

# Science Notebook

Glencoe Science

## Biology

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# 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, identify what you want to find out, and then assess what you learned.**

**Science Journals help you make connections to the concepts in the chapter.**

**Vocabulary Activities help you understand information better.**

Name \_\_\_\_\_ Date \_\_\_\_\_

## Cellular Structure and Function

### Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

**Science Journal**

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Cellular Structure and Function 63

Name \_\_\_\_\_ Date \_\_\_\_\_

## Cellular Structure and Function

### Section 7.1 Cell Discovery and Theory

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

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

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Review Vocabulary** Use your book or dictionary to define organization.

organization \_\_\_\_\_

**New Vocabulary** Use your book or dictionary to define each term.

cell \_\_\_\_\_

cell theory \_\_\_\_\_

eukaryotic cell \_\_\_\_\_

nucleus \_\_\_\_\_

organelle \_\_\_\_\_

plasma membrane \_\_\_\_\_

prokaryotic cell \_\_\_\_\_

64 Cellular Structure and Function

Name \_\_\_\_\_ Date \_\_\_\_\_

**Section 7.2 The Plasma Membrane (continued)**

**Main Idea** \_\_\_\_\_  
I found this information on page \_\_\_\_\_

**Details** \_\_\_\_\_

**Model** the plasma membrane. Label each part, and describe the function of that part in detail.

**Discuss** how the terms fluid and mosaic describe the plasma membrane.

**Fluid:** \_\_\_\_\_

**Mosaic:** \_\_\_\_\_

**SUMMARIZE** Analyze the role of the plasma membrane in maintaining homeostasis in the cell.

Cellular Structure and Function 69

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

**Graphic Organizers provide a visual format for organizing the section's important information.**

Name \_\_\_\_\_ Date \_\_\_\_\_

**Section 7.3 Structures and Organelles (continued)**

**Main Idea** \_\_\_\_\_

**Cytoplasm and Cytoskeleton**  
I found this information on page \_\_\_\_\_

**Details** \_\_\_\_\_

**Compare** the cytoplasm and cytoskeleton by defining each in the boxes.

Cytoplasm	Cytoskeleton

**Cell Structures**  
I found this information on page \_\_\_\_\_

**Identify** the part of the cell that corresponds to each function described.

	directs cell processes; contains the cell's DNA; stores information for cell growth, function, and reproduction
	double membrane that surrounds the nucleus
	helps manufacture proteins
	produces ribosomes inside the nucleus
	site of ribosome attachment; can be smooth or rough
	modifies, sorts, and packages proteins for transport outside the cell
	membrane-bound storage area within the cell
	vesicle that contains substances that digest excess or worn-out organelles
	structure near the nucleus that functions during cell division
	converts fuel particles (sugars) into useable energy
	captures light energy and converts it to chemical energy through photosynthesis
	gives support to plant cells
	projections that allow the cell to move or to move substances along the surface of the cell

Cellular Structure and Function 71

# Note-Taking Tips

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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 your teacher emphasizes.
- Write your notes as clearly and concisely as possible. The following symbols and abbreviations may be helpful in your note-taking.

Word or Phrase	Symbol or Abbreviation	Word or Phrase	Symbol or Abbreviation
for example	e.g.	and	+
such as	i.e.	approximately	≈
with	w/	therefore	∴
without	w/o	versus	vs

- Use a symbol such as a star (★) or an asterisk (\*) to emphasize 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 your notes as soon as possible after class. During this time, organize and summarize new concepts and clarify misunderstandings.

# Note-Taking Don'ts

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

# The Study of Life

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*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.*

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# The Study of Life

## Section 1.1 Introduction to Biology

**Main Idea**

**Details**

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

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define environment.

*environment*

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

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

- adaptation*
- biology*
- development*
- growth*
- homeostasis*
- organism*
- organization*
- reproduction*
- response*
- species*
- stimulus*

\_\_\_\_\_ is the science of life. A(n) \_\_\_\_\_ is anything that has all the characteristics of life. All living things are arranged in an orderly way. In other words, living things have \_\_\_\_\_. Most living things begin as one cell. The addition of mass is called \_\_\_\_\_. Over an organism's life, natural changes, called \_\_\_\_\_, take place. The production of offspring, or \_\_\_\_\_, must occur to enable the group of breeding organisms, or \_\_\_\_\_, to continue to exist. A living thing also has the ability to react to a(n) \_\_\_\_\_ from its internal or external environment. The reaction is called a \_\_\_\_\_. An organism must be able to maintain its internal conditions. If anything upsets its normal state, processes to restore \_\_\_\_\_ begin. Any inherited characteristic, or \_\_\_\_\_, developed in a species over time can enhance the species' ability to survive and produce offspring in its environment.

**Section 1.1 Introduction to Biology** (continued)

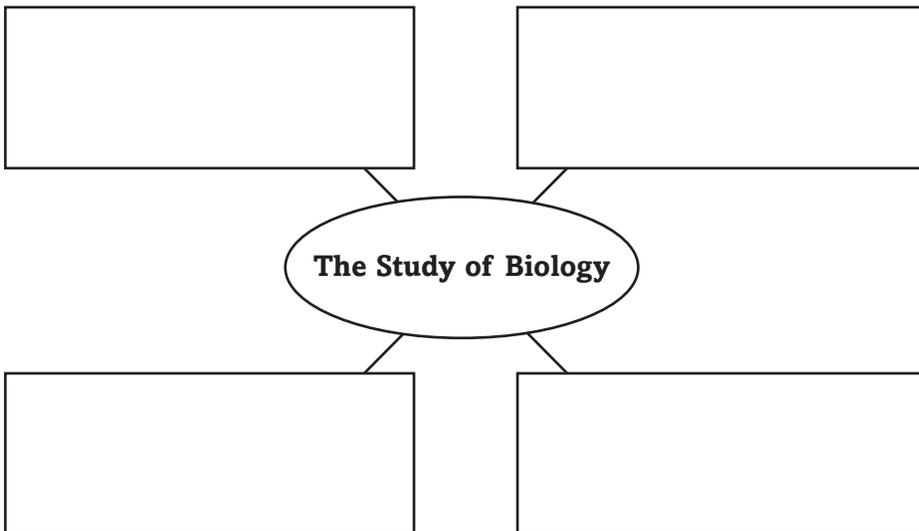
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**The Science of Life**

*I found this information on page \_\_\_\_\_.*

**Identify** four kinds of information you will learn about living things when you study biology.



**What Do Biologists Do?**

*I found this information on page \_\_\_\_\_.*

**Model** one specific question that a biologist might seek to answer for each of the following areas of study.

Area of Study	Question
Diversity of life	
Diseases	
New technologies	
Agriculture	
Environment	

**Analyze** the specific type of work in biology that you might like to do, and explain why.

Type of work: \_\_\_\_\_

Reason: \_\_\_\_\_

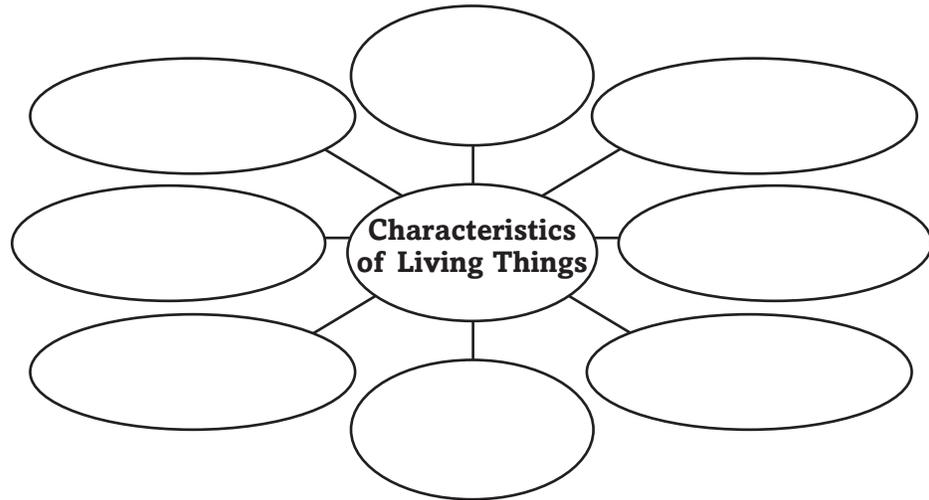
Section 1.1 Introduction to Biology (continued)

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**The Characteristics of Life**

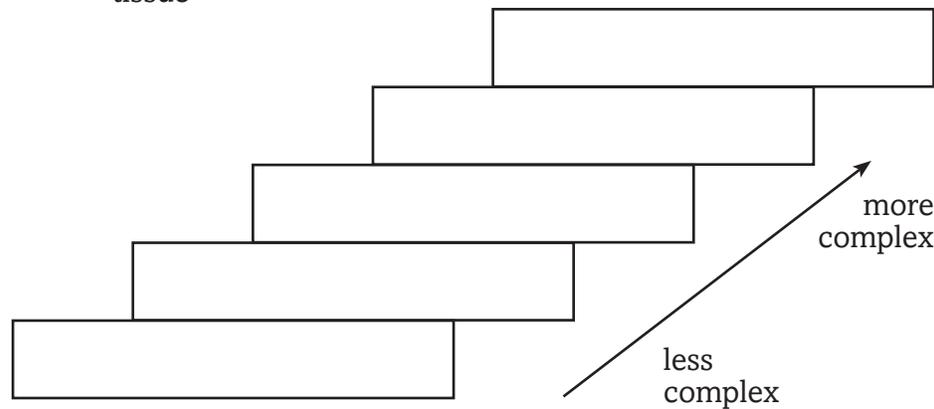
I found this information on page \_\_\_\_\_.

Identify the eight characteristics that something must have to be alive.



Sequence the levels of organization listed below in the correct order from least complex to most complex.

- organ
- atoms and molecules
- cell
- organ system
- tissue



**CONNECT**

A friend argues that a car is alive because its parts form organized systems and it requires energy (gasoline and battery power). How would you respond to your friend?

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# The Study of Life

## Section 1.2 The Nature of Science

### Main Idea

### Details

**Scan** the titles, boldfaced words, pictures, figures, and captions in Section 2. Write two facts you discovered about the nature of science as you scanned the section.

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define investigation.

*investigation*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*ethics*

\_\_\_\_\_

*forensics*

\_\_\_\_\_

\_\_\_\_\_

*metric system*

\_\_\_\_\_

*peer review*

\_\_\_\_\_

\_\_\_\_\_

*science*

\_\_\_\_\_

*SI*

\_\_\_\_\_

\_\_\_\_\_

*theory*

\_\_\_\_\_

\_\_\_\_\_

### Academic Vocabulary

Define unbiased to show its scientific meaning.

*unbiased*

\_\_\_\_\_

**Section 1.2 The Nature of Science (continued)**

**Main Idea**

**Details**

**What is science?**

*I found this information on page \_\_\_\_\_.*

**Classify each statement as a characteristic of a science, a pseudoscience, or both.**

- makes unbiased observations
- often driven by cultural or commercial goals
- makes claims about the natural world
- physics
- astrology
- involves constant reevaluation of what is known
- research designed to justify existing knowledge
- discards observations that are not consistent with beliefs
- bases claims on a large amount of data
- uses peer review

Science	Both	Pseudoscience
<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>

**Analyze what is required for a proposed explanation to become accepted as a theory.**

\_\_\_\_\_

\_\_\_\_\_

**Identify what each SI unit listed below is used to measure.**

gram: \_\_\_\_\_ meter: \_\_\_\_\_

second: \_\_\_\_\_ liter: \_\_\_\_\_

**Section 1.2 The Nature of Science (continued)**

**Main Idea**

**Science in Everyday Life**

*I found this information on page \_\_\_\_\_.*

**Details**

**Identify** an environmental issue, and explain why you think it is an important topic for scientific study.

Issue: \_\_\_\_\_

Importance: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Analyze** an ethical issue. Choose one issue involving ethics mentioned in the text. Write a statement summarizing each side of the issue, both for and against.

Issue: \_\_\_\_\_

For: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Against: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Explain** why it is important for you to become science literate.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**SUMMARIZE**

Identify clues you would look for to judge whether a claim is based on science or pseudoscience.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# The Study of Life

## Section 1.3 Methods of Science

### Main Idea

### Details

**Skim** Section 3 of the chapter. Write two questions that come to mind from reading the headings and illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*theory*

Use your book or dictionary to define theory.

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Write the correct vocabulary term in the left column for each definition below.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- information gained from observations
- group in an experiment that is exposed to the factor being tested
- direct method of gathering information in an orderly way
- group in an experiment that is not exposed to the factor being tested and is used for comparison
- organized series of events in scientific inquiry
- factor in an experiment that results from or depends on changes to the independent variable
- logo that alerts you about a specific danger during lab activities
- factor that remains fixed during an experiment while the independent and dependent variables change
- tested factor in an experiment that might affect the outcome
- testable explanation of a situation
- investigation done in a controlled setting that tests a hypothesis
- logical conclusion based on gathered information
- occurrence of accidental or unexpected, but fortunate, results

**Section 1.3 Methods of Science** (continued)

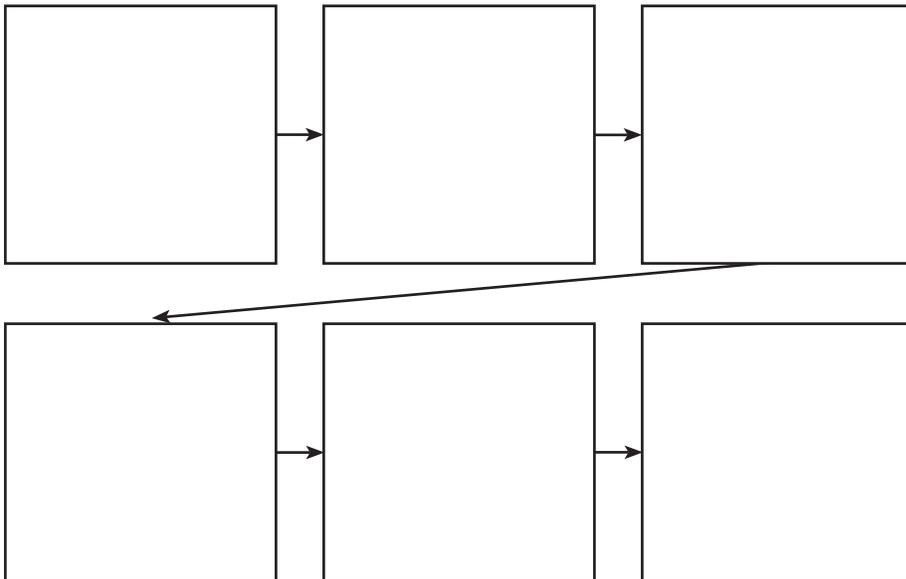
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Ask a Question**

*I found this information on page \_\_\_\_\_.*

**Sequence** *the basic steps in scientific methods by completing the flowchart.*



**Form a Hypothesis**

*I found this information on page \_\_\_\_\_.*

**Analyze** *the relationship between a hypothesis and a theory.*

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**Collect the Data**

*I found this information on page \_\_\_\_\_.*

**Identify** *the parts of the experiment described in the table below.*

Experiment: A biologist gives a new kind of food to a group of dogs and compares the weight gain of these dogs over time to a group of similar dogs that do not receive the new food.
Experimental group:
Control group:
Independent variable:
Dependent variable:

**Section 1.3 Methods of Science** (continued)

**Main Idea** \_\_\_\_\_

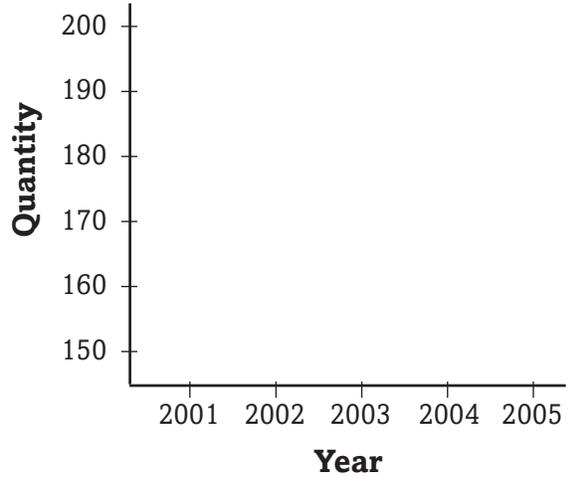
**Details** \_\_\_\_\_

**Analyze the Data**

*I found this information on page \_\_\_\_\_.*

**Model** a line graph from the data in the table below. Plot the points, and draw a line connecting the points.

Grizzly Bears in Park X	
Year	Quantity
2001	195
2002	190
2003	184
2004	164
2005	158



**Report Conclusions**

*I found this information on page \_\_\_\_\_.*

**Summarize** what the above graph shows about grizzly bears in Park X.

---

---

**Analyze** why it is important for biologists to report their results in scientific journals.

---

---

**Student Scientific Inquiry**

*I found this information on page \_\_\_\_\_.*

**State** what you will do when you see a safety symbol in a lab activity.

---

---

---

**CONNECT**

Analyze an experiment in which one group of plants receives extra fertilizer and another group receives extra water. Is the experiment controlled or uncontrolled? Support your answer.

---

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# Principles of Ecology

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*Organisms such as birds get what they need to survive from their environment. Hypothesize why is it important for birds to be able to fly long distances.*

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# Principles of Ecology

## Section 2.1 Organisms and Their Relationships

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

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

---



---

**New Vocabulary**

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

- abiotic factor*
- biological community*
- biome*
- biosphere*
- biotic factor*
- commensalism*
- ecology*
- ecosystem*
- habitat*
- mutualism*
- niche*
- parasitism*
- population*
- predation*
- symbiosis*

Levels of Organization	

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

<b>habitat</b>	<b>niche</b>
<b>abiotic factor</b>	<b>biotic factor</b>

<b>symbiosis</b>		
<b>commensalism</b>	<b>mutualism</b>	<b>parasitism</b>
<b>predation</b>		

**Section 2.1 Organisms and Their Relationship (continued)**

**Main Idea**

**Details**

**Ecology**

*I found this information on page \_\_\_\_\_.*

**Create a journal entry.** *Imagine that you are an ecologist. Choose one plant or animal in nature and write three relationships of that organism in its environment.*

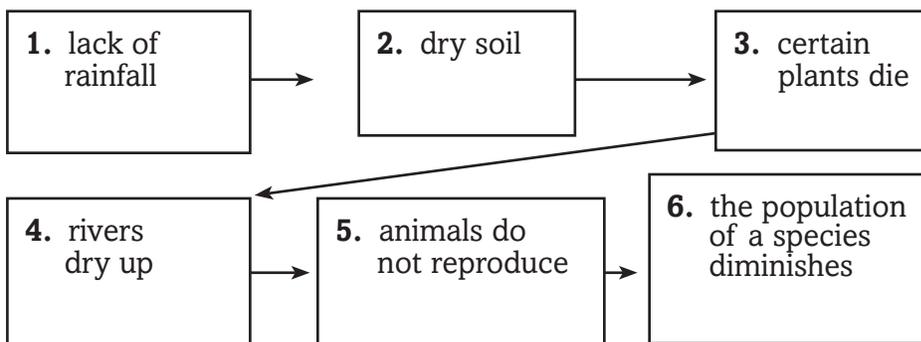
**Journal Entry** **Date** \_\_\_\_\_  
 Organism \_\_\_\_\_

1. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
2. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
3. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**The Biosphere**

*I found this information on page \_\_\_\_\_.*

**Sequence the abiotic and biotic factors.** *Write abiotic or biotic in each square.*



**Levels of Organization**

*I found this information on page \_\_\_\_\_.*

**Identify each level of organization that is described.**

- \_\_\_\_\_ a group of organisms of all the same species
- \_\_\_\_\_ interacting populations
- \_\_\_\_\_ an individual living thing made of cells
- \_\_\_\_\_ all the different populations in a community
- \_\_\_\_\_ a large group of organisms that share the same climate and have similar types of communities

**Section 2.1 Organisms and Their Relationships** (continued)

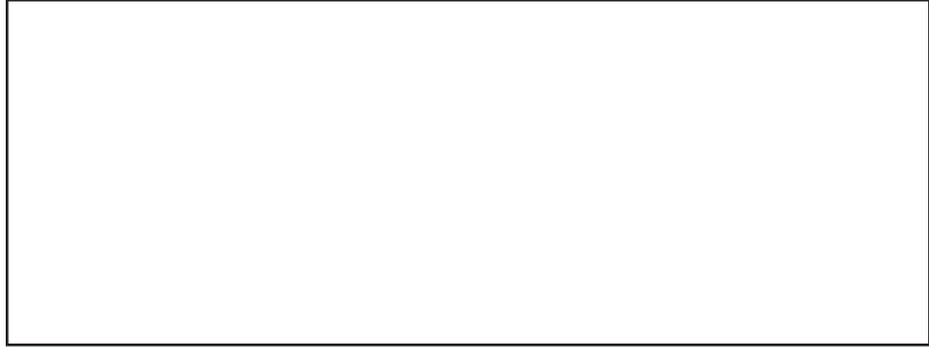
**Main Idea**

**Ecosystem Interactions**

I found this information on page \_\_\_\_\_.

**Details**

**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 long.



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**Community Interactions**

I found this information on page \_\_\_\_\_.

**Rephrase** mutualism, commensalism, and parasitism in your own words. Provide an example of each term.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

**SUMMARIZE**

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

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# Principles of Ecology

## Section 2.2 Flow of Energy in an Ecosystem

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Scan** Section 2 of the chapter. Make a list of the ways in which organisms obtain energy.

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**Review Vocabulary**

Use your book or dictionary to define energy. Then name the ultimate source of energy for Earth.

energy

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**New Vocabulary**

Use your book or dictionary to fill in vocabulary terms in this paragraph about food chains.

- autotroph
- biomass
- carnivore
- decomposer
- detritivore
- food chain
- food web
- herbivore
- heterotroph
- omnivore
- trophic level

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 \_\_\_\_\_. An \_\_\_\_\_ is a heterotroph that eats only plants, whereas a \_\_\_\_\_ preys on other heterotrophs. An \_\_\_\_\_ eats both plants and animals. Nutrients are returned to the soil, air, and water by \_\_\_\_\_. 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 foundation to show its scientific meaning.

foundation

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**Section 2.2 Flow of Energy in an Ecosystem** (continued)

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

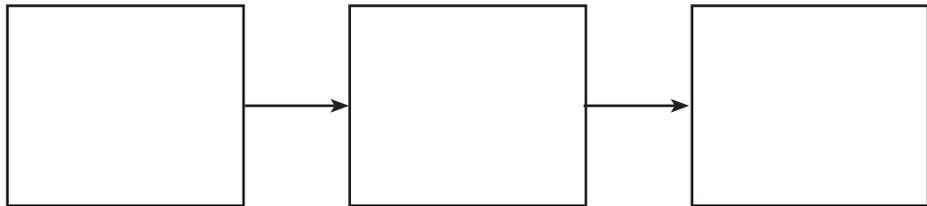
**Energy in an Ecosystem**

*I found this information on page \_\_\_\_\_.*

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

Type of Organism	Autotrophs		
Other name(s) for this type		consumers, herbivores, carnivores, scavengers, omnivores	no other name
Food comes from		1. 2. 3.	
Chemical reactions that occur		The organisms that are eaten are turned into energy and molecules for the consumer's body.	
Examples			

**Design** *your own three-step example of the flow of energy.*



**Classify** *each of the following organisms as an autotroph or a heterotroph. Put an A in front of those that are autotrophs and an H in front of those that are heterotrophs.*

- |                   |                       |                   |
|-------------------|-----------------------|-------------------|
| ___ 1. Alligator  | ___ 5. Moss           | ___ 9. Dandelion  |
| ___ 2. Squirrel   | ___ 6. Siberian tiger | ___ 10. Rabbit    |
| ___ 3. Maple tree | ___ 7. Daffodil       | ___ 11. Tomato    |
| ___ 4. Whale      | ___ 8. Rhinoceros     | ___ 12. Cockroach |

**Section 2.2 Flow of Energy in an Ecosystem** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Models of Energy Flow**

*I found this information on page \_\_\_\_\_.*

**Contrast** a food chain *with* a food web.

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**State** three things that an ecological pyramid shows that food webs and food chains do not show.

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**Create** a food web and name the organisms you include. Indicate each organism's trophic level.

**SUMMARIZE**

Analyze the place in the food chain in which you participate. Use the vocabulary terms from this section that apply to you.

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# Principles of Ecology

## Section 2.3 Cycling of Matter

**Main Idea**

**Details**

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

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define cycle. Then give an example of a cycle.

*cycle*

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each vocabulary term.

*biogeochemical cycle*

\_\_\_\_\_  
\_\_\_\_\_

*denitrification*

\_\_\_\_\_  
\_\_\_\_\_

*matter*

\_\_\_\_\_  
\_\_\_\_\_

*nitrogen fixation*

\_\_\_\_\_  
\_\_\_\_\_

*nutrient*

\_\_\_\_\_  
\_\_\_\_\_

**Section 2.3 Cycling of Matter** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Cycles in the Biosphere**

*I found this information on page \_\_\_\_\_.*

**Create** *minimodels for each cycle of matter in nature. Use words or pictures to sketch a simple example for each type of cycle to show the movement of matter.*

<p><b>A. The Water Cycle</b></p>	<p><b>B. The Carbon Cycle</b></p>
<p><b>C. The Nitrogen Cycle</b></p>	<p><b>D. The Phosphorus Cycle</b> (short-term and long-term)</p>

**Section 2.3 Cycling of Matter** (continued)

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Describe** each of the cycles in nature. Identify where each cycle is found, how organisms use them, and what key words relate to them.

	<b>Water</b>	<b>Carbon/ oxygen</b>	<b>Nitrogen</b>	<b>Phosphorus</b>
Where found				
How used				
Key words in the cycle				

**SUMMARIZE**

Analyze current farming practices that are designed to make the best use of energy flow in ecosystems and cycles of matter.

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# Communities, Biomes, and Ecosystems

## Before You Read

Before you read the chapter, respond to these statements.

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

Before You Read	Communities, Biomes, and Ecosystems	After You Read
	<ul style="list-style-type: none"> <li>• Once an ecosystem is established, its plant and animal species remain the same.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Over time, a forest can develop from bare rock.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Mountains are not a biome because climate, plants, and animals change with elevation.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Most of Earth’s freshwater is locked in ice.</li> </ul>	

### Science Journal

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

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# Communities, Biomes, and Ecosystems

## Section 3.1 Community Ecology

**Main Idea**

**Details**

**Skim** Section 1 of the chapter. List three facts you discovered about ecosystems.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define abiotic factor.

*abiotic factor*

\_\_\_\_\_

**New Vocabulary**

Use the new vocabulary terms to complete the following sentences

- climax community*
- community*
- ecological succession*
- limiting factor*
- primary succession*
- secondary succession*
- tolerance*

Your \_\_\_\_\_ includes the people, other animals, plants, bacteria, and fungi in your area. A \_\_\_\_\_ is any abiotic or biotic factor that restricts the numbers, reproduction, or distribution of organisms. The ability of any organism to survive when subjected to abiotic or biotic factors is its \_\_\_\_\_. Changing abiotic or biotic factors can trigger \_\_\_\_\_—the replacement of one community with another. \_\_\_\_\_ occurs when a community becomes established in an area of exposed rock without topsoil. Eventually, a stable, mature \_\_\_\_\_ can develop from bare rock. If a disturbance, such as fire, removes the community but not the soil, an orderly and predictable change called \_\_\_\_\_ restores the community over time.

**Section 3.1 Community Ecology** (continued)

**Main Idea**

**Details**

**Communities**

I found this information on page \_\_\_\_\_.

**Predict** how an unusually prolonged drought might affect a biological community.

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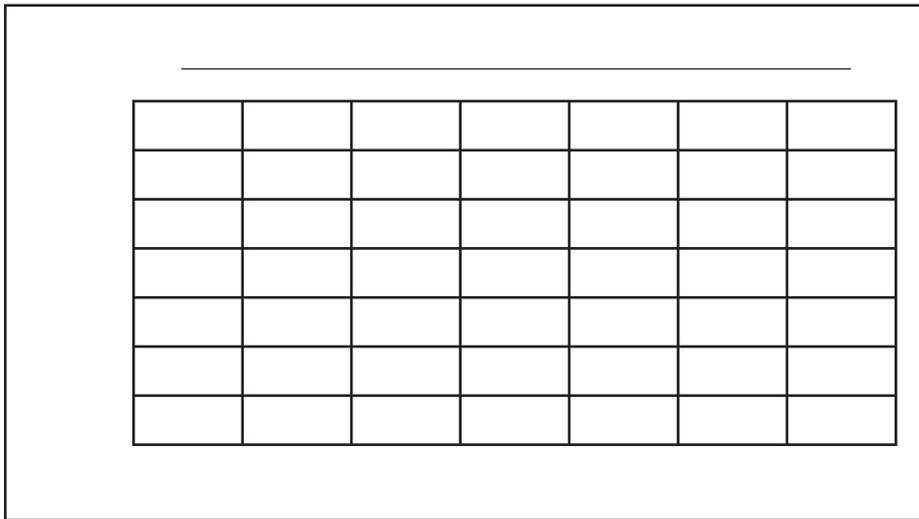
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**Create** a tolerance graph similar to the *Tolerance of Steelhead Trout* figure in your book. Title your graph *Tolerance of Plant A*. Label the zones. Then label the limits of each zone according to the facts about Plant A listed below.

- can live at an elevation between 1,000 and 2,000 m
- can live at an elevation between 5,000 and 6,000 m
- cannot live above 6,000 m
- grows best between 2,000 and 5,000 m
- cannot live below 1,000 m



**Infer** other abiotic factors that might limit the survival of Plant A.

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**Section 3.1 Community Ecology** (continued)

**Main Idea**

**Ecological Succession**

I found this information on page \_\_\_\_\_.

**Details**

**Contrast** *primary succession and secondary succession. Give an example of each.*

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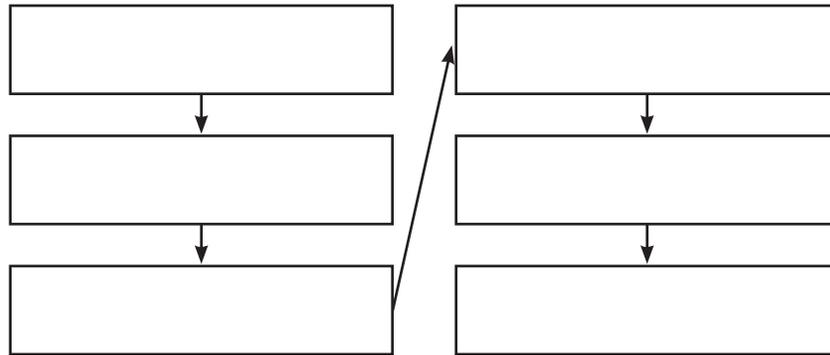
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**Sequence** *the following steps in the primary succession of a forest by writing each step in the flowchart.*

- perennial herbs and grasses
- lichens
- shade-tolerant trees
- bare rock
- shrubs and shade-intolerant trees
- small annual plants



**CONNECT**

Suppose that a recent flood devastated a wildlife preserve in your area. Local leaders suggested organizing volunteers to plant trees in the damaged area. Evaluate your plan and support your reasoning.

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# Communities, Biomes, and Ecosystems

## Section 3.2 Terrestrial Biomes

**Main Idea**

**Details**

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

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define biome.

*biome*

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define the following term.

*latitude*

\_\_\_\_\_

\_\_\_\_\_

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

*weather*  
*climate*

weather:	climate:
----------	----------

Describe the vegetation and growing conditions for each biome.

*boreal forest*  
*desert*  
*grassland*  
*temperate forest*  
*tropical rain forest*  
*tropical savanna*  
*tropical seasonal forest*  
*tundra*  
*woodland*

tundra:	boreal forest:	temperate forest:
woodlands:	grassland:	desert:
tropical savanna:	tropical seasonal forest:	tropical rain forest:

**Section 3.2 Terrestrial Biomes (continued)**

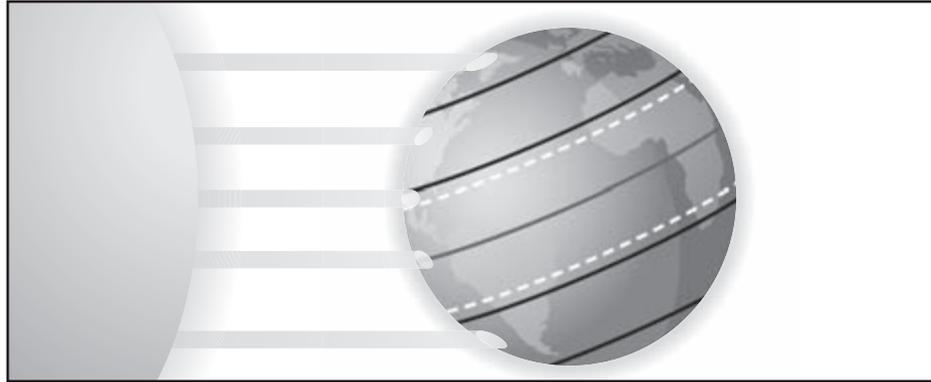
**Main Idea**

**Effects of Latitude and Climate**

I found this information on page \_\_\_\_\_.

**Details**

**Model** the latitude lines, poles, equator, Tropic of Cancer, Tropic of Capricorn, and the Sun below.



**Analyze** how latitude affects climate and why.

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**Identify** three factors other than latitude that affect climate.

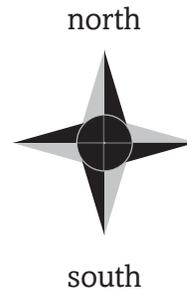
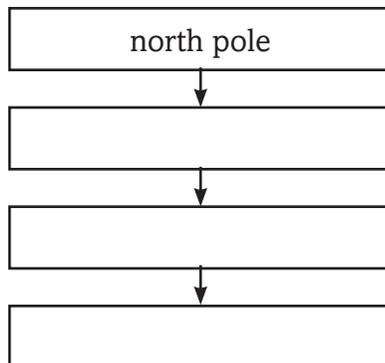
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**Major Land Biomes**

I found this information on page \_\_\_\_\_.

**Sequence** the boreal forest, temperate forest, and tundra in the diagram below.



**Section 3.2 Terrestrial Biomes (continued)**

**Main Idea**

**Details**

**Classify** the land biome described by each characteristic below.

Characteristic	Biome
most trees drop their leaves during the dry season	
annual rate of evaporation exceeds rate of precipitation	
open areas of trees and mixed shrubs along the west coasts of North and South America	
most diverse of all biomes, with a canopy and understory of vegetation	
grasses and scattered trees; receives less precipitation than other tropical areas	
thick cover of grasses with underground stems and buds that can survive fires	
dense evergreen forest; also called northern coniferous forest or taiga	
composed of broad-leaved deciduous trees; has four well-defined seasons	
treeless; has a layer of permanently frozen soil below the surface called permafrost	

**Other Terrestrial Areas**

*I found this information on page \_\_\_\_\_.*

**Analyze** why the two land areas below are not true biomes.

Mountains: \_\_\_\_\_  
 \_\_\_\_\_

Polar regions: \_\_\_\_\_  
 \_\_\_\_\_

**CONNECT**

Compare and contrast a tundra to a desert. Include latitude, climate, and major biomes.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Communities, Biomes, and Ecosystems

## Section 3.3 Aquatic Ecosystems

### Main Idea

### Details

**Scan** the titles, boldfaced words, figures, and captions in Section 3. Write three facts you discovered about aquatic ecosystems.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

*salinity*

Use your book or dictionary to define salinity.

\_\_\_\_\_

### New Vocabulary

Write the correct term in the left column for each definition below.

_____	deepest areas of a large lake
_____	narrow band where the ocean meets land
_____	area of the open ocean that is too deep for sunlight to penetrate
_____	area of the open ocean to a depth of about 200 m that is shallow enough for sunlight to penetrate
_____	deepest region of the ocean
_____	areas of land such as marshes, swamps, and bogs that are saturated with water and that support aquatic plants
_____	area of a lake or pond that is closest to shore
_____	ecosystem that is formed where a freshwater river or stream merges with the ocean
_____	open water area of a lake or pond that is well lit and dominated by plankton
_____	area of sand, silt, and dead organisms along the ocean floor
_____	material that is deposited by water, wind, or glaciers
_____	free-floating photosynthetic autotrophs that live in freshwater or marine ecosystems

**Section 3.3 Aquatic Ecosystems (continued)**

**Main Idea**

**The Water on Earth**

*I found this information on page \_\_\_\_\_.*

**Details**

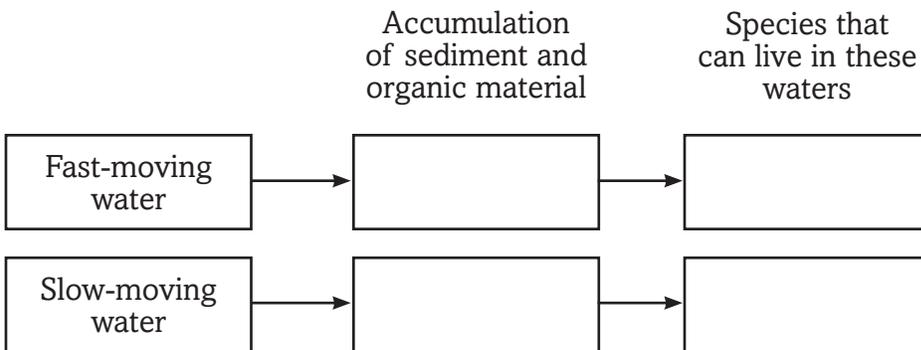
**Complete** *this paragraph about the distribution of water on the Earth.*

By far, \_\_\_\_\_ is the most common type of water on Earth. Of the 2.5 percent of \_\_\_\_\_ on Earth, most is locked in the ice of \_\_\_\_\_. Most freshwater species live in \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ that make up only \_\_\_\_\_ percent of all freshwater. The remaining freshwater is found in \_\_\_\_\_.

**Freshwater Ecosystems**

*I found this information on page \_\_\_\_\_.*

**Analyze** *how the speed of water flow affects life in a river by writing more or less in the appropriate boxes in the figure.*



**Compare** *the zones of lakes and ponds by completing the table below.*

Zone	Location	Example Species
	well-lit open water area	
		limited due to cold and reduced light and oxygen
littoral		

**Section 3.3 Aquatic Ecosystems (continued)**

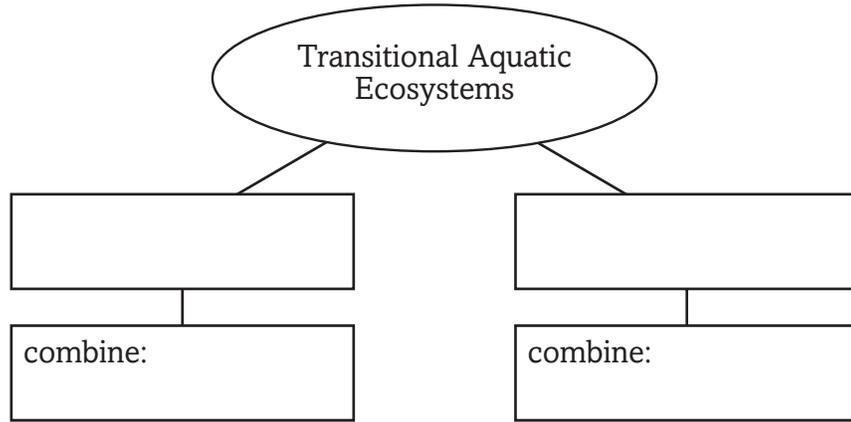
**Main Idea**

**Transitional Aquatic Ecosystems**

I found this information on page \_\_\_\_\_.

**Details**

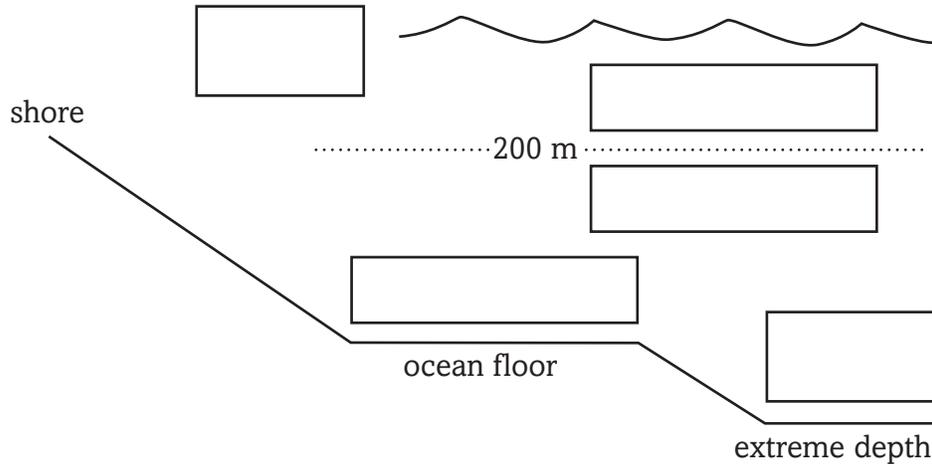
**Compare** *transitional aquatic ecosystems. Identify two types in the organizer below and describe the environments each type combines.*



**Marine Ecosystems**

I found this information on page \_\_\_\_\_.

**Identify** *the marine ecosystems. Write the name of the zone in each box in the figure below.*



**SUMMARIZE** Analyze several adaptations that would help organisms survive in the intertidal zone.

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# Population Ecology

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*White-tailed deer have become so numerous in some areas of the United States that they are a nuisance. Why do you think these deer populations have grown so large?*

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# Population Ecology

## Section 4.1 Population Dynamics

**Main Idea**

**Details**

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

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define population.

*population*

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

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

*carrying capacity*

<b>population density</b>	<b>dispersion</b>

*density-dependent factor*

<b>density-independent factor</b>	<b>density-independent factor</b>

*density-independent factor*

*dispersion*

*emigration*

<b>population growth rate</b>	
<b>emigration</b>	<b>immigration</b>

*immigration*

*population density*

*population growth rate*

<b>carrying capacity</b>

**Academic Vocabulary**

Define fluctuate to show its scientific meaning.

*fluctuate*

\_\_\_\_\_

\_\_\_\_\_

**Section 4.1 Population Dynamics** (continued)

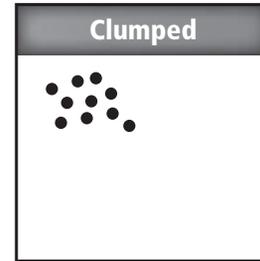
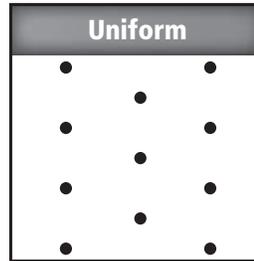
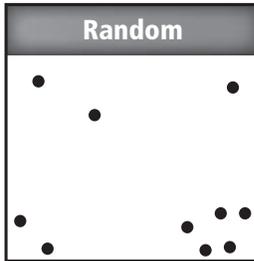
**Main Idea**

**Population Characteristics**

*I found this information on page \_\_\_\_\_.*

**Details**

**Identify** each pattern of dispersion represented below.



**Analyze** why populations are limited in their spatial distribution.

\_\_\_\_\_

\_\_\_\_\_

**Classify** each limiting factor below as either density-independent or density-dependent by placing an X in the appropriate column.

Factor	Density-Independent	Density-Dependent
Lava flow		
Number of predators		
Spread of disease		
Especially cold winter		
Toxic chemical spill into a stream		
Another species competing for the same resources		
Diverting a river for irrigation		
Fungus that attacks elm trees		

**Analyze** how the expansion of housing developments in southern California might limit coyote populations in the area.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 4.1 Population Dynamics** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Population-limiting factors**

*I found this information on page \_\_\_\_\_.*

**Identify four main factors in a population's growth rate.**

Factors in Population's Growth Rate	
•	•
•	•

**Compare** the general shapes of the curves of population growth graphs. Draw the appropriate graph. Label the lag phase, exponential growth phase, and carrying capacity. Below each graph, describe what the graph shows.

**Exponential Population Growth**

**Logistic Population Growth**

**SUMMARIZE**

Analyze whether humans are *r*-strategists or *k*-strategists. Explain why. Support your reasoning.

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# Population Ecology

## Section 4.2 Human Population

**Main Idea**

**Details**

**Skim** Section 2 of the chapter. Make a list of the ways in which human populations change.

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**Review Vocabulary**

Use your book or dictionary to define carrying capacity.

*carrying capacity*

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**New Vocabulary**

Use your book or dictionary to define each term.

*age structure*

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*demographic transition*

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*demography*

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*zero population growth (ZPG)*

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**Section 4.2 Human Population** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Human Population Growth**

*I found this information on page \_\_\_\_\_.*

**Summarize** *two examples of events that could produce each of the following effects.*

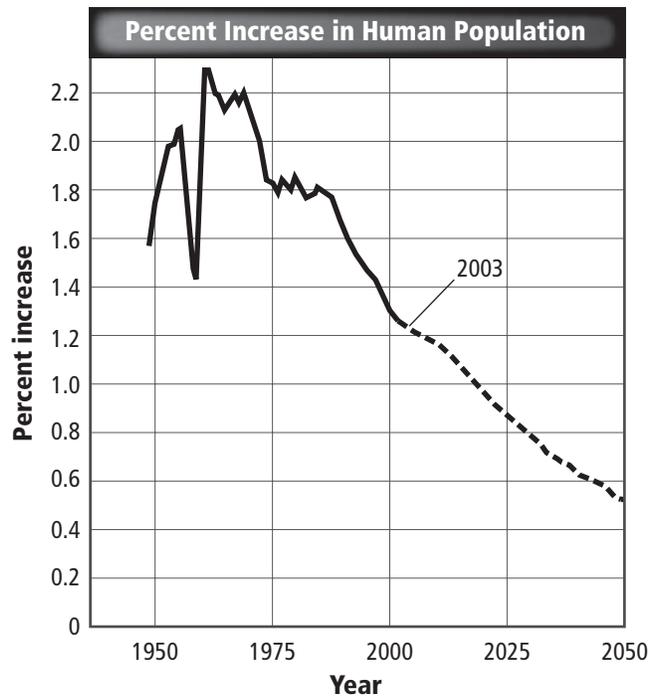
Effect: decline in world population growth

Events that could produce this effect: \_\_\_\_\_

Effect: increase in world population growth

Events that could produce this effect: \_\_\_\_\_

**Examine** *the graph below. Then complete the table that follows.*



Approximate Growth Rate			
1950	1975	2000	2025 (estimated)

What are the main reasons for the expected trend in human population between now and 2050?

\_\_\_\_\_

**Section 4.2 Human Population** (continued)

**Main Idea**

**Trends in Human Population Growth**

*I found this information on page \_\_\_\_\_.*

**Details**

**Calculate** *the population growth rate for each fictitious country listed in the table below.*

Country	Births per 1000	Deaths per 1000	Growth rate (percent)
X	25	9	
Y	14	4	
Z	12	15	

**Compare** *trends in industrialized nations and developing countries in terms of the following factors.*

Population growth rate: \_\_\_\_\_  
 \_\_\_\_\_

Resource use by individuals: \_\_\_\_\_  
 \_\_\_\_\_

**Identify** *three factors that could keep the human population from reaching its carrying capacity.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**SUMMARIZE**

Imagine that medical science discovered a cure for all cancers. Analyze how this medical achievement might affect life on Earth.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Tie It Together

## FURTHER INQUIRY

*Create a demographic profile for an imaginary country by describing its population characteristics below. List the sources of your data.*

Name of country: \_\_\_\_\_

Geographic location: \_\_\_\_\_

Is it classified as a developing country or as an industrialized nation? \_\_\_\_\_

Population size: \_\_\_\_\_

Population density: \_\_\_\_\_

Description of the population's spatial distribution across the country's land area:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Birthrate: \_\_\_\_\_

Death rate: \_\_\_\_\_

Current population growth rate: \_\_\_\_\_

Expected population growth rate in the next 10 to 20 years: \_\_\_\_\_

General age structure: \_\_\_\_\_

Major factors promoting population growth: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Major factors limiting population growth: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Data sources used: \_\_\_\_\_

# Biodiversity and Conservation

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Biodiversity and Conservation	After You Read
	<ul style="list-style-type: none"> <li>• Biodiversity is the variety of ecosystems in the biosphere.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Genetic diversity tends to decrease over time in small pieces of habitat.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Nonnative species can damage an ecosystem.</li> </ul>	
	<ul style="list-style-type: none"> <li>• The first national park was established in the United States in 1972.</li> </ul>	

### 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.*

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# Biodiversity and Conservation

## Section 5.1 Biodiversity

### Main Idea

### Details

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

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define gene.

*gene*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*biodiversity*

\_\_\_\_\_

*ecosystem diversity*

\_\_\_\_\_

\_\_\_\_\_

*extinction*

\_\_\_\_\_

\_\_\_\_\_

*genetic diversity*

\_\_\_\_\_

\_\_\_\_\_

*species diversity*

\_\_\_\_\_

\_\_\_\_\_

### Academic Vocabulary

Define diverse to show its scientific meaning.

*diverse*

\_\_\_\_\_

\_\_\_\_\_

**Section 5.1 Biodiversity** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**What is Biodiversity?**

*I found this information on page \_\_\_\_\_.*

**Compare and contrast** *the species biodiversity of different areas.*

	<b>Rain Forest</b>	<b>Corn Field</b>	<b>Vegetable Garden</b>	<b>Tundra</b>
Plants				
Animals				

**Describe** *observable differences among the types of biodiversity using a forest ecosystem.*

<b>Type of Biodiversity</b>	<b>Example</b>
Genetic diversity	
Species diversity	
Ecosystem diversity	

**Analyze** *how genetic diversity in a population of fishes in a stream can help the fishes resist disease.*

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**Section 5.1 Biodiversity** (continued)

**Main Idea**

**Details**

**The Importance of Biodiversity**

*I found this information on page \_\_\_\_\_.*

**Summarize** why species should be preserved as a possible source of useful genes.

	<b>Agriculture</b>	<b>Medicine</b>
Organisms that might have value include		
These organisms someday might be useful as		

**Identify** resources and services that a healthy biosphere provides to people.

<b>Resources</b>	<b>Services</b>
1.	1.
2.	2.
3.	3.
4.	4.

**Organize** how humans are dependent on plants and animals by describing two ways that you use products of each.

<b>Products of Animals</b>	<b>Products of Plants</b>

**SUMMARIZE**

Explain how the health of the biosphere impacts the health of people.

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# Biodiversity and Conservation

## Section 5.2 Threats to Biodiversity

### Main Idea

### Details

**Scan** the titles, boldfaced words, figures, and captions in Section 2. List three threats you discovered to biodiversity.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define food web.

*food web*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define the following terms.

*biological magnification*

\_\_\_\_\_  
\_\_\_\_\_

*edge effect*

\_\_\_\_\_  
\_\_\_\_\_

*eutrophication*

\_\_\_\_\_  
\_\_\_\_\_

*habitat fragmentation*

\_\_\_\_\_  
\_\_\_\_\_

*introduced species*

\_\_\_\_\_  
\_\_\_\_\_

*overexploitation*

\_\_\_\_\_  
\_\_\_\_\_

**Section 5.2 Threats to Biodiversity (continued)**

**Main Idea**

**Details**

**Extinction Rates**

I found this information on page \_\_\_\_\_.

**Factors That Threaten Biodiversity**

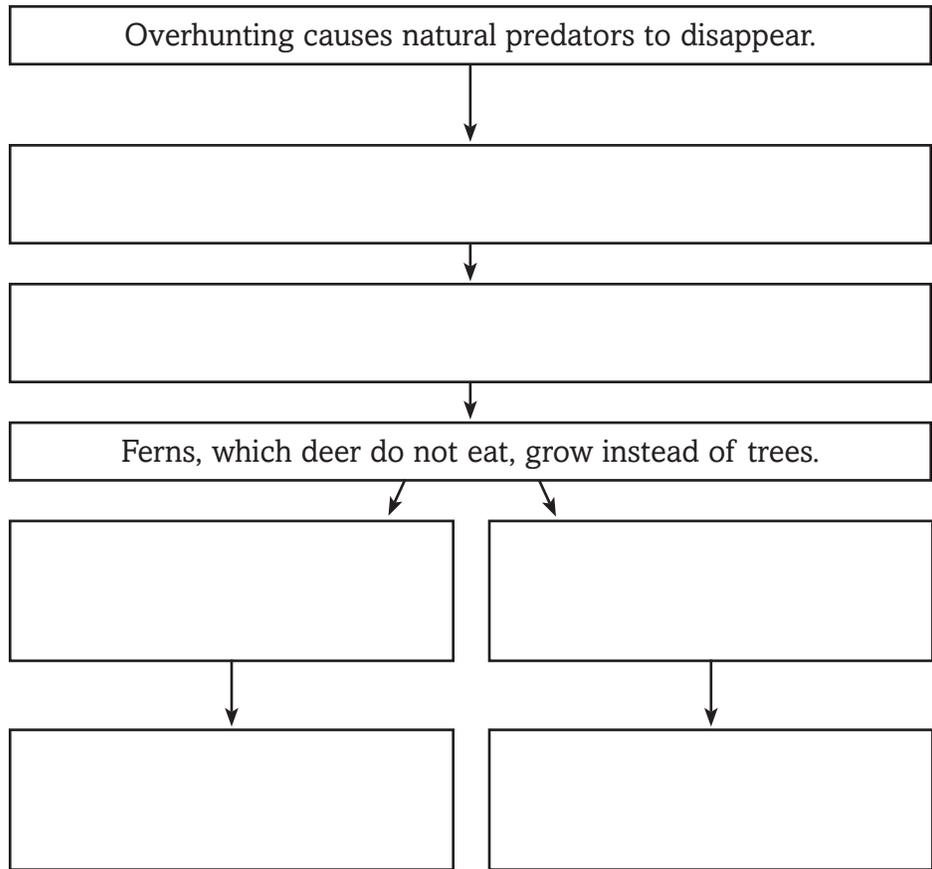
I found this information on page \_\_\_\_\_.

**Summarize** *extinction rates by completing the sentences below.*

\_\_\_\_\_ is slow and gradual. It is caused as \_\_\_\_\_ change by natural processes. A \_\_\_\_\_ is an event in which extinctions increase dramatically. Some scientists believe we are in a period of \_\_\_\_\_ today.

**Sequence** *the series of events describing how a habitat can be disrupted. The first one has been done for you.*

- Owls that prey on small mammals decline.
- Deer eat most of the young trees in a forest.
- Squirrels and rabbits that live in and around trees decline.
- Deer that are prey for predators increase in number.
- Birds that eat the insects decline.
- Overhunting causes natural predators to disappear.
- Insects that live in the bark of trees decline.



**Section 5.2 Threats to Biodiversity** (continued)

**Main Idea**

**Details**

**Explain** *why carnivores are subject to biological magnification of substances like DDT and PCBs.*

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

Edge effects	
Introduced species	
Pollution	
Habitat fragmentation	
Habitat loss	

**CONNECT**

Imagine a habitat near you. Hypothesize what would happen to the ecosystem if one species died out. Support your reasoning with information from this section.

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# Biodiversity and Conservation

## Section 5.3 Conserving Biodiversity

### Main Idea

### Details

**Read** the main idea of Section 3 of the chapter and look at the figures and captions in the section. Predict two ways that people are preserving biodiversity.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define natural resources.

*natural resources*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define the following terms.

*biological augmentation*

\_\_\_\_\_  
\_\_\_\_\_

*bioremediation*

\_\_\_\_\_  
\_\_\_\_\_

*endemic*

\_\_\_\_\_

*nonrenewable resource*

\_\_\_\_\_  
\_\_\_\_\_

*renewable resource*

\_\_\_\_\_  
\_\_\_\_\_

*sustainable use*

\_\_\_\_\_  
\_\_\_\_\_

**Section 5.3 Conserving Biodiversity** (continued)

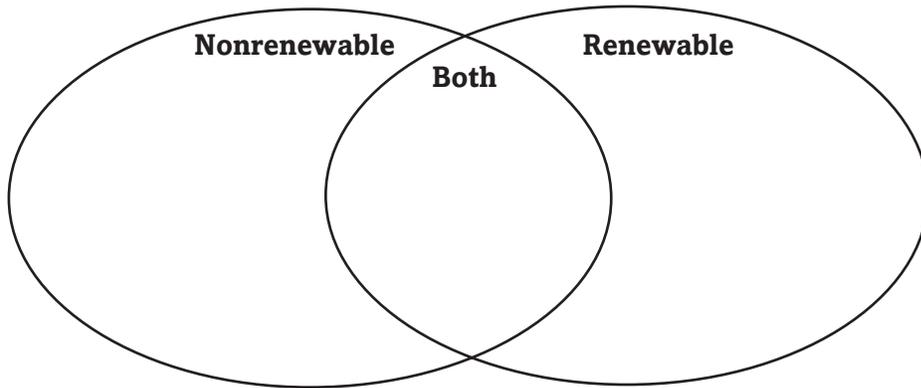
**Main Idea**

**Details**

**Natural Resources**

I found this information on page \_\_\_\_\_.

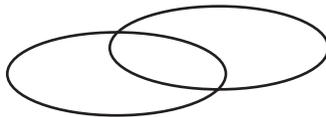
**Compare and contrast** *renewable and nonrenewable resources* by writing characteristics of each in the Venn diagram.



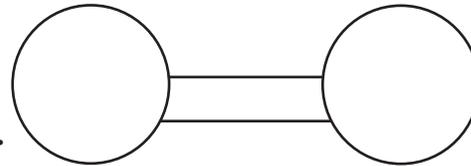
**Protecting Biodiversity**

I found this information on page \_\_\_\_\_.

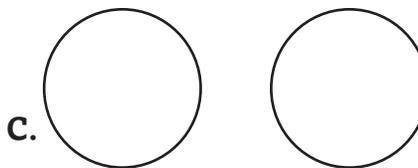
**Choose** the diagram that best represents a habitat corridor. Explain your choice.



A.



B.



C.

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**Summarize** the purpose of a habitat corridor. Provide an example to support your response.

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**Section 5.3 Conserving Biodiversity** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Restoring Ecosystems**

*I found this information on page \_\_\_\_\_.*

**Organize** *the factors that impact how long it takes for an ecosystem to recover after a disaster.*

**Explain** *the methods ecologists use to restore ecosystems.*

Method: \_\_\_\_\_

How it works: \_\_\_\_\_

Example: \_\_\_\_\_

Method: \_\_\_\_\_

How it works: \_\_\_\_\_

Example: \_\_\_\_\_

**Legally Protecting Biodiversity**

*I found this information on page \_\_\_\_\_.*

**Rephrase** *a law or treaty designed to protect biodiversity.*

Who or what: \_\_\_\_\_

When: \_\_\_\_\_

How: \_\_\_\_\_

**SUMMARIZE**

Analyze how sustainable use could preserve biodiversity in hot spots.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Chemistry in Biology

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Chemistry in Biology	After You Read
	<ul style="list-style-type: none"> <li>• Atoms are the smallest particles in matter.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Chemical reactions occur constantly inside your body.</li> </ul>	
	<ul style="list-style-type: none"> <li>• About 70 percent of your body is water.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Almost all molecules in living things contain the element carbon.</li> </ul>	

### Science Journal

*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.*

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# Chemistry in Biology

## Section 6.1 Atoms, Elements, and Compounds

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Scan** the headings and boldfaced words in Section 1 of the chapter. Predict two things that you think might be discussed.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define substance.

*substance*

**New Vocabulary**

Compare the terms in the table by defining them side by side.

*atom*  
*electron*  
*neutron*  
*nucleus*  
*proton*  
  
*compound*  
*covalent bond*  
*element*  
*ion*  
*ionic bond*  
*isotope*  
*molecule*  
*van der Waals force*

atom	atom	
electron	nucleus	neutron
neutron		
nucleus	proton	electron
proton		

Complete the paragraph below using the terms listed to the left.

A substance that cannot be broken down into other substances is a(n) \_\_\_\_\_. Carbon-14 is a(n) \_\_\_\_\_. It has a different number of neutrons than other carbon atoms. A(n) \_\_\_\_\_ forms when two or more elements combine. The chemical bond that holds the elements together is a(n) \_\_\_\_\_ when electrons are shared. A substance with this kind of bond is called a(n) \_\_\_\_\_. An atom that has lost or gained one or more electrons becomes a(n) \_\_\_\_\_, which carries an electric charge. Two of these oppositely charged atoms can form an electrical attraction called a(n) \_\_\_\_\_. An attraction between oppositely charged regions of molecules is called a(n) \_\_\_\_\_.

### Section 6.1 Atoms, Elements, and Compounds (continued)

#### Main Idea

#### Details

##### Atoms

I found this information on page \_\_\_\_\_.

**Model** an oxygen atom and label the parts. Note the type of electric charge for each part. Then complete the sentence that follows.

The overall charge of the oxygen atom is \_\_\_\_\_, because the atom \_\_\_\_\_.

##### Elements

I found this information on page \_\_\_\_\_.

**Compare and contrast** the characteristics of carbon-14 by completing the following sentences.

Structurally, carbon-14 differs from other carbon atoms because \_\_\_\_\_.

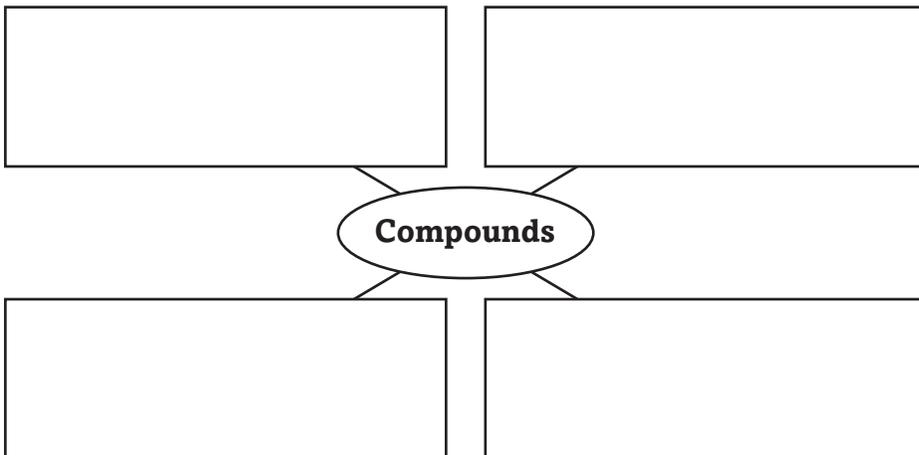
Carbon-14 is radioactive because \_\_\_\_\_.

Knowing the half-life of carbon-14 enables scientists to \_\_\_\_\_.

##### Compounds

I found this information on page \_\_\_\_\_.

**Identify** four unique characteristics of compounds.



**Section 6.1 Atoms, Elements, and Compounds** (continued)

**Main Idea**

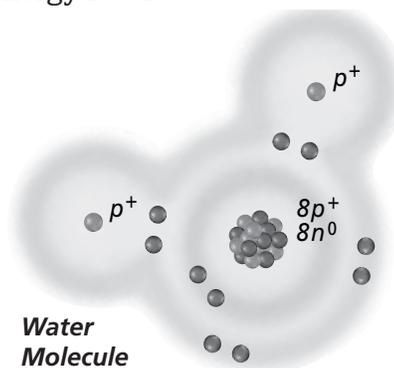
**Chemical Bonds**

I found this information on page \_\_\_\_\_.

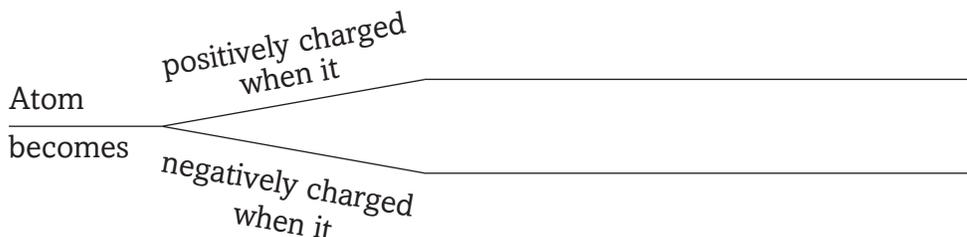
**Details**

Label the following parts of the water molecule illustrated below.

- hydrogen atom(s)
- oxygen atom(s)
- covalent bonds
- first energy level
- second energy level



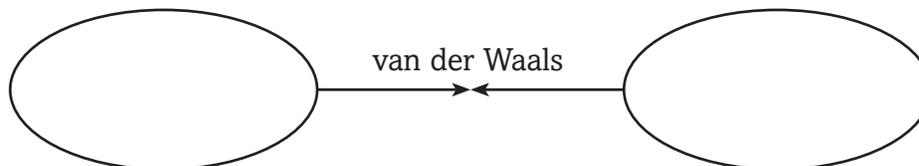
Compare positively and negatively charged ions.



**van der Waals Forces**

I found this information on page \_\_\_\_\_.

Identify the type of substances held together by van der Waals forces. Include indicators of electric charges.



**CONNECT**

A chemical compound in your toothpaste helps protect your teeth from decay. The formula for this compound is  $\text{Na}_2\text{PO}_3\text{F}$ . Use the periodic table in your book to identify each element in this compound.

# Chemistry in Biology

## Section 6.2 Chemical Reactions

### Main Idea

### Details

**Skim** Section 2 of the chapter. Write two facts that you discovered as you read the headings and illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define process.

*process*

### New Vocabulary

Use your book or dictionary to define each term.

*activation energy*

*active site*

*catalyst*

*chemical reaction*

*enzyme*

*product*

*reactant*

*substrate*

### Academic Vocabulary

Define coefficient to show its scientific meaning.

*coefficient*

## Section 6.2 Chemical Reactions (continued)

### Main Idea

#### Reactants and Products

I found this information on page \_\_\_\_\_.

### Details

Label the sides of the following equation as either products or reactants.



Calculate the number of atoms of each element in the chemical equation above. Record the information in the table below.

Element Symbol	Element Name	Number of Atoms (reactant side)	Number of Atoms (product side)

Analyze the formula to check to see if it is balanced. Support your reasons.

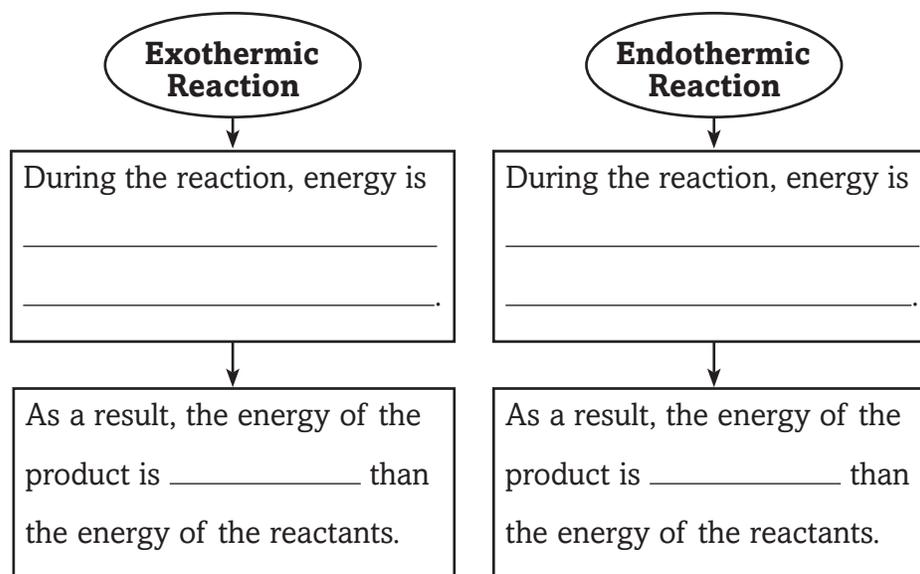
\_\_\_\_\_

\_\_\_\_\_

#### Energy of Reactions

I found this information on page \_\_\_\_\_.

Compare what happens to energy in exothermic and endothermic reactions by completing the diagram below.



**Section 6.2 Chemical Reactions** (continued)

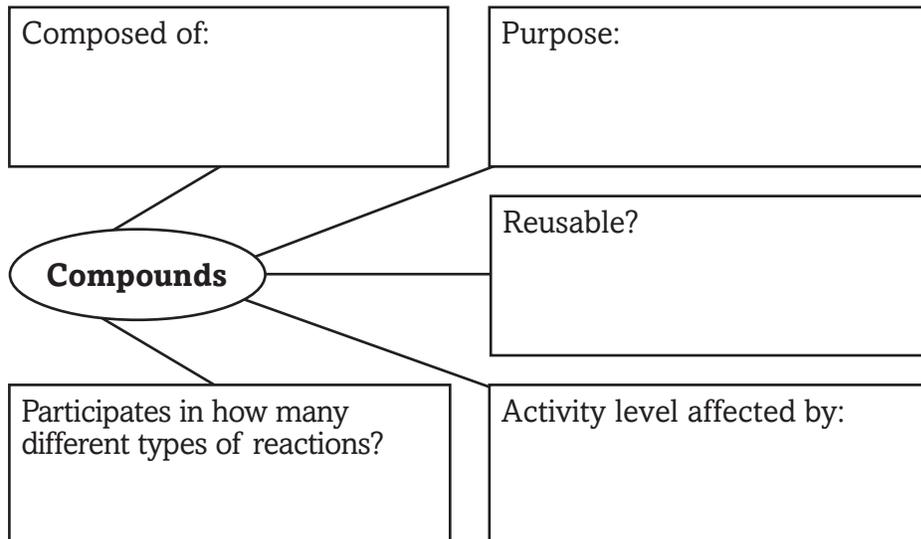
**Main Idea**

**Details**

**Enzymes**

I found this information on page \_\_\_\_\_.

**Summarize** key characteristics of an enzyme by completing the organizer below.



**Analyze** how an enzyme works by completing the following paragraph.

For a substrate to bind with a particular enzyme, the \_\_\_\_\_ and \_\_\_\_\_ of the substrate must match that of the enzyme's \_\_\_\_\_. In the enzyme-substrate complex, chemical bonds in the \_\_\_\_\_ are broken and \_\_\_\_\_ form. The results of the interaction between an enzyme and its \_\_\_\_\_ are products, which are released by the \_\_\_\_\_.

**SUMMARIZE**

Analyze the role of catalysts in chemical reactions.

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# Chemistry in Biology

## Section 6.3 Water and Solutions

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Scan** Section 3 of the chapter. Identify two facts you discovered about water.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

*physical property*

Use your book or dictionary to define physical property.

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Write the correct vocabulary term in the left column for each definition below.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

substance that releases hydroxide ions when dissolved in water

substance that releases hydrogen ions when dissolved in water

substance in which another substance is dissolved

mixture that can react with an acid or a base to keep the pH within a particular range

measure of concentration of hydrogen ions in a solution

substance that is dissolved in a solvent

weak interaction involving a hydrogen atom and a fluorine, oxygen, or nitrogen atom

molecule that has oppositely charged regions

mixture that has a uniform composition throughout

combination of two or more substances in which each substance retains its individual characteristics and properties

**Academic Vocabulary**

*suspend*

Define suspend to show its scientific meaning.

\_\_\_\_\_

**Section 6.3 Water and Solutions (continued)**

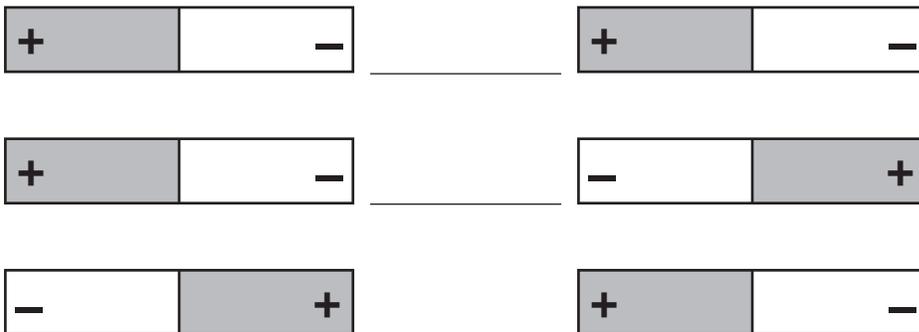
**Main Idea**

**Water's Polarity**

I found this information on page \_\_\_\_\_.

**Details**

**Analyze** polarity by writing attract or repel to complete the diagram.



**Analyze** reasons for water's polarity and the effect of polarity.

Polarity of Water	
Reasons for polarity:	Effects of polarity:

**Identify** the properties of water that allow it to help an organism maintain homeostasis.

Property	Description
	Water can separate the ions in many compounds.
	Water will form hydrogen bonds with other surfaces. Capillary action is one result.
	Water has a slight positive charge on one side of the molecule and a slight negative charge on the other side.
	Water molecules are attracted to each other.

**Section 6.3 Water and Solutions (continued)**

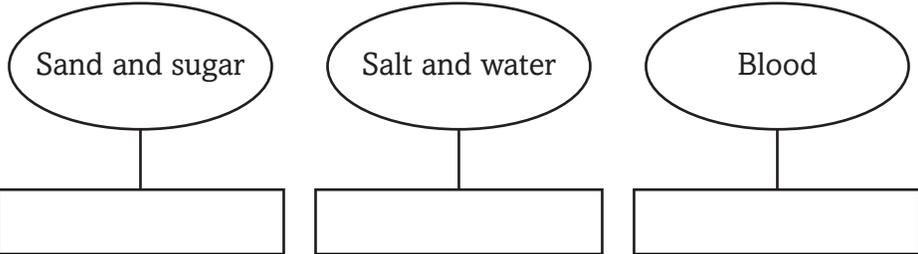
**Main Idea**

**Details**

**Mixtures with Water**

*I found this information on page \_\_\_\_\_.*

**Identify each of the following mixtures as either homogeneous or heterogeneous.**

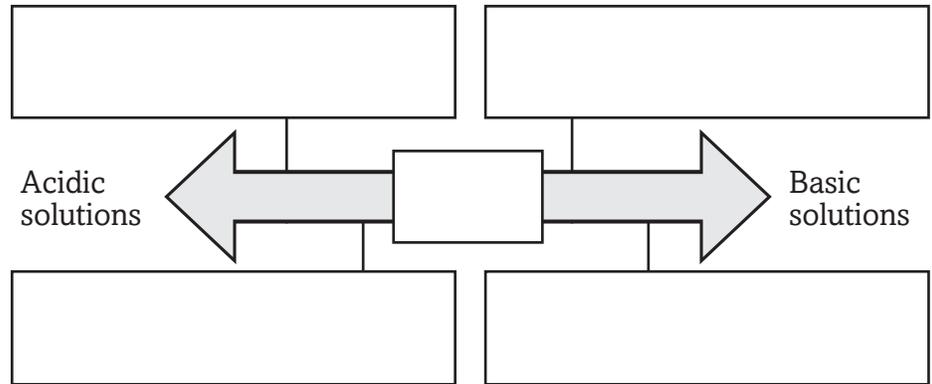


**For any homogeneous mixture above, identify the solvent and the solute.**

Solvent: \_\_\_\_\_ Solute: \_\_\_\_\_

**Construct a model of acidic solutions and basic solutions by placing each of the items below in the correct sequence on the scale.**

- releases some hydrogen ions
- releases many hydrogen ions
- water
- releases some hydroxide ions
- releases many hydroxide ions



**SUMMARIZE**

Analyze how water is important to life.

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# Chemistry in Biology

## Section 6.4 The Building Blocks of Life

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Skim** Section 4 of the chapter. Write two facts that you learned from reading the headings and illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define organic compound.

*organic compound*

\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each term.

*amino acid*

\_\_\_\_\_  
\_\_\_\_\_

*carbohydrate*

\_\_\_\_\_  
\_\_\_\_\_

*lipid*

\_\_\_\_\_  
\_\_\_\_\_

*macromolecule*

\_\_\_\_\_

*nucleic acid*

\_\_\_\_\_

*nucleotide*

\_\_\_\_\_

*polymer*

\_\_\_\_\_  
\_\_\_\_\_

*protein*

\_\_\_\_\_

**Section 6.4 The Building Blocks of Life** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Organic Chemistry**

*I found this information on page \_\_\_\_\_.*

**Contrast** *an organic compound to an inorganic compound.*

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**Model** *a carbon atom, and label its parts. Then use a label to point out and briefly explain why carbon can form a variety of organic compounds.*

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**Macromolecules**

*I found this information on page \_\_\_\_\_.*

**Compare** *the composition and functions of the four major groups of biological macromolecules by completing the table below.*

Group	Composition	Functions
	amino acids made of carbon, nitrogen, oxygen, hydrogen, and sometimes sulfur	
Nucleic acids		
		store energy; provide structural support
		store energy; provide steroids; waterproof coatings

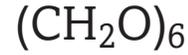
**Section 6.4 The Building Blocks of Life** (continued)

**Main Idea**

*I found this information on page \_\_\_\_\_.*

**Details**

**Evaluate** the number of molecules of each element in the carbohydrate described by the formula below.



Carbon: \_\_\_\_\_ Hydrogen: \_\_\_\_\_ Oxygen: \_\_\_\_\_

Ratio of carbon, hydrogen, and oxygen: \_\_\_\_\_

Type of carbohydrate: \_\_\_\_\_

**Model** the two general shapes of proteins named below.

<p><b>Pleat</b></p>
---------------------

<p><b>Helix</b></p>
---------------------

**Describe** nucleic acids by filling in the following chart.

Units that Make Up Nucleotides		

Function of DNA:	Function of RNA:
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**CONNECT**

Identify two examples of foods that contain high amounts of each of the following macromolecules: carbohydrates, lipids, and proteins. If you need help, read food labels.

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# Tie It Together

## FURTHER INQUIRY

*You have read about chemical reactions. Now create a simple science review manual explaining how chemical reactions allow living things to grow and develop. Your review manual should be easy to read and contain basic information and specific examples. Include diagrams to illustrate the ideas. Use the space below to create an outline for your review manual.*

# Cellular Structure and Function

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

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

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# Cellular Structure and Function

## Section 7.1 Cell Discovery and Theory

**Main Idea**

**Details**

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

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define organization.

*organization*

\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each term.

*cell*

\_\_\_\_\_

*cell theory*

\_\_\_\_\_

\_\_\_\_\_

*eukaryotic cell*

\_\_\_\_\_

\_\_\_\_\_

*nucleus*

\_\_\_\_\_

\_\_\_\_\_

*organelle*

\_\_\_\_\_

\_\_\_\_\_

*plasma membrane*

\_\_\_\_\_

\_\_\_\_\_

*prokaryotic cell*

\_\_\_\_\_

\_\_\_\_\_

**Section 7.1 Cell Discovery and Theory** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**History of the Cell Theory**

*I found this information on page \_\_\_\_\_.*

**Identify** *the three main ideas of the cell theory. Then write a short sentence for each one describing each idea.*

**Microscope Technology**

*I found this information on page \_\_\_\_\_.*

**Summarize** *information about electron microscopes using five or six bullet points.*

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Section 7.1 Cell Discovery and Theory (continued)

**Main Idea**

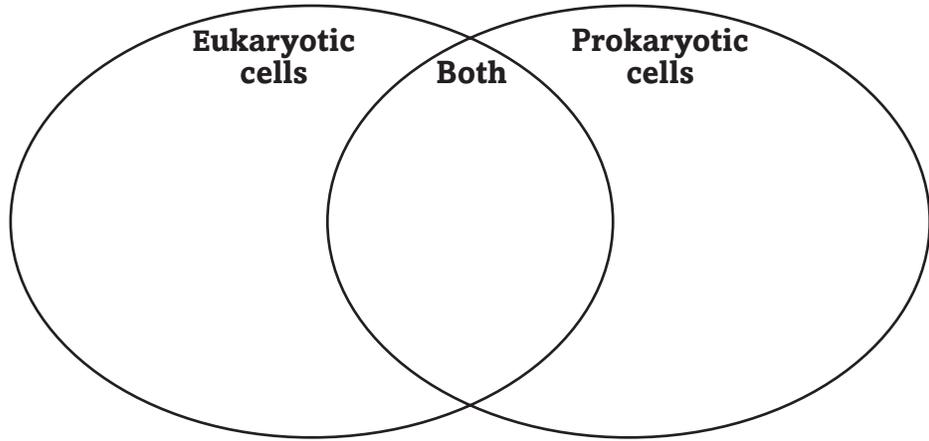
**Details**

**Basic Cell Types**

I found this information on page \_\_\_\_\_.

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

- bacteria
- contain organelles
- have loose strands of DNA
- have a nucleus
- have membrane-bound organelles
- multicellular organisms
- unicellular organisms
- do not have membrane-bound organelles



**Model** *a eukaryotic cell. Label the parts of the cell.*



**SUMMARIZE**

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Cellular Structure and Function

## Section 7.2 The Plasma Membrane

**Main Idea**

**Details**

**Scan** the illustrations and captions in Section 2 of the chapter. List two facts you discovered about the plasma membrane.

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define ion.

*ion*

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each term.

*fluid mosaic model*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*phospholipid bilayer*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*selective permeability*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*transport protein*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



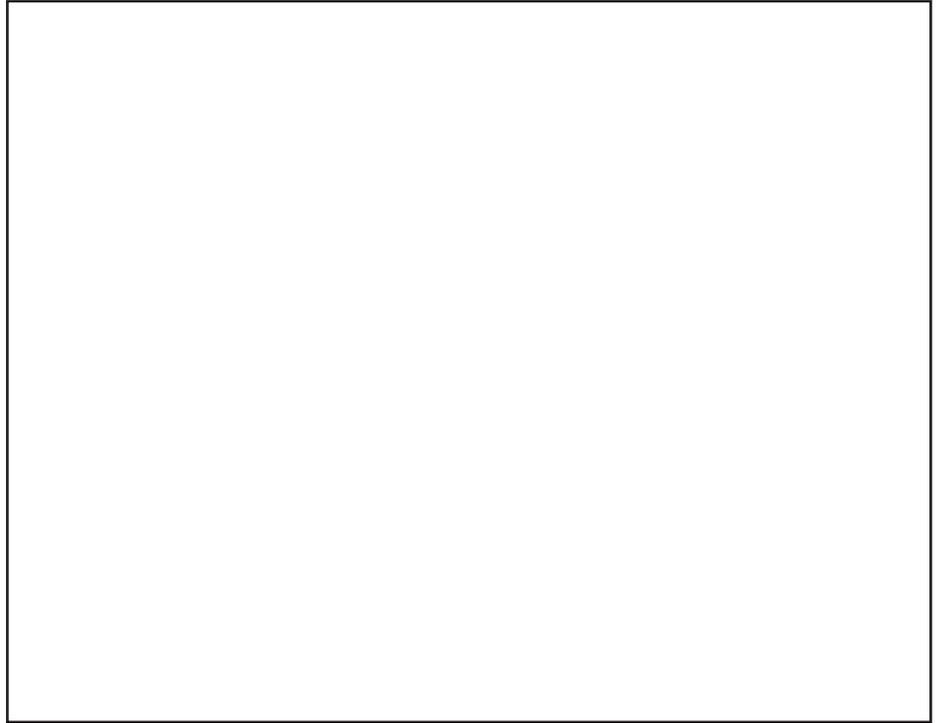
**Section 7.2 The Plasma Membrane** (continued)

**Main Idea** \_\_\_\_\_

*I found this information  
on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Model** the plasma membrane. Label each part, and describe the function of that part in detail.



**Discuss** how the terms fluid and mosaic describe the plasma membrane.

**Fluid:** \_\_\_\_\_  
\_\_\_\_\_

**Mosaic:** \_\_\_\_\_  
\_\_\_\_\_

**SUMMARIZE**

Analyze the role of the plasma membrane in maintaining homeostasis in the cell.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Cellular Structure and Function

## Section 7.3 Structures and Organelles

**Main Idea**

**Details**

**Skim** Section 3 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define enzyme.

enzyme

**New Vocabulary**

Write each term in the table under the heading that best describes it.

cell wall

centriole

chloroplast

cilium

cytoplasm

cytoskeleton

endoplasmic reticulum

flagellum

Golgi apparatus

lysosome

mitochondrion

nucleolus

ribosome

vacuole

Cell Structure (5)	Related to Genetic Material (2)	Food, Storage, and Waste (5)	Energy (2)

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

<b>Chloroplast</b>	<b>Mitochondrion</b>
<b>Vacuole</b>	<b>Centriole</b>
<b>Cilium</b>	<b>Flagellum</b>

**Section 7.3 Structures and Organelles (continued)**

**Main Idea** \_\_\_\_\_

**Cytoplasm and Cytoskeleton**

*I found this information on page \_\_\_\_\_.*

**Cell Structures**

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Compare** *the cytoplasm and cytoskeleton by defining each in the boxes.*

Cytoplasm	Cytoskeleton

**Identify** *the part of the cell that corresponds to each function described.*

	directs cell processes; contains the cell's DNA; stores information for cell growth, function, and reproduction
	double membrane that surrounds the nucleus
	helps manufacture proteins
	produces ribosomes inside the nucleus
	site of ribosome attachment; can be smooth or rough
	modifies, sorts, and packages proteins for transport outside the cell
	membrane-bound storage area within the cell
	vesicle that contains substances that digest excess or worn-out organelles
	structure near the nucleus that functions during cell division
	converts fuel particles (sugars) into useable energy
	captures light energy and converts it to chemical energy through photosynthesis
	gives support to plant cells
	projections that allow the cell to move or to move substances along the surface of the cell

Section 7.3 Structures and Organelles (continued)

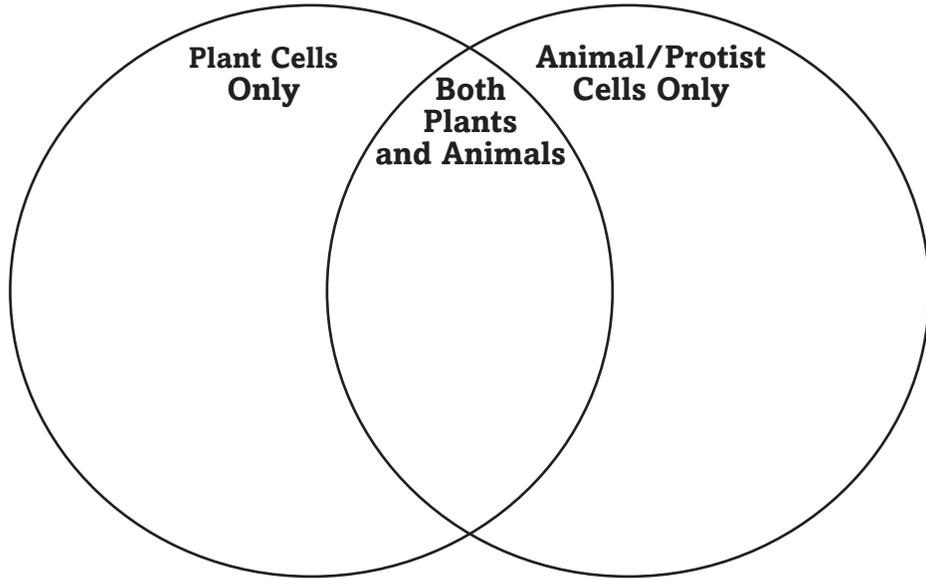
**Main Idea**

**Details**

**Comparing Cells**

I found this information on page \_\_\_\_\_.

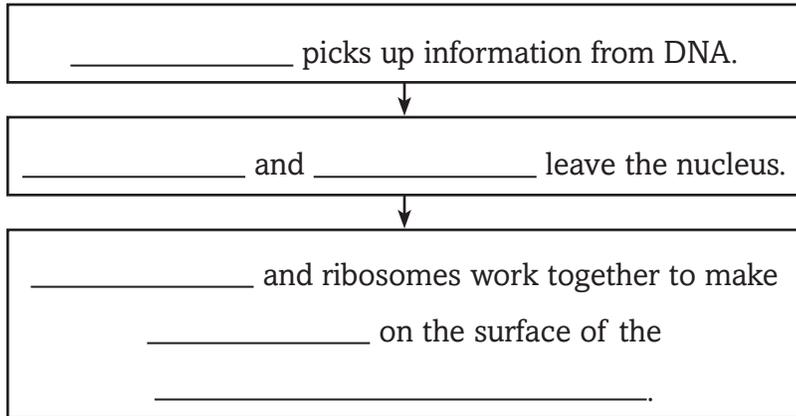
**Compare and contrast** the cell parts found in the following categories.



**Organelles at Work**

I found this information on page \_\_\_\_\_.

**Sequence** the steps that describe how proteins are made by completing the flowchart.



**CONNECT**

Create and describe a unique model for the structure and function of the cell.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Cellular Structure and Function

## Section 7.4 Cellular Transport

### Main Idea

### Details

**Skim** Section 4 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define homeostasis.

*homeostasis*

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Write the correct vocabulary term in the left column for each definition below.

- |       |   |
|-------|---|
| _____ | process by which the plasma membrane surrounds a substance outside the cell and moves it inside the cell                |
| _____ | movement of substances from a region of lower concentration to a region of higher concentration                         |
| _____ | net movement of particles from an area where there are many particles of the substance to an area where there are fewer |
| _____ | solution that has a higher concentration of solutes in the cell   |
| _____ | solution in which the inside of the cell and the solution it is in have the same concentration of water and solutes     |
| _____ | process by which the plasma membrane surrounds a substance inside the cell and moves it outside the cell                |
| _____ | diffusion of water across a selectively permeable membrane  |
| _____ | form of transport that uses transport proteins to move other ions and small molecules across the plasma membrane        |
| _____ | condition in which there is continuous movement but no overall change in concentration                                  |
| _____ | solution that has a lower concentration of solutes in the cell  |

**Section 7.4 Cellular Transport** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Diffusion**

I found this information on page \_\_\_\_\_.

**Rephrase** *the process of diffusion in your own words, and give an example.*

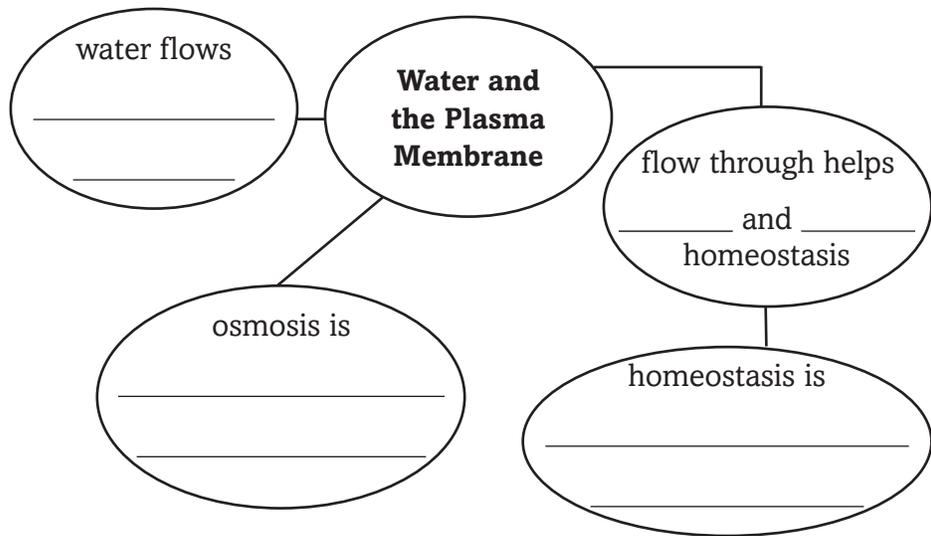
\_\_\_\_\_

\_\_\_\_\_

**Osmosis:  
Diffusion of  
Water**

I found this information on page \_\_\_\_\_.

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



**Model** *a cell in a hypertonic, hypotonic, and isotonic solution. Underneath each model, summarize the effect of each solution on the cell.*

Solutions		
Hypertonic	Hypotonic	Isotonic

**Section 7.4 Cellular Transport** (continued)

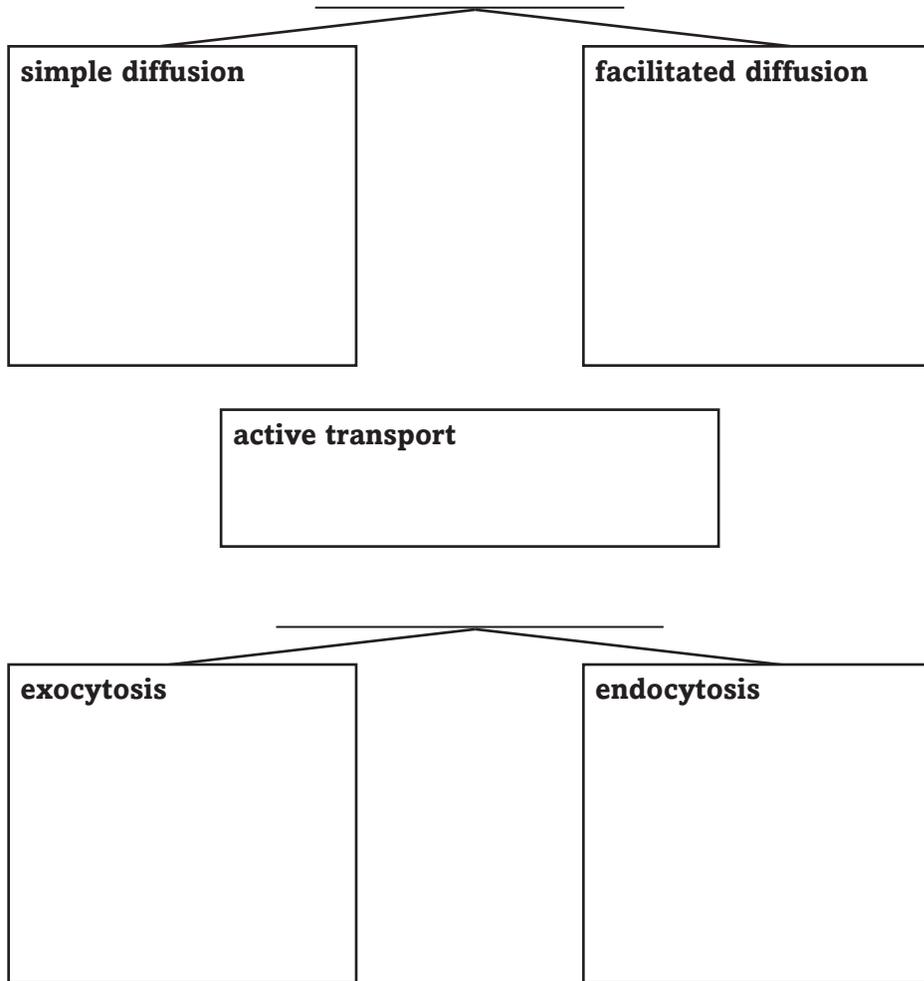
**Main Idea**

**Active Transport and Transport of Large Particles**

I found this information on page \_\_\_\_\_.

**Details**

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



**CONNECT**

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.

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# Tie It Together

## SUMMARIZE

*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 might find it easier to list the facts or topics you want to include first, then decide how to connect them in the web.*



# Cellular Energy

## Section 8.1 How Organisms Obtain Energy

### Main Idea

### Details

**Scan** Section 1 of the chapter and make a list of three general ways in which cells use energy.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define metabolism.

*metabolism*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each vocabulary term.

*adenosine triphosphate*

\_\_\_\_\_  
\_\_\_\_\_

*cellular respiration*

\_\_\_\_\_  
\_\_\_\_\_

*energy*

\_\_\_\_\_

*metabolism*

\_\_\_\_\_

*photosynthesis*

\_\_\_\_\_  
\_\_\_\_\_

*thermodynamics*

\_\_\_\_\_  
\_\_\_\_\_

**Section 8.1 How Organisms Obtain Energy** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Transformation of Energy**

*I found this information on page \_\_\_\_\_.*

**Organize** *at least seven of your body's cell processes that require energy.*

**Energy in Cell Processes**

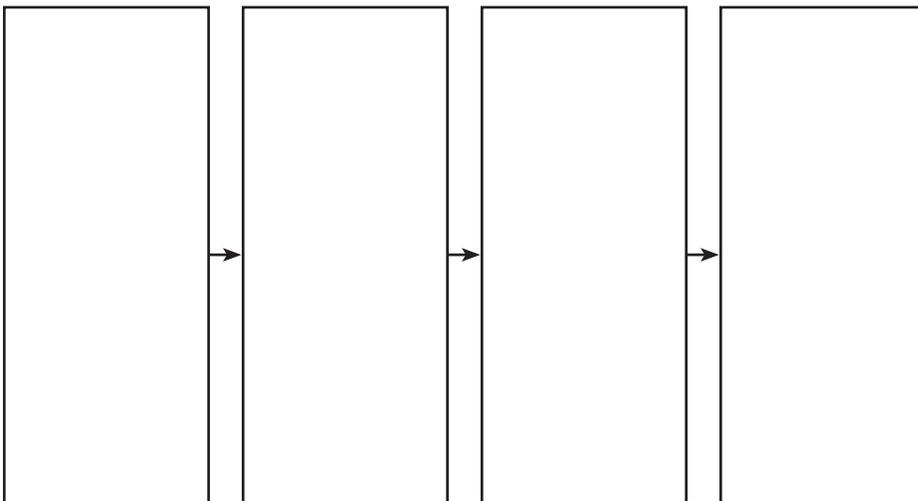

**Metabolism**

*I found this information on page \_\_\_\_\_.*

**Compare** *the laws about how energy flows. Give an example of each.*

	<b>First Law of Thermodynamics</b>	<b>Second Law of Thermodynamics</b>
<b>Defined</b>		
<b>Example</b>		

**Sequence** *the flow of energy from the Sun to heterotrophs.*

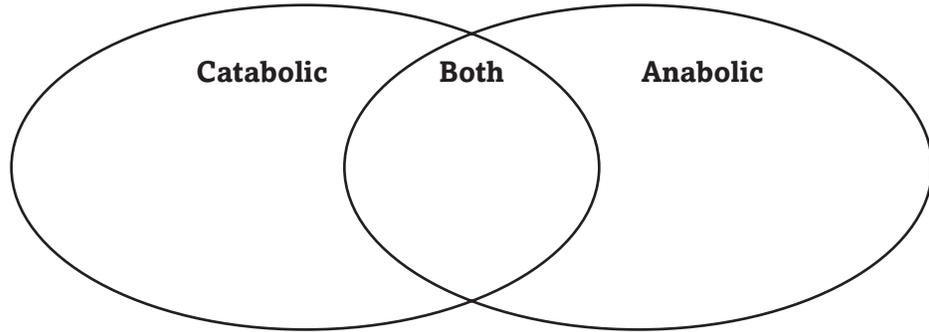


**Section 8.1 How Organisms Obtain Energy** (continued)

**Main Idea**

**Details**

**Compare and contrast** *catabolic and anabolic pathways* by writing characteristics of each in the Venn diagram.



**ATP: The Unit of Cellular Energy**

I found this information on page \_\_\_\_\_.

**Summarize** *ATP and ADP*.

**ATP**  
Explain how your body uses ATP, and list the three parts of the molecule.

**ADP**  
Explain how ADP is made from ATP.

**SUMMARIZE**

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

# Cellular Energy

## Section 8.2 Photosynthesis

**Main Idea**

**Details**

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

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define carbohydrate.

*carbohydrate*

**New Vocabulary**

Use your book or dictionary to define each vocabulary term.

*Calvin cycle*

*granum*

*NADP+*

*pigments*

*rubisco*

*stroma*

*thylakoid*

**Academic Vocabulary**

Define transport to show its scientific meaning.

*transport*

**Section 8.2 Photosynthesis** (continued)

**Main Idea**

**Overview of Photosynthesis**

*I found this information on page \_\_\_\_\_.*

**Phase One: Light Reactions**

*I found this information on page \_\_\_\_\_.*

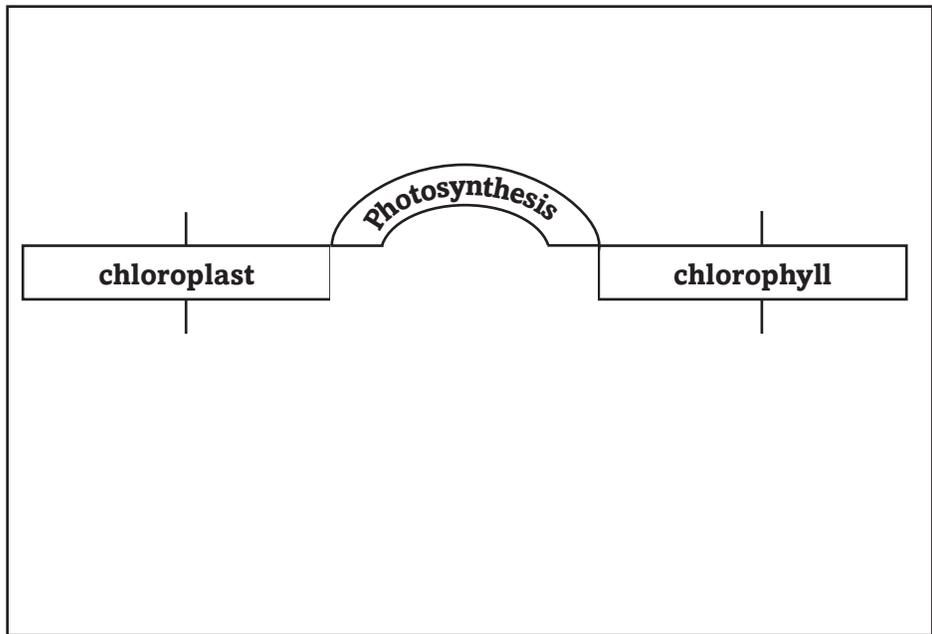
**Details**

**Summarize** the functions of the light-dependent and light-independent reactions by completing the sentences.

Plants and other green organisms \_\_\_\_\_ from \_\_\_\_\_ . The light-dependent reactions change \_\_\_\_\_ into the molecules \_\_\_\_\_. The light-dependent reactions use \_\_\_\_\_ to make \_\_\_\_\_.

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.



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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 8.2 Photosynthesis (continued)**

**Main Idea**

**Phase Two:  
The Calvin Cycle**

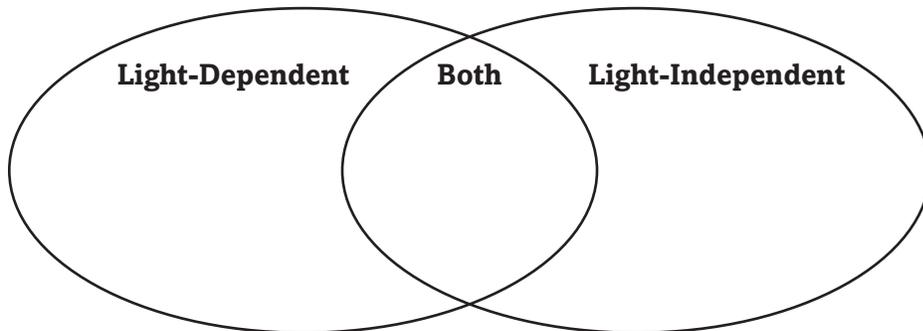
*I found this information  
on page \_\_\_\_\_.*

**Details**

**Model** *light-dependent reactions in a flow chart.*

**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



**Alternative Pathways**

*I found this information  
on page \_\_\_\_\_.*

**Compare** *two alternative photosynthesis pathways. Identify plants that use each pathway.*

Pathway:	Pathway:
Description:	Description:
Plants that use this pathway:	Plants that use this pathway:

**SUMMARIZE**

**Explain the results of light-dependent and light-independent reactions.**

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# Cellular Energy

## Section 8.3 Cellular Respiration

### Main Idea

### Details

**Scan** the headings, illustrations, and captions in Section 3 of the chapter. Write three facts that you discover about cellular respiration.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

*cyanobacterium*

Use your book or dictionary to define cyanobacterium.

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

metabolic process that does not require oxygen

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

metabolic processes that require oxygen

in cellular respiration, a cycle 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 reactions in the cytoplasm that regenerate  $\text{NAD}^+$  for glycolysis and produce ATP; supplies energy for aerobic organisms when oxygen is low

in cellular respiration, the processes that take place in the mitochondrion and require oxygen; includes the Krebs cycle and electron transport

**Section 8.3 Cellular Respiration (continued)**

**Main Idea**

**Details**

**Overview of Cellular Respiration**

*I found this information on page \_\_\_\_\_.*

**Glycolysis, Krebs Cycle, and Electron Transport**

*I found this information on page \_\_\_\_\_.*

**Anaerobic Respiration**

*I found this information on page \_\_\_\_\_.*

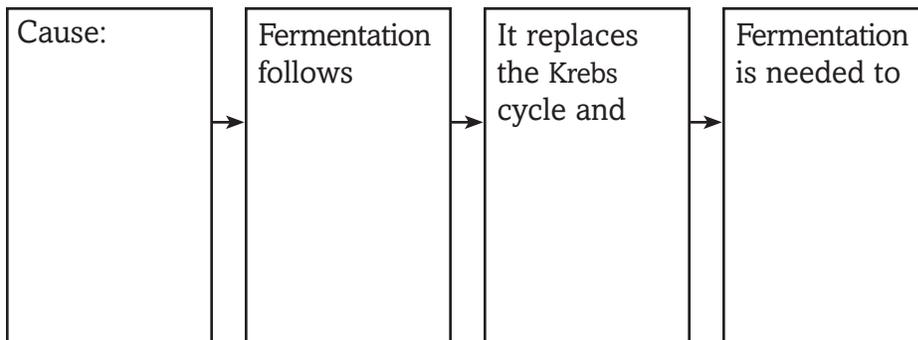
**Rephrase** *the function of cellular respiration in your own words. Write the equation that describes it.*

<b>Function:</b>	<b>Equation:</b>

**Compare and summarize** *the three stages of cellular respiration.*

Glycolysis	Krebs Cycle	Electron Transport
	a series of chemical reactions that break down pyruvate from glycolysis	
takes place in	takes place in	takes place in
produces two ATP molecules for every glucose molecule that is broken down	produces	provides energy for ATP production final electron acceptor is

**Sequence** *events that lead to fermentation in aerobic organisms.*



**Section 8.3 Cellular Respiration** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Summarize** *a process of fermentation that is useful to humans.*

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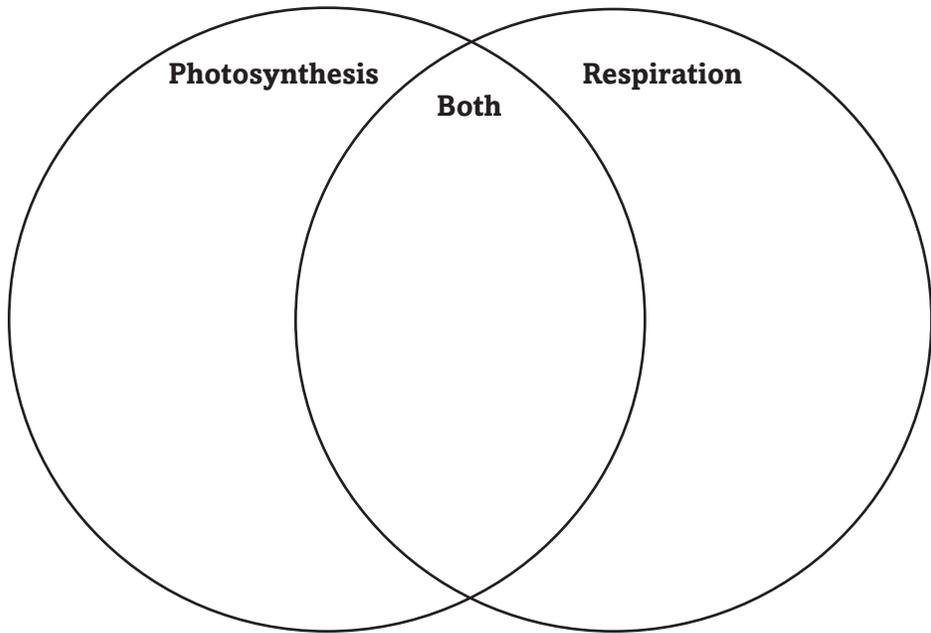
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**Photosynthesis  
and Cellular  
Respiration**

*I found this information  
on page \_\_\_\_\_.*

**Compare** *photosynthesis and respiration in a Venn diagram.*



**SUMMARIZE**

Create a graphic organizer to compare aerobic and anaerobic processes.

# Cellular Reproduction

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*New cells are created in your body every day. Write about the reasons your body might need new cells.*

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# Cellular Reproduction

## Section 9.1 Cellular Growth

### Main Idea

### Details

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

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

### Review Vocabulary

*carbohydrate*

Use your book or dictionary to define carbohydrate.

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

*cell cycle*

*chromatin*

*chromosome*

*cytokinesis*

*interphase*

*mitosis*

Use your book or dictionary to define each term.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 9.1 Cellular Growth** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Cell Size Limitations**

*I found this information on page \_\_\_\_\_.*

**The Cell Cycle**

*I found this information on page \_\_\_\_\_.*

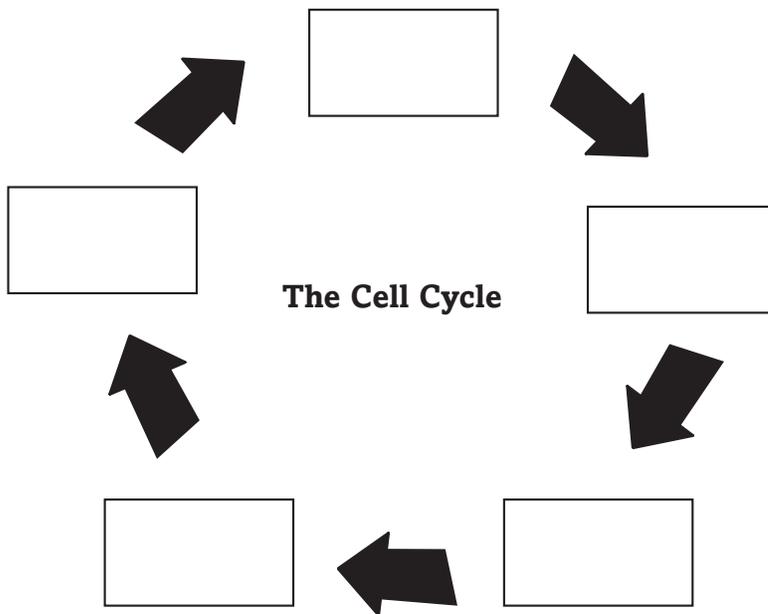
**Analyze** *movement of nutrients and wastes as cell size increases.*

If a _____ _____ _____,	transport of _____ _____ by _____ slows down.	Therefore, cells _____ before _____ _____.
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**Describe** *how surface area-to-volume ratio relates to cell size by completing the sentence.*

As a cell grows larger, its \_\_\_\_\_ increases more rapidly than its \_\_\_\_\_, thus surface area-to-volume ratio \_\_\_\_\_.

**Complete** *the diagram of the cell cycle. Describe the main events in each stage.*



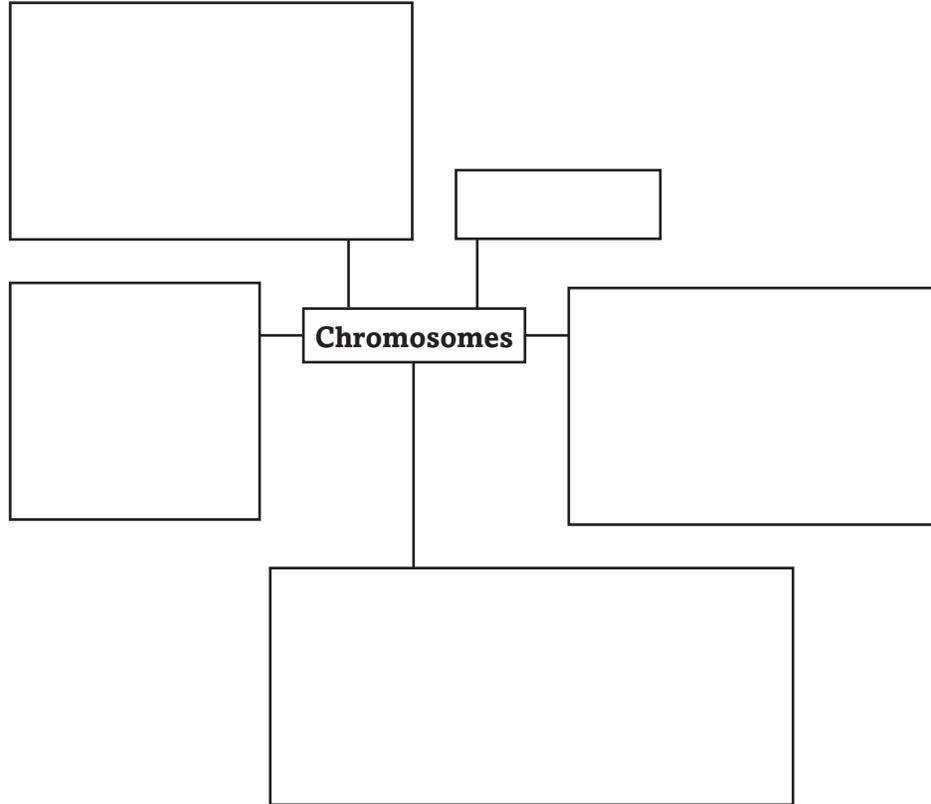
**Section 9.1 Cellular Growth** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Organize** information about chromosomes in the concept web.



**Identify** four events that occur in a cell during interphase.

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_
- 3. \_\_\_\_\_
- 4. \_\_\_\_\_

**SUMMARIZE**

Analyze the relationship between cell size and the stages of the cell cycle.

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# Cellular Reproduction

## Section 9.2 Mitosis and Cytokinesis

### Main Idea

### Details

**Scan** Section 2 of the chapter. From the headings and illustrations list the four stages of mitosis.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define life cycle.

*life cycle*

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### New Vocabulary

Use your book or dictionary to define the following terms.

*anaphase*

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*centromere*

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*metaphase*

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*prophase*

---

---

*sister chromatid*

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*spindle apparatus*

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*telophase*

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**Section 9.2 Mitosis and Cytokinesis** (continued)

**Main Idea**

**Details**

**Mitosis**

*I found this information on page \_\_\_\_\_.*

**Identify** *two functions of mitosis in animals.*

Function of mitosis in animals



**The Stages of Mitosis**

*I found this information on page \_\_\_\_\_.*

**Model** *the stages of mitosis and the process of cytokinesis. Draw and label a cell in each stage, name each stage, and describe what is happening.*

Name of Phase	Sketch of Cell	Description
cytokinesis		

**Summarize** *the similarities and differences of any two phases of mitosis.*

---



---



---

**Section 9.2 Mitosis and Cytokinesis** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Summarize the function of each structure in mitosis.**

centromeres: \_\_\_\_\_

microtubules: \_\_\_\_\_

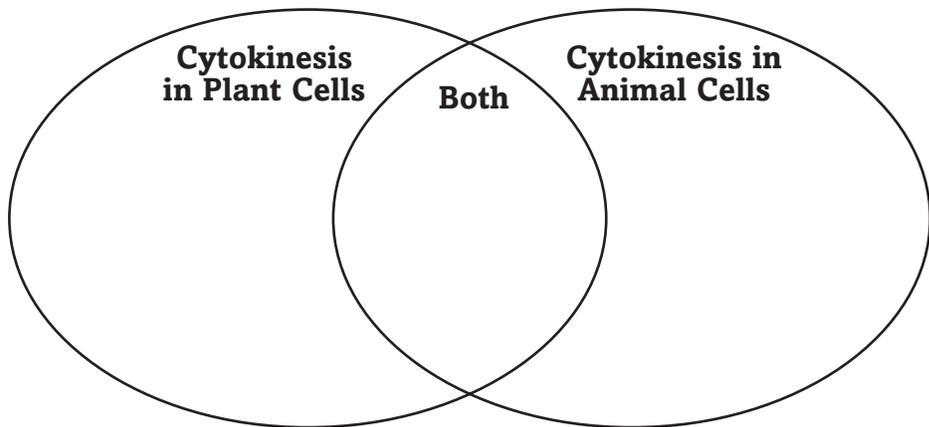
motor proteins: \_\_\_\_\_

spindle apparatus: \_\_\_\_\_

**Cytokinesis**

*I found this information on page \_\_\_\_\_.*

**Compare and contrast cytokinesis in plant and animal cells.**



**SUMMARIZE**

Create a concept map describing the stages of the cell cycle.

# Cellular Reproduction

## Section 9.3 Cell Cycle Regulation

**Main Idea**

**Details**

**Scan** the illustrations and read the captions in Section 3 of the chapter. Write three facts you discovered about stem cells.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define nucleotide.

*nucleotide*

\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define the following term.

*apoptosis*

\_\_\_\_\_

*cancer*

\_\_\_\_\_

\_\_\_\_\_

*carcinogen*

\_\_\_\_\_

*cyclin*

\_\_\_\_\_

\_\_\_\_\_

*cyclin-dependent kinase*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*stem cell*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 9.3 Cell Cycle Regulation** (continued)

**Main Idea**

**Normal Cell Cycle**

I found this information on page \_\_\_\_\_.

**Abnormal Cell Cycle**

I found this information on page \_\_\_\_\_.

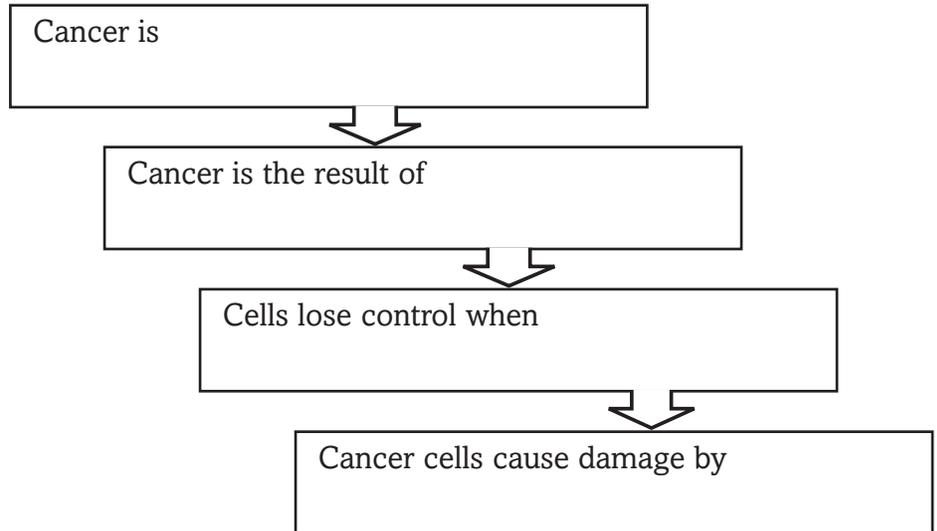
**Details**

**Summarize** how cells regulate the cell cycle. Choose from the list of words to complete the paragraph.

- checkpoints
- cyclin/CDK
- cyclins
- cyclin-dependent kinases
- cytokinesis
- G<sub>1</sub> stage
- G<sub>2</sub> stage
- mitosis
- S stage

Cells use \_\_\_\_\_ and \_\_\_\_\_ to control the cell cycle. Different combinations of \_\_\_\_\_ start the cell cycle at different \_\_\_\_\_. The cell also uses \_\_\_\_\_ to monitor the cycle for quality control. In \_\_\_\_\_, the cell checks the DNA for damage. If there is any damage, the cycle won't proceed to \_\_\_\_\_. In \_\_\_\_\_, if the spindle apparatus is malfunctioning, the cycle won't proceed to \_\_\_\_\_.

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



**Identify four environmental factors that cause cancer.**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**Section 9.3 Cell Cycle Regulation** (continued)

**Main Idea**

**Details**

**Apoptosis**

I found this information on page \_\_\_\_\_.

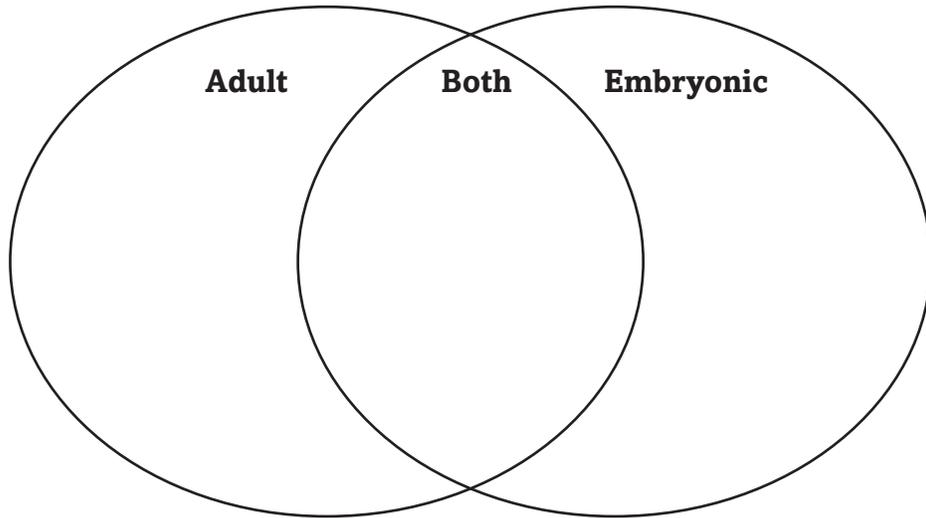
**Summarize** *information about apoptosis.*

Apoptosis is	Organisms use apoptosis to	Two processes that use apoptosis:  1.  2.
--------------	----------------------------	---

**Stem Cells**

I found this information on page \_\_\_\_\_.

**Compare and contrast** *adult and embryonic stem cells by writing characteristics in the Venn diagram.*



**CONNECT**

A classmate thinks that cancer and apoptosis are both harmful to organisms. Do you agree or disagree? Explain your reasoning.

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# Sexual Reproduction and Genetics

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*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 in other families, animals, or plants that you think might have been inherited.*

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# Sexual Reproduction and Genetics

## Section 10.1 Meiosis

**Main Idea**

**Details**

**Skim** the headings and illustration captions in Section 1 of the chapter. Write three facts you discovered about meiosis as you scanned the section.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define chromosome.

*chromosome*

**New Vocabulary**

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

*diploid*  
*gamete*  
*gene*  
*haploid*  
*homologous chromosomes*  
*meiosis*  
*fertilization*  
*crossing over*

A segment of DNA on a chromosome that controls the production of a protein is called a \_\_\_\_\_. A \_\_\_\_\_ cell contains two copies of each chromosome. A sex cell, or \_\_\_\_\_, is \_\_\_\_\_, meaning it contains one copy of each chromosome. \_\_\_\_\_ are pairs of chromosomes, one from each parent.

Describe three processes that occur during sexual reproduction.

	Meiosis	Fertilization	Crossing Over
What happens?			
What is the product?			

**Section 10.1 Meiosis** (continued)

**Main Idea**

**Chromosomes and Chromosome Numbers**

*I found this information on page \_\_\_\_\_.*

**Meiosis I, Meiosis II, and The Importance of Meiosis**

*I found this information on page \_\_\_\_\_.*

**Details**

**Identify** *three characteristics that are the same in each member of a pair of homologous chromosomes. Name one thing that is different.*

Same	Different
1.	1.
2.	
3.	

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

Meiosis I	Prophase I	Metaphase I	Anaphase I	Telophase I
Description				
Sketch				
Meiosis II	Prophase II	Metaphase II	Anaphase II	Telophase II
Description				
Sketch				

**Analyze** *the chart above to determine the phase of meiosis when crossing over can occur. Mark a star on the correct phase.*

**Section 10.1 Meiosis** (continued)

**Main Idea**

**Sexual  
Reproduction  
v. Asexual  
Reproduction**

I found this information  
on page \_\_\_\_\_.

**Details**

**Compare** *meiosis and mitosis by filling in the chart below.*

	<b>Mitosis</b>	<b>Meiosis</b>
Number of DNA replications		
Number of cell divisions		
Number of daughter cells		
Chromosome number of daughter cells		

**Organize** *information on how meiosis produces genetic variation.*

Meiosis produces \_\_\_\_\_

**Compare** *sexual reproduction and asexual reproduction by completing the paragraph with the terms below.*

- sexual reproduction
- asexual reproduction
- protists
- mammals
- animals
- plants
- genes
- genetic diversity

In \_\_\_\_\_, an organism inherits its genetic material from a single parent. The new organism has the same \_\_\_\_\_ as its parent. In \_\_\_\_\_, an organism inherits genetic material from two different parents. Sexual reproduction increases \_\_\_\_\_, whereas asexual reproduction does not. \_\_\_\_\_, simple \_\_\_\_\_, and most \_\_\_\_\_ can reproduce sexually or asexually. \_\_\_\_\_ only reproduce sexually.

**SUMMARIZE**

Explain how meiosis and fertilization produce genetic variation during sexual reproduction.

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# Sexual Reproduction and Genetics

## Section 10.2 Mendelian Genetics

**Main Idea**

**Details**

**Skim** Section 1 of the chapter, and then write two questions that come to mind from reading the headings and illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define segregation.

*segregation*

**New Vocabulary**

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

*allele*  
*genetics*  
*hybrid*  
*law of independent assortment*  
*law of segregation*

\_\_\_\_\_ is the branch of biology that studies how traits are inherited. \_\_\_\_\_ 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.*

*dominant*  
*genotype*  
*heterozygous*  
*homozygous*  
*phenotype*  
*recessive*

<b>dominant trait</b>	<b>recessive trait</b>
<b>genotype</b>	<b>phenotype</b>
<b>homozygous</b>	<b>heterozygous</b>

**Section 10.2 Mendelian Genetics** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**How Genetics Began**

*I found this information on page \_\_\_\_\_.*

**Describe** *how a plant self-pollinates.*

---



---

**Infer** *why Mendel used cross-pollination to study inheritance.*

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**The Inheritance of Traits**

*I found this information on page \_\_\_\_\_.*

**Analyze** *Mendel's experiment with green-seed and yellow-seed pea plants by completing this summary paragraph.*

Mendel used only \_\_\_\_\_ lines, which consistently produced the same trait in the offspring. He controlled variables by \_\_\_\_\_. When he crossed a green-seed plant with a yellow-seed plant, the F<sub>1</sub> offspring were \_\_\_\_\_ percent yellow and \_\_\_\_\_ percent green. He allowed the F<sub>1</sub> plants to \_\_\_\_\_ to produce \_\_\_\_\_ plants. The F<sub>2</sub> plants were \_\_\_\_\_ percent yellow and \_\_\_\_\_ percent green. Mendel concluded that each trait has two forms, called \_\_\_\_\_. Mendel called yellow seed color the \_\_\_\_\_ form and green seed color the \_\_\_\_\_ form of the trait.

**Compare** *genotypes and phenotypes for pea plants.*

Genotype	Homozygous or Heterozygous	Phenotype
	homozygous	
	heterozygous	
yy		

**Section 10.2 Mendelian Genetics** (continued)

**Main Idea**

I found this information on page \_\_\_\_\_.

**Punnett Squares and Probability**

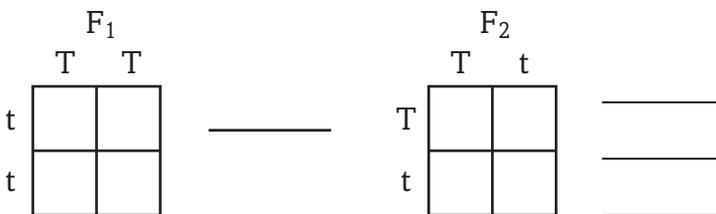
I found this information on page \_\_\_\_\_.

**Details**

**Demonstrate** the law of independent assortment by listing the 4 alleles that are produced when a pea plant with the genotype  $RrYy$  produces gametes.

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

**Complete** the Punnett squares for height in the  $F_1$  and  $F_2$  generations. Tall plants ( $T$ ) are dominant over short plants ( $t$ ). Write the expected genotypes and the probability for each.



**Identify** the genotypes within the Punnett square showing the dihybrid cross of seed color and seed texture. The first row has been done for you. Write the expected phenotypic ratio.

	$YR$	$yR$	$Yr$	$yr$
$YR$	YYRR	YyRR	YYRr	YyRr
$yR$				
$Yr$				
$yr$				

Phenotypic ratio: \_\_\_\_\_

**SUMMARIZE**

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

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# Sexual Reproduction and Genetics

## Section 10.3 Gene Linkage and Polyploidy

### Main Idea

### Details

**Scan** the headings, boldfaced words, pictures, figures, and captions in Section 3.

- Read all section titles.
- Read all boldfaced words.
- Look at all pictures and read the captions.
- Look at all figures.
- Read all captions.

*Predict three things that you think will be discussed.*

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

*Use your book or dictionary to define protein.*

*protein*

\_\_\_\_\_

### New Vocabulary

*Use your book or dictionary to define each term.*

*genetic recombination*

\_\_\_\_\_  
\_\_\_\_\_

*polyploidy*

\_\_\_\_\_  
\_\_\_\_\_

**Section 10.3 Gene Linkage and Polyploidy (continued)**

**Main Idea**

**Details**

**Genetic Recombination**

*I found this information on page \_\_\_\_\_.*

**Calculate** the number of chromosome combinations due to independent assortment by filling in the chart. Use the formula  $2^n$ . The first one has been done for you.

Species	Chromosome Number ( $n$ )	Possible Combinations
Pea	7	$2^7 = 128$
Housefly	6	
Cabbage	9	
Fruit fly	4	
Frog	13	

**Gene Linkage and Chromosome Maps**

*I found this information on page \_\_\_\_\_.*

**Summarize** at least five pieces of information about genetic recombination by creating a concept map below.

**Section 10.3 Gene Linkage and Polyploidy (continued)**

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Complete** the paragraph about gene linkage.

- chromosomes
- farther
- inherited
- sequence
- crossing over
- individual genes
- linked

Genes close together on the same chromosome are \_\_\_\_\_.

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.

**Analyze** whether the gene linkage is an exception to, or an example of, Mendel’s law of independent assortment. Use an example from your book.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Polyploidy**

*I found this information on page \_\_\_\_\_.*

**Identify** four species that show polyploidy.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**SUMMARIZE**

Compare and contrast gene linkage to polyploidy and how they do not follow all of Mendel’s laws of inheritance.

Gene Linkage	Polyploidy

# Complex Inheritance and Human Heredity

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

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

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# Complex Inheritance and Human Heredity

## Section 11.1 Basic Patterns of Human Inheritance

### Main Idea

### Details

**Skim and Scan** Section 1 of the chapter. 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

Use your book or dictionary to define genes.

*genes*

### New Vocabulary

Use your book or dictionary to define each vocabulary term.

*carrier*

*pedigree*

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

### Academic Vocabulary

Define decline to show its scientific meaning.

*decline*

**Section 11.1 Basic Patterns of Human Inheritance** (continued)

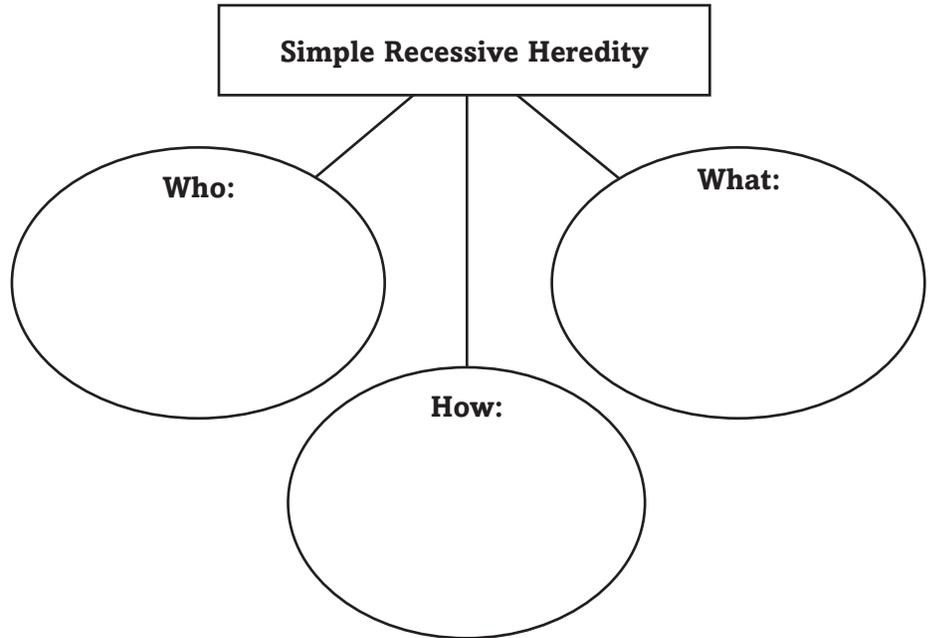
**Main Idea**

**Recessive Genetic Disorders**

I found this information on page \_\_\_\_\_.

**Details**

Write three facts about recessive heredity in the concept map.



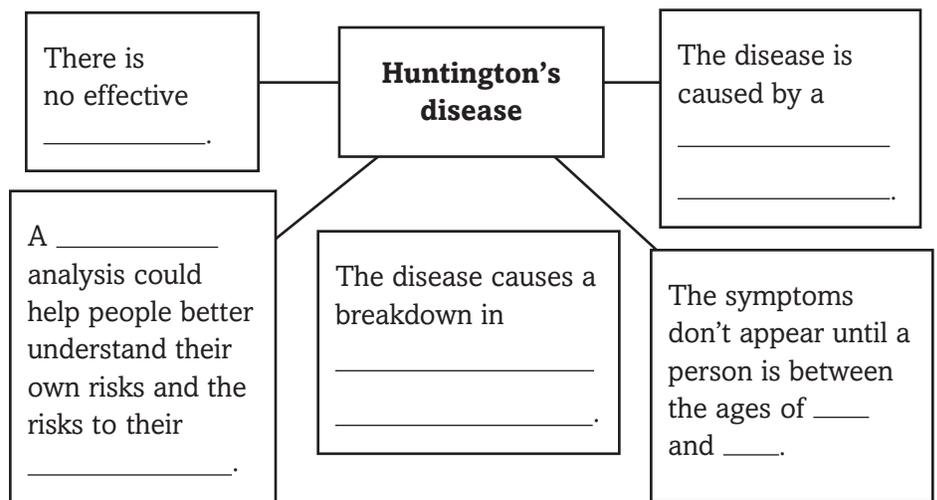
**Dominant Genetic Disorders**

I found this information on page \_\_\_\_\_.

Identify two examples of dominant genetic disorders in humans.

dominant genetic disorders  

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



**Section 11.1 Basic Patterns of Human Inheritance** (continued)

**Main Idea**

**Details**

**Pedigrees**

I found this information on page \_\_\_\_\_.

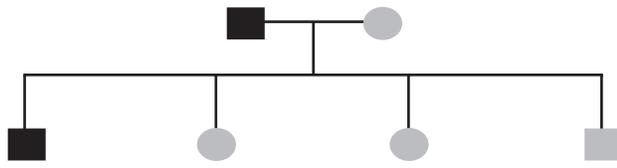
**Summarize** pedigree symbols by naming them and then drawing them in the right-hand column of the table. Sketches should resemble those in the book.

	Description of Symbol	Sketch of Symbol
male	square	

**Analyzing Pedigrees**

I found this information on page \_\_\_\_\_.

**Evaluate** the inheritance of achondroplasia shown in the pedigree.



Parent with achondroplasia: \_\_\_\_\_

Number of children with achondroplasia: \_\_\_\_\_

Genotype of the younger son: \_\_\_\_\_

**CONNECT**

Create a pedigree diagram for an imaginary 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.

# Complex Inheritance and Human Heredity

## Section 11.2 Complex Patterns of Inheritance

### Main Idea

### Details

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

1. \_\_\_\_\_

2. \_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define gamete.

*gamete*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*autosomes*

\_\_\_\_\_

*codominance*

\_\_\_\_\_

\_\_\_\_\_

*epistasis*

\_\_\_\_\_

*incomplete dominance*

\_\_\_\_\_

\_\_\_\_\_

*multiple alleles*

\_\_\_\_\_

*polygenic trait*

\_\_\_\_\_

\_\_\_\_\_

*sex chromosomes*

\_\_\_\_\_

\_\_\_\_\_

*sex-linked traits*

\_\_\_\_\_

**Section 11.2 Complex Patterns of Inheritance** (continued)

**Main Idea**

**Incomplete Dominance**

I found this information on page \_\_\_\_\_.

**Details**

**Analyze** the ratios of offspring of the following snapdragon pairs. *Hint: To write the genotypes, designate the dominant red allele as R and the recessive white allele as r.*

Parent Flowers	Genotypes of Parent Flowers	Punnett Square	Ratio of Offspring									
red and white	$RR \times rr$	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td></td> <td>R</td> <td>R</td> </tr> <tr> <td>r</td> <td>Rr</td> <td>Rr</td> </tr> <tr> <td>r</td> <td>Rr</td> <td>Rr</td> </tr> </table>		R	R	r	Rr	Rr	r	Rr	Rr	4 pink
	R	R										
r	Rr	Rr										
r	Rr	Rr										
pink and white	×	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>										
red and pink	×	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>										
pink and pink	×	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>										

**Codominance**

I found this information on page \_\_\_\_\_.

**Predict** the results if two people who are heterozygous for sickle-cell anemia but lead normal lives have a child.

\_\_\_\_\_

\_\_\_\_\_

**Multiple Alleles**

I found this information on page \_\_\_\_\_.

**Identify** the blood group that results from each combination of genotypes. The first one has been done for you.

Possible Genotype Combinations	Phenotypes
A and A	A
A and B	
A and O	
B and B	
B and O	
O and O	

**Section 11.2 Complex Patterns of Inheritance** (continued)

**Main Idea**

**Epistasis, Sex Determination, Dosage Compensation, Sex-Linked Traits, and Polygenic Traits**

*I found this information on page \_\_\_\_\_.*

**Environmental Influences**

*I found this information on page \_\_\_\_\_.*

**Twin Studies**

*I found this information on page \_\_\_\_\_.*

**Details**

**Analyze** the role of each item in inheritance. Give an example of a trait governed by each process.

	Role in Inheritance	Example
Epistasis		
Polygenic traits		
X-chromosome inactivation		
X-linked traits		

**Identify** environmental influences that can affect phenotype.

External factors	Behaviors
1.	1.
2.	2.

**Describe** the use of twin studies in the study of genetics by completing the paragraph.

Scientists use twin studies to distinguish between \_\_\_\_\_ and \_\_\_\_\_ influences on a trait. If a high percentage of \_\_\_\_\_ but not \_\_\_\_\_ express a trait, there is a strong chance that the trait is \_\_\_\_\_.

**CONNECT**

Think of some traits in people, plants, or animals. Describe one trait and tell whether you think the trait is a dominant/recessive, multiple allele, codominant, incompletely dominant, sex-linked, or polygenic trait. Explain your reasoning.

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# Complex Inheritance and Human Heredity

## Section 11.3 Chromosomes and Human Heredity

### Main Idea

### Details

**Organize Information** *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.*

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### Review Vocabulary

*Use your book or dictionary to define mitosis.*

*mitosis*

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### New Vocabulary

*Use your book or dictionary to define the following terms.*

*nondisjunction*

---

*telomere*

---

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

*karyotype*

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**Section 11.3 Chromosomes and Human Heredity** (continued)

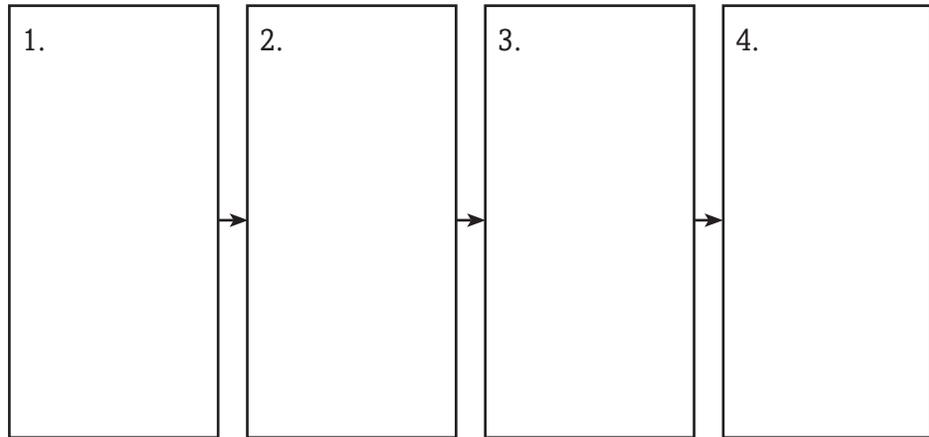
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

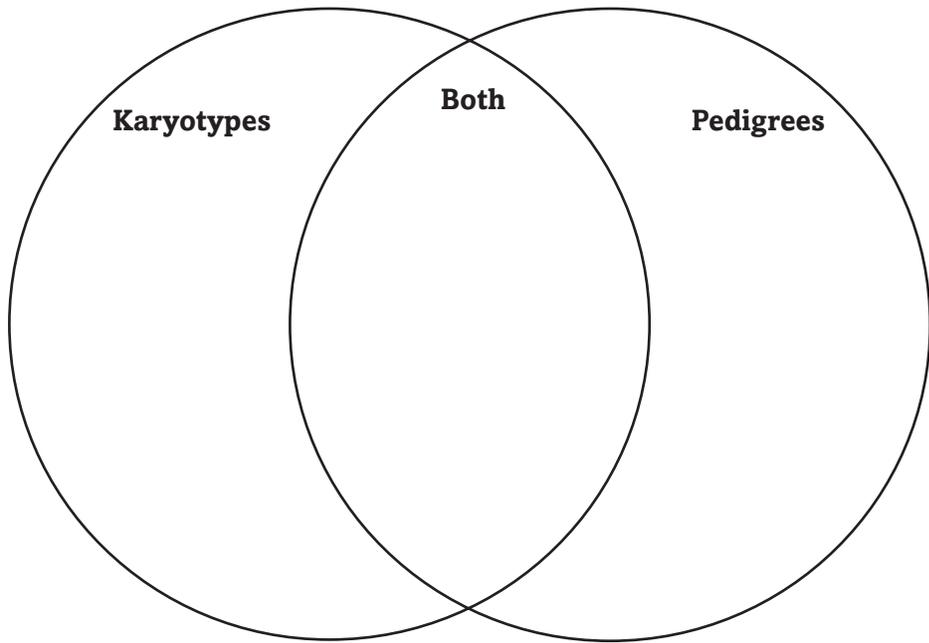
**Karyotype Studies**

*I found this information on page \_\_\_\_\_.*

**Sequence** *how a scientist makes a karyotype.*



**Compare and contrast** *karyotype studies and pedigrees by writing characteristics in the Venn diagram.*



**Telomeres**

*I found this information on page \_\_\_\_\_.*

**Describe** *telomeres by completing the paragraph.*

Telomeres are made of \_\_\_\_\_ and \_\_\_\_\_. They are located at \_\_\_\_\_. Their function is \_\_\_\_\_.

## Section 11.3 Chromosomes and Human Heredity

### Main Idea

#### Nondisjunction

I found this information on page \_\_\_\_\_.

### Details

**Model** a picture showing the ways that nondisjunction during meiosis can produce a sex cell with an extra copy of a chromosome.



**Model** a karyotype of a boy with Down's syndrome.



#### Fetal Testing

I found this information on page \_\_\_\_\_.

**Summarize** the following facts about fetal testing.

- how an abnormal number of chromosomes is identified
- four possible results of abnormal chromosome numbers

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### SUMMARIZE

Analyze how nondisjunction during meiosis could lead to Klinefelter's syndrome.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Molecular Genetics

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Molecular Genetics	After You Read
	<ul style="list-style-type: none"> <li>• James Watson and Francis Crick discovered that DNA was the genetic material.</li> </ul>	
	<ul style="list-style-type: none"> <li>• DNA replication is the same in prokaryotes and eukaryotes.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Information in a cell flows from DNA to RNA to protein.</li> </ul>	
	<ul style="list-style-type: none"> <li>• A mutation is a permanent change in a cell's DNA.</li> </ul>	

### Science Journal

*Ponies on the Shetland Islands in Scotland have short stature, 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?*

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# Molecular Genetics

## Section 12.1 DNA: The Genetic Material

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Scan** Section 1 of the chapter. Identify the results of three DNA experiments.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define nucleic acid.

*nucleic acid*

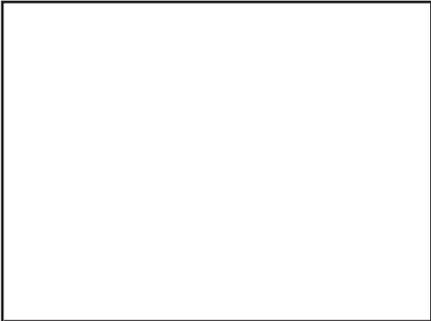
\_\_\_\_\_

**New Vocabulary**

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

*double helix*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



*nucleosome*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**Academic Vocabulary**

Define transform to show its scientific meaning.

*transform*

\_\_\_\_\_

**Section 12.1 DNA: The Genetic Material** (continued)

**Main Idea**

**Discovery of the Genetic Material**

I found this information on page \_\_\_\_\_.

**DNA Structure**

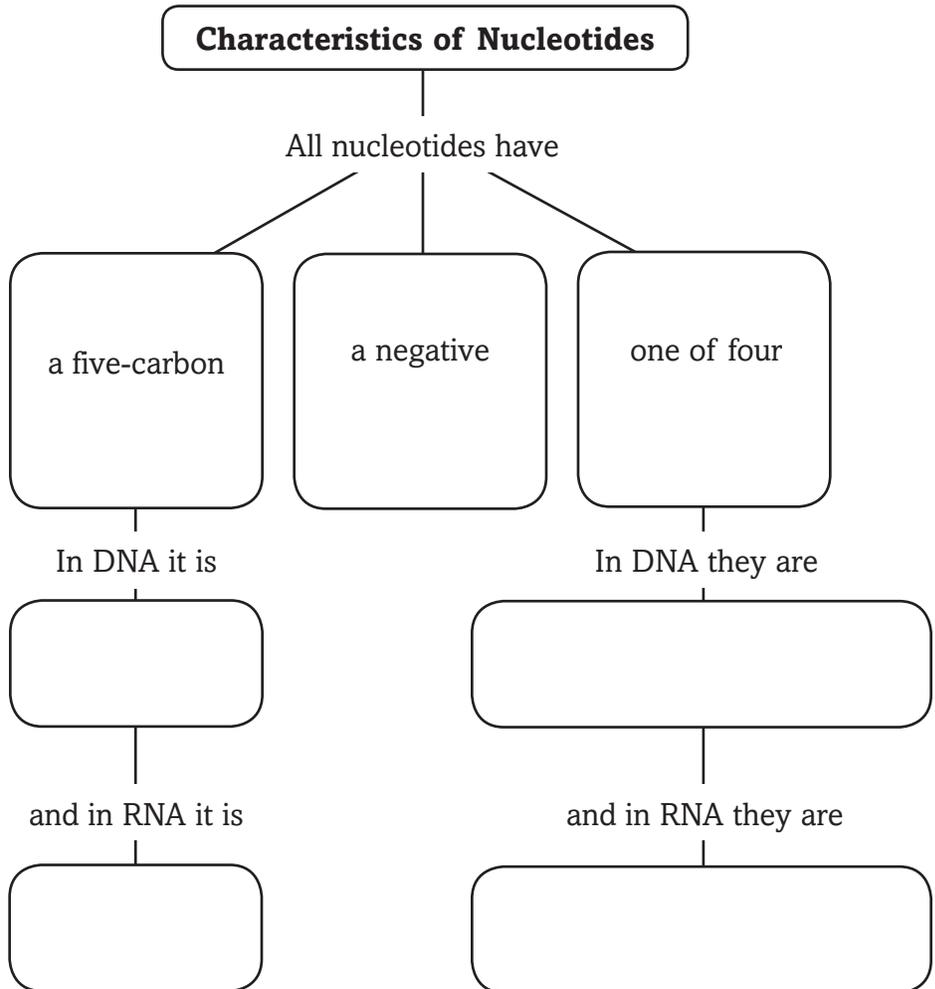
I found this information on page \_\_\_\_\_.

**Details**

Complete the table below about geneticists and their discoveries.

Scientist	Discovery	Year
Fredrick Griffith		
Oswald Avery		
Alfred Hershey and Martha Chase		
James Watson and Francis Crick		

Organize the characteristics of nucleotides by filling in the graphic organizer below.



**Section 12.1 DNA: The Genetic Material** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

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

Word and What It Means	Sketch of Effect
complementary:	
helix:	
double (as in “double helix”):	

**Chromosome Structure**

*I found this information on page \_\_\_\_\_.*

**Synthesize and rephrase** how a DNA strand that is 200 million bases long can fit inside a cell.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**SUMMARIZE**

State how Watson and Crick’s DNA structure supported Chargaff’s rules.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Molecular Genetics

## Section 12.2 Replication of DNA

### Main Idea

### Details

**Scan** Section 2 of the chapter. Write three questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define *template*.

*template*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define the following terms. Then look through the section to find a sentence with each term. Write the sentence.

*DNA polymerase*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*Okazaki fragment*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*semiconservative replication*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 12.2 Replication of DNA** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Semiconservative Replication**

*I found this information on page \_\_\_\_\_.*

**Describe** *semiconservative DNA replication.*

Model	During replication, the parental strands	The new DNA molecule is composed of
Semiconservative replication		

**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. In the last box, describe and draw the products of replication.*

A.	B.
C.	D.

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

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**Section 12.2 Replication of DNA** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Complete** the table below on the role of each protein in DNA replication. The first one has been done for you.

Protein	Stage of DNA Replication	Activity
DNA helicase	unwinding	unwinds and unzips the DNA
DNA ligase		
DNA polymerase		
RNA primase		
Single-stranded binding protein		

**Comparing DNA Replication in Eukaryotes and Prokaryotes**

*I found this information on page \_\_\_\_\_.*

**Contrast** the differences between prokaryotic and eukaryotic DNA replication.

	Eukaryotes	Prokaryotes
Number of origins for DNA replication		
Where replication takes place in the cell		

**SUMMARIZE**

Analyze how the activity of DNA polymerase is consistent with Watson and Crick's model of semiconservative replication.

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# Molecular Genetics

## Section 12.3 DNA, RNA, and Protein

### Main Idea

### Details

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

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

### Review Vocabulary

*synthesis*

Use your book or dictionary to define synthesis.

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Write the correct term in the left column for each definition below.

\_\_\_\_\_

process in which RNA is synthesized from DNA

\_\_\_\_\_

a group of three nitrogenous bases in DNA or mRNA that code for one amino acid

\_\_\_\_\_

nucleic acid made of ribose, phosphate, and one of four nitrogenous bases—adenine, cytosine, guanine, or uracil

\_\_\_\_\_

intervening DNA sequences that are transcribed and then removed from the final mRNA

\_\_\_\_\_

process by which mRNA directs the synthesis of a protein

\_\_\_\_\_

long strands of RNA that are complementary to one strand of DNA

\_\_\_\_\_

protein coding sequences in DNA that are transcribed into mRNA and translated into protein

\_\_\_\_\_

small RNA molecules that transport amino acids to the ribosome

\_\_\_\_\_

an enzyme that catalyzes the synthesis of mRNA using DNA as a template

\_\_\_\_\_

RNA molecules that make up part of the ribosome

**Section 12.3 DNA, RNA, and Protein (continued)**

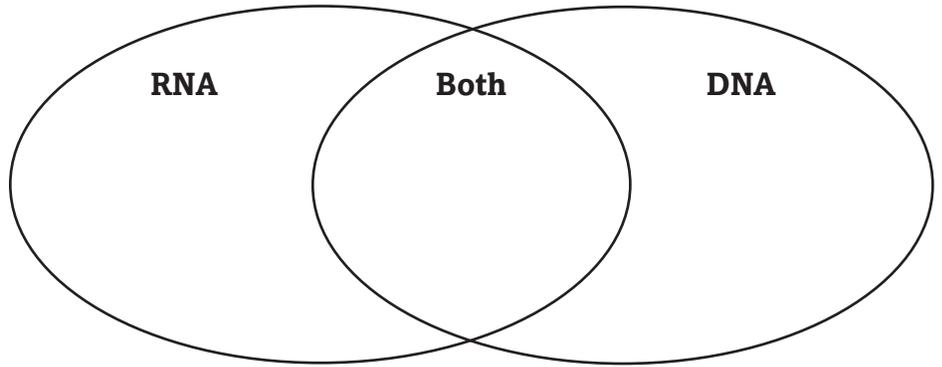
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

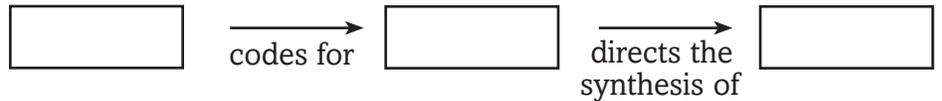
**Central Dogma**

I found this information on page \_\_\_\_\_.

**Compare and contrast RNA and DNA by writing at least five characteristics of their structure and composition in the Venn diagram.**



**State the central dogma of biology.**



**Compare the function of each type of RNA molecule by completing the table.**

Type of RNA	Function
mRNA	
rRNA	
tRNA	

**Sequence the steps in transcription of RNA.**

Section 12.3 DNA, RNA, and Protein (continued)

**Main Idea**

**The Code,  
One Gene—  
One Enzyme**

I found this information  
on page \_\_\_\_\_.

**Details**

**Identify** four examples of codons and state the instructions they encode.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**Model** the movement of tRNA molecules showing the translation process.

**State** the updated version of Beadle and Tatum's hypothesis.

\_\_\_\_\_ codes for \_\_\_\_\_.

**SUMMARIZE**

Create a flow chart to describe the formation of a protein.  
Describe the activities of DNA and the three types of RNA.

# Molecular Genetics

## Section 12.4 Gene Regulation and Mutation

**Main Idea**

**Details**

**Scan** the illustrations and tables in Section 3. Predict the effect of mutations on organisms.

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**Review Vocabulary**

Use your book or dictionary to define prokaryote.

*prokaryote*

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**New Vocabulary**

Use your book or dictionary to define the following terms.

*gene regulation*

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*mutagen*

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*mutation*

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---

*operon*

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**Academic Vocabulary**

Define substitution and write a sentence to show its scientific meaning.

*substitution*

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**Section 12.4 Gene Regulation and Mutation** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Prokaryote Gene Regulation**

I found this information on page \_\_\_\_\_.

**Describe** *gene regulation in prokaryotes by using the terms below to complete the paragraph.*

- *E. coli*
- environment
- genes
- metabolic pathway
- operator
- promoter
- proteins
- repressor
- RNA polymerase

An operon is a cluster of genes in \_\_\_\_\_. These genes make \_\_\_\_\_ that work together in one \_\_\_\_\_. An operon is able to respond to changes in the \_\_\_\_\_. The \_\_\_\_\_ is a segment of DNA that acts as a switch for transcription, turning the operon on or off. When the operon is on, [RNA polymerase] binds to the \_\_\_\_\_ and transcribes the DNA. When the operon is off, a \_\_\_\_\_ blocks transcription.

**Compare and contrast** *the trp operon and the lac operon.*

	<i>Trp Operon</i>	<i>Lac Operon</i>
Responds to the presence of		
Transcription is turned on when		
The repressor is active when		
When the operon is turned on, the cell can		

**Eukaryote Gene Regulation**

I found this information on page \_\_\_\_\_.

**Analyze** *the ways eukaryotes control gene expression.*

<b>Molecule</b>	<b>Effect on Gene Expression</b>
Hox genes	
Nucleosomes	
Small interfering RNA	
Transcription factors	

**Section 12.4 Gene Regulation and Mutation** (continued)

**Main Idea**

**Details**

**Mutations**

I found this information on page \_\_\_\_\_.

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

Point mutation happens when	consequence:
Frameshift mutation occurs when	consequence:

**Analyze** each type of DNA mutation and its result. Sketch what each change might look like.

Mutation	Result	Sketch
Missense mutation		
Nonsense mutation		
Chromosome rearrangement		
Chromosome deletion		

**SUMMARIZE**

Discuss why a mutagen can have longer-lasting effects in a sex cell than in a body cell.

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# Tie It Together

## SUMMARY

*Create a concept web to tie together what you learned in this chapter about molecular genetics. Hint: You might find it easier to first list the facts or topics you want to include, then decide how to connect them in the web.*

# Genetics and Biotechnology

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Genetics and Biotechnology	After You Read
	<ul style="list-style-type: none"> <li>• Hybridization is a type of selective breeding.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Genetic engineering is the process of breeding animals for desired traits.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Polymerase chain reaction is a way to make millions of copies of a fragment of DNA.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Scientists have determined the sequence of all human DNA.</li> </ul>	

### Science Journal

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

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# Genetics and Biotechnology

## Section 13.1 Applied Genetics

### Main Idea

### Details

**Scan** Section 1 of the chapter. 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.

Write three facts you discovered about genetic technology.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define hybrid.

*hybrid*

\_\_\_\_\_

### New Vocabulary

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

*inbreeding*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*selective breeding*

\_\_\_\_\_  
\_\_\_\_\_

*test cross*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 13.1 Applied Genetics (continued)**

**Main Idea**

**Selective Breeding**

*I found this information on page \_\_\_\_\_.*

**Details**

**Summarize** *selective breeding by completing the prompts.*

Goal: \_\_\_\_\_

Example: \_\_\_\_\_

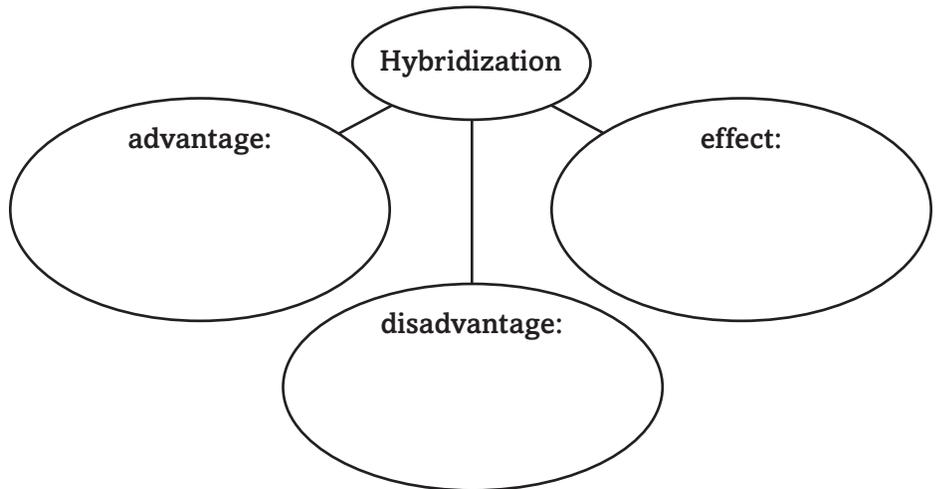
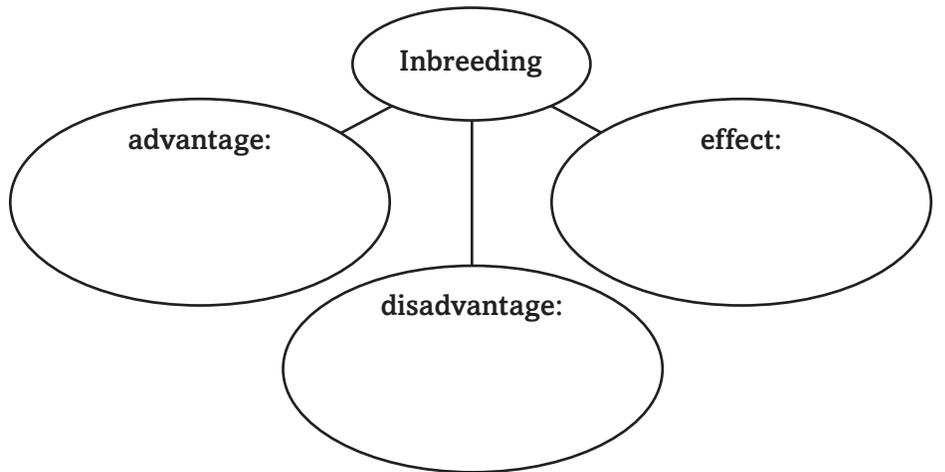
The offspring of parents that have different forms of a trait:

\_\_\_\_\_.

Two different types of selective breeding:

\_\_\_\_\_ and \_\_\_\_\_.

**Analyze** *inbreeding and hybridization by identifying the effect, an advantage, and a disadvantage of each.*



**Section 13.1 Applied Genetics (continued)**

**Main Idea**

**Details**

**Test Cross**

I found this information on page \_\_\_\_\_.

**Analyze** the use of a test cross to determine the genotype of a yellow flower by completing the prompts. The first one has been done for you.

The genotype of the white flower: yy

Possible genotypes of the yellow flower: \_\_\_\_\_

	Possible Phenotypes	Possible Genotypes
offspring if the yellow flower is heterozygous		
offspring if the yellow flower is homozygous		

**Create** a Punnett Square that shows the result of each test cross.

Heterozygous:

Homozygous:



**Summarize** how test crosses work by using the words genotype and phenotype to complete the sentence.

In a test cross, the \_\_\_\_\_ of the offspring can reveal the \_\_\_\_\_ of the parents.

**CONNECT**

Selective breeding practices have been used since ancient times.

Provide specific examples where selective breeding has resulted in plants or animals that are familiar to us today.

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# Genetics and Biotechnology

## Section 13.2 DNA Technology

### Main Idea

### Details

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

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define DNA.

DNA

### New Vocabulary

Use your book or dictionary to define each term.

- \_\_\_\_\_ method of manipulating DNA from one organism and inserting the DNA fragment into a host organism of the same or different species
- \_\_\_\_\_ the total DNA present in the nucleus of each cell
- \_\_\_\_\_ bacterial enzyme that can cut foreign DNA at a specific nucleotide sequence
- \_\_\_\_\_ a method of separating DNA fragments by size with the use of an electric current
- \_\_\_\_\_ DNA made by recombining fragments of DNA from different sources
- \_\_\_\_\_ small, circular, double-stranded DNA found in bacterial cells and used as a vector
- \_\_\_\_\_ an enzyme that is used to join DNA fragments; used by the cell for DNA repair and replication
- \_\_\_\_\_ a method for getting plasmid DNA into bacterial cells
- \_\_\_\_\_ the process of creating a genetically identical copy of an organism or gene
- \_\_\_\_\_ a technique for making millions of copies of a specific region of DNA
- \_\_\_\_\_ organism that contains functional recombinant DNA from a different organism

**Section 13.2 DNA Technology (continued)**

**Main Idea**

**Genetic Engineering**

*I found this information on page \_\_\_\_\_.*

**DNA Tools**

*I found this information on page \_\_\_\_\_.*

**Recombinant DNA Technology**

*I found this information on page \_\_\_\_\_.*

**Details**

**Identify one transgenic organism from this chapter. Describe how it was created. Then use your imagination to think of another possible transgenic organism that could be made and identify the original organisms that could be used to make it.**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Complete the paragraph about DNA tools by using the words below.**

- blunt ends
- Eco RI
- gel electrophoresis
- restriction enzymes
- sticky ends

Scientists use \_\_\_\_\_ to cut DNA at specific sequences, and \_\_\_\_\_ to separate fragments based on size. Some \_\_\_\_\_ create DNA with single-stranded, \_\_\_\_\_.

\_\_\_\_\_ is an example of this type of enzyme. The resulting DNA fragments can be joined with other DNA fragments that have complementary \_\_\_\_\_.

Other \_\_\_\_\_ create \_\_\_\_\_, which can be joined to another DNA fragment that has \_\_\_\_\_.

**Compare the DNA tools and techniques used in genetic engineering.**

<b>Genetic Engineering Application</b>	<b>Tool or Technique Used</b>
Make millions of copies of a region of DNA	
Determine the order of nucleotides	
Chemically join together two fragments of DNA	
Carry recombinant DNA into bacteria	
Produce large amounts of recombinant DNA	

**Section 13.2 DNA Technology (continued)**

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Describe** *the functions of the components of PCR.*

thermocycler: \_\_\_\_\_

primers: \_\_\_\_\_

nucleotides: \_\_\_\_\_

DNA polymerase: \_\_\_\_\_

**Biotechnology**

*I found this information on page \_\_\_\_\_.*

**Organize** *advances that have been made in transgenic organisms.*

Area	Examples
transgenic animals	
transgenic plants	
transgenic bacteria	

**SUMMARIZE**

Summarize the uses of genetic technology.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Genetics and Biotechnology

## Section 13.3 The Human Genome

### Main Idea

### Details

**Scan** Section 3 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Look at all illustrations and read the captions.

Write three facts you discovered as you scanned the section.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*bioinformatics*

\_\_\_\_\_  
\_\_\_\_\_

*DNA microarray*

\_\_\_\_\_

*haplotype*

\_\_\_\_\_

*pharmacogenomics*

\_\_\_\_\_

*single nucleotide  
polymorphism*

\_\_\_\_\_  
\_\_\_\_\_

### Academic Vocabulary

Define sequence to show its scientific meaning. Write a sentence using sequence.

*sequence*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 13.3 The Human Genome (continued)**

**Main Idea**

**The Human Genome Project**

*I found this information on page \_\_\_\_\_.*

**Details**

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

↓

↓

↓

**Organize** *three applications of DNA fingerprinting.*

DNA fingerprinting	
--------------------	--

**Identifying Genes**

*I found this information on page \_\_\_\_\_.*

**Identify** *different ways to find genes in DNA sequences. Name the organisms for which each method is used.*

Method for identifying genes	Organism

**Section 13.3 The Human Genome (continued)**

**Main Idea**

**Bioinformatics,  
DNA Microarrays,  
The Genome  
and Genetic  
Disorders,  
Genomics and  
Proteomics**

*I found this information  
on page \_\_\_\_\_.*

**Details**

**Organize** *the techniques that have arisen in the age of genomics. Give one benefit or application for each technique. The first one has been done for you.*

Description	Technique	Application or Benefit
inserting recombinant DNA into human cells to treat diseases	gene therapy	might someday be used to cure genetic diseases
slides or chips used to analyze complex changes in gene expression		
an international effort to describe regions of linked variations in the human genome		
the study of how to manage large amounts of biological information		
the study of all of the DNA in the genome of an organism		
the study and cataloging of an organism's proteins		
the study of how to match a person's genetics to the drugs they are prescribed		

**SUMMARIZE**

Discuss the applications of genetic technology that you think might affect your life in the future and the limitations you think there will be on DNA technology.

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# The History of Life

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

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

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# The History of Life

## Section 14.1 Fossil Evidence of Change

**Main Idea**

**Details**

**Skim** Section 1 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define extinction.

*extinction*

**New Vocabulary**

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

*Cambrian explosion*

*era*

*fossil*

*geologic time scale*

*half-life*

*K-T boundary*

*law of superposition*

*paleontologist*

*period*

*plate tectonics*

*radiometric dating*

*relative dating*

Scientists measure Earth's geological and biological events using the \_\_\_\_\_, which is divided into \_\_\_\_\_ and \_\_\_\_\_. The \_\_\_\_\_ is the name of a period of rapid change during which the ancestors of most animal groups emerged. A layer of soot found between rock layers worldwide, known as the \_\_\_\_\_, might indicate that a large meteorite collided with Earth.

The theory of \_\_\_\_\_ describes Earth's surface as large plates that move over Earth's thick, liquid interior. These plates are made up of various types of rocks. \_\_\_\_\_ are scientists who study \_\_\_\_\_. They determine the relative age of rocks using \_\_\_\_\_, which compares the sequence of rock layers. The \_\_\_\_\_ states that younger rock layers are deposited on top of older rock layers. Another method of determining the age of rocks is \_\_\_\_\_, which measures the decay of radioactive isotopes. The rate of decay can be measured using \_\_\_\_\_, the amount of time required for half of a radioactive isotope to decay.

**Section 14.1 Fossil Evidence of Change (continued)**

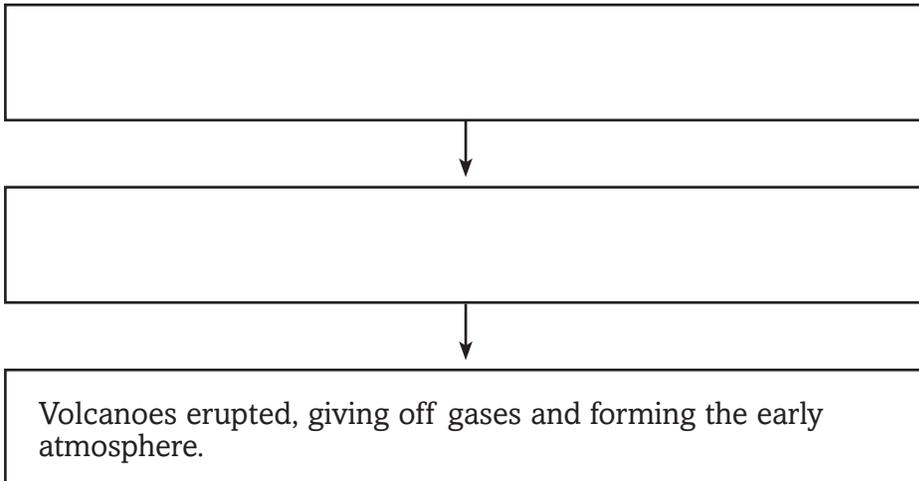
**Main Idea**

**Earth's Early History**

*I found this information on page \_\_\_\_\_.*

**Details**

**Sequence** *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.*



**Clues in Rocks**

*I found this information on page \_\_\_\_\_.*

**Identify** *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.*

Relative Dating	Radiometric Dating
1.	1.
2.	2.
3.	3.

**Section 14.1 Fossil Evidence of Change** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**The Geologic Time Scale**

*I found this information on page \_\_\_\_\_.*

**Summarize** *the four eras of the geologic time scale using the table below.*

Geologic Era	Major Biological Events	Organisms that Appeared	Other Facts
		unicellular life, eukaryotic cells, small marine animals	includes Earth's formation, almost 90% of Earth's entire history
	Cambrian explosion at beginning of Paleozoic, mass extinction at end		
		dinosaurs, small mammals, flowering plants, birds	
	following extinction of dinosaurs, mammals diversify		

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

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**SUMMARIZE**

Discuss how paleontologists use relative and radiometric dating to support the geologic timescale.

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# The History of Life

## Section 14.2 The Origin of Life

**Main Idea**

**Details**

**Scan** Section 2 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Look at all pictures and read the captions.
- Think about what you already know about the history of life.

*Write three facts you discovered about the origin of life.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

*Use your book or dictionary to define amino acid. Use the term in a sentence to show its scientific meaning.*

*amino acid*

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

*Use your book or dictionary to define each term.*

*endosymbiont theory*

\_\_\_\_\_  
\_\_\_\_\_

*spontaneous generation*

\_\_\_\_\_  
\_\_\_\_\_

*theory of biogenesis*

\_\_\_\_\_  
\_\_\_\_\_

**Academic Vocabulary**

*Define mechanism to show its scientific meaning.*

*mechanism*

\_\_\_\_\_  
\_\_\_\_\_

Section 14.2 The Origin of Life (continued)

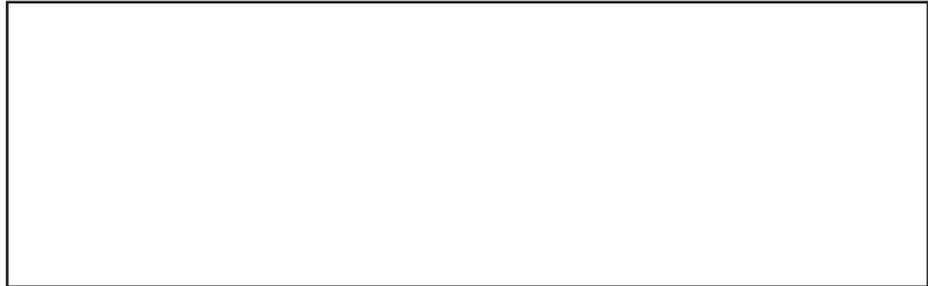
**Main Idea**

**Details**

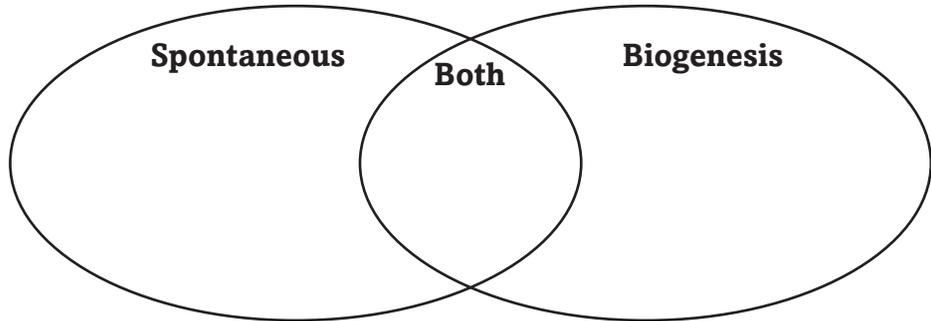
**Origins:  
Early Ideas**

I found this information  
on page \_\_\_\_\_.

**Create** a cartoon that illustrates how Redi's experiment was used to disprove spontaneous generation.



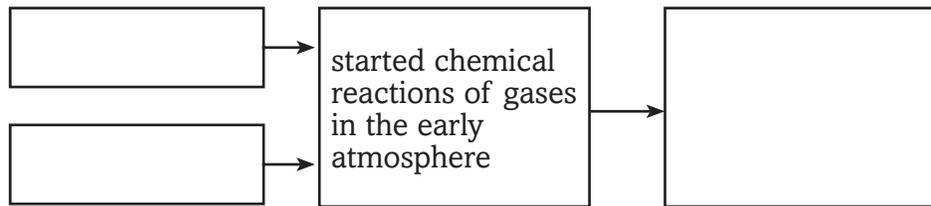
**Compare** spontaneous generation and biogenesis.



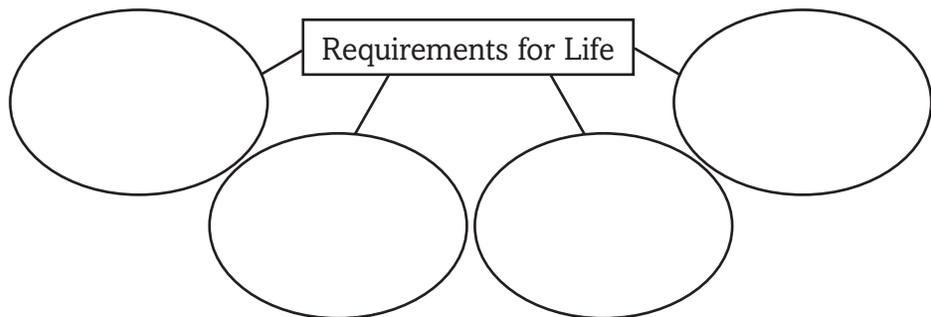
**Origins:  
Modern Ideas**

I found this information  
on page \_\_\_\_\_.

**Model** Oparin's primordial soup hypothesis for the formation of simple organic molecules by filling in the graphic organizer below.



**Identify** four requirements for life using the concept map below.



**Section 14.2 The Origin of Life** (continued)

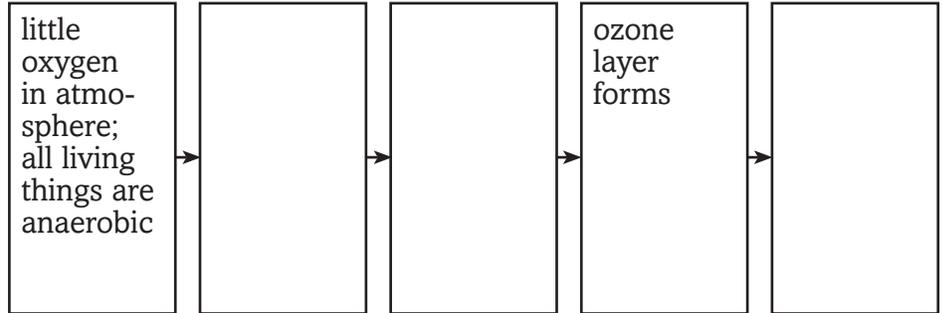
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Cellular Evolution**

*I found this information on page \_\_\_\_\_.*

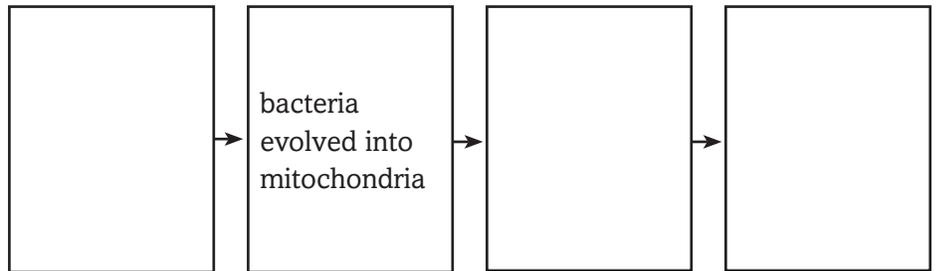
**Sequence** *how oxygen accumulated in the atmosphere and the effect it had on life by completing the flowchart below.*



**Identify** *three properties that mitochondria and chloroplasts share with prokaryotes.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Analyze** *the endosymbiont theory of the evolution of plant cells by completing the sequence chart.*



**SUMMARIZE**

Analyze how the four requirements for life were identified by scientists.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Tie It Together

## SUMMARIZE

*Write an analogy to explain the difference between radiometric and relative dating. Develop a second analogy to explain the endosymbiont theory.*

**Analogy of dating methods used by paleontologists:**

**Analogy of endosymbiont theory:**

# Evolution

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*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?*

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# Evolution

## Section 15.1 Darwin's Theory of Natural Selection

### Main Idea

### Details

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

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define selective breeding.

*selective breeding*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*artificial selection*

\_\_\_\_\_  
\_\_\_\_\_

*evolution*

\_\_\_\_\_  
\_\_\_\_\_

*natural selection*

\_\_\_\_\_  
\_\_\_\_\_

Write a short paragraph that uses at least two of the terms above.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 15.1 Darwin's Theory of Natural Selection** (continued)

**Main Idea**

**Developing the Theory of Natural Selection**

*I found this information on page \_\_\_\_\_.*

**Details**

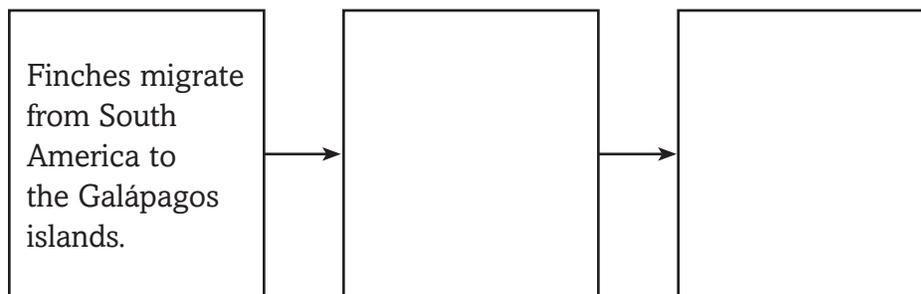
**Summarize** *three observations Darwin made in his research on the South American mainland.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Identify** *three organisms from the Galápagos Islands and their distinguishing characteristics.*

Organism	Variation

**Analyze** *Darwin's hypothesis on the origin of Galápagos finches by filling in the flow chart. The first step has been done for you.*



**Summarize** *three observations that Darwin made in his research with pigeons.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Section 15.1 Darwin's Theory of Natural Selection (continued)**

**Main Idea** \_\_\_\_\_

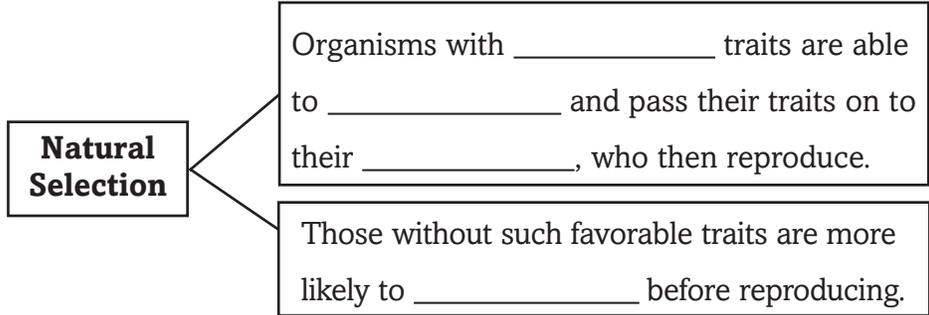
*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Identify the four principles of natural selection.**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

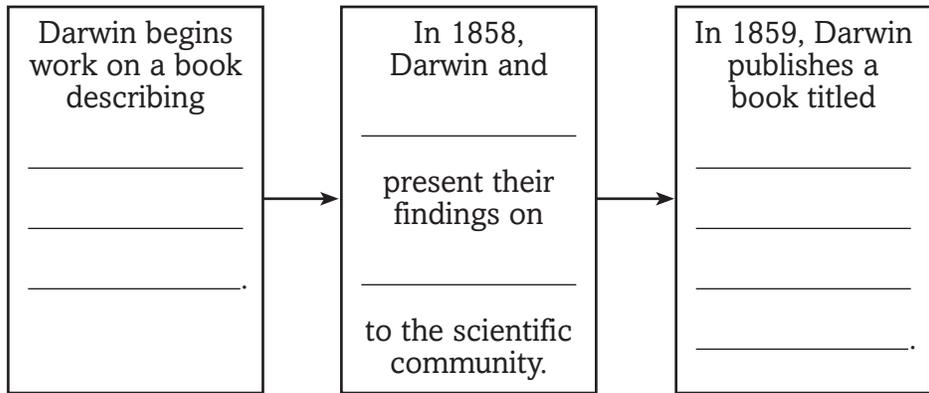
**Summarize natural selection by completing the sentences below.**



**The Origin of Species**

*I found this information on page \_\_\_\_\_.*

**Sequence the events that led to the publication of Darwin's ideas.**



**SUMMARIZE**

Discuss Darwin's different observations that led him to propose the theory of natural selection.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Evolution

## Section 15.2 Evidence of Evolution

**Main Idea**

**Details**

**Scan** Section 2 of the chapter. List the lines of evidence that support Darwin's theory of evolution by natural selection.

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**Review Vocabulary**

Use your book or dictionary to define fossil.

*fossil*

---

**New Vocabulary**

Use your book or dictionary to define the following terms.

*analogous structures*

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---

*ancestral trait*

---

*biogeography*

---

*camouflage*

---

*derived trait*

---

*embryo*

---

*fitness*

---

---

*homologous structures*

---

*mimicry*

---

*vestigial structure*

---

**Section 15.2 Evidence of Evolution** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

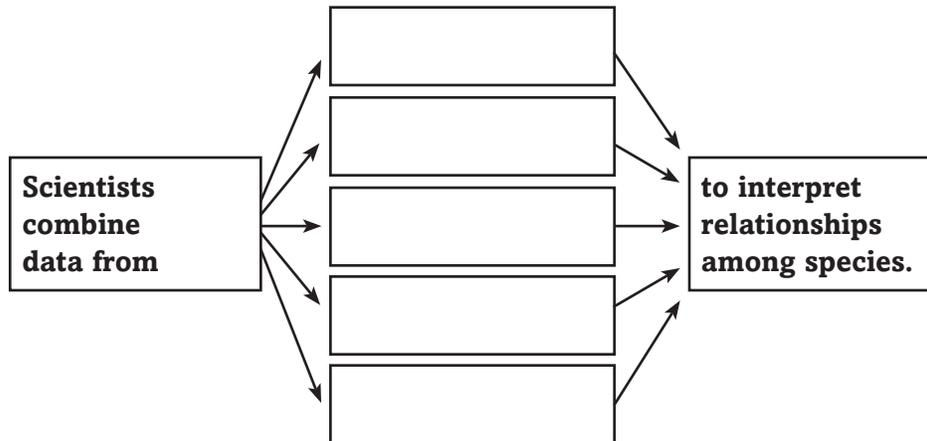
**Support for Evolution**

*I found this information on page \_\_\_\_\_.*

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

Structure	What is it?	Example
Homologous structure		
Analogous structure		
Vestigial structure		
Embryo		

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



**Section 15.2 Evidence of Evolution** (continued)

**Main Idea**

**Details**

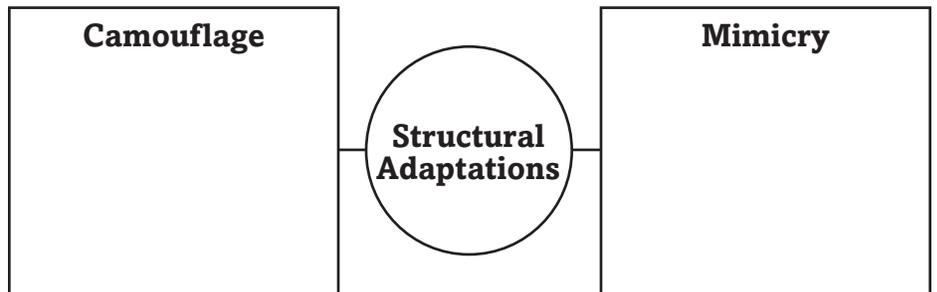
**Adaptation**

I found this information on page \_\_\_\_\_.

**Compare** similarities and differences between adaptations and non-adaptations by writing yes or no in the table. Then give an example of an adaptation and a non-adaptation.

Characteristics	Adaptations	Non-Adaptations
inherited traits		
increase survival or reproduction		
by-product arising from other evolutionary changes		
Example:		

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



**Analyze** how antibiotics can lose their effectiveness over time.

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**SUMMARIZE**

Explain why fossils are important tools in understanding evolution.

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# Evolution

## Section 15.3 Shaping Evolutionary Theory

### Main Idea

### Details

**Scan** Section 3 of the chapter. Write two facts that you discover.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define allele.

*allele*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Write the correct vocabulary term in the left column for each definition below.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- allele frequencies remain the same unless acted upon by a factor
- random evolution that occurs in a small, separate subpopulation
- process of a large population declining in number then rebounding to a large number again
- mechanism that operates before fertilization occurs
- change in the allele frequencies in a population by chance
- selection which removes organisms with extreme expressions of a trait
- mechanism that operates after fertilization occurs to ensure that resulting hybrid remains infertile
- selection which shifts a population toward an extreme trait
- selection which removes individuals with average traits
- change in a trait based on competition for mates
- speciation in the presence of a barrier
- speciation without any barriers

**Section 15.3 Shaping Evolutionary Theory** (continued)

**Main Idea**

**Mechanisms of Evolution**

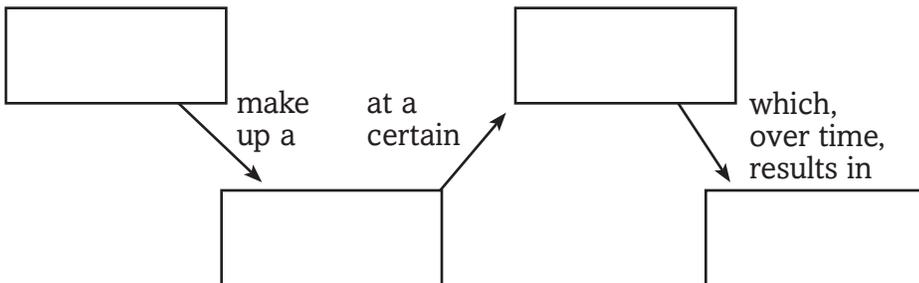
I found this information on page \_\_\_\_\_.

**Reproductive Isolation**

I found this information on page \_\_\_\_\_.

**Details**

**Sequence** 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** geographic isolation and reproductive isolation.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Compare** natural selection and sexual selection by completing the table.

	<b>Species Changes Based on</b>	<b>Increases Fitness?</b>
Natural selection		
Sexual selection		

**Section 15.3 Shaping Evolutionary Theory** (continued)

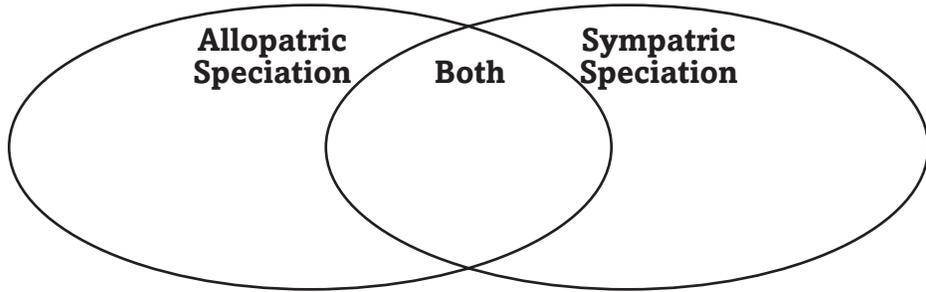
**Main Idea**

**Details**

**Speciation**

I found this information on page \_\_\_\_\_.

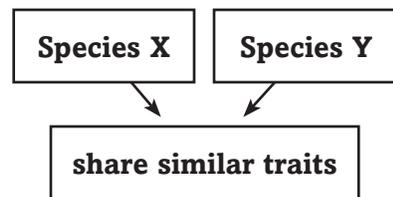
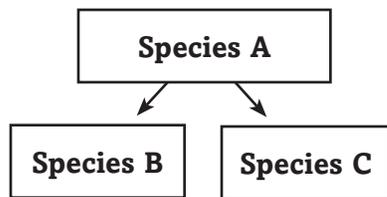
**Compare** *allopatric speciation and sympatric speciation by writing one fact in each segment of the Venn diagram below.*



**Speciation and Patterns of Evolution**

I found this information on page \_\_\_\_\_.

**Label** each model as representing *divergent evolution or convergent evolution.*



**Summarize** the current thoughts about the rate of speciation by completing the table below.

Gradualism	Punctuated Equilibrium

**SUMMARIZE**

List three possible patterns of evolution and an example of each.

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# Primate Evolution

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*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.*

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# Primate Evolution

## Section 16.1 Primates

### Main Idea

### Details

**Scan** the title and main idea of Section 1. List two things that might be discussed in this section.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define extinction.

*extinction*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*anthropoid*

\_\_\_\_\_

*arboreal*

\_\_\_\_\_

*binocular vision*

\_\_\_\_\_

*diurnal*

\_\_\_\_\_

*hominin*

\_\_\_\_\_

*nocturnal*

\_\_\_\_\_

*opposable first digit*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*prehensile tail*

\_\_\_\_\_

### Academic Vocabulary

Define *diverge* to show its scientific meaning.

*diverge*

\_\_\_\_\_

**Section 16.1 Primates** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Characteristics of Primates**

*I found this information on page \_\_\_\_\_.*

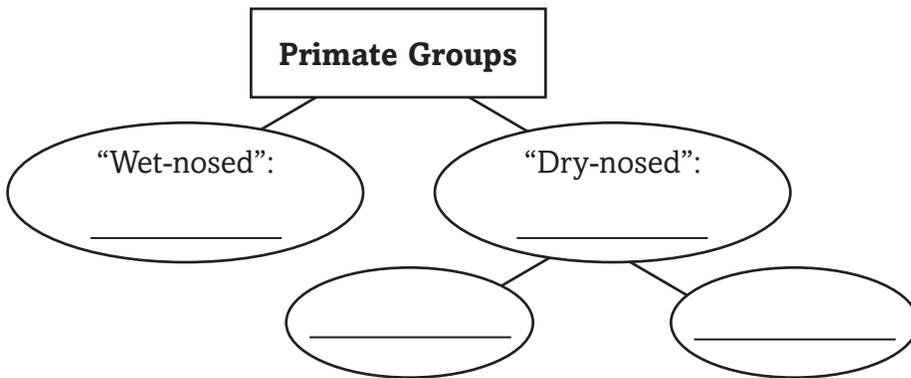
*Identify the benefits of the following primate characteristics.*

Primate Characteristic	Benefits
Opposable first digit	
Binocular vision	
Unspecialized teeth	
Flexible shoulders and hips	
Large, complex brain	
Low reproductive rate	

**Primate Groups**

*I found this information on page \_\_\_\_\_.*

*Identify the primate groups in the diagram below.*



**Strepsirrhines**

*I found this information on page \_\_\_\_\_.*

*Summarize a theory on why lemurs are found only on Madagascar and nearby islands.*

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**Section 16.1 Primates** (continued)

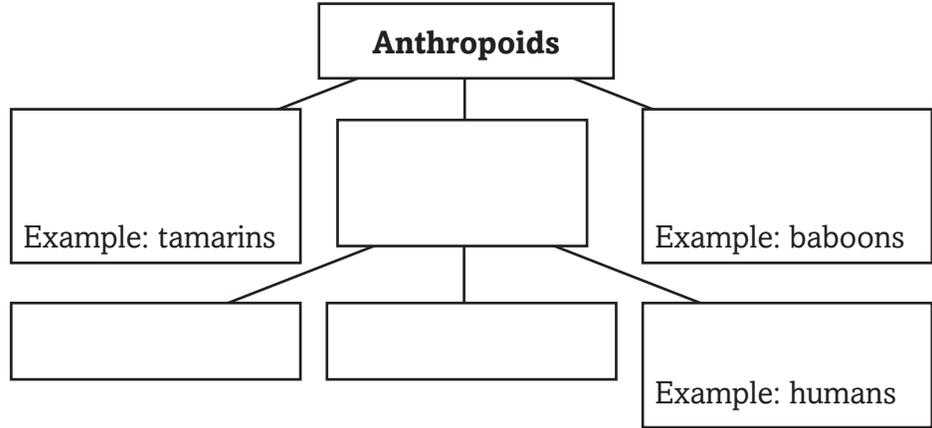
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Haplorhines**

I found this information on page \_\_\_\_\_.

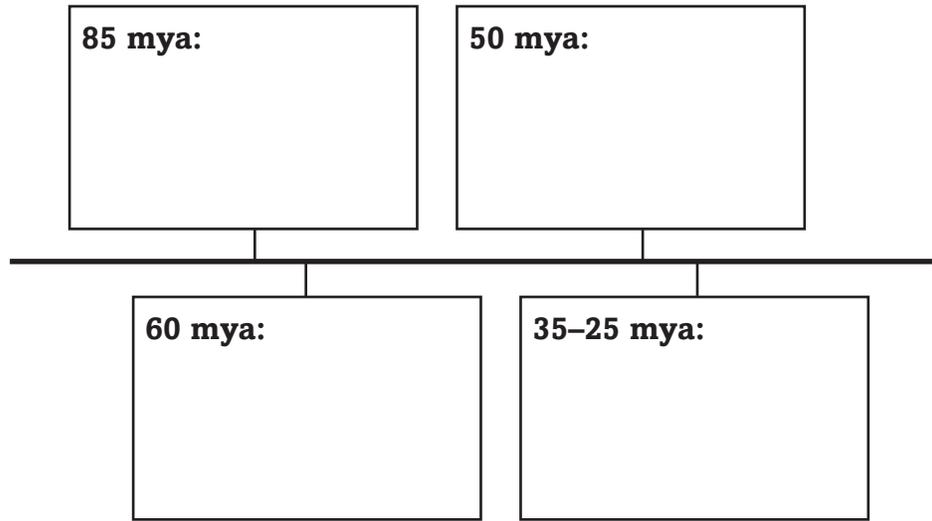
**Classify** the subgroups of anthropoids by completing the diagram.



**Primate Evolution**

I found this information on page \_\_\_\_\_.

**Summarize** primate evolution by completing the time line below.



**SUMMARIZE**

Analyze the theory that the rise of flowering trees had a great impact on primate evolution. Explain why.

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# Primate Evolution

## Section 16.2 Hominoids to Hominins

**Main Idea**

**Details**

**Scan** the time line and other illustrations in Section 2 of the chapter. Write two questions that come to mind.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define savanna.

*savanna*

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each term.

*australopithecine*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

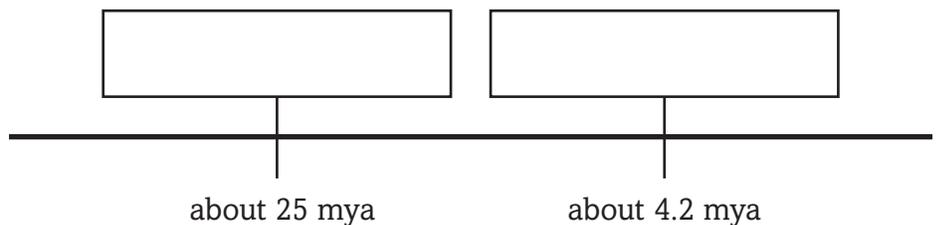
*bipedal*

\_\_\_\_\_  
\_\_\_\_\_

*hominoid*

\_\_\_\_\_  
\_\_\_\_\_

Place the first australopithecines and first hominoids in the general time line below.



**Section 16.2 Hominoids to Hominins** (continued)

**Main Idea** \_\_\_\_\_

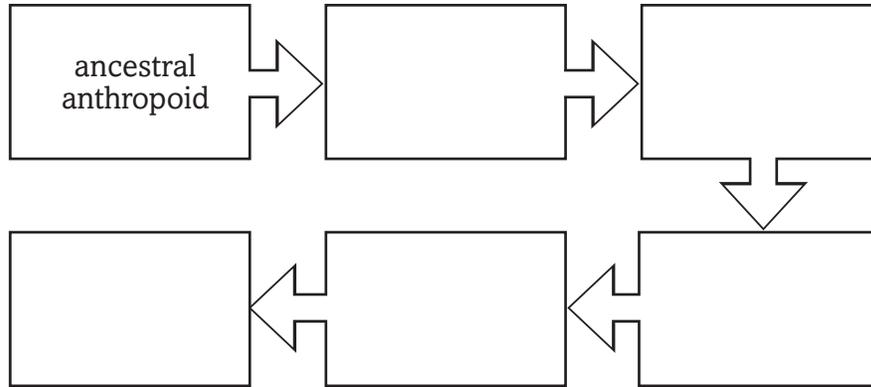
**Details** \_\_\_\_\_

**Hominoids**

*I found this information on page \_\_\_\_\_.*

**Sequence** *hominoid divergence by placing the primates listed below in the proper location on the flowchart.*

- gorillas
- gibbons
- chimpanzees and bonobos
- humans
- orangutans



**Describe** *why the Proconsul species was an important find for scientists.*

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**Hominins**

*I found this information on page \_\_\_\_\_.*

**Label** *five adaptations for bipedalism on the skeleton.*



**Section 16.2 Hominoids to Hominins** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Describe** some potential advantages and disadvantages of bipedalism compared to quadrupedalism.

Disadvantages of bipedalism:	Advantages of bipedalism:
------------------------------	---------------------------

**Identify** a key discovery by each of the following scientists. Then analyze how the discovery contributed to the debate about which adaptation evolved first: larger brain or bipedalism.

Raymond Dart	Donald Johanson	Mary Leakey
Discovery:	Discovery:	Discovery:
Analysis:	Analysis:	Analysis:

**CONNECT**

Analyze why scientists have difficulty classifying many hominin fossils.

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# Primate Evolution

## Section 16.3 Human Ancestry

### Main Idea

### Details

**Scan** Section 3 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Read all tables, figures, and graphs.
- Look at all pictures and read the captions.

Write two facts you discovered as you scanned the section.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*mitochondrion*

Use your book or dictionary to define mitochondrion.

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

*Cro-Magnon*

Use your book or dictionary to define each term.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*Homo*

\_\_\_\_\_

\_\_\_\_\_

*Neanderthal*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 16.3 Human Ancestry (continued)**

**Main Idea**

**The *Homo* Genus**

I found this information on page \_\_\_\_\_.

**Details**

**Identify the correct species from the list below for each of the following characteristics.**

- *H. habilis*                      • *H. erectus*                      • *H. heidelbergensis*
- *H. ergaster*                      • *H. floresiensis*                      • *H. neanderthalensis*

Characteristic	<i>Homo</i> Species
Evidence suggests they cared for their sick and buried their dead	
More versatile than predecessors; adapted successfully to a variety of environments	
First undisputed member of the <i>Homo</i> genus	
Nicknamed “The Hobbit” because of its small size	
Larger and more heavily muscled than modern humans	
Believed to have had the first human nose (nostrils facing downward)	
Classification for various transitional fossils that display a mosaic of <i>H. ergaster</i> and <i>H. sapiens</i> traits	
Name means “handy man” because of association with primitive stone tools	
Probably evolved from <i>H. erectus</i> or a <i>Homo</i> intermediary	
First African <i>Homo</i> species to migrate in large numbers to Asia and Europe	
Serves as evidence that <i>H. erectus</i> or some other ancient hominin species remained on Earth until 12,000 years ago	

**Identify a *Homo* species that scientists hypothesize to be a human ancestor, based on features shared with modern humans.**

\_\_\_\_\_

**Identify a *Homo* species that scientists believe was not a human ancestor, based on DNA tests on fossil bones.**

\_\_\_\_\_

Section 16.3 Human Ancestry (continued)

**Main Idea**

**Emergence of Modern Humans**

I found this information on page \_\_\_\_\_.

**Details**

**Rephrase** two hypotheses proposed to explain the global dominance of modern humans.

Multiregional evolution model:
“Out of Africa” hypothesis:

**Summarize** a scientific study that supported the “Out of Africa” hypothesis by completing the paragraph.

- Africans have the most variation in mitochondrial DNA
- mitochondrial DNA changes very little over time
- mitochondrial DNA is inherited only from the mother
- the population with the most variation had the longest existence

Because \_\_\_\_\_, scientists reasoned that \_\_\_\_\_ . In studying the DNA of contemporary humans, scientists found that \_\_\_\_\_ . Because \_\_\_\_\_ , scientists concluded that *H. sapiens* emerged in Africa from a hypothetical “Mitochondrial Eve.”

**SUMMARIZE**

Contrast *Homo sapiens* to all other *Homo* species.

_____
_____
_____

# Organizing Life's Diversity

## Before You Read

Use the "What I Know" column to list the things you know about life's diversity. Then list the questions you have about diversity in the "What I Want to Find Out" column.

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

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.

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# Organizing Life's Diversity

## Section 17.1 The History of Classification

**Main Idea**

**Details**

**Scan** Section 1 of the chapter. Write three questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define morphology.

*morphology*

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

Classify each term at the left as being part of Linnaeus' two-word naming system or a taxonomic group.

- binominal nomenclature*
- class*
- division*
- domain*
- family*
- genus*
- kingdom*
- order*
- phylum*

Linnaeus' System	Taxonomic Group

Use your book to define each term.

*classification*

\_\_\_\_\_

*taxon*

\_\_\_\_\_

*taxonomy*

\_\_\_\_\_

\_\_\_\_\_

**Section 17.1 The History of Classification** (continued)

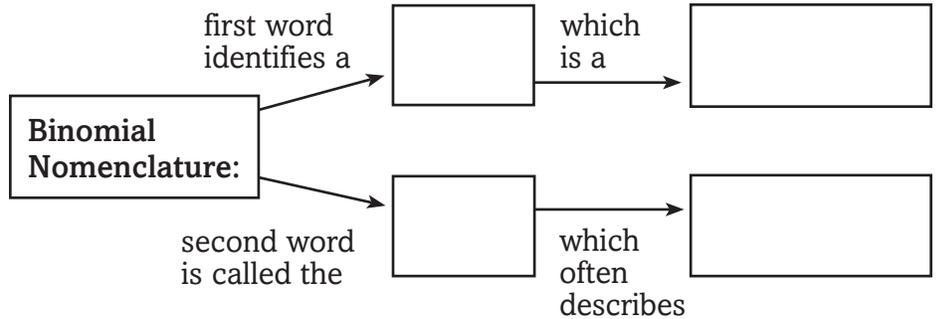
**Main Idea**

**Early Systems of Classification**

I found this information on page \_\_\_\_\_.

**Details**

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



Distinguish the genus and specific name, or epithet, for the species name of modern humans.



1. Compare data in the table below to determine which two animals are most closely related. Support your reasoning.

\_\_\_\_\_

\_\_\_\_\_

**Taxonomic Categories**

I found this information on page \_\_\_\_\_.

Classification of Selected Mammals				
Kingdom	Animalia	Animalia	Animalia	Animalia
Phylum	Chordata	Chordata	Chordata	Chordata
Class	Mammalia	Mammalia	Mammalia	Mammalia
Order	Cetacea	Carnivora	Carnivora	Carnivora
Family	Mysticeti	Felidae	Canidae	Canidae
Genus	<i>Balenopora</i>	<i>Felis</i>	<i>Canis</i>	<i>Canis</i>
Species	<i>B. physalis</i>	<i>F. catus</i>	<i>C. latrans</i>	<i>C. lupus</i>
Common name	Blue whale	Domestic cat	Coyote	Wolf

2. Analyze at which level the blue whale diverges from the other animals on the table.

\_\_\_\_\_

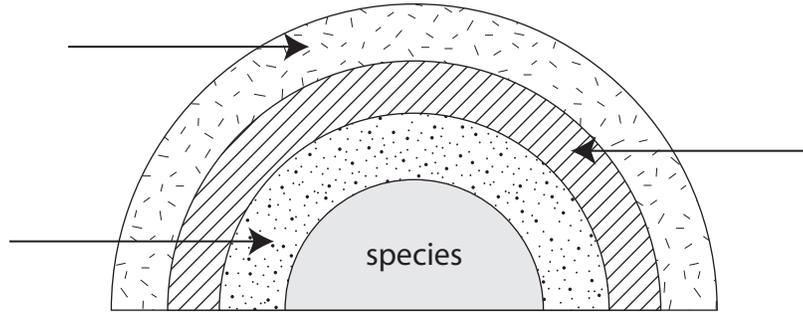
**Section 17.1 The History of Classification** (continued)

**Main Idea**

I found this information on page \_\_\_\_\_.

**Details**

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



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

Domain: \_\_\_\_\_

Kingdom: \_\_\_\_\_

Phylum: \_\_\_\_\_

Class: \_\_\_\_\_

**Systematics Applications**

I found this information on page \_\_\_\_\_.

**Summarize** how a dichotomous key works.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**SUMMARIZE**

Explain why a name such as *catfish* is not a good scientific name. Analyze why scientific names are better.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Organizing Life's Diversity

## Section 17.2 Modern Classification

### Main Idea

### Details

**Scan** the illustrations in Section 2 of the chapter and read the captions. Select one illustration and state why you think it will be important.

Illustration: \_\_\_\_\_

Why it will be important: \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define evolution.

*evolution*

### New Vocabulary

Use your book or dictionary to define each term.

*characters*

*cladistics*

*cladogram*

*molecular clock*

*phylogeny*

### Academic Vocabulary

Define corresponding to show its scientific meaning.

*corresponding*

**Section 17.2 Modern Classification** (continued)

**Main Idea**

**Details**

**Determining Species**

*I found this information on page \_\_\_\_\_.*

**Compare** *the four concepts that biologists have used or are using to classify organisms.*

Concept	Basis of Classification	Limitations
Typological species concept		
	group of organisms that can interbreed and produce fertile offspring in a natural setting	
		unknown evolutionary histories for some species

**Section 17.2 Modern Classification** (continued)

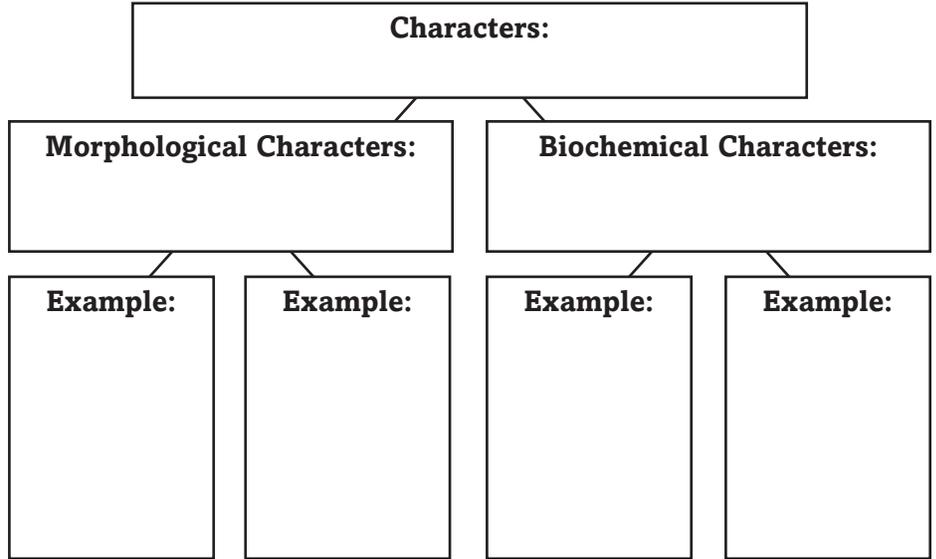
**Main Idea**

**Details**

**Characters**

I found this information on page \_\_\_\_\_.

**Identify and give examples of the two types of characters in the concept map.**



**Phylogenetic Reconstruction**

I found this information on page \_\_\_\_\_.

**Describe cladograms by completing the paragraph.**

A \_\_\_\_\_ is a branching diagram that represents the proposed \_\_\_\_\_ or evolution of a \_\_\_\_\_ or group. The groups used in cladograms are called \_\_\_\_\_. To \_\_\_\_\_ a cladogram, \_\_\_\_\_ characters are identified. Then the \_\_\_\_\_ of various species is identified based on the \_\_\_\_\_ or \_\_\_\_\_ of the derived characters in the \_\_\_\_\_. In making a cladogram, \_\_\_\_\_ assume that groups that \_\_\_\_\_ more derived characters have a more \_\_\_\_\_ common ancestor.

**SUMMARIZE**

Describe a process scientists use to construct a cladogram that includes a new species of vascular plant that was recently discovered in the rainforest.

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# Organizing Life's Diversity

## Section 17.3 Domains and Kingdoms

### Main Idea

### Details

**Scan** Section 3 of the chapter. 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 groups of organisms.

Write three facts you discovered as you scanned the section.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

*eukaryote*

Use your book or dictionary to define eukaryote.

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

*Archaea*

Use your book or dictionary to define each term.

\_\_\_\_\_  
\_\_\_\_\_

*eubacteria*

\_\_\_\_\_

*fungus*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*protists*

\_\_\_\_\_  
\_\_\_\_\_

**Section 17.3 Domains and Kingdoms** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Grouping Species**

*I found this information on page \_\_\_\_\_.*

**Rephrase** *why the members formerly in the Kingdom Monera were separated into the two new domains Bacteria and Archaea.*

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**Domain Bacteria**

*I found this information on page \_\_\_\_\_.*

**Model** *the cell walls of eubacteria. Label the features of eubacteria.*

**Domain Archaea**

*I found this information on page \_\_\_\_\_.*

**Analyze** *why archaeobacteria are sometimes called extremophiles.*

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**Domain Eukarya**

*I found this information on page \_\_\_\_\_.*

**Organize** *the kingdoms in the Domain Eukarya and describe their cell structure. List each kingdom's sources of energy and other important characteristics.*

Kingdom	Cell Structure	Energy Sources	Other Characteristics
Eubacteria			
Archaeobacteria			

**Section 17.3 Domains and Kingdoms** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

*I found this information  
on page \_\_\_\_\_.*

Kingdom	Cell Structure	Energy Sources	Other Characteristics
Protists			
Fungi			
Plants			
Animals			

**SUMMARIZE**

Model a diagram of the relationship between domains and kingdoms.



# Bacteria and Viruses

## Section 18.1 Bacteria

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Scan** Section 1 of the chapter. Write two facts that you discovered as you scanned the section.

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

**Review Vocabulary**

*prokaryotic cell*

Use your book or dictionary to define prokaryotic cell.

\_\_\_\_\_

**New Vocabulary**

*bacteria*

*binary fission*

*capsule*

*conjugation*

*endospore*

*nucleoid*

*pilus*

Use your book or dictionary to define each term.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 18.1 Bacteria** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Diversity of Prokaryotes**

*I found this information on page \_\_\_\_\_.*

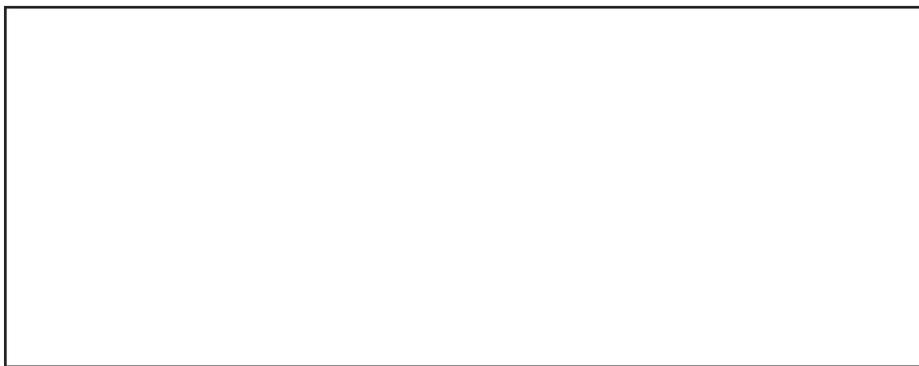
**Summarize** *three general environments where archaeobacteria live, and give one example of each environment.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Prokaryote Structure**

*I found this information on page \_\_\_\_\_.*

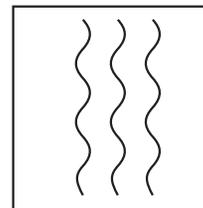
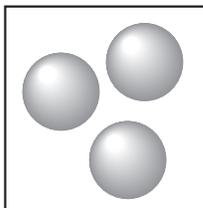
**Model** *a prokaryotic cell and label its structures.*



**Identifying Prokaryotes**

*I found this information on page \_\_\_\_\_.*

**Identify** *each bacterial shape below with its scientific name.*



\_\_\_\_\_

**Reproduction of Prokaryotes**

*I found this information on page \_\_\_\_\_.*

**Compare** *prokaryote reproduction by completing the table below.*

Reproduction Method		
Process		
Result		

**Section 18.1 Bacteria** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Metabolism of Prokaryotes**

*I found this information on page \_\_\_\_\_.*

**Compare prokaryotes by describing how each group below obtains energy for cellular respiration.**

Saprotrophs: \_\_\_\_\_

Photoautotrophs: \_\_\_\_\_

Chemoautotrophs: \_\_\_\_\_

**Survival of Bacteria**

*I found this information on page \_\_\_\_\_.*

**Identify two bacterial survival mechanisms and describe the advantages of each mechanism.**

Mechanism	Survival Advantages
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

**Ecology of Bacteria**

*I found this information on page \_\_\_\_\_.*

**List five ways that bacteria are helpful to humans.**

Bacteria are helpful

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**SUMMARIZE**

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

\_\_\_\_\_  
\_\_\_\_\_

# Bacteria and Viruses

## Section 18.2 Viruses and Prions

**Main Idea**

**Details**

**Scan** the table and time line in Section 2 of the chapter. Write three facts you discovered about viruses from these elements.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define protein.

*protein*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

Use the new vocabulary terms in the left column to complete the following paragraph.

*capsid*

*lysogenic cycle*

*lytic cycle*

*prion*

*retrovirus*

*virus*

A \_\_\_\_\_ is genetic material within a protein coat, but it has no organelles or other characteristics of life. The genetic material lies inside its \_\_\_\_\_, or outer layer of protein. In the \_\_\_\_\_, viral genes instruct the host cell to make many copies of the viral RNA or DNA. Some viruses replicate in a \_\_\_\_\_, in which the viral DNA integrates into a host chromosome and lies dormant for some time. A \_\_\_\_\_, such as the HIV virus, contains RNA instead of DNA. Mutation in the genes of a normal protein called a \_\_\_\_\_ is responsible for diseases such as “mad cow.”

**Academic Vocabulary**

Define *widespread* to show its scientific meaning.

*widespread*

\_\_\_\_\_

\_\_\_\_\_

**Section 18.2 Viruses and Prions (continued)**

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Viruses**

*I found this information on page \_\_\_\_\_.*

**Model** of one type of virus. Label its parts.



**Viral Infection**

*I found this information on page \_\_\_\_\_.*

**Synthesize** why many viruses cannot pass from one species to another.

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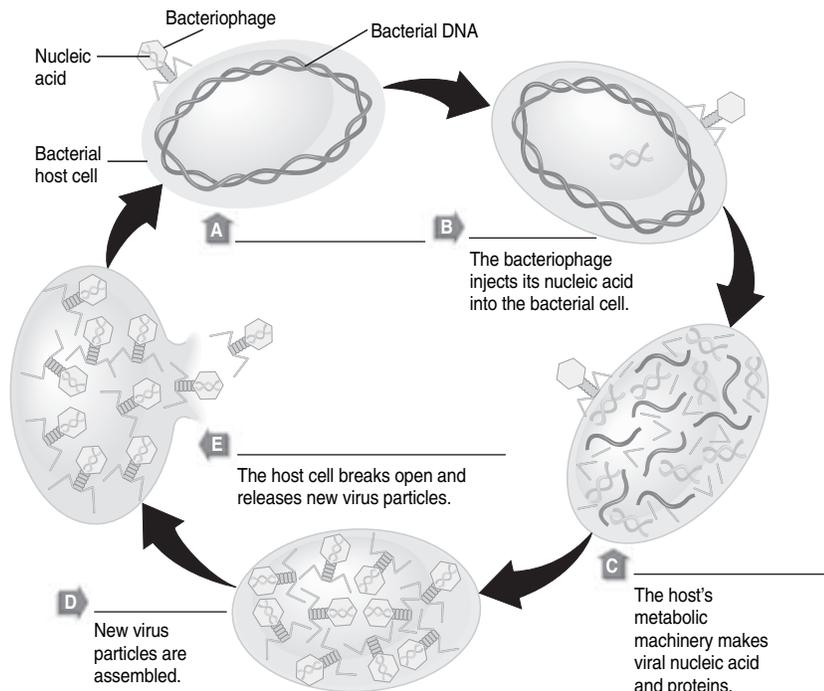
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**Label** steps A, B, C, D, and E of a lytic cycle in the figure below. Use the following terms.

- Assembly
- Attachment
- Entry
- Lysis and Release
- Replication

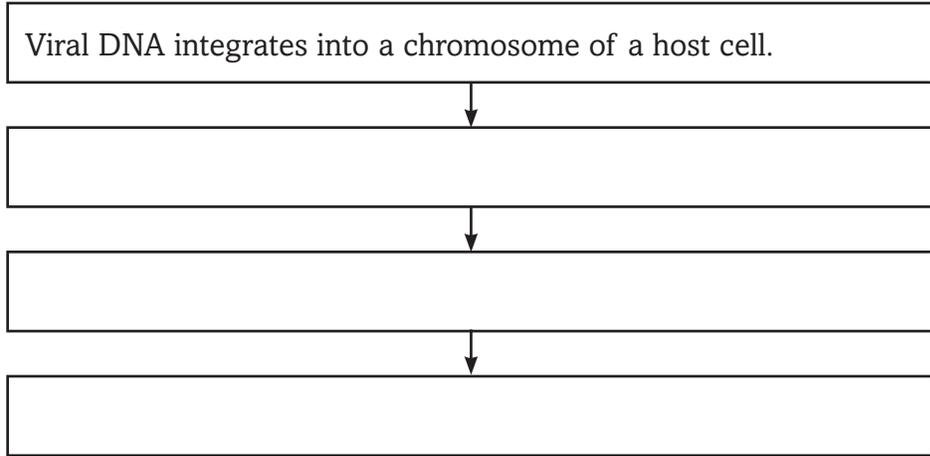


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**Section 18.2 Viruses and Prions** (continued)

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Sequence** *the steps of a lysogenic cycle.*



**Retroviruses**

*I found this information on page \_\_\_\_\_.*

**Evaluate and discuss** *the role of reverse transcriptase in the replication cycle of HIV.*

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**Prions**

*I found this information on page \_\_\_\_\_.*

**Summarize** *information about prions by completing the table.*

What is a prion?	What causes a prion to become harmful?
How might humans contract a prion-caused disease?	What is the result of prion infection?

**SUMMARIZE**

**Conclude whether viruses that replicate by the lytic cycle or the lysogenic cycle are more dangerous. Explain your reasoning.**

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# Tie It Together

## SYNTHESIZE

*Create a quiz to help you review key topics in this chapter. Write one question with its answer for each major topic listed below.*

<p>Topic: Diversity of Prokaryotes</p> <p>Question: _____</p> <p>Answer: _____</p>	<p>Topic: Metabolism of Prokaryotes</p> <p>Question: _____</p> <p>Answer: _____</p>
<p>Topic: Prokaryote Structure</p> <p>Question: _____</p> <p>Answer: _____</p>	<p>Topic: Ecology of Bacteria</p> <p>Question: _____</p> <p>Answer: _____</p>
<p>Topic: Identifying Prokaryotes</p> <p>Question: _____</p> <p>Answer: _____</p>	<p>Topic: Viruses</p> <p>Question: _____</p> <p>Answer: _____</p>
<p>Topic: Reproduction of Prokaryotes</p> <p>Question: _____</p> <p>Answer: _____</p>	<p>Topic: Retroviruses</p> <p>Question: _____</p> <p>Answer: _____</p>
<p>Topic: Survival of Bacteria</p> <p>Question: _____</p> <p>Answer: _____</p>	<p>Topic: Prions</p> <p>Question: _____</p> <p>Answer: _____</p>

# Protists

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Protists	After You Read
	<ul style="list-style-type: none"> <li>• Protists are not animals, plants, or fungi.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Some amoebas have a hard covering like a shell.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Protists cannot make their own food.</li> </ul>	
	<ul style="list-style-type: none"> <li>• A type of downy mildew was responsible for widespread starvation in 19th century Ireland.</li> </ul>	

### 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.*

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# Protists

## Section 19.1 Introduction to Protists

### Main Idea

### Details

**Scan** the table and pictures in Section 1 of the chapter. Read all captions. List three facts that you discovered about protists.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define heterotroph. Then use the term in a sentence to show its scientific meaning.

*heterotroph*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each vocabulary term. Then use each term in a sentence.

*microsporidium*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*protozoan*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 19.1 Introduction to Protists** (continued)

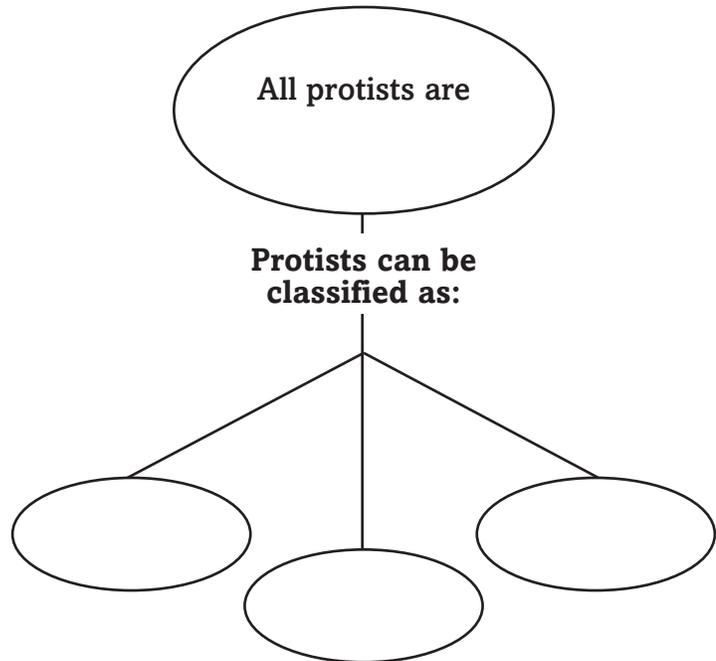
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Protists**

*I found this information on page \_\_\_\_\_.*

**Organize** information about how protists are classified.



**Analyze** the characteristics that are used to classify protists.

Type of Protist	Characteristic	Example
Animal-like		
Plantlike		
Funguslike		

**List** two characteristics that distinguish funguslike protists from fungi.

distinguishing characteristics \_\_\_\_\_  
of funguslike protists \_\_\_\_\_

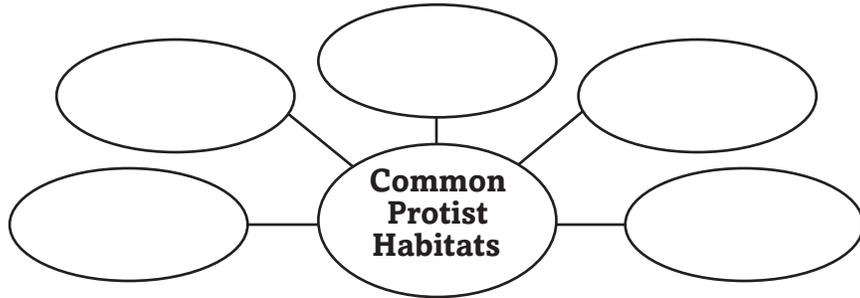
**Section 19.1 Introduction to Protists (continued)**

**Main Idea** \_\_\_\_\_

I found this information on page \_\_\_\_\_.

**Details** \_\_\_\_\_

**Summarize** the common habitats of protists by completing the graphic organizer.



**Identify** two examples of mutualistic relationships between protists and other organisms.

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_

**Origin of Protists**

I found this information on page \_\_\_\_\_.

**Summarize** information about the origin of protists by completing the following paragraph.

The theory of \_\_\_\_\_ suggests that \_\_\_\_\_ became part of protist cells early in the evolutionary process. Later in the evolutionary process, \_\_\_\_\_ appeared in cells, and \_\_\_\_\_ evolved as the only protists that could photosynthesize.

**SUMMARIZE**

Analyze why protists are difficult to classify and why the classification system is likely to change.

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# Protists

## Section 19.2 Protozoans—Animal-like Protists

### Main Idea

### Details

**Scan** Section 2 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Look at all illustrations and read the captions.
- Think about what you already know about protists.

*Write two facts you discovered as you scanned the section.*

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*Use your book or dictionary to define hypotonic.*

*hypotonic*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

*Use your book or dictionary to define each vocabulary term.*

*contractile vacuole*

\_\_\_\_\_  
\_\_\_\_\_

*pellicle*

\_\_\_\_\_

*pseudopod*

\_\_\_\_\_

*test*

\_\_\_\_\_  
\_\_\_\_\_

*trichocyst*

\_\_\_\_\_  
\_\_\_\_\_

**Section 19.2 Protozoans—Animal-like Protists (continued)**

**Main Idea**

**Ciliophora**

*I found this information on page \_\_\_\_\_.*

**Details**

**Model** and label a paramecium and its parts in the space below. Label the following parts with a brief description of each part.

- anal pore
- cilia
- contractile vacuole
- ectoplasm
- gullet
- micronucleus
- macronucleus
- oral groove

**Sarcodina**

*I found this information on page \_\_\_\_\_.*

**Organize** facts about amoebas in the table below.

Phylum:	Excretion method:
Habitats:	Feeding method:
Body structures:	Reproduction method:

**Section 19.2 Protozoans—Animal-like Protists** (continued)

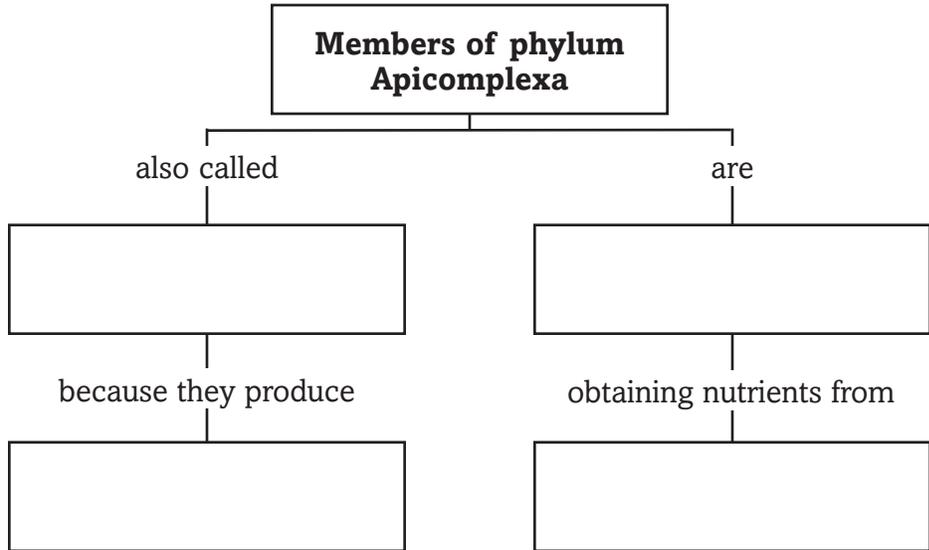
**Main Idea**

**Apicomplexa**

I found this information on page \_\_\_\_\_.

**Details**

**Organize** information about the members of the phylum Apicomplexa.



**Zoomastigina**

I found this information on page \_\_\_\_\_.

**Compare** American and African sleeping sickness.

	American	African
Host insect:	[ ]	[ ]
Passes to human from insect's:	[ ]	[ ]
Can damage host's:	[ ]	[ ]

**SUMMARIZE**

Compare the habitats and methods of movement among the three phyla of protozoans.

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# Protists

## Section 19.3 Algae—Plantlike Protists

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

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

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define chloroplasts.

*chloroplasts*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each vocabulary term. Then write a sentence for each term to show its scientific meaning.

*alternation of generations*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*bioluminescent*

\_\_\_\_\_  
\_\_\_\_\_

*colony*

\_\_\_\_\_  
\_\_\_\_\_

**Academic Vocabulary**

Define suspension, then write a sentence to show its scientific meaning.

*suspension*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 19.3 Algae—Plantlike Protists** (continued)

**Main Idea**

**Characteristics of Algae**

*I found this information on page \_\_\_\_\_.*

**Details**

**Organize** information about algae by completing the chart.

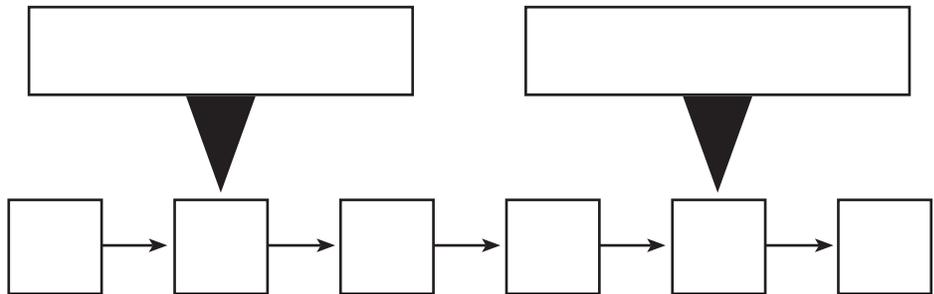
Algae	
Like plants:	Unlike plants:
Function of secondary pigments:	Found in many colors because:

**Diversity of Algae**

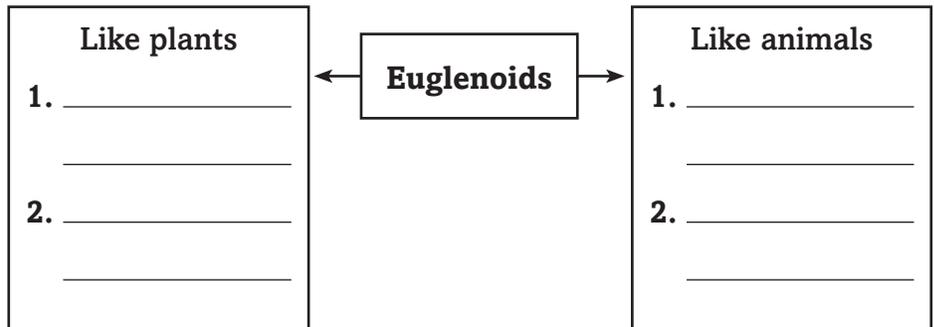
*I found this information on page \_\_\_\_\_.*

**Sequence** the asexual and sexual reproductive cycles of diatoms by writing the letter for each step in the correct box.

- a. fusion of gametes
- b. meiosis
- c. mitosis
- d. gametes released
- e. wall formation around cell
- f. zygote



**Compare** the ways that euglenoids are like plants and like animals.



**Section 19.3 Algae—Plantlike Protists (continued)**

**Main Idea**

**Details**

**Uses for Algae**

I found this information on page \_\_\_\_\_.

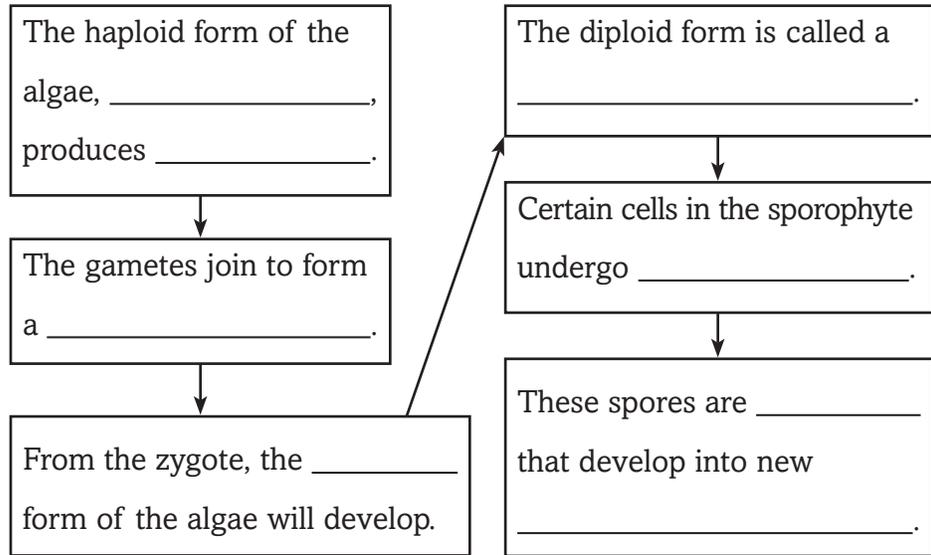
**Summarize** the common uses for algae. Algae types may be used more than once.

Common Uses	Type of Algae
Used for filtering water supplies	
Used to stabilize syrups	
Used in the preparation of scientific gels	
Used as abrasives	
Used in salads	
Used to thicken puddings and shampoos	
Used to preserve canned meat and fish	

**Life Cycle of Algae**

I found this information on page \_\_\_\_\_.

**Summarize** the alternation of generations.



**SUMMARIZE**

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

\_\_\_\_\_

\_\_\_\_\_

# Protists

## Section 19.4 Funguslike Protists

### Main Idea

### Details

**Scan** Section 4 of the chapter. Write three facts that you discovered about cellular and acellular slime molds.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

*cellulose*

Use your book or dictionary to define cellulose.

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

*acrasin*

Use your book or dictionary to define each vocabulary term.

\_\_\_\_\_  
\_\_\_\_\_

*plasmodium*

\_\_\_\_\_  
\_\_\_\_\_

### Academic Vocabulary

*phase*

Define phase to show its scientific meaning. Then use the word in a sentence.

\_\_\_\_\_  
\_\_\_\_\_

**Section 19.4 Funguslike Protists (continued)**

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Slime Molds**

I found this information on page \_\_\_\_\_.

**Compare** *slime molds to fungi by completing the table below.*

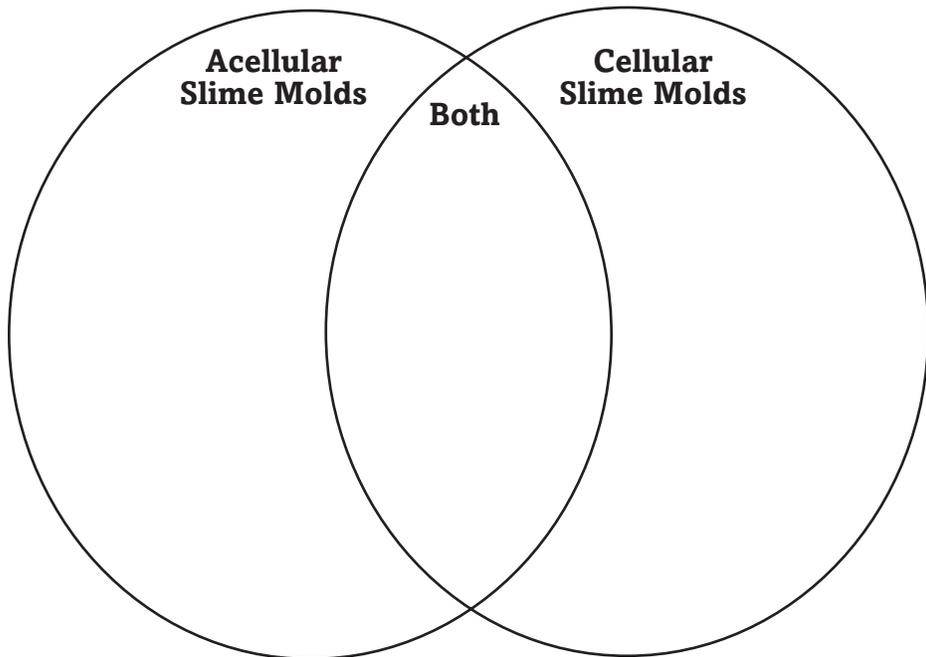
<b>Similarities in Slime Molds and Fungi</b>
Reproduce using:
Feed on:
Absorb nutrients through:

**Contrast** *slime molds and fungi by completing the following sentence.*

The cell walls of fungi are composed of \_\_\_\_\_, and cell walls in slime molds contain \_\_\_\_\_.

**Compare and contrast** *acellular and cellular slime molds by using the following phrases to complete the Venn diagram.*

- move and surround food like amoebas
- flagellated during part of life cycle
- most of life cycle spent as single, amoeba-like cells
- form colonies when food is scarce
- mobile mass of cytoplasm with no separate cells
- make spores to reproduce



**Section 19.4 Funguslike Protists (continued)**

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Analyze** *two ways in which the life cycles of acellular and cellular slime molds are similar and two ways in which they are different.*

Similarities in Life Cycle	Differences in Life Cycle
1.	1.
2.	2.

**Water Molds and Downy Mildew**

*I found this information on page \_\_\_\_\_.*

**Organize** *information about water molds and downy mildews by completing the table below.*

Water Molds and Downy Mildews	
Habitat	
Source of nutrition	
Similarities to fungi	
Differences from fungi	

# Tie It Together

## SUMMARIZE

*Malaria is a disease caused by sporozoans. It is spread by mosquitoes. Consider which would have a greater benefit—developing a drug that would cure malaria or developing an insecticide that would kill all mosquitoes. List the possible advantages and disadvantages of each approach. Then make a conclusion about which choice would be better.*

### Malaria Drug

Advantages

Disadvantages

### Insecticide

Advantages

Disadvantages

### Conclusions

# Fungi

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

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

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# Fungi

## Section 20.1 Introduction to Fungi

### Main Idea

### Details

**Scan** the figures and read the figure captions in Section 1 of the chapter. Write two facts that you discovered about fungi.

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define *saprobe*.

*saprobe*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*chitin*

\_\_\_\_\_

\_\_\_\_\_

*fruiting body*

\_\_\_\_\_

\_\_\_\_\_

*haustoria*

\_\_\_\_\_

\_\_\_\_\_

*hyphae*

\_\_\_\_\_

\_\_\_\_\_

*mycelium*

\_\_\_\_\_

\_\_\_\_\_

*septa*

\_\_\_\_\_

*sporangium*

\_\_\_\_\_

*spore*

\_\_\_\_\_

\_\_\_\_\_

**Section 20.1 Introduction to Fungi (continued)**

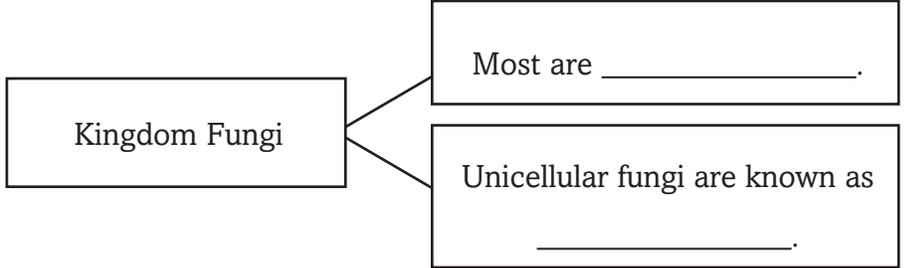
**Main Idea**

**Characteristics of Fungi/Major Features of Fungi**

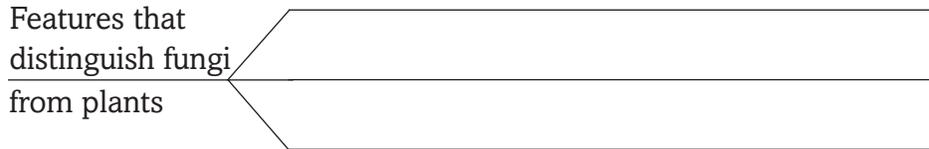
*I found this information on page \_\_\_\_\_.*

**Details**

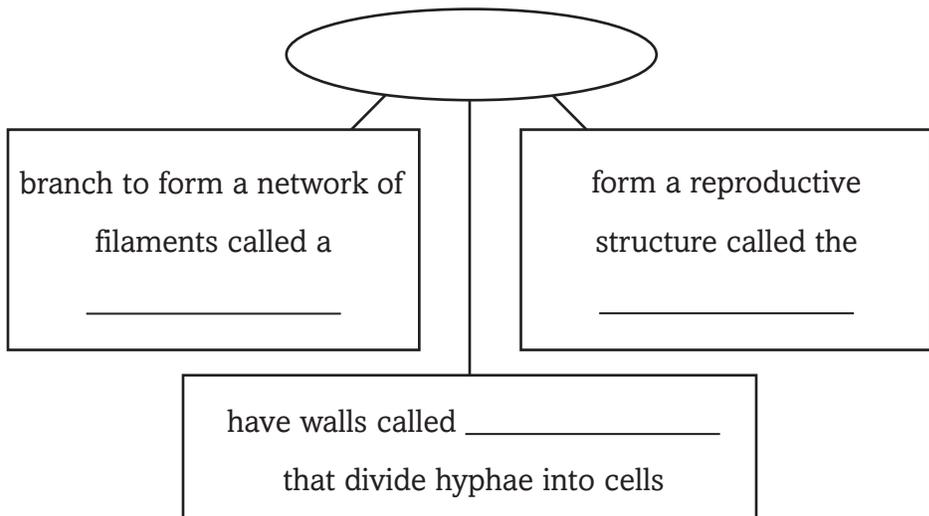
**Describe** *the kingdom Fungi.*



**List** *three features of fungi that distinguish them from plants.*



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



**Nutrition in Fungi**

*I found this information on page \_\_\_\_\_.*

**Describe** *how fungi digest their food outside the body.*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 20.1 Introduction to Fungi (continued)**

**Main Idea**

**Details**

**Classify** *types of fungi by writing how each obtains food.*

<b>Saprophytes</b>	
<b>Mutualists</b>	
<b>Parasites</b>	

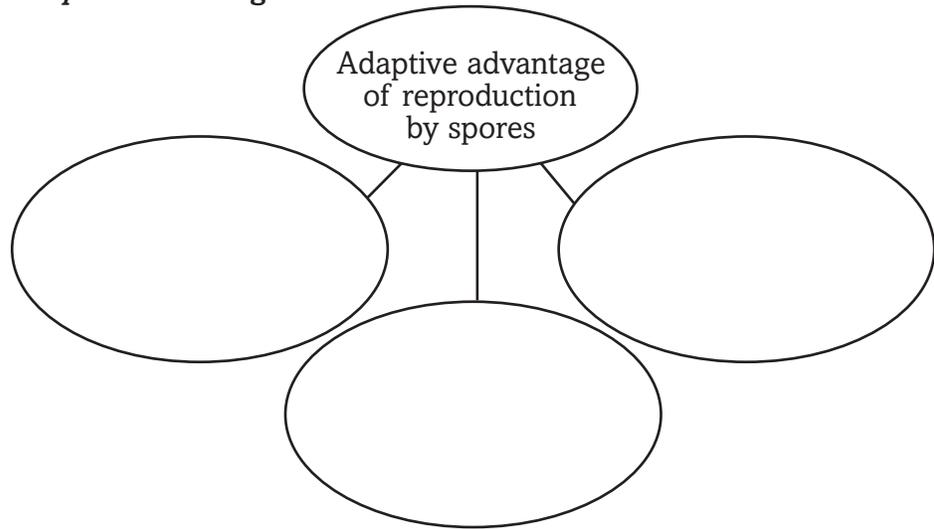
**Reproduction in Fungi**

*I found this information on page \_\_\_\_\_.*

**Distinguish** *the 3 forms of asexual reproduction in fungi in the boxes below.*

Forms of asexual reproduction

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



**SUMMARIZE**

Discuss why hyphae are an adaptive advantage in fungi.

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# Fungi

## Section 20.2 Diversity of Fungi

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

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

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define flagellated.

*flagellated*

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Write the correct vocabulary term in the left column for each definition below.

- |       |  |
|-------|--|
| _____ | in molds, hyphae that spread across the surface of food                                |
| _____ | in molds, hyphae that penetrate food and absorb nutrients                              |
| _____ | a mold reproductive structure that contains a haploid nucleus                          |
| _____ | in sac fungi, hyphae that produce spores on their tips for asexual reproduction        |
| _____ | in sac fungi, a reproductive structure where a zygote forms during sexual reproduction |
| _____ | in sac fungi, a saclike structure where spores develop during sexual reproduction      |
| _____ | spores produced by the ascus in sac fungi  |
| _____ | fruiting body of club fungi  |
| _____ | club-shaped hyphae that produce spores in club fungi                                   |
| _____ | spores produced in basidia during sexual reproduction of club fungi                    |

**Section 20.2 Diversity of Fungi (continued)**

**Main Idea**

**Classification of Fungi**

I found this information on page \_\_\_\_\_.

**Chytrids**

I found this information on page \_\_\_\_\_.

**Common Molds**

I found this information on page \_\_\_\_\_.

**Details**

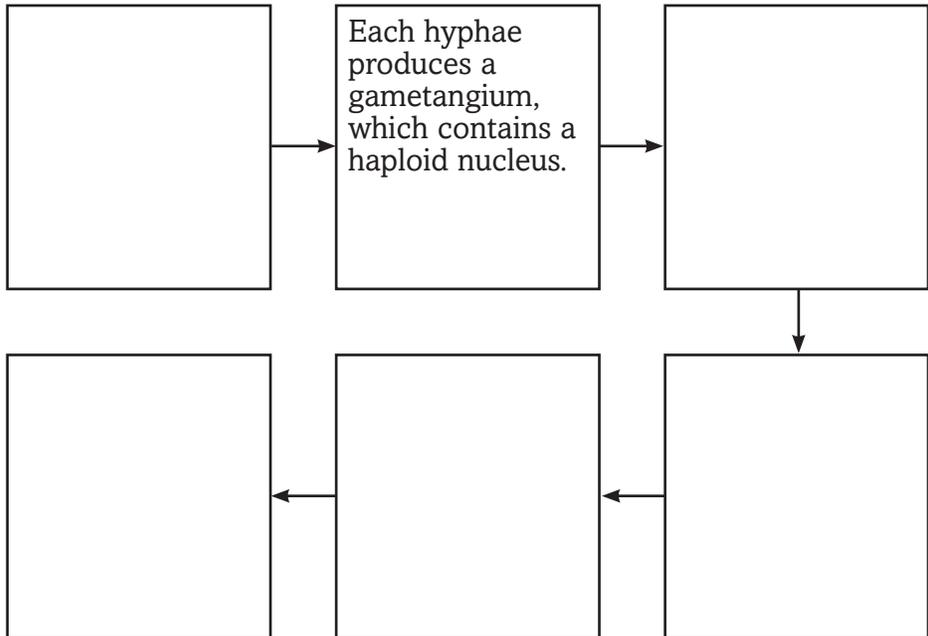
**Model** a phylogenetic tree for fungi and label the major phyla.

**Summarize** the evidence supporting the initial classification of chytrids as protists and later reclassification as fungi.

**Chytrids are like protists.**

**Chytrids are like fungi.**

**Sequence** how zygomycetes reproduce sexually, by completing the graphic organizer.



**Section 20.2 Diversity of Fungi** (continued)

**Main Idea**

**Sac Fungi**

I found this information on page \_\_\_\_\_.

**Club Fungi**

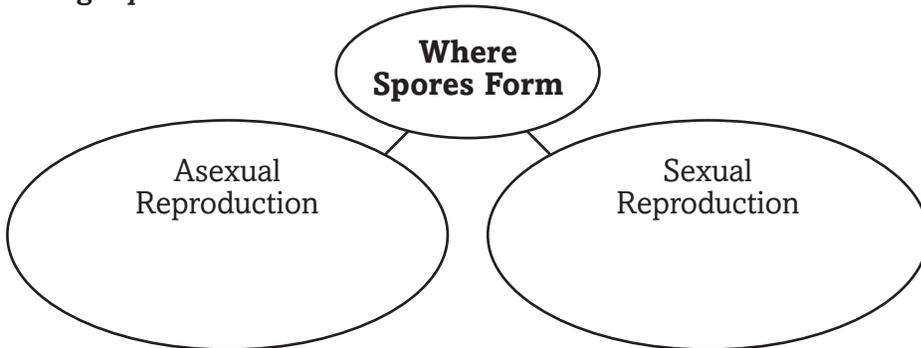
I found this information on page \_\_\_\_\_.

**Other Fungi**

I found this information on page \_\_\_\_\_.

**Details**

**Organize** information about where the spores of sac fungi form during reproduction.



**Model** a club fungi. Label the basidiocarp and the basidia.

**Predict** what might happen to the phylum Deuteromycota as scientists continue to study its species. Explain your reasoning.

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**SUMMARIZE**

Explain the adaptive advantages of zygospores that help ensure the survival of the species.

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# Fungi

## Section 20.3 Ecology of Fungi

### Main Idea

### Details

**Scan** Section 3 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Read all tables.
- Look at all pictures and read the captions.

Write two facts you discovered about the ecology of fungi.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*cyanobacterium*

Use your book or dictionary to define cyanobacterium.

\_\_\_\_\_

### New Vocabulary

*bioindicator*

Use your book or dictionary to define each term.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*lichen*

\_\_\_\_\_  
\_\_\_\_\_

*mycorrhiza*

\_\_\_\_\_  
\_\_\_\_\_

### Academic Vocabulary

*cooperate*

Define cooperate to show its scientific meaning.

\_\_\_\_\_  
\_\_\_\_\_

**Section 20.3 Ecology of Fungi (continued)**

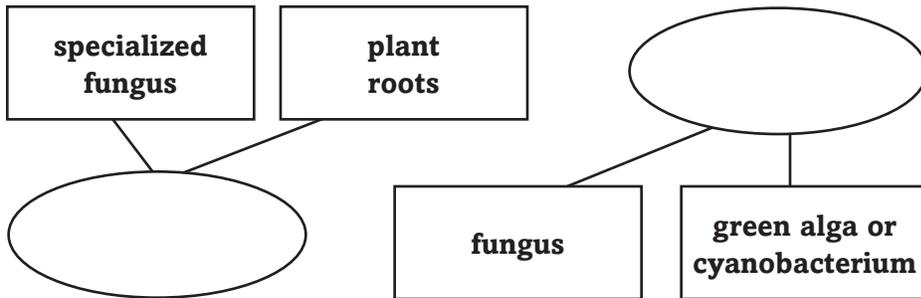
**Main Idea**

**Fungi and Photosynthesizers**

I found this information on page \_\_\_\_\_.

**Details**

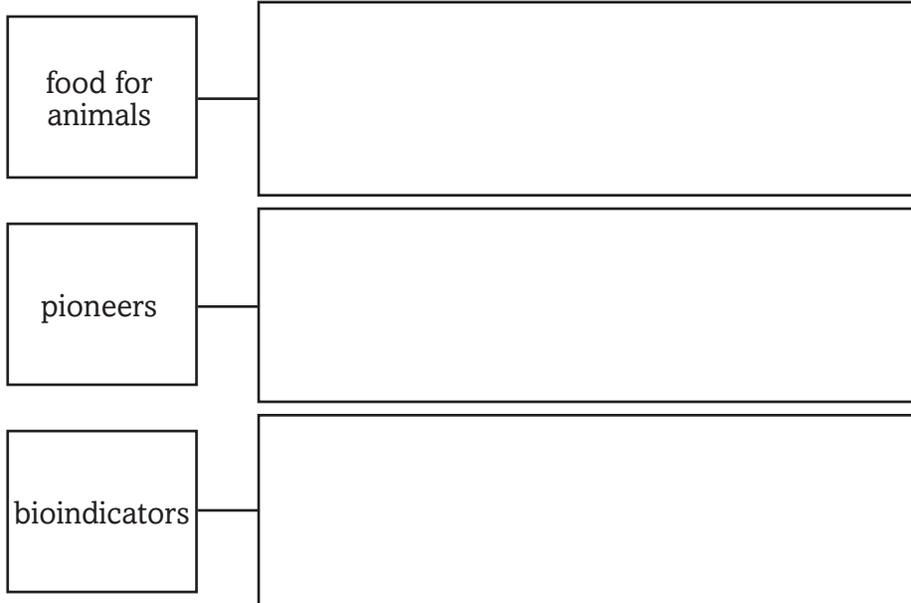
Identify the symbiotic relationships formed by the partners in the graphic organizer.



Complete the paragraph below to describe mycorrhizal relationships.

Infection by a fungal partner helps orchid seeds to \_\_\_\_\_ . The fungal partner of a *Eucalyptus* tree absorbs \_\_\_\_\_ for the tree. The tree can absorb more water because the \_\_\_\_\_ of the fungus increase the \_\_\_\_\_ of the tree's roots. In return, the fungus receives \_\_\_\_\_ from the tree.

Analyze the benefits of lichens as . . .



**Section 20.3 Ecology of Fungi (continued)**

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Fungi and Humans**

*I found this information on page \_\_\_\_\_.*

**Organize** *the beneficial effects of fungi in the table below.*

<b>Role of Fungi</b>	<b>Benefits to Humans</b>
as decomposers	
in medicine	
in foods	
in bioremediation	

**Describe** *the harmful effects of fungi on each of the following.*

<b>Plants</b>	<b>Humans</b>

**SUMMARIZE**

Compare and contrast mycorrhizae and lichens.

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# Introduction to Plants

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

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

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# Introduction to Plants

## Section 21.1 Plant Evolution and Adaptations

### Main Idea

### Details

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

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*limiting factor*

Use your book or dictionary to define limiting factor.

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*nonvascular plant*

\_\_\_\_\_

*seed*

\_\_\_\_\_

\_\_\_\_\_

*stomata*

\_\_\_\_\_

\_\_\_\_\_

*vascular plant*

\_\_\_\_\_

\_\_\_\_\_

*vascular tissue*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Academic Vocabulary

Define dominant to show its scientific meaning.

*dominant*

\_\_\_\_\_

**Section 21.1 Plant Evolution and Adaptations** (continued)

**Main Idea**

**Plant Evolution**

*I found this information on page \_\_\_\_\_.*

**Details**

**Sequence** *the evolution of plants by placing the following information in the correct boxes below.*

- algae at edges of seas adapted to life on land
- algae in oceans
- no plants
- simple plants appear



**Identify** *the 6 characteristics of the present-day members of the algae and plant groups.*

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Plant Adaptations to Land Environments**

*I found this information on page \_\_\_\_\_.*

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

	Location	Purpose	Plant organ?
cuticle	on stems and leaves	reduce water loss	no
leaf	grows from stem		
root			
stem			
seed		protects embryo from drying	

**Section 21.1 Plant Evolution and Adaptations** (continued)

**Main Idea**

**Details**

**Alternation of Generations**

*I found this information on page \_\_\_\_\_.*

**Compare** *the gametophyte generation and the sporophyte generation of plants.*

Gametophyte Generation	Sporophyte Generation

**Plant Classification**

*I found this information on page \_\_\_\_\_.*

**Classify** *the following plant categories by writing an NV in front of nonvascular plants, an NS in front of seedless vascular plants, and a VS in front of vascular plants with seeds.*

- |                      |                       |
|----------------------|-----------------------|
| _____ cycadophytes   | _____ anthocerophytes |
| _____ anthophytes    | _____ bryophytes      |
| _____ coniferophytes | _____ ginkgophytes    |
| _____ pterophytes    | _____ gnetophytes     |
| _____ hepaticophytes | _____ lycophytes      |

**SUMMARIZE**

Contrast how the sperm reaches the egg differently in seed plants than in non-seed plants.

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# Introduction to Plants

## Section 21.2 Nonvascular Plants

### Main Idea

### Details

**Scan** Section 2 of the chapter. 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

*symbiosis*

*Use your book or dictionary to define symbiosis.*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

*thallose*

*Use your book or dictionary to define the following term.*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 21.2 Nonvascular Plants** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Diversity of Nonvascular Plants**

*I found this information on page \_\_\_\_\_.*

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

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

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

	Description	Environment	Example
Bryophyta			
Hepaticophyta			
Anthocerophyta			

**Section 21.2 Nonvascular Plants** (continued)

**Main Idea**

**Details**

**Organize** *the following terms with the correct definition below: sporophyte, gametophyte, thallus, and rhizoid.*

Term	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

**Conclude** *how anthocerophytes became known as hornworts.*

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**Create** *a graphic organizer that models the possible common ancestry of nonvascular and vascular plants.*

**SUMMARIZE**

Classify each group of nonvascular plants by naming one species of the group and one identifiable structure on that species.

Bryophytes

Anthocerophytes

Hepaticophytes

# Introduction to Plants

## Section 21.3 Seedless Vascular Plants

### Main Idea

### Details

**Predict** the primary difference between the plants you read about in Section 2 of the chapter and the seedless vascular plants that you will read about in Section 3.

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### Review Vocabulary

Use your book or dictionary to define spore.

*spore*

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### New Vocabulary

Use your book or dictionary to define each term.

*epiphyte*

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*rhizome*

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*sorus*

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*sporangium*

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*strobilus*

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**Section 21.3 Seedless Vascular Plants** (continued)

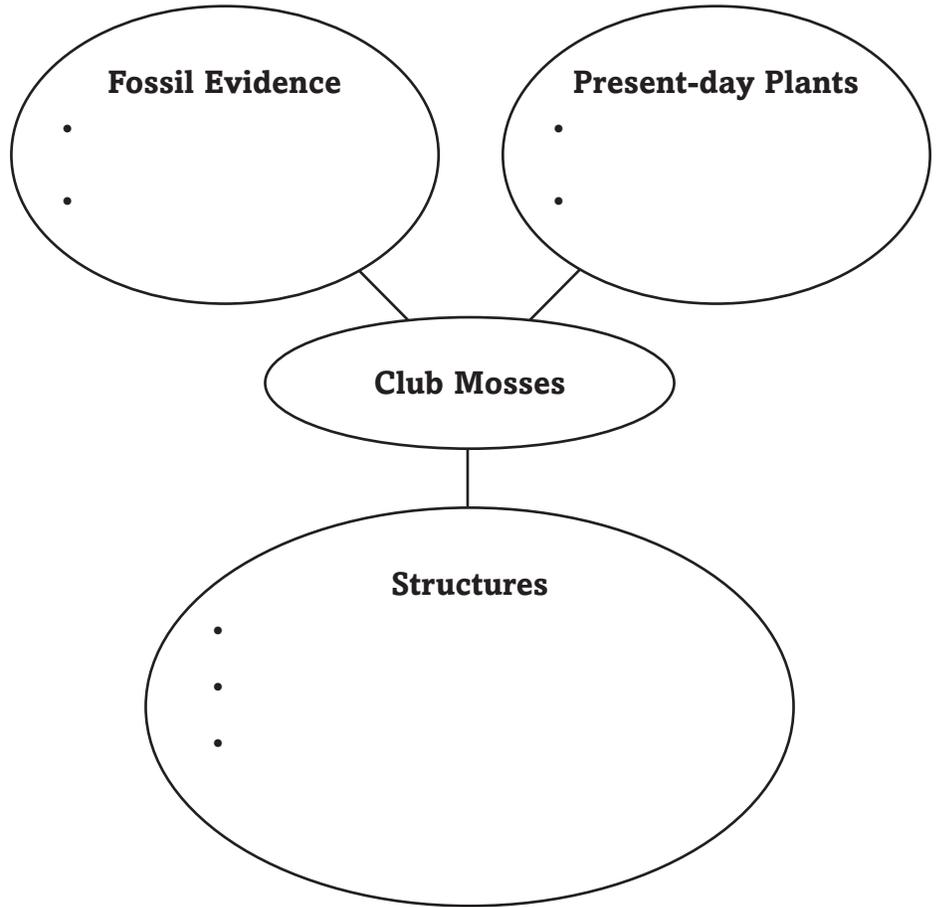
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Diversity of Seedless Vascular Plants**

I found this information on page \_\_\_\_\_.

**Compare** *present-day club mosses with their ancestors and describe the structures found in present-day plants.*



**Describe** *the structures and common locations of ferns and horsetails.*

	<b>Ferns</b>	<b>Horsetails</b>
Structures		
Locations		

**Section 21.3 Seedless Vascular Plants** (continued)

**Main Idea**

**Details**

**Compare** *the 2 divisions of non-seed vascular plants by completing the table below.*

Lycophyta	Pterophyta

**Identify** *each of the following plants or plant structures as lycophyte or pterophyte. Write L for lycophyte and P for pterophyte.*

- |                          |                       |
|--------------------------|-----------------------|
| _____ club moss          | _____ strobilus       |
| _____ spike moss         | _____ rhizome         |
| _____ tropical tree fern | _____ frond           |
| _____ sorus              | _____ scouring rushes |
| _____ epiphyte           |                       |

**SUMMARIZE**

Model the two main groups of non-seed vascular plants. Label the important features of each group and give an example of each one.

# Introduction to Plants

## Section 21.4 Vascular Seed Plants

### Main Idea

### Details

**Scan** the illustrations and read the captions. List two conclusions that you can draw about seeds and cones.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define parasite.

*parasite*

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*annual*

\_\_\_\_\_

\_\_\_\_\_

*biennial*

\_\_\_\_\_

\_\_\_\_\_

*cone*

\_\_\_\_\_

\_\_\_\_\_

*cotyledon*

\_\_\_\_\_

\_\_\_\_\_

*perennial*

\_\_\_\_\_

\_\_\_\_\_

**Section 21.4 Vascular Seed Plants** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Diversity of Seed Plants**

*I found this information on page \_\_\_\_\_.*

**Summarize** *the information about the divisions of seed plants by writing one or two sentences about division.*

Division Cycadophyta: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Division Gnetophyta: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Division Ginkgophyta: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Division Coniferophyta: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Division Anthophyta: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Identify** *the life span of each of the following types of plants and list one example of each.*

Annual:	Biennial:	Perennial:

**Section 21.4 Vascular Seed Plants** (continued)

**Main Idea**

**Details**

**Compare** the characteristics of the different divisions of seed plants by completing the table below. The first one has been done for you.

	<b>Reproduction</b>	<b>Environment</b>	<b>Examples</b>
Cycadophyta	males produce pollen grains from cones, pollen produce motile sperm	tropics and subtropics	there are about 100 species today
Ginkgophyta			
Gnetophyta	none given		
Coniferophyta			
Anthophyta			

**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.

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# Tie It Together

## FURTHER INQUIRY

*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.*

# Plant Structure and Function

## Before You Read

Use the “What I Know” column to list the things you know about plant structure and function. Then list the questions you have about plant structure and function in the “What I Want to Find Out” column.

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*Describe some plants that you eat. Then describe some products that you use that come from plants.*

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# Plant Structure and Function

## Section 22.1 Plant Cells and Tissues

**Main Idea**

**Details**

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

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define adaptation.

*adaptation*

\_\_\_\_\_

\_\_\_\_\_

**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.

- collenchyma cell*
- companion cell*
- cork cambium*
- epidermis*
- ground tissue*
- guard cell*
- meristem*
- parenchyma cell*
- phloem*
- sclerenchyma cell*
- sieve-tube member*
- tracheid*
- vascular cambium*
- vessel element*
- xylem*

Cells (8 terms)	Tissues (7 terms)

**Section 22.1 Plant Cells and Tissues** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Plant Cells**

*I found this information on page \_\_\_\_\_.*

**Point out** *three ways that plant cells differ from animal cells.*

\_\_\_\_\_

\_\_\_\_\_

**Model** *a plant cell. Label the cell wall, central vacuole, and chloroplast.*

**Compare** *the three types of plant cells by completing the table below. Describe one characteristic and one function for each type of cell.*

	Parenchyma	Collenchyma	Sclerenchyma
Characteristic			
Function			

**Plant Tissues**

*I found this information on page \_\_\_\_\_.*

**Summarize** *the function of each of the following.*

epidermis: \_\_\_\_\_

stomata: \_\_\_\_\_

guard cells: \_\_\_\_\_

trichomes: \_\_\_\_\_

**Section 22.1 Plant Cells and Tissues** (continued)

**Main Idea** \_\_\_\_\_

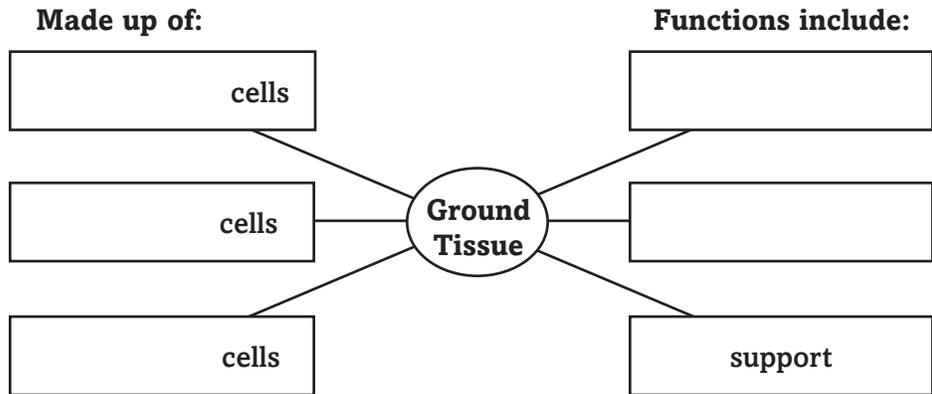
*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Model** a sketch of phloem tissue. Label the following parts.

- companion cell
- sieve plate
- sieve tube member

**Analyze** ground tissue by completing the organizer below.



**SUMMARIZE**

Model a plant. Include captions that explain the three types of cells as well as the four types of tissues.

# Plant Structure and Function

## Section 22.2 Roots, Stems, and Leaves

### Main Idea

### Details

**Skim** Section 2 of the chapter. For each structure below, list two functions.

Roots: \_\_\_\_\_  
\_\_\_\_\_

Stems: \_\_\_\_\_  
\_\_\_\_\_

Leaves: \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define apical meristem.

*apical meristem*

\_\_\_\_\_

### New Vocabulary

Write the correct term in the left column for each definition below.

\_\_\_\_\_

layer of cells just within the endodermis that gives rise to lateral roots

\_\_\_\_\_

single layer of cells that forms a waterproof seal around a root's vascular tissue

\_\_\_\_\_

column-shaped cells that contain many chloroplasts; most photosynthesis takes place here

\_\_\_\_\_

loss of water through stomata

\_\_\_\_\_

tough, protective layer of parenchyma cells that covers the tip of a root

\_\_\_\_\_

layer of ground tissue in the root that is involved in the transport of water

\_\_\_\_\_

stalk that joins the leaf blade to the stem

\_\_\_\_\_

layer of irregularly shaped, loosely packed cells through which oxygen, carbon dioxide, and water vapor move

**Section 22.2 Roots, Stems, and Leaves (continued)**

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Roots**

*I found this information on page \_\_\_\_\_.*

**Compare** *the two main types of root systems. Describe taproots and fibrous roots, then make a sketch of each type.*

Taproots	Fibrous Roots
Definition:	Definition:
Sketch:	Sketch:

**Sequence** *the layers of cells of roots beginning with the outermost layer.*

\_\_\_ endodermis \_\_\_ epidermis \_\_\_ pericycle \_\_\_ cortex

**Stems**

*I found this information on page \_\_\_\_\_.*

**Distinguish** *among the three stems that store food.*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Summarize** *the information on stems in the blanks in the paragraph below.*

Stems vary in their size and \_\_\_\_\_. The main function of a plant's stem is \_\_\_\_\_ of the \_\_\_\_\_ and \_\_\_\_\_ structures. They also \_\_\_\_\_ water and dissolved substances throughout the plant. The annual growth of bundles of \_\_\_\_\_ and \_\_\_\_\_ in the stem can lead to the formation of \_\_\_\_\_ that reveal the \_\_\_\_\_ of the plant. Some stems, such as \_\_\_\_\_, bulbs, and \_\_\_\_\_, store \_\_\_\_\_.

**Section 22.2 Roots, Stems, and Leaves (continued)**

**Main Idea**

**Details**

**Leaves**

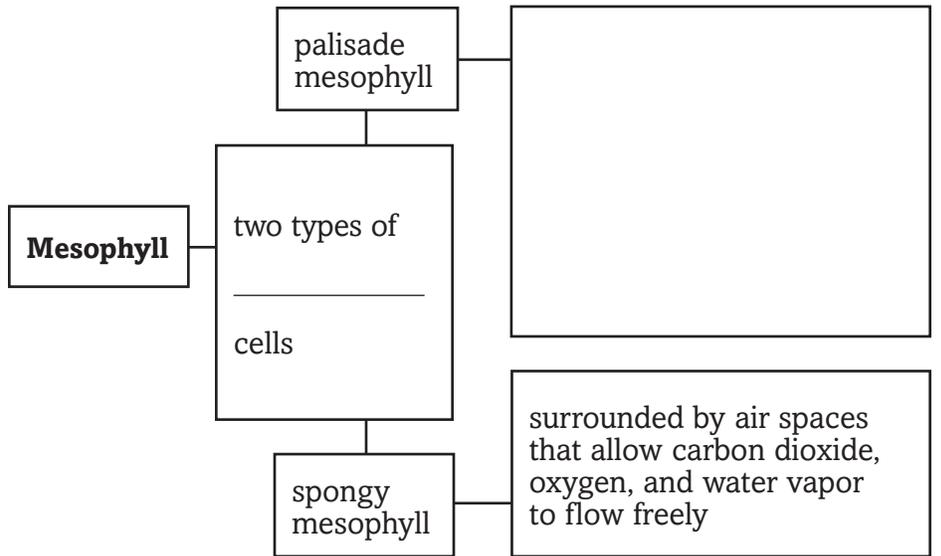
I found this information on page \_\_\_\_\_.

**Compare** the shapes of leaves. Give a brief description of a simple and a compound leaf, and provide one example of each.

simple leaf: \_\_\_\_\_

compound leaf: \_\_\_\_\_

**Summarize** the role of mesophyll by completing the organizer below.



**Analyze** two plants with leaves that have functions besides photosynthesis. Briefly describe these functions.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_

**SUMMARIZE**

Use an analogy to explain how plant structures are adapted to their functions.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Plant Structure and Function

## Section 22.3 Plant Hormones and Responses

### Main Idea

### Details

**Scan** Section 3 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Read all tables.
- Look at all pictures and read the captions.

*Write two facts you discovered about plant hormones.*

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*active transport*

*Use your book or dictionary to define active transport.*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

*auxins*

*cytokinins*

*ethylene*

*gibberellins*

*nastic response*

*tropism*

*Use your book or dictionary to define each term.*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 22.3 Plant Hormones and Responses** (continued)

**Main Idea**

**Plant Hormones**

I found this information on page \_\_\_\_\_.

**Details**

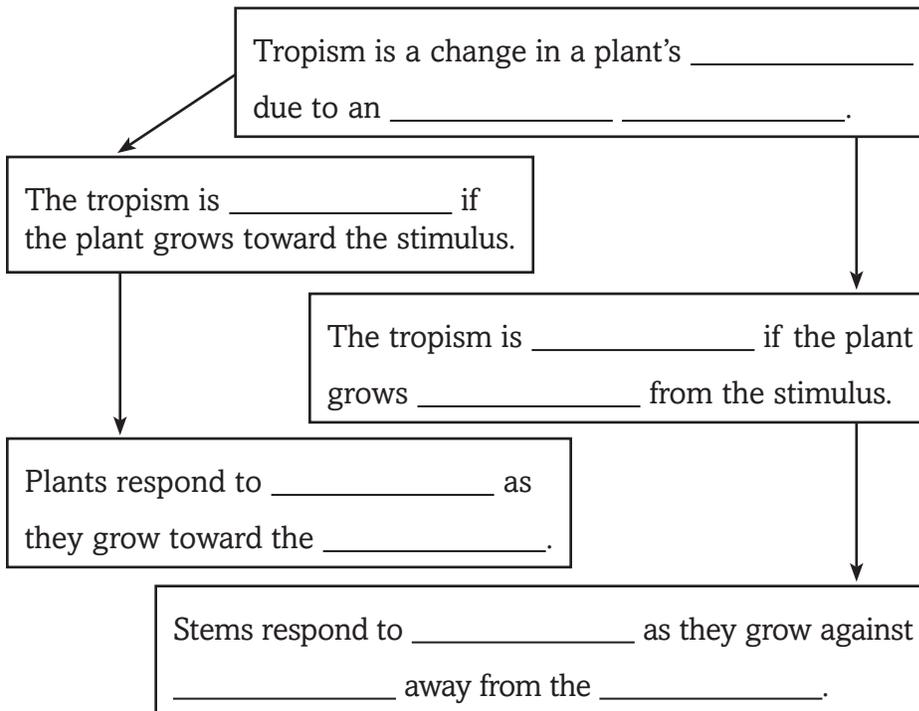
Compare four plant hormones by completing the table below.

Hormone	How This Hormone Regulates Growth	Characteristic of This Hormone	Another Benefit of This Hormone
Auxin			
Gibberellin			
Cytokinin			
Ethylene			

**Plant Responses**

I found this information on page \_\_\_\_\_.

Summarize the two types of tropisms in the organizer below.



**Section 22.3 Plant Hormones and Responses** (continued)

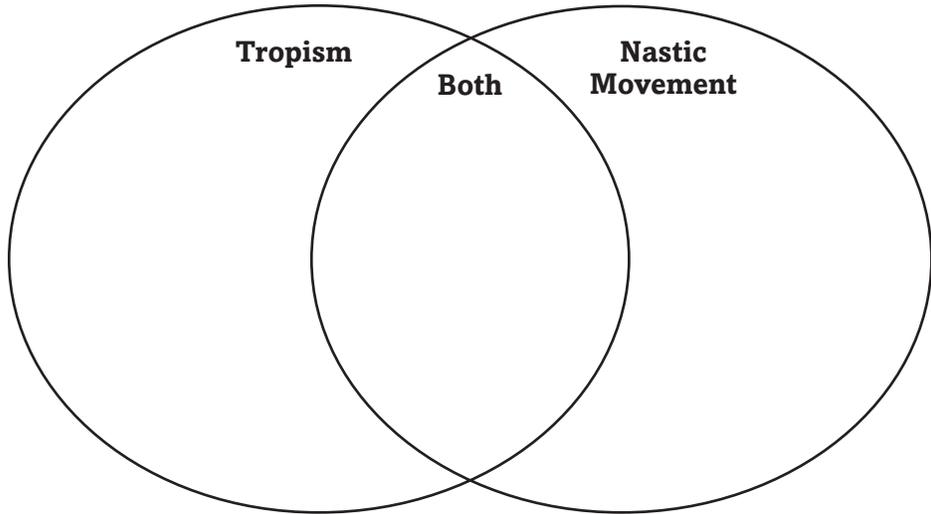
**Main Idea**

I found this information on page \_\_\_\_\_.

**Details**

**Compare** *tropism* and *nastic movement*. Place each characteristic in the correct location in the Venn diagram below.

- does not involve growth
- involves growth
- involves plant response
- is reversible
- is not reversible
- response can be positive or negative



**Classify** each of the following as an example of *tropism* or *nastic movement*.

- \_\_\_\_\_ Venus flytrap closes on an insect.
- \_\_\_\_\_ Sweet pea tendrils climb a fence.
- \_\_\_\_\_ 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.

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# Reproduction in Plants

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*Explain how you think life on Earth would be affected if plants were to stop reproducing.*

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# Reproduction in Plants

## Section 23.1 Introduction to Plant Reproduction

### Main Idea

### Details

**Skim** Section 1 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define flagellated.

*flagellated*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*chemotaxis*

\_\_\_\_\_

\_\_\_\_\_

*heterosporous*

\_\_\_\_\_

\_\_\_\_\_

*megaspore*

\_\_\_\_\_

*micropyle*

\_\_\_\_\_

*microspore*

\_\_\_\_\_

*prothallus*

\_\_\_\_\_

\_\_\_\_\_

*protonema*

\_\_\_\_\_

\_\_\_\_\_

*vegetative reproduction*

\_\_\_\_\_

\_\_\_\_\_

**Section 23.1 Introduction to Plant Reproduction** (continued)

**Main Idea**

**Details**

**Vegetative Reproduction**

I found this information on page \_\_\_\_\_.

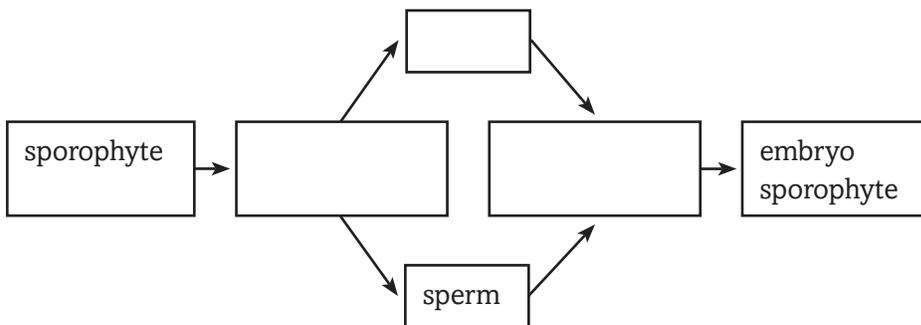
List three examples of vegetative reproduction.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

**Alternation of Generations**

I found this information on page \_\_\_\_\_.

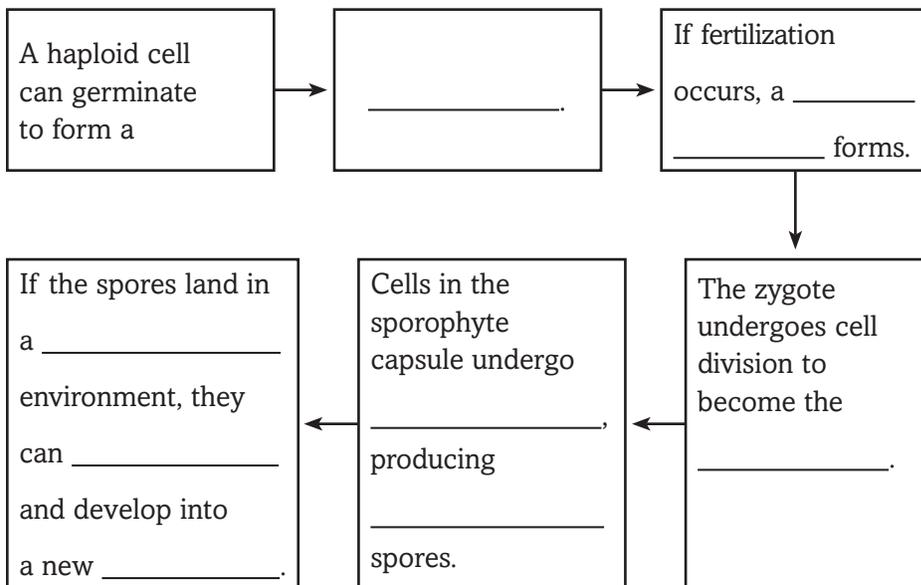
Summarize the alternation of generations in the flowchart below. Use the words eggs, diploid zygote, and haploid gametophyte.



**Moss Reproduction and Life Cycle**

I found this information on page \_\_\_\_\_.

Model the life cycle of mosses by completing the flowchart below.



**Section 23.1 Introduction to Plant Reproduction** (continued)

**Main Idea**

**Fern  
Reproduction  
and Life Cycle**

I found this information  
on page \_\_\_\_\_.

**Details**

**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.
- \_\_\_\_\_ If pieces of the rhizome break off, new fern plants can develop from the pieces by vegetative reproduction.
- \_\_\_\_\_ If fertilization occurs, the resulting diploid zygote develops into a sporophyte.
- \_\_\_\_\_ The prothallus dies and decomposes as the sporophyte matures.
- \_\_\_\_\_ The mature fern consists of rhizomes from which roots and fronds grow.
- \_\_\_\_\_ Sperm released by antheridia swim to eggs in archegonia.
- \_\_\_\_\_ As soon as the sporophyte produces green fronds, it can carry on photosynthesis and live on its own.
- \_\_\_\_\_ The prothallus produces archegonia and antheridia on its surface.
- 9   The cycle continues when sporangia develop on the fronds, and spores are released.

**Conifer  
Reproduction and  
Life Cycle**

I found this information  
on page \_\_\_\_\_.

**Compare** *female and male conifer cones in the table below. List two facts about each type of cone.*

Female Cones	Male Cones

**SUMMARIZE**

Create a graphic organizer to compare the reproductive structure of mosses, ferns, and conifers.

# Reproduction in Plants

## Section 23.2 Flowers

**Main Idea**

**Details**

**Skim** Section 2 of the chapter. Write two facts you discover about flower organs or adaptations.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define nocturnal.

*nocturnal*

**New Vocabulary**

Use your book or dictionary to define the following term.

*photoperiodism*

**Classify** each term as being a type of plant or a part of a plant. Write a brief definition of each term.

	Type of Flowering Plant (4 terms)	Part of Flowering Plant (4 terms)
<i>day-neutral plant</i>		
<i>intermediate-day plant</i>		
<i>long-day plant</i>		
<i>petal</i>		
<i>pistil</i>		
<i>sepal</i>		
<i>short-day plant</i>		
<i>stamen</i>		

**Section 23.2 Flowers** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Flower Organs**

I found this information on page \_\_\_\_\_.

**Compare** the organs of a flower in the table below. Give the location and function for each organ.

Organ	Location	Function
Petal		
Stamen		
Sepal		
Pistil		

**Model** a complete flower and label the petals, sepals, stamen, and pistil.

**Section 23.2 Flowers** (continued)

**Main Idea**

**Details**

**Flower Adaptations**

*I found this information on page \_\_\_\_\_.*

**Identify** *the three types of pollination.*

Types of pollination

**Compare** *the four types of plants based on their critical periods.*

Plant Type	Flowering Season	Characteristic	Example
Short-day plant		flower when the number of hours of darkness is greater than the critical period	
Long-day plant		flower when the number of hours darkness is less than the critical period	
Day-neutral plant		flower over a range in the number of hours of darkness	
Intermediate-day plant		will flower if the number of hours of darkness is neither too great or too few	

**SUMMARIZE**

Collect a flower from your home or neighborhood. On a separate sheet of paper, draw a diagram of the plant and label the major parts. List its critical period, flower adaptations, and methods of pollination.

# Reproduction in Plants

## Section 23.3 Flowering Plants

### Main Idea

### Details

**Scan** the illustrations, and read the captions in Section 3 of the chapter. List two facts you learn about seeds.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define cytoskeleton.

*cytoskeleton*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*dormancy*

\_\_\_\_\_

*endosperm*

\_\_\_\_\_

\_\_\_\_\_

*germination*

\_\_\_\_\_

*hypocotyl*

\_\_\_\_\_

*polar nuclei*

\_\_\_\_\_

\_\_\_\_\_

*radicle*

\_\_\_\_\_

\_\_\_\_\_

*seed coat*

\_\_\_\_\_

\_\_\_\_\_

### Academic Vocabulary

Define compatible to show its scientific meaning.

*compatible*

\_\_\_\_\_

**Section 23.3 Flowering Plants (continued)**

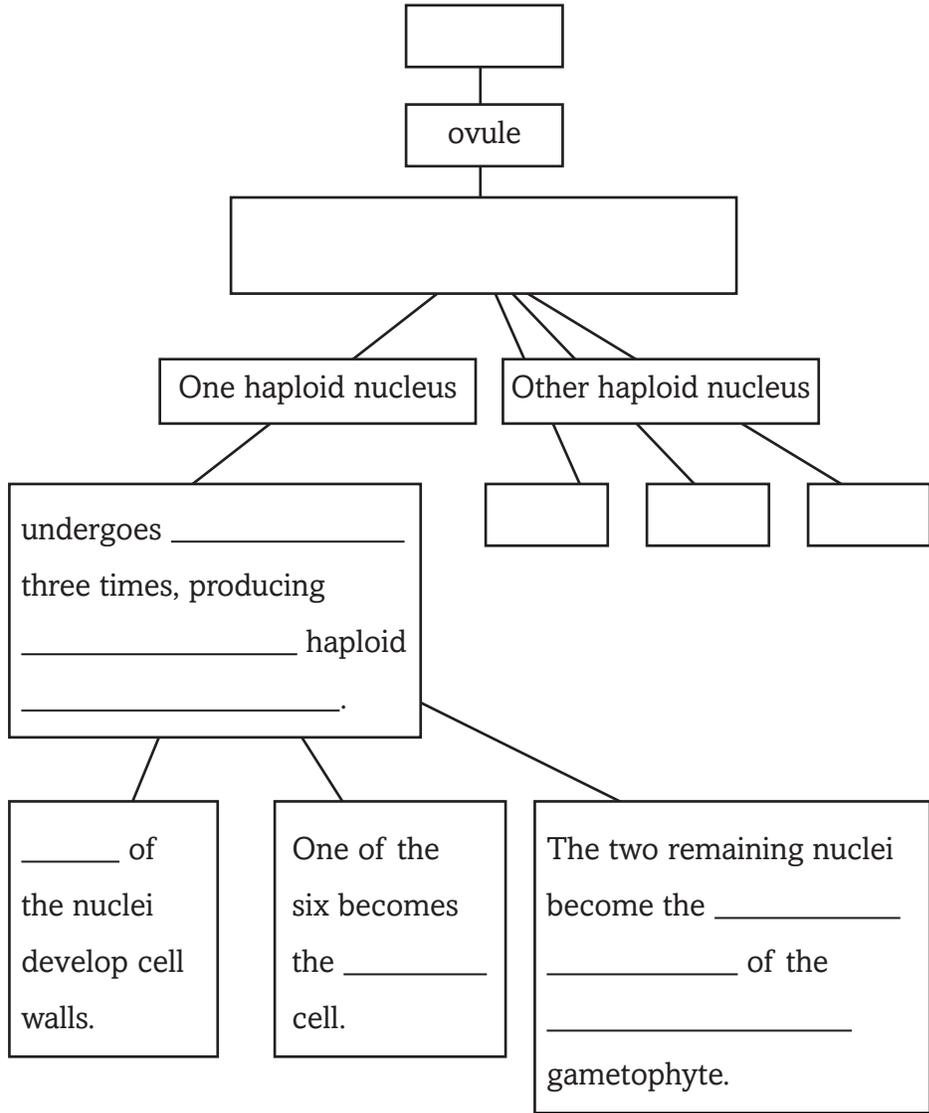
**Main Idea**

**Details**

**Life Cycle**

I found this information on page \_\_\_\_\_.

**Summarize** the development of the female gametophyte by completing the flowchart below.



**Compare** how the two haploid nuclei are involved in fertilization.

Tube Nucleus	Generative Nucleus

**Section 23.3 Flowering Plants** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Results of Reproduction**

*I found this information on page \_\_\_\_\_.*

**Compare** *the characteristics of seeds and fruits in the table below.*

	<b>Structure</b>	<b>Formation</b>	<b>Benefit to Plant</b>
Seed			
Fruit			

**Analyze** *the specific conditions that the following seeds need to germinate.*

some conifer and wildflower seeds: \_\_\_\_\_

apple seeds: \_\_\_\_\_

coconut seeds: \_\_\_\_\_

**SUMMARIZE**

Create a flowchart to describe the life cycle of flowering plants.

# Introduction to Animals

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*Describe at least three characteristics that distinguish animals from plants.*

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# Introduction to Animals

## Section 24.1 Animal Characteristics

**Main Idea**

**Details**

**Scan** the titles, boldfaced words, pictures, figures, and captions in Section 1 of the chapter. Write two facts you discovered about animals as you scanned the section.

1. \_\_\_\_\_

2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define protist.

*protist*

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

Compare the terms in the table by defining them side by side.

*blastula*  
*endoskeleton*  
*exoskeleton*  
*external fertilization*  
*gastrula*  
*hermaphrodite*  
*internal fertilization*  
*invertebrate*  
*vertebrate*  
*zygote*

vertebrate	invertebrate
endoskeleton	exoskeleton
internal fertilization	external fertilization
blastula	gastrula
hermaphrodite	
zygote	

List the cell layers from the most interior to the most exterior. Identify the tissues that develop from each layer.

*ectoderm*  
*endoderm*  
*mesoderm*

Layers of Cells in the Gastrula

**Section 24.1 Animal Characteristics (continued)**

**Main Idea**

**General Animal Features and Feeding and Digestion**

*I found this information on page \_\_\_\_\_.*

**Support**

*I found this information on page \_\_\_\_\_.*

**Habitats**

*I found this information on page \_\_\_\_\_.*

**Animal Cell Structure and Movement**

*I found this information on page \_\_\_\_\_.*

**Details**

**Identify** *the following facts about animals.*

earliest true animals from which all others likely evolved

\_\_\_\_\_

features that mark the branching points of the evolutionary tree

\_\_\_\_\_

way that animals differ from plants in obtaining food

\_\_\_\_\_

\_\_\_\_\_

**Classify** *each animal below as having an endoskeleton or an exoskeleton.*

beetle \_\_\_\_\_ shark \_\_\_\_\_

horse \_\_\_\_\_ cicada \_\_\_\_\_

**Analyze** *each habitat below. Give an example of an adaptation that enables an animal to live in that habitat.*

Habitat	Adaptation
Polar region	
Ocean	
Rain forest	

**Summarize** *the important differences between animals and plants.*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 24.1 Animal Characteristics** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Reproduction**

I found this information on page \_\_\_\_\_.

**Sequence** *the development of an animal from fertilization to birth by completing the following paragraph.*

During \_\_\_\_\_ reproduction, fertilization occurs when an \_\_\_\_\_ is penetrated by a \_\_\_\_\_, forming a \_\_\_\_\_. After \_\_\_\_\_ and cell division begin, the egg is called an embryo. The cells form a fluid-filled ball called a \_\_\_\_\_. 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 \_\_\_\_\_.

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 \_\_\_\_\_.

**Identify** *the tissue types into which each layer develops.*

Cell Layer	Forms These Tissues
Mesoderm	
Ectoderm	
Endoderm	

**SUMMARIZE**

Next to each prefix, write a vocabulary word from this section that uses this prefix. Then write what you think the prefix means.

endo- \_\_\_\_\_

exo- \_\_\_\_\_

meso- \_\_\_\_\_

# Introduction to Animals

## Section 24.2 Animal Body Plans

**Main Idea**

**Details**

**Scan** the figures and read the captions in Section 2 of the chapter. Write two facts that you discovered about animal body plans.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define phylogeny.

*phylogeny*

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

Compare the terms within each table by writing their definitions.

*acoelomate*

anterior	posterior	dorsal	ventral
----------	-----------	--------	---------

*anterior*

*bilateral symmetry*

*cephalization*

cephalization
---------------

*coelom*

symmetry
----------

*deuterostome*

*dorsal*

*posterior*

*protostome*

bilateral	radial
-----------	--------

*pseudocoelom*

protostome	deuterostome
------------	--------------

*radial symmetry*

*symmetry*

*ventral*

coelom	acoelomate	pseudocoelom
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**Section 24.2 Animal Body Plans** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Evolution of Animal Body Plans and Development of Tissues**

I found this information on page \_\_\_\_\_.

**Model** an evolutionary tree, and show what the trunk, branches, and branching points represent.

**Symmetry**

I found this information on page \_\_\_\_\_.

**Analyze** the evolutionary sequence by completing the sentences.

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.

**Model** a bilaterally symmetrical being. Then create characters showing asymmetry and radial symmetry. Use your imagination. List the number of arms, legs, eyes, etc., that each character has.

Bilateral Symmetry	Radial Symmetry	Asymmetry
body parts: 2 eyes, 2 legs, 2 arms, 1 nose in center	body parts:	body parts:

**Section 24.2 Animal Body Plans** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Body Cavities**

*I found this information on page \_\_\_\_\_.*

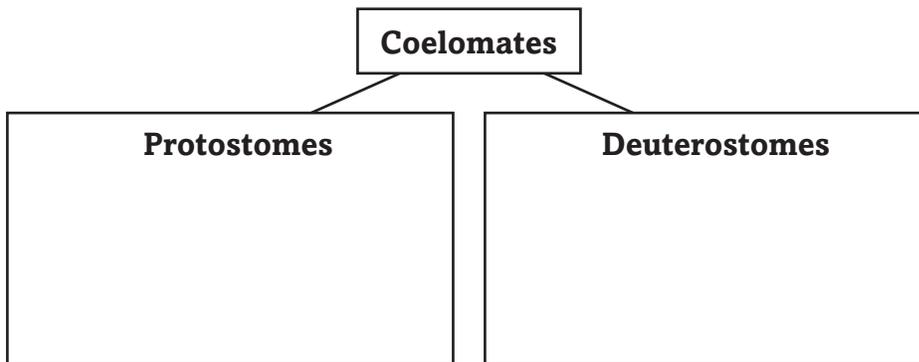
**Model** each type of body cavity labeled below.

Acoelomate	Pseudocoelomate	Coelomate

**Development in Coelomate Animals**

*I found this information on page \_\_\_\_\_.*

**Compare** mouth development in the two major lines of coelomates.



**Segmentation**

*I found this information on page \_\_\_\_\_.*

**Analyze** two advantages of segmentation.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_

**SUMMARIZE**

Describe the general evolutionary trend of animal body parts. Explain your description.

\_\_\_\_\_

\_\_\_\_\_

# Introduction to Animals

## Section 24.3 Sponges and Cnidarians

### Main Idea

### Details

**Skim** Section 3 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define diploid.

*diploid*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*cnidocyte*

\_\_\_\_\_

*filter feeder*

\_\_\_\_\_

*gastrovascular cavity*

\_\_\_\_\_

*medusa*

\_\_\_\_\_

\_\_\_\_\_

*nematocyst*

\_\_\_\_\_

*nerve net*

\_\_\_\_\_

\_\_\_\_\_

*polyp*

\_\_\_\_\_

\_\_\_\_\_

*sessile*

\_\_\_\_\_

### Academic Vocabulary

Define survive to show its scientific meaning.

*survive*

\_\_\_\_\_

**Section 24.3 Sponges and Cnidarians** (continued)

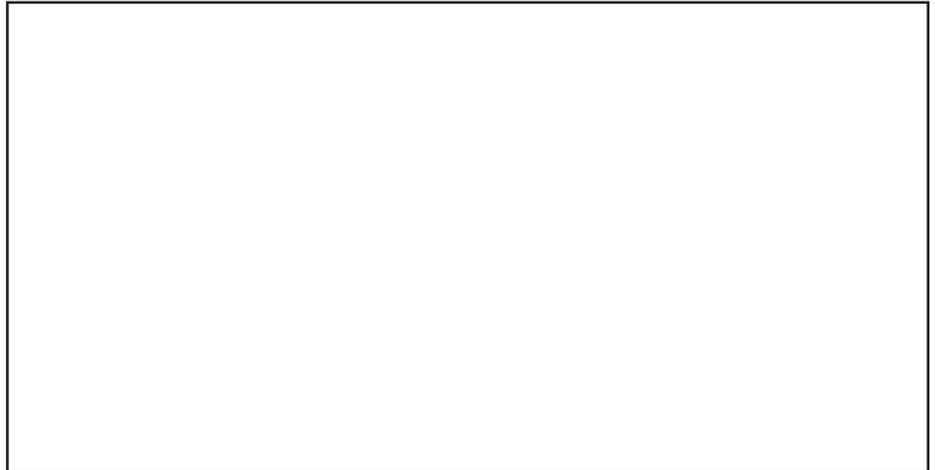
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Sponges**

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.



Sponges	
Body Part	Function of Body Part
Osculum	
Epithelial-like cells	
Collar cells	
Pores	
Archaeocytes	
Spicules	

**Section 24.3 Sponges and Cnidarians** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Cnidarians**

*I found this information on page \_\_\_\_\_.*

**Compare** a polyp with a medusa by filling in the table.

	<b>Polyp</b>	<b>Medusa</b>
Body shape		
Position of mouth		
Position of tentacles		

**Model** the complete life cycle of a jellyfish.

**SUMMARIZE**

Compare cnidarians and sponges.

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# Worms and Mollusks

## Before You Read

Use the “What I Know” column to list the things you know about worms and mollusks. Then list the questions you have about these organisms in the “What I Want to Find Out” column.

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*Even the simplest organism has a role in the ecological community. Hypothesize the role of mollusks in their ecosystems. Why would people need to know about worms?*

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# Worms and Mollusks

## Section 25.1 Flatworms

### Main Idea

### Details

**Scan** the illustrations and read the captions in Section 1 of the chapter. List three characteristics of flatworms that you discovered.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define acoelomate.

*acoelomate*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*flame cells*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*ganglion*

\_\_\_\_\_  
\_\_\_\_\_

*pharynx*

\_\_\_\_\_  
\_\_\_\_\_

*proglottid*

\_\_\_\_\_  
\_\_\_\_\_

*regeneration*

\_\_\_\_\_  
\_\_\_\_\_

*scolex*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 25.1 Flatworms** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Body Structure**

*I found this information on page \_\_\_\_\_.*

**Summarize** *facts about flatworms in the table.*

Size Range	Number of Species
Preferred Environments	Adaptations for Movement of Free-living Flatworm
Diet of a Free-living Flatworm	Symmetry
What Happens When Free-living Flatworms Are Damaged	Adaptations for Parasitic Lifestyle

**Model** *a flatworm. Label at least nine body parts.*

**Section 25.1 Flatworms** (continued)

**Main Idea**

**Diversity of Flatworms**

I found this information on page \_\_\_\_\_.

**Details**

Identify the correct flatworm class for each characteristic below and write it in the appropriate box. Some characteristics may belong in more than one class.

- parasitic
- free-living
- scolex
- eyespots
- flukes
- auricles
- proglottids
- planaria

Classes of Flatworms		
Trematodes	Cestodes	Turbellarians

Model the life cycle of a fluke.

**CONNECT**

Identify and describe a human disorder that tapeworms and flukes can cause.

Group	Human Disorder Caused

# Worms and Mollusks

## Section 25.2 Roundworms and Rotifers

### Main Idea

### Details

**Scan** Section 2 of the chapter. Use the checklist as a guide.

- Read all the section titles.
- Read all boldfaced words.
- Look at all illustrations and read the captions.
- Think about what you already know about worms.

*Write three facts that you discovered about roundworms and rotifers.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

*Use your book or dictionary to define cilia.*

*cilia*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

*Use your book or dictionary to define each term. Then write a sentence using the word to show its scientific meaning.*

*hydrostatic skeleton*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*trichinosis*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 25.2 Roundworms and Rotifers** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Body Structure of Roundworms**

*I found this information on page \_\_\_\_\_.*

**Organize** information about roundworms by filling in the chart below.

Phylum:	Symmetry:
Habitats:	
Body shape:	
Food:	
Digestive tract of free-living forms:	
Circulatory and respiratory organs:	
Stimuli they can detect:	
Reproduction method:	Type of fertilization:

**Analyze** the movement of roundworms.

Roundworm Movement	
Thrashing Movement	
Role of Pseudocoelom	

**Section 25.2 Roundworms and Rotifers (continued)**

**Main Idea**

**Diversity of Roundworms**

*I found this information on page \_\_\_\_\_.*

**Details**

**Identify** *the roundworm that matches each description.*

Animal	Description
	most common roundworm parasite in the U.S.
	enters the human body through bare feet
	world's most common roundworm infection
	carried by infected, undercooked pork
	causes plant diseases
	mosquito acts as intermediate host

**Identify** *a negative and a positive effect of nematodes on plants.*

Negative: \_\_\_\_\_

\_\_\_\_\_

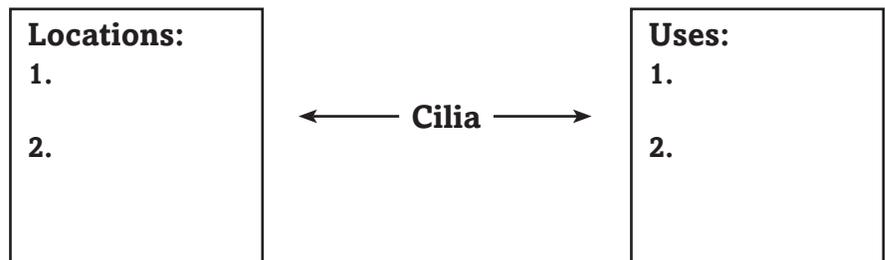
Positive: \_\_\_\_\_

\_\_\_\_\_

**Rotifers**

*I found this information on page \_\_\_\_\_.*

**Analyze** *the cilia of rotifers by completing the graphic organizer below.*



**CONNECT**

Compare the digestive tracts of roundworms with those in free-living flatworms. What does the comparison suggest about the probable evolutionary history of roundworms?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Worms and Mollusks

## Section 25.3 Mollusks

### Main Idea

### Details

**Skim** Section 3 of the chapter. Write two questions that come to mind from reading the headings and illustration captions.

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define herbivore.

*herbivore*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*closed circulatory system*

\_\_\_\_\_

\_\_\_\_\_

*gills*

\_\_\_\_\_

\_\_\_\_\_

*mantle*

\_\_\_\_\_

\_\_\_\_\_

*nephridia*

\_\_\_\_\_

*open circulatory system*

\_\_\_\_\_

\_\_\_\_\_

*radula*

\_\_\_\_\_

\_\_\_\_\_

*siphon*

\_\_\_\_\_

\_\_\_\_\_

**Section 25.3 Mollusks** (continued)

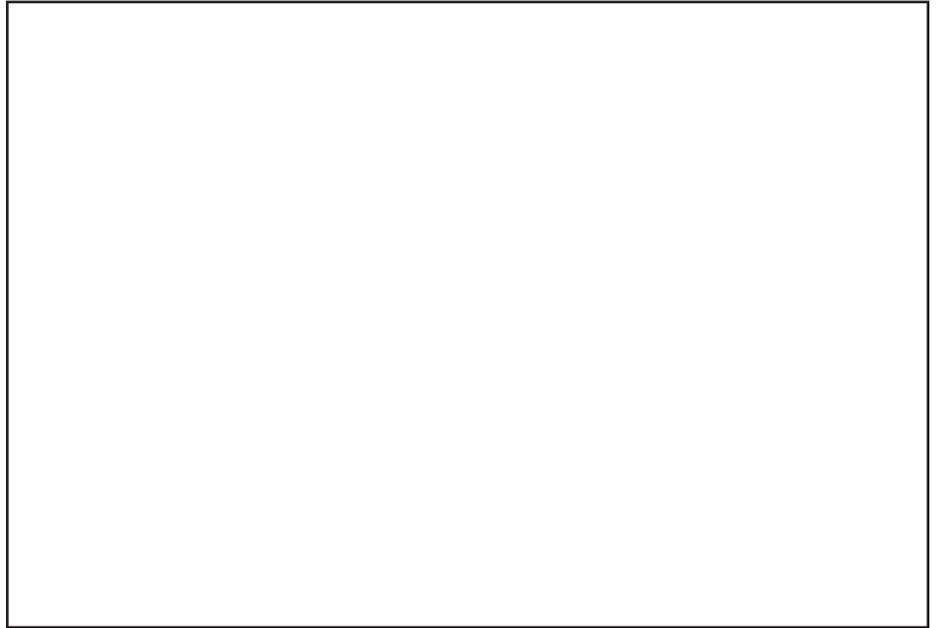
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Body Structure**

*I found this information  
on page \_\_\_\_\_.*

**Model** *a snail and a squid. Label the body parts of each.*



**List** *the snail and squid structures that differ.*

\_\_\_\_\_

\_\_\_\_\_

**Distinguish** *two ways mollusks feed.*

Radula: \_\_\_\_\_

\_\_\_\_\_

Filter feeders: \_\_\_\_\_

**Compare** *the way mollusks reproduce in water and on land.*

in water:	on land:
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Section 25.3 Mollusks (continued)

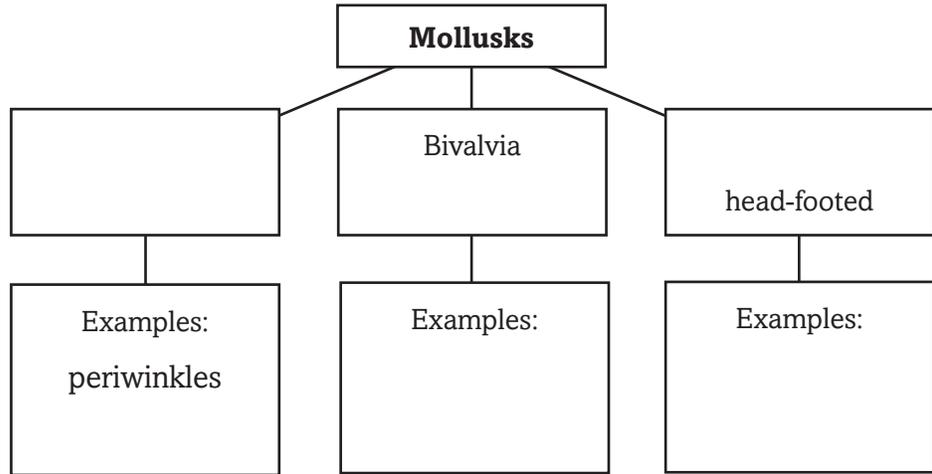
**Main Idea**

**Diversity of Mollusks, Ecology of Mollusks**

I found this information on page \_\_\_\_\_.

**Details**

Analyze 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.

Class	Mollusk Characteristics
	has a single shell and a large foot under the body
	has no radula; has two shells connected with a ligament, and a large, muscular foot for digging in the sand
	is brightly colored and has a layer of mucus covering its body; has a large foot under the body and no shell
	has a radula and tentacles; has no shell; squirts ink at predators

**CONNECT**

Compare mollusks' excretory structures with those of two or more groups that evolved earlier.

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# Worms and Mollusks

## Section 25.4 Segmented Worms

**Main Idea**

**Details**

**Skim** Section 4 of the chapter. Write three facts that you discovered about segmented worms.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define protostome.

*protostome*

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each term.

*clitellum*

\_\_\_\_\_  
\_\_\_\_\_

*crop*

\_\_\_\_\_  
\_\_\_\_\_

*gizzard*

\_\_\_\_\_  
\_\_\_\_\_

*setae*

\_\_\_\_\_  
\_\_\_\_\_

**Academic Vocabulary**

Define convert to show its scientific meaning.

*convert*

\_\_\_\_\_  
\_\_\_\_\_

**Section 25.4 Segmented Worms (continued)**

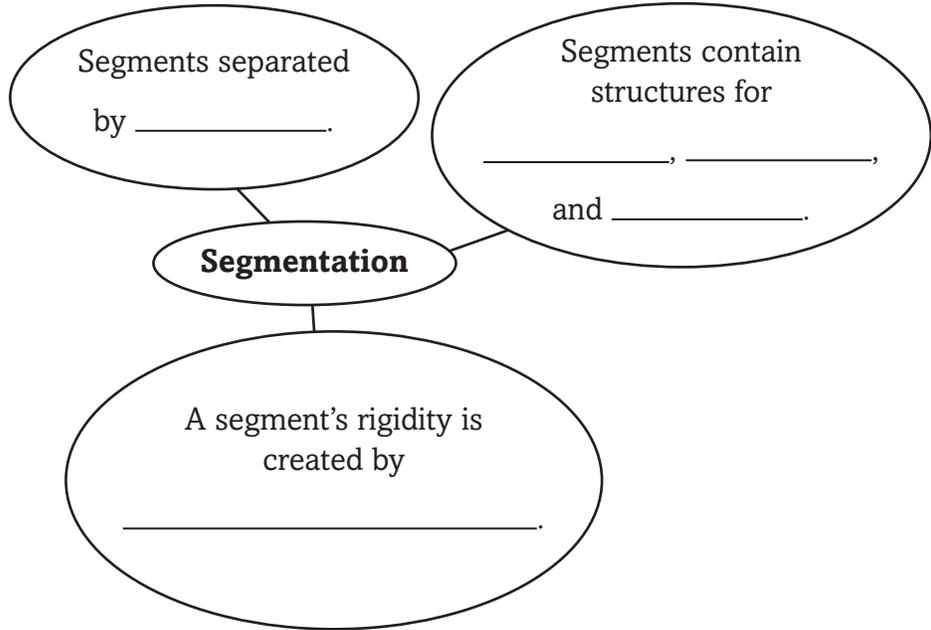
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Body Structure**

I found this information on page \_\_\_\_\_.

**Summarize** *the characteristics of segmentation.*



**Sequence** *the process of digestion in an earthworm.*

↓
↓
↓
↓

**Section 25.4 Segmented Worms (continued)**

**Main Idea**

**Diversity of Annelids/Ecology of Annelids/ Evolution of Mollusks and Annelids**

*I found this information on page \_\_\_\_\_.*

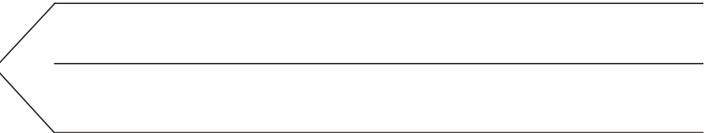
**Details**

**Organize** information about annelids. Identify two characteristics of each annelid. Then write the class to which they belong.

fanworms bristleworms	leeches	earthworms
Class:	Class:	Class:

**Analyze** two ways that each of these annelids benefit their ecosystem.

Earthworms 

Marine Polychaetes 

**Sequence** these developments in the evolution of annelids: body suckers, parapodia, clitella.

From earliest to latest: \_\_\_\_\_

**SUMMARIZE**

Compare the type of circulatory system found in annelids with that found in some mollusks. State the advantage of the annelid type.

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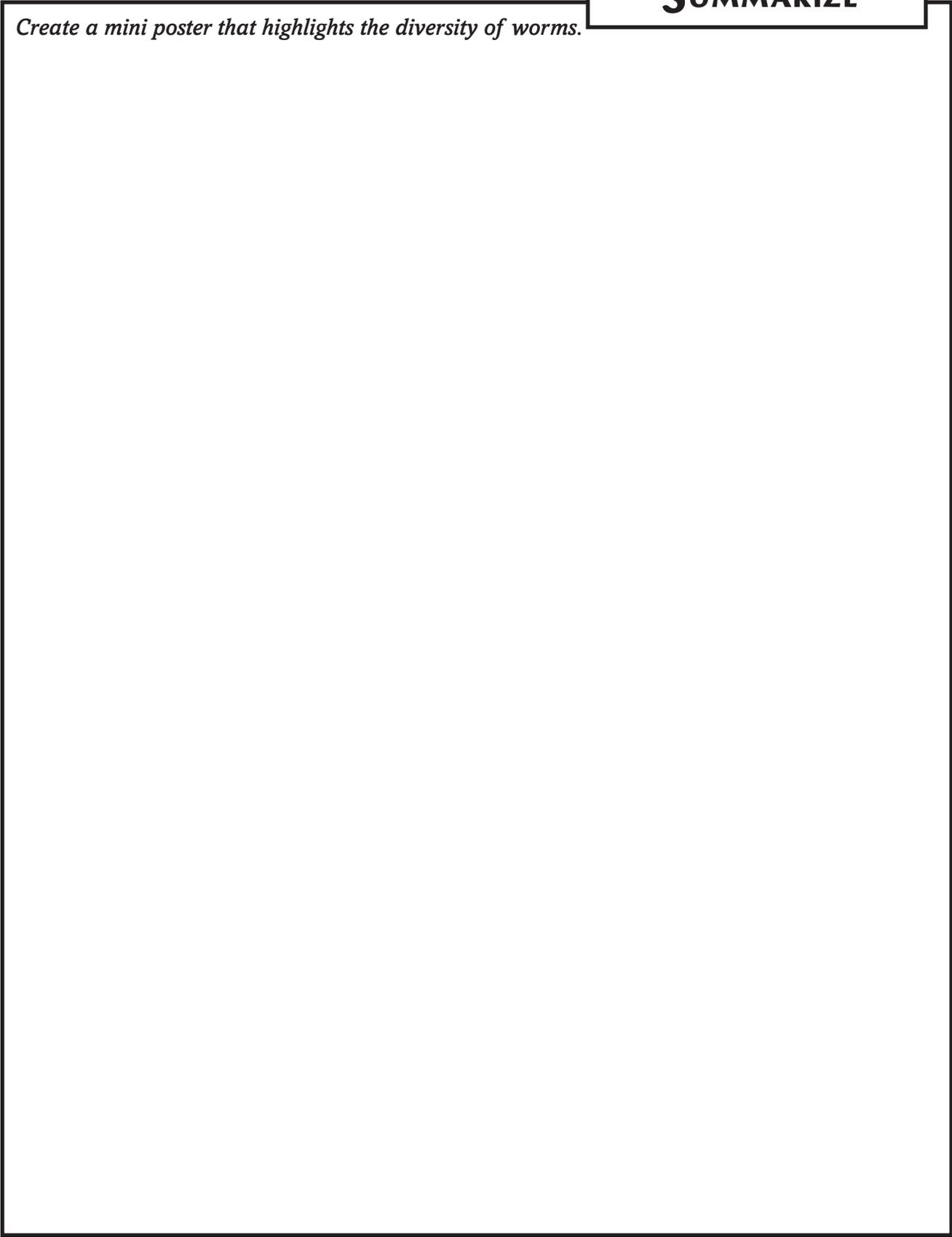


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# Tie It Together

## SUMMARIZE

*Create a mini poster that highlights the diversity of worms.*



# Arthropods

## Before You Read

Before you read the chapter, respond to these statements.

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

Before You Read	Arthropods	After You Read
	<ul style="list-style-type: none"> <li>• A lobster's hard covering cannot grow as the animal grows.</li> </ul>	
	<ul style="list-style-type: none"> <li>• A spider begins digesting its food while the food is outside its body.</li> </ul>	
	<ul style="list-style-type: none"> <li>• When you try to swat a fly, it often escapes because it can sense changes in airflow.</li> </ul>	
	<ul style="list-style-type: none"> <li>• A newly hatched butterfly looks like an adult butterfly only smaller.</li> </ul>	

### Science Journal

*Speculate about what would happen if cockroaches and other insects were to disappear.*

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# Arthropods

## Section 26.1 Arthropod Characteristics

### Main Idea

### Details

**Skim** Section 1 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define ganglion.

ganglion

### New Vocabulary

Write the correct term in the left column for each definition below.

- |       |   |
|-------|---|
| _____ | body structure consisting of fused thorax and head regions  |
| _____ | opening from the tracheae or book lungs to the outside of an arthropod's body   |
| _____ | tube that branches into smaller and smaller tubules to carry oxygen throughout the body                                       |
| _____ | body region of fused segments at the posterior end of an arthropod that contains digestive structures and reproductive organs |
| _____ | in most arthropods, structure that removes cellular wastes from the blood and empties into the gut                            |
| _____ | saclike pocket with highly folded walls for respiration   |
| _____ | in arthropods, process of shedding an exoskeleton   |
| _____ | middle body region, consisting of three fused main segments to which, in many arthropods, legs and wings are attached         |
| _____ | structure that grows and extends from an animal's body  |
| _____ | mouthpart in arthropods that can be adapted for biting and chewing  |
| _____ | chemical secreted by many animal species that influences the behavior of other animals of the same species                    |

### Academic Vocabulary

Define transport to show its scientific meaning.

transport

**Section 26.1 Arthropod Characteristics** (continued)

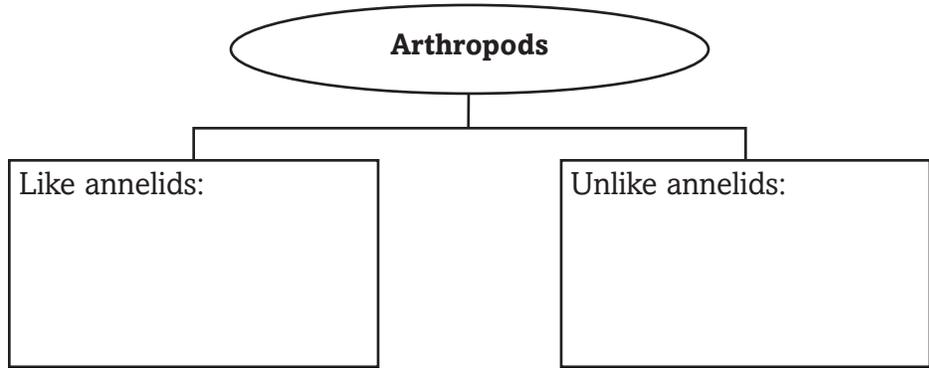
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

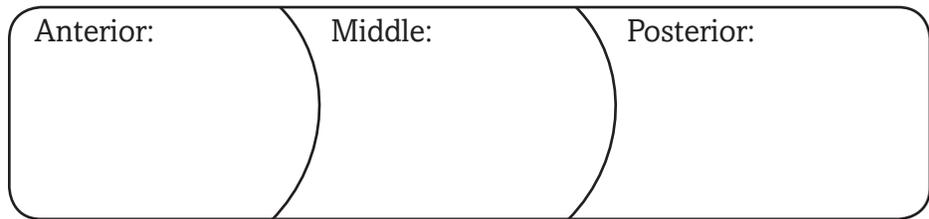
**Arthropod Features**

*I found this information on page \_\_\_\_\_.*

**Compare** *arthropods to annelids by listing characteristics below.*



**Identify** *the structures attached to or contained in the main body regions of arthropods.*



What regions are fused in a cephalothorax? \_\_\_\_\_

**Analyze** *the advantages and disadvantages of an exoskeleton.*

Advantages	Disadvantages

**Evaluate** *the role of the body functions below in the molting process.*

Fluid secreted by skin glands: \_\_\_\_\_

Increased blood circulation: \_\_\_\_\_

Section 26.1 Arthropod Characteristics (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Body Structure of Arthropods**

I found this information on page \_\_\_\_\_.

**Model** *three types of arthropod respiratory structures. Identify the habitat—aquatic or terrestrial—of the arthropods with that type of respiratory system. Label the spiracles.*

Structure: _____	Structure: _____	Structure: _____
Habitat: _____	Habitat: _____	Habitat: _____

**Rephrase** *one key fact about arthropods for each function below.*

Excretion: \_\_\_\_\_

Chemical communication: \_\_\_\_\_

Movement: \_\_\_\_\_

**SUMMARIZE**

Identify three structures that arthropods use to respond to their environments. Explain how each structure is helpful to the arthropods.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Arthropods

## Section 26.2 Arthropod Diversity

### Main Idea

### Details

**Scan** Section 2 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Read all tables, figures, graphs, and captions.

Write two facts you discovered as you scanned the section.

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define sessile.

*sessile*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*chelicera*

\_\_\_\_\_

\_\_\_\_\_

*cheliped*

\_\_\_\_\_

\_\_\_\_\_

*pedipalp*

\_\_\_\_\_

\_\_\_\_\_

*spinneret*

\_\_\_\_\_

\_\_\_\_\_

*swimmeret*

\_\_\_\_\_

\_\_\_\_\_

**Section 26.2 Arthropod Diversity** (continued)

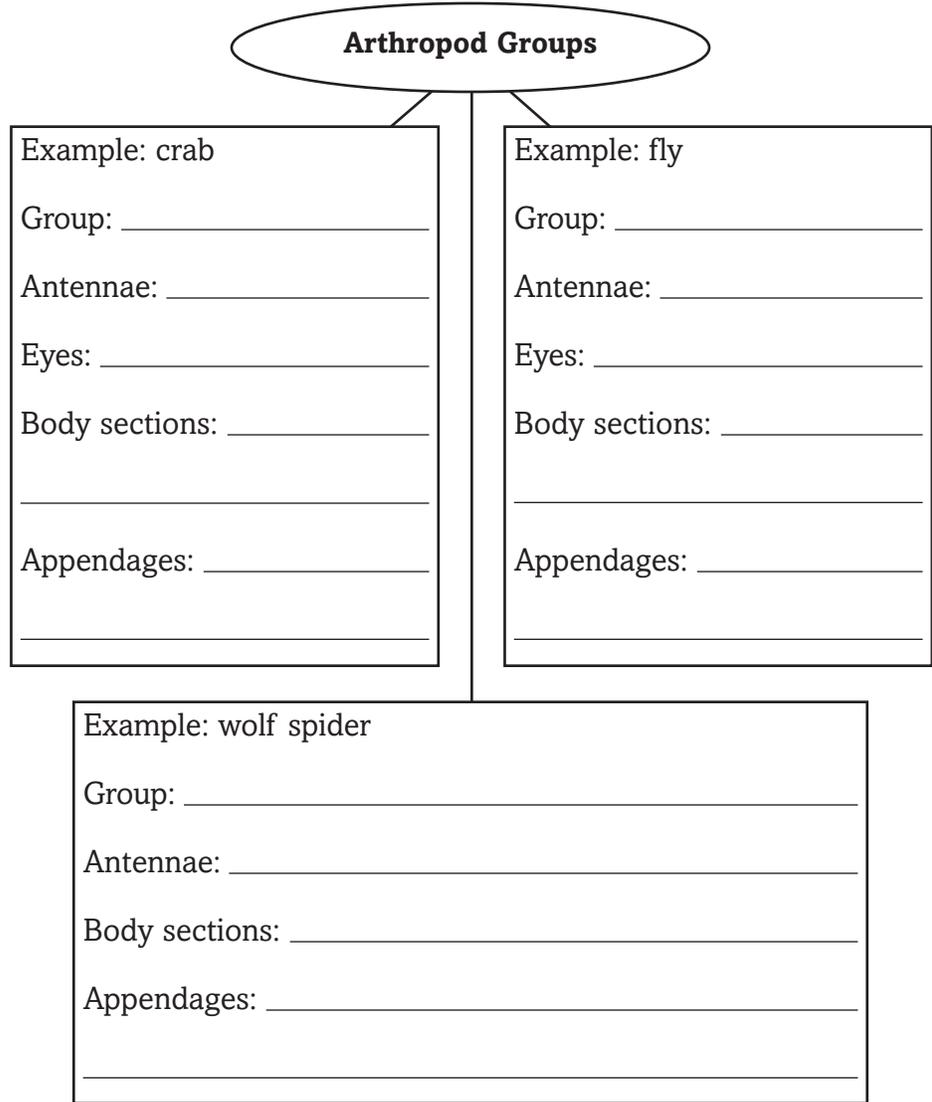
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Arthropod Groups**

*I found this information on page \_\_\_\_\_.*

**Compare** *the common characteristics of the major arthropod groups.*



**Crustaceans**

*I found this information on page \_\_\_\_\_.*

**Model** *a lobster and label its appendages.*

**Section 26.2 Arthropod Diversity** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Spiders and Their Relatives**

*I found this information on page \_\_\_\_\_.*

**Distinguish** *the arachnid appendage for each description below. Names will be used more than once.*

Appendage	Description
	create silk from fluid protein
	function as fangs or pincers
	used for sensing and holding prey
	often connected to a poison gland
	located at the end of a spider's abdomen
	large pincers on scorpions

**Analyze** *ways in which a spider uses the web it constructs.*

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Conclude** *why the leaflike plates on the posterior appendages are important to a female horseshoe crab during reproduction.*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**SUMMARIZE**

Create a concept web that you can use to identify arthropods.

# Arthropods

## Section 26.3 Insects and their Relatives

### Main Idea

### Details

**Skim** Section 3 of the chapter. Examine each illustration and read the caption. Write three facts that you learn about the structures of insects.

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define subphylum.

*subphylum*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*caste*

\_\_\_\_\_  
\_\_\_\_\_

*metamorphosis*

\_\_\_\_\_  
\_\_\_\_\_

*nymph*

\_\_\_\_\_  
\_\_\_\_\_

*pupa*

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_

**Section 26.3 Insects and their Relatives** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Diversity of Insects**

*I found this information on page \_\_\_\_\_.*

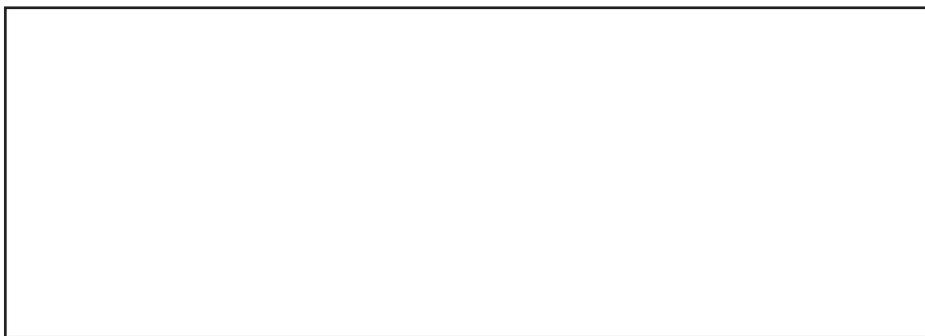
**Conclude** *how insects can live in many habitats.*

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**External Features**

*I found this information on page \_\_\_\_\_.*

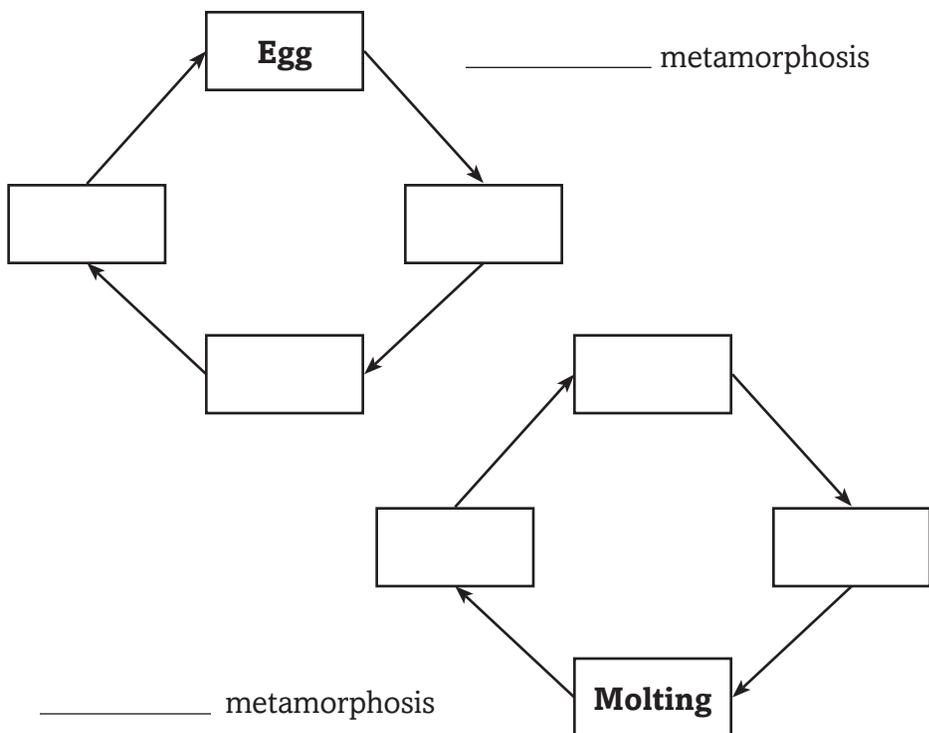
**Model** *a cricket and label its external features.*



**Insect Adaptations**

*I found this information on page \_\_\_\_\_.*

**Sequence** *the stages in two types of metamorphosis by completing the flowcharts below. Identify each type of metamorphosis.*



**Section 26.3 Insects and their Relatives** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

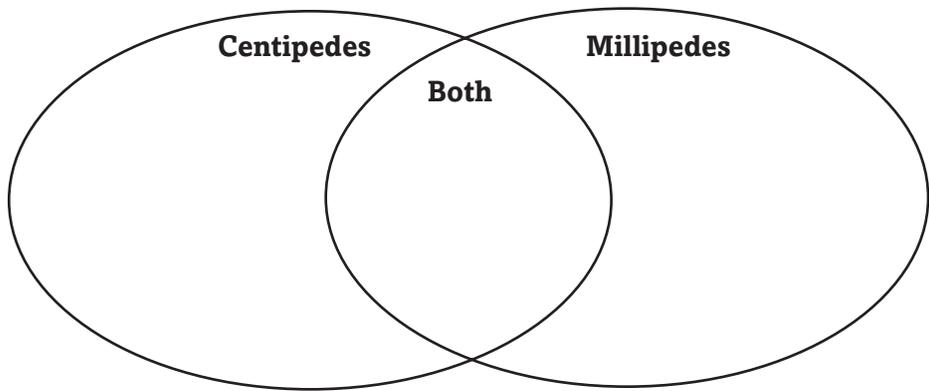
**Details** \_\_\_\_\_

**Model** the honeybee's waggle dance in the space below. Use labels to explain how the dance communicates where the food is.

**Centipedes and Millipedes**

*I found this information on page \_\_\_\_\_.*

**Compare** centipedes and millipedes by listing their characteristics in the Venn diagram.



**Evolution of Arthropods**

*I found this information on page \_\_\_\_\_.*

**Conclude** in general how segmentation has evolved from ancestral arthropods to present-day arthropods.

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**SUMMARIZE**

Compare and contrast insect features to other arthropod groups.

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# Echinoderms and Invertebrate Chordates

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Echinoderms and Invertebrate Chordates	After You Read
	<ul style="list-style-type: none"> <li>• A sea star can make its stomach come out of its mouth.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Many echinoderms can regrow lost body parts.</li> </ul>	
	<ul style="list-style-type: none"> <li>• A lancelet's body organs are visible through its skin.</li> </ul>	
	<ul style="list-style-type: none"> <li>• A tunicate is called a sea squirt because it is the smallest creature in the sea.</li> </ul>	

### Science Journal

*Write what you know or stories you have heard about sea stars, sea urchins, and other spiny sea creatures.*

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# Echinoderms and Invertebrate Chordates

## Section 27.1 Echinoderm Characteristics

### Main Idea

### Details

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

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define endoskeleton.

*endoskeleton*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*ampulla*

\_\_\_\_\_  
\_\_\_\_\_

*madreporite*

\_\_\_\_\_  
\_\_\_\_\_

*pedicellaria*

\_\_\_\_\_  
\_\_\_\_\_

*tube foot*

\_\_\_\_\_  
\_\_\_\_\_

*water-vascular system*

\_\_\_\_\_  
\_\_\_\_\_

### Academic Vocabulary

Define *aid* to show its scientific meaning.

*aid*

\_\_\_\_\_

**Section 27.1 Echinoderm Characteristics (continued)**

**Main Idea**

**Echinoderms Are Deuterostomes**

*I found this information on page \_\_\_\_\_.*

**Body Structure**

*I found this information on page \_\_\_\_\_.*

**Details**

**Analyze** *the importance of deuterostome development.*

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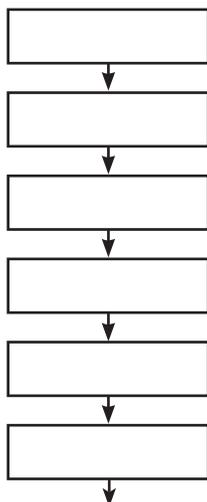


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**Sequence** *the steps that occur in the water-vascular system to enable an echinoderm to move. Complete the flowchart by writing the letters of the scrambled steps in the proper boxes.*



- A.** Water is forced into the tube foot.
- B.** Water moves through the stone canal to the ring canal.
- C.** Water is drawn into the madreporite.
- D.** The muscles of the ampulla contract.
- E.** With hydraulic suction, the tube foot attaches to a surface.
- F.** Water moves to the radial canals.

The echinoderm moves.

**Identify** *the echinoderm that moves in the described way.*

<b>Echinoderm</b>	<b>Movement</b>
	burrows into rocky areas using movable spines
	makes snakelike movements using tube feet and arms
	uses cirri to grasp soft sediments on the seafloor
	crawls using tube feet and body wall muscles

**Section 27.1 Echinoderm Characteristics (continued)**

**Main Idea**

**Echinoderm Diversity**

*I found this information on page \_\_\_\_\_.*

**Details**

**Name** *the class of each echinoderm described below.*

Echinoderm Class	Characteristics
	cucumber shape; leathery covering; tentacles near mouth
	body encased in a test; burrows
	often five arms; arms regenerate; no suction cups on tube feet
	often five arms; tube feet used for feeding and movement
	no arms; tube feet located around a central disk
	sessile for some part of life

**List** *echinoderm strategies for coping with potential predators.*

sea stars: \_\_\_\_\_

brittle stars: \_\_\_\_\_

sea urchins: \_\_\_\_\_

sea cucumbers: \_\_\_\_\_

**Ecology of Echinoderms**

*I found this information on page \_\_\_\_\_.*

**Analyze** *the effect of echinoderms on other organisms in the following situations.*

Activity as bioturbators: \_\_\_\_\_

\_\_\_\_\_

Unexplained population explosions of crown-of-thorns sea stars:

\_\_\_\_\_

**CONNECT**

Give an example of regeneration in humans. Then give an example of regeneration in echinoderms that is beyond the capability of humans.

\_\_\_\_\_

\_\_\_\_\_

# Echinoderms and Invertebrate Chordates

## Section 27.2 Invertebrate Chordates

**Main Idea**

**Details**

**Scan** the illustrations and read the captions in Section 2. Write two facts you discovered about invertebrate chordates.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define deuterostome.

*deuterostome*

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each term.

*chordate*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*dorsal tubular nerve cord*

\_\_\_\_\_

*invertebrate chordate*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*notochord*

\_\_\_\_\_  
\_\_\_\_\_

*pharyngeal pouch*

\_\_\_\_\_  
\_\_\_\_\_

*postanal tail*

\_\_\_\_\_  
\_\_\_\_\_

**Section 27.2 Invertebrate Chordates** (continued)

**Main Idea**

**Invertebrate Chordate Features**

*I found this information on page \_\_\_\_\_.*

**Details**

**Identify** *the four distinctive features of chordates and their location on the animal. Describe how each feature benefits the animal.*

Feature	Location	Benefits
notochord		
		can propel an animal with more powerful movements than the body structure of invertebrates without a postanal tail
	above the digestive organs	

**Analyze** *the importance of an endostyle.*

\_\_\_\_\_

**Diversity of Invertebrate Chordates**

*I found this information on page \_\_\_\_\_.*

**Describe** *the following features of lancelets.*

Phylum:	Subphylum:
Skin:	
Feeding method:	
Movement:	
Sensory structures:	
Blood circulation:	

**Section 27.2 Invertebrate Chordates** (continued)

**Main Idea**

*I found this information on page \_\_\_\_\_.*

**Details**

**Model** *a tunicate. Label its parts. Identify its subphylum.*

Subphylum: \_\_\_\_\_

**Analyze** *why tunicates are called sea squirts.*

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**Evolution of Echinoderms and Invertebrate Chordates**

*I found this information on page \_\_\_\_\_.*

**Identify** *key developments in the evolution of echinoderms and invertebrate chordates by completing the following paragraph.*

Probably echinoderms evolved from ancestors with \_\_\_\_\_ symmetry because echinoderms have this kind of symmetry in the \_\_\_\_\_ stage. Echinoderms develop \_\_\_\_\_ symmetry in the adult stage. \_\_\_\_\_ development links echinoderms to chordates. The key features of \_\_\_\_\_ shared by lancelets and tunicates show their close relationship, though \_\_\_\_\_ have these features only as larvae. A key development in the evolution of chordates was the \_\_\_\_\_, which provided support and a place for \_\_\_\_\_ to attach, leading to the first large animals.

**SUMMARIZE**

Why do lancelets excite the scientific community?

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# Tie It Together

## SYNTHESIZE

*You plan to visit a large aquarium. You want to be able to identify specific echinoderms and invertebrate chordates among the many sea creatures on display. Create an identification guide by listing two observable features that distinguish each animal below. Features can be physical or behavioral.*

Sea Star: • _____ _____ • _____ _____	Brittle Star: • _____ _____ • _____ _____
Sea Urchin: • _____ _____ • _____ _____	Sand Dollar: • _____ _____ • _____ _____
Sea Lily: • _____ _____ • _____ _____	Feather Star: • _____ _____ • _____ _____
Sea Cucumber: • _____ _____ • _____ _____	Lancelet: • _____ _____ • _____ _____
Tunicate: • _____ _____ • _____ _____	_____ _____ _____ _____

# Fishes and Amphibians

## Before You Read

Use the “What I Know” column to list the things you know about fishes and amphibians. Then list the questions you have about them in the “What I Want to Find Out” column.

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*Hypothesize what factors might be responsible for amphibian species becoming extinct.*

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# Fishes and Amphibians

## Section 28.1 Fishes

### Main Idea

### Details

**Skim** Section 1 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*notochord*

Use your book or dictionary to define notochord.

### New Vocabulary

Write the correct term in the left column for each definition below.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

receptors that enable fishes to detect movement in the water and help keep them upright and balanced

external fertilization in which male and female fishes release their gametes near each other in the water

chamber of the heart that pumps blood to the gills

in vertebrates, group of cells that develop from the nerve cord and contribute to the development of other important features

chamber of the heart that receives blood from the body

small, flat, platelike structure near the skin surface of most fishes

gas-filled space in bony fishes that allows a fish to control its depth

tough, flexible material making up the skeletons or parts of skeletons of vertebrates

movable flap that covers the gills and protects them

filtering unit within the kidney that helps maintain the salt and water balance of the body and remove cellular waste

### Academic Vocabulary

*precision*

*propulsion*

Define these terms to show their scientific meaning.

- \_\_\_\_\_
- \_\_\_\_\_

**Section 28.1 Fishes** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Characteristics of Vertebrates**

I found this information on page \_\_\_\_\_.

**Summarize** information about two major characteristics of vertebrates.

	Vertebral Column	Neural Crest
<b>Formation</b>		
<b>Functions</b>		

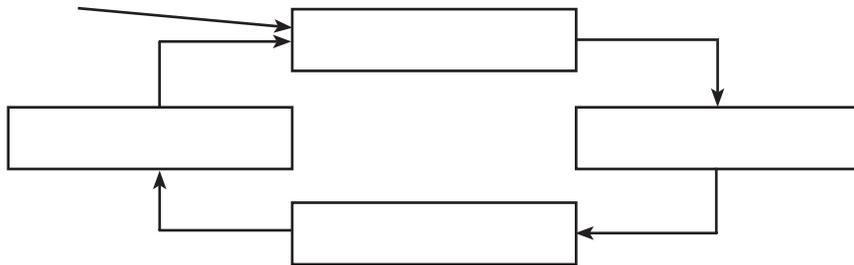
**Characteristics of Fishes**

I found this information on page \_\_\_\_\_.

**Model** the flow of blood through the body of a fish by writing the following terms in the correct boxes in the flowchart.

- gills
- throughout body
- ventricle
- atrium

**Blood enters heart**



**Summarize** the reproduction method of most fishes.

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**Section 28.1 Fishes** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Organize facts about characteristics of fishes.**

Characteristic	Facts
habitats	
adaptive advantages of jaws	
benefits of paired fins	
four types of scales and their composition	
functions of gills	
functions of pyloric ceca	
functions of nephrons	
sensory abilities	
process for controlling depth in water	

**CONNECT**

Design a graphic organizer to summarize the adaptations and functions of fish.

# Fishes and Amphibians

## Section 28.2 Diversity of Today's Fishes

### Main Idea

### Details

**Scan** Section 2 of the chapter. Use the checklist as a guide.

- Read all headings.
- Read all boldfaced words.
- Read all diagrams.
- Look at all pictures and read the captions.

*Write three facts that you discovered about fishes.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

*adaptive radiation*

*Use your book or dictionary to define adaptive radiation.*

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### New Vocabulary

*tetrapod*

*Use your book or dictionary to define the following term.*

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*Use tetrapod in a sentence describing its possible place in the evolution of fishes.*

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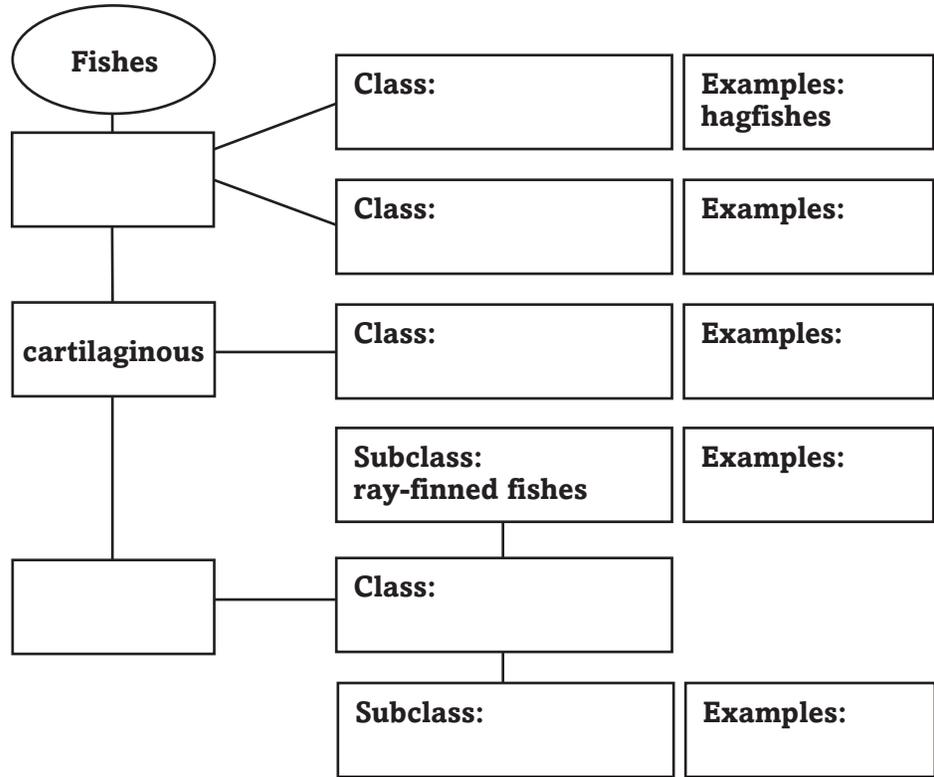
**Section 28.2 Diversity of Today's Fishes** (continued)

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Classes of Fishes**

*I found this information on page \_\_\_\_\_.*

**Classify** fishes and provide an example in the organizer below.



**Compare and contrast** how each pair of fishes are alike and how they differ.

**Hagfish and lamprey**

Alike: \_\_\_\_\_

Different: \_\_\_\_\_

**Great white shark and whale shark**

Alike: \_\_\_\_\_

Different: \_\_\_\_\_

**Trout and lungfish**

Alike: \_\_\_\_\_

Different: \_\_\_\_\_

**Section 28.2 Diversity of Today's Fishes (continued)**

**Main Idea**

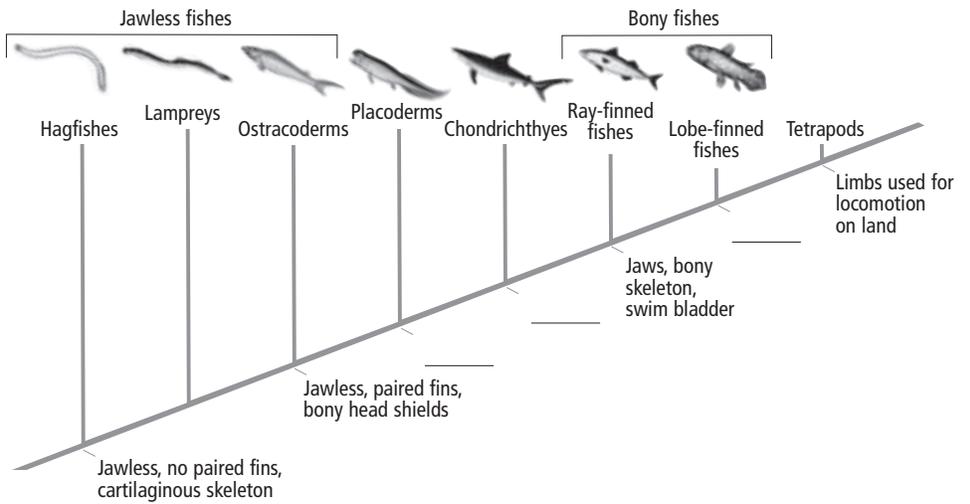
**Details**

**Evolution of Fishes**

I found this information on page \_\_\_\_\_.

**Sequence** the evolution of fishes by writing the letter of the following features on the cladogram in the order in which they appeared.

- a. jaws, bony skeleton, primitive lung
- b. jaws, paired fins, bony plates covering body
- c. jaws, placoid scales, cartilaginous skeleton



**Ecology of Fishes**

I found this information on page \_\_\_\_\_.

**Analyze** the effects of human activities on fishes.

Damming rivers in Pacific Northwest: \_\_\_\_\_  
 \_\_\_\_\_

Polluting waterways: \_\_\_\_\_  
 \_\_\_\_\_

**CONNECT**

Describe ways in which humans can use water resources with less impact on aquatic ecosystems. Identify how an individual could support this effort.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Fishes and Amphibians

## Section 28.3 Amphibians

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Skim** Section 3 of the chapter. Name two characteristics of amphibians.

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

**Review Vocabulary**

*metamorphosis*

Use your book or dictionary to define metamorphosis.

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

*cloaca*

Use your book or dictionary to define each term.

\_\_\_\_\_  
\_\_\_\_\_

*ectotherm*

\_\_\_\_\_  
\_\_\_\_\_

*nictitating membrane*

\_\_\_\_\_  
\_\_\_\_\_

*tympanic membrane*

\_\_\_\_\_  
\_\_\_\_\_

**Academic Vocabulary**

*diversify*

Define and use diversify in a sentence to show its scientific meaning.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 28.3 Amphibians** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Evolution of Tetrapods**

*I found this information on page \_\_\_\_\_.*

**Characteristics of Amphibians**

*I found this information on page \_\_\_\_\_.*

**Amphibian Diversity**

*I found this information on page \_\_\_\_\_.*

**Identify** *three adaptations that helped amphibians leave water for life on land.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Summarize** *the characteristics of amphibians.*

<b>Characteristics of Amphibians</b>
Feeding and digestion:
Excretion:
Respiration:
Circulation:
Brain and senses:
Reproduction:

**Create** *a concept map to show characteristics and examples of each order of amphibians.*

**Section 28.3 Amphibians** (continued)

**Main Idea** \_\_\_\_\_ **Details** \_\_\_\_\_

**Evolution of Amphibians**

*I found this information on page \_\_\_\_\_.*

**Identify** the evolutionary adaptations that make the branching points for each amphibian group.

Amphibian Group	Evolutionary Branching Points
Rhipidistians	
Igthyostegans	
Tetrapods	
Caecilians	
Salamanders	
Frogs and toads	

**Ecology of Amphibians**

*I found this information on page \_\_\_\_\_.*

**Describe** factors in the worldwide decline of amphibians and explain how each factor affects the ability of amphibians to survive.

Local factors: \_\_\_\_\_  
\_\_\_\_\_

Effects: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Global factors: \_\_\_\_\_  
\_\_\_\_\_

Effects: \_\_\_\_\_  
\_\_\_\_\_

**SUMMARIZE**

Compare amphibians with fishes. List some important evolutionary advances seen in amphibians.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Reptiles and Birds

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Reptiles and Birds	After You Read
	<ul style="list-style-type: none"> <li>• Snakes flick their tongue to smell odors.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Some scientists hypothesize that a meteorite crashed to Earth, causing extinction of the dinosaurs.</li> </ul>	
	<ul style="list-style-type: none"> <li>• All birds have feathers.</li> </ul>	
	<ul style="list-style-type: none"> <li>• All birds can fly.</li> </ul>	

### Science Journal

*Think about the lives 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?*

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# Reptiles and Birds

## Section 29.1 Reptiles

### Main Idea

### Details

**Skim** Section 1 of the chapter. Read the headings and illustration captions. Write three questions that come to mind.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define embryo.

*embryo*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*amnion*

\_\_\_\_\_  
\_\_\_\_\_

*amniotic egg*

\_\_\_\_\_  
\_\_\_\_\_

*carapace*

\_\_\_\_\_  
\_\_\_\_\_

*Jacobson's organ*

\_\_\_\_\_  
\_\_\_\_\_

*plastron*

\_\_\_\_\_  
\_\_\_\_\_

### Academic Vocabulary

Define interpretation to show its scientific meaning.

*interpretation*

\_\_\_\_\_  
\_\_\_\_\_

**Section 29.1 Reptiles** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Characteristics of Reptiles**

*I found this information on page \_\_\_\_\_.*

**Identify the adaptations reptiles made to survive on land.**

Needed for Life on Land	Adaptation
protect embryo from drying out	
prevent excessive loss of water and minerals from the body	
exchange gases other than through skin	
crocodile's need for more oxygen delivered to cells to help move its large body	
snake's need to swallow prey larger than itself	
complex vision and muscle function	
move faster and bear more body weight	

**Model a reptilian egg. Label the amnion, embryo, allantois, yolk sac, chorion, and shell.**



# Reptiles and Birds

## Section 29.2 Birds

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Skim** Section 2 of the chapter. Identify characteristics of birds that make them different from reptiles.

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**Review Vocabulary**

Use your book or dictionary to define *terrestrial*.

*terrestrial*

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**New Vocabulary**

Use your book or dictionary to define each term.

*air sac*

---

*contour feather*

---

*down feather*

---

*endotherm*

---

*feather*

---

*incubate*

---

*preen gland*

---

*sternum*

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**Section 29.2 Birds** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Characteristics of Birds**

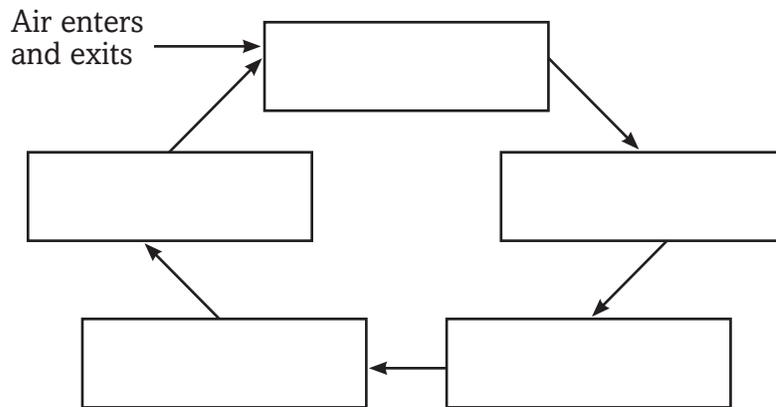
I found this information on page \_\_\_\_\_.

**Model** a contour feather and a down feather. Label the structures. Write brief captions describing the characteristics or functions of each feather.

Down feathers	Contour feathers

**Sequence** the respiratory organs of a bird. Place the organs from the list below in the proper sequence. One organ appears more than once.

- lungs
- anterior air sacs
- posterior air sacs
- trachea



**Analyze** how eye position reflects a bird's life habits.

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**Section 29.2 Birds** (continued)

**Main Idea**

**Details**

**Diversity of Modern Birds**

*I found this information on page \_\_\_\_\_.*

**Identify the order and one member of the order for each distinguishing characteristic listed below.**

Characteristic	Order/Member
builds nests in cavities	Piciformes/woodpecker
flipper-like wings; solid bones	
flightless; includes largest living birds	
sing; feet adapted for perching	
marine; tube-shaped nostrils	
long legs for wading	
nocturnal; large eyes; talons	
aquatic; round beak	

**Evolution of Birds**

*I found this information on page \_\_\_\_\_.*

**Compare features of dinosaurs found in fossil records that are similar to features of present-day birds.**

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**Ecology of Birds**

*I found this information on page \_\_\_\_\_.*

**Analyze how birds are key to the survival of many plants.**

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**SUMMARIZE**

Compare and contrast ectothermy and endothermy.

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# Tie It Together

## SUMMARIZE

*Create a profile of one bird and one reptile common to your area. Identify the animal's order and species. Sketch each animal and label characteristics that distinguish it from other birds or reptiles. Write a brief summary of its life habits from your research. Point out characteristics on the sketches that are adapted for the animal's life habits.*

Reptile species:

Order:

Bird species:

Order:

# Mammals

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Mammals	After You Read
	<ul style="list-style-type: none"> <li>• If an animal has hair, it is a mammal.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Mammals produce their body heat internally.</li> </ul>	
	<ul style="list-style-type: none"> <li>• A duck-billed platypus is not a true mammal because it lays eggs.</li> </ul>	
	<ul style="list-style-type: none"> <li>• The first mammals probably evolved from reptiles.</li> </ul>	

### 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.*

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# Mammals

## Section 30.1 Mammalian Characteristics

### Main Idea

### Details

**Skim** Section 1 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*metabolic rate*

Use your book or dictionary to define metabolic rate.

\_\_\_\_\_

\_\_\_\_\_

### New Vocabulary

Write the correct vocabulary term in the left column for each definition below.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- produces and secretes milk that nourishes developing young
- sheet of muscle located beneath the lungs that separates the chest cavity from the abdominal cavity; its contraction and relaxation allows air to move into and out of the lungs
- highly folded outer layer of the cerebrum; responsible for coordinating conscious activities, memory, and ability to learn
- part of the brain responsible for balance and coordinating movement
- group of cells that secretes fluid to be used elsewhere in the body
- saclike muscular organ in which embryos develop
- organ that provides food and oxygen to and removes waste from the developing young
- amount of time the young stay in the uterus until they are born

### Academic Vocabulary

*retain*

Define retain to show its scientific meaning.

\_\_\_\_\_

\_\_\_\_\_

**Section 30.1 Mammalian Characteristics** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Hair and Mammary Glands**

*I found this information on page \_\_\_\_\_.*

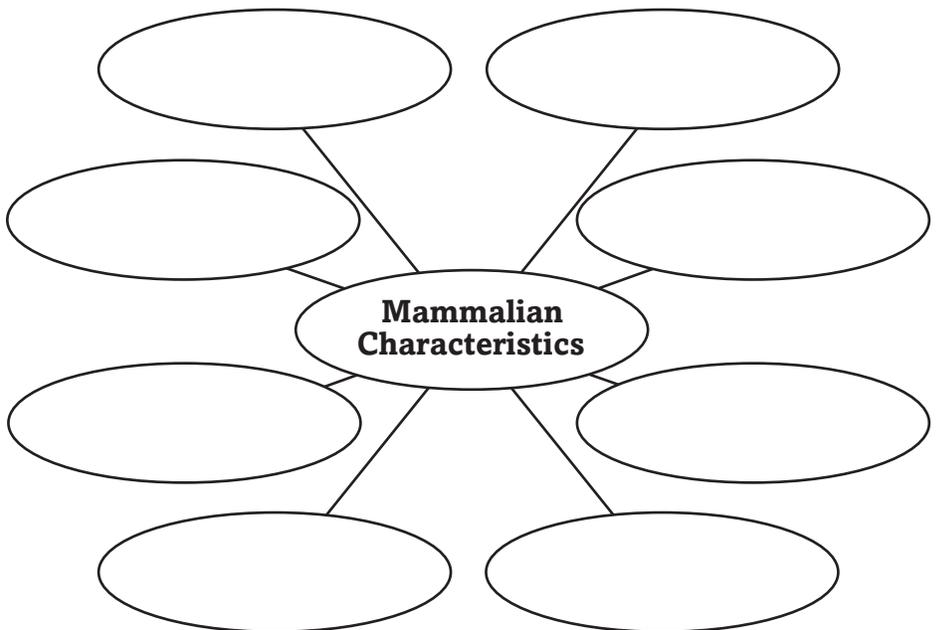
**Analyze** *the importance of hair by identifying the six functions of hair and giving an example of each function.*

Functions	Examples

**Other Characteristics**

*I found this information on page \_\_\_\_\_.*

**Organize** *mammalian characteristics by completing the concept map.*



**Section 30.1 Mammalian Characteristics** (continued)

**Main Idea** \_\_\_\_\_

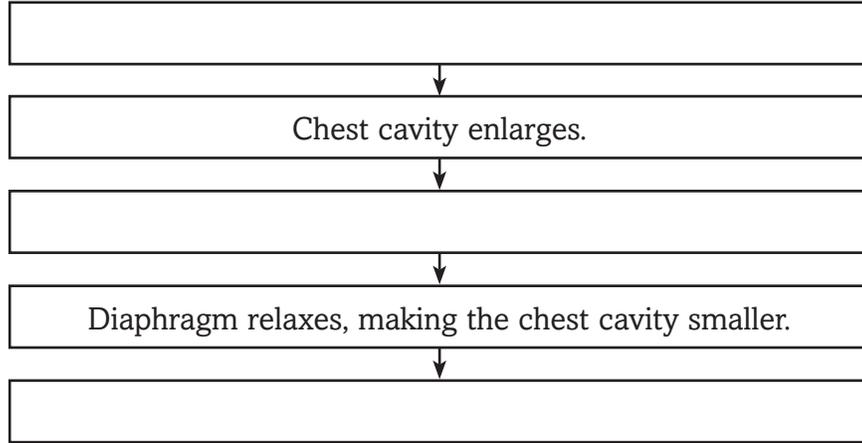
*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Classify** each description below as a characteristic of insectivores, herbivores, carnivores, or omnivores.

Classification	Characteristic
	have longest digestive tract
	feed on both plants and animals
	have long, curved incisors to seize prey
	have long, sharp canines to pierce prey

**Sequence** how the diaphragm works in respiration.



**Describe** the functions of each type of gland listed below.

Sweat glands:	Scent glands:
Mammary glands:	Oil glands:

**SUMMARIZE**

Create a graphic organizer showing characteristics of mammals. The organizer should distinguish characteristics common to all mammals from characteristics common to only certain species.

# Mammals

## Section 30.2 Diversity of Mammals

### Main Idea

### Details

**Scan** Section 2 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Read all tables and graphs.
- Look at all illustrations and read the captions.
- Think about what you already know about mammals.

*Write two facts that you discovered about the subgroups of mammals.*

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

*Use your book or dictionary to define chromosome.*

*chromosome*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

*Use your book or dictionary to define the following terms.*

*marsupial*

\_\_\_\_\_  
\_\_\_\_\_

*monotreme*

\_\_\_\_\_  
\_\_\_\_\_

*placental mammal*

\_\_\_\_\_  
\_\_\_\_\_

*therapsid*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Section 30.2 Diversity of Mammals** (continued)

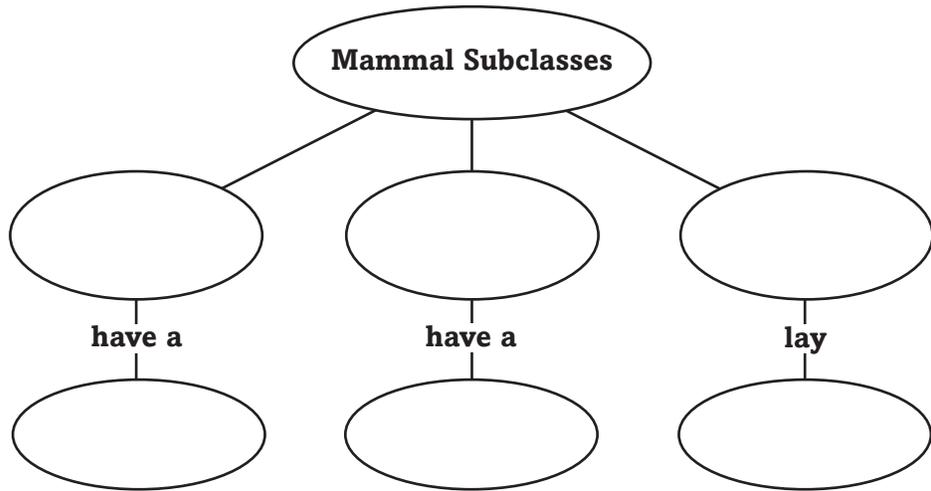
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

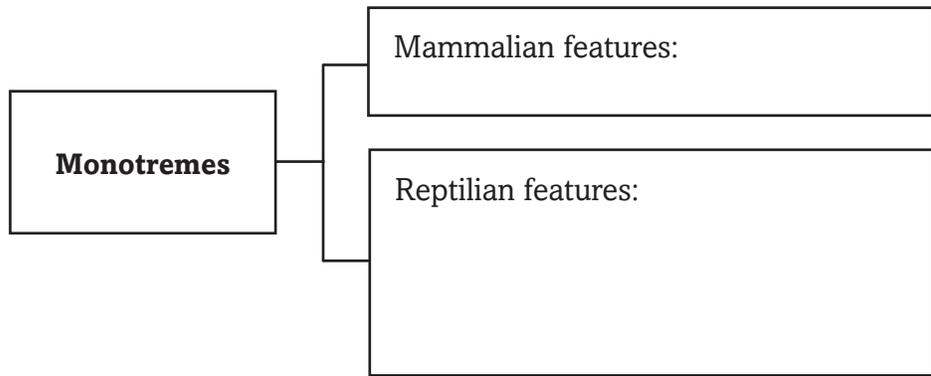
**Mammal Classification**

*I found this information on page \_\_\_\_\_.*

**Organize** information about the three subclasses of mammals by completing the concept map below.



**Analyze** characteristics of monotremes by identifying their mammal-like and reptilelike features.



**Compare and contrast** the development of young in a placental mammal with the development of young in a marsupial.

Marsupial	Placental Mammal

**Section 30.2 Diversity of Mammals** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

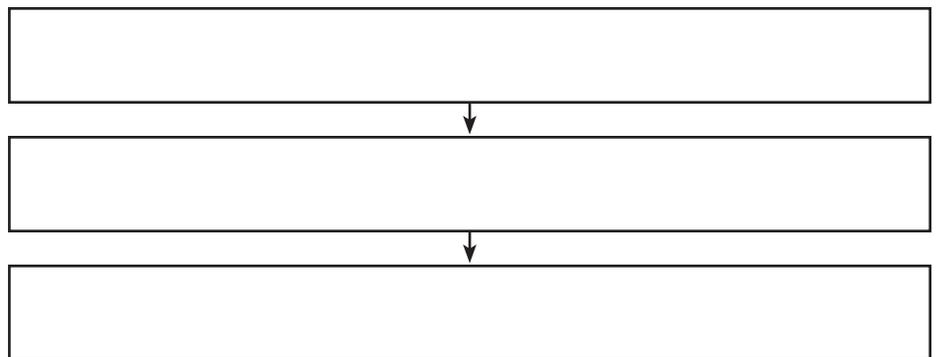
**Contrast** orders of placental mammals. List characteristics that distinguish each order.

Order	Characteristics
Chiroptera	
Xenarthra	
Carnivora	
Primates	
Artiodactyla	
Perissodactyla	
Cetacea	

**Evolution of Mammals**

*I found this information on page \_\_\_\_\_.*

**Sequence** the environmental developments that led to the expansion of mammalian diversity during the Cenozoic era.



**SUMMARIZE**

Describe what the mammals of Australia might be like today if the movement of Earth's plates had not separated Australia from other continents. Explain your reasoning.

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# Tie It Together

## SYNTHESIZE

*Describe the ideal adaptations that would be needed by a mammal who lived in a high desert with broad temperature ranges, limited food and water, and predatory birds and reptiles. Identify the likely distinguishing characteristics in the areas of hair functions, teeth, senses, limb types, movement, and metabolic rate.*

# Animal Behavior

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*Describe two behavior patterns in humans.*

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# Animal Behavior

## Section 31.1 Basic Behaviors

**Main Idea**

**Details**

**Scan** the titles, boldfaced words, illustrations, and captions in Section 1. Write two facts you discovered about animal behavior.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define natural selection.

*natural selection*

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

Use the new vocabulary words to complete the paragraph below.

- behavior*
- classical conditioning*
- cognitive behavior*
- fixed action pattern*
- habituation*
- imprinting*
- innate behavior*
- learned behavior*
- operant conditioning*

Any way that an animal responds to a stimulus is \_\_\_\_\_.

Some behaviors, such as \_\_\_\_\_, are genetically based.

An animal that carries out a specific set of actions, in the same order, in response to a stimulus is exhibiting a \_\_\_\_\_.

Behavior that results from an interaction between genetically based behaviors and past experiences is \_\_\_\_\_. An example is \_\_\_\_\_, in which the response decreases after repeated exposure to a stimulus that has no positive or negative effects. An animal can learn to associate two different kinds of stimuli through \_\_\_\_\_. Learning through \_\_\_\_\_ involves rewards and punishments. One type of permanent learning, called \_\_\_\_\_, occurs only within a specific time period. When an animal solves a problem, it is exhibiting \_\_\_\_\_.

**Academic Vocabulary**

Define inanimate to show its scientific meaning.

*inanimate*

\_\_\_\_\_

**Section 31.1 Basic Behaviors** (continued)

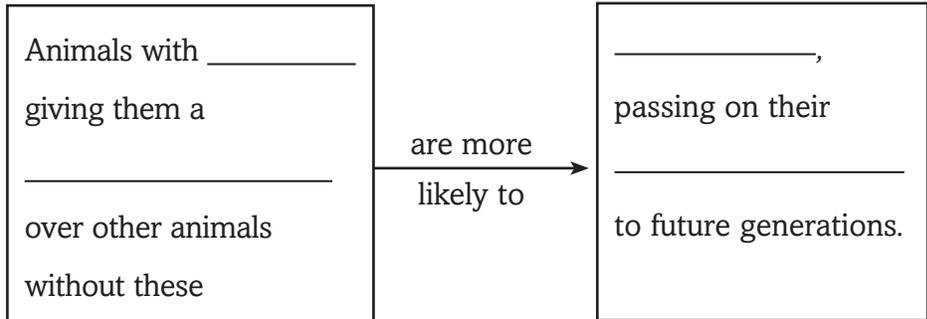
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Behavior**

*I found this information on page \_\_\_\_\_.*

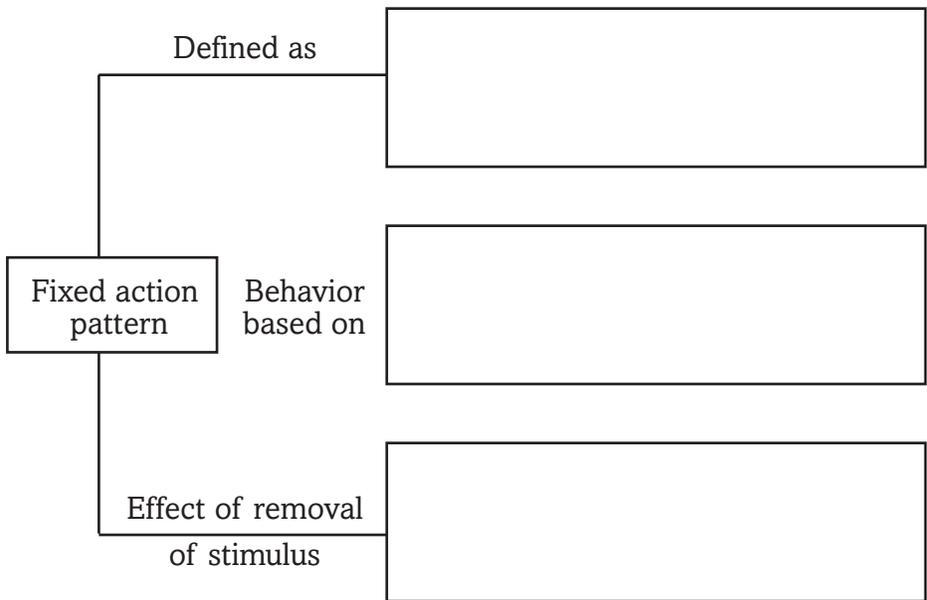
**Analyze** the relationship of behavior and natural selection by completing the graphic organizer.



**Innate Behavior**

*I found this information on page \_\_\_\_\_.*

**Complete** the fixed action pattern by completing the diagram.



**Learned Behavior**

*I found this information on page \_\_\_\_\_.*

**Contrast** learned behavior to innate behavior. Give an example of a behavior in response to a particular stimulus.

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**Section 31.1 Basic Behaviors (continued)**

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Organize** information about the different kinds of learned behavior in the chart.

Learned Behavior	Description	Example
		a horse ignoring noisy cars that pass by its pasture
		a cat rushing to its food bowl at the sound of a can opener because its food is opened with a can opener
	learning to associate a response to a stimulus with a reward or punishment	
Imprinting		
Cognitive behavior		

**SUMMARIZE**

Animals respond to both internal and external stimuli. Give an example of a response to an internal stimulus and a response to an external stimulus.

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# Animal Behavior

## Section 31.2 Ecological Behaviors

### Main Idea

### Details

**Skim** Section 2 of the chapter. Write three questions that come to mind from reading the headings and illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define colony.

colony

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### New Vocabulary

Write the correct vocabulary term in the left column for each definition below.

_____	threatening or combative interaction between two individuals of the same species
_____	ranking within a group, in which a top-ranked animal gets access to resources without conflict from others in the group
_____	attempt to adopt and control a physical area over other animals of the same species
_____	finding and eating food
_____	moving long distances seasonally to new locations
_____	cycle that occurs daily
_____	auditory communication in which animals use vocal organs to produce groups of sounds that have shared meanings
_____	behavior designed to attract a mate
_____	parental care of offspring in early stages of development
_____	action that benefits another individual at a cost to the actor

**Section 31.2 Ecological Behaviors** (continued)

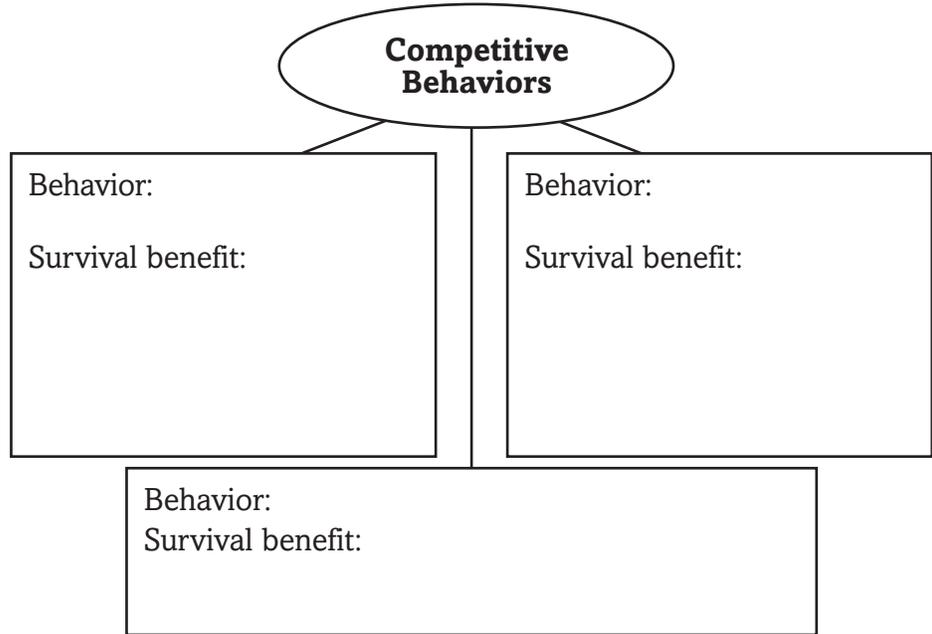
**Main Idea**

**Types of Behaviors**

I found this information on page \_\_\_\_\_.

**Details**

**Analyze** competitive behaviors by describing the survival benefits of each behavior.



**Communication Behaviors**

I found this information on page \_\_\_\_\_.

**Contrast** language with communication. Give an example of communication and an example of language.

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**Courting and Nurturing Behaviors**

I found this information on page \_\_\_\_\_.

**Infer** why a peacock fans and shakes his large, colorful tail in the presence of a pea hen during mating season.

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**Section 31.2 Ecological Behaviors** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Cooperative Behaviors**

*I found this information on page \_\_\_\_\_.*

**Analyze** *why an animal might engage in altruistic behavior, even though the behavior does not promote its own reproductive success.*

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**Advantages and Disadvantages**

*I found this information on page \_\_\_\_\_.*

**Organize** *the costs and benefits for survival and reproductive success of the behaviors listed below.*

<b>Behavior</b>	<b>Benefit</b>	<b>Cost</b>
Geese fly south before winter in North America.		
Male lions fight to establish a territory.		
Hawk parents fly many kilometers daily to find food for their young.		

**CONNECT**

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 and its advantages.

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# Tie It Together

## FURTHER INQUIRY

*Observe animal behaviors and take notes. Select two behaviors you observe, and analyze them, using the forms below. Conduct further research, as needed, to complete your behavior report thoroughly.*

Animal:	
Description of behavior:	
Innate or learned?	Type of behavior:
Description of stimulus:	
Internal or external?	
Advantages of behavior for survival or reproductive success:	
Costs of behavior in terms of survival or reproductive success:	

Animal:	
Description of behavior:	
Innate or learned?	Type of behavior:
Description of stimulus:	
Internal or external?	
Advantages of behavior for survival or reproductive success:	
Costs of behavior in terms of survival or reproductive success:	

# Integumentary, Skeletal, and Muscular Systems

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Integumentary, Skeletal, and Muscular Systems	After You Read
	<ul style="list-style-type: none"> <li>• Skin is an organ.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Use of a tanning bed will not put you at risk for skin cancer.</li> </ul>	
	<ul style="list-style-type: none"> <li>• All joints of the skeleton allow the bones to move.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Some muscles in your body are not under your conscious control.</li> </ul>	

### Science Journal

*Think about a sport you or someone you know plays. Describe how your skin, skeleton, and muscles help you play that sport.*

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# Integumentary, Skeletal, and Muscular Systems

## Section 32.1 The Integumentary System

**Main Idea**

**Details**

**Scan** Use the checklist below to preview Section 1 of the chapter.

- Read all section titles.
- Read all boldfaced words.
- 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. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define integument.

*integument*

**New Vocabulary**

Write the correct vocabulary term in the left column for each definition below.

- |       |   |
|-------|---|
| _____ | a pigment manufactured by cells in the inner layer of epidermis that protects from ultraviolet radiation            |
| _____ | structure that produces oil that lubricates skin and hair   |
| _____ | protein found in the outer layers of epidermal cells that waterproofs and protects the cells and tissues underneath |
| _____ | narrow cavity in the dermis from which hair cells grow  |
| _____ | the outer superficial layer of skin   |
| _____ | the inner, thicker layer of skin  |

**Academic Vocabulary**

Define function, then write a sentence to show its scientific meaning.

*function*

**Section 32.1 The Integumentary System (continued)**

**Main Idea**

**The Structure of Skin**

*I found this information on page \_\_\_\_\_.*

**Details**

**Analyze** the four types of body tissues in the integumentary system, and give the function of each one.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**Classify** each phrase as describing the dermis or epidermis. Write each phrase under the correct skin layer.

- |                                 |   |
|---------------------------------|---|
| • consists of connective tissue | • contains muscle fibers, nerve cells, sweat glands, and oil glands |
| • has inner and outer portions  | • outer layer of skin   |
| • contains dead cells that shed | • inner, thicker portion of skin                                    |
| • contains keratin              |   |
| • contains melanin              |   |

Main Layers of Skin	
Dermis	Epidermis

**Summarize** the diagram of the integumentary system in your book.

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**Section 32.1 The Integumentary System (continued)**

**Main Idea**

**Functions of the Integumentary System**

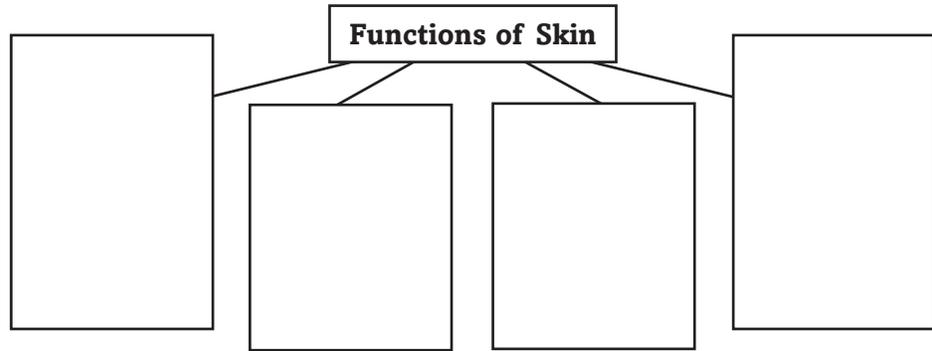
I found this information on page \_\_\_\_\_.

**Damage to the Skin**

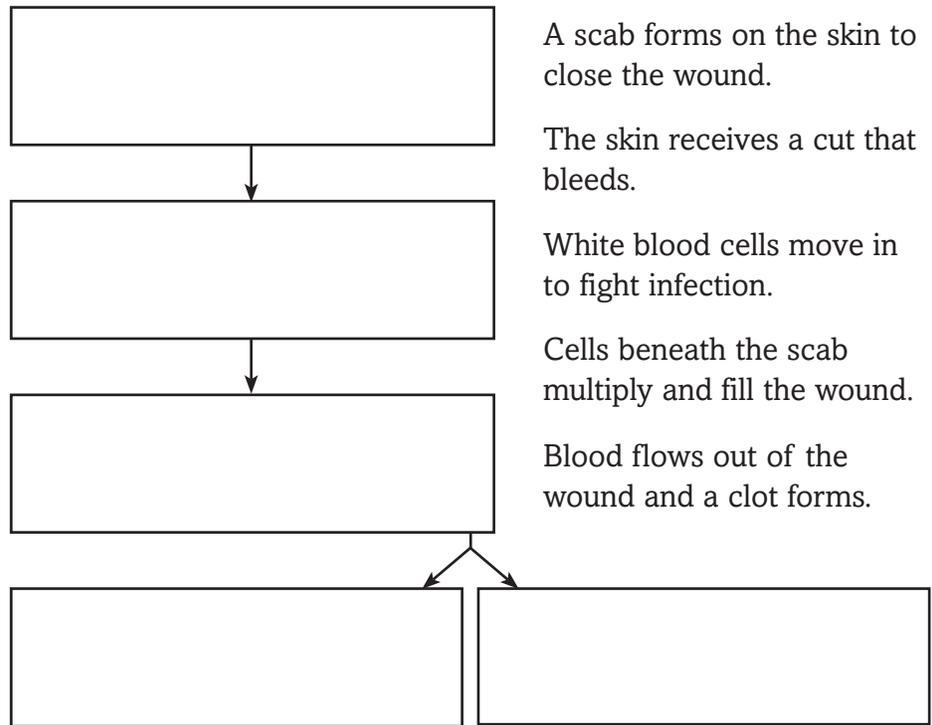
I found this information on page \_\_\_\_\_.

**Details**

**Organize** information about the four functions of skin.



**Sequence** the steps that occur during skin healing.



A scab forms on the skin to close the wound.

The skin receives a cut that bleeds.

White blood cells move in to fight infection.

Cells beneath the scab multiply and fill the wound.

Blood flows out of the wound and 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.

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# Integumentary, Skeletal, and Muscular Systems

## Section 32.2 The Skeletal System

### Main Idea

### Details

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

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define cartilage.

*cartilage*

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### New Vocabulary

Use your book or dictionary to define each term.

*compact bone*

*osteocyte*

*spongy bone*

*red bone marrow*

*yellow bone marrow*

*osteoblast*

*ossification*

*osteoclast*

*ligament*

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Section 32.2 The Skeletal System (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Structure of the Skeletal System**

I found this information on page \_\_\_\_\_.

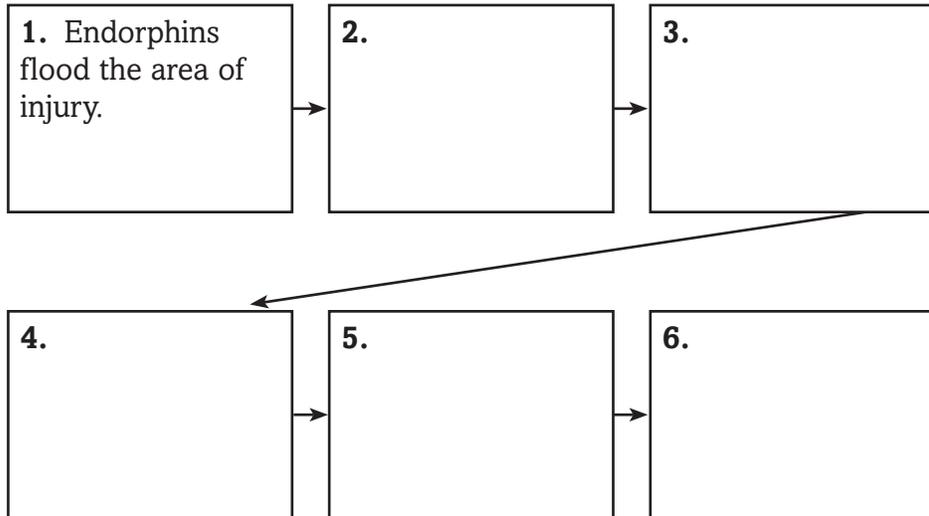
**Identify** the two main divisions of the human skeleton and the bones each includes.

	includes	
--	----------	--

	includes	
--	----------	--

**Create** a sketch of a bone. Show and label compact bone, spongy bone, and the location of osteons. Use the figure in your book to help you.

**Sequence** the steps in the repair of fractured bone. The first step has been completed for you.



**Section 32.2 The Skeletal System** (continued)

**Main Idea**

**Details**

**Joints**

I found this information on page \_\_\_\_\_.

**Classify** each bone joint listed below as one or more of the following types:

- gliding
- hinge
- ball-and-socket
- suture
- pivot

knee joint \_\_\_\_\_ skull bone joint \_\_\_\_\_

elbow joint \_\_\_\_\_ shoulder joint \_\_\_\_\_

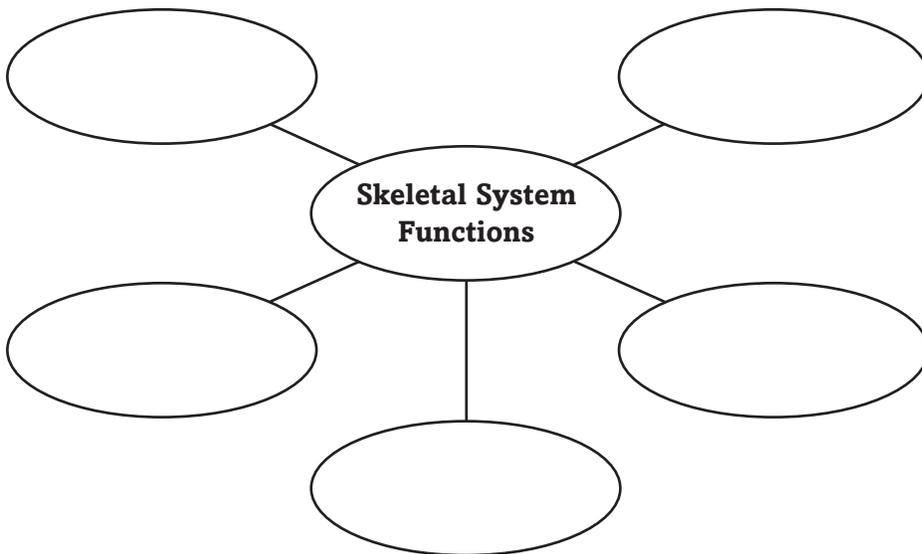
hip joint \_\_\_\_\_ wrist joint \_\_\_\_\_

ankle joint \_\_\_\_\_ vertebral joint \_\_\_\_\_

**Function of the Skeletal System**

I found this information on page \_\_\_\_\_.

**Complete** the concept map about the skeletal system functions.



**SUMMARIZE**

Compare yellow bone marrow and red bone marrow.

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# Integumentary, Skeletal, and Muscular Systems

## Section 32.3 The Muscular System

### Main Idea

### Details

**Skim** Section 3 of the chapter. Write two facts you discovered about muscles.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define anaerobic.

*anaerobic*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*actin*

\_\_\_\_\_

*cardiac muscle*

\_\_\_\_\_

*involuntary muscle*

\_\_\_\_\_

*myofibril*

\_\_\_\_\_

*myosin*

\_\_\_\_\_

*sarcomere*

\_\_\_\_\_

*skeletal muscle*

\_\_\_\_\_

\_\_\_\_\_

*smooth muscle*

\_\_\_\_\_

*tendon*

\_\_\_\_\_

\_\_\_\_\_

*voluntary muscle*

\_\_\_\_\_

**Section 32.3 The Muscular System** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Three Types of Muscle**

*I found this information on page \_\_\_\_\_.*

**Identify** *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. Label the nucleus and striation if the muscle is striated. Next to each muscle, describe its function.*

Muscle Model	Muscle Function
Smooth Muscle	
Cardiac Muscle	
Skeletal Muscle	

**Section 32.3 The Muscular System** (continued)

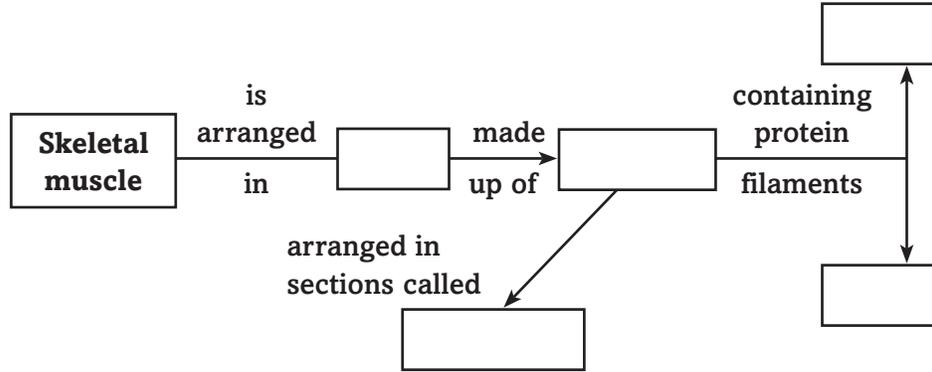
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Skeletal Muscle Contraction**

I found this information on page \_\_\_\_\_.

**Analyze** *muscle tissue by completing the graphic organizer.*



**Summarize** *the sliding filament theory.*

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**Skeletal Muscle Strength**

I found this information on page \_\_\_\_\_.

**Contrast** *the abilities of slow-twitch and fast-twitch muscles.*

Slow-twitch	Fast-twitch

**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.

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# Nervous System

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*Think about a time you have been frightened. Describe how you felt and how your body responded.*

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# Nervous System

## Section 33.1 Structure of the Nervous System

### Main Idea

### Details

**Skim** Section 1 of the chapter. Focus on the headings, subheadings, boldfaced words, and main ideas. Write two facts you discovered about the structure of the nervous system.

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

*diffusion*

Use your book or dictionary to define diffusion.

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Write the correct vocabulary term in the left column for each definition below.

\_\_\_\_\_

region of a neuron that receives impulses from other neurons and conducts them to the cell body

\_\_\_\_\_

gap in the myelin sheath along the length of an axon

\_\_\_\_\_

nerve impulse

\_\_\_\_\_

nerve pathway that consists of a sensory neuron, an interneuron, and a motor neuron; the basic structure of the nervous system

\_\_\_\_\_

minimum stimulus to cause an action potential to be produced

\_\_\_\_\_

contains the nucleus of a neuron and many of the cell organelles

\_\_\_\_\_

chemical that diffuses across a synapse and binds to receptors on the dendrite of a neighboring cell

\_\_\_\_\_

region of a neuron that carries the nerve impulse from the cell body to other neurons and muscles

\_\_\_\_\_

small gap between the axon of one neuron and the dendrite of another neuron

\_\_\_\_\_

specialized cell that helps you gather, interpret, and react to information about your environment

**Section 33.1 Structure of the Nervous System (continued)**

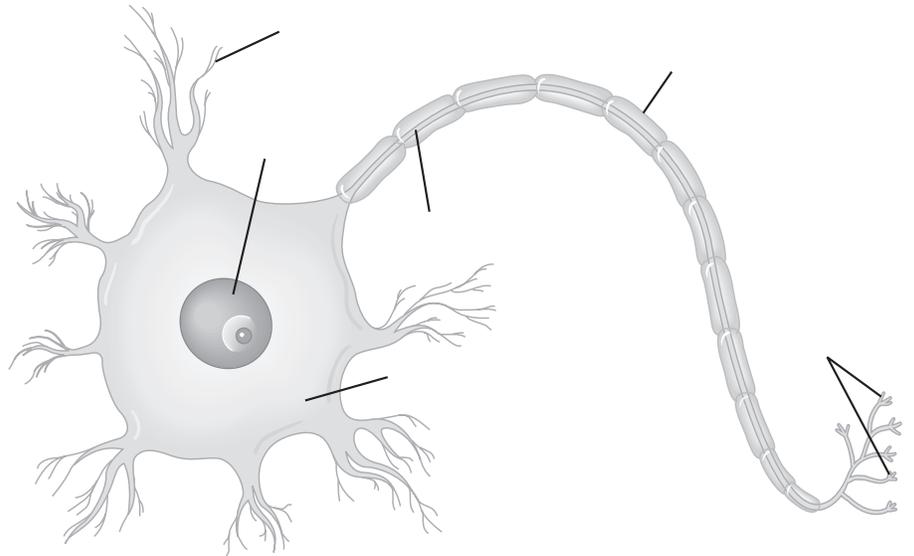
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Neurons**

*I found this information on page \_\_\_\_\_.*

**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.



**A Nerve Impulse**

*I found this information on page \_\_\_\_\_.*

**Analyze** how the myelin sheath increases the speed at which impulses move.

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**Evaluate** how neurotransmitters move across synapses. Write one question and answer about the diagram above.

Question: \_\_\_\_\_

Answer: \_\_\_\_\_

---

### Section 33.1 Structure of the Nervous System (continued)

#### Main Idea

I found this information on page \_\_\_\_\_.

#### Details

**Sequence** the steps in how a nerve impulse moves from one neuron to another neuron, by writing the numbers 1 to 5 in the squares to the left of the steps.

- The neurotransmitter drifts across the synapse and binds to receptors on the dendrite of a neighboring neuron.
- An electrical impulse is sent along an axon, jumping from node to node in axons covered with myelin.
- The neuron is at rest, with more sodium ions outside the cell and more potassium ions inside the cell.
- The impulse reaches the synapse, where channels again open. Vesicles fuse with the plasma membrane and release a neurotransmitter by exocytosis.
- The threshold for an action potential is reached at a dendrite, opening channels in the plasma membrane and causing a reversal in electrical charge.

#### SUMMARIZE

Give an example of an impulse that would be carried by a neuron with myelin and by a neuron without myelin.

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# Nervous System

## Section 33.2 Organization of the Nervous System

**Main Idea**

**Details**

**Skim** Section 2 of the chapter, taking note of headings, illustrations, photos, and captions. Then identify two facts that drew your interest.

Fact 1: \_\_\_\_\_

Fact 2: \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define sensory.

*sensory*

**New Vocabulary**

Classify each term in the left column as being part of the nervous system or part of the brain. Write a brief definition of each term.

	Part of Nervous System (4 terms)	Part of Brain (4 terms)
<i>autonomic nervous system</i>		
<i>cerebrum</i>		
<i>hypothalamus</i>		
<i>medulla oblongata</i>		
<i>parasympathetic nervous system</i>		
<i>pons</i>		
<i>somatic nervous system</i>		
<i>sympathetic nervous system</i>		

**Section 33.2 Organization of the Nervous System (continued)**

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**The Central Nervous System**

*I found this information on page \_\_\_\_\_.*

**Identify** *two body parts that make up the central nervous system.*

1. \_\_\_\_\_ 2. \_\_\_\_\_

**Compare and contrast** *the central nervous system and the peripheral nervous system.*

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**Organize** *the information about three main sections of the brain in the table below.*

	Cerebrum	Cerebellum	Medulla Oblongata
Description			
Function			

**Section 33.2 Organization of the Nervous System (continued)**

**Main Idea**

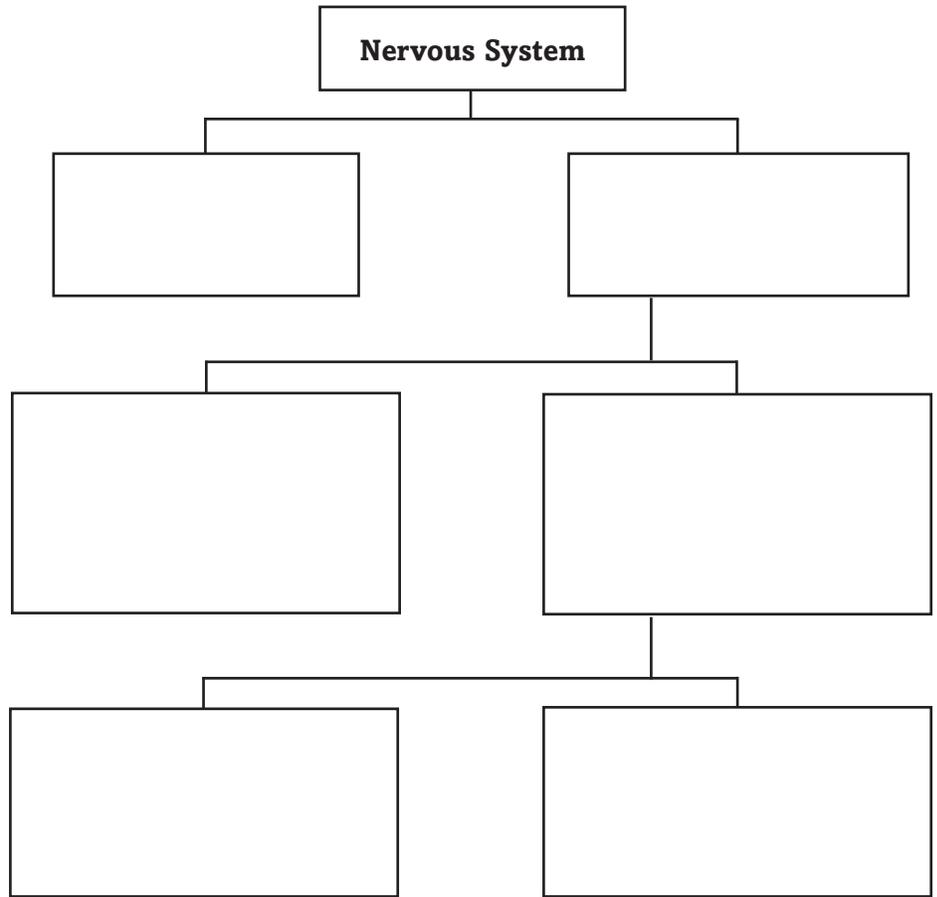
**The Peripheral Nervous System**

*I found this information on page \_\_\_\_\_.*

**Details**

**Organize and summarize** *each division of the nervous system and its function.*

- autonomic
- central
- parasympathetic
- peripheral
- somatic
- sympathetic



**SUMMARIZE**

Compare and contrast a voluntary response of the somatic nervous system and a reflex.

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# Nervous System

## Section 33.3 The Senses

### Main Idea

### Details

**Skim** Section 3 of the chapter. Write two questions that come to mind from reading the headings and illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define stimulus.

*stimulus*

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*cochlea*

\_\_\_\_\_  
\_\_\_\_\_

*lens*

\_\_\_\_\_  
\_\_\_\_\_

*retina*

\_\_\_\_\_  
\_\_\_\_\_

*rod*

\_\_\_\_\_  
\_\_\_\_\_

*semicircular canal*

\_\_\_\_\_  
\_\_\_\_\_

*taste bud*

\_\_\_\_\_  
\_\_\_\_\_

### Academic Vocabulary

Define interpret to show its scientific meaning.

*interpret*

\_\_\_\_\_  
\_\_\_\_\_

**Section 33.3 The Senses (continued)**

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

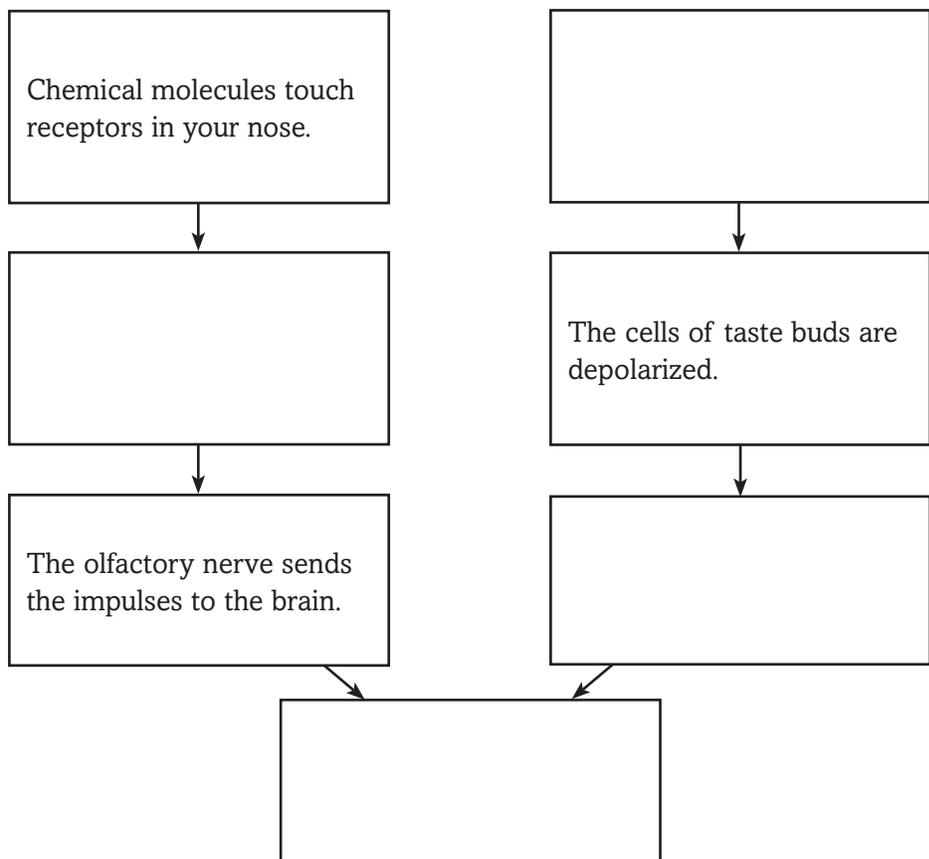
**Taste and Smell**

*I found this information on page \_\_\_\_\_.*

**Identify** *the sensory receptors in the mouth and nasal cavity.*

Sensory receptors \_\_\_\_\_

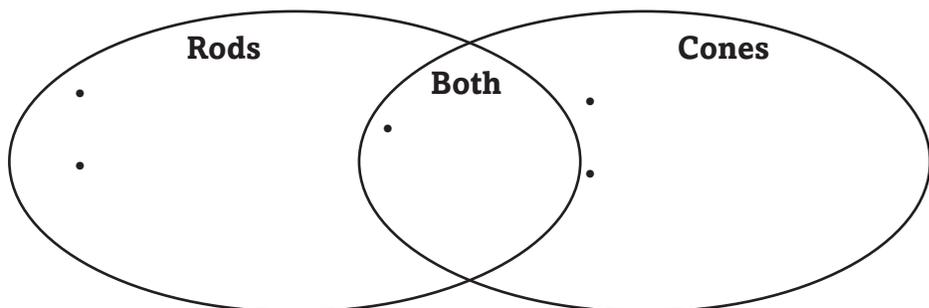
**Compare** *the steps in smelling and tasting. Write the steps for smelling on the left. Write the steps for tasting on the right. Some steps have been completed for you.*



**Sight**

*I found this information on page \_\_\_\_\_.*

**Compare** *how rods and cones in your eyes help you to sense light.*



Section 33.3 The Senses (continued)

**Main Idea**

**Hearing and Balance and Touch**

*I found this information on page \_\_\_\_\_.*

**Details**

**Sequence** *the steps in how your sense of hearing works, by writing the numbers 1 to 5 in the squares to the left of the steps.*

The hairs produce electric impulses that travel to the cerebrum, where they are interpreted as sound.

The stapes causes the membrane of the oval window to move back and forth.

Sound waves enter your ear and travel down to the end of the ear canal.

Sound waves strike the eardrum and cause it to vibrate. The vibrations pass to the bones in the middle ear.

Fluid in the cochlea moves, causing the hair cells to bend.

**Identify** *three stimuli to which receptors in the dermis of the skin respond.*

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

**CONNECT**

Predict how damage to the semicircular canals in the ears would affect balance. Support your reasoning.

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# Nervous System

## Section 33.4 Effects of Drugs

**Main Idea**

**Details**

**Scan** Section 3 of the chapter and identify two legal and two illegal drugs.

Legal Drugs	Illegal Drugs
1.	1.
2.	2.

**Review Vocabulary**

Use your book or dictionary to define threshold.

*threshold*

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**New Vocabulary**

Use your book or dictionary to define the following terms.

*addiction*

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*depressant*

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*dopamine*

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*drug*

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*stimulant*

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*tolerance*

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**Section 33.4 Effects of Drugs** (continued)

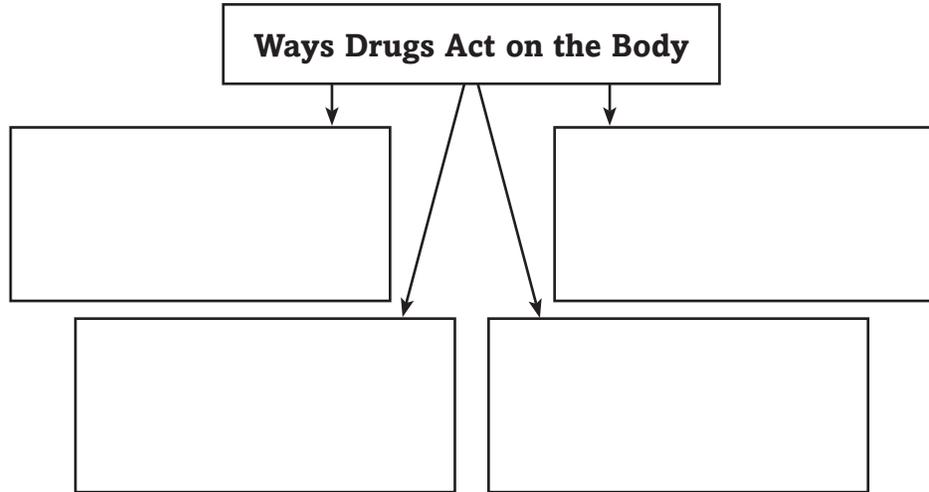
**Main Idea** \_\_\_\_\_

**How Drugs Work**

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

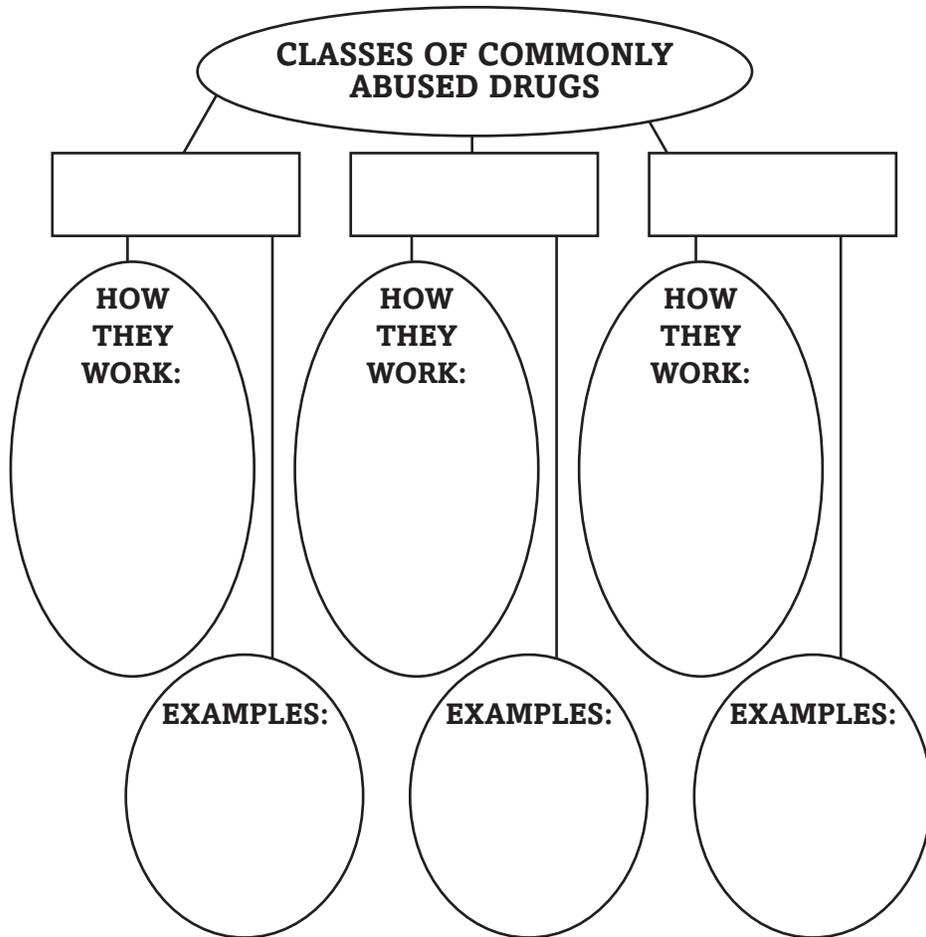
**Summarize** *four ways drugs can act on the body.*



**Classes of Commonly Abused Drugs**

*I found this information on page \_\_\_\_\_.*

**Compare** *the three main classes of commonly abused drugs. Identify each class, how it works in the body, and common examples.*



**Section 33.4 Effects of Drugs** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Analyze the short-term and long-term risks of smoking marijuana.**

Short-term risks: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Long-term risks: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Tolerance and Addiction**

*I found this information on page \_\_\_\_\_.*

**Identify the following scenarios as tolerance, physiological dependence, or psychological dependence.**

\_\_\_\_\_ “I just can’t go to that party without having some alcohol. I need it to feel like I fit in.”

\_\_\_\_\_ “I used to take two painkillers a day, but lately I have to take three or four pills to get the same effect as before.”

\_\_\_\_\_ “When I try to go for a day without my caffeine, I get a terrible headache and nausea.”

**CONNECT**

**Analyze why some stimulants are illegal and others are not.**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Tie It Together

*You have read about the structures and functions of the human nervous system, as well as the effects of drugs on it. Create a mini poster that informs readers of the importance of the nervous system to the body's health.*

# Circulatory, Respiratory, and Excretory Systems

## Before You Read

*Before you read the chapter, respond to these statements.*

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

Before You Read	Circulatory, Respiratory, and Excretory Systems	After You Read
	<ul style="list-style-type: none"> <li>• Your pulse rate is the number of times your heart beats each minute.</li> </ul>	
	<ul style="list-style-type: none"> <li>• If you need a blood transfusion, the donated blood must be the same type as yours.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Breathing and respiration are two names for the same process.</li> </ul>	
	<ul style="list-style-type: none"> <li>• The components of the excretory system are the lungs, skin, and kidneys.</li> </ul>	

### Science Journal

*When you breathe in, oxygen enters your lungs. Describe what you understand about how oxygen from the air reaches the cells in your body.*

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# Circulatory, Respiratory, and Excretory Systems

## Section 34.1 Circulatory System

### Main Idea

### Details

**Scan** Section 1 of the chapter. Identify and list the functions of blood.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define muscle contraction.

*muscle contraction*

\_\_\_\_\_

### New Vocabulary

Use the new vocabulary terms to complete the paragraph below.

- arteries*
- atherosclerosis*
- capillaries*
- heart*
- pacemaker*
- plasma*
- platelets*
- red blood cells*
- valves*
- veins*
- white blood cells*

Large blood vessels called \_\_\_\_\_ carry oxygenated blood away from the heart. The blood flows into microscopic \_\_\_\_\_, where the blood exchanges oxygen and wastes with body cells. Then \_\_\_\_\_ carry deoxygenated blood back to the heart. In these large vessels, flaps of tissue called \_\_\_\_\_ prevent blood from flowing backward. The hollow, muscular \_\_\_\_\_ pumps blood throughout the body. A \_\_\_\_\_ in the right atrium sends out signals that tell the heart muscle to contract. Over half of blood is made up of a clear, yellowish fluid called \_\_\_\_\_. The function of \_\_\_\_\_ is to carry oxygen to all body cells. The \_\_\_\_\_ are the body's disease fighters. Cell fragments called \_\_\_\_\_ help to form blood clots at a wound site. Blood clots, fat deposits, or other materials can block the flow of blood through the arteries, resulting in a condition called \_\_\_\_\_.

**Section 34.1 Circulatory System (continued)**

**Main Idea**

**Functions of the Circulatory System**

*I found this information on page \_\_\_\_\_.*

**Blood Vessels and The Heart**

*I found this information on page \_\_\_\_\_.*

**Details**

**Analyze** how the circulatory system functions as the body's transport system.

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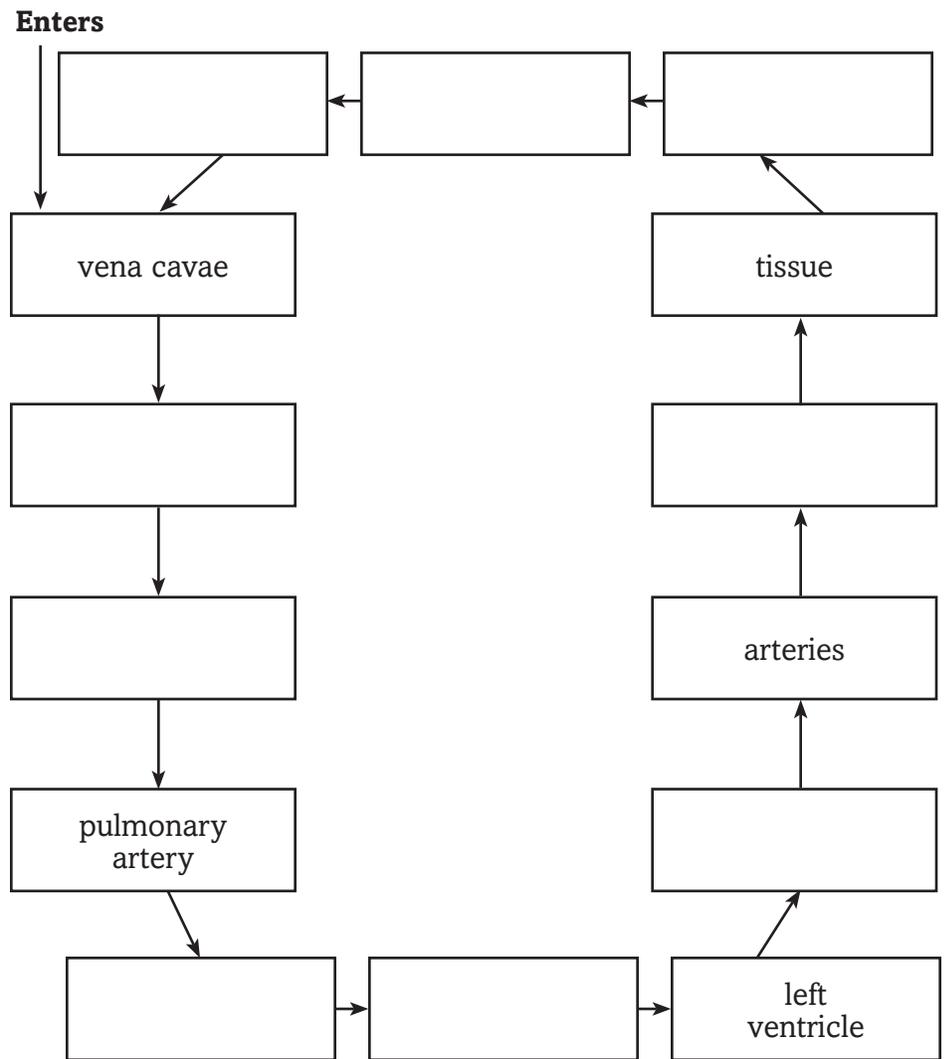


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**Sequence** the path blood takes through the human body by completing the flowchart below.



**Section 34.1 Circulatory System (continued)**

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Blood Components**

*I found this information on page \_\_\_\_\_.*

**Identify** *the components of blood, and list the characteristics of each.*

Blood Component	Characteristics

**Blood Types**

*I found this information on page \_\_\_\_\_.*

**Distinguish** *between blood type, by putting checks in the boxes to show which marker molecules and antibodies it contains.*

Blood Type	Marker A	Marker B	Anti-A Antibody	Anti-B Antibody
A				
B				
AB				
O				

**Circulatory System Disorders**

*I found this information on page \_\_\_\_\_.*

**Compare** *heart attacks to strokes.*

	Heart Attack	Stroke
<b>Causes</b>		
<b>Effects</b>		

**SUMMARIZE**

Create an analogy that explains the one way flow of blood through the circulatory system.

\_\_\_\_\_

\_\_\_\_\_

# Circulatory, Respiratory, and Excretory Systems

## Section 34.2 Respiratory System

**Main Idea**

**Details**

**Skim** Section 2 of the chapter. Read the headings and illustration captions. Write three questions that come to mind.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define ATP.

*ATP*

\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define each term.

*alveolus*

\_\_\_\_\_  
\_\_\_\_\_

*breathing*

\_\_\_\_\_

*bronchus*

\_\_\_\_\_

*external respiration*

\_\_\_\_\_

*internal respiration*

\_\_\_\_\_

*lung*

\_\_\_\_\_  
\_\_\_\_\_

*trachea*

\_\_\_\_\_

Section 34.2 Respiratory System (continued)

**Main Idea** \_\_\_\_\_

**The Importance of Respiration**

I found this information on page \_\_\_\_\_.

**The Path of Air**

I found this information on page \_\_\_\_\_.

**Details** \_\_\_\_\_

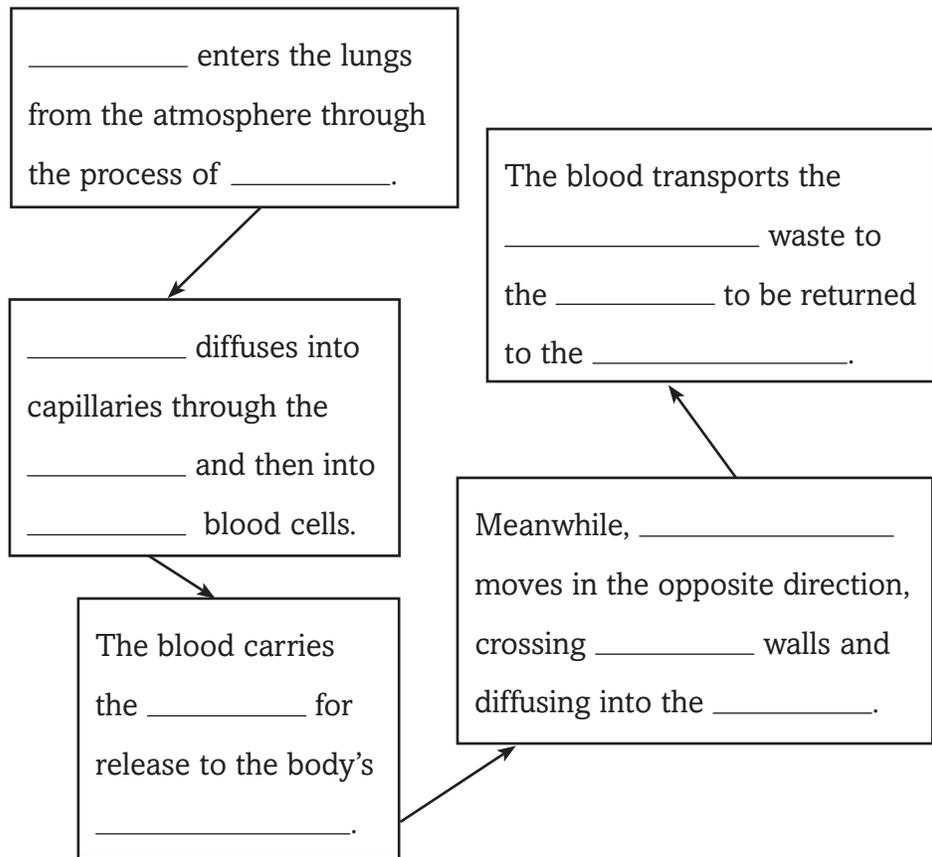
**Contrast** *breathing and respiration.*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Identify** *three structures that filter air as it enters through the nose on its way to the lungs.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Sequence** *the process of gas exchange by completing the sentences in the flow chart below.*



**Section 34.2 Respiratory System** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Breathing**

I found this information on page \_\_\_\_\_.

**Model** the lungs during inhalation and exhalation. Label and describe the position of the diaphragm during each process.

Inhalation	Exhalation

**Respiratory Disorders**

I found this information on page \_\_\_\_\_.

**Summarize** each of the following common respiratory disorders.

Respiratory Disorder	Description
Pneumonia	
Emphysema	
Lung cancer	
Asthma	
Bronchitis	
Pulmonary tuberculosis	

**SUMMARIZE**

Discuss the importance of respiration to the body.

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# Circulatory, Respiratory, and Excretory Systems

## Section 34.3 Excretory System

**Main Idea**

**Details**

**Scan** Section 3 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Read all tables, figures, and graphs.
- Look at all pictures and read the captions.
- Think about what you already know about the excretory system.

**Write** three facts you discovered as you scanned the section.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

*pH*

Use your book or dictionary to define pH.

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

*kidney*

Use your book or dictionary to define each term.

\_\_\_\_\_  
\_\_\_\_\_

*urea*

\_\_\_\_\_  
\_\_\_\_\_

**Academic Vocabulary**

*inhibit*

Define inhibit to show its scientific meaning.

\_\_\_\_\_  
\_\_\_\_\_

**Section 34.3 Excretory System** (continued)

**Main Idea** \_\_\_\_\_

**Parts of the Excretory System**

*I found this information on page \_\_\_\_\_.*

**The Kidneys**

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Describe** *three functions of the excretory system that help maintain homeostasis of the body.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Identify** *the main waste products secreted by the following components of the excretory system.*

lungs: \_\_\_\_\_

skin: \_\_\_\_\_

**Model** *the structure of a kidney, including a diagram of a nephron. Label each major component.*

**Section 34.3 Excretory System (continued)**

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Kidney Disorders**

*I found this information on page \_\_\_\_\_.*

**Summarize** *information about kidney disorders in the table below.*

Disorder	Symptoms	Common Causes	Treatments
Kidney infection			
Nephritis			
Kidney stones			

**Kidney Treatments**

*I found this information on page \_\_\_\_\_.*

**Contrast** *the two types of dialysis by explaining how they differ in the following areas.*

Filtering device: \_\_\_\_\_  
 \_\_\_\_\_

Frequency and duration of treatment: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**SUMMARIZE**

Analyze the path wastes take from the kidney out of the body by making a list of the order of the structures through which wastes flow.

- |                         |          |
|-------------------------|----------|
| 1. <u>kidneys</u> _____ | 5. _____ |
| 2. _____                | 6. _____ |
| 3. _____                | 7. _____ |
| 4. _____                | 8. _____ |

# Digestive and Endocrine Systems

## Before You Read

Use the “What I Know” column to list the things you know about the digestive and endocrine systems. Then list the questions you have about these systems in the “What I Want to Find Out” column.

K What I Know	W What I Want to Find Out	L What I Learned

### 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.*

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# Digestive and Endocrine Systems

## Section 35.1 The Digestive System

### Main Idea

### Details

**Skim** Section 1 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.

1. \_\_\_\_\_

2. \_\_\_\_\_

### Review Vocabulary

*nutrients*

Use your book or dictionary to define nutrients.

\_\_\_\_\_  
\_\_\_\_\_

### New Vocabulary

Write the correct vocabulary term in the left column for each definition below.

\_\_\_\_\_

process that breaks food into smaller pieces by chewing and by the churning action of smooth muscles in the stomach and small intestine

\_\_\_\_\_

longest part of the digestive tract, which connects the stomach and the large intestine and where digestion is completed

\_\_\_\_\_

muscular tube that connects the pharynx to the stomach

\_\_\_\_\_

enzyme found in saliva that begins chemical digestion by breaking down starches into sugars

\_\_\_\_\_

fingerlike structures in the small intestine through which chemical digestion is completed and most nutrients from food are absorbed

\_\_\_\_\_

enzyme in the stomach that helps digest proteins

\_\_\_\_\_

largest internal organ of the body; produces bile, which helps to break down fats

\_\_\_\_\_

action of digestive enzymes in breaking down large molecules of food into smaller molecules that can be absorbed by cells

\_\_\_\_\_

rhythmic contraction of smooth muscles that moves food through the digestive tract

\_\_\_\_\_

end portion of the digestive tract, which includes the colon, rectum, and appendix

**Section 35.1 The Digestive System (continued)**

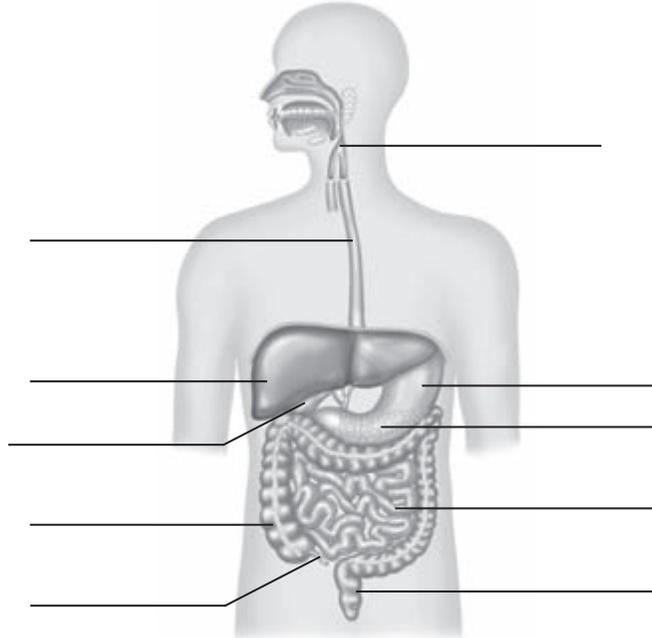
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Functions of the Digestive System**

*I found this information on page \_\_\_\_\_.*

**Label** *the parts of the digestive system in the figure below.*



**Summarize** *how each organ below mechanically and chemically digests food.*

Organ	Mechanical Digestion	Chemical Digestion
Mouth		
Stomach	churning of the smooth muscles breaks food into smaller pieces	
Small intestine		
Pancreas	does not apply	produces enzymes that digest carbohydrates, proteins, and fats; secretes alkaline fluid that aids enzyme action
Liver	does not apply	

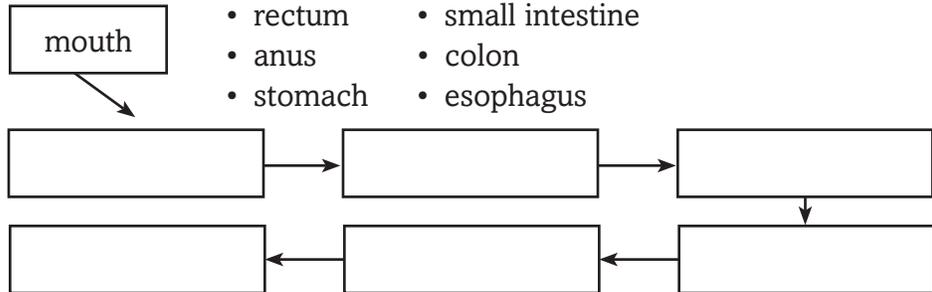
**Section 35.1 The Digestive System** (continued)

**Main Idea** \_\_\_\_\_

I found this information on page \_\_\_\_\_.

**Details** \_\_\_\_\_

**Sequence** the path of food through the digestive tract by placing the terms from the following list in the proper order on the flowchart.



**Analyze** why a sandwich would progress through your digestive tract, even if you ate it while standing on your head.

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**Contrast** the digestive functions of the small intestine with those of the large intestine.

Small Intestine	Large Intestine

**CONNECT**

Describe how your body's ability to benefit from food would change if your small intestine did not have villi. Explain why.

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# Digestive and Endocrine Systems

## Section 35.2 Nutrition

### Main Idea

### Details

**Scan** Section 2 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Read all tables, figures, and graphs.
- Look at all pictures and read the captions.
- Think about what you already know about nutrition.

Write three facts you discovered as you scanned the section.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define amino acids.

*amino acids*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*Calorie*

\_\_\_\_\_

*mineral*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*nutrition*

\_\_\_\_\_

\_\_\_\_\_

*vitamin*

\_\_\_\_\_

\_\_\_\_\_

**Section 35.2 Nutrition** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Calories**

*I found this information on page \_\_\_\_\_.*

**Evaluate** *Assume that playing soccer requires 540 Calories per hour. On a particular day, you ate 2,000 Calories in food. You played soccer for 2.5 hours. Your body used 800 Calories in other activities. Did you use more energy than you consumed on this day? Show your work.*

\_\_\_\_\_

\_\_\_\_\_

**Carbohydrates and Fats and Proteins**

*I found this information on page \_\_\_\_\_.*

**Summarize** *information about carbohydrates, fats, and proteins by completing the table below.*

	<b>Break Down Into</b>	<b>Importance to the Body</b>
Carbohydrates		
Fats		provide energy; building blocks for body; protect some internal organs; store and transport some vitamins
Proteins		

**Food Pyramid**

*I found this information on page \_\_\_\_\_.*

**Classify** *all the foods you ate yesterday in the appropriate food groups.*

<b>Grains</b>	<b>Fruits</b>	<b>Milk</b>
<b>Vegetables</b>	<b>Oils</b>	<b>Meat and Beans</b>

**Section 35.2 Nutrition** (continued)

**Main Idea**

**Vitamins and Minerals and Nutrition Labels**

I found this information on page \_\_\_\_\_.

**Details**

Examine the food label below, and complete the table below assuming you ate the contents of the entire container.

<b>NUTRITION FACTS</b>	
Serving Size: 1 cup (237 g)	
Servings Per Container: 2	
-----	
Amount Per Serving	
Calories 100	Calories from Fat 20
-----	
	% Daily Value
Total Fat 2 g	3%
Saturated Fat 0.5 g	3%
Cholesterol 20 mg	7%
Sodium 960 mg	40%
Total Carbohydrate 13 g	4%
Dietary Fiber 1 g	5%
Sugars 1 g	
Protein 9 g	
-----	
Vitamin A 30%	Vitamin C 0%
Calcium 2%	Iron 4%

Calories Consumed	Grams of Saturated Fat	Grams of Protein	Percent of Daily Value of Calcium

**SUMMARIZE**

Typically men need more Calories per day than women, and teenagers need more Calories than adults. Analyze why Calorie needs differ between these groups.

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# Digestive and Endocrine Systems

## Section 35.3 The Endocrine System

### Main Idea

### Details

**Scan** the titles, boldfaced words, figures, and captions in Section 3. Write two facts you discovered as you scanned the section.

1. \_\_\_\_\_
2. \_\_\_\_\_

### Review Vocabulary

*homeostasis*

Use your book or dictionary to define homeostasis.

### New Vocabulary

Write the correct term in the left column for each definition below.

_____	acts on target cells and tissues to produce a specific response
_____	hormone that causes cells to have a higher rate of metabolism
_____	any gland that produces hormones, which are released into the bloodstream and distributed to body cells
_____	thyroid hormone that is partly responsible for the regulation of calcium, blood clotting, nerve function, and muscle contraction
_____	increases blood calcium by stimulating the bones to release calcium
_____	steroid hormone secreted by the adrenal glands that primarily affects the kidneys and is important for reabsorbing sodium
_____	steroid hormone secreted by the adrenal glands that raises blood glucose levels and also reduces inflammation
_____	secretes hormones that regulate many body functions as well as other endocrine glands
_____	pancreatic hormone that signals liver cells to convert glycogen to glucose and release the glucose into the blood
_____	pancreatic hormone that signals liver and muscle cells to accelerate the conversion of glucose to glycogen, which is stored in the liver
_____	hormone produced by the hypothalamus, regulates water balance

**Section 35.3 The Endocrine System (continued)**

**Main Idea**

**Action of Hormones**

I found this information on page \_\_\_\_\_.

**Negative Feedback**

I found this information on page \_\_\_\_\_.

**Endocrine Glands and Their Hormones**

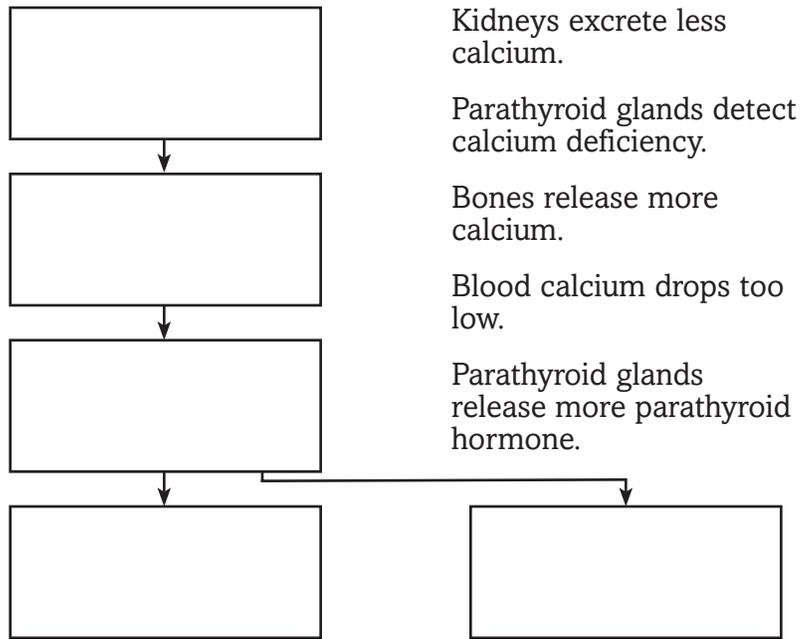
I found this information on page \_\_\_\_\_.

**Details**

**Contrast** *the action of steroid hormones and amino acid hormones.*

Steroid Hormones	Amino Acid Hormones

**Sequence** *the steps in a portion of the negative feedback system. Steps in the regulation of calcium are written in scrambled order at right. Write the steps in the correct order in the boxes.*



**Explain** *how the endocrine system functions as a communication system.*

Serves as messengers	
Produces messengers	
Receives the messages	

**Section 35.3 The Endocrine System (continued)**

**Main Idea**

**Details**

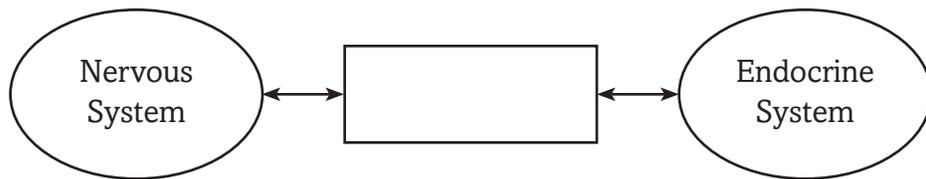
**Links to the Endocrine/  
Nervous System**

I found this information on page \_\_\_\_\_.

**Compare** *the hormone functions of the glands listed below.*

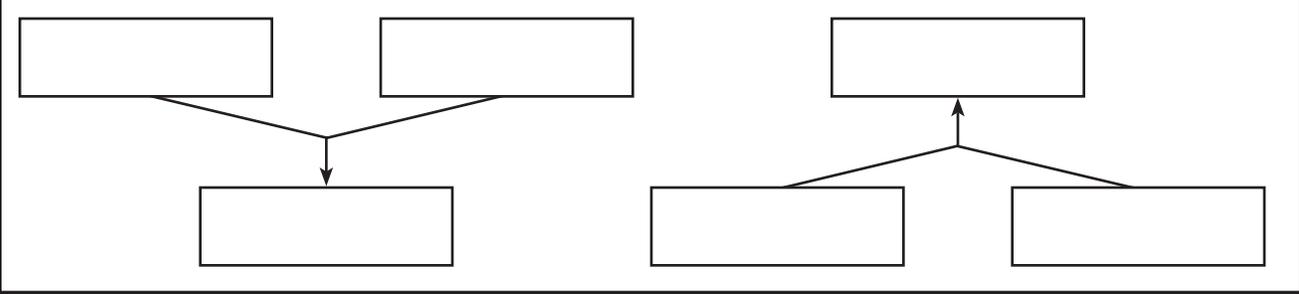
Gland/ Location	Hormones Produced	Body Functions Regulated
Pituitary Location:		
Thyroid Location:		
Parathyroid Location:		
Pancreas Location:		
Adrenal Location:		

**Identify** *the key link in the diagram below.*



**SUMMARIZE**

Create a concept map showing two pairs of hormones that work together and the effect of their cooperation on homeostasis.



# Human Reproduction and Development

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### 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.*

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# Human Reproduction and Development

## Section 36.1 Reproductive Systems

**Main Idea**

**Details**

**Skim** Section 1 of the chapter. Read the headings and illustration captions. Write three questions that come to mind.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define hypothalamus.

*hypothalamus*

\_\_\_\_\_

\_\_\_\_\_

**New Vocabulary**

Classify each vocabulary term. Give a brief description of each. One term fits in both categories.

	Male Reproductive System	Female Reproductive System
<i>epididymis</i>		
<i>menstrual cycle</i>		
<i>oocyte</i>		
<i>oviduct</i>		
<i>polar body</i>		
<i>puberty</i>		
<i>semen</i>		
<i>seminiferous tubule</i>		
<i>urethra</i>		
<i>vas deferens</i>		

**Section 36.1 Reproductive Systems** (continued)

**Main Idea**

**Details**

**Human Male Reproductive System**

*I found this information on page \_\_\_\_\_.*

**Model** the structures of the male reproductive system below. Label the testes, epididymus, vas deferens, and urethra. Describe the function of each.

**Create** a diagram to show how the negative feedback system works to control FSH and LH in the male body.

**Human Female Reproductive System**

*I found this information on page \_\_\_\_\_.*

**Identify** the three main functions of the female reproductive system.

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**Model** the structures of the human female reproductive system below. Label the oviduct, cervix, ovary, and uterus. Describe the function of each.

**Section 36.1 Reproductive Systems** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Sex Cell Production**

I found this information on page \_\_\_\_\_.

**Summarize** the results of each meiotic division in the production of eggs.

First Meiotic Division	Second Meiotic Division

**The Menstrual Cycle**

I found this information on page \_\_\_\_\_.

**Sequence** the steps in the menstrual cycle. Describe the changes in hormones, the uterus, and the ovary at each stage.

<b>1.</b>		
<b>Hormone Changes</b>	<b>Uterine Changes</b>	<b>Ovary Changes</b>
<b>2.</b>		
<b>Hormone Changes</b>	<b>Uterine Changes</b>	<b>Ovary Changes</b>
<b>3.</b>		
<b>Hormone Changes</b>	<b>Uterine Changes</b>	<b>Ovary Changes</b>

**SUMMARIZE**

Draw a concept web that shows sex cell production in males and females.

# Human Reproduction and Development

## Section 36.2 Human Development Before Birth

**Main Idea**

**Details**

**Skim** Section 2 of the chapter. Write two questions that come to mind from reading the heading and illustration captions.

1. \_\_\_\_\_
2. \_\_\_\_\_

**Review Vocabulary**

*lysosome*

Use your book or dictionary to define lysosome.

**New Vocabulary**

*amniotic fluid*

*blastocyst*

*morula*

Use your book or dictionary to define each term. Then make a sketch of each to help you remember.

\_\_\_\_\_

\_\_\_\_\_

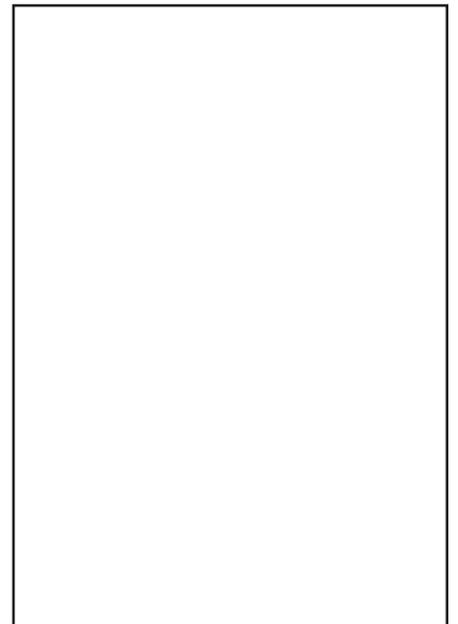
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**Academic Vocabulary**

*enable*

Define enable to show its scientific meaning. Write a sentence using the term.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section 36.2 Human Development Before Birth** (continued)

**Main Idea**

**Details**

**Fertilization and Early Development**

I found this information on page \_\_\_\_\_.

**Sequence** *the steps of fertilization of an egg and implantation of a blastocyst. The steps are written in scrambled order at right. Write the steps in the correct order in the boxes.*



The sperm that survive the acidic vagina swim through the vagina into the uterus.



One sperm penetrates the egg, which changes the electrical charge of the egg's membrane so other sperm cannot enter.



The zygote moves into the uterus and becomes a blastocyst.

300 million to 500 million sperm are released in the female's vagina.

The nucleus of the sperm and the nucleus of the egg unite, forming a zygote.

A few hundred sperm make it into the two oviducts.

The zygote moves down the oviduct and begins to divide by mitosis.

The blastocyst attaches to the uterine lining.

**Section 36.2 Human Development Before Birth** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Model** 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.

**Three Trimesters of Development**

*I found this information on page \_\_\_\_\_.*

**Compare** development of an embryo into a fetus during each trimester. Describe the changes that occur.

First Trimester	Second Trimester	Third Trimester

**Diagnosis in the Fetus**

*I found this information on page \_\_\_\_\_.*

**Analyze** one of the methods of diagnosis in the fetus and describe its benefits and risks.

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**SUMMARIZE**

Use the analogy of plant growth to compare to the growth and development of a fetus over nine months.

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# Human Reproduction and Development

## Section 36.3 Birth, Growth, and Aging

**Main Idea**

**Details**

**Scan** the illustrations and read the captions in Section 3 of the chapter. Predict two things you will read about birth and growth.

1. \_\_\_\_\_

2. \_\_\_\_\_

**Review Vocabulary**

Use your book or dictionary to define growth.

*growth*

\_\_\_\_\_  
\_\_\_\_\_

**New Vocabulary**

Use your book or dictionary to define the following terms.

*adolescence*

\_\_\_\_\_  
\_\_\_\_\_

*adulthood*

\_\_\_\_\_  
\_\_\_\_\_

*dilation*

\_\_\_\_\_  
\_\_\_\_\_

*expulsion stage*

\_\_\_\_\_  
\_\_\_\_\_

*infancy*

\_\_\_\_\_  
\_\_\_\_\_

*labor*

\_\_\_\_\_  
\_\_\_\_\_

*placental stage*

\_\_\_\_\_  
\_\_\_\_\_

**Section 36.3 Birth, Growth, and Aging** (continued)

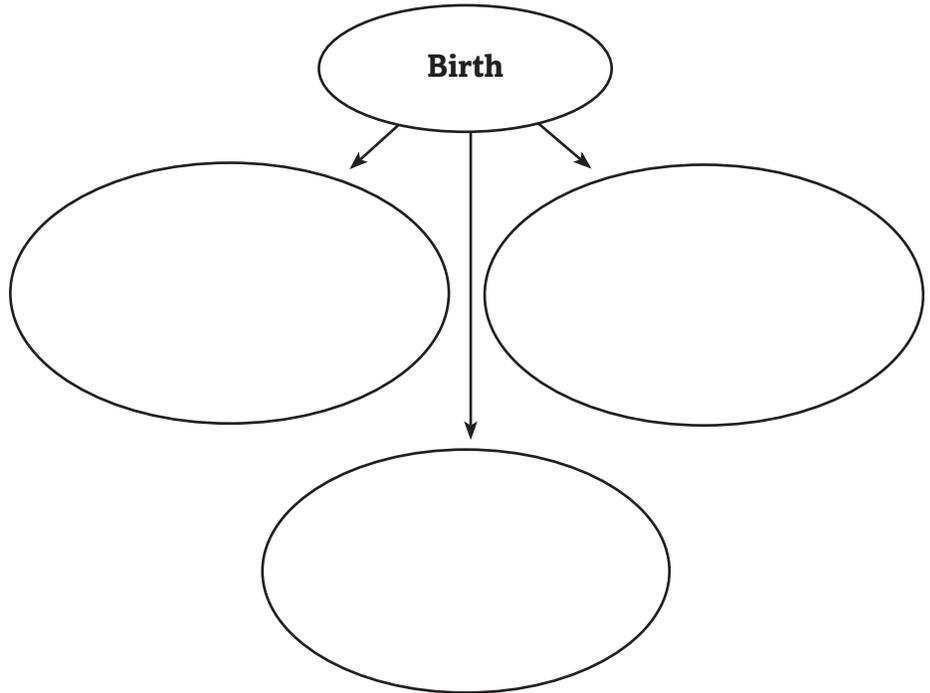
**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Birth**

I found this information on page \_\_\_\_\_.

**Identify and describe** the three stages of birth in the graphic organizer below.



**Growth and Aging**

I found this information on page \_\_\_\_\_.

**Analyze** the primary way the following hormones affect human growth.

Hormone	Effect on Growth
Human growth hormone	
Thyroxine	
Steroids	

**Section 36.3 Birth, Growth, and Aging** (continued)

**Main Idea** \_\_\_\_\_

*I found this information on page \_\_\_\_\_.*

**Details** \_\_\_\_\_

**Describe** the changes that occur at each stage of growth and development.

1. Infancy

2. Childhood

3. Adolescence

4. Adulthood

**SUMMARIZE**

Create a flowchart of the stages of human development from newborn to adulthood. Write the approximate age when an individual moves from one stage to the next.

# The Immune System

## Before You Read

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

K What I Know	W What I Want to Find Out	L What I Learned

### Science Journal

*When you get a cold, your immune system fights it and you eventually feel better. Hypothesize how people with weakened immune systems might need to live their lives differently to stay healthy.*

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# The Immune System

## Section 37.1 Infectious Diseases

### Main Idea

### Details

**Skim** Section 1 of the chapter and list three ways that diseases spread from person to person.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

Use your book or dictionary to define protozoan.

*protozoan*

\_\_\_\_\_

### New Vocabulary

Use your book or dictionary to define each term.

*antibiotic*

\_\_\_\_\_

\_\_\_\_\_

*endemic disease*

\_\_\_\_\_

*epidemic*

\_\_\_\_\_

\_\_\_\_\_

*infectious disease*

\_\_\_\_\_

\_\_\_\_\_

*Koch's postulates*

\_\_\_\_\_

*pandemic*

\_\_\_\_\_

\_\_\_\_\_

*pathogen*

\_\_\_\_\_

*reservoir*

\_\_\_\_\_

**Section 37.1 Infectious Diseases (continued)**

**Main Idea**

**Details**

**Pathogens Cause Infectious Disease**

*I found this information on page \_\_\_\_\_.*

**Germ Theory and Koch's Experiments**

*I found this information on page \_\_\_\_\_.*

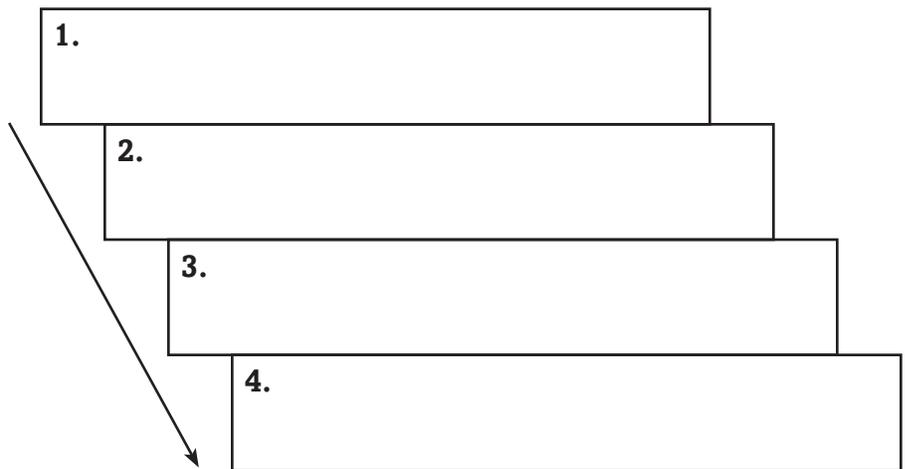
**Spread of Disease**

*I found this information on page \_\_\_\_\_.*

**Identify facts about harmful and helpful microorganisms.**

Five types of pathogens:	Four places that helpful microorganisms live in your body:
1.	1.
2.	2.
3.	3.
4.	4.
5.	

**Design the experimental steps you would use to identify the virus that caused bird flu in a flock of chickens using Koch's postulates.**



**Analyze how diseases spread.**

Three disease reservoirs:	Four main ways diseases are transmitted to humans:
1.	1.
2.	2.
3.	3.
	4.

**Section 37.1 Infectious Diseases (continued)**

**Main Idea**

**Details**

**Symptoms of Disease**

*I found this information on page \_\_\_\_\_.*

**Contrast** *how viruses and bacteria cause symptoms of disease.*

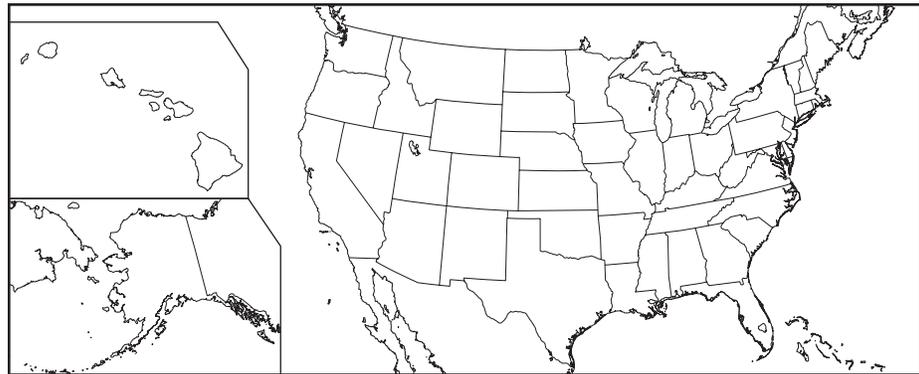
**Viruses:**

**Bacteria:**

**Disease Patterns**

*I found this information on page \_\_\_\_\_.*

**Compare** *endemic, epidemic, and pandemic disease by using different colors or patterns to represent each disease pattern. Add a key to explain your map.*



**Treating and Fighting Diseases**

*I found this information on page \_\_\_\_\_.*

**Analyze** *the relationship between natural selection and the increase in antibiotic-resistant bacteria.*

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**SUMMARIZE**

**Critique** what people can do to help keep antibiotics effective in disease fighting.

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# The Immune System

## Section 37.2 The Immune System

**Main Idea**

**Details**

**Skim** Section 2 of the chapter. Identify the system responsible for the body's specific immunity.

**Review Vocabulary**

Use your book or dictionary to define white blood cells.

*white blood cells*

**New Vocabulary**

Write the correct vocabulary term in the left column for each definition below.

\_\_\_\_\_

lymphocyte that destroys pathogens and releases cytokines

\_\_\_\_\_

long-living cell that is exposed to an antigen during the primary immune response and will respond rapidly if the body encounters the same pathogen later

\_\_\_\_\_

protein produced by B lymphocytes that specifically reacts to a foreign pathogen

\_\_\_\_\_

deliberate exposure of the body to an antigen so that a primary response and immune memory will develop

\_\_\_\_\_

protein secreted by virus-infected cells that binds to neighboring cells and stimulates these cells to produce antiviral proteins

\_\_\_\_\_

protein that enhances phagocytosis by helping the phagocytic cells bind better to pathogens, activating the phagocytes, and enhancing the destruction of the pathogen's membrane

\_\_\_\_\_

lymphocyte that activates antibody secretion in B cells and another type of T cell that aids in killing microorganisms

\_\_\_\_\_

type of white blood cell that is produced in red bone marrow and plays a role in specific immunity

\_\_\_\_\_

antibody-producing cell that is present in all lymphatic tissues

**Section 37.2 The Immune System (continued)**

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Nonspecific Immunity**

*I found this information on page \_\_\_\_\_.*

**Summarize** *nonspecific immune defenses by completing the table.*

Defense	How it Works
Skin	
Saliva, tears, and nasal secretions	
Mucus	blocks bacteria from sticking to inner epithelial cells; inner surfaces secrete extra mucus when infected, triggering coughing that helps move infected mucus out of the body
Stomach acid	
Phagocytosis	
Interferon	
Inflammatory response	chemicals released by invaders and body cells attract phagocytes, increase blood flow to area, and make blood vessels more permeable to allow white blood cells to escape; result is more white blood cells in the area

**Specific Immunity**

*I found this information on page \_\_\_\_\_.*

**Compare** *the functions of these organs of the lymphatic system.*

Lymph Nodes	Tonsils	Spleen	Thymus Gland

**Section 37.2 The Immune System (continued)**

**Main Idea**

**B Cell Response, T Cell Response**

*I found this information on page \_\_\_\_\_.*

**Passive and Active Immunity**

*I found this information on page \_\_\_\_\_.*

**Immune System Failure**

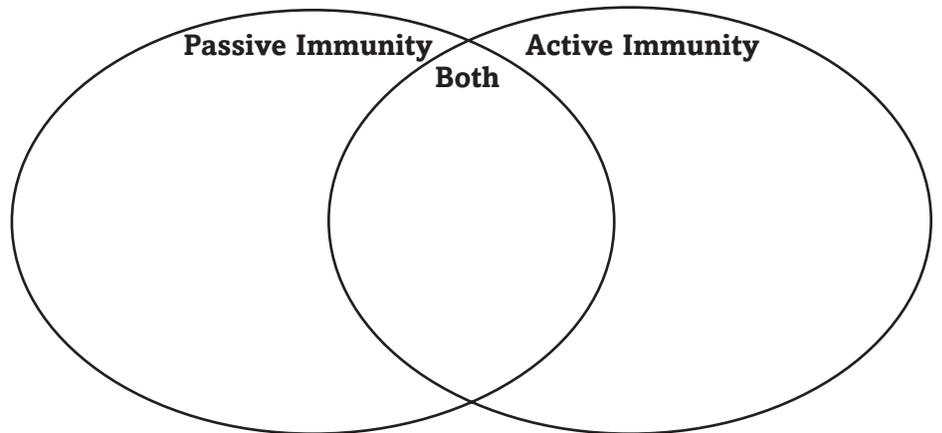
*I found this information on page \_\_\_\_\_.*

**Details**

**Sequence** *B cell and T cell responses. Write the numbers 1–5 next to the activities below to show the order in which they occur.*

- \_\_\_ A processed antigen is displayed on the membrane of the macrophage.
- \_\_\_ The activated helper T cell reproduces and attaches to a B cell or cytotoxic T cell.
- \_\_\_ A macrophage digests a pathogen.
- \_\_\_ The B cell begins to make antibodies and the cytotoxic T cell releases cytokines.
- \_\_\_ The macrophage binds with a helper T cell.

**Contrast** *passive immunity and active immunity.*



**Analyze** *why AIDS patients often die from a secondary infection caused by a different pathogen.*

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**SUMMARIZE**

Classify AIDS as an endemic, an epidemic, or a pandemic disease. Explain your reasoning.

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# The Immune System

## Section 37.3 Noninfectious Disorders

### Main Idea

### Details

**Scan** Section 3 of the chapter. Use the checklist as a guide.

- Read all section titles.
- Read all boldfaced words.
- Read all tables, figures, and graphs.
- Look at all pictures and read the captions.
- Think about what you already know about noninfectious disorders.

*Write three facts you discovered as you scanned the section.*

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Review Vocabulary

*cancer*

*Use your book or dictionary to define cancer.*

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### New Vocabulary

*Write the correct vocabulary term in the left column for each definition below.*

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- severe allergic reaction to particular allergens, which causes a massive release of histamine; smooth muscles in the bronchioles contract, restricting air flow into and out of the lungs
- disease that results from an error in a biochemical pathway
- diseases that result when a part of the body wears out
- a response to environmental antigens

**Section 37.3 Noninfectious Disorders** (continued)

**Main Idea**

**Genetic Disorders, Degenerative Diseases, Metabolic Diseases, Cancer**

*I found this information on page \_\_\_\_\_.*

**Details**

**Classify** each noninfectious disorder according to whether it is caused strictly by a person's genes, or by genes combined with environmental factors.

- arteriosclerosis
- Down syndrome
- coronary artery disease
- hemophilia
- sickle cell anemia
- Type 1 diabetes
- leukemia
- albinism

**Causes of Noninfectious Disorders**

Genes Only	Genes and Environmental Factors

**Evaluate** ways that an individual can increase his or her chance of surviving one of the noninfectious diseases that are partly caused by environmental factors.

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**Identify** the causes of noninfectious disorders.

Noninfectious Disorders	Causes
genetic disorders	
degenerative diseases	
metabolic diseases	
cancer	

**Section 37.3 Noninfectious Disorders** (continued)

**Main Idea** \_\_\_\_\_

**Details** \_\_\_\_\_

**Inflammatory Diseases**

*I found this information on page \_\_\_\_\_.*

**Compare and contrast** *the pairs of disorders in the table below.*

Inflammatory response to infectious disease and inflammatory disease:

Simple allergic reaction and anaphylactic shock:

Degenerative arthritis and rheumatoid arthritis:

**Identify** *the parts of the body attacked by antibodies in each of the following autoimmune disorders.*

Rheumatic fever	Lupus	Rheumatoid arthritis

**SUMMARIZE**

Make a table of the types of noninfectious disorders, listing one cause and one example of each disorder.