Science Journal**

How could scientists use knowledge about animal populations to help species from becoming extinct?

---

*Population Biology 29*
**Main Idea**

Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. 
2. 
3. 

**Details**

Use your book to define the following term.

**population**

Use your book to define each term.

**carrying capacity**

**exponential growth**

**life-history pattern**

Compare density-dependent factors and density-independent factors by defining them side-by-side.

<table>
<thead>
<tr>
<th>Density-Dependent Factors</th>
<th>Density-Independent Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 4.1 Population Dynamics (continued)

Main Idea

**Principles of Population Growth**

I found this information on page ___________.

Details

**Draw and label J-shaped and S-shaped population graphs.**

Compare and contrast the meanings of the shapes of the graphs.

---

**Reproduction Patterns**

I found this information on page ___________.

---

**Analyze** carrying capacity by filling in the blanks.

If a population grows larger than its carrying capacity, there will be more _________ than _________.

Until the carrying capacity is reached, there are usually more _________ than _________.

**Identify** five examples each of density-dependent factors and density-independent factors.

<table>
<thead>
<tr>
<th>Density-Dependent Factors</th>
<th>Density-Independent Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Create a population cycle starting with mice as the primary food source for wolves.

Mice population increases.

Describe ways that individual behavior may change due to the stress of overpopulation.

CONNECT

Write a brief paragraph describing one population in your environment. Predict three changes for the population.
Population Biology
Section 4.2 Human Population

**Main Idea**

**Details**

Find the Main Idea As you read this section, make a list of the ways in which human populations change.

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

**Review Vocabulary**

Use your book to define the following term.

- limiting factor
  - [ ]
  - [ ]
  - [ ]

**New Vocabulary**

Use your book to define each term.

- age structure
  - [ ]
  - [ ]
  - [ ]

- birthrate
  - [ ]
  - [ ]
  - [ ]

- death rate
  - [ ]
  - [ ]
  - [ ]

- demography
  - [ ]
  - [ ]
  - [ ]

- doubling time
  - [ ]
  - [ ]
  - [ ]

**Academic Vocabulary**

Define the following term.

- eventual
  - [ ]
  - [ ]
  - [ ]
Section 4.2 Human Population (continued)

Main Idea — World Population

I found this information on page _________.

Details

Analyze the growth of the human population by making a list of factors that have changed over the past 100 years.

1. ______________________
2. ______________________
3. ______________________

Identify the factors that scientists use to determine the growth of a population. Fill in the chart below.

<table>
<thead>
<tr>
<th>Factors That Increase Population</th>
<th>Factors That Decrease Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

Write the PGR formula.

____________________________________________________________

Describe the possible effects on the environment in an area with a fast human doubling time.

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________

____________________________________________________________
Section 4.2 Human Population (continued)

**Main Idea**

**World Population**

*I found this information on page ____________.*

**Details**

Create an age structure graph based on data that you collect from your school, family, or community.

**Details**

Describe how the human population has affected the environment where you live.

How does human population growth affect the availability of resources? Describe methods that are already in use, and resource protection strategies that humans might use in the future, to accommodate population growth.
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<tr>
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<tbody>
<tr>
<td>What I Wanted to Find Out</td>
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<tr>
<td>1.</td>
<td>1.</td>
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- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

Summarize

After reading this chapter, list three things you have learned about population biology.

________________________

________________________

________________________
Biological Diversity and Conservation

Before You Read

Use the “What I Know” column to list three things you know about conservation and diversity among plants and animals. Then list three questions you have about conservation and diversity in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Science Journal

For many years the bald eagle was close to extinction but now lives and reproduces in the wild. Hypothesize how scientists used their knowledge of diversity to save the bald eagle.

---

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc. 37 Biological Diversity and Conservation
Biological Diversity and Conservation
Section 5.1 Vanishing Species

Main Idea

Details

Skim Section 1 of your book. Read the headings and the illustration captions. Write two questions that come to mind.

1. 

2. 

Review Vocabulary

Use your book to define the following term.

habitat

New Vocabulary

Use your book to define each term.

acid precipitation

biodiversity

edge effects

endangered species

exotic species

extinction

habitat degradation

habitat fragmentation

ozone layer

threatened species

Biological Diversity

I found this information on page  .

Importance of Biodiversity

I found this information on page  .

Analyze the effect of an attack by pests on a corn field compared to a similar attack by pests on a rain forest.

Discuss how humans are dependent on plants and animals by describing two ways that you use products of each.
Section 5.1 Vanishing Species (continued)

**Main Idea**

**Loss of Biodiversity**

I found this information on page ________.

**Threats to Biodiversity**

I found this information on page ________.

**Details**

**Compare** the meanings of extinct, endangered, and threatened species.

**Describe** the effects of each change in habitat on species of animals.

<table>
<thead>
<tr>
<th>edge effects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>exotic species</td>
<td></td>
</tr>
<tr>
<td>habitat degradation</td>
<td></td>
</tr>
<tr>
<td>habitat fragmentation</td>
<td></td>
</tr>
<tr>
<td>habitat loss</td>
<td></td>
</tr>
</tbody>
</table>

**CONNECT**

Choose an area near you. Make a list of the biodiversity in that specific area. Hypothesize what would happen to the ecosystem if one species died out.

|  |  |
|  |  |
|  |  |
|  |  |
Biological Diversity and Conservation

Section 5.2 Conservation of Biodiversity

Main Idea

Research an animal that has been brought back from near extinction. Describe steps taken by conservationists. What are the strengths and weaknesses of such programs?

Details

Review Vocabulary

Use your book to define the following term.

biodiversity

New Vocabulary

Use your book to define each term.

captivity

conservation biology

habitat corridors

natural resources

reintroduction programs

sustainable use

Academic Vocabulary

Define the following term.

benefit
Create a job description for conservation biologist. Include at least three important roles of conservation biology in society.

List three national parks created to preserve threatened and endangered species.

1. 
2. 
3. 

Choose the diagram that best represents a habitat corridor.

A.  
B.  
C.  

Explain the purpose of a habitat corridor.
Section 5.2 Conservation of Biodiversity (continued)

Main Idea

Conservation Biology

I found this information on page __________.

Details

Identify one example of a sustainable use.

Sequence the stages of species protection. Put the sentences below in the correct order in the flow-chart boxes.

Elephants are reintroduced to the wild.
Elephants are killed by poachers; the number of elephants is greatly diminished.
Elephants run free in abundance in the wild.
Elephants are caught and put in captivity for breeding.

CONNECT

Hypothesize why it is easier to reintroduce plants into the wild than animals. Think of specific examples.
### Biological Diversity and Conservation Chapter Wrap-Up

*In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.*

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

*Use this checklist to help you study.*

- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

### Summarize

After reading this chapter, list three things you have learned about diversity and conservation.

[Blank lines for responses]
The Chemistry of Life

Before You Read

Use the “What I Know” column to list three things you know about chemistry in biology. Then list three questions you have about chemistry in biology in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>__________________________________</td>
<td>1.</td>
<td>__________________________________</td>
</tr>
<tr>
<td>2.</td>
<td>__________________________________</td>
<td>2.</td>
<td>__________________________________</td>
</tr>
<tr>
<td>3.</td>
<td>__________________________________</td>
<td>3.</td>
<td>__________________________________</td>
</tr>
</tbody>
</table>

Consider the characteristics of a living and a nonliving thing. Describe a few ways that the two are alike and a few ways that the two are different.

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________
The Chemistry of Life
Section 6.1 Atoms and Their Interactions

Main Idea

Compare and Contrast What makes a living thing different from a nonliving thing? How are the particles that make up a rock similar to those of a coral?

Details

New Vocabulary

Use the five terms to the left to complete the following paragraph.

An ________ is a substance that can’t be broken down into simpler chemical substances. The smallest particle of an element that has the characteristics of that element is called an ________.

The ________ is the positively charged center of an atom composed of neutrons and positively charged protons, and surrounded by negatively charged electrons. ________ are atoms of the same element that have different numbers of neutrons in the nucleus. ________ refers to all of the chemical reactions that occur within an organism.

Categorize the ten terms to the left as relating to compounds and bonding or mixtures and solutions.

<table>
<thead>
<tr>
<th>Compounds and Bonding (5 terms)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mixtures and Solutions (5 terms)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
Section 6.1 Atoms and Their Interactions (continued)

Main Idea

Elements
I found this information on page __________.

Details

Summarize information about elements by completing the paragraph.

About ____ elements on Earth are needed by living organisms. Four of these elements—________________________—together make up more than _______ percent of the mass of the human body. ________ elements are needed by organisms, but only in very small amounts. ________ get trace elements by taking them in through their roots. ________ get trace elements from the foods they eat.

Identify the elements represented by each of the symbols.
C: _________  H: _________  O: _________  N: _________

Apply The nucleus of a carbon atom contains six protons. Sketch a model of a carbon atom similar to the examples in your book. Be sure to label the following.
• electrons  • energy level 2  • nucleus
• energy level 1  • neutrons  • protons

Describe how your model of the carbon atom above would be different if you were to draw an isotope of the atom.

Identify the elements that combine to form table salt.

Table Salt
Section 6.1 Atoms and Their Interactions (continued)

Compounds and Bonding

I found this information on page __________.

Explain why atoms form bonds.

Examine the figure of the water molecule below. Label the two hydrogen atoms and the oxygen atom. Then circle the shared electrons.

Draw a sodium atom and a chlorine atom. Include the electrons in each atom’s energy levels. Then show how the atoms become stable.

State why the sodium and chlorine atoms form an ionic bond.
Section 6.1 Atoms and Their Interactions (continued)

**Main Idea**

**Chemical Reactions**

I found this information on page _________.

**Details**

Label the chemical reaction with the following terms.
- compound
- molecule
- reactants
- element
- product
- reaction arrow

\[ 2 \text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O} \]

**Mixtures and Solutions**

I found this information on page _________.

Summarize information about mixtures, solutions, and acids and bases. Give the definition of each and an example.

CONNECT

Describe two examples of chemical reactions that you see around you in your everyday life. Give examples that were not discussed in the section.

---

The Chemistry of Life 49
The Chemistry of Life
Section 6.2 Water and Diffusion

Main Idea

Organize Information As you read this section, make a list of the properties of water. Next to each property, write how it is important in maintaining homeostasis in living organisms.

Details

Review Vocabulary

Use your book to define the following term.

homeostasis

New Vocabulary

Use your book to define each term.

diffusion

dynamic equilibrium

hydrogen bond

polar molecule
Main Idea

Water and Its Importance

I found this information on page __________.

Details

Explain what makes water a polar molecule. In addition, describe the positive and negative ends.

Locate Refer to the figure below. Circle the electrons that are closest to the oxygen nucleus.

Describe two special characteristics of water by completing the organizer.

The Chemistry of Life 51
Main Idea

Diffusion

I found this information on page ________.

Details

Model the diffusion of concentrated orange juice in water. Label the following in your sketch: area of higher concentration of particles, area of lower concentration of particles, and direction of diffusion.

Summarize three factors that affect diffusion by describing each one in the organizers below.

- Concentration
- Temperature
- Pressure

Sketch an example of diffusion that has not reached dynamic equilibrium and an example of dynamic equilibrium.

Cell

Cell

Analyze

Describe the effect of the oceans on Earth’s climate.

Describe the effect of the oceans on Earth’s climate.

Describe the effect of the oceans on Earth’s climate.

Describe the effect of the oceans on Earth’s climate.
### Main Idea

**Scan** the titles, boldfaced words, pictures, figures, and captions in Section 3. Write three facts you discovered about life substances as you scanned the section.

1. 
2. 
3. 

### Details

#### New Vocabulary

*Use your book to define each term.*

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>carbohydrates</td>
<td></td>
</tr>
<tr>
<td>enzyme</td>
<td></td>
</tr>
<tr>
<td>lipids</td>
<td></td>
</tr>
<tr>
<td>nucleic acid</td>
<td></td>
</tr>
<tr>
<td>nucleotides</td>
<td></td>
</tr>
<tr>
<td>proteins</td>
<td></td>
</tr>
</tbody>
</table>
The Role of Carbon in Organisms

I found this information on page _____________.

Identify the bonding abilities of carbon by completing the paragraph below.

Carbon is one of the substances found in _________________.
Carbon atoms can form _________ bonds with other carbon atoms and with many other _________.
Carbon atoms can form a _________ bond, _________ bond, or _________ bond with other carbon atoms to make _________ chains, _________ chains, or _________. The chains and rings are called _______________________. Carbon compounds may contain only one or two carbon atoms. But some carbon compounds contain _________________________ of carbon atoms. These large compounds are called _____________.

Describe how a single, double, and triple bond is represented in the figures in your book.

Single bond: ______________________________
Double bond: ______________________________
Triple bond: ______________________________

Sketch an example of a single, double, and triple bond in the space below. Be sure to label each bond.
### The Role of Carbon in Organisms

*I found this information on page ********."

### Main Idea

#### The Role of Carbon in Organisms

#### Details

Distinguish the types of biomolecules by completing the table below.

<table>
<thead>
<tr>
<th>Type</th>
<th>Composition</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipids</td>
<td>carbon, hydrogen, oxygen, nitrogen, sometimes sulfur</td>
<td>used to store and release energy</td>
</tr>
<tr>
<td>Enzymes</td>
<td></td>
<td>stores coded cellular information</td>
</tr>
</tbody>
</table>

### Connect

Write one example of food sources from each of the following biomolecules: proteins, carbohydrates, and lipids.

---

---

---

---

---
The Chemistry of Life  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>What I Wanted to Find Out</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

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- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

SUMMARIZE
After reading this chapter, list three things you have learned about chemistry in biology.

__________________________
__________________________
__________________________
# A View of the Cell

## Before You Read

Use the “What I Know” column to list three things you know about cells. Then list three questions you have about cells in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>____________</td>
<td>1.</td>
<td>____________</td>
</tr>
<tr>
<td>2.</td>
<td>____________</td>
<td>2.</td>
<td>____________</td>
</tr>
<tr>
<td>3.</td>
<td>____________</td>
<td>3.</td>
<td>____________</td>
</tr>
</tbody>
</table>

**Science Journal**

Imagine that you were small enough to fit inside a cell. Describe what you think you might observe while you are there.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
A View of the Cell
Section 7.1 The Discovery of Cells

Main Idea

Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. __________________________________________
2. __________________________________________
3. __________________________________________

Details

Review Vocabulary

Use your book to define the following term.

organization

New Vocabulary

Use your book to define each term.

cell

cell theory

compound light microscope

electron microscope

eukaryote

nucleus

organelle

prokaryote

Academic Vocabulary

Define the following term.

function
The History of the Cell Theory

I found this information on page ___________.

Create a timeline or flow chart to identify six scientists and summarize their contributions to the cell theory using microscopes. Include details, such as types of microscopes, subjects studied, nationalities of scientists, and dates.

Write the three main ideas of the cell theory. Then write a short sentence for each one describing some fact or observation from your previous knowledge that supports each idea.

1. ________________________________
   __________________________________
   __________________________________
   __________________________________

2. ________________________________
   __________________________________
   __________________________________
   __________________________________

3. ________________________________
   __________________________________
   __________________________________
   __________________________________
Section 7.1 The Discovery of Cells (continued)

**Main Idea**

**Two Basic Cell Types**

I found this information on page __________.

**Details**

Summarize information about electron microscopes by creating an outline.

<table>
<thead>
<tr>
<th>Eukaryotic Cells</th>
<th>Prokaryotic Cells</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>bacteria</td>
<td>multicellular organisms</td>
<td></td>
</tr>
<tr>
<td>contain organelles</td>
<td>unicellular organisms</td>
<td></td>
</tr>
<tr>
<td>have loose strands of DNA</td>
<td>do not have membrane-bound organelles</td>
<td></td>
</tr>
<tr>
<td>have a nucleus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>have membrane-bound organelles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compare and contrast eukaryotic and prokaryotic cells by putting the phrases in the Venn diagram.

SYNTHESIZE

Explain how more sophisticated microscopes have allowed scientists to advance their knowledge of cells.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Infer Considering that a cell’s environment is extremely watery, why might lipids be important to the composition of the plasma membrane?

Review Vocabulary
Use your book to define the following term.
ion

New Vocabulary
Use your book to define each term.
fluid mosaic model
phospholipid
plasma membrane
selective permeability
transport proteins

Academic Vocabulary
Define the following terms.
transport
passive
Main Idea

Maintaining a Balance

I found this information on page _________.

Details

Hypothesize what would happen if the cell membrane was not selectively permeable. Give reasons for your answer.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Describe how a window screen is selectively permeable.

________________________________________________________________________

List five ways that the membrane can deal with materials.

1. _____________________________________________________________________

2. _____________________________________________________________________

3. _____________________________________________________________________

4. _____________________________________________________________________

5. _____________________________________________________________________

Draw a phospholipid and label its parts. Describe how the phospholipid functions to make up the fluid membrane.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Structure of the Plasma Membrane

Create a detailed and accurate drawing of the plasma membrane. Write captions that label each part and describe the function of that part in detail.

Explain how the words fluid and mosaic describe the plasma membrane.

Fluid:

Mosaic:

ANALOGY

Think of a real-life situation to make an analogy of how the fluid membrane of a cell functions. Identify real-life roles similar to the functions of each type of molecule in the membrane.
A View of the Cell
Section 7.3 Eukaryotic Cell Structure

Main Idea

Skim Section 3 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

Details

Write each term in the table under the heading that best describes it. (Hint: The number of words that should go in each column is indicated in parentheses.)

<table>
<thead>
<tr>
<th>New Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>cell wall</td>
</tr>
<tr>
<td>chlorophyll</td>
</tr>
<tr>
<td>chloroplast</td>
</tr>
<tr>
<td>chromatin</td>
</tr>
<tr>
<td>cilia</td>
</tr>
<tr>
<td>cytoplasm</td>
</tr>
<tr>
<td>cytoskeleton</td>
</tr>
<tr>
<td>endoplasmic reticulum-flagella</td>
</tr>
<tr>
<td>Golgi apparatus</td>
</tr>
<tr>
<td>lysosome</td>
</tr>
<tr>
<td>microfilament</td>
</tr>
<tr>
<td>microtubule</td>
</tr>
<tr>
<td>mitochondria</td>
</tr>
<tr>
<td>nucleolus</td>
</tr>
<tr>
<td>plastid</td>
</tr>
<tr>
<td>ribosome</td>
</tr>
<tr>
<td>vacuole</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cell Structure (6)</th>
<th>Related to Genetic Material (3)</th>
<th>Food, Storage, &amp; Waste (6)</th>
<th>Energy (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compare and contrast each pair of terms by defining them and noting their differences.

<table>
<thead>
<tr>
<th>Chloroplast</th>
<th>Mitochondria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vacuole</th>
<th>Plastid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cilia</th>
<th>Flagella</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 7.3 Eukaryotic Cell Structure (continued)

**Main Idea**

**Cellular Boundaries**

I found this information on page __________.

**The Nucleus and Cell Control**

I found this information on page __________.

**Details**

List four types of cells that have walls and describe the function of the cell wall.

---

Summarize three facts about chromatin.

---

Describe the role and path of a ribosome by completing the paragraph.

Ribosomes are the sites where cells produce __________ according to the direction of the __________. Ribosomes are created by the __________ in the __________. Ribosomes are made of __________, and have no __________. After they are made, __________ and __________ move through __________ into the __________.

**Compare and Contrast** smooth endoplasmic reticulum and rough endoplasmic reticulum.

<table>
<thead>
<tr>
<th>Smooth Endoplasmic Reticulum</th>
<th>Rough Endoplasmic Reticulum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Assembly, Transport, and Storage

I found this information on page __________.

Main Idea

Details

Explain the formation of a protein and its transport to where it is needed by completing the flow chart.

1. Protein is created in the ____________________.

2. The proteins move to the ____________________.

3. There, they are packed into structures called ________.

4. They are sent to where they are needed.

List three types of material that can be stored in vacuoles.

1. ____________________

2. ____________________

3. ____________________

Analyze how a lysosome helps certain types of vacuoles.

______________________________

______________________________

Create a sketch to compare and contrast the organelles listed. Then write an observation about organelles.

Golgi apparatus
smooth endoplasmic reticulum
rough endoplasmic reticulum
lysosomes
Section 7.3 Eukaryotic Cell Structure (continued)

**Main Idea**

**Energy Transformers**

I found this information on page ________.

**Details**

Make a concept web with facts about mitochondria and chloroplasts.

**Organelles for Support and Locomotion**

I found this information on page ________.

Create an image of what you think the cilia, flagella, microtubules, microfilaments, centrioles, and cytoskeleton look like. Make captions on your diagram to explain how each works and how they all work together.

---

**COMPARE**

List some similarities and differences between plant and animal cells.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

**W**  |  **L**  
---|---
1. | 1.  
2. | 2.  
3. | 3.  

Use this checklist to help you study.

- Study your Science Notebook for this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about cells.
Cellular Transport and the Cell Cycle

Before You Read

Use the "What I Know" column to list three things you know about how cells work. Then list three questions you have about how cells work in the "What I Want to Find Out" column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
<td>__________________</td>
<td>2.</td>
<td>__________________</td>
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<tr>
<td>3.</td>
<td>__________________</td>
<td>3.</td>
<td>__________________</td>
</tr>
</tbody>
</table>

Science Journal

Write about the molecules that you think are moved in and out of cells. What types of molecules would be large? What types of molecules would be small?


Scan the titles, boldfaced words, pictures, figures, and captions in Section 1. Write two facts you discovered about cellular transport as you scanned the section.

1. 

2. 

Use your book to define each term.

<table>
<thead>
<tr>
<th>New Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>active transport</td>
</tr>
<tr>
<td>exocytosis</td>
</tr>
<tr>
<td>hypertonic solution</td>
</tr>
<tr>
<td>isotonic solution</td>
</tr>
<tr>
<td>passive transport</td>
</tr>
</tbody>
</table>

The diffusion of water across a selectively permeable membrane depending on the concentration of solutes on either side of the membrane is called _________. A solution in which the concentration of dissolved substances outside the cell is the same as the concentration of dissolved substances inside the cell is called a(n) _________. A(n) _________. _________ is a solution in which the concentration of dissolved substances outside the cell is lower than the concentration inside the cell. A(n) _________. _________ is a solution in which the concentration of dissolved substances outside the cell is higher than the concentration inside the cell.

_________ _________ is the movement of particles across cell membranes by diffusion or osmosis, where the cell uses no energy to move the particles. The passive transport of materials across a plasma membrane by transport proteins embedded in the plasma membrane is called _________. _________. An energy-expending process called _________. _________. involves cells transporting materials across the cell membrane against a concentration gradient. Active transport where a cell engulfs materials with a portion of the cell’s plasma membrane and releases the contents inside of the cell is _________. Active transport where materials are secreted or expelled from a cell is called _________.
Osmosis: Diffusion of Water

I found this information on page _________.

Main Idea

Details

Create a diagram to show the definition of “selectively permeable.”

Summarize the relationship between water and the plasma membrane by completing the concept web below.

Examine the figures in your book that show a cell after it has been in an isotonic, hypotonic, and hypertonic solution. Then answer the questions below.

In an isotonic solution, how does the concentration of the dissolved substances inside and outside of the cell compare?

___________________________________________________________

What happens to the size of a cell after being placed in a hypotonic solution?

___________________________________________________________

What happens to the pressure inside of a cell after being placed in a hypertonic solution?

___________________________________________________________
Classify and Summarize the five ways particles move through the membrane. Make notes and sketches in the rectangle for each one.

ANALOGY

Think of real-life movement between locations and make analogies of the five different kinds of transport that occurs through the cell membrane. Explain how each type of transport works in your analogy.

---

**Passive and Active Transport/** Transport of Large Particles

---

**Main Idea**

**Details**

- simple diffusion
- facilitated diffusion
- active transport
- exocytosis
- endocytosis
**Main Idea**

Compare cells in multicellular and unicellular organisms that undergo cell division. Contrast the two types of cells by explaining which one is more specialized.

**Details**

**Review Vocabulary**

Use your book to define the following term.

organelle

**New Vocabulary**

Compare the terms centromere, chromatin, chromosomes, and sister chromatids.

- centromere
- chromatin
- chromosomes
- sister chromatid

- organ
- organ system
- tissue

Describe the relationships between organ, organ system, and tissue.

Complete the concept map with the vocabulary words at left.

```
1. __________
2. __________
3. __________
4. __________
```
Section 8.2 Cell Growth and Reproduction (continued)

Main Idea

Cell Size Limitations
I found this information on page __________.

Cell Reproduction
I found this information on page __________.

The Cell Cycle, Interphase
I found this information on page __________.

Details

Analyze movement of nutrients and wastes as cell size increases.

If a ____ gets too ____
transport of ____ by ____ slows down.
Therefore, cells ____
before __________.

Summarize information about chromosomes in the concept web.

Chromosomes

Identify two periods of a cell’s life cycle.

a period of growth: ____________

a period of nuclear division: ______

List four events that occur in a cell during interphase.

1. __________________________

2. __________________________

3. __________________________

4. __________________________
Section 8.2 Cell Growth and Reproduction (continued)

Main Idea

Phases of Mitosis/ Cytokinesis

I found this information on page ____________________.

Details

Model and summarize the four stages of mitosis and the process of cytokinesis. Draw and label a cell in each stage, name each stage, and describe what is happening to the cell and its genetic material at each stage.

<table>
<thead>
<tr>
<th>Name of Phase</th>
<th>Sketch of Cell</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaphase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metaphase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telophase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cytokinesis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results of Mitosis

I found this information on page ____________________.

Sequence each type of life material from smallest to largest and give an example of each.

- cell
- organ
- organ system
- tissue

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compare

Choose two phases of mitosis and describe their similarities and differences in the Venn diagram.
Cellular Transport and the Cell Cycle
Section 8.3 Control of the Cell Cycle

**Main Idea**

**Details**

**Study and Organize** Section 3 notes by answering the following questions as you read.

1. What is a cause of uncontrolled cell division?

2. What are two environmental factors that contribute to the development of cancer? List possible ways you can influence these factors.

3. How does a person’s diet relate to the chances of getting cancer?

**Review Vocabulary**

*Use your book to define the following term.*

- **protein**

**New Vocabulary**

*Use your book to define the following term. Then write three sentences about what you already know about cancer and/or genes.*

- **cancer**

- **gene**

**Academic Vocabulary**

*Define the following term.*

- **restrict**
Normal Control of the Cell Cycle

I found this information on page _________.

Cancer: A Mistake in the Cell Cycle

I found this information on page _________.

Explain the cell cycle by completing the paragraph.

The cell cycle is controlled by ______________ and ______________. When something goes wrong with ______________, cells lose ______________. Cancer occurs when there is ______________.

Create a drawing of what uncontrolled cell division, which causes cancer, might look like.

Analyze the causes and effects of cancer by completing the flow chart below.

1. Scientists think that cancer is caused by
   ______________
   ______________
   ______________
   ______________

2. Something causes the damaged genes to
   ______________
   ______________

3. Cancerous cells then form
   ______________
called ______________

4. Tumors prevent
   ______________
   ______________

5. This causes damage to
   ______________

6. Cancer cells can spread
   ______________
   ______________
   ______________

Section 8.3 Control of the Cell Cycle (continued)
Main Idea

Cancer: A Mistake in the Cell Cycle

I found this information on page _______.

Details

List four environmental factors and one genetic factor that cause cancer.

1. ________________________________

2. ________________________________

3. ________________________________

4. ________________________________

5. ________________________________

Hypothetize the order of importance of the main factors that prevent cancer. Give reasons to support your order.

______________________________

______________________________

______________________________

______________________________

______________________________

Real-World Connection

Write a journal entry about someone you know who has had cancer, or about information you have heard about cancer in the news.

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________

______________________________
Tie-It-All-Together

Make a concept web to show the main ideas and important details in this chapter, and the relationships between the facts you learned. Hint: You may find it easier to list the facts or topics you want to include first, then decide how to connect them in the web.
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
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<tbody>
<tr>
<td>1.</td>
<td>1.</td>
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<td>2.</td>
<td>2.</td>
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<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

- Study your Science Notebook for this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about how cells work.
Energy in a Cell

Before You Read

Use the “What I Know” column to list three things you know about energy in cells. Then list three questions you have about cell energy in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

How does energy get to cells? How do cells use energy? Write your own ideas.

Science Journal

Name __________________________ Date _______________________
Energy in a Cell
Section 9.1 The Need for Energy

Main Idea

Summarize Scan this section and make a list of three general ways in which cells use energy.

1. ____________________________
2. ____________________________
3. ____________________________

Details

Use your book to define the following term.

active transport

Use your book to define each term. Then write a sentence that describes the relationship of the two words.

ADP (adenosine diphosphate)

ATP (adenosine triphosphate)

Academic Vocabulary

Define the following terms.

energy

transform
Section 9.1 The Need for Energy (continued)

**Cell Energy**

I found this information on page __________.

**Forming and Breaking Down ATP**

I found this information on page __________.

**Main Idea**

List at least seven of your body’s cell processes that require energy. Use both information from your book and your previous knowledge.

**Details**

Compare ATP and ADP.

- Explain what your body uses ATP for, and list the two parts besides ribose sugar.
- Explain how ADP is made from ATP.

Create a cycle diagram to show ATP, ADP, phosphate groups, and energy.
MAIN IDEA

Forming and Breaking Down ATP

I found this information on page ________.

DETAILS

Sequence the steps when a protein gets the energy out of an ATP molecule.

1. ________

2. ________

3. ________

4. ADP

USES OF CELL ENERGY

I found this information on page ________.

CREATE a concept web to show at least six uses of cell energy.

SUMMARIZE Make a concept map to show the three most important ideas from this section.

-------------------------
# Energy in a Cell

## Section 9.2 Photosynthesis: Trapping the Sun’s Energy

### Main Idea

Scan Section 2 of your book. Write two questions that come to mind from reading the headings and the illustration captions.

1. ________________
2. ________________

### Details

Use your book to define each term.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calvin cycle</td>
<td></td>
</tr>
<tr>
<td>chlorophyll</td>
<td></td>
</tr>
<tr>
<td>electron transport</td>
<td></td>
</tr>
<tr>
<td>chain</td>
<td></td>
</tr>
<tr>
<td>light-dependent</td>
<td></td>
</tr>
<tr>
<td>reactions</td>
<td></td>
</tr>
<tr>
<td>light-independent</td>
<td></td>
</tr>
<tr>
<td>reactions</td>
<td></td>
</tr>
<tr>
<td>photosynthesis</td>
<td></td>
</tr>
<tr>
<td>pigments</td>
<td></td>
</tr>
</tbody>
</table>
Section 9.2 Photosynthesis: Trapping the Sun’s Energy (continued)

**Main Idea**

Trapping Energy from Sunlight

I found this information on page _______.

**Details**

Summarize the functions of the light-dependent and light-independent reactions and photosynthesis in general by completing the sentences.

Plants and other green organisms ______________ from ______.

The energy must be stored in a form that ________________.

This form is called ____.

The light-dependent reactions change __________ into

______________.

The light-dependent reactions result in ______________ and

______________.

The light-independent reactions produce __________, which are then made into ________________ such as ____, which stores energy in plants.

Create a concept web to summarize what you know about chloroplasts and chlorophyll.

![Concept Web](chloroplast) -- (arrow) -- (chlorophyll)

**Analyze** why leaves change color in the fall.

_____________________________________________________________________________
Section 9.2 Photosynthesis: Trapping the Sun’s Energy (continued)

**Main Idea**

**Light-Dependent Reactions**

I found this information on page __________.

**Light-Independent Reactions**

I found this information on page __________.

**Details**

Model light-dependent reactions in a flow chart. Use the diagram in your book to help you.

Compare light-dependent and light-independent reactions by putting each phrase into the correct part of the Venn diagram.

- forms stored energy
- makes NADPH
- makes sugar
- needs sunlight

- occurs in the chloroplast
- occurs in the dark
- uses Calvin cycle
- uses electron transport chain

![Venn Diagram](image_url)

**Analogy**

Create an original analogy for the electron transport chain.
Energy in a Cell
Section 9.3 Getting Energy to Make ATP

Main Idea

Identify in which organelle sugars are converted to ATP.

Details

Use your book to define the following term.

Review Vocabulary

mitochondria

New Vocabulary

Read the definitions below and write the matching vocabulary term in the blank.

chemical reactions that do not require oxygen

in cellular respiration, a series of chemical reactions that break down glucose and produce ATP; energizes electron carriers that pass the energized electrons on to the electron transport chain

a series of anaerobic chemical reactions in which pyruvic acid uses NADH to form lactic acid and NAD+, which is then used in glycolysis; supplies energy when oxygen for aerobic respiration is scarce

anaerobic process in which cells convert pyruvic acid into carbon dioxide and ethyl alcohol; carried out by many bacteria and fungi such as yeasts

chemical process where mitochondria break down food molecules to produce ATP; the three stages of cellular respiration are glycolysis, the citric acid cycle, and the electron transport cycle

in cellular respiration, a series of anaerobic chemical reactions in the cytoplasm that break down glucose into pyruvic acid; forms a net profit of two ATP molecules

Academic Vocabulary

Define the following term.

cycle
Section 9.3 Getting Energy to Make ATP (continued)

**Main Idea**

**Cellular Respiration**

I found this information on page ________.

**Details**

**Compare and summarize** the three stages of cellular respiration. Make your own notes about each process.

<table>
<thead>
<tr>
<th>Glycolysis</th>
<th>Citric Acid Cycle</th>
<th>Electron Transport Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>takes place in</td>
<td>takes place in</td>
<td>takes place in</td>
</tr>
<tr>
<td></td>
<td>also called</td>
<td>also called</td>
</tr>
<tr>
<td>produces</td>
<td>produces</td>
<td>provides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>final acceptor is</td>
</tr>
</tbody>
</table>

**Fermentation**

I found this information on page ________.

**Sequence** events that lead to fermentation by completing the prompts.

Cause: ______________________________________

Fermentation follows __________. It replaces the ________________ _________________. The ________________ will be backed up because ________________.

Results in: _______________

**List** the steps of lactic acid fermentation.

1. ____________________________
2. ____________________________
3. ____________________________
Section 9.3 Getting Energy to Make ATP (continued)

**Main Idea**

**Fermentation**

I found this information on page __________.

**Comparing Photosynthesis and Cellular Respiration**

I found this information on page __________.

**Details**

Name and describe a process that bacteria and yeast do that is useful to humans and give an example.

Create your own Venn diagram to compare photosynthesis and respiration. Use similarities as well as differences.

![Venn diagram](image)

**Summarize**

List all of the molecules in the section. Make a concept web to summarize their relationships, including the processes that transform one into another.
Tie-It-All-Together

**Think** about the interactions and relationships in nature that involve cellular respiration and photosynthesis. How do the processes of one organism affect another? Make a diagram or write a journal entry to explain your ideas. Include at least one example of how plants and animals interact.
## Energy in a Cell  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th></th>
<th>L</th>
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</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
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<td>2.</td>
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<tr>
<td>3.</td>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**Summarize**

After reading this chapter, list three things you have learned about energy in cells.

---

92  Chapter Wrap-Up
Mendel and Meiosis

Before You Read

Use the “What I Know” column to list three things you know about genetics. Then list three questions you have about genetics in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I know</th>
<th>W</th>
<th>What I want to find out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
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<td>2.</td>
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<tr>
<td>3.</td>
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</tr>
</tbody>
</table>

Genetics explains why you have inherited certain characteristics from your parents. Write about some characteristics that you have inherited from your own parents, or similarities that you see in other families or in animals or plants that you think might have been inherited.

Science Journal
Mendel and Meiosis
Section 10.1 Mendel’s Laws of Heredity

Skim  Section 1 of your book, write three questions that come to mind from reading the headings and illustration captions.

1. 
2. 
3. 

New Vocabulary

Use terms in the left margin to complete the paragraph below.

allele is the branch of biology that studies , which is the passing on of characteristics, known as , from parents to offspring. Male and female sex cells, called , unite during (which is called in plants) to form a fertilized cell, called a . offspring result from parents that have different forms of for certain traits. Mendel’s states that every individual has two alleles of each gene and when gametes are produced, each gamete receives one of these alleles. Mendel’s states that genes for different traits are inherited independently of each other.

Compare and contrast each pair of terms by defining them and/or noting their differences.

<table>
<thead>
<tr>
<th>dominant trait</th>
<th>recessive trait</th>
</tr>
</thead>
<tbody>
<tr>
<td>genotype</td>
<td>phenotype</td>
</tr>
<tr>
<td>heterozygous</td>
<td>homozygous</td>
</tr>
<tr>
<td>homozygous</td>
<td>recessive</td>
</tr>
<tr>
<td>phenotype</td>
<td>genotype</td>
</tr>
<tr>
<td>homozygous</td>
<td>heterozygous</td>
</tr>
</tbody>
</table>
Section 10.1 Mendel’s Laws of Heredity (continued)

**Main Idea**

**Why Mendel Succeeded**

I found this information on page __________.

**Details**

Describe how a plant self-pollinates.

Describe how Mendel cross-pollinated pea plants. Why did Mendel use this technique to study inheritance?

**Mendel’s Monohybrid Crosses**

I found this information on page __________.

Summarize Mendel’s first experiment.

Mendel crossed: ________________________________

He controlled variables by: ________________________________

The first trait he studied: ________________________________

Results: ________________________________

When the offspring were allowed to self-pollinate: ________________________________

The dominant allele was: ________________________________

The recessive allele was: ________________________________

The number of monohybrid crosses he eventually tried: __________

His conclusion: ________________________________

Compare genotypes and phenotypes for pea plants.

<table>
<thead>
<tr>
<th>genotype</th>
<th>homozygous or heterozygous</th>
<th>phenotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>tt</td>
<td>heterozygous</td>
<td>short plant</td>
</tr>
</tbody>
</table>
Mendel’s Dihybrid Crosses

Demonstrate the law of independent assortment by listing the four alleles that are produced when a pea plant with the genotype RrYy produces gametes.

1. ___  2. ___  3. ___  4. ___

List two things that can be predicted by a Punnett square.

Complete the Punnett squares for height in the F₁ and F₂ generations. Write the expected genotypes and the probability for each.

<table>
<thead>
<tr>
<th>F₁</th>
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<th></th>
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<tbody>
<tr>
<td>T</td>
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</table>

<table>
<thead>
<tr>
<th>F₂</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>T</td>
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</tbody>
</table>

Identify the locations, within the Punnet square showing Mendel’s F₂ dihybrid results, of genotypes that satisfy each description.

<table>
<thead>
<tr>
<th>RY</th>
<th>ry</th>
<th>RY</th>
<th>rY</th>
</tr>
</thead>
<tbody>
<tr>
<td>RY</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>ry</td>
<td>E</td>
<td>F</td>
<td>G</td>
</tr>
<tr>
<td>RY</td>
<td>I</td>
<td>J</td>
<td>K</td>
</tr>
<tr>
<td>rY</td>
<td>M</td>
<td>N</td>
<td>O</td>
</tr>
</tbody>
</table>

1. peas with only dominant alleles ___
2. green peas _________________
3. wrinkled yellow peas __________
4. round green peas ____________
5. peas with only recessive alleles ___
6. round peas _________________
7. homozygous for color ______________
8. heterozygous for roundness ___________

Real-World Connection

Discuss the effects of Mendel’s two laws (segregation and independent assortment). Give an example.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Mendel and Meiosis

Section 10.2 Meiosis

Main Idea

Organize Information As you read Section 2, list the ways in which meiosis explains Mendel’s results.

Details

Use your text to define the following term.

Use the terms in the left margin to complete the graphic organizer below.

Review Vocabulary

mitosis

terms in the left margin to complete the graphic organizer below.

New Vocabulary

crossing over
diploid
egg
genetic recombination
haploid
homologous chromosome
meiosis
nondisjunction
sexual reproduction
sperm

A first step in _____________ occurs when

a _____ cell with homologous chromosomes,
or two of each pair, undergoes _____

which produces four cells containing half the number of chromosomes,

______ cells, called

_____ and ______.

Describe three things that can happen to homologous chromosomes during meiosis.

<table>
<thead>
<tr>
<th>crossing over</th>
<th>genetic recombination</th>
<th>nondisjunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>What happens</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results in</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Main Idea

**Genes, Chromosomes, and Numbers**  
I found this information on page ________.

### Details

Summarize **at least six pieces of information about chromosomes** by creating a concept map below.

### The Phases of Meiosis

**Compare and contrast** the phases of **Meiosis I and Meiosis II**.  
**Sketch each phase.**

<table>
<thead>
<tr>
<th>Sketch</th>
<th>Description</th>
<th>Sketch</th>
<th>Description</th>
<th>Compare and Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophase I</td>
<td></td>
<td>Prophase II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metaphase I</td>
<td></td>
<td>Metaphase II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaphase I</td>
<td></td>
<td>Anaphase II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telophase I</td>
<td></td>
<td>Telophase II</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 10.2 Meiosis (continued)

Main Idea

The Phases of Meiosis
I found this information on page __________.

Meiosis Provides for Genetic Variation
I found this information on page __________.

Nondisjunction
I found this information on page __________.

Gene Linkage and Maps
I found this information on page __________.

Details

Identify the phase of meiosis when crossing over may occur. Describe the process.

List two factors that increase genetic variation. Name the process.
1. __________________________________________________________________________
2. __________________________________________________________________________
Process: _______________________________________________________________________

Identify an advantage and a disadvantage of nondisjunction.

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explain gene linkage by completing the paragraph below.
- chromosomes
- farther
- inherited
- sequence
- crossing over
- genes
- linked

Genes close together on the same chromosome are usually _____.
Linked genes are usually _______ together. ______________________, not _________________. follow Mendel's law of independent assortment. Linked genes might become separated, as a result of ________________. Crossing over is more likely to happen if genes are ________ apart on a chromosome. Scientists use the __________________________ to map the __________________________ on a chromosome.
Mendel and Meiosis  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______________________</td>
<td>1. ______________________</td>
</tr>
<tr>
<td>__________________________</td>
<td>__________________________</td>
</tr>
<tr>
<td>2. ______________________</td>
<td>2. ______________________</td>
</tr>
<tr>
<td>__________________________</td>
<td>__________________________</td>
</tr>
<tr>
<td>3. ______________________</td>
<td>3. ______________________</td>
</tr>
<tr>
<td>__________________________</td>
<td>__________________________</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

☐ Study your Science Notebook for this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Reread the chapter and review the tables, graphs, and illustrations.
☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

After reading this chapter, list three things you have learned about genetics.

__________

__________

__________
DNA and Genes

Before You Read

Use the “What I Know” column to list three things you know about genes and DNA. Then list three questions you have about DNA and genes in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>___________________</td>
<td>1.</td>
<td>___________________</td>
</tr>
<tr>
<td>2.</td>
<td>___________________</td>
<td>2.</td>
<td>___________________</td>
</tr>
<tr>
<td>3.</td>
<td>___________________</td>
<td>3.</td>
<td>___________________</td>
</tr>
</tbody>
</table>

Science Journal

Ponies on the Shetland Islands in Scotland have short structure, thick hair, strength, and hardiness so they can thrive in their harsh environment. How do you think the DNA of their population has changed over time?
DNA and Genes
Section 11.1 DNA: The Molecule of Heredity

Main Idea

List current events and issues concerning DNA that you have read about in a newspaper or magazine. As you read this section, refer to your list and add explanations from the book.

Details

Review Vocabulary

Use your book to define the following term.

nucleotide

New Vocabulary

Use your book to define each term. In the box to the right, make a sketch to help you remember each term.

DNA replication

double helix

nitrogenous base
What is DNA?

I found this information on page __________.

Write the correct information to complete each list.

<table>
<thead>
<tr>
<th>Actions That Depend on Enzymes</th>
<th>Types of Information in DNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pieces of a Nucleotide</th>
<th>Nitrogenous Bases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>

Create a memory device to help you remember how the nitrogenous bases are always paired.

Describe the DNA molecule by explaining how each word applies to the molecule. Use a sketch to back up your explanation in each case.

<table>
<thead>
<tr>
<th>Word and What it Means</th>
<th>Sketch of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>zipper:</td>
<td></td>
</tr>
<tr>
<td>helix:</td>
<td></td>
</tr>
<tr>
<td>double (as in “double helix”):</td>
<td></td>
</tr>
</tbody>
</table>

Explain why the four nitrogenous bases in DNA provide so much variety in life.
Section 11.1 DNA: The Molecule of Heredity (continued)

**Replication of DNA**  
I found this information on page __________.

**Main Idea**

**Details**

**Identify** when DNA replication occurs as a step in cell reproduction.

**Sequence and model** each step in the replication of a DNA molecule. Write about what happens, and draw a DNA molecule going through each step.

<table>
<thead>
<tr>
<th>A.</th>
<th>B.</th>
<th>C.</th>
<th>D.</th>
</tr>
</thead>
</table>

**State** how a DNA molecule acts like a template.

**SYNTHESIZE**

Compare and contrast the processes of cell division and DNA replication.
DNA and Genes
Section 11.2 From DNA to Protein

Main Idea

Scan the headings and boldfaced words for the section. Predict three things that you think might be discussed.

1. 
2. 
3. 

Details

Use your book to define the following term.

polymer

Use your book to define the following term.

codon

Compare and contrast the three types of RNA by describing the function of each.

<table>
<thead>
<tr>
<th>messenger RNA</th>
<th>Ribosomal RNA</th>
<th>Transfer RNA</th>
</tr>
</thead>
</table>

Compare and contrast transcription and translation.

<table>
<thead>
<tr>
<th>transcription</th>
<th>Translation</th>
</tr>
</thead>
</table>

Academic Vocabulary

Define the following term as a verb.

code
### Section 11.2 From DNA to Protein (continued)

<table>
<thead>
<tr>
<th>Main Idea</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Genes and Proteins, RNA</strong></td>
<td>Analogy If DNA and RNA were employees in a factory, what would their jobs be? Explain the function of each type of molecule.</td>
</tr>
<tr>
<td>I found this information on page __________.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compare and contrast RNA and DNA by writing at least five characteristics in the Venn diagram.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RNA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sequence the steps in transcription of RNA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model the movement of tRNA molecules during the translation process.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
The Genetic Code

I found this information on page __________.

Translation: From mRNA to Protein

I found this information on page __________.

Identify four examples of codons.

1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________

Describe amino acid chains by completing the diagram.

They twist and curl into Each type of chain forms the same

Amino Acid Chains

Amino acid chains become proteins when

Proteins become

SUMMARIZE

Create a flow chart to describe the formation of a protein. Describe the activities of DNA and the three types of RNA.
Recognize Cause and Effect  Why might a mutation have little or no harmful effect on an organism?

Use your book to define the following term.

cancer

Complete the sentence with two vocabulary words.

______________, which include high temperatures, radiation, and chemicals, can cause _____________, which are changes in the DNA sequence.

Compare and contrast the three types of mutations by defining them side-by-side.

<table>
<thead>
<tr>
<th>Chromosomal Mutation</th>
<th>Frameshift Mutation</th>
<th>Point Mutation</th>
</tr>
</thead>
</table>

Define the following term.

error
Mutations

Outline the important facts about mutations.

A. internal causes of mutations:
   1. 
   2. 
   3. 

B. 
   1. radiation from the sun
   2. 
   3. 

C. types of cells affected by mutations from outside forces:
   1. 
   2. 
   3. 

D. why mutations from outside forces on those three types of cells are not passed on to offspring:

E. possible effects of mutations from outside forces on those three types of cells:

Compare and contrast a point mutation and a frameshift mutation by defining each mutation stating its consequence.

<table>
<thead>
<tr>
<th>Point mutation happens when</th>
<th>consequence:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frameshift mutation occurs when</td>
<td>consequence:</td>
</tr>
</tbody>
</table>
Section 11.3 Genetic Changes (continued)

**Main Idea**

**Mutations**

I found this information on page __________.

**Chromosomal Alterations**

I found this information on page __________.

**Details**

Model each of the following.

a normal strip of DNA

the same DNA strip, with a point mutation

the same DNA strip, with a frameshift mutation

List four examples of how chromosomes can change. Use your imagination to draw a sketch of what each change might look like.

<table>
<thead>
<tr>
<th>Example</th>
<th>Sketch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 11.3 Genetic Changes (continued)

**Main Idea**

Chromosomal Alterations
I found this information on page __________.

Causes of Mutations
I found this information on page __________.

**Details**

Describe two ways in which chromosomal alterations occur in plants.

Examine the types and effects of mutagens by completing the concept web.

Summarize how mistakes and mutations in DNA are repaired by cells and state the effectiveness of the mechanism.

Connect
Write about genetic mutations you have heard about in the news or daily life. Hypothesize what caused the mutation in each case.
DNA and Genes  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

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☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

SUMMARIZE
After reading this chapter, list three things you have learned about DNA and genes.

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
Patterns of Heredity and Human Genetics

Before You Read

Use the “What I Know” column to list three things you know about heredity and genetics. Then list three questions you have about these topics in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Science Journal

Describe how you think a child’s DNA is different from his or her mother’s DNA and father’s DNA.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Patterns of Heredity and Human Genetics 113
Patterns of Heredity and Human Genetics
Section 12.1 Mendelian Inheritance of Human Traits

Scan Section 1 of your book. Use the checklist as a guide.

☐ Read all section titles.
☐ Read all boldfaced words.
☐ Read all tables and graphs.
☐ Look at all pictures and read the captions.
☐ Think about what you already know about patterns of heredity and human genetics.

Write three facts you discovered about patterns of heredity and human genetics as you scanned the section.

1. __________________________________________________________
2. __________________________________________________________
3. __________________________________________________________

Review Vocabulary

trait

New Vocabulary

carrier

pedigree

Use your book to define the following term.

Use your book to define each term.

carryer

pedigree

Explain why pedigrees are needed to identify the carriers of a recessive trait in a family.

Academic Vocabulary

dominate

Define the following term.


Mendelian Inheritance of Human Traits
Section 12.1 Mendelian Inheritance of Human Traits (continued)

Main Idea

Making a Pedigree

I found this information on page ____________.

Details

Summarize the pedigree symbols by naming them and then drawing them in the right-hand column of the table. The first two boxes have been completed for you. Sketches should resemble those in the book.

<table>
<thead>
<tr>
<th>Description of Symbol</th>
<th>Sketch of Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>square</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Simple Recessive Heredity

I found this information on page ____________.

Write three facts about recessive heredity using the concept map below.
List five examples of dominant traits in humans.

1. 
2. 
3. 
4. 
5. 

Summarize the facts about Huntington’s disease by completing the concept map below.

- There is no effective _______.
- Huntington’s disease
- The disease is caused by a _______.
- A _______ analysis could help people better understand their own risks and the risks to their _______.
- The disease causes a breakdown in _______.
- The disease doesn’t occur until a person is between the ages of _______ and _______.

CONNECT

Make your own pedigree diagram for a family. Pick a trait and designate it as dominant, then shade the boxes to show who has recessive genes, who has dominant genes, and who is likely heterozygous.
Analyze Corn kernels can be many different colors and patterns. Think about what you know about Mendelian inheritance. Explain how you know that the inheritance of kernel color in corn is not simply Mendelian.

Use your book to define the following term.

**allele**

Use your book to define each term.

**autosomes**

**codominant alleles**

**incomplete dominance**

**multiple alleles**

**polygenic inheritance**

**sex chromosomes**

**sex-linked traits**
Complex Patterns of Inheritance

I found this information on page __________.

Section 12.2 When Heredity Follows Different Rules (continued)

Main Idea

Complex Patterns of Inheritance

Details

Analyze the ratios of offspring of the following snapdragon pairs by writing the genotype of each phenotype given, then filling in the Punnett square. The first row has been done for you. Hint: To write the genotypes, designate the dominant red allele as R and the recessive white allele as R'.

<table>
<thead>
<tr>
<th>Parent Flowers</th>
<th>Genotypes of Parent Flowers</th>
<th>Punnett Square</th>
<th>Ratio of Offspring</th>
</tr>
</thead>
<tbody>
<tr>
<td>red and white</td>
<td>RR × R'R'</td>
<td>R  R'</td>
<td>4 pink</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>R'</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>RR</td>
<td>RR'</td>
</tr>
<tr>
<td>R'</td>
<td>RR'</td>
<td>RR'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pink and white</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>red and pink</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pink and pink</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Compare incomplete and codominant traits.

Analyze how the following pairs of multiple alleles for pigeon feathers would be expressed. The first one has been done for you.

wild-type blue + chocolate-brown = blue
wild-type blue + ash-red = __________
ash-red 1 chocolate-brown 5 __________

Sequence the multiple alleles (ash-red, wild-type blue, and chocolate-brown) for pigeon feathers from most dominant to most recessive.

__________________________ dominant ________ ________ recessive
Section 12.2 When Heredity Follows Different Rules (continued)

**Main Idea**

Complex Patterns of Inheritance

*I found this information on page ________.*

**Details**

Contrast the two given items in each line below.

1. sex chromosomes with the 22 pairs of autosomes

2. traits of sex-linked inheritance with polygenic inheritance

Connect

Think of some traits in people, plants, or animals. Describe one trait and tell whether you think the trait is dominant/recessive, multiple allele, codominant, incompletely dominant, sex-linked, or polygenic trait. Explain your reasoning.
Patterns of Heredity and Human Genetics
Section 12.3 Complex Inheritance of Human Traits

**Main Idea**

**Organize Information** As you read Section 3, make a list of some physical characteristics that appear in your family members or friends. Try to determine how each trait is inherited by examining its inheritance pattern.

**Details**

Use your book to define the following term.

- **homozygous**: 

Use your book to define the following term.

- **blood typing**: Define blood typing and tell why it is important.

Define karyotype and describe its use. Then make a sketch of a human karyotype in the space below.

- **karyotype**: 

Define the following term.

- **link**: 

120 Complex Inheritance of Human Traits
Section 12.3 Complex Inheritance of Human Traits (continued)

**Main Idea**

**Codominance in Humans**

I found this information on page ___________.

**Details**

**Describe** the effects of sickle-cell anemia for people who are heterozygous for the disease and for people who are homozygous for the disease.

![Heterozygous](image1)

**Predict** how the offspring may be affected if two people who are heterozygous for sickle-cell anemia but lead normal lives have a child. It may be helpful to make a Punnett square to show the genotypes of the offspring.

Predicted Genotypes:

<table>
<thead>
<tr>
<th>Genotype Combinations</th>
<th>Phenytypes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and A</td>
<td></td>
</tr>
<tr>
<td>A and B</td>
<td></td>
</tr>
<tr>
<td>A and O</td>
<td></td>
</tr>
<tr>
<td>B and B</td>
<td></td>
</tr>
<tr>
<td>B and O</td>
<td></td>
</tr>
<tr>
<td>D and O</td>
<td></td>
</tr>
</tbody>
</table>

**Multiple Alleles Govern Blood Type**

I found this information on page ___________.

**Identify** the phenotype that results from each combination of genotypes. The first one has been done for you.
Section 12.3 Complex Inheritance of Human Traits (continued)

**Main Idea**

Multiple Alleles
Govern Blood Type

* I found this information on page __________.

Sex-Linked Traits in Humans

* I found this information on page __________.

**Details**

**Consider** in each case whether the father could possibly have the blood type given. Circle your choice.

- mother: type O  child: type A  father: type AB  yes  no
- mother: type B  child: type A  father: type A  yes  no
- mother: type AB  child: type O  father: type AB  yes  no
- mother: type A  child: type B  father: type O  yes  no
- mother: type O  child: type O  father: type AB  yes  no
- mother: type B  child: type O  father: type A  yes  no

**Explain** how a boy can have red-green color blindness with just one recessive allele, but a girl must have two recessive alleles to have this trait.

- Create a pedigree diagram to show how a boy could inherit his grandfather’s hemophilia even if neither of his parents have the disease. Review pedigree diagrams from Section 12.1 if you need help.
Section 12.3 Complex Inheritance of Human Traits (continued)

Main Idea

Polygenic Inheritance in Humans

I found this information on page ____________.

Details

Create a flow chart to show polygenic inheritance of skin color. In the first generation a light-skinned person mates with a dark-skinned person. Show the possible skin colors of the next three generations.

1. light skinned and dark skinned
2. ____________________________
3. ____________________________
4. ____________________________

Changes in Chromosome Numbers

I found this information on page ____________.

Summarize the following facts about chromosomes.

• how an abnormal number of chromosomes is identified

• four possible results of abnormal chromosome numbers

CONNECT

Consider a genetic disorder such as cystic fibrosis. Explain why genetic disorders like cystic fibrosis appear more often among certain ethnic groups.

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Patterns of Heredity and Human Genetics Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>____________________________</td>
<td>1.</td>
<td>____________________________</td>
</tr>
<tr>
<td>2.</td>
<td>____________________________</td>
<td>2.</td>
<td>____________________________</td>
</tr>
<tr>
<td>3.</td>
<td>____________________________</td>
<td>3.</td>
<td>____________________________</td>
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</tbody>
</table>

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☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
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☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about heredity and human genetics.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Genetic Technology

Before You Begin

Use the “What I Know” column to list three things you know about genetic technology. Then list three questions you have about this topic in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Science Journal

Describe two examples of genetic technology that have affected your life or that you have read about in the news.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Genetic Technology
Section 13.1 Applied Genetics

Main Idea

Scan Section 1 of your book. Use the checklist as a guide.

☐ Read all section titles.
☐ Read all boldfaced words.
☐ Read all tables and graphs.
☐ Look at all pictures and read the captions.
☐ Think about what you already know about communicating in science.

Write three facts you discovered about genetic technology.
1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Review Vocabulary

Use your book to define the following term.

Hybrid

New Vocabulary

Use your book to define each term. Then look through the section to find a sentence with each term and write the sentence.

inbreeding

test cross

Academic Vocabulary

Define the following term.

select
Section 13.1 Applied Genetics (continued)

Selective Breeding

I found this information on page 1.

Summarize selective breeding by completing the prompts.

Time frame:__________________________________________

Reason it takes that long:________________________________

Goal:_________________________________________________

Successful example:_____________________________________

The offspring of parents that have different forms of a trait:

______________.

Analyze inbreeding by identifying the effect, an advantage, and a disadvantage.

Interpret information about genotypes by completing the paragraph below.

For ______________________, breeders select ________ or ________ with the greatest chance of passing on ________________.

To do this, breeders must determine the genotype, (______________ or _______________), for a ________________. The method of doing so is a ____________________, which _______________ an individual of ___________________ with an individual of ___________________.
Section 13.1 Applied Genetics (continued)

**Main Idea**

Determining Genotypes

I found this information on page __________.

**Details**

Create a flow chart or other concept diagram to describe how a breeder would determine the genotype of an Alaskan malamute. Include the type of information that is known and what the possible outcomes are (including Punnett Squares).

**Generalize** the process of determining genotypes by inferring a general step from the process for Alaskan malamute dogs.

<table>
<thead>
<tr>
<th>Alaskan Malamute Dog</th>
<th>General Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Choose dwarf dog.</td>
<td></td>
</tr>
<tr>
<td>Step 2: Cross it with unknown dog.</td>
<td></td>
</tr>
<tr>
<td>Step 3: Observe the offspring to determine whether the unknown dog was homozygous or heterozygous.</td>
<td></td>
</tr>
</tbody>
</table>

**CONNECT**

Selective breeding practices have been used in agriculture since ancient times. Provide a specific example where selective breeding has resulted in an improved agricultural product.

---

128 Applied Genetics
Think Critically Predict why a gene from a firefly can function in a tobacco plant.

New Vocabulary Use your book to define each term.

- clone
- genetic engineering
- plasmid
- recombinant DNA
- restriction enzyme
- transgenic organism
- vector

Academic Vocabulary Define the following term.

- insert
### Section 13.2 Recombinant DNA Technology (continued)

**Main Idea**

**Genetic Engineering**

I found this information on page ________.

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify one transgenic organism from your book and the two original organisms that went into it. Then use your imagination to think of two other possible transgenic organisms that could be made and give the original organisms that could be used to make it.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence the three steps to produce a transgenic organism. Explain how each step is carried out.</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain what happens after the transgenic organism is produced.</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify two types of experiments scientists perform with gene clones.</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>State the benefit of agricultural animal cloning.</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Section 13.2 Recombinant DNA Technology (continued)

Main Idea

Genetic Engineering

I found this information on page __________.

Applications of DNA Technology

I found this information on page __________.

Describe how a PCR machine works.

Summarize advances that have been made in genetic technology.

<table>
<thead>
<tr>
<th>Area</th>
<th>Recent Advances</th>
</tr>
</thead>
<tbody>
<tr>
<td>industry</td>
<td></td>
</tr>
<tr>
<td>medicine</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td>agriculture</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
</tr>
</tbody>
</table>

SYNTHESIZE

Make a flow chart showing the process of making recombinant DNA. List any advantages or disadvantages of the process.
Genetic Technology
Section 13.3 The Human Genome

Main Idea

Research As a class, build a reference file of the latest discoveries by the Human Genome Project. Use library resources or visit bdol.glencoe.com to collect information. Update the file throughout the school year.

New Vocabulary

Use your book to define each term. Then skim the section to find one extra interesting fact related to each vocabulary word.

gene therapy

hhuman genome

linkage map

Details

Academic Vocabulary

Define each of the following terms as a noun and as a verb.

cycle

sequence
Section 13.3 The Human Genome (continued)

**Main Idea**

Mapping and Sequencing the Human Genome

I found this information on page ____________.

**Details**

Create a linkage map for your state and the surrounding eight states or combination of states and bodies of water.

Describe methods used to find linkage data on chromosomes by completing the sentences below.

Originally, information used to assign genes to particular chromosomes came from _______________.

Scientists know that genes are farther apart when _______________.

The original method was not efficient because _______________.

A more efficient method that is used now is _______________.

Using this reaction, _______________.

The locations of _______________ are used as markers to track _______________.

Sequence the steps in gene sequencing by writing the steps in order.

1. _______________.
2. _______________.
3. _______________.
Applications of the Human Genome Project

I found this information on page __________.

Create an outline of applications of the Human Genome Project.

A. Diagnosing disorders in unborn fetuses:

____________________________________________________________________

____________________________________________________________________

B. Gene therapy is ______________________________________________________________________

____________________________________________________________________

C. Doctors are experimenting with treating
   
   i. ___________________  iv. ___________________
   
   ii. ___________________  v. ___________________
   
   iii. ___________________  vi. ___________________

D. Law enforcement: ______________________________________________________________________

____________________________________________________________________

   1. Samples can be used from
   
   i. ___________________  iii. ___________________
   
   ii. ___________________  iv. ___________________

   2. The method works because
   
   i. ______________________________________________________________________
   
   ii. ______________________________________________________________________

E. Studying ancient life:

   1. Geneticists use the DNA polymerase chain reaction (_______) to ______________________________________________________________________.
   
   2. DNA from fossils is studied to compare
   
   i. ______________________________________________________________________
   
   ii. ______________________________________________________________________

SYNTHESIZE

Hypothesize about the future of genetic technology. Write about applications you think might touch your life in the next ten or twenty years, and the limitations you think there will be on DNA technology.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Section 13.3 The Human Genome (continued)
Tie-It-All-Together

Create a concept web or mini-poster to tie together what you learned in this chapter about advances in genetic technology. Use pictures and words to show the most important ideas.
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
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<td></td>
<td></td>
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<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

☐ Study your Science Notebook for this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Reread the chapter and review the tables, graphs, and illustrations.
☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about genetic technology.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
The History of Life
Before You Read

Use the “What I Know” column to list three things you know about the history of life. Then list three questions you have about the history of life in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Think about early life on Earth. Describe the physical conditions that needed to be present in order for life to begin to form.

__________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________
The History of Life
Section 14.1 The Record of Life

Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. __________________________
2. __________________________
3. __________________________

Review Vocabulary
Use your book to define the following term.

isotope

New Vocabulary
Use your book to define each term.

fossil

plate tectonics

Academic Vocabulary
Define the following terms.

method

evident
Section 14.1 The Record of Life (continued)

Main Idea

Early History of Earth
I found this information on page ___________.

Complete the organizer below by listing the order of events that led to the formation of life in the oceans. The last step has been done for you.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Life forms in the oceans between 3.9 and 3.5 billion years ago.

History in Rocks
I found this information on page ___________.

Name three types of materials in which fossils are found.

1. ______________________________
2. ______________________________
3. ______________________________

Compare relative and radiometric dating using the table below. Provide three facts for each type of dating.

<table>
<thead>
<tr>
<th>Relative Dating</th>
<th>Radiometric Dating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>
**Main Idea**

**A Trip Through Geologic Time**

I found this information on page _________.

**Details**

Summarize the four eras of the geologic time scale using the following table. The first row has been done for you.

<table>
<thead>
<tr>
<th>Geologic Era</th>
<th>Dates</th>
<th>Organisms</th>
<th>Other Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precambrian</td>
<td>4.6 billion – 544 million years ago</td>
<td>unicellular life forms, jellyfish, sponges</td>
<td>makes up about 87% of Earth’s history</td>
</tr>
<tr>
<td>Paleozoic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesozoic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cenozoic</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Describe the current theory on the cause of the mass extinction at the end of the Mesozoic era.

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

**Compare**

Explain how paleontologists helped create the geologic time scale.

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

____________________________________________________________________________________
# The History of Life

## Section 14.2 The Origin of Life

<table>
<thead>
<tr>
<th><strong>Main Idea</strong></th>
<th><strong>Details</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Using Prior Knowledge</strong> Before you read Section 2, explain why mold forms on food that has been left in your refrigerator for a long period of time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Review Vocabulary</strong></th>
<th><strong>Use your book to define the following term.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>prokaryotes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>New Vocabulary</strong></th>
<th><strong>Use your book to define each term.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>archaeobacteria</td>
<td></td>
</tr>
</tbody>
</table>

|                  |                                       |
| biogenesis        |                                       |
| protocell         |                                       |

|                     |                                       |
| spontaneous generation |                                   |

<table>
<thead>
<tr>
<th><strong>Academic Vocabulary</strong></th>
<th><strong>Define the following terms.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>complex</td>
<td></td>
</tr>
<tr>
<td>conclude</td>
<td></td>
</tr>
</tbody>
</table>
Section 14.2 The Origin of Life (continued)

Main Idea

Origins: The Early Ideas

I found this information on page _________.

Origin: The Modern Ideas

I found this information on page _________.

Details

Draw a diagram that illustrates how Redi’s experiment was used to disprove spontaneous generation.

Compare spontaneous generation and biogenesis by describing one way that the two are alike and one way that the two are different.

Explain the formation of simple organic molecules by filling in the graphic organizer below.

Identify the gases believed to have been part of Earth’s early atmosphere.

1. __________

2. __________

3. __________

4. __________
The Evolution of Cells

I found this information on page __________.

**Main Idea**

**Details**

**Explain why early organisms on Earth were anaerobic.**

**Describe the impact that the addition of oxygen to the atmosphere had on the organisms that lived on Earth.**

**Summarize** Refer to the figure in your book to summarize the evolution of the eukaryote. One step has been done for you.

**COMPARE**

Create a cartoon that describes the difference between a prokaryote and a eukaryote.
The History of Life  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W: What I Wanted to Find Out</th>
<th>L: What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

- Study your Science Notebook for this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about the history of life.

- 
- 
-
The Theory of Evolution

Before You Read

Use the “What I Know” column to list three things you know about evolution. Then list three questions you have about evolution in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Life has evolved slowly on Earth. Certain organisms evolved in response to changes in their environment. Describe an adaptation of an organism that you see around you. How has the organism become better suited to its environment as a result of this adaptation?

1. ______________________________________
2. ______________________________________
3. ______________________________________
4. ______________________________________
5. ______________________________________
6. ______________________________________
7. ______________________________________
8. ______________________________________
The Theory of Evolution
Section 15.1 Natural Selection and the Evidence for Evolution

Main Idea

Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. __________________________
2. __________________________
3. __________________________

Review Vocabulary

Use your book to define the following term.

evolution

New Vocabulary

Use your book to define each term.

- analogous structure
- artificial selection
- camouflage
- embryo
- homologous structure
- mimicry
- natural selection
- vestigial structure
Section 15.1 Natural Selection and the Evidence for Evolution (continued)

Main Idea

Charles Darwin and Natural Selection
I found this information on page ____________.

Details

Describe three observations that Darwin made in his research with pigeons.

1. ____________________________
2. ____________________________
3. ____________________________

Summarize natural selection by completing the sentences below.

Organisms with _____________ traits are able to ___________ and pass their traits on to their ____________, who then reproduce.

Those without such favorable traits are more likely to _________ before reproducing.

Adaptations: Evidence for Evolution
I found this information on page ____________.

Natural Selection

Apply Give separate examples of how animals use camouflage and mimicry in order to protect themselves. Use examples that are not given in your book.

Camouflage

__________________________
__________________________
__________________________
__________________________
__________________________

Mimicry

__________________________
__________________________
__________________________
__________________________
__________________________

Explain how medicines can lose their effectiveness over time.

__________________________
__________________________
__________________________

The Theory of Evolution 147
Other Evidence for Evolution

I found this information on page _________.

### Main Idea

Other Evidence for Evolution

### Details

**Summarize** the role that anatomy plays in teaching us about evolution by completing the table below.

<table>
<thead>
<tr>
<th>Structure</th>
<th>What is it?</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homologous Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analogous Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vestigial Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embryology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Identify** ways scientists interpret relationships among species by completing the organizer below.

Scientists combine data from _______ to interpret relationships among species.

**Compare**

Explain why fossils are such important tools in understanding evolution.

---

148  *Natural Selection and the Evidence for Evolution*
Infer Suppose two species of birds live in the same area. What might prevent competition between them?

Organize the vocabulary terms. Find each term in your book and place it under the appropriate heading. Then define each term. The number of terms under each heading is given.

<table>
<thead>
<tr>
<th>New Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>adaptive radiation</td>
</tr>
</tbody>
</table>

| Population, Genetics, and Evolution (4) | The Evolution of the Species (6) | Patterns of Evolution (3) |
Section 15.2 Mechanisms of Evolution (continued)

Main Idea

Population Genetics and Evolution

I found this information on page _________.

Details

Organize the steps associated with genetic equilibrium by completing the graphic organizer below.

Identify three ways that genetic equilibrium can be disrupted.

1. __________________________________________

2. __________________________________________

3. __________________________________________

Contrast Briefly explain the difference between geographic isolation and reproductive isolation.

___________________________________________

___________________________________________

___________________________________________

Summarize the current thoughts about the time it takes to develop a new species by completing the table below.

<table>
<thead>
<tr>
<th>Polyploidy</th>
<th>Gradualism</th>
<th>Punctuated Equilibrium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summarize the idea of convergent evolution by completing the graphic organizer below. The first step has been done for you.

Unrelated species live in similar environments.

Explain adaptive radiation using the example of a Hawaiian honeycreeper.

Label each model as representing divergent evolution or convergent evolution.

Species A
Species B
Species C
Species X
Species Y

COMPARE

Explain how geographic isolation can lead to adaptive radiation.
The Theory of Evolution  Chapter Wrap-Up

*In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.*

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______________________</td>
<td>1. ______________________</td>
</tr>
<tr>
<td>______________________</td>
<td>______________________</td>
</tr>
<tr>
<td>2. ______________________</td>
<td>2. ______________________</td>
</tr>
<tr>
<td>______________________</td>
<td>______________________</td>
</tr>
<tr>
<td>3. ______________________</td>
<td>3. ______________________</td>
</tr>
<tr>
<td>______________________</td>
<td>______________________</td>
</tr>
</tbody>
</table>

*Use this checklist to help you study.*

- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about evolution.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Primate Evolution

Before You Read

Use the “What I Know” column to list three things you know about the way primates evolved. Then list three questions you have about primate evolution in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Know</td>
<td>What I Want to Find Out</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

The ability of an organism to adapt to its surroundings is needed for survival. Describe the adaptations you think were most important to the survival of primates in a variety of climates.

The ability of an organism to adapt to its surroundings is needed for survival. Describe the adaptations you think were most important to the survival of primates in a variety of climates.

__________________________
__________________________
__________________________
__________________________
__________________________
__________________________
__________________________
__________________________

Science Journal
Predict Read the title of Section 1. List three things that might be discussed in this section.

1. 
2. 
3. 

Review Vocabulary Use your book to define the following term.

speciation

New Vocabulary Use your book to define each term.

anthropoids

opposable thumb

prehensile tail

primate

Academic Vocabulary Define the following term.

unique
What is a primate?

I found this information on page ___________.

Identify nine traits that make primates unique compared to other mammals.

1. ____________________________
2. ____________________________
3. ____________________________
4. ____________________________
5. ____________________________
6. ____________________________
7. ____________________________
8. ____________________________
9. ____________________________

Explain why having eyes that face forward is an important adaptation for primates.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Primate Origins

I found this information on page ___________.

Compare modern haplorhines and strepsirrhines by completing the table.

<table>
<thead>
<tr>
<th>Primate Group</th>
<th>Description</th>
<th>Location</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strepsirrhines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haplorhines</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Primate Origins

I found this information on page _________.

Classify the subgroups of the Anthropoids by completing the graphic organizer below.

- **Anthropoids**
- **live in hot and cold climates**
- **humans**
- **prehensile tail**

Summarize the evolution of anthropoids by filling in the diagram below.

- **Gibbons**
- **chimpanzees**

COMPARE

Describe some similarities and differences among the members of the hominoid group.

- ___________________________
- ___________________________
- ___________________________
- ___________________________
Primate Evolution
Section 16.2 Human Ancestry

Main Idea

Infer Describe the parts of a skeleton you think would provide scientists with the most information about human ancestry.

Details

New Vocabulary

Use your book to define each term.

australopithecine

bipedal

Cro-Magnon

hominid

hominoid

Neandertal
Section 16.2 Human Ancestry (continued)

Hominids

I found this information on page ____________.

Identify key terms in the evolution from hominoid to hominid by completing the flow chart below.

Scientists suggest that the separation in the ________ population is a result of _________ changes.

These changes caused hominoid ancestors to leave the ____ and move onto the ____ to find ____.

It may have been helpful to be _____, or able to walk upright on two legs.

______ are bipedal primates that include modern _______ and their direct ________.

The Emergence of Modern Humans

I found this information on page ____________.

Identify three characteristics of Lucy and other Australopithecus afarensis.

1. ________________________________
2. ________________________________
3. ________________________________

Compare Homo habilis and Homo erectus by giving five characteristics of each species using the table below.

<table>
<thead>
<tr>
<th>Homo habilis</th>
<th>Homo erectus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 16.2 Human Ancestry (continued)

Main Idea

The Emergence of Modern Humans

I found this information on page __________.

Details

Explain how scientists formed their hypotheses relating to how modern humans may have emerged.

Identify two different species that existed before Homo sapiens.
1. __________
2. __________

Compare Neandertals and Cro-Magnons by completing the table below. The first box has been done for you.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Neandertal</th>
<th>Cro-Magnon</th>
</tr>
</thead>
<tbody>
<tr>
<td>brain size</td>
<td>at least as large as humans</td>
<td></td>
</tr>
<tr>
<td>bone structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>home life</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summarize

Describe how the australopithecine adapted to its environment.

<table>
<thead>
<tr>
<th>Description</th>
<th>Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. _______________</td>
<td>1. _______________</td>
</tr>
<tr>
<td>_______________</td>
<td>_______________</td>
</tr>
<tr>
<td>2. _______________</td>
<td>2. _______________</td>
</tr>
<tr>
<td>_______________</td>
<td>_______________</td>
</tr>
<tr>
<td>3. _______________</td>
<td>3. _______________</td>
</tr>
<tr>
<td>_______________</td>
<td>_______________</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about primate evolution.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Organizing Life’s Diversity
Before You Read

Use the “What I Know” column to list three things you know about life’s diversity. Then list three questions you have about diversity in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Consider several living organisms that you see around you. Describe some characteristics that biologists might use when trying to classify, or organize, them into similar species.
Scan Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. 
2. 
3. 

Use your book to define the following term.

**species**

Classify each term at the left as being part of Linnaeus’ two-word naming system or a taxonomic group. The number of terms in each column is given to you.

<table>
<thead>
<tr>
<th>Linnaeus’ System (3)</th>
<th>Taxonomic Group (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use your book to define each term.

classification

taxonomy
Section 17.1 Classification (continued)

How Classification Began

I found this information on page ____________.

Modern Classification

I found this information on page ____________.

Main Idea

Details

Identify the parts of Linnaeus’ two-word naming system by completing the graphic organizer below.

Binomial Nomenclature:

first word identifies a which is a

second word is called the which often describes

Name the genus and specific epithet for the species name of modern humans.

genus

specific epithet

Explain why scientists now think that dinosaurs are more closely related to birds than to reptiles.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Describe three uses of taxonomy.

1. ______________________________________________________________________

   ______________________________________________________________________

2. ______________________________________________________________________

   ______________________________________________________________________

3. ______________________________________________________________________

   ______________________________________________________________________
How Living Things are Classified

Organize the following taxa from most specific to least specific: family, genus, order, species. The first one has been done for you.

Species

Examine the figure of the taxonomic groups in your book. Then identify the kingdom, phylum, and class for humans.

Kingdom: _____________________________
Phylum: ______________________________
Class: ________________________________

ANALOGY
Create your own organizer that shows where you live in a similar way that a classification system works. For example, you may want to indicate the continent you live on, your country, state, county, and town in your “home” classification.

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## Organizing Life’s Diversity

### Section 17.2 The Six Kingdoms

#### Main Idea

**Compare and contrast** What physical characteristics do you share with your parents? What physical characteristics make you different from them?

---

#### Details

Use your book to define the following term.

**archaeabacteria**

---

**New Vocabulary**

Use your book to define each term.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>cladistics</em></td>
<td></td>
</tr>
<tr>
<td><em>cladogram</em></td>
<td></td>
</tr>
<tr>
<td><em>eubacteria</em></td>
<td></td>
</tr>
<tr>
<td><em>fungus</em></td>
<td></td>
</tr>
<tr>
<td><em>phylogeny</em></td>
<td></td>
</tr>
<tr>
<td><em>protist</em></td>
<td></td>
</tr>
</tbody>
</table>
Section 17.2 The Six Kingdoms

Main Idea

How are evolutionary relationships determined?

Identify the five characteristics that are the basis for evolutionary relationships.

Phylogenic Classification: Models

I found this information on page __________.

Details

Explain how scientists came to the conclusion that giant pandas and red pandas are not closely related to each other.

Compare two models that are used to show the phylogeny of a species by completing the table below. Write two facts about each model.

<table>
<thead>
<tr>
<th>Cladogram</th>
<th>Fan-Shaped Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 17.2 The Six Kingdoms

The Six Kingdoms of Organisms

I found this information on page ____________.

Identify each kingdom with its description by placing the letters on the appropriate lines.

- a. animals
- b. archaebacteria
- c. eubacteria
- d. fungi
- e. plants
- f. protists

___ have strong cell walls, cause diseases
___ are stationary unicellular or multicellular heterotrophs
___ live in extreme environments
___ are multicellular autotrophs, cells have walls
___ have simple organ systems
___ all are multicellular heterotrophs

Summarize the main characteristics of organisms by writing at least one fact in each box.

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Cell Structure</th>
<th>Energy Sources</th>
<th>Other Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eubacteria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archaebacteria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protists</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fungi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animals</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compare

Provide one example of how chemosynthetic organisms are different from photosynthetic organisms.
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______________________</td>
<td>1. ______________________</td>
</tr>
<tr>
<td>______________________</td>
<td>______________________</td>
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<tr>
<td>2. ______________________</td>
<td>2. ______________________</td>
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<tr>
<td>______________________</td>
<td>______________________</td>
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<tr>
<td>3. ______________________</td>
<td>3. ______________________</td>
</tr>
<tr>
<td>______________________</td>
<td>______________________</td>
</tr>
</tbody>
</table>

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- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about organizing life’s diversity.

____________________

____________________

____________________
Viruses and Bacteria

Before You Read

Use the “What I Know” column to list three things you know about viruses and bacteria. Then list three questions you have about viruses and bacteria in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Many viruses and bacteria can cause diseases in animals and plants. Write about a disease that you know of that is caused by a virus or a bacteria. Be sure to discuss how the disease is treated.

Many viruses and bacteria can cause diseases in animals and plants. Write about a disease that you know of that is caused by a virus or a bacteria. Be sure to discuss how the disease is treated.
Main Idea

Research List three vaccines and the disease that each vaccine prevents.

New Vocabulary Use your book to define the following terms.

virion
prion
viroid
virus
host cell
capsid
bacteriophage

Use the terms at the left to complete the following paragraph.
During a ________ a virus takes over a host cell’s genetic material and uses its structures and energy to replicate until the host cell bursts. A virus’s nucleic acid integrates into the host cell’s chromosome, during a _________. It is then called a _______. It replicates each time the host cell reproduces. A ________ makes DNA from its RNA using __________, an enzyme it carries inside its capsid. The viral DNA is then integrated into the host cell’s chromosome.
What is a virus?

I found this information on page __________.

Viral Replication Cycles

I found this information on page __________.

Sketch a model of a virus in the space below. Be sure to label the following parts in your sketch.
- Capsid
- Nucleic Acid
- Envelope

Describe how a virus enters a host cell.

Label steps A, B, C, D, and E of a lytic cycle in the figure below. Use the following terms.
- Assembly
- Attachment
- Entry
- Lysis and Release
- Replication

Bacteriophage

Nucleic acid

Bacterial host cell

Bacterial DNA

The bacteriophage injects its nucleic acid into the bacterial cell.

The host cell breaks open and releases new virus particles.

New virus particles are assembled.

The host's metabolic machinery makes viral nucleic acid and proteins.
Section 18.1 Viruses (continued)

Main Idea

Viral Replication Cycles

I found this information on page __________.

Details

Sequence the steps of a lysogenic cycle.

1. A virus ____________.

2. The viral ________ enters the cell.

3. Viral DNA is ________________.

4. The provirus replicates along the host cell’s chromosome.

Cancer and Viruses, and Origin of Viruses

I found this information on page __________.

Explain the role of reverse transcriptase.

Create one review question relating to the link between viruses and cancer and one review question relating to the origin of viruses. Include your answer to each question.

1. Question: _________________________________
   Answer: _________________________________
   _________________________________

2. Question: _________________________________
   Answer: _________________________________
   _________________________________
Viruses and Bacteria
Section 18.2 Archaebacteria and Eubacteria

**Main Idea**

**Details**

Scan Section 2 of your book. Write two facts you discovered as you scanned the section.

1. 

2. 

New Vocabulary

Use your book to define each term.

**binary fission**

**chemosynthesis**

**conjugation**

**endospore**

**nitrogen fixation**

**obligate aerobe**

**obligate anaerobe**

**toxin**
Section 18.2 Archaebacteria and Eubacteria (continued)

**Main Idea**

Diversity of Prokaryotes

I found this information on page _________.

**Details**

Describe Give a general description of the three types of environments where archaebacteria live. With each general description, also provide one specific example of the environment.

1. ___________________________________________________________
   ___________________________________________________________

2. ___________________________________________________________
   ___________________________________________________________

3. ___________________________________________________________
   ___________________________________________________________

Organize information about the three types of eubacteria by completing the graphic organizer below. Label the three types, and describe how they obtain food.

<table>
<thead>
<tr>
<th>type:</th>
<th>type:</th>
<th>type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>food:</td>
<td>food:</td>
<td>food source:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Draw and label a bacterial cell in the space below. Use the figure in your book for help. Be sure to include the following parts.

- capsule
- cell wall
- chromosome
- flagellum
- pilus
- plasma membrane
- plasmid
Section 18.2 Archaebacteria and Eubacteria (continued)

What is a bacterium?
I found this information on page ___________.

Adaptations in Bacteria
I found this information on page ___________.

The Importance of Bacteria
I found this information on page ___________.

Compare bacterial reproduction by completing the table below.

<table>
<thead>
<tr>
<th></th>
<th>Binary Fission</th>
<th>Conjugation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Reproduction</td>
<td>asexual</td>
<td></td>
</tr>
<tr>
<td>How It Occurs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description of Cells Produced</td>
<td></td>
<td>new genetic combination</td>
</tr>
</tbody>
</table>

Summarize information about endospores by answering the questions below.

What are they?

How do they germinate?

How can they cause problems for humans?

List five ways that bacteria are helpful to humans.

1. ______________________________________________________
2. ______________________________________________________
3. ______________________________________________________
4. ______________________________________________________
5. ______________________________________________________

Assess whether bacteria are more harmful than helpful to humans. Defend your answer.

______________________________________________________

______________________________________________________
Viruses and Bacteria  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______________________</td>
<td>1. ______________________</td>
</tr>
<tr>
<td>__________________________</td>
<td>______________________</td>
</tr>
<tr>
<td>2. ______________________</td>
<td>2. ______________________</td>
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<tr>
<td>__________________________</td>
<td>______________________</td>
</tr>
<tr>
<td>3. ______________________</td>
<td>3. ______________________</td>
</tr>
<tr>
<td>__________________________</td>
<td>______________________</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

☐ Study your Science Notebook for this chapter.
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☐ Reread the chapter and review the tables, graphs, and illustrations.
☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about viruses and bacteria.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Protists

Before You Read

Use the “What I Know” column to list three things you know about protists. Then list three questions you have about protists in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Science Journal

Protists are the base for most food chains in aquatic environments. Describe how protists might contribute to an important food source—fish and other seafood.
**Protists**

Section 19.1 The World of Protists

**Main Idea**

**Details**

**Explain** Read Section 1 and then define a protist.

---

**Review Vocabulary**

Use your book to define the following term.

- **eukaryote**

---

**New Vocabulary**

Use your book to define each term.

- **algae**

- **asexual reproduction**

- **ciliates**

- **flagellates**

- **protozoans**

- **pseudopodia**

- **spore**

- **sporozoans**

---

178  The World of Protists
Main Idea

What is a protist?
I found this information on page __________.

What is a protozoan?
I found this information on page __________.

Diversity of Protozoans
I found this information on page __________.

Details

Organize information about different types of protists by completing the concept web.

Protozoans
Protozoans are found in __________ environments.
Protozoans feed on __________ or __________.
All protozoans are __________.

List the four main groups of protozoans.
1. __________
2. __________
3. __________
4. __________
Diversity of Protozoans
I found this information on page _________.

Describe the ways that amoebas, flagellates, and ciliates move.

Amoebas: ____________________________________________________________
                                                          __________________

Flagellates: __________________________________________________________
                                                          __________________

Ciliates: ____________________________________________________________
                                                          __________________

Draw and label a paramecium and its parts in the space below. For each label, include a brief explanation. For example, “Cilia—allow paramecium to move.” Include the following labels.
- anal pore
- cilia
- contractile vacuole
- gullet
- micronucleus and macronucleus
- oral groove

CONNECT

Malaria is a disease that is caused by a sporozoan. It is spread by certain types of mosquitoes. Consider which would have a greater benefit—developing a drug that would cure malaria or developing a drug eliminating mosquitoes’ ability to carry it. Explain your reasoning.

_____________________________________________________________________
_____________________________________________________________________

The World of Protists 180
Protists

Section 19.2 Algae: Plantlike Protists

Main Idea

Details

Skim Section 2 of your book. Write two questions that come to mind from reading the headings and the illustration captions.

1. 

2. 

Review Vocabulary

Use your book to define the following term.

photosynthesis

New Vocabulary

Use your book to define each term.

alternation of generations

colony

fragmentation

gametophyte

sporophyte

thallus
Section 19.2 Algae: Plantlike Protists (continued)

Main Idea

What are algae?
I found this information on page __________.

Diversity of Algae
I found this information on page __________.

Details

Organize information about algae by completing the table.

<table>
<thead>
<tr>
<th>Algae</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>How they obtain energy:</td>
<td></td>
</tr>
<tr>
<td>The kinds of pigments they contain:</td>
<td></td>
</tr>
<tr>
<td>Phytoplankton produce:</td>
<td>Seaweed is:</td>
</tr>
</tbody>
</table>

Describe the ways that euglenoids are like plants and like animals.

like plants
1. ____________
   ____________
2. ____________

Euglanoids

like animals
1. ____________
2. ____________

Sequence the asexual and sexual reproductive cycles of diatoms by writing the letter for each step in the correct box. Use the figure in your book for help.

a. fusion of gametes
d. sperm released
b. meiosis
e. wall formation around cell
c. mitosis
f. zygote
Section 19.2 Algae: Plantlike Protists (continued)

Diversity of Algae

I found this information on page __________.

Outline information about red, brown, and green algae. Write three main points about each type on the lines provided.

I. Red algae
   A. __________________________
   B. __________________________
   C. __________________________

II. Brown algae
   A. __________________________
   B. __________________________
   C. __________________________

III. Green algae
   A. __________________________
   B. __________________________
   C. __________________________

Summarize the alternation of generations by completing the organizer below.

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
</table>
| The haploid form of the algae, ________, produces _________.
| The gametes join to form a _____________.
| From the zygote, the ________ form of the algae will develop.

The diploid form is called _________.

Certain cells in the sporophyte undergo _________.

These spores are ________ that develop into new _________.

SYNTHESIZE
Use the words meiosis, fertilization, diploid, and haploid in a sentence that demonstrates your understanding of alternation of generations in green algae.

__________________________
Protists
Section 19.3 Slime Molds, Water Molds, and Downy Mildews

Main Idea

Describe: As you read the section, write a description or draw your perception of how the funguslike protists appear physically and how they live. Compare and contrast these descriptions with how you would describe fungi.

Details

Review Vocabulary

Use your book to define the following term.

heterotroph

New Vocabulary

Use your book to define the following term.

plasmodium

Academic Vocabulary

Define the following term.

consist

distinct
What are fungus-like protists?

I found this information on page _________.

Describe fungus-like protists by completing the paragraph below.
The fungus-like protists include ____________, ____________, and _____________. They are like fungi because they ________________organic material for _____________. Two of the three phyla of funguslike protists are made up of _____________. The third phylum consists of ____________ and _____________.

Distinguish between plasmodial slime molds and cellular slime molds by writing the letter for each phrase in the correct area of the Venn diagram.

a. are animal-like during much of their life cycle
b. slimy mass forms many, separate stalks that produce spores
c. form a mass of cytoplasm with no cell walls or membranes
d. make spores to reproduce
e. move and surround food like amoebas
f. multicellular mass forms a single stalk that produces spores
g. spend part of their life cycle as single, amoeba-like cells

Plasmodial Slime Molds  Both  Cellular Slime Molds

Compare and contrast the life cycles of plasmodial slime and cellular slime. Identify two ways in which they are alike, and two ways in which they are different.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Protists  185
Water Molds and Downy Mildews

I found this information on page __________.

Organize information about water molds and downy mildews by filling in the prompts below.

Where they live: _________________________________

What they feed on: ________________________________

How they are different from fungi: __________________;

What they look like: _______________________________

Problems they cause for humans: ____________________

Origin of Protists

I found this information on page __________.

Infer how analyzing the RNA of ancient green algae lead biologists to believe that ancient green algae were probably the ancestors to modern plants.

<table>
<thead>
<tr>
<th>Main Idea</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Molds and Downy Mildews</strong></td>
<td><strong>Organize information about water molds and downy mildews by filling in the prompts below.</strong></td>
</tr>
<tr>
<td>I found this information on page __________.</td>
<td>Where they live: _________________________________</td>
</tr>
<tr>
<td></td>
<td>What they feed on: ________________________________</td>
</tr>
<tr>
<td></td>
<td>How they are different from fungi: __________________;</td>
</tr>
<tr>
<td></td>
<td>What they look like: _______________________________</td>
</tr>
<tr>
<td></td>
<td>Problems they cause for humans: ____________________</td>
</tr>
</tbody>
</table>

Origin of Protists

I found this information on page __________.

Infer how analyzing the RNA of ancient green algae lead biologists to believe that ancient green algae were probably the ancestors to modern plants.

<table>
<thead>
<tr>
<th>Section 19.3 Slime Molds, Water Molds, and Downy Mildews (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Idea</strong></td>
</tr>
<tr>
<td>Water Molds and Downy Mildews</td>
</tr>
<tr>
<td>I found this information on page __________.</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Origin of Protists</th>
<th>I found this information on page __________.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infer how analyzing the RNA of ancient green algae lead biologists to believe that ancient green algae were probably the ancestors to modern plants.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Summarize</th>
<th>Create a simple organizer below that shows how the following are related.</th>
</tr>
</thead>
<tbody>
<tr>
<td>cellular slime mold</td>
<td>plasmodial slime molds</td>
</tr>
<tr>
<td>funguslike protists</td>
<td>water molds and downy mildew</td>
</tr>
<tr>
<td></td>
<td>three phyla of funguslike protists</td>
</tr>
</tbody>
</table>
Tie-It-All-Together

The world of protists is large and complex. It contains organisms that resemble animals, plants, and fungi. In the space below, create a concept web that includes all the kinds of protists discussed in this chapter.
## Protists Chapter Wrap-Up

In the "What I Wanted to Find Out" column, copy the questions you listed in the Chapter Preview. In the "What I Learned" column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

**Use this checklist to help you study.**

- Study your Science Notebook for this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

### Summarize
After reading this chapter, list three things you have learned about protists.
Fungi

Before You Read

Use the “What I Know” column to list three things you know about fungi. Then list three questions you have about fungi in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>What I Know</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Fungi can be both helpful and harmful to humans. On the lines below, write two things that you already know about fungi.

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Fungi
Fungi
Section 20.1 What is a fungus?

**Main Idea**

Infer why mushrooms sometimes grow in a ring, given that thread-like filaments under the soil may grow a long distance before they produce the surface mushrooms.

**Details**

Use your book to define each term.

- **decomposer**
- **budding**
- **chitin**
- **haustoria**
- **hyphae**
- **mycelium**
- **sporangium**

**Review Vocabulary**

Use your book to define the following term.

- decomposer
Section 20.1 What is a fungus? (continued)

The Characteristics of Fungi

Organize information about the structure of multicellular fungi by completing the graphic organizer.

- List three functions of hyphae.
  1. 
  2. 
  3. 

Define three types of fungi by writing how each obtains food.

- Saprophytes
- Mutualists
- Parasites
Section 20.1 What is a fungus? (continued)

**Main Idea**

Reproduction in Fungi

I found this information on page ________.

**Details**

Name the two forms of asexual reproduction in fungi in the boxes below.

Asexual Reproduction

Sequence the steps involved in reproduction of fungi by spores. Write the steps in the correct boxes.

1. spore arrives in a place with favorable growing conditions

2.

3.

4.

5. sporangium releases spores

Reproduction of Fungus by Spores

Describe three ways that reproduction by spores gives fungi an adaptive advantage.

1. 

2. 

3. 

**ANALYZE**

Explain where you would expect to find a greater number of fungal spores—in a desert or in a tropical forest.
## Fungi

### Section 20.2 The Diversity of Fungi

**Main Idea**

**Details**

**Skim** Section 2 of your book. Write two questions that come to mind from reading the headings and the illustration captions.

1. 
2. 

**New Vocabulary**

Classify each vocabulary word in the table as relating to hyphae, spores, or the relationship between organisms. Write a brief definition for each term.

<table>
<thead>
<tr>
<th>Hyphae (5 terms)</th>
<th>Spores (5 terms)</th>
<th>Relationship Between Organisms (2 terms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ascospores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ascus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>basidia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>basidiospores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conidia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conidiophores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gametangium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lichen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mycorrhiza</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rhizoids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stolons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>zygospores</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 20.2 The Diversity of Fungi (continued)

(Zygomecotes) I found this information on page _________.

Explain *how zygomecotes reproduce sexually.*

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>____________________________</td>
</tr>
<tr>
<td>____________________________</td>
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<tr>
<td>____________________________</td>
</tr>
<tr>
<td>____________________________</td>
</tr>
<tr>
<td>____________________________</td>
</tr>
</tbody>
</table>

(Ascomycotes) I found this information on page _________.

Organize *information about ascomycotes by completing the table below.*

<table>
<thead>
<tr>
<th>How they reproduce sexually</th>
<th>How they reproduce asexually</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Basidiomycotes) I found this information on page _________.

Examine *the illustration of a basidiomycote’s reproductive cycle in your book. Then make your own sketch of step D—hyphae fusion. Be sure to label the + and – mating types as well as the new mycelium.*

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>____________________________</td>
</tr>
<tr>
<td>____________________________</td>
</tr>
<tr>
<td>____________________________</td>
</tr>
<tr>
<td>____________________________</td>
</tr>
<tr>
<td>____________________________</td>
</tr>
</tbody>
</table>
Section 20.2 The Diversity of Fungi (continued)

**Main Idea**

**Deuteromycotes**

*I found this information on page __________.*

**Details**

Summarize information about the uses of deuteromycotes by completing the organizer below.

![Diagram of Deuteromycotes]

**Mutualism:**

**Mycorrhizae and Lichens**

*I found this information on page __________.*

**Origins of Fungi**

*I found this information on page __________.*

**SYNTHESIZE**

Describe one similarity and one difference between mycorrhizae and lichens.

---

Add to each sentence that explains mycorrhizae.

Fungi benefit from a mycorrhizal relationship because the ________

Plants benefit from a mycorrhizal relationship because ________

---

**Explain** why fossils of fungi are rare, and also give the approximate age of the oldest fungi fossils.

---

---
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

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- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

**Summarize**

After reading this chapter, list three things you have learned about fungi.

1. 
2. 
3. 
What is a plant?

Before You Read

Use the “What I Know” column to list three things you know about plants. Then list three questions you have about plants in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Plants are found in many different environments. Describe some of the plants you are familiar with. Identify the environment in which each lives.

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10.
What is a plant?

Section 21.1 Adapting to Life on Land

Scan Section 1 of your book. Write two questions that come to mind from reading the headings and the illustration captions.

1. 

2. 

New Vocabulary

Use your book to define each term.

**cuticle**

**leaf**

**nonvascular plant**

**root**

**seed**

**stem**

**vascular plant**

**vascular tissue**
Section 21.1 Adapting to Life on Land (continued)

Origins of Plants
I found this information on page ___________.

Adaptations in Plants
I found this information on page ___________.

Describe the characteristics of the modern members of the algae and plant groups.

Summarize adaptations in plants by identifying four challenges that land-based plants face.

1. ______________________________________
2. ______________________________________
3. ______________________________________
4. ______________________________________

Draw a diagram of a plant and label the following parts: leaf, root, and stem.
Main Idea

Adaptations in Plants

I found this information on page ________.

Details

Identify an important structural adaptation of vascular plants. Then describe two ways that vascular plants benefit from this adaptation.

Adaptation: ________________________________

Benefits: ________________________________

______________________________

Organize the plant organs by completing the table below. The first row has been filled out for you.

<table>
<thead>
<tr>
<th>Location</th>
<th>Purpose</th>
<th>Plant organ?</th>
<th>General Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>cuticle</td>
<td>on stems and leaves</td>
<td>reduce water loss</td>
<td>no allowed plant to move on land</td>
</tr>
<tr>
<td>leaf</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>root</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>seed</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contrast

Explain how the sperm reaches the egg differently in seed plants than in non-seed plants.
What is a plant?
Section 21.2 Survey of the Plant Kingdom

Main Idea

Infer What structural and physiological adaptations do plants, such as cacti and mosses, have that would allow them to survive in different biomes on Earth? Compare and then evaluate the significance of these adaptations.

Details

Review Vocabulary Use your book to define the following term.

evolution

New Vocabulary Use your book to define each term.

cones

frond

Academic Vocabulary Define the following terms.

diverse

environment
Section 21.2 Survey of the Plant Kingdom (continued)

Main Idea

Phylogeny of Plants

I found this information on page ________.

Non-seed Plants

I found this information on page ________.

Details

Describe three causes for the phylogeny of plants.

1. ____________________________

2. ____________________________

3. ____________________________

Compare the different types of non-seed plants by completing the table below. The first row has been done for you.

<table>
<thead>
<tr>
<th>Vascular/Nonvascular?</th>
<th>Characteristic</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepaticophytes</td>
<td>nonvascular</td>
<td>small, flattened bodies; grow in moist places</td>
</tr>
<tr>
<td>Anthocerophytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bryophytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psilophytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lycophytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthrophytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pterophytes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 21.2 Survey of the Plant Kingdom (continued)

Main Idea

Seed Plants
I found this information on page __________.

Details

Compare the different types of seed plants by filling in the table below. Provide at least one description for each type of seed.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycads</td>
<td></td>
</tr>
<tr>
<td>Gnetophytes</td>
<td></td>
</tr>
<tr>
<td>Ginkgophytes</td>
<td></td>
</tr>
<tr>
<td>Conifers</td>
<td></td>
</tr>
<tr>
<td>Anthophytes</td>
<td></td>
</tr>
</tbody>
</table>

Explain the difference between seeds and cones.

SYNTHESIZE

Describe the differences between a seed plant and a non-seed plant. Include specific examples and labeled diagrams of each plant.
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>2.</td>
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<tr>
<td>3.</td>
<td>3.</td>
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</table>

Use this checklist to help you study.
- Study your Science Notebook for this chapter.
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- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

SUMMARIZE After reading this chapter, list three things you have learned about plants.

____________________________________________________

____________________________________________________

____________________________________________________

204 Chapter Wrap-Up
The Diversity of Plants

Before You Read

Use the “What I Know” column to list three things you know about the diversity of plants. Then list three questions you have about plant diversity in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
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<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Plants can be categorized as either non-seed or seed plants. Think about the plants you see around you. Give an example of each type of plant, and briefly describe the difference between the two.

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 

The Diversity of Plants
Section 22.1 Nonvascular Plants

Scan Section 1 of your book. Use the checklist as a guide.

☐ Read all section titles.
☐ Read all boldfaced words.
☐ Read all tables and graphs.
☐ Look at all pictures and read the captions.
☐ Think about what you already know about the diversity of plants.

Write three facts you discovered about the diversity of plants as you scanned the section.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Review Vocabulary
fertilization

Use your book to define the following term.

New Vocabulary
antheridium
archegonium

Use your book to define each term.

Academic Vocabulary
adapt

Define the following term.

Section 22.1 Nonvascular Plants (continued)

**Main Idea**

What is a nonvascular plant?

*I found this information on page ____________.*

**Details**

*Explain why nonvascular plants need to be near water.*

*Sketch and label an example of a sporophyte attached to a gametophyte.*

**Adaptations in Bryophyta, Hepaticophyta, and Anthocerophyta**

*I found this information on page ____________.*

**Compare the general characteristics of bryophytes, hepaticophytes, and anthocerophytes by completing the table below.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Environment</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bryophyta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepaticophyta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthocerophyta</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Adaptations in Bryophyta, Adaptations in Hepaticophyta, and Adaptations in Anthocerophyta

I found this information on page _________.

Origins of Nonvascular Plants

I found this information on page _________.

**Main Idea**

Adaptations in Bryophyta, Adaptations in Hepaticophyta, and Adaptations in Anthocerophyta

**Details**

Match the following terms with the definitions below: sporophyte, gametophyte, thallus, rhizoid. Write the correct term next to the definition.

- ____________ colorless, multicellular structures found in nonvascular plants; used to help anchor the plants to the soil
- ____________ broad shape resembling a fleshy lobed leaf
- ____________ diploid generation; grow attached to gametophytes
- ____________ haploid generation; dominant generation

Describe how anthocerophytes became known as hornworts.

Create your own graphic organizer that models the possible common ancestry of nonvascular and vascular plants.

**COMPARE**

Draw a diagram of a liverwort and a hornwort. Label each part and include information on their environment and surroundings as part of your overall diagram. Use a separate sheet of paper if necessary.
The Diversity of Plants
Section 22.2 Non-Seed Vascular Plants

**Concept Map** After you read about non-seed vascular plants, make a concept map that identifies and analyzes the relationships among these organisms.

**Main Idea**

**Details**

**Review Vocabulary** Use your book to define the following term.

- alternation of generations

**New Vocabulary** Use your book to define each term.

- prothallus
- rhizome
- sorus
- strobilus
Section 22.2 Non-Seed Vascular Plants (continued)

Main Idea

What is a non-seed vascular plant?

I found this information on page .

Details

Describe vascular tissue.


Summarize the alternation of generations for vascular plants by completing the graphic organizer below.

Explain how leaves in non-seed plants protect the developing reproductive cells.

Compare the three divisions of non-seed vascular plants by completing the table below. Write at least two facts about each division.

<table>
<thead>
<tr>
<th>Lycophyta</th>
<th>Arthrophyta</th>
<th>Pterophyta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adaptations in Lycophyta, Adaptations in Arthrophyta, and Adaptations in Pterophyta

I found this information on page .
Section 22.2 Non-Seed Vascular Plants (continued)

Main Idea
Adaptations in Lycophyta, Adaptations in Arthrophyta, and Adaptations in Pterophyta

I found this information on page _________.

Details

Distinguish between the non-seed vascular plants that appear in the fossil record and the ones found today by completing the organizer below.

<table>
<thead>
<tr>
<th>Fossil Record</th>
<th>Today</th>
</tr>
</thead>
</table>
| Lycophytes were the size of trees and part of the early forest community. | |}

They grow to about 1 m tall.

Ancient ferns grew tall and treelike and formed forests.

Sequence the evolution of the non-seed vascular plant in the sentences below. The first one has been done for you.

1. Many non-seed vascular plants died out, leaving the ones that are dominant today.
2. Earth became cooler and drier 280 million years ago.
3. The earliest evidence of the non-seed vascular plants was from the Devonian Period 375 million years ago.
4. During the Carboniferous Period, large, tree-sized lycophytes, arthrophytes, and pterophytes were abundant in warm forests.

Synthesize
Use a separate sheet of paper to create your own drawings of the three main groups of non-seed vascular plants. Label the important features of each group and give an example of each one.

The Diversity of Plants 211
# The Diversity of Plants

## Section 22.3 Seed Plants

### Main Idea

**Creative Writing** As a class, brainstorm and record items you use that are either seed plants or are derived from seed plants. Identify the seed plant(s) for each item. After reviewing your list, write a story about what your life would be like without seed plants.

### Details

#### Review Vocabulary

Use your book to define the following term.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>reproduction</td>
<td></td>
</tr>
</tbody>
</table>

#### New Vocabulary

Use your book to define each term.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>annual</td>
<td></td>
</tr>
<tr>
<td>biennial</td>
<td></td>
</tr>
<tr>
<td>cotyledons</td>
<td></td>
</tr>
<tr>
<td>deciduous plant</td>
<td></td>
</tr>
<tr>
<td>dicotyledon</td>
<td></td>
</tr>
<tr>
<td>embryo</td>
<td></td>
</tr>
<tr>
<td>fruit</td>
<td></td>
</tr>
<tr>
<td>monocotyledon</td>
<td></td>
</tr>
</tbody>
</table>
What is a seed plant?

I found this information on page ________.

Describe a seed.

Sketch a seed plant. Be sure to label the ovary and ovules. On the line below, describe what the ovule does.

The ovule _________________________________.

Identify three advantages of seeds.

1. ______________________________________

2. ______________________________________

3. ______________________________________

Compare the two types of seed plants by completing the organizers below. Write at least two facts for each type of seed plant.

Seeds not Protected by Fruit

Seeds Protected by Fruit
### Adaptations in Cycadophyta, Ginkgophyta, Gnetophyta, Coniferophyta, and Anthophyta

I found this information on page __________.

### Origins of Seed Plants

I found this information on page __________.

### Compare the characteristics of the different divisions of seed plants by completing the table below. The first one has been done for you.

<table>
<thead>
<tr>
<th></th>
<th>Reproduction</th>
<th>Environment</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycadophyta</td>
<td>males produce pollen grains from cones, pollen produce motile sperm</td>
<td>tropics and subtropics</td>
<td>there are about 100 species today</td>
</tr>
<tr>
<td>Ginkgophyta</td>
<td>none given</td>
<td>none given</td>
<td>none given</td>
</tr>
<tr>
<td>Gnetophyta</td>
<td>none given</td>
<td>none given</td>
<td>none given</td>
</tr>
<tr>
<td>Coniferophyta</td>
<td>none given</td>
<td>none given</td>
<td>none given</td>
</tr>
<tr>
<td>Anthophyta</td>
<td>none given</td>
<td>none given</td>
<td>none given</td>
</tr>
</tbody>
</table>

### Describe one major event that took place in each period.

- **Paleozoic:**
- **Mesozoic:**
- **Jurassic:**

### CONNECT

Suppose you want to plant a vegetable garden. Research the soil conditions and overall climate in your area. Then describe a plant that should be successful, and explain your reasoning.

---

**Section 22.3 Seed Plants** (continued)
Tie-It-All-Together

You have read about the three types of plants: nonvascular plants, non-seed vascular plants, and seed plants. Now create a quick identification guide to common plants in your area. Your plant guide should be easy to read, yet contain basic information about the reproduction, environment, general structure, and significant characteristics of each plant. Include one plant from each type. Remember that a good plant guide has well-labeled diagrams. When you are finished, share your plant guide with your class.
# The Diversity of Plants  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

*Use this checklist to help you study.*

- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about the diversity of plants.

---

216  Chapter Wrap-Up
Plant Structure and Function

Before You Read

Use the “What I Know” column to list three things you know about plant structure and function. Then list three questions you have about plant structure and function in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Know</td>
<td>What I Want to Find Out</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Science Journal

Describe some plants that you eat. Then describe some products that you use that come from plants.

<table>
<thead>
<tr>
<th>Description of plants eaten</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Scan Section 1 of your book. Write two questions that come to mind from reading the headings and the illustration captions.

1. 

2. 

**New Vocabulary**

Classify each vocabulary word in the list to the left as being a plant cell or a plant tissue. Then give a short description.

<table>
<thead>
<tr>
<th>Cells (8 terms)</th>
<th>Tissues (10 terms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>apical meristem</td>
<td></td>
</tr>
<tr>
<td>collenchyma</td>
<td></td>
</tr>
<tr>
<td>companion cells</td>
<td></td>
</tr>
<tr>
<td>cork cambium</td>
<td></td>
</tr>
<tr>
<td>epidermis</td>
<td></td>
</tr>
<tr>
<td>guard cells</td>
<td></td>
</tr>
<tr>
<td>lateral meristem</td>
<td></td>
</tr>
<tr>
<td>meristems</td>
<td></td>
</tr>
<tr>
<td>parenchyma</td>
<td></td>
</tr>
<tr>
<td>phloem</td>
<td></td>
</tr>
<tr>
<td>sclerenchyma</td>
<td></td>
</tr>
<tr>
<td>sieve tube members</td>
<td></td>
</tr>
<tr>
<td>stomata</td>
<td></td>
</tr>
<tr>
<td>tracheids</td>
<td></td>
</tr>
<tr>
<td>trichomes</td>
<td></td>
</tr>
<tr>
<td>vascular cambium</td>
<td></td>
</tr>
<tr>
<td>vessel elements</td>
<td></td>
</tr>
<tr>
<td>xylem</td>
<td></td>
</tr>
</tbody>
</table>
Section 23.1 Plant Cells and Tissues (continued)

**Main Idea**

**Types of Plant Cells**

*I found this information on page _______.*

**Details**

**Point out** three ways that plant cells differ from animal cells.

- [ ]

- [ ]

- [ ]

**Label** the cell wall, central vacuole, and chloroplast in the figure below.

![Cell Diagram]

**Compare** the three types of plant cells by completing the table below. Describe one characteristic and one function for each type of cell.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Parenchyma</th>
<th>Collenchyma</th>
<th>Sclerenchyma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Plant Tissues**

*I found this information on page _______.*

**Describe** the function of each of the following.

- epidermis: ____________________________________________

- stomata: ____________________________________________

- guard cells: _________________________________________

- trichomes: _________________________________________
**Main Idea**

**Plant Tissues**

I found this information on page ____.

**Details**

Draw a sketch of phloem tissue. Label the following parts.

- companion cell
- sieve plate
- sieve tube member

**Describe** ground tissue by completing the organizer below.

<table>
<thead>
<tr>
<th>Made up of:</th>
<th>Functions include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>cells</td>
<td></td>
</tr>
<tr>
<td>cells</td>
<td>support</td>
</tr>
<tr>
<td>cells</td>
<td></td>
</tr>
</tbody>
</table>

**Construct** two questions about meristematic tissues. Then give the answer to each question.

1. Question: ____________________________

   Answer: ____________________________
            ____________________________
            ____________________________

2. Question: ____________________________

   Answer: ____________________________
            ____________________________
            ____________________________

**SYNTHESIZE**

Use a separate sheet of paper to draw a diagram of a plant. Include captions that explain the three types of cells as well as the four types of tissues.
Plant Structure and Function
Section 23.2 Roots, Stems, and Leaves

Main Idea

Details

**Experiment** After reading the first two sections of this chapter, design an investigation to demonstrate how vascular tissue is common to roots, stems, and leaves. Show your plan to your teacher and get permission to perform the investigation. Be sure to follow all laboratory safety rules. Share your findings with your class.

New Vocabulary

**Classify** each term at the left as relating to roots, stems, or leaves. Provide a brief definition for each term.

<table>
<thead>
<tr>
<th>cortex</th>
<th>endodermis</th>
<th>mesophyll</th>
<th>pericycle</th>
<th>petiole</th>
<th>root cap</th>
<th>sink</th>
<th>translocation</th>
<th>transpiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roots (4 terms)</td>
<td>Stems (2 terms)</td>
<td>Leaves (3 terms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 23.2 Roots, Stems, and Leaves (continued)

**Main Idea**

**Roots**

I found this information on page __________.

**Organize** information about the two main types of root systems. Give a brief description of taproots and fibrous roots, then make a sketch of each type.

- taproots: _____________________________
- fibrous roots: _____________________________

**Stems**

I found this information on page __________.

**Identify** the layers of cells of roots beginning with the outermost layer. The first one has been done for you.

- endodermis 1 epidermis 1 pericycle 1 cortex

**Describe** three stems that store food.

- _____________________________
- _____________________________
- _____________________________

**Summarize** the function of the stem by completing the model of the vascular tissues of a carrot.

```
Leaf

____ moves water and dissolved minerals from the roots to the leaves

Phloem
```

---

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Section 23.2 Roots, Stems, and Leaves (continued)

**Main Idea**

**Leaves**

I found this information on page ________.

**Details**

Organize information about the shapes of leaves. Give a brief description of a simple and a compound leaf, and provide one example of each. Then make a sketch of each type.

simple leaf: ____________________________

compound leaf: ____________________________

Summarize the role of mesophyll by completing the organizer below.

Name two plants with leaves that have functions besides photosynthesis. Briefly describe these functions.

1. ____________________________

2. ____________________________

CONNECT

Plant roots, stems, and leaves all serve as food sources for humans. Give a specific example of a food we eat from each of the three categories.

[Diagram of plant structure]

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Plant Structure and Function
Section 23.3 Plant Responses

**Main Idea**

**Details**

Make and Use Tables As you read this section, make a table of plant stimuli and responses. Include the source of the stimulus and describe how the plant responds.

---

**Review Vocabulary**

*Use your book to define the following term.*

- **stimulus**

**New Vocabulary**

*Use your book to define each term.*

- **auxins**
- **cytokinins**
- **ethylene**
- **gibberellins**
- **hormone**
- **nastic movement**
- **tropism**

---

224 Plant Responses
**Main Idea**

**Plant Hormones**

*I found this information on page __________.*

**Details**

**Compare** four plant hormones by completing the table below.

<table>
<thead>
<tr>
<th>Hormone</th>
<th>How This Hormone Regulates Growth</th>
<th>A Characteristic of This Hormone</th>
<th>Another Benefit of This Hormone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gibberellins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cytokinins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethylene</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Plant Responses**

*I found this information on page __________.*

**Summarize** the two types of tropisms by completing the organizer below.

Tropism is a change in a plant’s _____ due to an _____ _____.

The tropism is _____ if the plant grows toward the stimulus.

The tropism is _____ if the plant grows _____ from the stimulus.

Plants respond to _______ as they grow toward ____.

Stems respond to _______ as they grow against _______ away from the _____.

---

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Compare tropism and nastic movement. Place each characteristic in the correct location in the Venn diagram below.

- does not involve growth • is reversible
- involves growth • is not reversible
- involves plant response • response can be positive or negative

Classify each of the following as examples of tropism or nastic movement.

__________ Venus’s-flytrap closes on an insect.
__________ Sweet pea tendrils climb a fence.
__________ A plant grows toward a lamp.
__________ Mimosa pudica leaflets become limp when touched.
__________ Plant roots grow into the soil.

Connect Farmers often use hormones to improve their crop yield. Describe a hormone that a farmer might use and how the hormone can help increase crop output.
You have read about the structure and function of plants. Create a detailed and well-labeled diagram of a plant including the plant stem, roots, and leaves. Beside each section, indicate the types of tissues and cells at work in these areas as well as their functions. Your diagram may have smaller callouts where you draw a part of your diagram in greater detail. Refer to the figure that shows the structure of roots in Section 2 for an example of a callout. Be sure to indicate where growth and reproduction in the plant occur.
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>______________________</td>
<td>1.</td>
<td>______________________</td>
</tr>
<tr>
<td></td>
<td>______________________</td>
<td></td>
<td>______________________</td>
</tr>
<tr>
<td>2.</td>
<td>______________________</td>
<td>2.</td>
<td>______________________</td>
</tr>
<tr>
<td></td>
<td>______________________</td>
<td></td>
<td>______________________</td>
</tr>
<tr>
<td>3.</td>
<td>______________________</td>
<td>3.</td>
<td>______________________</td>
</tr>
<tr>
<td></td>
<td>______________________</td>
<td></td>
<td>______________________</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

☐ Study your Science Notebook for this chapter.

☐ Study the definitions of vocabulary words.

☐ Review daily homework assignments.

☐ Reread the chapter and review the tables, graphs, and illustrations.

☐ Review the Section Assessment questions at the end of each section.

☐ Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about plant structure and function.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Reproduction in Plants

Before You Read

Use the “What I Know” column to list three things you know about plant reproduction. Then list three questions you have about reproduction in plants in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Explain how you think life on Earth would be affected if plants were to stop reproducing.
Reproduction in Plants
Section 24.1 Life Cycles of Mosses, Ferns, and Conifers

Main Idea

Review Vocabulary
Use your book to define the following term.

- gametophyte

New Vocabulary
Use your book to define each term.

- megaspore
- micropyle
- microspore
- protonema
- vegetative reproduction

Academic Vocabulary
Define the following terms.

- generation
- release

Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. ____________________________________________________________
2. ____________________________________________________________
3. ____________________________________________________________
Section 24.1 Life Cycles of Mosses, Ferns, and Conifers (continued)

Main Idea

Alteration of Generations

I found this information on page __________.

Details

Summarize the alternation of generations found in plants by completing the flowchart below.

Identify the steps in the alternation of generations that have been labeled in the flowchart above. Choose from the following terms.

- cell division
- sex cells
- sexual reproduction

A __________________________________________________________________________

B __________________________________________________________________________

C __________________________________________________________________________

D __________________________________________________________________________

Model the life cycle of mosses by completing the flowchart below.

A haploid cell can germinate to form a ____________ → ____________ → If fertilization occurs, a _______ _______ forms.

If the spores land in a ________ environment, they can ________ and develop into a new ____.

Cells in the sporophyte capsule undergo ________, producing _______ spores.

The zygote undergoes cell division to become the _________.

Reproduction in Plants 231
Sequence the life cycle of ferns by numbering the following steps in the order that they occur. The first and last steps have been done for you.

1. A spore develops to form a prothallus.
2. If pieces of the rhizome break off, new fern plants can develop from the pieces by vegetative reproduction.
3. If fertilization occurs, the resulting diploid zygote develops into a sporophyte.
4. The prothallus dies and decomposes as the sporophyte matures.
5. The cycle continues when sporangia develop on the fronds and spores are released.
6. The mature fern consists of rhizomes from which roots and fronds grow.
7. Sperm released by antheridia swim to eggs in archegonia.
8. As soon as the sporophyte produces green fronds, it can carry on photosynthesis and live on its own.
9. The prothallus produces archegonia and antheridia on its surface.

Compare female and male conifer cones by completing the table below. List three facts about each type of cone.

<table>
<thead>
<tr>
<th>Female Cones</th>
<th>Male Cones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Choose one of the following plants: mosses, ferns, or conifers. Then briefly describe the life cycle of the plant.
Reproduction in Plants
Section 24.2 Flowers and Flowering

Main Idea

Assemble For one week, find images of flowers in magazines and other periodicals. With permission, cut them out and bring them to class. Create a class list of the name of each flower and create a classification system of the flowers.

Details

Review Vocabulary

Use your book to define the following term.

response

New Vocabulary

Use your book to define the following term.

photoperiodism

Classify each term in the left column as being a type of plant or a part of a plant by filling in the table below. Write a brief definition of each term.

<table>
<thead>
<tr>
<th>Type of Flowering Plant (4 terms)</th>
<th>Part of Flowering Plant (6 terms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>anther</td>
<td></td>
</tr>
<tr>
<td>day-neutral plants</td>
<td></td>
</tr>
<tr>
<td>long-day plants</td>
<td></td>
</tr>
<tr>
<td>ovary</td>
<td></td>
</tr>
<tr>
<td>petals</td>
<td></td>
</tr>
<tr>
<td>pistil</td>
<td></td>
</tr>
<tr>
<td>sepals</td>
<td></td>
</tr>
<tr>
<td>short-day plant</td>
<td></td>
</tr>
<tr>
<td>stamen</td>
<td></td>
</tr>
</tbody>
</table>
What is a flower?
I found this information on page .

Compare the organs of a flower by completing the table below.
Give the location and function for each organ.

<table>
<thead>
<tr>
<th>Organ</th>
<th>Location</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stamen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sepals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pistil</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Classify each of the following as either a complete or an incomplete flower.
walnut tree ___________________________
rose _________________________________
sweet corn ___________________________
lily _________________________________

Sketch a flower and label the petals, sepals, stamen, and pistil.
### Main Idea

**Photoperiodism**

*I found this information on page __________.*

### Details

**Compare** the four types of plants based on their critical periods.

<table>
<thead>
<tr>
<th>Flowering Season</th>
<th>Characteristic</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-Day Plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-Day Plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day-Neutral Plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate-Day Plant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Explain** why photoperiodism is important to plants.

---

**SYNTHESIZE**

Collect a flower from your home or neighborhood. Draw a diagram of the plant and label the major parts.
Reproduction in Plants
Section 24.3 The Life Cycle of a Flowering Plant

Finding Main Ideas On a separate sheet of paper, construct an outline about the life cycle of a flowering plant. Use the titles in this section as a guideline. As you read the paragraphs that follow the titles, add important information and vocabulary words to your outline.

New Vocabulary Use your book to define each term.

- dormancy
- double fertilization
- endosperm
- germination
- hypocotyl
- polar nuclei
- radicle
Section 24.3 The Life Cycle of a Flowering Plant (continued)

Main Idea

The Life Cycle of an Anthophyte

I found this information on page __________.

Details

Summarize the development of the female gametophyte by completing the flowchart below.

The surviving megaspore’s haploid nucleus undergoes mitosis three times, producing eight haploid nuclei.

Choose one pollination adaptation and describe it in the space below.

Describe how the two haploid nuclei are involved in fertilization.

<table>
<thead>
<tr>
<th>Tube Nucleus</th>
<th>Generative Nucleus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Main Idea

**Seeds and Fruits**

*I found this information on page ___________.*

---

### Details

**Compare the characteristics of seeds and fruits by completing the table below.**

<table>
<thead>
<tr>
<th>Structure</th>
<th>Formation</th>
<th>Benefit to Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Explain the specific conditions that the following seeds need to germinate.**

- some conifer and wildflower seeds: ___________________________
- apple seeds: ___________________________
- coconut seeds: ___________________________

### SYNTHESIZE

Describe how seeds are dispersed. Choose one of the methods that is discussed in this section.

---
Tie-It-All-Together

You have read about the life cycles of mosses, ferns, conifers, and flowering plants. Now create a simple science review manual explaining the life cycles of each type of plant. Your review manual should be easy to read, yet contain basic information on the male and female reproductive cells of each plant. Include specific examples in your review manual. A good review manual will have well-labeled diagrams. When you are finished, share your review manual with the class.
Reproduction in Plants  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

☐ Study your Science Notebook for this chapter.

☐ Study the definitions of vocabulary words.

☐ Review daily homework assignments.

☐ Reread the chapter and review the tables, graphs, and illustrations.

☐ Review the Section Assessment questions at the end of each section.

☐ Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about plant reproduction.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
What is an animal?

Before You Read

Use the “What I Know” column to list three things you know about animals. Then list three questions you have about animals in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.

Describe at least three characteristics that distinguish animals from plants.
What is an animal?
Section 25.1 Typical Animal Characteristics

Scan the titles, boldfaced words, pictures, figures, and captions in Section 1. Write two facts you discovered about animals as you scanned the section.

1. ______________________________________
2. ______________________________________

New Vocabulary

Use your book to define each term.

blastula

deuterostome

ectoderm

endoderm

gastrula

mesoderm

protostome

cessile
Characteristics of Animals

Identify the following facts about animals.

six characteristics of animals

one way animals are different from plants

List four sessile organisms and analyze the characteristics of their environment that allows them to be sessile.

1. 

2. 

3. 

4. 

evironment for sessile organisms: 

Model the digestive systems of earthworms and flatworms and describe their differences.

---

Main Idea

Details

I found this information on page .
Main Idea

Development of Animals

I found this information on page ___________.

Details

Describe the sequence for the development of an animal from fertilization to birth by completing the following sentences.

1. During ______ reproduction, fertilization occurs when an ______ is penetrated by a ________, forming a ________.
2. After ______ and cell division begin, the egg is called an embryo.
3. The cells form a fluid-filled ball called a ________.
4. Some cells migrate inside, forming a cup-shaped structure called the ________, which has two cell layers. The layer on the outside is the ________ and will form the ___________________. The inner layer is called the ________, which will form ___________________.
5. All animals retain the two embryonic cell layers throughout their lives, but others develop a third cell layer, the ________, between the other layers. This layer forms ___________________.

Draw a gastrula. Label the mesoderm, ectoderm, and endoderm. Then in the table below write the tissue types that each layer develops into.

<table>
<thead>
<tr>
<th>Cell Layer</th>
<th>Forms These Tissues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesoderm</td>
<td></td>
</tr>
<tr>
<td>Ectoderm</td>
<td></td>
</tr>
<tr>
<td>Endoderm</td>
<td></td>
</tr>
</tbody>
</table>

SYNTHESIZE

Compare and contrast protostomes and deuterostomes.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
What is an animal?
Section 25.2 Body Plans and Adaptations

Main Idea
Details

Make and Use Tables
After you read about the different types of animal symmetry, make a table to categorize 25 animals according to their symmetry. Include animals that you are familiar with or have read about in this book.

Review Vocabulary
Use your book to define the following term.

**gastrula**

New Vocabulary
Compare the terms within each table by writing their definitions.

<table>
<thead>
<tr>
<th>anterior</th>
<th>posterior</th>
<th>dorsal</th>
<th>ventral</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>symmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td>bilateral</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>endoskeleton</th>
<th>exoskeleton</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>vertebrate</th>
<th>invertebrate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>coelom</th>
<th>acoelomate</th>
<th>pseudoceolom</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 25.2 Body Plans and Adaptations (continued)

**Main Idea**

**What Is Symmetry?**

*I found this information on page _________.*

**Details**

Explain the evolutionary sequence by using the terms below to complete the sentences.

- anterior
- asymmetrical
- coelomate
- posterior
- radial symmetry
- sponges
- bilateral symmetry
- prey
- three

The earliest animals had ________ body plans, as do their modern descendants, such as ________.

Later, sea stars, hydras, and other animals appeared with ________. They were able to detect and capture ________ coming from any direction.

The last body plan to develop was ________ with a head at the ________ end of the body and a tail at the ________ end of the body.

All of the animals developed from ________ embryonic cell layers, and many have fluid-filled body cavities. If the cavities are completely lined with mesoderm, the animals are called ________.

Model a bilaterally symmetrical human being. Then create comic book characters, one that is asymmetrical, and one that has radial symmetry. Use your imagination. Explain the number of arms, legs, eyes, etc. that each type of comic book character has.

<table>
<thead>
<tr>
<th>Bilateral Symmetry</th>
<th>Radial Symmetry</th>
<th>Asymmetrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>body parts: 2 eyes, 2 legs, 2 arms, 1 nose in center</td>
<td>body parts:</td>
<td>body parts:</td>
</tr>
</tbody>
</table>
Section 25.2 Body Plans and Adaptations (continued)

**Main Idea**

**Animal Protection and Support**

I found this information on page __________.

**Details**

Describe the types of protection (type of skeleton or shell) each type of animal has and explain characteristics of the skeleton or shell.

- **mollusks**
- **beetles**
- **horses**
- **sharks**

**Origin of Animals**

I found this information on page __________.

**Sequence** the organisms with the oldest at the bottom and the most recently evolved at the top.

- **acoelomates**
- **coelomates**
- **sponges**

**SUMMARIZE**

Read each prefix below. Then write what you think is the meaning of the prefix. Afterwards, check the meaning of each prefix in a dictionary and write this definition next to your original one.

- **endo-**
- **exo-**
- **bi-**
- **in-**
What is an animal? Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ________________________</td>
<td>1. _____________</td>
</tr>
<tr>
<td>___________________________</td>
<td>__________________</td>
</tr>
<tr>
<td>2. ________________________</td>
<td>2. _____________</td>
</tr>
<tr>
<td>___________________________</td>
<td>__________________</td>
</tr>
<tr>
<td>3. ________________________</td>
<td>3. _____________</td>
</tr>
<tr>
<td>___________________________</td>
<td>__________________</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

- Study your Science Notebook for this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

After reading this chapter, list three things you have learned about animals.
Sponges, Cnidarians, Flatworms, and Roundworms

Before You Read

Use the “What I Know” column to list three things you know about sponges, cnidarians, flatworms, and roundworms. Then list three questions you have about these organisms in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Even the simplest organism has a role in the ecological community. Hypothesize the role of sponges and cnidarians in the oceans. Why would people need to know about flatworms and roundworms?

---

Name ____________________________ Date ____________________________

Sponges, Cnidarians, Flatworms, Roundworms 249
Sponges, Cnidarians, Flatworms, and Roundworms

Section 26.1 Sponges

Scan Section 1 of your book. Use the checklist as a guide.

☐ Read all section titles.
☐ Read all boldfaced words.
☐ Read all tables and graphs.
☐ Look at all pictures and read the captions.
☐ Think about what you already know about communicating in science.

Write three facts you discovered as you scanned the section.

1. 
2. 
3. 

Review Vocabulary

Use your book to define the following term.

sessile

New Vocabulary

Use your book to define each term.

external fertilization

filter feeding

hermaphrodite

internal fertilization

Academic Vocabulary

Define the following term.

differentiate
Section 26.1 Sponges (continued)

What is a sponge?

I found this information on page _________.

Model a sponge. Use the figure in your book to help you. Label the six parts that are listed in the table below on your diagram. Then describe the function of each part in the table below.

<table>
<thead>
<tr>
<th>Sponges</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body Part</strong></td>
<td><strong>Function of Body Part</strong></td>
</tr>
<tr>
<td>osculum</td>
<td></td>
</tr>
<tr>
<td>epithelial-like cells</td>
<td></td>
</tr>
<tr>
<td>collar cells</td>
<td></td>
</tr>
<tr>
<td>pore cell</td>
<td></td>
</tr>
<tr>
<td>amoebocytes</td>
<td></td>
</tr>
<tr>
<td>spicules</td>
<td></td>
</tr>
</tbody>
</table>
**Section 26.1 Sponges (continued)**

**Main Idea**

**What is a sponge?**

*I found this information on page ________.*

**Details**

**Summarize** reproduction methods of sponges by completing the following sentences.

A bud is __________________________.

When a bud drops off, __________________________

______________________________.

When a bud does not drop off __________________________

______________________________.

If a fragment drops off __________________________

Gemmules are ________________ that are produced when __________________________.

In the spring, gemmules __________________________

The advantage of hermaphroditism for sessile sponges is that it __________________________

Fertilization usually occurs ________________ and results in ________________ that __________________________.

**SUMMARIZE**

Create a concept web to connect at least 10–15 facts about sponges from this section. Include all of the terms below.

- evolved
- feeding
- sessile
- reproduction
- species
- shaped
- spicule
- spongin
Sponges, Cnidarians, Flatworms, and Roundworms

Section 26.2 Cnidarians

Main Idea

Finding Main Ideas Construct an outline about cnidarian characteristics. Use the titles in this section of your book as a guideline. As you read the paragraphs that follow the titles, add important information and vocabulary words to your outline.

I. ______________________________________

A. Body Structure
   1. ______________________________________
   2. ______________________________________

B. Body Forms
   1. ______________________________________
   2. ______________________________________

Details

Review Vocabulary

Use your book to define the following term.

endocytosis

New Vocabulary

Use your book to define each term.

gastrovascular cavity

medusa

nematocyst

nerve net

polyp
**Main Idea**

What is a cnidarian?

*I found this information on page __________.*

**Details**

**Compare** a polyp with a medusa by filling in the table.

<table>
<thead>
<tr>
<th></th>
<th>Polyp</th>
<th>Medusa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body shape</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position of mouth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position of tentacles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Model** the complete life cycle of a jellyfish.
Section 26.2 Cnidarians (continued)

**Main Idea**

**Diversity of Cnidarians, Origins of Sponges and Cnidarians**

I found this information on page ___________.

**Details**

**Summarize** the Cnidarian classes and examples of each in the concept map.

- e.g. jellyfish
- Cnidarians
- Cubozoa
- e.g.
- siphonophores e.g.

**Describe** the symbiotic relationship between corals and zooxanthellae.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

**Identify** two reasons scientists have inferred that sponges and cnidarians evolved from protists.

1. ________________________________________________________________

2. ________________________________________________________________

**COMPARE**

Write a few sentences comparing cnidarians and sponges.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Sponges, Cnidarians, Flatworms, and Roundworms

Section 26.3 Flatworms

**Main Idea**

**Details**

**Compare and contrast** Compile two lists: Advantages of Parasitism and Disadvantages of Parasitism. Infer what structural adaptations are found in most parasites.

**Review Vocabulary**

*Use your book to define the following term.*

- acoelomate

**New Vocabulary**

*Use your book to define each term.*

- pharynx
- proglostid
- regeneration
- scolex

**Academic Vocabulary**

*Define the following term.*

- complex
What is a flatworm?

I found this information on page _________.

Summarize facts about flatworms in the table.

<table>
<thead>
<tr>
<th>Size Range</th>
<th>Number of Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred Environments</td>
<td>Difference Between Flukes and Planarians</td>
</tr>
<tr>
<td>Diet of a Planarian</td>
<td>Symmetry</td>
</tr>
<tr>
<td>What Happens When They Are Damaged</td>
<td>Why Parasitic Flatworms are Simpler than Planarians</td>
</tr>
</tbody>
</table>

Model a planarian. Include at least nine body parts.
What is a flatworm?

I found this information on page _________.

Identify the planarian body part for each function.

<table>
<thead>
<tr>
<th>Functions</th>
<th>Body Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>taking in food</td>
<td></td>
</tr>
<tr>
<td>detecting chemicals and movements in environment</td>
<td></td>
</tr>
<tr>
<td>removing excess water</td>
<td></td>
</tr>
<tr>
<td>sensing and responding to the environment in front of the animal</td>
<td></td>
</tr>
<tr>
<td>sensing light</td>
<td></td>
</tr>
<tr>
<td>receive messages from eyespots, sensory cells</td>
<td></td>
</tr>
<tr>
<td>communicates with rest of body</td>
<td></td>
</tr>
<tr>
<td>moving</td>
<td></td>
</tr>
</tbody>
</table>

Model the life cycle of a fluke.

Connect

Identify a human disorder that tapeworms and flukes may cause.

<table>
<thead>
<tr>
<th>Group</th>
<th>Human Disorder Caused</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sponges, Cnidarians, Flatworms, and Roundworms

Section 26.4 Roundworms

Main Idea

Details

Research Collect information about roundworm life cycles, ways to prevent infection by round worms, and recommended treatments for roundworm infections.

Review Vocabulary

Use your book to define the following term.

pseudocoelom

New Vocabulary

Use your book to define the following term.

trichinosis

Academic Vocabulary

Define the following terms.

infer

expose
Section 26.4 Roundworms (continued)

What is a roundworm?
I found this information on page __________.

Diversity of Roundworms
I found this information on page __________.

Main Idea
Describe the structure and movement of a roundworm.

Details
Identify the roundworm that matches each description.

<table>
<thead>
<tr>
<th>Description</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>most common roundworm parasite in the U.S.</td>
<td></td>
</tr>
<tr>
<td>enters the human body through bare feet</td>
<td></td>
</tr>
<tr>
<td>world’s most common roundworm infection</td>
<td></td>
</tr>
<tr>
<td>carried by infected, undercooked pork</td>
<td></td>
</tr>
<tr>
<td>causes plant diseases</td>
<td></td>
</tr>
</tbody>
</table>

Identify a positive and a negative effect of nematodes on plants.

negative: ________________________________

positive: ________________________________

CONNECT
Compare the digestive tracts of roundworms with those in sponges, hydras, planarians, and humans. What does the comparison suggest about the probable evolutionary history of roundworms?

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Tie-It-All-Together

Create a time line to show some important evolutionary advances in the organisms in this chapter. Fill in the diagram to summarize
• the likely order in which major changes occurred;
• what the changes were;
• the groups in which they appeared.

Group: ____________________________
Changes: _________________________
_________________________________
_________________________________
_________________________________

Group: ____________________________
Changes: _________________________
_________________________________
_________________________________
_________________________________

Group: ____________________________
Changes: _________________________
_________________________________
_________________________________
_________________________________

Group: ____________________________
Changes: _________________________
_________________________________
_________________________________
Sponges, Cnidarians, Flatworms, and Roundworms  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>________________________</td>
<td>1.</td>
<td>________________________</td>
</tr>
<tr>
<td>2.</td>
<td>________________________</td>
<td>2.</td>
<td>________________________</td>
</tr>
<tr>
<td>3.</td>
<td>________________________</td>
<td>3.</td>
<td>________________________</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about sponges, cnidarians, flatworms, and roundworms.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Before you read the chapter, use the “What I Know” column to list three things you know about mollusks and segmented worms. Then list three questions you have about these animals in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

What is the purpose of the mucus layer on snails, slugs, and other mollusks? Write about experiences you have had with snails and slugs.
Mollusks and Segmented Worms
Section 27.1 Mollusks

Main Idea

Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. ______________________________
2. ______________________________
3. ______________________________

Details

Review Vocabulary

Use your book to define the following term.

coelom

New Vocabulary

Use your book to define each term.

closed circulatory system

mantle

nephridia

open circulatory system

radula

Academic Vocabulary

Define the following term.

coordinate

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Section 27.1 Mollusks (continued)

Main Idea

What is a mollusk?

I found this information on page __________.

Details

Draw a snail and a squid. Label the parts of each. Identify the structures that make the organism different.

Describe two ways mollusks feed.

Radula: ____________________________

______________________________

Filter feeders: ____________________________

______________________________

Compare the way mollusks reproduce in water and on land.

in water: ____________________________

______________________________

on land: ____________________________

______________________________
Diversity of Mollusks

I found this information on page __________.

**Main Idea**

**Details**

Identify the three classes of mollusks and the meaning of each class name. Provide at least three examples of each class.

Classify each mollusk in the left column of the table. Place it in the proper class (such as Bivalvia).

<table>
<thead>
<tr>
<th>Mollusk</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>has a beautiful shell that is often collected on beaches and a large foot under the body</td>
<td></td>
</tr>
<tr>
<td>has no radula; has two shells connected with a ligament, and a large, muscular foot for digging in the sand</td>
<td>Bivalvia</td>
</tr>
<tr>
<td>is brightly colored and has a layer of mucus covering its body; has a large foot under the body and no shell</td>
<td></td>
</tr>
<tr>
<td>has a radula and tentacles; has no shell; squirts ink at predators</td>
<td></td>
</tr>
</tbody>
</table>

**CONNECT**

Write a few lines comparing mollusks' excretory structures with those of two or more groups that evolved earlier.
Finding Main Ideas As you read through Section 2, answer the following questions.

1. What is the basic body plan of a segmented worm?

2. Describe the digestive process of an earthworm.

3. Why are some leeches considered parasites?

Review Vocabulary Use your book to define the following term.

parasitism

New Vocabulary Model a segmented worm. Write captions to define the gizzard, setae, and other parts.

gizzard

setae

Academic Vocabulary Define the following terms.
detect

distinct
What is a segmented worm? Why is segmentation important?

Define segmentation and state its two main advantages.

Sequence the process of digestion in segmented worms.

Create a diagram of the process of reproduction in earthworms, based on the word description in your book.
Section 27.2 Segmented Worms (continued)

**Main Idea**

**Diversity of Segmented Worms**

*I found this information on page ____________.*

**Details**

Describe two characteristics of each group of animals. Then write the class and the phylum to which they belong.

<table>
<thead>
<tr>
<th>fanworms</th>
<th>sea mice</th>
<th>bristleworms</th>
<th>leeches</th>
<th>earthworms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Class:风扇虫

Class:海鼠

Class:海Cashew

Phylum:  

**Origins of Mollusks and Segmented Worms**

*I found this information on page ____________.*

**Summarize** the fossilization of segmented worms and mollusks by completing the sentences.

Because _________ have nearly no hard body parts, the fossil record for segmented worms is limited. The most common fossils they left were tubes formed by the _________. They appear in the fossil record _________. The phylum may have originated from the larvae of ancestral _________. _________ are seen later in the fossil record. Precambrian deposits include shells of _________, _________, and _________.

**CONNECT**

Compare the kind of circulatory system found in annelids with that found in some mollusks. State the advantage of the annelid type.

_________________________________________________________________

_________________________________________________________________

_________________________________________________________________
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about mollusks and segmented worms.

---

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# Arthropods

## Before You Read

*Use the “What I Know” column to list three things you know about arthropods. Then list three questions you have about them in the “What I Want to Find Out” column.*

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Science Journal

*Speculate about what would happen if cockroaches and other insects were to disappear.*

---

*Arthropods* 271
Arthropods
Section 28.1 Characteristics of Arthropods

**Main Idea**

**Details**

*Skim* Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. __________________________________
2. __________________________________
3. __________________________________

**Review Vocabulary**

Use your book to define the following term.

exoskeleton

**New Vocabulary**

Use your book to help you place the vocabulary terms where they belong in the following table. The number in brackets shows the number of terms in each column. Write one or two words to help you remember what each term means.

<table>
<thead>
<tr>
<th>Body Parts (8)</th>
<th>Chemicals (1)</th>
<th>Processes (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>appendage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>book lungs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cephalothorax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>compound eye</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malpighian tubule</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mandibles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>molting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>parthenogenesis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pheromones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>simple eye</td>
<td></td>
<td></td>
</tr>
<tr>
<td>spiracles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tracheal tubes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 28.1 Characteristics of Arthropods (continued)

Main Idea

What is an arthropod?

I found this information on page __________.

Details

Identify six characteristics of arthropods.

List the advantages and disadvantages of an exoskeleton.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discuss the different body sections and amount of fusion in various types of arthropods.

_______
_______
_______
_______
_______
_______
Section 28.1 Characteristics of Arthropods (continued)

Main Idea

What is an arthropod?

Model the respiratory structures for a grasshopper, a crab, and a spider.

Details

Create a concept map with at least four facts about arthropod reproduction.

ANALOGY

Describe at least three kinds of arthropod mandibles, and name an animal in which each kind of mandible is found. For each one, state a human tool that performs a similar function.
**Arthropods**

Section 28.2 Diversity of Arthropods

**Main Idea**

**Infer** What structures enable arthropods to eat varied diets? Explain.

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>_______</td>
</tr>
<tr>
<td>_______</td>
</tr>
<tr>
<td>_______</td>
</tr>
</tbody>
</table>

**Review Vocabulary**

Use your book to define the following term.

<table>
<thead>
<tr>
<th>term</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>habitat</td>
<td></td>
</tr>
<tr>
<td>_______</td>
<td></td>
</tr>
</tbody>
</table>

**New Vocabulary**

Use your book to define each term.

<table>
<thead>
<tr>
<th>term</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>chelicerae</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>larva</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>metamorphosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>nymph</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>pedipalps</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>pupa</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>spinnerets</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 28.2 Diversity of Arthropods (continued)

Main Idea

I found this information on page _______.

Details

Identify the body part for each function.

<table>
<thead>
<tr>
<th>Function</th>
<th>Spider Body Part or Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>spinning silk</td>
<td></td>
</tr>
<tr>
<td>protection of eggs</td>
<td></td>
</tr>
<tr>
<td>imageless, light-sensitive sight</td>
<td></td>
</tr>
<tr>
<td>holding and moving food or sperm</td>
<td></td>
</tr>
<tr>
<td>poisoning prey</td>
<td></td>
</tr>
<tr>
<td>gas exchange</td>
<td></td>
</tr>
<tr>
<td>making silk</td>
<td></td>
</tr>
</tbody>
</table>

Draw a spider. Label at least six parts.

Describe the type of food eaten by each group of arachnids.

<table>
<thead>
<tr>
<th>Arachnid Group</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>scorpions</td>
<td></td>
</tr>
<tr>
<td>mites</td>
<td></td>
</tr>
<tr>
<td>ticks</td>
<td></td>
</tr>
</tbody>
</table>
Section 28.2 Diversity of Arthropods (continued)

**Main Idea**

Crustaceans, Centipedes and Millipedes, Horseshoe Crabs: Living Fossils, and Insects

I found this information on page __________.

**Details**

Organize arthropod classifications and examples by completing the map.

Class Diplopoda (Diplopoda)

Class ______ (centipedes)

Class ______ (crabs, lobsters, shrimps)

Class Merostomata (Merostomata)

Class ______ (arthropods)

Class Arachnida (Arachnida)

Phylum ______

**Identify** four stages in metamorphosis.

________

________

________

________

**Write** the missing words in the sentences about arthropod evolution.

The success of arthropods is due in part to their ________, ________ and ________.

They evolved from the same ancestors as ________, but arthropods have more developed ________ and ________ and their ________ provide protection and support. Muscles in arthropods are arranged in ________.

**Compare and Contrast**

Compare and contrast insects and arachnids.

________

________

________

________

________
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>_________________________</td>
<td>1.</td>
<td>_________________________</td>
</tr>
<tr>
<td></td>
<td>_________________________</td>
<td></td>
<td>_________________________</td>
</tr>
<tr>
<td>2.</td>
<td>_________________________</td>
<td>2.</td>
<td>_________________________</td>
</tr>
<tr>
<td></td>
<td>_________________________</td>
<td></td>
<td>_________________________</td>
</tr>
<tr>
<td>3.</td>
<td>_________________________</td>
<td>3.</td>
<td>_________________________</td>
</tr>
<tr>
<td></td>
<td>_________________________</td>
<td></td>
<td>_________________________</td>
</tr>
</tbody>
</table>

*Use this checklist to help you study.*

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- [ ] Study the definitions of vocabulary words.
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- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**Summarize**

After reading this chapter, list three things you have learned about arthropods.

_____________________________________

_____________________________________

_____________________________________

_____________________________________
# Echinoderms and Invertebrate Chordates

## Before You Read

Use the “What I Know” column to list three things you know about echinoderms and invertebrate chordates. Then list three questions you have about them in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ___________________</td>
<td>1. ___________________</td>
</tr>
<tr>
<td>2. ___________________</td>
<td>2. ___________________</td>
</tr>
<tr>
<td>3. ___________________</td>
<td>3. ___________________</td>
</tr>
</tbody>
</table>

## Science Journal

Write what you know or stories you have heard about starfish, sea urchins, and other spiny sea creatures.
### Echinoderms and Invertebrate Chordates

#### Section 29.1 Echinoderms

**Main Idea**

**Details**

**Skim** Section 1 of your book. Read the headings and the illustration captions. Write three questions that come to mind.

1. 
2. 
3. 

**Review Vocabulary**

Use your book to define the following term.

- **endoskeleton**

**New Vocabulary**

Use your book to define each term.

- **ampulla**
- **madreporite**
- **pedicellariae**
- **rays**
- **tube foot**
- **water vascular system**

**Academic Vocabulary**

Define the following terms.

- **flexible**
- **rigid**
What is an echinoderm?
I found this information on page _______.

Diversity of Echinoderms
I found this information on page _______.

<table>
<thead>
<tr>
<th>Echinoderm Class</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>long, oblong shape; leathery surface</td>
<td></td>
</tr>
<tr>
<td>five to 40 rays; calcium carbonate skeleton</td>
<td></td>
</tr>
<tr>
<td>very small; disk-shaped; feet along edge</td>
<td></td>
</tr>
<tr>
<td>feathery rays catch food; only sessile echinoderms; resemble plants</td>
<td></td>
</tr>
<tr>
<td>fragile; can regenerate broken rays; don’t use their tube feet for movement</td>
<td></td>
</tr>
<tr>
<td>shaped like globes or disks; may be covered with long, pointed spines</td>
<td></td>
</tr>
</tbody>
</table>

Describe echinoderm methods for coping with encounters with predators.
brittle stars ____________________________
sea urchins ____________________________
sea cucumbers ____________________________

Describe the water vascular system. In your description, include the terms ampulla, excrete, gases, madreporite, and tube feet.

Identify each echinoderm class that is described below.
Section 29.1 Echinoderms (continued)

**Main Idea**

Diversity of Echinoderms

I found this information on page __________.

**Details**

Draw a sea star. Label 15 parts. Use the figure in your book to help you.

**Write** words to fill in the blanks in the following discussion of the origins of echinoderms.

Echinoderms are the only invertebrates that are __________. That characteristic makes biologists think echinoderms may be the closest invertebrate relatives of the __________. Though echinoderms are now __________ symmetrical, the earliest members of the group may have had __________ symmetry. Because of their __________, made of calcium carbonate, we have a lot of __________ of echinoderms, beginning in the __________ Era.

**Connect**

Identify a major clue that suggests a link between echinoderms and chordates. Suggest one characteristic that links echinoderms to annelids and mollusks.
Echinoderms and Invertebrate Chordates

Section 29.2 Invertebrate Chordates

Finding Main Ideas  Construct an outline about invertebrate chordates. Use the titles in this section of your book as a guideline. As you read the paragraphs that follow the titles, add important information and vocabulary words to your outline.

Main Idea

Details

Review Vocabulary  Use your book to define the following term.

mesoderm

New Vocabulary  Use your book to define each term.

dorsal hollow nerve cord

notochord

pharyngeal pouches

Academic Vocabulary  Define the following term.

structure
Section 29.2 Invertebrate Chordates (continued)

What is an invertebrate chordate?

I found this information on page _________.

Diversity of Invertebrate Chordates

I found this information on page _________.

Identify the phylum and subphyla described below.

<table>
<thead>
<tr>
<th>Phylum</th>
<th>Subphylum</th>
<th>Subphylum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lancelets</td>
<td>Tunicates</td>
</tr>
<tr>
<td></td>
<td>Fishes, reptiles, birds,</td>
<td>Fishes, reptiles, birds,</td>
</tr>
<tr>
<td></td>
<td>amphibians, mammals</td>
<td>amphibiais, mammals</td>
</tr>
</tbody>
</table>

Describe four characteristics of chordates. For each one, state where it is on the animal and describe what it does.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Location</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>notochord</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dorsal hollow nerve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pharyngeal pouches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>postanal tail</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Draw a tunicate. Use the figure in your book to help you. Label eight parts.
Section 29.2 Invertebrate Chordates (continued)

**Main Idea**

Diversity of Invertebrate Chordates, Origins of Invertebrate Chordates

I found this information on page __________.

**Details**

Draw a lancelet (longitudinal view). Use the figure in your book to help you. Label nine parts.

**Compare and contrast** tunicates and lancelets by completing the table.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Tunicates</th>
<th>Lancelets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are all chordate features present in adults?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What kind of body covering do they have?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do they sometimes live in colonies?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do they have gill slits?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How are their bodies shaped?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONNECT**

Explain why scientists think modern vertebrates may have arisen from free-swimming larval stages of ancestral invertebrate chordates.
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>__________________________</td>
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<td>2.</td>
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<td>3.</td>
<td>__________________________</td>
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<td>__________________________</td>
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</tbody>
</table>

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☐ Review daily homework assignments.
☐ Reread the chapter and review the tables, graphs, and illustrations.
☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

Summarize

After reading this chapter, list three things you have learned about echinoderms and invertebrate chordates.

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________
Fishes and Amphibians

Before You Read

Use the “What I Know” column to list three things you know about fishes and amphibians. Then list three questions you have about them in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
<td></td>
<td>2.</td>
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<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Hypothesize what factors might be responsible for amphibian species becoming extinct.

Science Journal

1. 
2. 
3. 

Name ____________________________ Date ______________
Fishes and Amphibians
Section 30.1 Fishes

Main Idea

Skim Section 1 of your book. Write two questions that come to mind from reading the headings and the illustration captions.

1. ____________________________________________

2. ____________________________________________

Details

Review Vocabulary

Use your book to define the following term.

vertebrate

New Vocabulary

Use your book to define each term.

cartilage

fin

lateral line system

scale

spawning

swim bladder
What is a fish?
I found this information on page …

Main Idea

Details

Identify the classes of fishes, what the class names mean, and some examples.

WITHOUT JAWS

(CARTILAGINOUS FISHES)

Model how oxygen moves from water into a fish’s blood. Use the figure in your book to help you. Write brief captions about the gills, the heart, and blood flow.

Examples: trout, bass, and tuna
### What Is a Fish, Diversity of Fishes, Origins of Fishes

I found this information on page _________.

#### Main Idea

#### Details

Identify a term or phrase for each fact about fishes.

<table>
<thead>
<tr>
<th>Where fishes live</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>how fishes reproduce</td>
<td></td>
</tr>
<tr>
<td>purpose of the lateral line system</td>
<td></td>
</tr>
<tr>
<td>egg laying in fishes</td>
<td></td>
</tr>
<tr>
<td>first developed in ancestral fishes</td>
<td></td>
</tr>
<tr>
<td>way that sharks find prey</td>
<td></td>
</tr>
<tr>
<td>vision in fishes</td>
<td></td>
</tr>
<tr>
<td>when coelacanths appear in fossils</td>
<td></td>
</tr>
<tr>
<td>two types of bony fishes</td>
<td></td>
</tr>
<tr>
<td>early jawless fishes</td>
<td></td>
</tr>
<tr>
<td>type of skeleton that is not bone</td>
<td></td>
</tr>
<tr>
<td>number of chambers in a fish heart</td>
<td></td>
</tr>
<tr>
<td>purpose of swim bladder</td>
<td></td>
</tr>
<tr>
<td>purpose of fins</td>
<td></td>
</tr>
</tbody>
</table>

### Compare

Identify characteristics of fishes that are similar to lancelets and characteristics that are more advanced.
Fishes and Amphibians
Section 30.2 Amphibians

**Main Idea**

Infer: Make a list of characteristics that are necessary for an animal to live successfully on land.

**Details**

**Review Vocabulary**

Use your book to define the following term.

metamorphosis

**New Vocabulary**

Use your book to define each term.

ectotherm

vocal cord

**Academic Vocabulary**

Define the following terms.

external

range
**Main Idea**

**What is an amphibian?**

_**I found this information on page _______**_.

**Details**

**Summarize** how ectotherms cope with changes in environmental temperature.

---

**Compare** the stages in metamorphosis for a frog and a salamander.

<table>
<thead>
<tr>
<th>Frog</th>
<th>Salamander</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young:</td>
<td>Young:</td>
</tr>
<tr>
<td>Adult:</td>
<td>Adult:</td>
</tr>
</tbody>
</table>

**Create** a concept map to show characteristics and examples of each order of the class Amphibia.
Section 30.2 Amphibians (continued)

**Main Idea**

**Amphibian Diversity**

I found this information on page __________.

**Details**

**Describe** each chamber of the amphibian heart and gas exchange in amphibians.

State **three adaptations** that helped amphibians leave water.

1. __________________________
2. __________________________
3. __________________________

**Summarize** the advantages and difficulties for amphibians emerging onto land from life in water.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Difficulties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COMPARE**

Compare amphibians with fishes. List some important evolutionary advances seen in amphibians.

________________________

________________________

________________________
Fishes and Amphibians  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>_________________________</td>
<td>1.</td>
<td>_________________________</td>
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<tr>
<td></td>
<td>_________________________</td>
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<tr>
<td>2.</td>
<td>_________________________</td>
<td>2.</td>
<td>_________________________</td>
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<tr>
<td></td>
<td>_________________________</td>
<td></td>
<td>_________________________</td>
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<tr>
<td>3.</td>
<td>_________________________</td>
<td>3.</td>
<td>_________________________</td>
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<tr>
<td></td>
<td>_________________________</td>
<td></td>
<td>_________________________</td>
</tr>
</tbody>
</table>

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☐ Reread the chapter and review the tables, graphs, and illustrations.
☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about fishes and amphibians.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Reptiles and Birds

Before You Read

Use the “What I Know” column to list three things you know about reptiles and birds. Then list three questions you have about them in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
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<tr>
<td>3.</td>
<td>3.</td>
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</tr>
</tbody>
</table>

Science Journal

Think about the life of fishes compared to the lives of reptiles and the lives of birds. What adaptations do birds and reptiles have to suit them to life on land and in the air?


Reptiles and Birds
Section 31.1 Reptiles

Main Idea

Review Vocabulary

Embryo

Use your book to define the following term.

New Vocabulary

Amniotic egg

Use your book to define each term.

Jacobson’s organ

Draw a cross-section of the head of a reptile and label the Jacobson’s organ. Use the figure in your book to help you.

Details

Skim Section 1 of your book. Read the headings and the illustration captions. Write three questions that come to mind.

1. 

2. 

3. 

Reptiles and Birds
Section 31.1 Reptiles

Name ___________________________ Date ________________
Main Idea

What is a reptile?

I found this information on page _________.

Details

Identify how reptiles adapted to deal with each factor needed for life on land.

<table>
<thead>
<tr>
<th>Needed for Life on Land</th>
<th>Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>running and walking without support from water</td>
<td>sturdy limbs beneath body</td>
</tr>
<tr>
<td>protection of embryo from drying out</td>
<td></td>
</tr>
<tr>
<td>slowing of moisture loss from body</td>
<td></td>
</tr>
<tr>
<td>gas exchange other than through skin</td>
<td></td>
</tr>
<tr>
<td>protection from predators</td>
<td></td>
</tr>
<tr>
<td>delivering more oxygen to tissues that require more energy</td>
<td></td>
</tr>
</tbody>
</table>

Draw a reptilian egg. Label the amnion, embryo, allantois, albumen, yolk, shell, and chorion.
**Main Idea**

**Diversity of Reptiles**

I found this information on page __________.

**Details**

Summarize characteristics about each order in class Reptilia.

<table>
<thead>
<tr>
<th>Squamata</th>
<th>Chelonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>includes:</td>
<td>includes:</td>
</tr>
<tr>
<td>Crocodilia</td>
<td>Rhynochocephalia</td>
</tr>
<tr>
<td>includes:</td>
<td>includes:</td>
</tr>
</tbody>
</table>

**Origins of Reptiles**

I found this information on page __________.

**Connect**

Hypothesize what clues might have led scientists to believe that birds belong in each of the two places in the evolutionary map you created above.

---

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Reptiles and Birds

Section 31.2 Birds

**Main Idea**

Infer the characteristics that birds have that make them different from reptiles.

**Details**

<table>
<thead>
<tr>
<th>Review Vocabulary</th>
<th>Use your book to define the following term.</th>
</tr>
</thead>
<tbody>
<tr>
<td>phylogeny</td>
<td></td>
</tr>
</tbody>
</table>

**New Vocabulary**

Use your book to define each term.

| endotherm |                                            |
| feather   |                                            |
| incubate  |                                            |
| sternum   |                                            |

**Academic Vocabulary**

Define the following terms.

| factor |                                            |
| retain |                                            |
What is a bird?

I found this information on page __________.

Create a concept web about the structure and function of feathers.

Describe the role of the sternum in flight.

Sequence the organs air passes through as a bird breathes.

Contrast how birds stay warm and how they cool off. List factors or make sketches to explain.
### Diversity of Birds

*I found this information on page ________.*

**Main Idea**

**Details**

**Compare** bird adaptations to various habitats and food sources.

<table>
<thead>
<tr>
<th>Kind of Bird</th>
<th>Adaptations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

### Origins of Birds

*I found this information on page ________.*

**Main Idea**

**Details**

**Identify** features shared by birds and theropods.

---

**COMPARE**

Compare ectothermy and endothermy. In what animal groups are they found? What are the advantages and disadvantages of each?

---

---
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
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</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
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<td>1.</td>
<td>1.</td>
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<tr>
<td>2.</td>
<td>2.</td>
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<tr>
<td>3.</td>
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SUMMARIZE After reading this chapter, list three things you have learned about reptiles and birds.

________________________
________________________
________________________
Mammals

Before You Read

Use the “What I Know” column to list three things you know about mammals. Then list three questions you have about mammals in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
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<tr>
<td>2.</td>
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<td>3.</td>
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</tbody>
</table>

Mammals are one of the most successful groups of animals on Earth. Think about a specific mammal and some of its characteristics. Write about how you think some of these characteristics help the mammal to survive and be successful.

---

Science Journal

Mammals are one of the most successful groups of animals on Earth. Think about a specific mammal and some of its characteristics. Write about how you think some of these characteristics help the mammal to survive and be successful.
Mammals
Section 32.1 Mammal Characteristics

Main Idea

Skim Section 1 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. 
2. 
3. 

Details

Use your book to define the following term.

metabolism

Use your book to define each term. Then label each term on the sketch of the fox below.

diaphragm

gland

mammary gland
Section 32.1 Mammal Characteristics (continued)

Main Idea

What is a mammal?

I found this information on page __________.

Details

Organize the concept map about the characteristics of mammals.

Describe how mammals feed their young by completing the statements.

Mammals feed their young from ________________, which produce ______ and may be _________________. Milk is rich in __________, __________, __________, __________, and __________. Mammals stop feeding their young when ____________________.

Sequence the steps that occur during respiration and circulation to help mammals maintain a high metabolism. Write the steps in the correct order in the boxes on the left.

1. The heart delivers blood with nutrients and oxygen to the cells.
2. The diaphragm helps expand the chest cavity to allow oxygen into the lungs.
3. Oxygen in the cells helps maintain an endothermic metabolism.
4. In the lungs, oxygen diffuses into the blood.
**Main Idea**

What is a mammal?

I found this information on page __________.

**Details**

Organize information about different types of specialized adaptations and how they help mammals. Give an example of a mammal that has each specific type of teeth or limb adaptation if possible.

<table>
<thead>
<tr>
<th>Mammal</th>
<th>Type of Specialized Teeth</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Mammal</th>
<th>Type of Specialized Limb</th>
<th>Function</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**Analyze** why mammals are able to learn. Explain the characteristics mammals have that enable them to learn and remember.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

**Synthesize**

Evaluate how a mammal’s ability to learn and remember can help it to adapt and survive in its habitat. Give a specific example.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Mammals

Section 32.2 Diversity of Mammals

Main Idea

Finding Main Ideas As you read Section 2, complete the outline about mammal classification.

I. Mammal Classification
   A. __________ mammals
      1. give birth to young that have developed inside mother’s uterus
   B. __________ mammals
      1. ________________
   C. Monotremes
      1. lay __________

New Vocabulary

Read the definitions below. Then write the correct term in the left margin.

__________ reptilian ancestors of mammals that had features of both reptiles and mammals
__________ organ that provides food and oxygen to and removes wastes from young inside the uterus of placental mammals
__________ subclass of mammals that have hair and mammary glands but reproduce by laying eggs
__________ in females, the hollow, muscular organ in which offspring of placental mammals develop
__________ mammals that give birth to young that have developed inside the mother’s uterus until their body systems are fully functional and they can live independently of their mother’s body
__________ subclass of mammals in which young develop for a short period in the uterus and complete their development outside of the mother’s body in a pouch made of skin and hair
__________ time during which placental animals develop inside the uterus
Section 32.2 Diversity of Mammals (continued)

Main Idea

Mammal Classification

I found this information on page __________.

Details

Describe the three subclasses of mammals by completing the concept map below.

Compare and contrast the development of young in a placental mammal with the development of young in a marsupial.

<table>
<thead>
<tr>
<th>Placental Mammal</th>
<th>Marsupial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Describe the rise of marsupials in Australia and the effect of the introduction of placental mammals there.

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________

____________________________________________________________________________________


Diversity of Mammals
Section 32.2 Diversity of Mammals (continued)

**Main Idea**

**Mammal Classification**

I found this information on page _______.

**Details**

Organize information about the characteristics of the platypus using the table.

<table>
<thead>
<tr>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Classify animals discussed in this section as placental mammals, marsupials, or monotremes.

- Placental Mammals
- Marsupials
- Monotremes

Summarize four past causes of the increase in the number of mammals on Earth.

1. 
2. 
3. 
4.

**ANALYZE**

Examine the diagram showing the orders of mammals in your book. Describe how the connection between therapsids, placental mammals, and marsupials is different from the connection between therapsids and monotremes.

1. 
2. 
3. 
4.
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th></th>
<th>L</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What I Wanted to Find Out</strong></td>
<td><strong>What I Learned</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
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<td>2.</td>
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Summarize

After reading this chapter, list three things you have learned about mammals.

________________________

________________________

________________________

Chapter Wrap-Up
Animal Behavior

Before You Read

Use the “What I Know” column to list three things you know about animal behavior. Then list three questions you have about animal behavior in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
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</tr>
</tbody>
</table>

Describe two behavior patterns in humans.

Science Journal

Describe two behavior patterns in humans.
Finding Main Ideas Use the headings in your book to make an outline of the main ideas of the section.

Main Idea

Details

Review Vocabulary

Use your book to define the following term.

Vocabulary

New Vocabulary

Use the new vocabulary words to complete the paragraph below.

Anything an animal does in response to something is a __________. There are different kinds of behavior. Some behaviors, like ________________, are inherited. With this type of behavior, animals often respond automatically to a stimulus. Examples of automatic responses include __________ and __________. Animals also may show an __________, which is a complex pattern of innate behavior. For example, ________________ is instinctive. Animals also show instinctive behavior when they are defending their __________. They may use __________ to intimidate another animal of the same species. Sometimes this kind of behavior leads to social ranking within a group, called a ________________. Behavior can be a response to internal biological rhythms. For example, a sleep/wake cycle of behavior is called a ________________. ________________ is an instinctive behavior that happens on a seasonal cycle. Animals that do not migrate may go into ________________. Animals in hot climates may go into ________________.
Section 33.1 Innate Behavior (continued)

**Main Idea**

**What is behavior?**
I found this information on page __________.

**Inherited Behavior**
I found this information on page __________.

**Details**

**Identify** a behavior that you did in response to a stimulus today.
__________________________________________________________

**Analyze** the relationship of behavior and natural selection. Fill in the blanks.

Individuals with
_____________ that
makes them more
_____________ at
_____________ and
_____________

produce

more __________,
which inherit the
_____________ for the ____________
behavior.

**Define** fixed-action response and give an example.
__________________________________________________________

**Compare** automatic responses and instinctive behavior by placing each characteristic or response in the correct place in the diagram.

- complex behavior pattern
- has adaptive value
- has survival value
- innate behavior
- no conscious control
- simple behavior

Automatic Responses  Both  Instinctive Behavior
Evaluate instinctive behaviors. Choose one type and describe its benefit to an animal.

1. ____________________________

Summarize the different kinds of innate behavior. Use the word bank to fill in the graphic organizer.

- aggressive behavior
- dominance hierarchy
- hibernation
- reflexes
- automatic response
- fight-or-flight
- instinctive behavior
- migration
- fixed-action
- courtship behavior
- territoriality
- response

You have dominance hierarchies in your life similar to some animals. Although they function differently, some of the benefits are the same. Describe one of these hierarchies in your life and its advantages.
Animal Behavior
Section 33.2 Learned Behavior

Main Idea

Details

Skim Section 2 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. ______________________________________
2. ______________________________________
3. ______________________________________

New Vocabulary

Use your book to define each term.

classical conditioning

communication

habitation

imprinting

insight

language

motivation

trial-and-error learning
Section 33.2 Learned Behavior (continued)

What is Learned Behavior?

I found this information on page _________.

Kinds of Learned Behavior

I found this information on page _________.

Analyze why learned behaviors are more common in vertebrates than in invertebrates and give a benefit of learned behavior.

Organize information about the different kinds of learned behavior in the table.

<table>
<thead>
<tr>
<th>Kind of Learned Behavior</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a horse ignoring noisy cars that pass by their pasture</td>
</tr>
<tr>
<td>Imprinting</td>
<td></td>
<td>an animal receives a reward for making a particular response and learns which solutions to a problem work best</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a cat responding to the sound of a can opener because its food is opened with a can opener</td>
</tr>
<tr>
<td>Insight</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 33.2 Learned Behavior (continued)

Kinds of Learned Behavior

I found this information on page __________.

The Role of Communication

I found this information on page __________.

Evaluate Describe why insight is the most complex type of learning.

Summarize the different ways animals communicate. Include an example of each method.

Contrast how language is different from communication. Give an example of communication and an example of language.

Compare the types of motivation involved with trial-and-error learning, classical conditioning, and insight.
Animal Behavior  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W What I Wanted to Find Out</th>
<th>L What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ______________________</td>
<td>1. ______________________</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ______________________</td>
<td>2. ______________________</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3. ______________________</td>
<td>3. ______________________</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

☐ Study your Science Notebook for this chapter.
☐ Study the definitions of vocabulary words.
☐ Review daily homework assignments.
☐ Reread the chapter and review the tables, graphs, and illustrations.
☐ Review the Section Assessment questions at the end of each section.
☐ Look over the Study Guide at the end of the chapter.

Summarize

After reading this chapter, list three things you have learned about animal behavior.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

318  Chapter Wrap-Up
Protection, Support, and Locomotion

Before You Read

Use the “What I Know” column to list three things you know about how the body protects itself, supports itself, and moves. Then list three questions you have about these ideas in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Think about a sport you or someone you know plays. Describe how your skin, skeleton, and muscles help you play that sport.

Name ______________________  Date ______________________

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Protection, Support, and Locomotion

Section 34.1 Skin: The Body’s Protection

Main Idea

Scan Use the checklist below to preview Section 1 of your book.

☐ Read all section titles.
☐ Read all bold words.
☐ Read all tables and graphs.
☐ Look at all pictures and read the captions.
☐ Think about what you already know about skin.

Write two facts you discovered about skin as you scanned the section.
1. 
2. 

Details

Review Vocabulary

Use your book to define the following term.

homeostasis

New Vocabulary

Read the definitions below, then write the correct term in the left column.

the outermost layer of the skin

a pigment that colors the skin

the inner, thicker portion of the skin

narrow opening in the dermis from which hair grows

a protein found in the exterior portion of the epidermis that helps protect the interior layer of the epidermis from exposure to bacteria, heat, and chemicals

Academic Vocabulary

Define the following term.

role

Skin: The Body’s Protection
Structure and Functions of the Integumentary System
I found this information on page __________.

Identify the four types of body tissues in the integumentary system. Then give the function of each one.

1. __________________________________________
2. __________________________________________
3. __________________________________________
4. __________________________________________

Compare and contrast the structures and functions of the epidermis with the dermis. Place each phrase below in the correct place in the Venn diagram.

- can be covered in hair
- has exterior and interior portions
- helps the body maintain homeostasis
- consists of dead, flattened cells

- contains keratin
- contains melanin
- contains blood vessels, nerves, sweat glands, and oil glands
- outer layer of skin
- inner, thicker portion of the skin

Describe the diagram of the integumentary system in your book.
Section 34.1 Skin: The Body’s Protection (continued)

**Main Idea**

**Structure and Functions of the Integumentary System**

I found this information on page ________.

**Details**

Describe the five functions of skin in the graphic organizer below.

**Skin Injury and Healing**

I found this information on page ________.

Sequence the steps that occur during skin healing. Write the steps in the correct order.

A scab forms on the skin to close the wound.

The skin receives a scrape that bleeds.

White blood cells move to the wound to fight infection.

New skin cells form beneath the scab eventually pushing the scab off.

Blood flows out onto the skin until a clot forms.

**Connect**

Your skin changes as you age. Describe some things you can do to protect your skin so that it can better protect your body.
Protection, Support, and Locomotion

Section 34.2 Bones: The Body’s Support

Main Idea

Organize As you read Section 2, complete the outline about bones.

I. __________system __________
   A. __________
      1. Ligaments, bursae, and __________
   B. Two types of __________
      1. __________bone
      2. __________bone

Details

New Vocabulary

Identify each vocabulary word as indicated below. Make a short note or definition about each term.

<table>
<thead>
<tr>
<th>Skeletal System Structure (9 terms)</th>
<th>Bone Formation (1 term)</th>
<th>Skeletal System Functions (2 terms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>appendicular skeleton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>axial skeleton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bursa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>compact bone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>joint</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ligament</td>
<td></td>
<td></td>
</tr>
<tr>
<td>osteoblast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>osteocyte</td>
<td></td>
<td></td>
</tr>
<tr>
<td>red marrow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>spongy bone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tendon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yellow marrow</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 34.2 Bones: The Body’s Support (continued)

Skeletal System Structure
I found this information on page ________.

Classify List the two main parts of the human adult skeleton and the bones each includes.
1. ________________________________
2. ________________________________

Identify five characteristics of joints.
1. ________________________________
2. ________________________________
3. ________________________________
4. ________________________________
5. ________________________________

Classify each movable joint as a hinge joint or a ball-and-socket joint.
hip joints ______________ elbow joints ______________
finger joints ______________ shoulder joints ______________

Create a sketch of a bone. Show compact bone, spongy bone, and the location of osteocytes. Use the figure in your book to help you.
Section 34.2 Bones: The Body's Support (continued)

**Main Idea**

**Formation of Bone**

I found this information on page __________.

**Details**

Sequence the steps in the formation of bone from osteoblasts. The first step has been completed for you.

1. Potential bone cells called osteoblasts are formed.
2. _____________________
3. _____________________
4. _____________________
5. _____________________

**Skeletal System Functions**

I found this information on page __________.

Complete the concept map about the skeletal system functions.

**COMPARE**

Compare yellow marrow and red marrow.

_____________________

_____________________

_____________________

_____________________

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Protection, Support, and Locomotion
Section 34.3 Muscles for Locomotion

Main Idea

Details

Organize Information As you read, complete the concept map to compare different types of muscles.

Muscle Types

- Cardiac
  - located
  - controlled
  - involuntarily

- attached to bones

New Vocabulary

- actin
- cardiac muscle
- involuntary muscle
- myofibril
- myosin
- sarcomere
- skeletal muscle
- sliding filament theory
- smooth muscle
- voluntary muscle

Use your book to define each term.
Section 34.3 Muscles for Locomotion (continued)

Main Idea

Three Types of Muscles

*List* the three types of muscles. Classify each as voluntary or involuntary.

1. 
2. 
3. 

*Distinguish* between voluntary muscles and involuntary muscles.

*Model* the structure and appearance of each type of muscle fiber. *Label* the fiber, the nucleus, and striation if the muscle fiber is striated. *Next to* each muscle fiber, *write* its function.

<table>
<thead>
<tr>
<th>smooth muscle fiber</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>cardiac muscle fiber</td>
<td></td>
</tr>
<tr>
<td>skeletal muscle fiber</td>
<td></td>
</tr>
</tbody>
</table>
Section 34.3 Muscles for Locomotion (continued)

Main Idea

Skeletal Muscle Contraction

I found this information on page _________.

Details

Analyze muscle tissue by completing the graphic organizer.

Muscle tissue is made up of _______.

Are made up of _______.

Can be divided into sections called _______.

Thinner filaments made of _______.

Thicker filaments made of _______.

Explain the sliding filament theory.

Muscle Strength and Exercise

I found this information on page _________.

Contrast the effects on your body of moderate and vigorous exercise.

Connect

Contract your biceps muscle. Describe what you did to contract the muscle and which muscle is relaxed. Try the opposite and contract the muscle that was relaxed and describe what happens.
Recall what you have learned about the different types of burns. In third degree burns, both the epidermis and dermis are destroyed. Skin grafts are often necessary to replace this lost skin. Think about the functions of skin and predict what problems people with third degree burns might face if skin grafts are not possible.

Some people suffer from a disease called osteogenesis imperfecta. It is commonly called brittle bone disease. The disease is caused by a mutation in the gene that produces collagen. Think about the formation of bones. Describe how this weaker form of collagen may lead to weaker bones.
### Protection, Support, and Locomotion  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>_________________________</td>
<td>1.</td>
<td>_________________________</td>
</tr>
<tr>
<td>2.</td>
<td>_________________________</td>
<td>2.</td>
<td>_________________________</td>
</tr>
<tr>
<td>3.</td>
<td>_________________________</td>
<td>3.</td>
<td>_________________________</td>
</tr>
</tbody>
</table>

**Use this checklist to help you study.**
- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**Summarize**

After reading this chapter, list three things you have learned about protection, support, and locomotion.

---

---
The Digestive and Endocrine Systems

Before You Read

Use the “What I Know” column to list three things you know about the digestive and endocrine systems. Then list three questions you have about these systems in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Know</td>
<td>What I Want to Find Out</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

**Science Journal**

What can go wrong with your digestive and endocrine systems? Describe your own experience, that of someone you know, or items you have heard about in the media.

______________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________________
The Digestive and Endocrine Systems

Section 35.1 Following Digestion of a Meal

Main Idea

Skim Section 1 of your text. Write three questions that come to mind from reading the headings and the illustration captions.

1. 
2. 
3. 

New Vocabulary

Read the definitions below, then write the correct term in the left column.

breaks down the starches in food into smaller molecules

an enzyme that begins the chemical digestion of protein in food; works best in an acidic environment

a chemical that helps break down large drops of fats into smaller droplets

details a tiny, fingerlike structure that is a projection on the lining of the small intestine; works in absorption of digested food

a series of smooth muscle contractions along the walls of the digestive tract

Use the vocabulary words in the left column to label the parts of the digestive system in the diagram to the right.

epiglottis
esophagus
gallbladder
large intestine
liver
pancreas
rectum
small intestine
stomach
Section 35.1 Following Digestion of a Meal (continued)

Functions of the Digestive System
I found this information on page __________.

The Mouth
I found this information on page __________.

Sequence the functions of the digestive system. Some of the steps have been completed for you. (Hint: focus on the functions, not the organs.)

1. System takes ingested food and begins moving it through the digestive tract.

2. System takes ingested food and begins moving it through the digestive tract.

3. MATERIALS THAT CANNOT BE DIGESTED ARE ELIMINATED FROM YOUR BODY.

Describe how each type of digestion takes place in the mouth.

Sequence how food moves from the mouth to the stomach by adding arrows between the boxes. Then describe the function of each organ or process.
Summarize how each organ below mechanically and chemically digests food.

<table>
<thead>
<tr>
<th>Organ</th>
<th>Mechanical Digestion</th>
<th>Chemical Digestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small intestine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pancreas</td>
<td>does not apply</td>
<td></td>
</tr>
<tr>
<td>Liver</td>
<td>does not apply</td>
<td></td>
</tr>
</tbody>
</table>

Contrast what happens in the small intestine with what happens in the large intestine.

SYNTHESIZE Describe how your body’s ability to absorb nutrients would change if your small intestine did not have villi.
The Digestive and Endocrine Systems
Section 35.2 Nutrition

**Main Idea**

**Using Prior Knowledge** List the foods you eat in a day. Then use the food pyramid in your book as a guide to categorize the foods into different groups according to food type.

<table>
<thead>
<tr>
<th>Fats and Sugars</th>
<th>Dairy</th>
<th>Meat, Fish, and Eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>Fruits</td>
<td>Grains</td>
</tr>
</tbody>
</table>

**New Vocabulary**

Use your book to define each term.

- **Calorie**
- **mineral**
- **vitamin**

Use your book to define the following term.

- **carbohydrate**
The Vital Nutrients

I found this information on page ________.

Name the six basic kinds of nutrients that can be found in foods.

1. ________________  4. ________________
2. ________________  5. ________________
3. ________________  6. ________________

Summarize how your body uses each kind of nutrient by completing the graphic organizer.
Section 35.2 Nutrition (continued)

Main Idea

The Vital Nutrients

I found this information on page __________.

Calories and Metabolism

I found this information on page __________.

Details

Describe what the liver does with each of the following nutrients.

1. Carbohydrates—
2. Fats—
3. Proteins—

Identify four factors that affect a person’s metabolic rate.

1.  
2.  
3.  
4.  

Explain the relationship between calories and health by completing the cause and effect diagram.

If a person takes in more Calories than the body can metabolize

If a person eats fewer Calories than the body can metabolize

ANALYZE

Analyze why men usually need more Calories per day than females, why teenagers use more Calories than adults, and why active people use more Calories than inactive people.
Organize Information As you read this section, complete the concept map about internal feedback in the endocrine system.

New Vocabulary

Use your book to define the following term.

Main Idea

Details

Review Vocabulary

gland

New Vocabulary

Read the definitions below, then write the correct term in the left column.

the part of the brain that connects the endocrine system and the nervous system

glands that release chemicals directly into the bloodstream; relay information to other parts of the body

located on top of the kidneys; outer portion secretes steroid hormones; inner portion secretes amino acid hormones; amino acid hormones are responsible for the fight-or-flight response

gland located in the neck that regulates metabolism, growth, and development

gland attached to the thyroid gland involved in mineral regulation in the body

the main gland of the endocrine system; controlled by the hypothalamus

the binding sites on target cells

cells to which hormones attach themselves; contain specific binding sites either on the plasma membranes, or in the nuclei

type of internal feedback mechanism that generally controls adjustments to the endocrine system
Control of the Body

I found this information on page ________.

Identify the two systems that direct internal control of the body.
1. __________________________
2. __________________________

Describe how the nervous and endocrine systems interact by completing the graphic organizer.

Messages from

stimulates

that either or

releases

stimulates

such as
Section 35.3 The Endocrine System (continued)

Main Idea

Negative Feedback Control

I found this information on page __________.

Details

Sequence the steps that occur in a negative feedback system. They are written in scrambled order at right. Write the steps in the correct order in the boxes.

Endocrine glands are stimulated to secrete hormone.

Homeostasis is reached.

Homeostasis is disrupted.

The hormone is no longer released.

Information is fed back.

The hormone travels to the target cells.

Contrast the structure and action of steroid hormones and amino acid hormones.

<table>
<thead>
<tr>
<th>Steroid Hormones</th>
<th>Amino Acid Hormones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Main Idea

**Adrenal Hormones and Stress**

*I found this information on page _________.*

### Details

**Compare four adrenal hormones in the table below.**

<table>
<thead>
<tr>
<th>Amino Acid or Steroid Hormone</th>
<th>Adrenal Hormone</th>
<th>What do they do?</th>
</tr>
</thead>
<tbody>
<tr>
<td>steroid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>amino acid</td>
<td>(adrenaline)</td>
<td></td>
</tr>
</tbody>
</table>

### Synthesize

Predict how an underactive pituitary gland (one that does not produce enough human growth hormone) would affect a person’s blood glucose levels. Explain.

---

**Thyroid and Parathyroid Hormones**

*I found this information on page _________.*

**Summarize thyroid and parathyroid hormones in the organizer.**

- **Thyroid gland**
  - **Hormone:**
  - **Function:**

- **Parathyroid gland**
  - **Hormone:**
  - **Function:**
The Digestive and Endocrine Systems  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>_________________________</td>
<td>1.</td>
<td>_________________________</td>
</tr>
<tr>
<td>2.</td>
<td>_________________________</td>
<td>2.</td>
<td>_________________________</td>
</tr>
<tr>
<td>3.</td>
<td>_________________________</td>
<td>3.</td>
<td>_________________________</td>
</tr>
</tbody>
</table>

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- Study your Science Notebook for this chapter.
- Study the definitions of vocabulary words.
- Review daily homework assignments.
- Reread the chapter and review the tables, graphs, and illustrations.
- Review the Section Assessment questions at the end of each section.
- Look over the Study Guide at the end of the chapter.

**SUMMARIZE**

After reading this chapter, list three things you have learned about the digestive and endocrine systems.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
The Nervous System

Before You Read

Use the “What I Know” column to list three things you know about the nervous system. Then list three questions you have about this system in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K What I Know</th>
<th>W What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ___________</td>
<td>1. ___________</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ___________</td>
<td>2. ___________</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3. ___________</td>
<td>3. ___________</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Think about a time you have been very frightened. Describe how you felt and how your body responded.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

The Nervous System
The Nervous System

Section 36.1 The Nervous System

**Main Idea**

**Details**

**Sequence** As you read through this section, record the sequence of changes that occurs in a neuron when it is excited by a stimulus.

<table>
<thead>
<tr>
<th>New Vocabulary</th>
</tr>
</thead>
</table>

Classify each vocabulary word as a nervous system, or part of the brain, or neurons. The number of terms in each column is given to you. One term will not fit into any of the three categories. Define that term on the lines below the chart.

<table>
<thead>
<tr>
<th>Nervous System (6 terms)</th>
<th>Brain (3 terms)</th>
<th>Neurons (5 terms)</th>
</tr>
</thead>
</table>

autonomic nervous system
axon
central nervous system
cerebellum
cerebrum
dendrite
medulla oblongata
neuron
neurotransmitters
parasympathetic nervous system
peripheral nervous system
reflex
somatic nervous system
sympathetic nervous system
synapse
Neurons: Basic Units of the Nervous System

Label the neuron. Include the axon, axon endings, cell body dendrites, nucleus, and myelin sheath. Draw arrows to show the direction that impulses move through the neuron.

Analyze how the myelin sheath increases the speed at which impulses move.

Evaluate the diagram of how neurotransmitters move across synapses. Write one question and answer about the diagram.

Question:

Answer:
The Central Nervous System

Identify two parts of the body that make up the central nervous system.

1. __________________  2. __________________

Contrast the central nervous system and the peripheral nervous system.

_________________________________________________________

_________________________________________________________

_________________________________________________________

_________________________________________________________

_________________________________________________________

_________________________________________________________

Describe the three main sections of the brain in the table below.

<table>
<thead>
<tr>
<th>Section:</th>
<th>Cerebrum</th>
<th>Cerebellum</th>
<th>Medulla Oblongata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Peripheral Nervous System

I found this information on page _________.

Describe each division of the nervous system and its function in the graphic organizer below.

- Autonomic
- Peripheral
- Central
- Somatic
- Parasympathetic
- Sympathetic

Connect

Describe a voluntary response that would happen under the control of the somatic nervous system. Then describe a reflex and compare it to the voluntary response you chose.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
The Nervous System
Section 36.2 The Senses

Main Idea

Skim Section 2 of your book. Write three questions that come to mind from reading the headings and the illustration captions.

1. 
2. 
3. 

Details

Review Vocabulary

Use your book to define the following term.

dermis

New Vocabulary

Use your book to define each term.

cochlea

cones

retina

rods

semicircular canals

taste buds
List the two senses that are involved in sensing chemicals.
1. 
2. 

Compare the steps in smelling and tasting. Write the steps for smelling on the left. Write the steps for tasting on the right. Some steps have been completed for you.

Chemical molecules touch receptors in your nose.

The cells of taste buds are depolarized.

The olfactory nerve sends the impulses to the brain.

Sensing Light
I found this information on page _________.

Compare how the rods and cones in your eyes help you to sense light.
Section 36.2 The Senses (continued)

Main Idea

Sensing Mechanical Stimulation

I found this information on page _________.

Details

Sequence the steps in how your sense of hearing works. The steps are in scrambled order at right. Write them in the correct order in the boxes.

1. The hairs produce electric impulses that travel to the cerebrum where they are interpreted as sound.

2. The stapes causes the membrane of the oval window to move back and forth.

3. Sound waves enter your ear and travel down to the end of the ear canal.

4. Sound waves strike the eardrum and cause it to vibrate. The vibrations pass to the bones in the middle ear.

5. Fluid in the cochlea moves, causing the hair cells to bend.

Identify three changes that receptors in the dermis of the skin respond to.

1. ________ 2. ________ 3. ________

Synthesize

Predict how damage to your semicircular canals in the ears would affect balance. Explain.
The Nervous System
Section 36.3 The Effects of Drugs

Finding Main Ideas As you read Section 3, complete the outline below about the effects of drugs on the nervous system.

I. Drugs act on the ______:
   A. _______ affect body _______

II. _______ Uses of Drugs
   A. Relieving _______:
      1. ________

Review Vocabulary

receptors

Use your book to define the following term.

New Vocabulary

Read the definitions below, then write the correct term in the left column.

chemical substance that affects body functions
the body becomes less responsive to a drug and an individual needs larger or more frequent doses of the drug to achieve the same effect
type of drug that lowers or depresses the activity of the nervous system
type of pain relief drug that affects the central nervous system
psychological response or physiological illness that occurs when a person stops taking a drug
psychological and/or physiological drug dependence
drug that increases the activity of the central and sympathetic nervous systems
drug that stimulates the central nervous system so that the user becomes disoriented and sees, hears, feels, tastes, or smells things that are not there
Section 36.3 The Effects of Drugs (continued)

**Main Idea**

**Drugs Act on the Body**

*Summarize three ways drugs can act on the body in the graphic organizer.*

**Medicinal Uses of Drugs**

*Compare the different medicinal uses of drugs in the graphic organizer. Identify each type of drug and give examples of what it is used for. Some have been completed for you.*

- **Ways Drugs Act on the Body**
  - stimulants
  - drugs to treat nervous disorders
  - encourage calmness and produce sleep
  - medicinal uses of drugs
  - cardiovascular drugs

---

*Name ____________________________________________ Date ____________

The Effects of Drugs 352

---
Section 36.3 The Effects of Drugs (continued)

**Main Idea**

The Misuse and Abuse of Drugs, Classes of Commonly Abused Drugs

*I found this information on page __________.*

**Details**

Compare the effects of each class of drugs by completing the table.

<table>
<thead>
<tr>
<th>Class</th>
<th>Effect on Body</th>
<th>Side Effects</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narcotics</td>
<td>increase the activity of the central and sympathetic nervous systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>slow down the activities of the central nervous system</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>stimulate the central nervous system altering moods, thoughts, and sensory perceptions</td>
<td></td>
<td>LSD</td>
</tr>
<tr>
<td></td>
<td>none given</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Breaking the Habit**

*I found this information on page __________.*

**ANALYZE**

Hypothesize why some stimulants are illegal and others are not.

1. __________________________  2. __________________________
The Nervous System  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>What I Wanted to Find Out</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

- [ ] Study your Science Notebook for this chapter.
- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about the nervous system.

__________________________________________

__________________________________________

__________________________________________
Respiration, Circulation, and Excretion

Before You Read

Use the “What I Know” column to list three things you know about respiration, circulation, and excretion. Then list three questions you have about these topics in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

When you breathe in, oxygen enters your lungs. Describe what you understand about how oxygen from the air reaches the cells in your body.

---

When you breathe in, oxygen enters your lungs. Describe what you understand about how oxygen from the air reaches the cells in your body.

---

When you breathe in, oxygen enters your lungs. Describe what you understand about how oxygen from the air reaches the cells in your body.

---

When you breathe in, oxygen enters your lungs. Describe what you understand about how oxygen from the air reaches the cells in your body.

---

When you breathe in, oxygen enters your lungs. Describe what you understand about how oxygen from the air reaches the cells in your body.

---

When you breathe in, oxygen enters your lungs. Describe what you understand about how oxygen from the air reaches the cells in your body.

---
Skim Section 1 of your book. Read the headings and illustration captions. Write three questions that come to mind.

1. 

2. 

3. 

Review Vocabulary

Use your book to define the following term.

diaphragm

New Vocabulary

Use your book to define the each term.

alveoli

trachea

Academic Vocabulary

Define the following term.

create
Passageways and Lungs

I found this information on page __________.

Identify the role of the cilia in respiration.

Contrast external and cellular respiration.

When you breathe:

- ________ is taken into the lungs.
- ________ is removed during exhalation.
- ________ diffuses into the blood through the ________.
- ________ takes ________ to ________.
- The ________ pumps ________ to the ________.
- ________ produces ________ ________.
- ________ is used for ________ ________.

Analyze the process of gas exchange by completing the sentences in the flow chart below.
### Main Idea

The Mechanics of Breathing

I found this information on page ________.

### Details

**Sequence** what happens when you inhale and exhale. Some of the steps have been completed for you.

1. You inhale, the muscles in your ribs contract and your rib cage rises.

2. More space in the chest cavity creates a slight vacuum.

3. The diaphragm relaxes, returning to its resting position.

### Control of Respiration

I found this information on page ________.

### Connect

Think of an example of when breathing is not an involuntary process. Describe how breathing is controlled in the example you give.
Infer Think about the functions of your blood such as forming clots, carrying oxygen, and taking away cellular wastes. Infer how the other cells in your body would be affected if blood could not carry out its functions.

Use terms from the left column to complete the paragraphs below.

The fluid portion of your blood is called _________. Suspended in fluid are ___________ and ___________.

Red blood cells have ___________, which is an iron-containing protein molecule that helps carry oxygen to cells. White blood cells help protect us from diseases. Blood also contains small cell fragments called ___________, which help blood to clot.

Different blood types are caused by proteins on the membranes of red blood cells, called ___________. Blood plasma contains proteins called ___________, which are shaped to match the antigens.

The three main types of vessels that carry blood are ___________, ___________, and ___________. The heart pumps the blood throughout the body. The two upper chambers of the heart are the ___________. The two lower chambers are the ___________. The right atrium of the heart gets blood through the ___________. The left ventricle of the heart pushes blood out through the ___________.

Each time the heart beats, a _________ can be felt in arteries close to the surface of the body. ____________ is the force that the blood exerts on the vessels as the heart pumps it through the body.
Section 37.2 The Circulatory System (continued)

Main Idea

Your Blood: Fluid Transport

I found this information on page _______.

Details

Compare the different parts of blood in the table below.

<table>
<thead>
<tr>
<th>Part of Blood</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ABO Blood Groups

I found this information on page _______.

Distinguish each blood type by putting checks in the correct boxes to show which antigens and antibodies it contains.

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>Antigen A</th>
<th>Antigen B</th>
<th>Anti-A Antibody</th>
<th>Anti-B Antibody</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analyze why the Rh factor does not cause complications in some pregnancies until the mother is pregnant a second time.

________________________________________

________________________________________

________________________________________

________________________________________

________________________________________
Your Blood Vessels: Pathways of Circulation and Your Heart: The Vital Pump

I found this information on page __________.

Describe each type of blood vessel.

1. Arteries

2. Capillaries

3. Veins

Summarize information about the pacemaker by completing the table below:

<table>
<thead>
<tr>
<th>what it looks like</th>
<th>how it works</th>
</tr>
</thead>
<tbody>
<tr>
<td>where it is found</td>
<td></td>
</tr>
<tr>
<td>its function</td>
<td></td>
</tr>
</tbody>
</table>
Your Blood Vessels: Pathways of Circulation and Your Heart: The Vital Pump

Identify the path blood takes through the human body by completing the flowchart below.

I found this information on page _________.

SYNTHESIZE

Explain why some people need artificial pacemakers, which are battery-operated devices that send electrical signals to stimulate your heart to contract. Explain how an artificial pacemaker is different from your body’s natural pacemaker.

---

362 The Circulatory System
Respiration, Circulation, and Excretion

Section 37.3 The Urinary System

Main Idea

Explain Your urinary system filters your blood and removes wastes. Why is it important that waste material be excreted from the body?

Details

Review Vocabulary

Use your book to define the following term.

amino acids

New Vocabulary

Read the definitions below, then write the correct term in the left column.

smooth muscle bag that stores urine until it is expelled from the body

tube through which urine is passed from the urinary bladder to the outside of the body

individual filtering unit of the kidneys

liquid composed of wastes that is filtered from the blood by the kidneys, stored in the urinary bladder, and eliminated through the urethra

organs of the vertebrate urinary system; remove wastes, control sodium levels of the blood, and regulate blood pH levels

tube that transports urine from each kidney to the urinary bladder

Academic Vocabulary

Define the following term.

process
Kidneys:
Structure and Function

Model the urinary system. Draw a kidney, ureter, urinary bladder, and the urethra. Write a brief caption about the function of each one.

Sequence how the kidneys remove waste from the body by completing the flow chart below. The first and last steps have been completed for you.

- Blood enters a nephron in the kidney and flows into the glomerulus.
- Urine passes out of the body through the urethra.
The Urinary System and Homeostasis

I found this information on page __________.

Identify the major waste products of cells in the graphic organizer below.

Describe three ways the kidney helps maintain homeostasis of the body.

1. 

2. 

3. 

Compare and Contrast

Distinguish between the ureter and the urethra by describing their differences and similarities.
In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>What I Wanted to Find Out</th>
<th>L</th>
<th>What I Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>_________________________</td>
<td>1.</td>
<td>_________________________</td>
</tr>
<tr>
<td></td>
<td>_________________________</td>
<td></td>
<td>_________________________</td>
</tr>
<tr>
<td>2.</td>
<td>_________________________</td>
<td>2.</td>
<td>_________________________</td>
</tr>
<tr>
<td></td>
<td>_________________________</td>
<td></td>
<td>_________________________</td>
</tr>
<tr>
<td>3.</td>
<td>_________________________</td>
<td>3.</td>
<td>_________________________</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

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- [ ] Study the definitions of vocabulary words.
- [ ] Review daily homework assignments.
- [ ] Reread the chapter and review the tables, graphs, and illustrations.
- [ ] Review the Section Assessment questions at the end of each section.
- [ ] Look over the Study Guide at the end of the chapter.

**Summarize**

After reading this chapter, list three things you have learned about respiration, circulation, and excretion.

__________________________________________

__________________________________________

__________________________________________

366  Chapter Wrap-Up
Reproduction and Development

Before You Read

Use the “What I Know” column to list three things you know about reproduction and development. Then list three questions you have about these topics in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>K</th>
<th>What I Know</th>
<th>W</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>___________</td>
<td>1.</td>
<td>___________</td>
</tr>
<tr>
<td>2.</td>
<td>___________</td>
<td>2.</td>
<td>___________</td>
</tr>
<tr>
<td>3.</td>
<td>___________</td>
<td>3.</td>
<td>___________</td>
</tr>
</tbody>
</table>

Science Journal

As you have grown and developed since birth, you have gone through many changes. Write about some of the physical changes you have experienced since you were born.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Reproduction and Development
Section 38.1 Human Reproductive Systems

Main Idea

Skim Section 1 of your book. Read the headings and the illustration captions. Write three questions that come to mind.

1. ____________________________
   ____________________________

2. ____________________________
   ____________________________

3. ____________________________
   ____________________________

New Vocabulary

Classify each vocabulary term. Give a brief description of each. One term fits in both categories.

<table>
<thead>
<tr>
<th>Male Reproductive System</th>
<th>Female Reproductive System</th>
</tr>
</thead>
<tbody>
<tr>
<td>bulbourethral gland</td>
<td></td>
</tr>
<tr>
<td>cervix</td>
<td></td>
</tr>
<tr>
<td>corpus luteum</td>
<td></td>
</tr>
<tr>
<td>epididymis</td>
<td></td>
</tr>
<tr>
<td>follicle</td>
<td></td>
</tr>
<tr>
<td>menstrual cycle</td>
<td></td>
</tr>
<tr>
<td>oviduct</td>
<td></td>
</tr>
<tr>
<td>ovulation</td>
<td></td>
</tr>
<tr>
<td>prostate gland</td>
<td></td>
</tr>
<tr>
<td>puberty</td>
<td></td>
</tr>
<tr>
<td>scrotum</td>
<td></td>
</tr>
<tr>
<td>semen</td>
<td></td>
</tr>
<tr>
<td>seminal vesicle</td>
<td></td>
</tr>
<tr>
<td>vas deferens</td>
<td></td>
</tr>
</tbody>
</table>

368 Human Reproductive Systems
**Main Idea**

**Human Male Anatomy**

*I found this information on page __________.*

**Details**

Sequence the path sperm take from their production to when they leave the male body. List the organs on the left, and their function on the right.

- Testes
- 
- 
- carries sperm out of the body

Organize List the glands that produce fluids to help transport sperm and describe the fluids they secrete.

1. 
   
2. 
   
3. 

Puberty in Males

*I found this information on page __________.*

Create a diagram to show how the negative feedback system works to control FSH and LH in the male body.
Identify the three main functions of the female reproductive system.

Create Sketch the structures of the human female reproductive system below. Label the oviduct, cervix, ovary, and uterus. Describe the function of each.

Describe eggs in the female body at each stage of development.

<table>
<thead>
<tr>
<th>Before Birth</th>
<th>Birth to Puberty</th>
<th>Beginning at Puberty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Main Idea**

The Menstrual Cycle

I found this information on page __________.

**Details**

Sequence the steps in the menstrual cycle. Describe the changes in hormones, the uterus, and the ovary at each stage.

<table>
<thead>
<tr>
<th></th>
<th>Changes in Hormones</th>
<th>Changes in the Uterus</th>
<th>Changes in the Ovary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SYNTHESIZE**

Hypothesize what piece of information in this section could help a female predict when she is ovulating.
Reproduction and Development
Section 38.2 Development Before Birth

Organize Information As you read the section, identify which structures are involved in the exchange of materials between the fetus and the mother.

Review Vocabulary Use your book to define the following term.
zygote

New Vocabulary Use your book to define each term. Then make a sketch of each to help you remember.
implantation
umbilical cord

Academic Vocabulary Define the following term.
attach

Main Idea
Details
**Main Idea**

Fertilization and Implantation

*I found this information on page __________.*

**Details**

Sequence the steps of fertilization of an egg and implantation of a blastocyst. The steps are written in scrambled form at right. Write the steps in the correct order in the boxes.

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The sperm that survive the acidic vagina swim through the vagina into the uterus.</td>
<td></td>
</tr>
<tr>
<td>2. The zygote moves down the oviduct and begins to divide by mitosis.</td>
<td></td>
</tr>
<tr>
<td>3. The blastocyst attaches to the uterine lining.</td>
<td></td>
</tr>
<tr>
<td>4. A few hundred sperm make it into the two oviducts.</td>
<td></td>
</tr>
<tr>
<td>5. The nucleus of the sperm and the nucleus of the egg unite, forming a zygote.</td>
<td></td>
</tr>
<tr>
<td>6. The zygote moves into the uterus and becomes a blastocyst.</td>
<td></td>
</tr>
<tr>
<td>7. 300 to 500 million sperm are released in the female’s vagina.</td>
<td></td>
</tr>
<tr>
<td>8. One sperm penetrates the egg, which changes the electrical charge of the egg’s membrane so other sperm cannot enter.</td>
<td></td>
</tr>
</tbody>
</table>
Section 38.2 Development Before Birth (continued)

Main Idea

Embyronic Membranes and the Placenta

I found this information on page ____________.

Details

Create a diagram of a placenta and umbilical cord attached to an embryo. Draw arrows to show the route oxygen and nutrients take from the mother’s blood to the embryo and how wastes are removed.

Fetal Development

I found this information on page ____________.

Compare development of an embryo into a fetus during each trimester. Describe the changes that occur.

<table>
<thead>
<tr>
<th>First Trimester</th>
<th>Second Trimester</th>
<th>Third Trimester</th>
</tr>
</thead>
</table>

**ANALOGY**

Think of an analogy to explain to younger students the growth and development of a fetus over nine months.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Reproduction and Development
Section 38.3 Birth, Growth, and Aging

Main Idea

Infer which organ systems are involved in growth of the human body.

Details

Review Vocabulary

Use your book to define the following term.

growth

New Vocabulary

Use your book to define the following term. Then create a concept map with facts about it.

labor

Academic Vocabulary

Define the following term.

physical
Section 38.3 Birth, Growth, and Aging (continued)

**Main Idea**

**Birth**

I found this information on page ________.

**Details**

**Compare** Describe the three stages of birth in the graphic organizer below.

![Birth diagram]

**Growth and Aging**

I found this information on page ________.

**Identify** the cells the human growth factor (hGH) acts on and describe how it works by completing the graphic organizer below.

![hGH diagram]
Growth and Aging

I found this information on page ___________.

Describe the changes that occur at each stage of growth and development.

<table>
<thead>
<tr>
<th>Main Idea</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Growth and Aging</strong></td>
<td><strong>Details</strong></td>
</tr>
<tr>
<td>1. Infancy</td>
<td></td>
</tr>
<tr>
<td>2. Childhood</td>
<td></td>
</tr>
<tr>
<td>3. Adolescence</td>
<td></td>
</tr>
<tr>
<td>4. Adulthood</td>
<td></td>
</tr>
</tbody>
</table>

**CONNECT**

Identify the stage of growth and development that you are currently in. Describe some of the changes your body has undergone in the last few years.

| CONNECT | |
|---------| |
| |
| |
| |
| |
| |
| |

Reproduction and Development 377
Reproduction and Development  Chapter Wrap-Up

In the “What I Wanted to Find Out” column, copy the questions you listed in the Chapter Preview. In the “What I Learned” column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
</tbody>
</table>

Use this checklist to help you study.

☐ Study your Science Notebook for this chapter.
☐ Study the definitions of vocabulary words.
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☐ Look over the Study Guide at the end of the chapter.

SUMMARIZE

After reading this chapter, list three things you have learned about reproduction and development.
Immunity from Disease

Before You Read

Use the “What I Know” column to list three things you know about disease and immunity. Then list three questions you have about disease and immunity in the “What I Want to Find Out” column.

<table>
<thead>
<tr>
<th>What I Know</th>
<th>What I Want to Find Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. _________</td>
<td>1. _________</td>
</tr>
<tr>
<td>2. _________</td>
<td>2. _________</td>
</tr>
<tr>
<td>3. _________</td>
<td>3. _________</td>
</tr>
</tbody>
</table>

When you get a cold, your immune system fights it and you eventually feel better. Hypothesize how people with weakened immune systems may need to live their lives differently to stay healthy.
Immunity from Disease
Section 39.1 The Nature of Disease

Scan Use the checklist below to preview Section 1 of your book.

☐ Read all section titles.
☐ Read all boldfaced words.
☐ Read all tables and graphs.
☐ Look at all pictures and read the captions.
☐ Think about what you already know about disease.

Write two facts you discovered about the nature of disease as you scanned the section.

1. 
2. 

Review Vocabulary Use your book to define the following term.

virus

occurs when many people in a given area are afflicted with the same disease at about the same time

disease-producing agents such as bacteria, protozoans, fungi, viruses, and other parasites

experimental steps relating a specific pathogen to a specific disease

disease that is constantly present in a population

any disease caused by pathogens in the body

substances produced by a microorganism that, in small amounts, will kill or inhibit growth and reproduction of other microorganisms

New Vocabulary Read the definitions below, then write the correct term in the left column.
### Main Idea

What is an infectious disease?  
Determining What Causes a Disease, The Spread of Infectious Diseases

*Identify the facts about disease.*

<table>
<thead>
<tr>
<th>Five types of pathogens that cause disease:</th>
<th>Five places that helpful microorganisms live in your body:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ___________________________</td>
<td>1. ___________________________</td>
</tr>
<tr>
<td>2. ___________________________</td>
<td>2. ___________________________</td>
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<tr>
<td>3. ___________________________</td>
<td>3. ___________________________</td>
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<tr>
<td>4. ___________________________</td>
<td>4. ___________________________</td>
</tr>
<tr>
<td>5. ___________________________</td>
<td>5. ___________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Four diseases not caused by pathogens, and their causes</th>
<th>Four main ways pathogens can be transmitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ___________________________</td>
<td>1. ___________________________</td>
</tr>
<tr>
<td>2. ___________________________</td>
<td>2. ___________________________</td>
</tr>
<tr>
<td>3. ___________________________</td>
<td>3. ___________________________</td>
</tr>
<tr>
<td>4. ___________________________</td>
<td>4. ___________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Three main sources of pathogens</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
</tbody>
</table>

**Write the four experimental steps of Koch’s postulates.**

1. ______________________________________

2. ______________________________________

3. ______________________________________

4. ______________________________________
Section 39.1 The Nature of Disease (continued)

Main Idea

What causes the symptoms of a disease?

I found this information on page __________.

Details

Contrast two causes of symptoms of a disease and the effects of each.

Connect

Hypothesize what people can do to help make antibiotics effective for a longer period of time.

Patterns of Diseases, Treating Diseases

I found this information on page __________.

Compare diseases that occur periodically, endemic diseases, and an epidemic. Describe each and give examples.

<table>
<thead>
<tr>
<th>Periodic</th>
<th>Endemic</th>
<th>Epidemic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Immunity from Disease

**Section 39.2 Defense Against Infectious Diseases**

**Main Idea**

**Details**

Infer how your body saves you from microscopic foes that cause infectious diseases and how the body’s defenses protect you.

Use vocabulary terms (in singular or plural form) to complete the paragraphs below about the body’s defenses.

Your body’s immune system works to protect you from diseases. Its _______ is always present and defends the body against all pathogens. _______ protect cells from viruses. _______ are white blood cells that destroy pathogens by surrounding and engulfing them. _______ attack anything they recognize as foreign. After a few days of immune response, infected tissue develops _______, which contains dead and live white blood cells, multiplying and dead pathogens, and body fluids.

Your immune system may gradually build up a resistance to a pathogen. This is called _______. Acquired immunity involves antibody immunity and cellular immunity. Both _______ and _______ are involved in antibody immunity. Your body can gain active immunity naturally or artificially by injecting a _______. Your lymphatic system helps your body defend against diseases and keep fluids at a constant level. It contains _______, which are small masses of tissue that contain lymphocytes. _______ are white blood cells that defend the body against foreign substances. _______ constantly bathes cells and collects in open-ended lymph capillaries. When it enters the lymph vessels, it is called _______.

**New Vocabulary**

- acquired immunity
- B cell
- innate immunity
- interferon
- lymph
- lymph node
- lymphocyte
- macrophage
- phagocyte
- pus
- T cell
- tissue fluid
- vaccine
### Innate Immunity

I found this information on page __________.

Summarize the functions of innate immunity by completing the table.

<table>
<thead>
<tr>
<th>Function</th>
<th>How it works</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>keeps microorganisms from entering the body</td>
</tr>
<tr>
<td>mucus</td>
<td></td>
</tr>
<tr>
<td>sweat, tears, and saliva</td>
<td></td>
</tr>
<tr>
<td>inflammation response</td>
<td>phagocytes engulf and destroy pathogens</td>
</tr>
<tr>
<td></td>
<td>protect cells from viruses</td>
</tr>
</tbody>
</table>

### Acquired Immunity

I found this information on page __________.

Compare the functions of these organs of the lymphatic system.

<table>
<thead>
<tr>
<th>Tonsils</th>
<th>Spleen</th>
<th>Lymph Nodes</th>
<th>Thymus Gland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>
**Main Idea**

**Antibody Immunity, Cellular Immunity**

I found this information on page __________.

**Details**

Compare antibody and cellular immunity in the Venn diagram.

- forms antibodies
- involves B cells
- involves cytotoxic T cells

• involves helper T cells
• involves T cells
• T cells produce clones

**Passive and Active Immunity**

I found this information on page __________.

Distinguish between passive immunity and active immunity.

**AIDS and the Immune System**

I found this information on page __________.

Identify the facts about HIV and AIDS.

<table>
<thead>
<tr>
<th>Two Ways HIV Can Be Spread</th>
<th>Seven Early Symptoms of AIDS</th>
</tr>
</thead>
</table>

**ANALYZE**

Analyze how vaccines have affected the health of people around the world in the last 100 years. Explain.
In the "What I Wanted to Find Out" column, copy the questions you listed in the Chapter Preview. In the "What I Learned" column, write down the answers you discovered as you worked through the chapter.

<table>
<thead>
<tr>
<th>W</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I Wanted to Find Out</td>
<td>What I Learned</td>
</tr>
<tr>
<td>1.</td>
<td>1.</td>
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<tr>
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SUMMARIZE

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