

Science Notebook

Glencoe Science

Biology

Consultant

Douglas Fisher, Ph.D.



Glencoe

New York, New York Columbus, Ohio Chicago, Illinois Peoria, Illinois Woodland Hills, California

About the Consultant

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



The McGraw-Hill Companies

Copyright © by the McGraw-Hill Companies, Inc. All rights reserved. Except as permitted under the United States Copyright Act, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher.

Send all inquiries to:
Glencoe/McGraw-Hill
8787 Orion Place
Columbus, OH 43240-4027

ISBN-13: 978-0-07-874603-1
ISBN-10: 0-07-874603-5

Printed in the United States of America

1 2 3 4 5 6 7 8 9 10 024 11 10 09 08 07 06

Table of Contents

Using Your Science Notebook	vi	Chapter 8	
Note-Taking Tips	viii	Cellular Energy Preview	77
Chapter 1		Section 8.1.....	78
The Study of Life Preview	1	Section 8.2.....	81
Section 1.1.....	2	Section 8.3.....	84
Section 1.2.....	5	Chapter 9	
Section 1.3.....	8	Cellular Reproduction Preview	87
Chapter 2		Section 9.1.....	88
Principles of Ecology Preview	11	Section 9.2.....	91
Section 2.1.....	12	Section 9.3.....	94
Section 2.2.....	15	Chapter 10	
Section 2.3.....	18	Sexual Reproduction and	
Chapter 3		Genetics Preview	97
Communities, Biomes, and		Section 10.1.....	98
Ecosystems Preview	21	Section 10.2.....	101
Section 3.1.....	22	Section 10.3.....	104
Section 3.2.....	25	Chapter 11	
Section 3.3.....	28	Complex Inheritance	
Chapter 4		and Human Heredity Preview	107
Population Ecology Preview	31	Section 11.1.....	108
Section 4.1.....	32	Section 11.2.....	111
Section 4.2.....	35	Section 11.3.....	114
Chapter 5		Chapter 12	
Biodiversity and		Molecular Genetics Preview	117
Conservation Preview.....	39	Section 12.1.....	118
Section 5.1.....	40	Section 12.2.....	121
Section 5.2.....	43	Section 12.3.....	124
Section 5.3.....	46	Section 12.4.....	127
Chapter 6		Chapter 13	
Chemistry in Biology Preview.....	49	Genetics and	
Section 6.1.....	50	Biotechnology Preview	131
Section 6.2.....	53	Section 13.1.....	132
Section 6.3.....	56	Section 13.2.....	135
Section 6.4.....	59	Section 13.3.....	138
Chapter 7		Chapter 14	
Cellular Structure and		The History of Life Preview	141
Function Preview	63	Section 14.1.....	142
Section 7.1.....	64	Section 14.2.....	145
Section 7.2.....	67	Chapter 15	
Section 7.3.....	70	Evolution Preview	149
Section 7.4.....	73	Section 15.1.....	150
		Section 15.2.....	153
		Section 15.3.....	156

Table of Contents

Chapter 16

Primate Evolution Preview	159
Section 16.1.....	160
Section 16.2.....	163
Section 16.3.....	166

Chapter 17

Organizing Life's	
Diversity Preview	169
Section 17.1.....	170
Section 17.2.....	173
Section 17.3.....	176

Chapter 18

Bacteria and Viruses Preview.....	179
Section 18.1.....	180
Section 18.2.....	183

Chapter 19

Protists Preview.....	187
Section 19.1.....	188
Section 19.2.....	191
Section 19.3.....	194
Section 19.4.....	197

Chapter 20

Fungi Preview	201
Section 20.1.....	202
Section 20.2.....	205
Section 20.3.....	208

Chapter 21

Introduction to Plants Preview.....	211
Section 21.1.....	212
Section 21.2.....	215
Section 21.3.....	218
Section 21.4.....	221

Chapter 22

Plant Structure and	
Function Preview	225
Section 22.1.....	226
Section 22.2.....	229
Section 22.3.....	232

Chapter 23

Reproduction in Plants Preview.....	235
Section 23.1.....	236
Section 23.2.....	239
Section 23.3.....	242

Chapter 24

Introduction to Animals Preview.....	245
Section 24.1.....	246
Section 24.2.....	249
Section 24.3.....	252

Chapter 25

Worms and Mollusks Preview	255
Section 25.1.....	256
Section 25.2.....	259
Section 25.3.....	262
Section 25.4.....	265

Chapter 26

Arthropods Preview	269
Section 26.1.....	270
Section 26.2.....	273
Section 26.3.....	276

Chapter 27

Echinoderms and Invertebrate	
Chordates Preview	279
Section 27.1.....	280
Section 27.2.....	283

Chapter 28

Fishes and Amphibians Preview	287
Section 28.1.....	288
Section 28.2.....	291
Section 28.3.....	294

Chapter 29

Reptiles and Birds Preview.....	297
Section 29.1.....	298
Section 29.2.....	301

Chapter 30

Mammals Preview	305
Section 30.1.....	306
Section 30.2.....	309

Chapter 31

Animal Behavior Preview.....	313
Section 31.1.....	314
Section 31.2.....	317

Table of Contents

Chapter 32

Integumentary, Skeletal, and

Muscular Systems Preview 321

Section 32.1 322

Section 32.2 325

Section 32.3 328

Chapter 33

Nervous System Preview 331

Section 33.1 332

Section 33.2 335

Section 33.3 338

Section 33.4 341

Chapter 34

Circulatory, Respiratory, and

Excretory Systems Preview 345

Section 34.1 346

Section 34.2 349

Section 34.3 352

Chapter 35

Digestive and

Endocrine Systems Preview 355

Section 35.1 356

Section 35.2 359

Section 35.3 362

Chapter 36

Human Reproduction and

Development Preview 365

Section 36.1 366

Section 36.2 369

Section 36.3 372

Chapter 37

Immune System Preview 375

Section 37.1 376

Section 37.2 379

Section 37.3 382

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

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

organization _____

cell _____

cell theory _____

eukaryotic cell _____

nucleus _____

organelle _____

plasma membrane _____

prokaryotic cell _____

New Vocabulary

Use your book or dictionary to define organization.

Use your book or dictionary to define each term.

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

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

- **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.

The Study of Life

Section 1.1 Introduction to Biology

Main Idea _____

Details _____

Review Vocabulary

environment

New Vocabulary

adaptation

biology

development

growth

homeostasis

organism

organization

reproduction

response

species

stimulus

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

1. _____

2. _____

3. _____

Use your book or dictionary to define environment.

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

_____ 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)

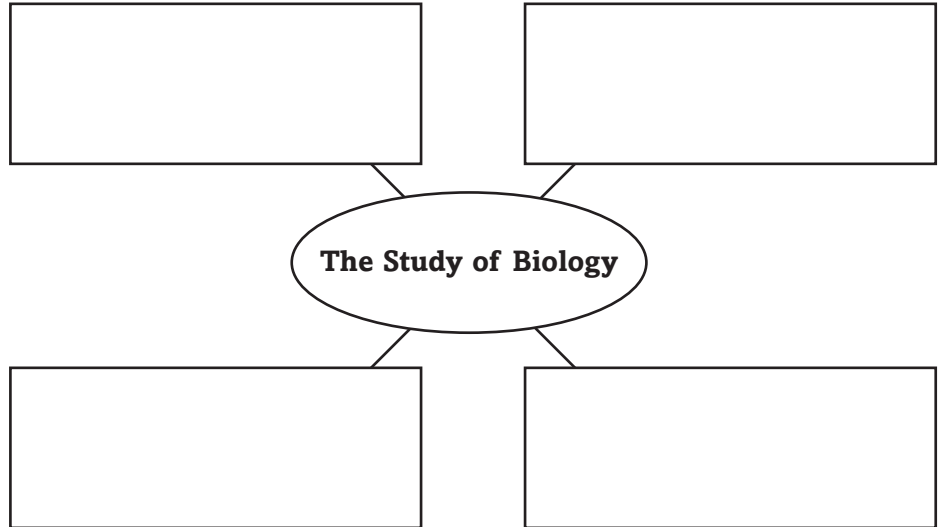
Main Idea _____

The Science of Life

I found this information on page _____.

Details _____

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)

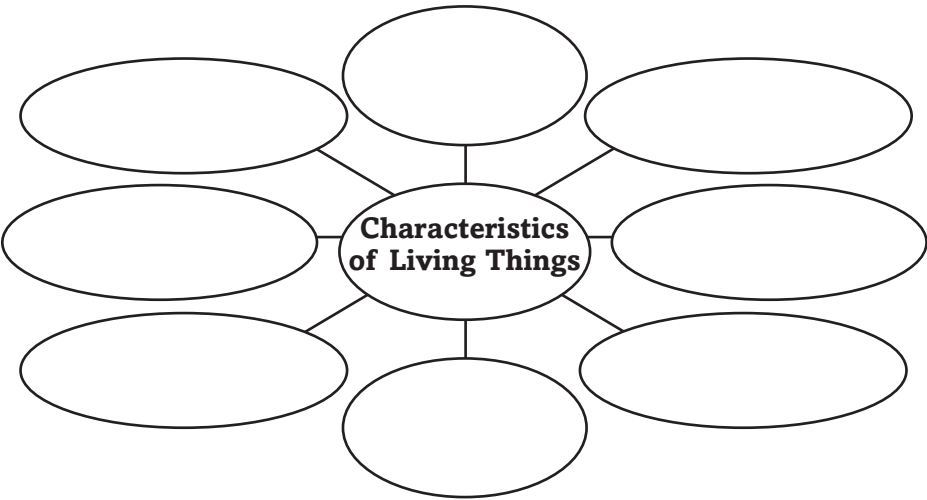
Main Idea _____

Details _____

The
Characteristics
of Life

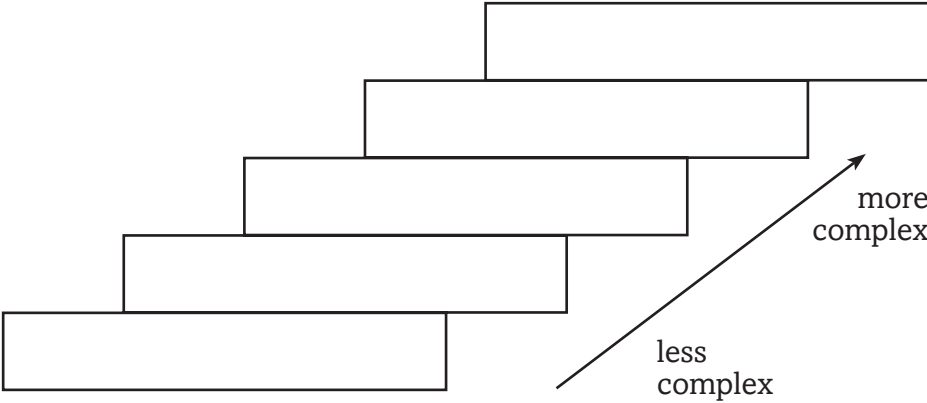
I found this information
on page _____.

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
 - cell
 - tissue
- atoms and molecules
 - organ system



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?

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

investigation

Use your book or dictionary to define investigation.

New Vocabulary

ethics

Use your book or dictionary to define each term.

forensics

metric system

peer review

science

SI

theory

Academic Vocabulary

unbiased

Define unbiased to show its scientific meaning.

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">•••••	<ul style="list-style-type: none">•	<ul style="list-style-type: none">••••

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 _____

Details _____

Science in Everyday Life

*I found this information
on page _____.*

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 _____

Review Vocabulary

theory

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

1. _____

2. _____

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)

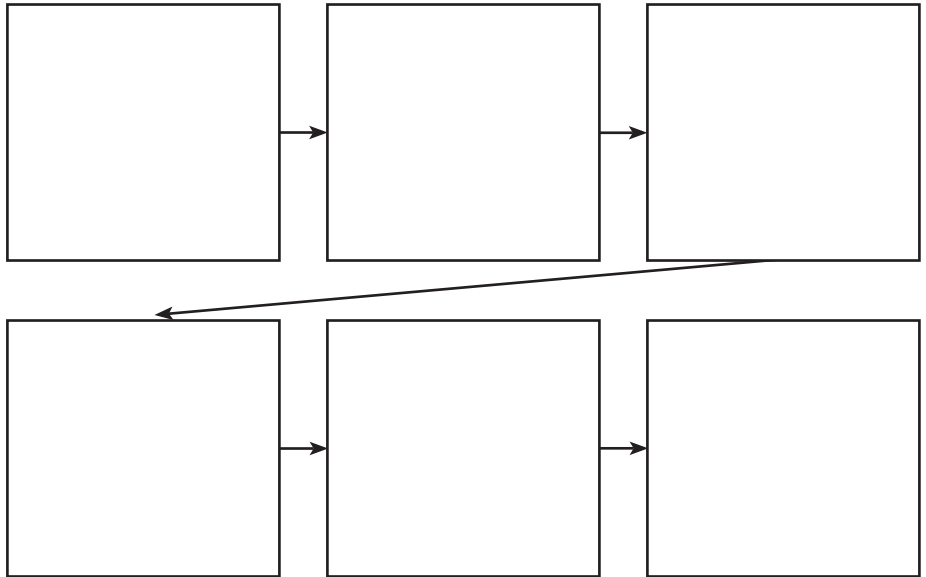
Main Idea _____

Ask a Question

I found this information
on page _____.

Details _____

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.*

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)

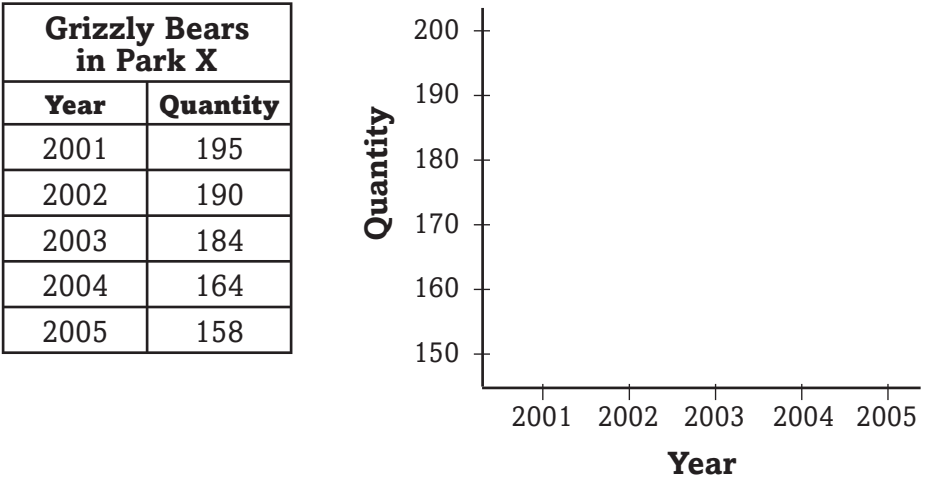
Main Idea _____

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.



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.

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.

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.

habitat	niche
abiotic factor	biotic factor

symbiosis		
commensalism	mutualism	parasitism
predation		

Section 2.1 Organisms and Their Relationship (continued)

Main Idea

Ecology

I found this information
on page _____.

Details

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. _____

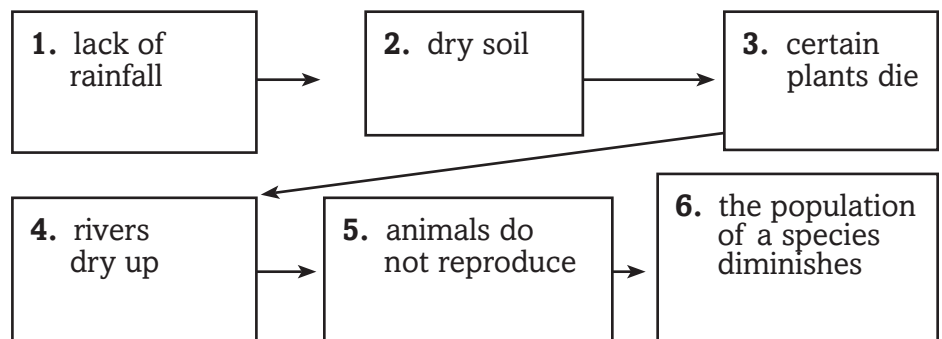
2. _____

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 _____

Details _____

Ecosystem Interactions

I found this information on page _____.

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

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.

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.

Review Vocabulary

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

energy

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

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 autotrophs.

- ___ 1. Alligator

___ 2. Squirrel

___ 3. Maple tree

___ 4. Whale
- ___ 5. Moss

___ 6. Siberian tiger

___ 7. Daffodil

___ 8. Rhinoceros
- ___ 9. Dandelion

___ 10. Rabbit

___ 11. Tomato

___ 12. Cockroach

Section 2.2 Flow of Energy in an Ecosystem (continued)

Main Idea _____

Models of Energy Flow

I found this information on page _____.

Details _____

Contrast a food chain *with* a food web.

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

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.

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

cycle

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

New Vocabulary

biogeochemical cycle

denitrification

matter

nitrogen fixation

nutrient

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.

	Water	Carbon/ oxygen	Nitrogen	Phosphorus
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.

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

Science Journal

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

Communities, Biomes, and Ecosystems

Section 3.1 Community Ecology

Main Idea _____

Details _____

Review Vocabulary

abiotic factor

New Vocabulary

climax community

community

ecological succession

limiting factor

primary succession

secondary succession

tolerance

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

1. _____

2. _____

3. _____

Use your book or dictionary to define abiotic factor.

Use the new vocabulary terms to complete the following sentences

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

Communities

*I found this information
on page _____.*

Details

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

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

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

Section 3.1 Community Ecology (continued)

Main Idea _____

Details _____

Ecological Succession

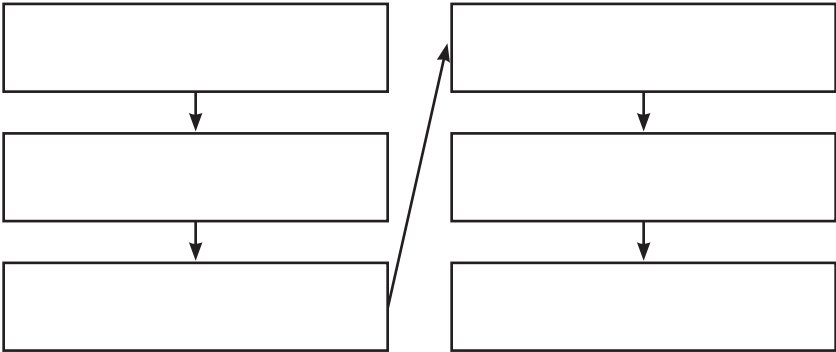
I found this information on page _____.

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

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.

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

weather:

climate:

climate

--	--

Describe the vegetation and growing conditions for each biome.

boreal forest

tundra:

boreal forest:

temperate forest:

desert

grassland

temperate forest

tropical rain forest

tropical savanna

tropical seasonal forest

tundra

woodland

Section 3.2 Terrestrial Biomes (continued)

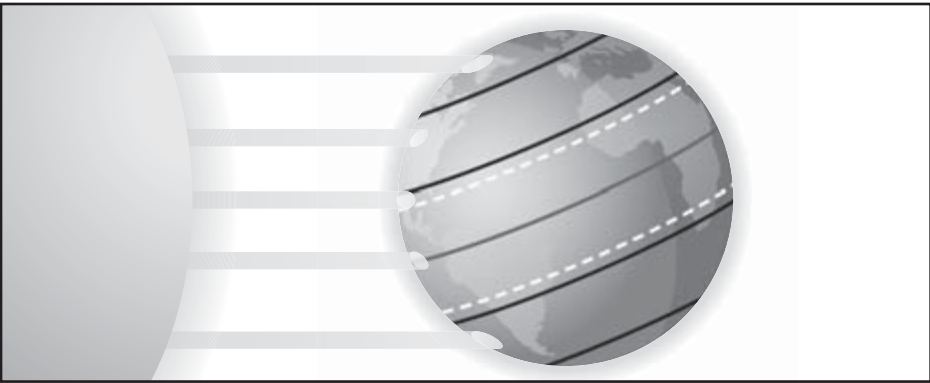
Main Idea _____

Details _____

Effects of
Latitude and
Climate

I found this information
on page _____.

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



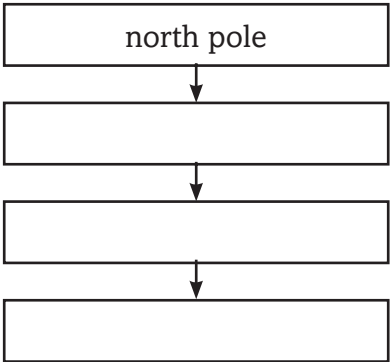
Analyze how latitude affects climate and why.

Identify three factors other than latitude that affect climate.

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

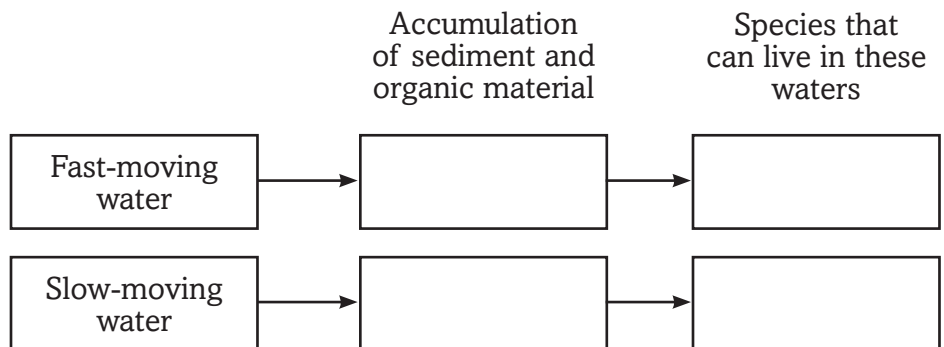
Complete this paragraph about the distribution of water on the Earth.

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)

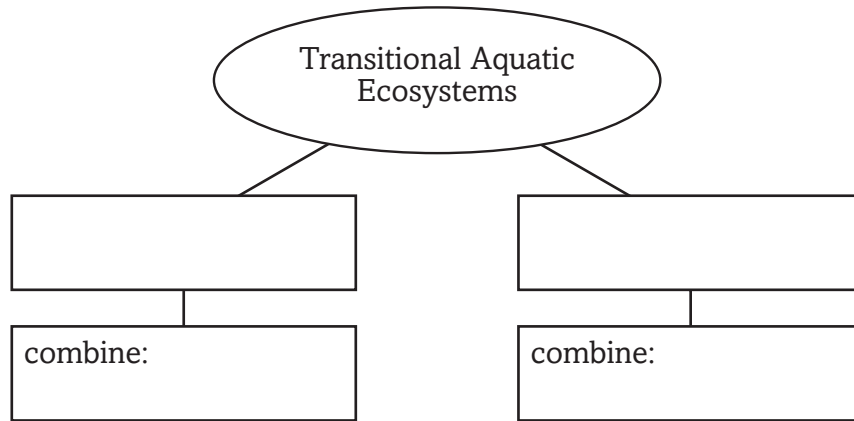
Main Idea

Transitional Aquatic Ecosystems

I found this information on page _____.

Details

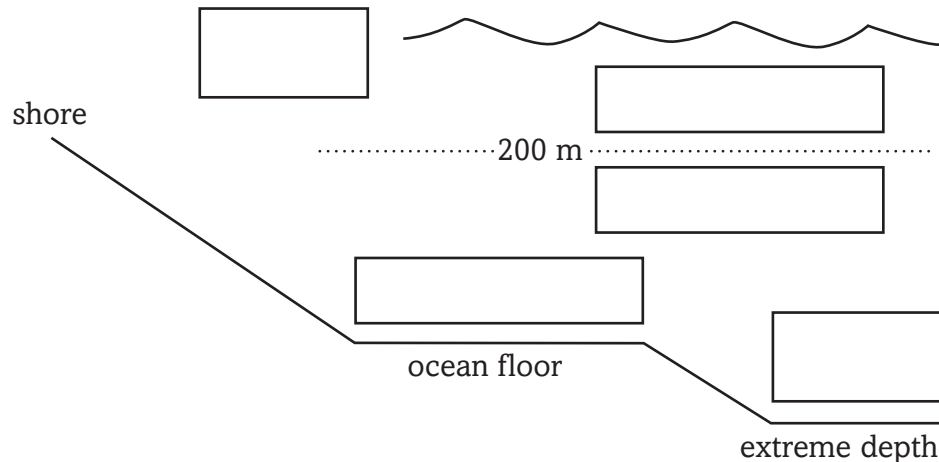
Compare *transitional aquatic ecosystems. Identify two types in the organizer below and describe the environments each type combines.*



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.

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?

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	population density	dispersion
density-dependent factor	density-independent factor	density-independent factor
density-independent factor		
dispersion		
emigration	population growth rate	
immigration	emigration	immigration
population density		
population growth rate	carrying capacity	

Academic Vocabulary

Define fluctuate to show its scientific meaning.

fluctuate

Section 4.1 Population Dynamics (continued)

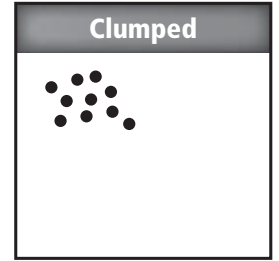
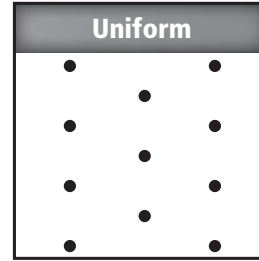
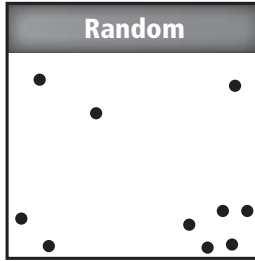
Main Idea

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.

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.

Review Vocabulary

Use your book or dictionary to define carrying capacity.

carrying capacity

New Vocabulary

Use your book or dictionary to define each term.

age structure

demographic transition

demography

zero population growth (ZPG)

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.*

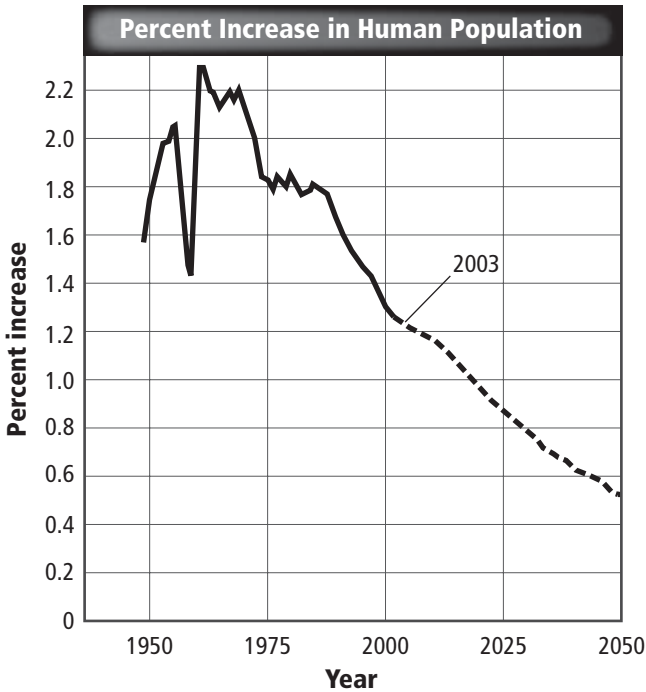
Effect: decline in world population growth

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.

- _____
- _____
- _____

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
	• Biodiversity is the variety of ecosystems in the biosphere.	
	• Genetic diversity tends to decrease over time in small pieces of habitat.	
	• Nonnative species can damage an ecosystem.	
	• The first national park was established in the United States in 1972.	

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.

Biodiversity and Conservation

Section 5.1 Biodiversity

Main Idea

Details

Review Vocabulary

gene

New Vocabulary

biodiversity

ecosystem diversity

extinction

genetic diversity

species diversity

Academic Vocabulary

diverse

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

1. _____

2. _____

Use your book or dictionary to define gene.

Use your book or dictionary to define each term.

Define diverse to show its scientific meaning.

Section 5.1 Biodiversity (continued)

Main Idea

What is Biodiversity?

I found this information on page _____.

Details

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

	Rain Forest	Corn Field	Vegetable Garden	Tundra
Plants				
Animals				

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

Type of Biodiversity	Example
Genetic diversity	
Species diversity	
Ecosystem diversity	

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

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.

	Agriculture	Medicine
Organisms that might have value include		
These organisms someday might be useful as		

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

Resources	Services
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.

Products of Animals	Products of Plants

SUMMARIZE

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

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 _____

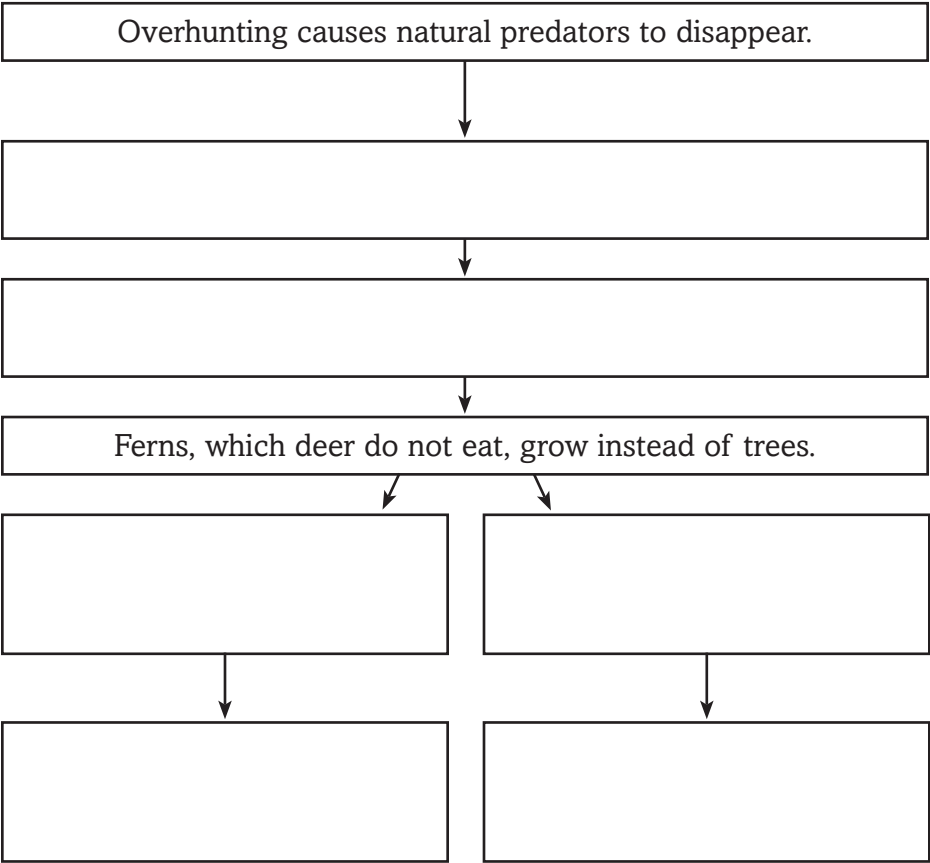
Extinction Rates
I found this information on page _____.

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.*

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.

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

natural resources

Use your book or dictionary to define natural resources.

New Vocabulary

biological augmentation

Use your book or dictionary to define the following terms.

bioremediation

endemic

nonrenewable resource

renewable resource

sustainable use

Section 5.3 Conserving Biodiversity (continued)

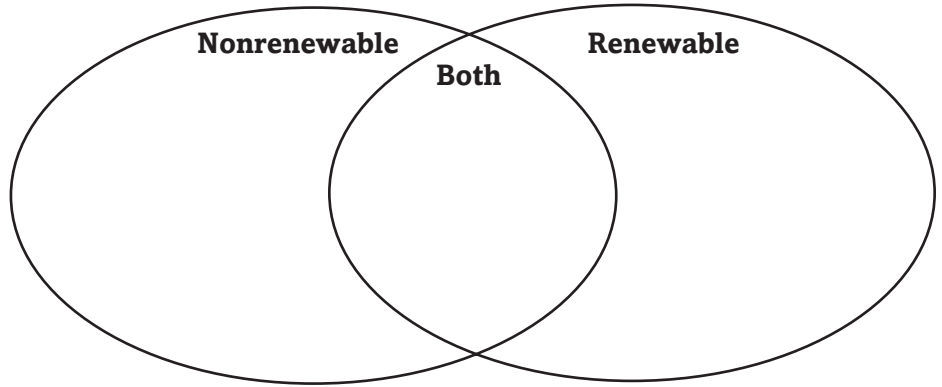
Main Idea

Natural Resources

I found this information on page _____.

Details

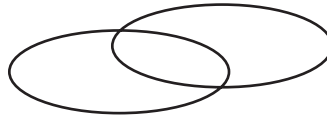
Compare and contrast *renewable and nonrenewable resources by writing characteristics of each in the Venn diagram.*



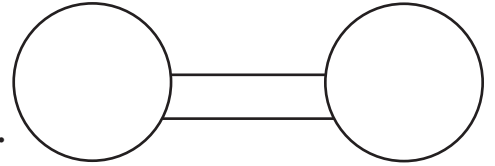
Protecting Biodiversity

I found this information on page _____.

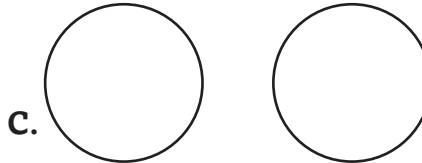
Choose the diagram that best represents a habitat corridor. *Explain your choice.*



A.



B.



C.

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

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
	• Atoms are the smallest particles in matter.	
	• Chemical reactions occur constantly inside your body.	
	• About 70 percent of your body is water.	
	• Almost all molecules in living things contain the element carbon.	

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.

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	atom	
electron	nucleus	neutron
neutron		
nucleus	proton	electron
proton		
<p>Complete the paragraph below using the terms listed to the left.</p> <p>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) _____.</p>		
compound		
covalent bond		
element		
ion		
ionic bond		
isotope		
molecule		
van der Waals force		

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 _____.

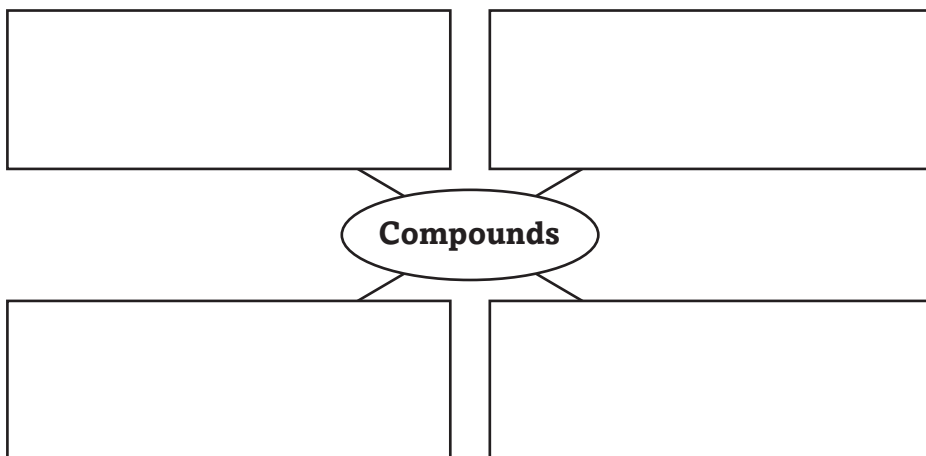
Carbon-14 is radioactive because _____.

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

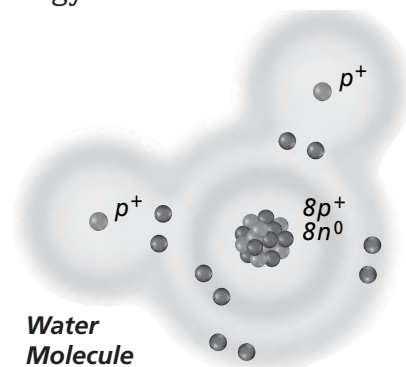
Chemical Bonds

I found this information
on page _____.

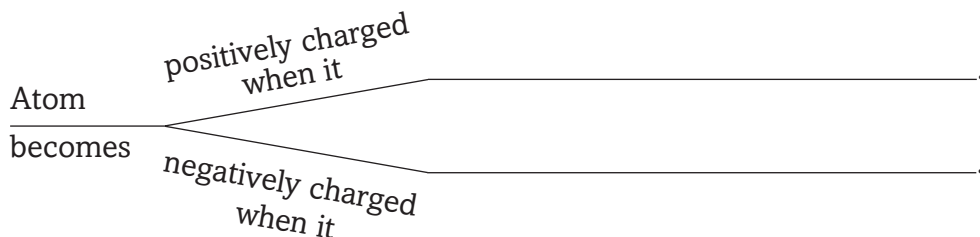
Details

Label the following parts of the water molecule illustrated below.

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



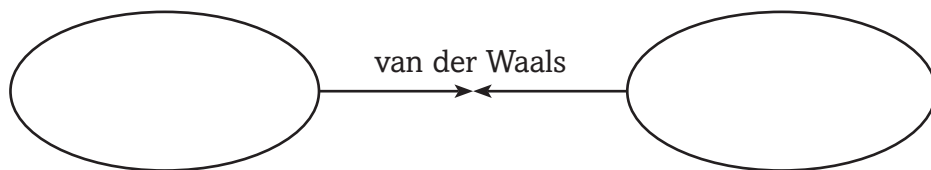
Compare positively and negatively charged ions.



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.

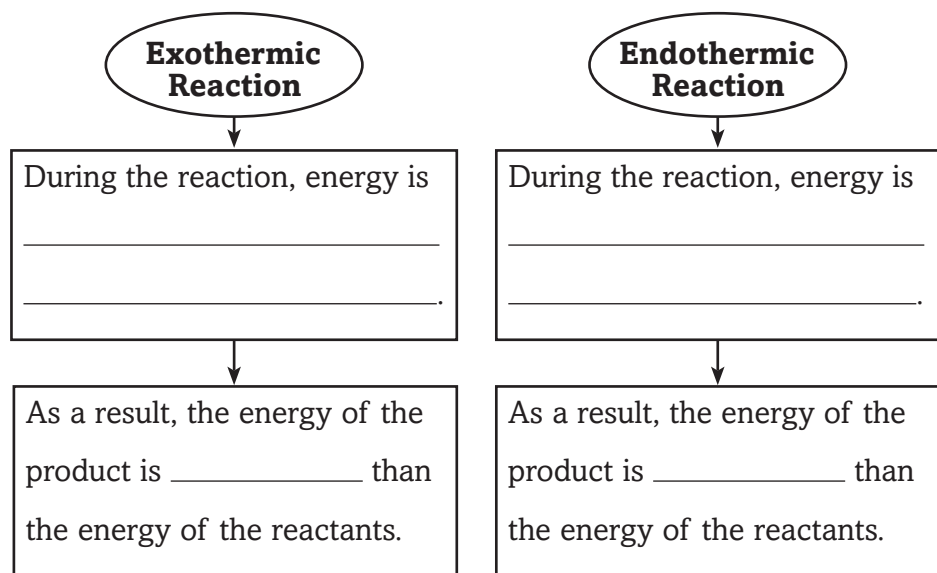
Element Symbol	Element Name	Number of Atoms (reactant side)	Number of Atoms (product side)

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)

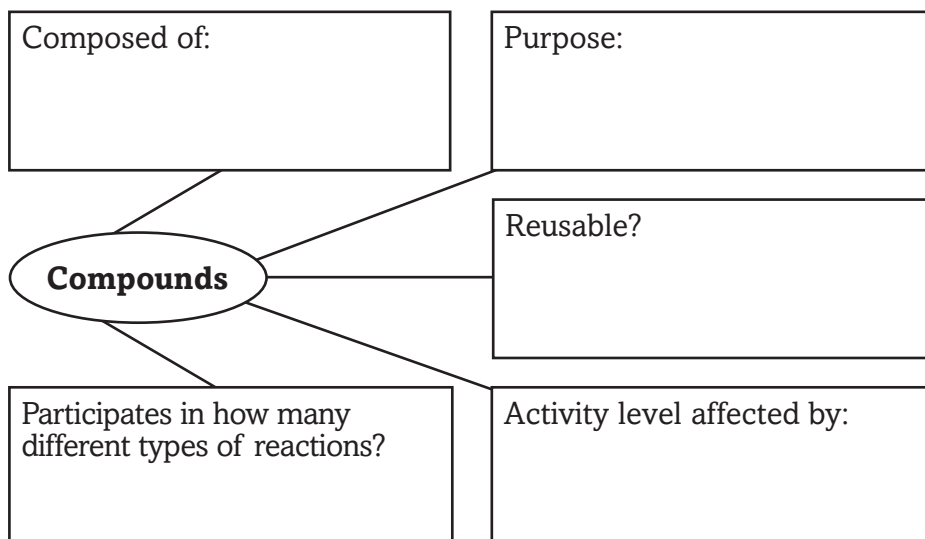
Main Idea

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.

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.*

<div style="display: inline-block; width: 100px; height: 30px; background-color: #cccccc; position: relative;"> + - </div>	<div style="display: inline-block; width: 100px; height: 30px; background-color: #cccccc; position: relative;"> + - </div>
<div style="display: inline-block; width: 100px; height: 30px; background-color: #cccccc; position: relative;"> + - </div>	<div style="display: inline-block; width: 100px; height: 30px; background-color: #cccccc; position: relative;"> - + </div>
<div style="display: inline-block; width: 100px; height: 30px; background-color: #cccccc; position: relative;"> - + </div>	<div style="display: inline-block; width: 100px; height: 30px; background-color: #cccccc; position: relative;"> + - </div>

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

Mixtures with Water

I found this information on page _____.

Details

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

Sand and sugar	Salt and water	Blood

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

Acidic solutions	Basic solutions

SUMMARIZE

Analyze how water is important to life.

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.*

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.*

--	--

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.

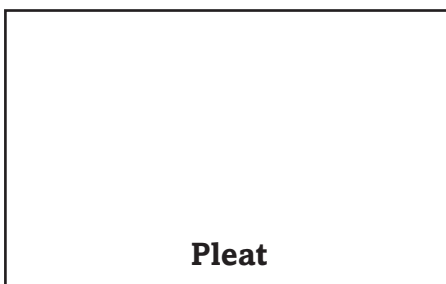


Carbon: _____ Hydrogen: _____ Oxygen: _____

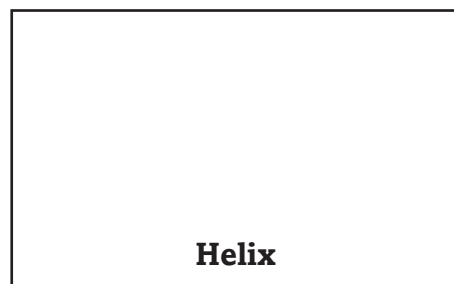
Ratio of carbon, hydrogen, and oxygen: _____

Type of carbohydrate: _____

Model the two general shapes of proteins named below.



Pleat



Helix

Describe nucleic acids by filling in the following chart.

Units that Make Up Nucleotides		
Function of DNA:	Function of RNA:	

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.

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.

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

organization

Use your book or dictionary to define organization.

New Vocabulary

cell

Use your book or dictionary to define each term.

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.

Section 7.1 Cell Discovery and Theory (continued)

Main Idea _____

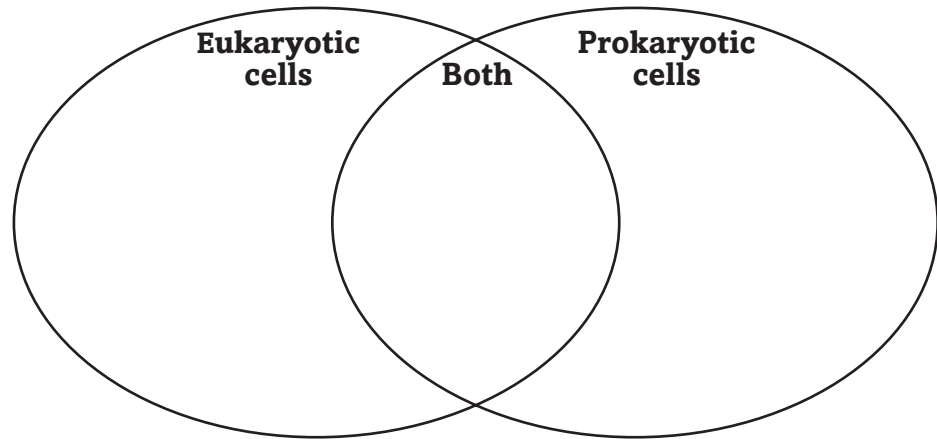
Details _____

Basic Cell Types

*I found this information
on page _____.*

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

- | | |
|---|---|
| <ul style="list-style-type: none"> • bacteria • contain organelles • have loose strands of DNA • have a nucleus | <ul style="list-style-type: none"> • 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 _____

Details _____

Function of
the Plasma
Membrane

I found this information
on page _____.

Analyze *what would happen if the cell membrane were not selectively permeable. Support your response.*

Identify *five ways that the membrane can deal with materials.*

membrane deals
with materials by

Structure of
the Plasma
Membrane

I found this information
on page _____.

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

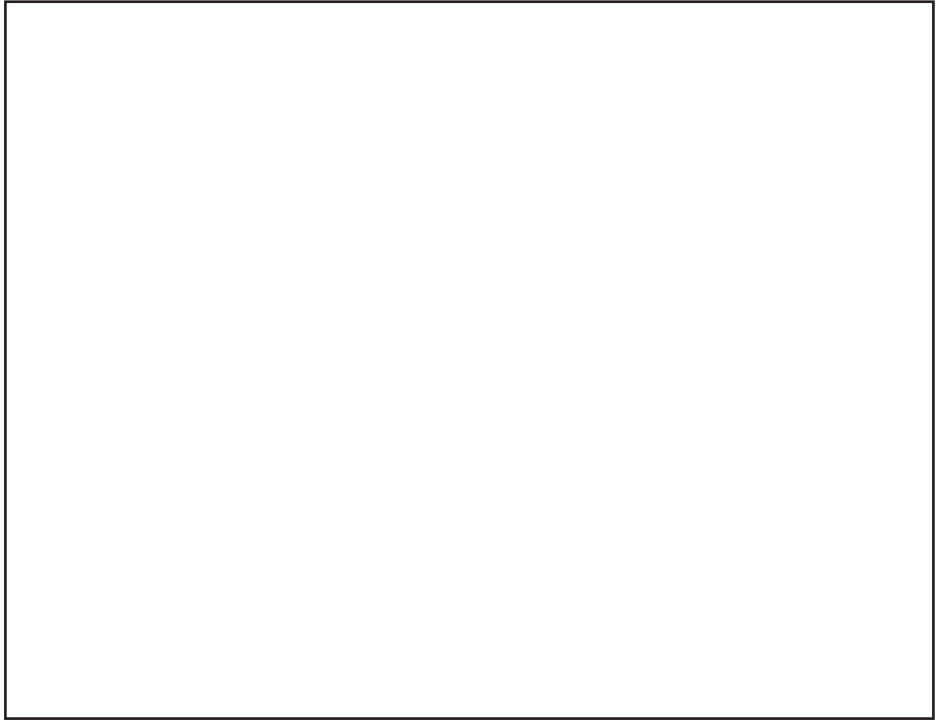
Section 7.2 The Plasma Membrane (continued)

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.

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)

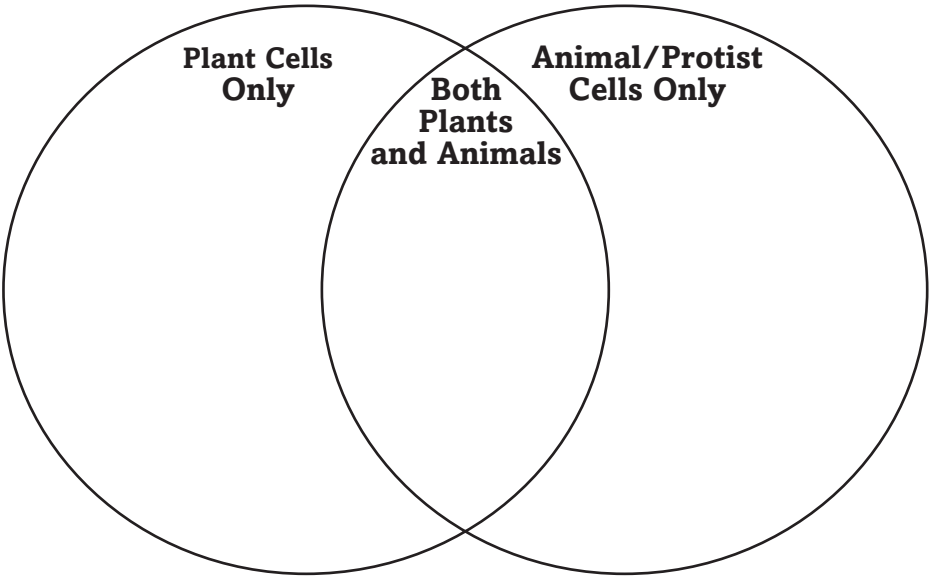
Main Idea _____

Details _____

Comparing Cells

I found this information
on page _____.

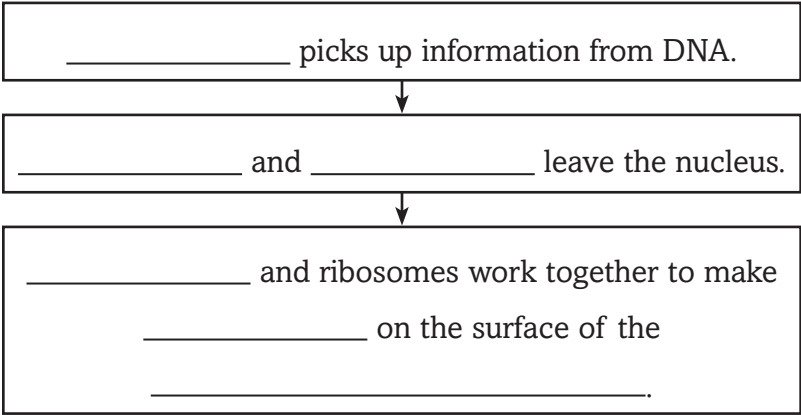
Compare and contrast the cell parts found in the following categories.



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

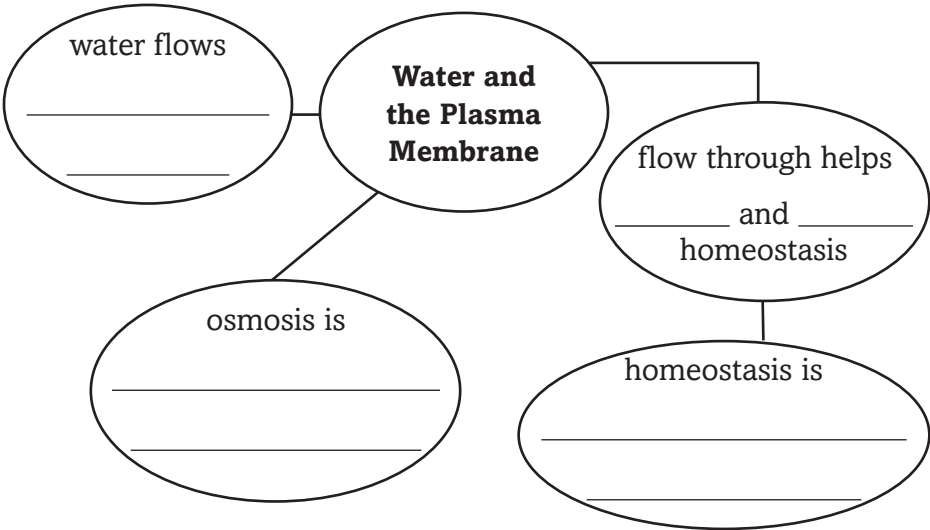
I found this information
on page _____.

Osmosis:
Diffusion of
Water

I found this information
on page _____.

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

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)

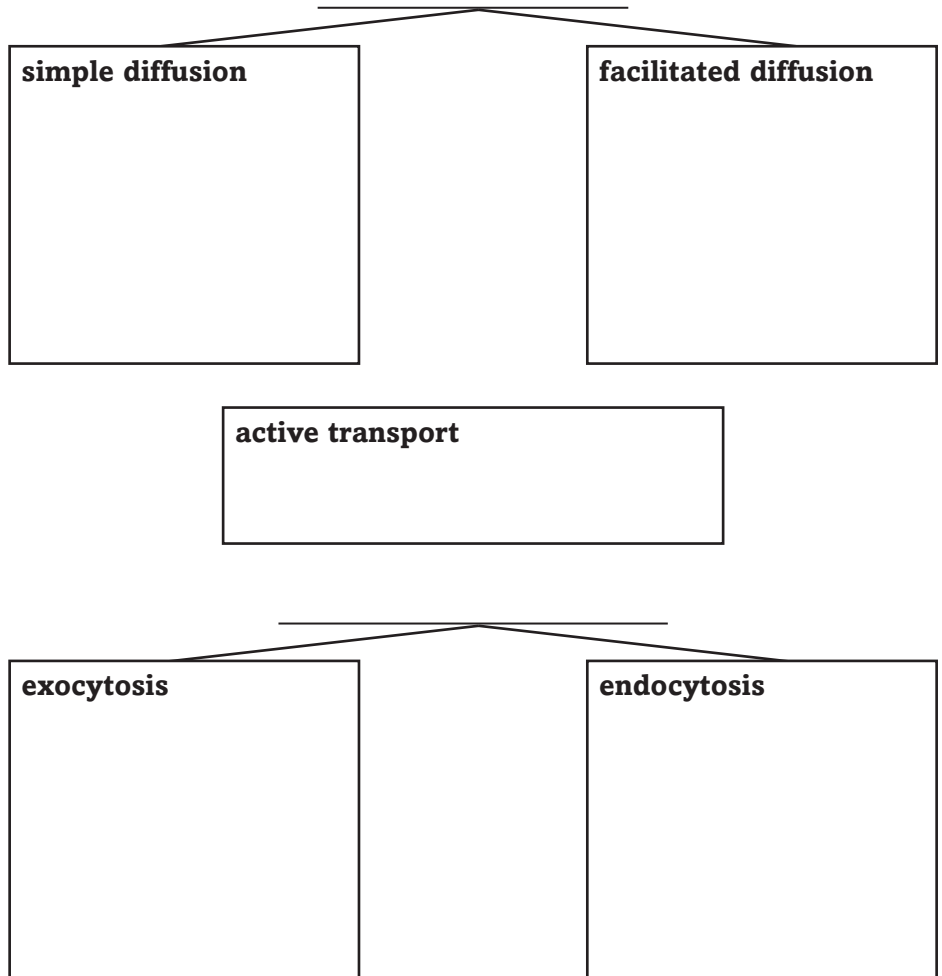
Main Idea

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.

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

Transformation of Energy

I found this information on page _____.

Details

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

Energy in Cell Processes

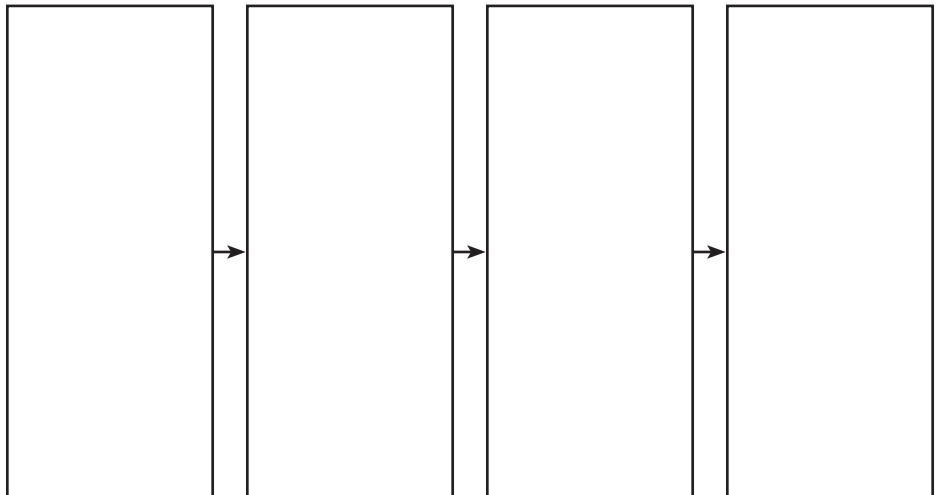
Metabolism

I found this information on page _____.

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

	First Law of Thermodynamics	Second Law of Thermodynamics
Defined		
Example		

Sequence the flow of energy from the Sun to heterotrophs.

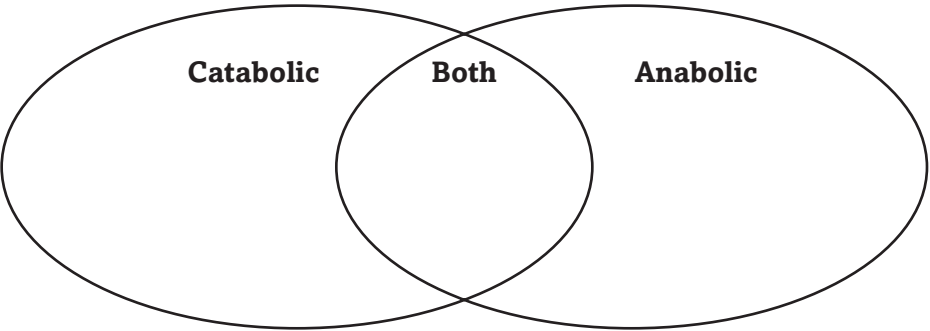


Section 8.1 How Organisms Obtain Energy (continued)

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 _____

Details _____

Overview of
Photosynthesis

I found this information
on page _____.

Phase One:
Light Reactions

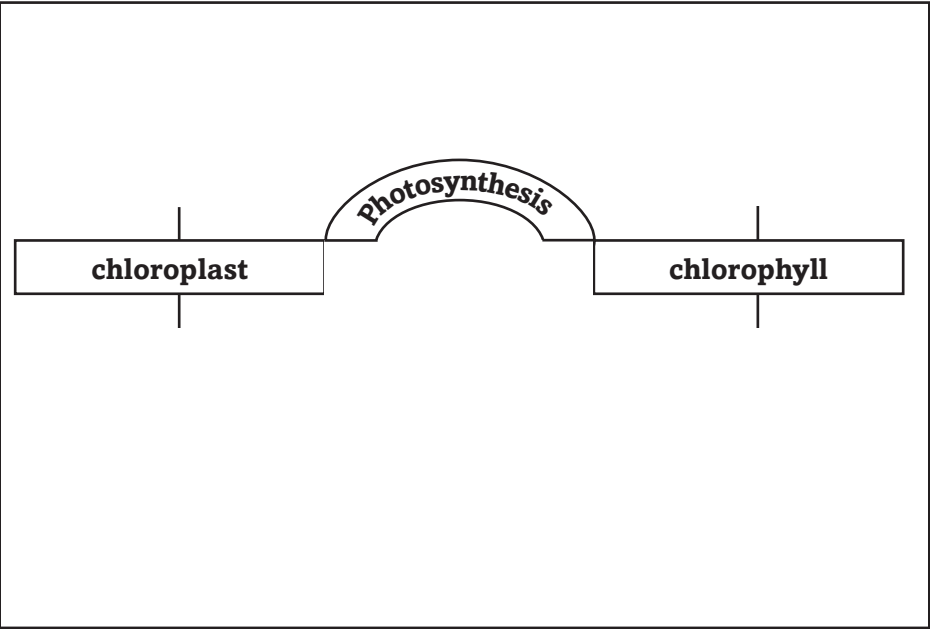
I found this information
on page _____.

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

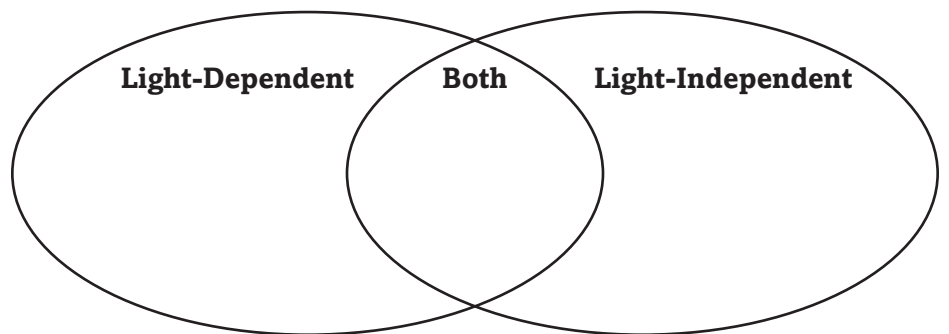
I found this information
on page _____.

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.

Section 8.3 Cellular Respiration

Details

1. _____

2. _____

3. _____

Use your book or dictionary to define cyanobacterium.

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

Section 8.3 Cellular Respiration (continued)

Main Idea

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 _____.

Details

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

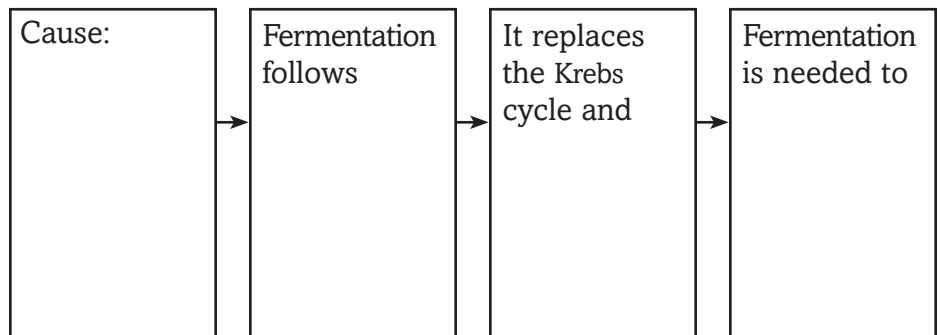
Function:

Equation:

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 _____

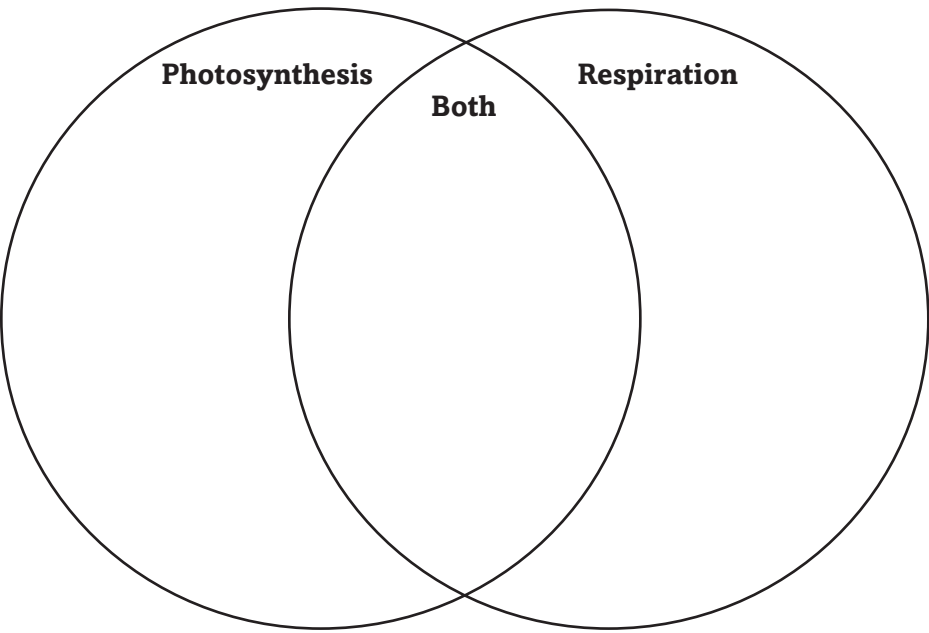
Details _____

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

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.

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

Cell Size Limitations

I found this information on page _____.

The Cell Cycle

I found this information on page _____.

Details

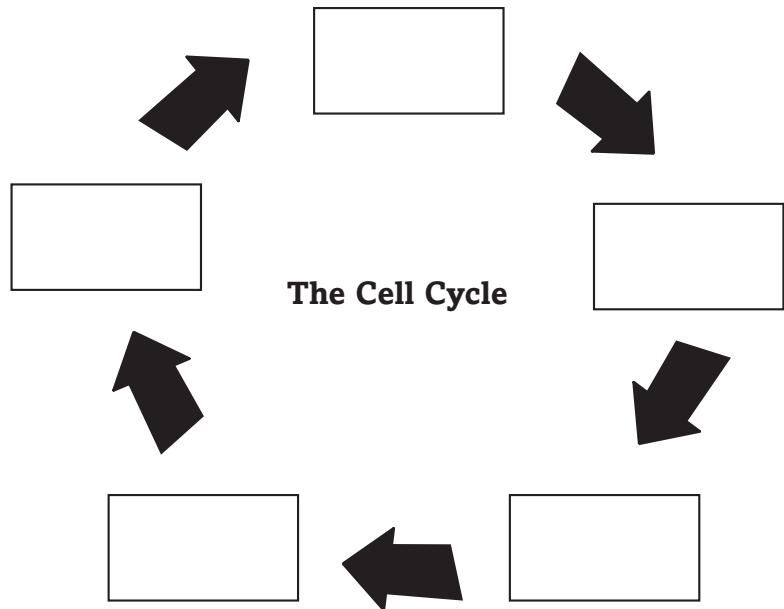
Analyze *movement of nutrients and wastes as cell size increases.*

If a _____ _____,	transport of _____ _____ by _____ slows down.	Therefore, cells _____ before _____ _____.
----------------------	---	--

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.*



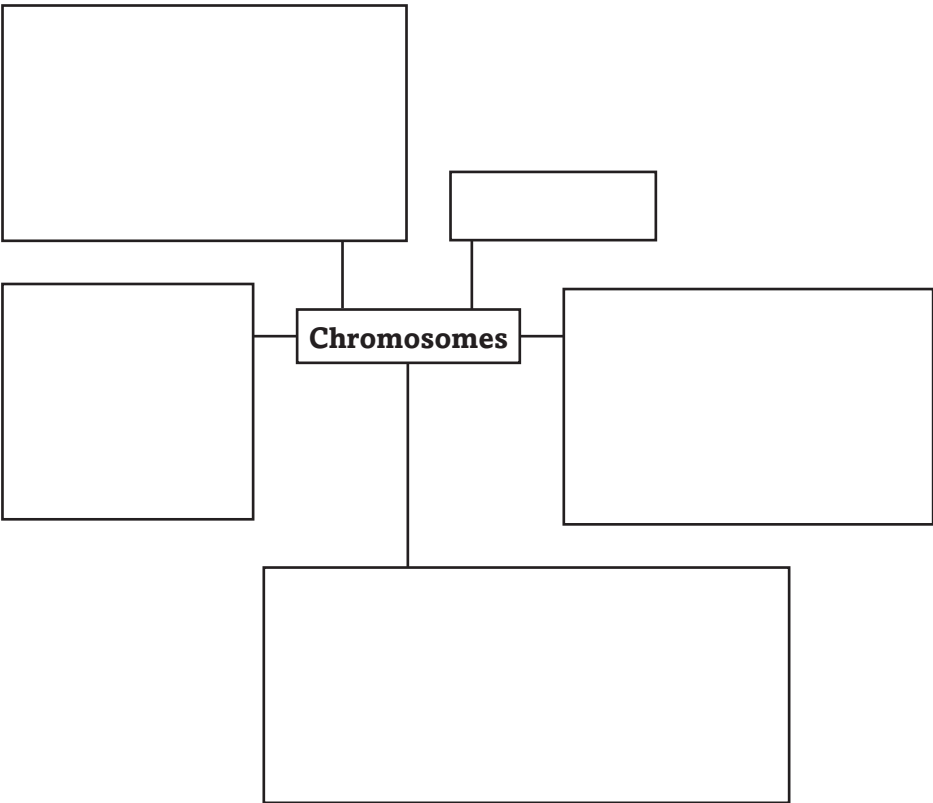
Section 9.1 Cellular Growth (continued)

Main Idea _____

Details _____

I found this information
on page _____.

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.

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. _____ 3. _____
2. _____ 4. _____

Review Vocabulary

Use your book or dictionary to define life cycle.

life cycle

New Vocabulary

Use your book or dictionary to define the following terms.

anaphase

centromere

metaphase

prophase

sister chromatid

spindle apparatus

telophase

Section 9.2 Mitosis and Cytokinesis (continued)

Main Idea _____

Details _____

Mitosis

I found this information
on page _____.

The Stages
of Mitosis

I found this information
on page _____.

Identify two functions of mitosis in animals.

Function of
mitosis in
animals

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: _____

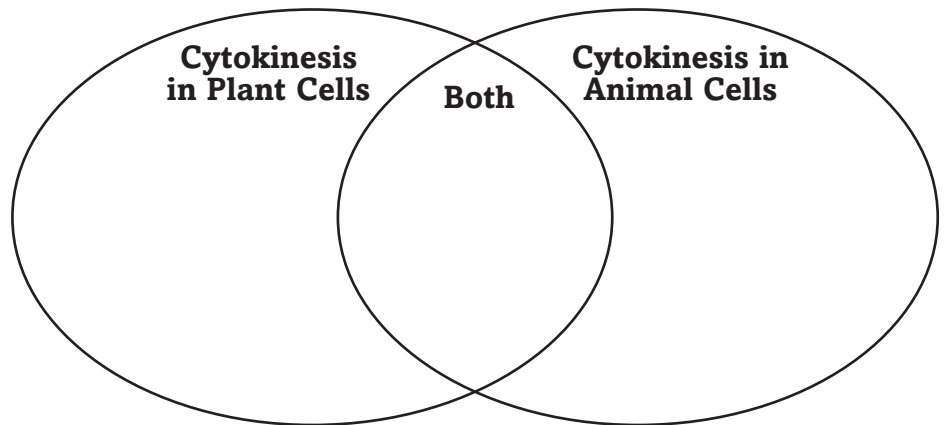
motor proteins: _____

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
	<p>Scan the illustrations and read the captions in Section 3 of the chapter. Write three facts you discovered about stem cells.</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p>
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 _____.

Details

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

- checkpoints • cyclin-dependent kinases • G₂ stage
- cyclin/CDK • cytokinesis • mitosis
- cyclins • G₁ stage • 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 _____.

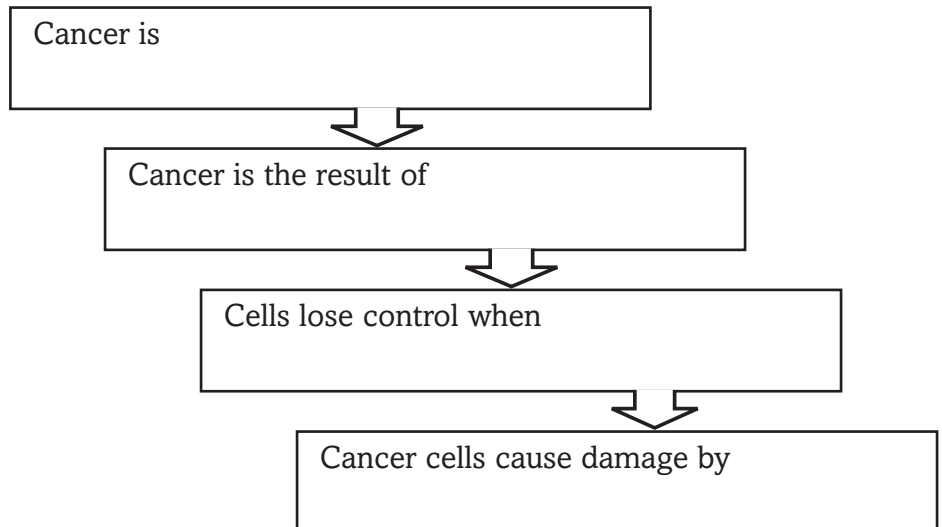
In _____, if the spindle apparatus is malfunctioning, the

cycle won't proceed to _____.

Abnormal Cell Cycle

I found this information
on page _____.

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



Identify *four environmental factors that cause cancer.*

1. _____ 3. _____

2. _____ 4. _____

Section 9.3 Cell Cycle Regulation (continued)

Main Idea _____

Details _____

Apoptosis

I found this information
on page _____.

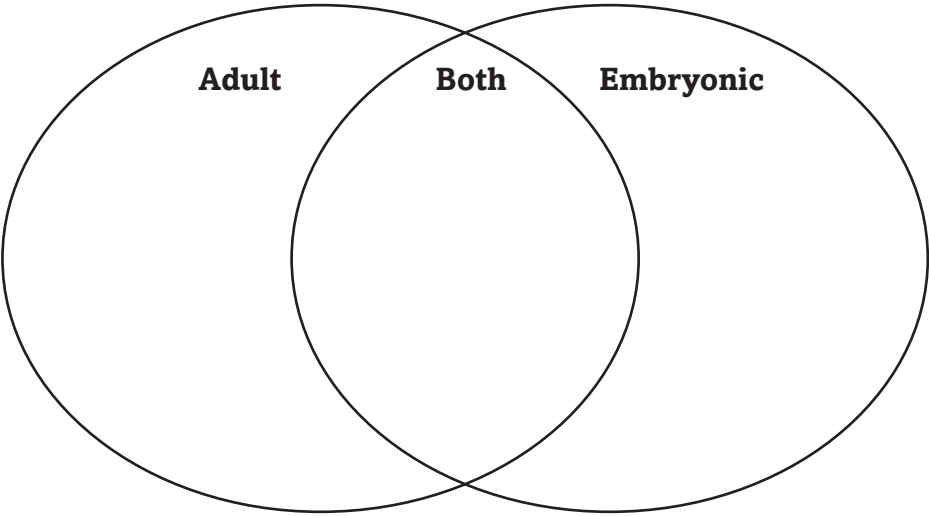
Summarize information about apoptosis.

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.

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.

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

chromosome

Use your book or dictionary to define chromosome.

New Vocabulary

diploid
gamete
gene
haploid
homologous chromosomes
meiosis
fertilization
crossing over

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

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 _____

Details _____

**Sexual
Reproduction
v. Asexual
Reproduction**
*I found this information
on page _____.*

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

	Mitosis	Meiosis
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.

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

dominant trait	recessive trait
genotype	phenotype
homozygous	heterozygous

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.

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 F₁ offspring were _____ percent yellow and _____ percent green. He allowed the F₁ plants to _____ to produce _____ plants. The F₂ 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.

F_1			F_2		
T	T		T	t	
t		_____	T		_____
t			t		_____

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.

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

protein

New Vocabulary

genetic recombination

polyploidy

Use your book or dictionary to define protein.

Use your book or dictionary to define each term.

Section 10.3 Gene Linkage and Polyploidy (continued)

Main Idea

Genetic Recombination

I found this information on page _____.

Gene Linkage and Chromosome Maps

I found this information on page _____.

Details

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	

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 _____

Details _____

I found this information
on page _____.

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. _____

3. _____

2. _____

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.

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

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

108 Complex Inheritance and Human Heredity

Section 11.1 Basic Patterns of Human Inheritance (continued)

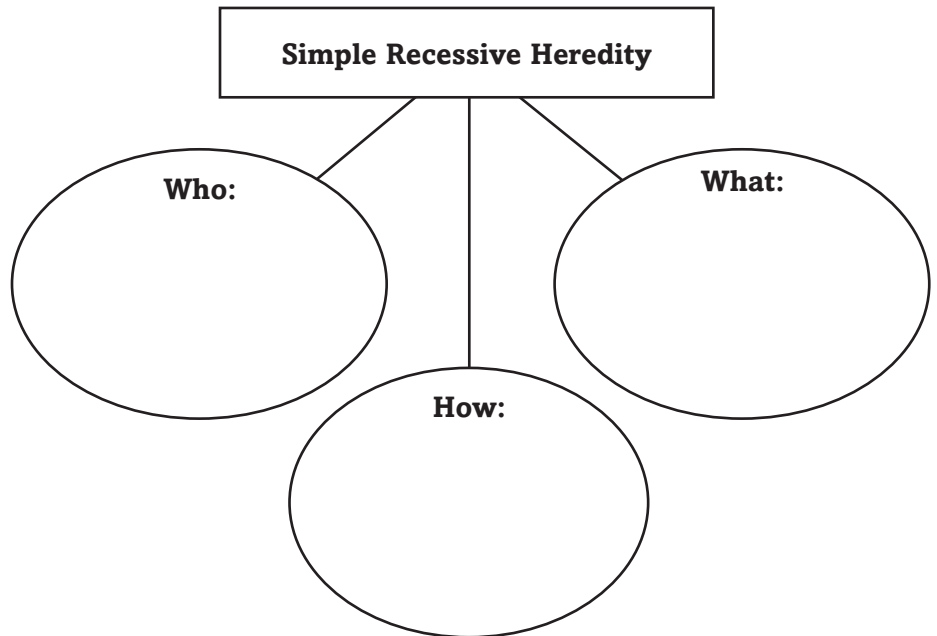
Main Idea

Recessive Genetic Disorders

I found this information on page _____.

Details

Write three facts about recessive heredity in the concept map.



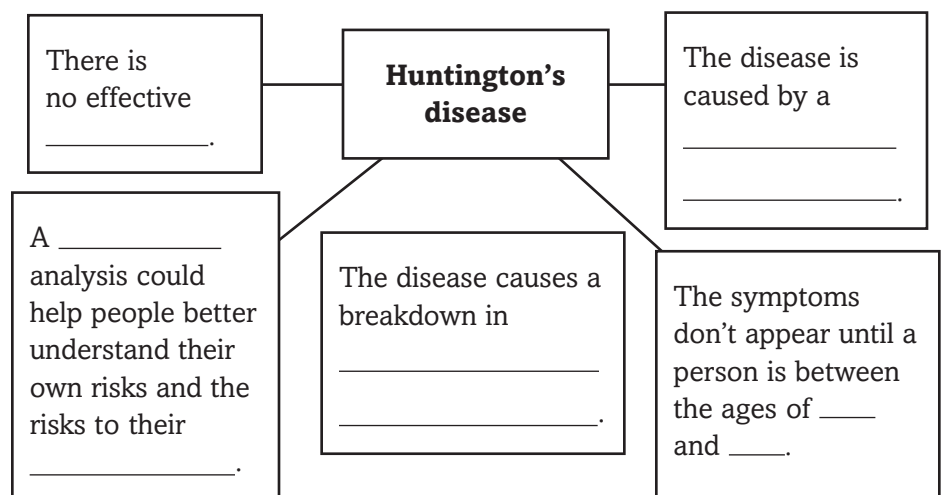
Dominant Genetic Disorders

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 _____.

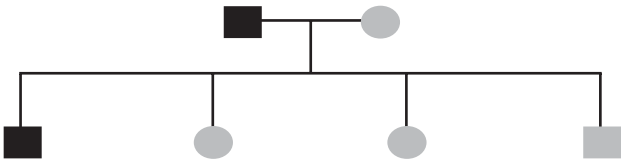
Summarize pedigree symbols by naming them and then drawing them in the right-hand column of the table. Sketches should resemble those in the book.

	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 _____

Details _____

Incomplete Dominance

I found this information on page _____.

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><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	\times	<table><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	\times	<table><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	\times	<table><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.

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.

Review Vocabulary

Use your book or dictionary to define mitosis.

mitosis

New Vocabulary

Use your book or dictionary to define the following terms.

nondisjunction

telomere

karyotype

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

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

114 Complex Inheritance and Human Heredity

Section 11.3 Chromosomes and Human Heredity (continued)

Main Idea

Details

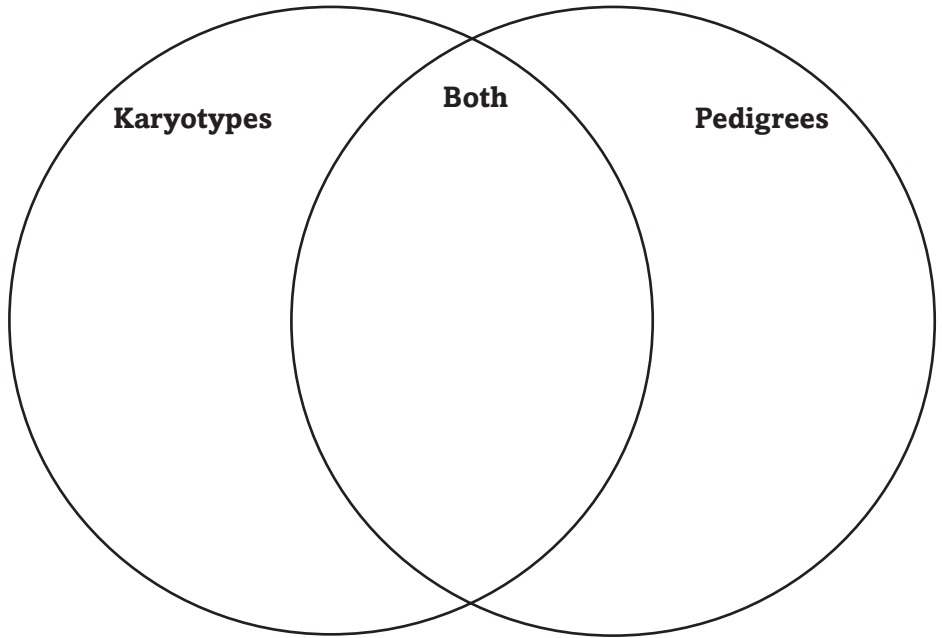
Karyotype Studies

I found this information on page _____.

Sequence *how a scientist makes a karyotype.*

1.	2.	3.	4.

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
	• James Watson and Francis Crick discovered that DNA was the genetic material.	
	• DNA replication is the same in prokaryotes and eukaryotes.	
	• Information in a cell flows from DNA to RNA to protein.	
	• A mutation is a permanent change in a cell's DNA.	

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?

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

nucleic acid

New Vocabulary

double helix

nucleosome

Academic Vocabulary

transform

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

118 Molecular Genetics

Section 12.1 DNA: The Genetic Material (continued)

Main Idea

Discovery of the Genetic Material

I found this information on page _____.

Details

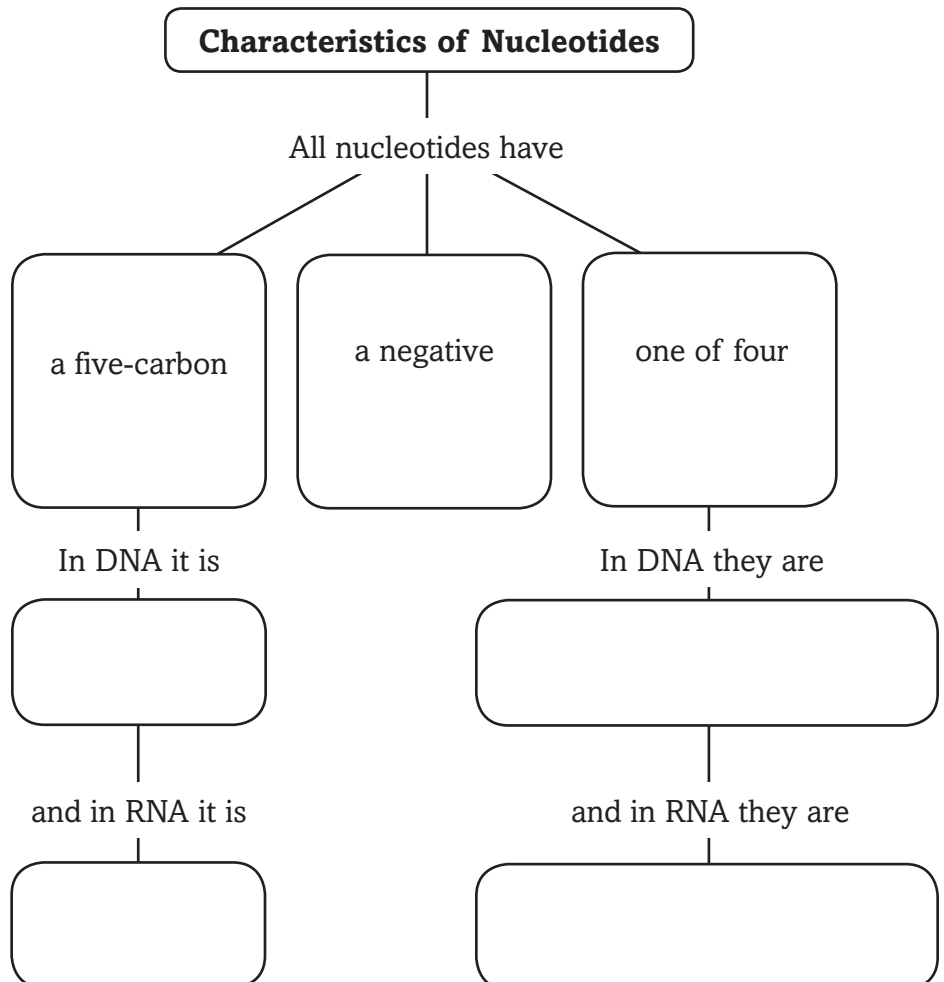
Complete the table below about geneticists and their discoveries.

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

DNA Structure

I found this information on page _____.

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



Section 12.1 DNA: The Genetic Material (continued)

Main Idea _____

Details _____

I found this information
on page _____.

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.*

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.

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)

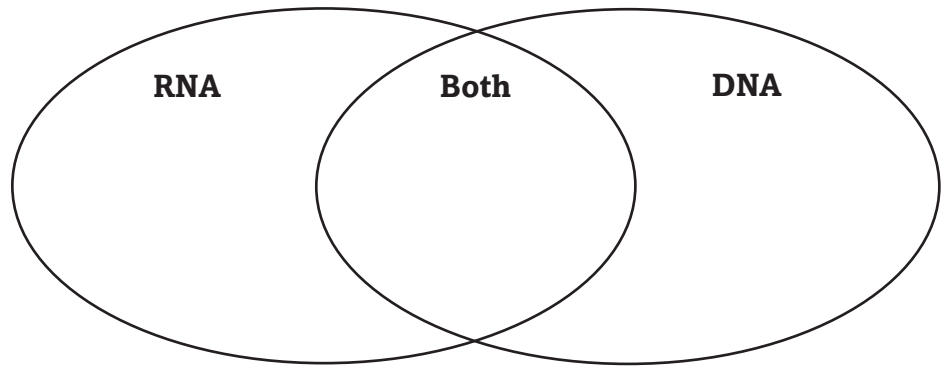
Main Idea _____

Details _____

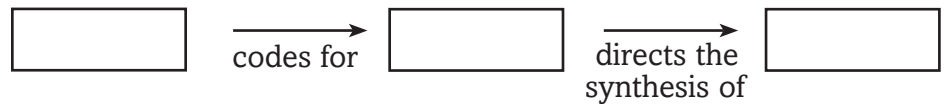
Central Dogma

*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 _____

Details _____

The Code,
One Gene—
One Enzyme

I found this information
on page _____.

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.

Review Vocabulary

Use your book or dictionary to define prokaryote.

prokaryote

New Vocabulary

Use your book or dictionary to define the following terms.

gene regulation

mutagen

mutation

operon

Academic Vocabulary

Define substitution and write a sentence to show its scientific meaning.

substitution

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.*

Molecule	Effect on Gene Expression
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.

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
	• Hybridization is a type of selective breeding.	
	• Genetic engineering is the process of breeding animals for desired traits.	
	• Polymerase chain reaction is a way to make millions of copies of a fragment of DNA.	
	• Scientists have determined the sequence of all human DNA.	

Science Journal

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

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

hybrid

Use your book or dictionary to define hybrid.

New Vocabulary

inbreeding

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.

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: _____

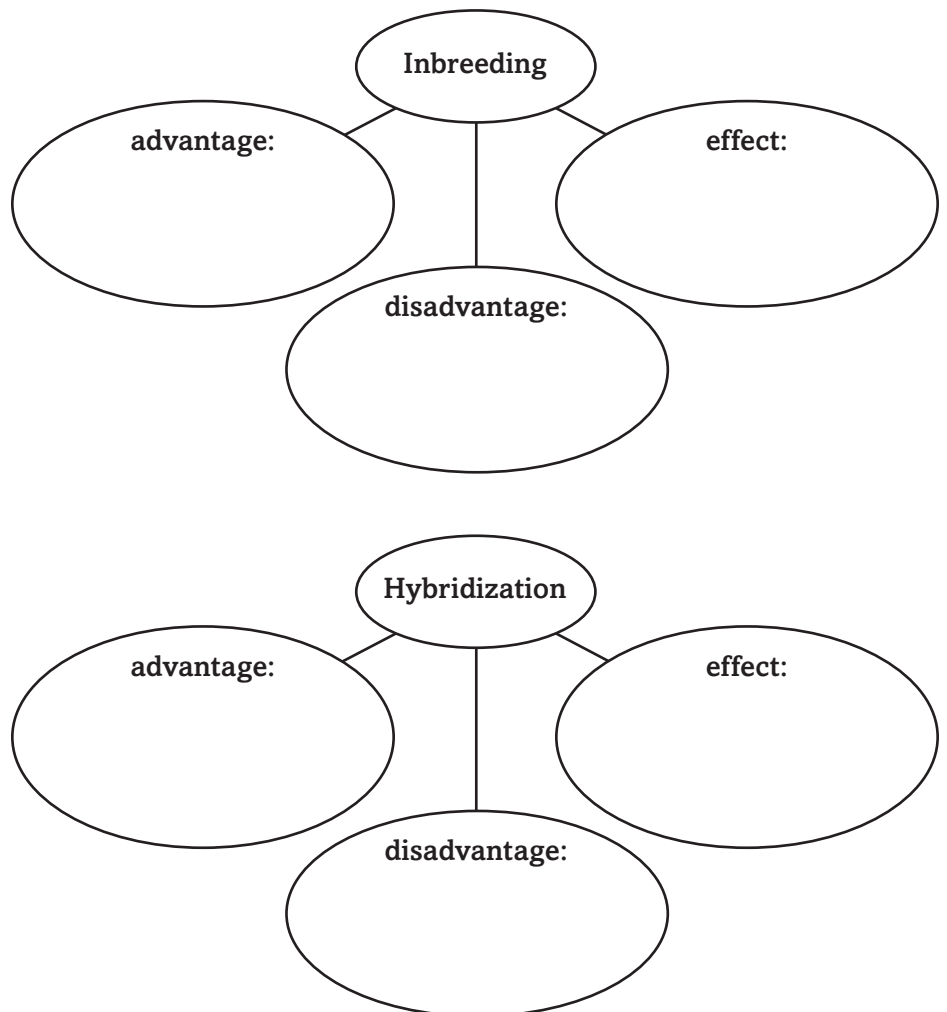
The offspring of parents that have different forms of a trait:

_____.

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.

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.

- | | |
|---|--|
| <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> | <p>method of manipulating DNA from one organism and inserting the DNA fragment into a host organism of the same or different species</p> <p>the total DNA present in the nucleus of each cell</p> <p>bacterial enzyme that can cut foreign DNA at a specific nucleotide sequence</p> <p>a method of separating DNA fragments by size with the use of an electric current</p> <p>DNA made by recombining fragments of DNA from different sources</p> <p>small, circular, double-stranded DNA found in bacterial cells and used as a vector</p> <p>an enzyme that is used to join DNA fragments; used by the cell for DNA repair and replication</p> <p>a method for getting plasmid DNA into bacterial cells</p> <p>the process of creating a genetically identical copy of an organism or gene</p> <p>a technique for making millions of copies of a specific region of DNA</p> <p>organism that contains functional recombinant DNA from a different organism</p> |
|---|--|

Section 13.2 DNA Technology (continued)

Main Idea _____

Details _____

Genetic Engineering

I found this information on page _____.

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.

DNA Tools

I found this information on page _____.

Complete the paragraph about DNA tools by using the words below.

- blunt ends
 - restriction enzymes
- Eco RI
 - sticky ends
- gel electrophoresis

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 _____.

Recombinant DNA Technology

I found this information on page _____.

Compare the DNA tools and techniques used in genetic engineering.

Genetic Engineering Application	Tool or Technique Used
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 _____

Details _____

**Bioinformatics,
DNA Microarrays,
The Genome
and Genetic
Disorders,
Genomics and
Proteomics**

I found this information
on page _____.

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.

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.

The History of Life

Section 14.1 Fossil Evidence of Change

Main Idea _____

Details _____

Review Vocabulary

extinction

Use your book or dictionary to define extinction.

New Vocabulary

Cambrian explosion

era

fossil

geologic time scale

half-life

K-T boundary

law of superposition

paleontologist

period

plate tectonics

radiometric dating

relative dating

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

1. _____

2. _____

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

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.



Volcanoes erupted, giving off gases and forming the early atmosphere.

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.

SUMMARIZE

Discuss how palentologists use relative and radiometric dating to support the geologic timescale.

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 _____

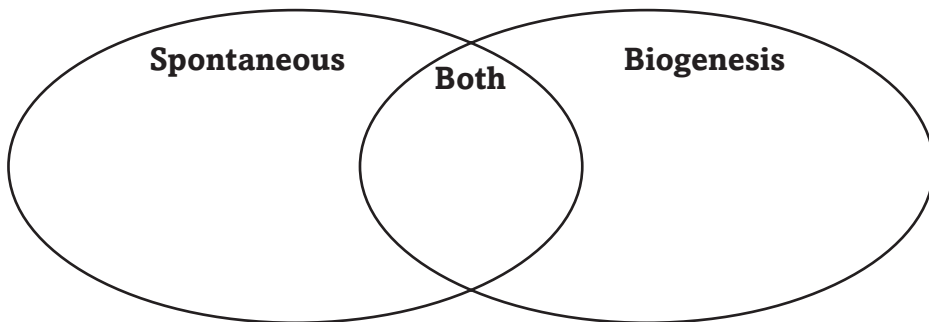
Details _____

Origins: Early Ideas

I found this information
on page _____.

Create a cartoon that illustrates how Redi's experiment was used to disprove spontaneous generation.

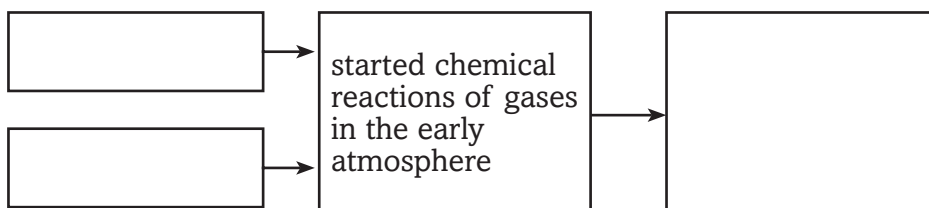
Compare spontaneous generation and biogenesis.



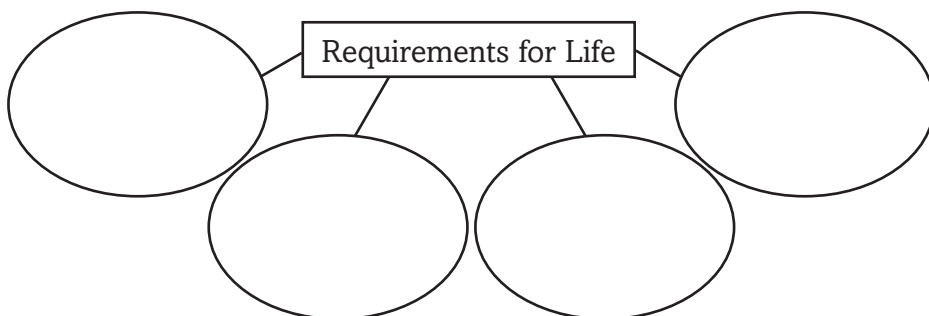
Origins: Modern Ideas

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)

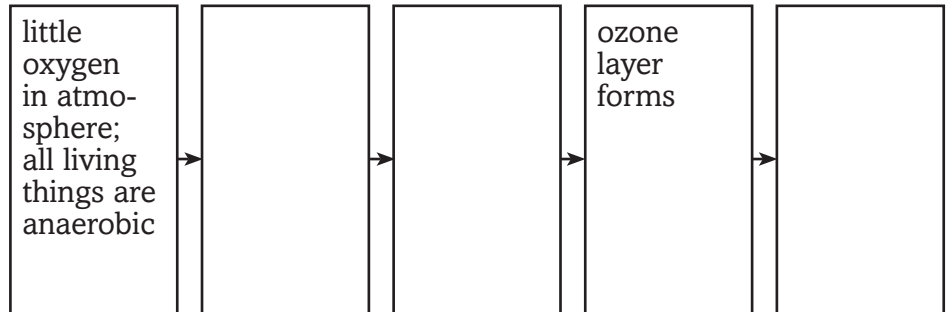
Main Idea

Cellular Evolution

I found this information
on page _____.

Details

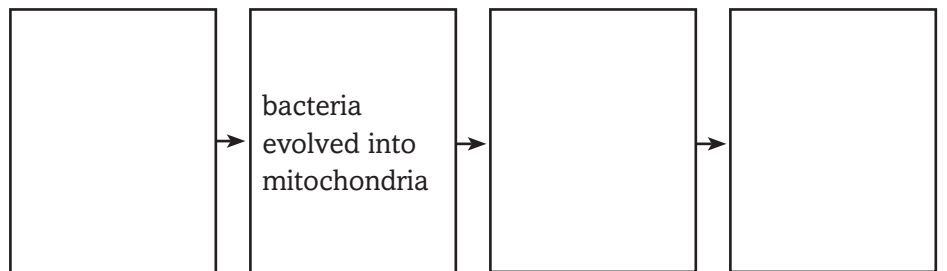
Sequence how oxygen accumulated in the atmosphere and the effect it had on life by completing the flowchart below.



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 palentologists:

Analogy of endosymbiont theory:

Evolution

Section 15.1 Darwin’s Theory of Natural Selection

Main Idea _____

Details _____

Review Vocabulary

selective breeding

New Vocabulary

artificial selection

evolution

natural selection

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

1. _____

2. _____

3. _____

Use your book or dictionary to define selective breeding.

Use your book or dictionary to define each term.

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

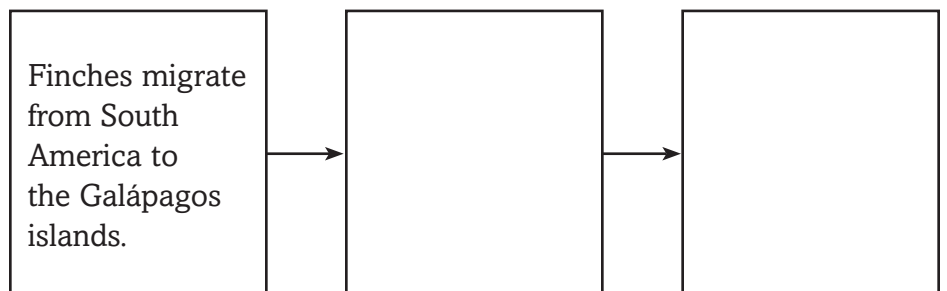
Summarize *three observations Darwin made in his research on the South American mainland.*

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 _____

Details _____

I found this information
on page _____.

Identify the four principles of natural selection.

1. _____

2. _____

3. _____

4. _____

Summarize natural selection by completing the sentences below.

Natural Selection

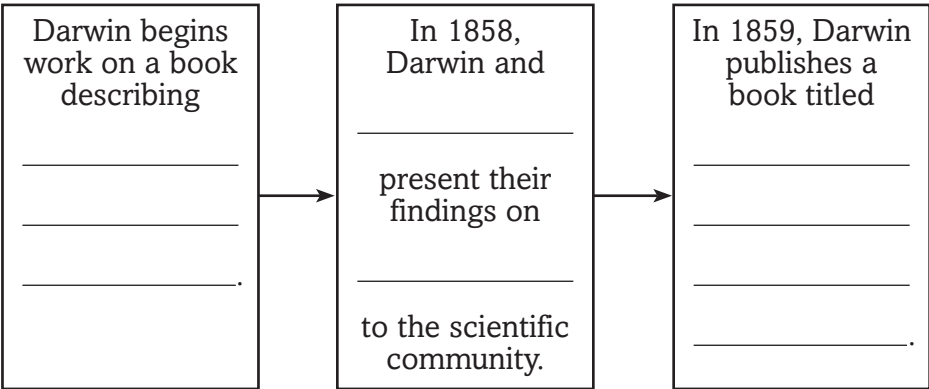
Organisms with _____ traits are able to _____ and pass their traits on to their _____, who then reproduce.

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

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
	<p>Scan Section 2 of the chapter. List the lines of evidence that support Darwin's theory of evolution by natural selection.</p> <p>_____</p> <p>_____</p>
<p>Review Vocabulary</p> <p><i>fossil</i></p>	<p>Use your book or dictionary to define fossil.</p> <p>_____</p>
<p>New Vocabulary</p> <p><i>analogous structures</i></p> <p><i>ancestral trait</i></p> <p><i>biogeography</i></p> <p><i>camouflage</i></p> <p><i>derived trait</i></p> <p><i>embryo</i></p> <p><i>fitness</i></p> <p><i>homologous structures</i></p> <p><i>mimicry</i></p> <p><i>vestigial structure</i></p>	<p>Use your book or dictionary to define the following terms.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

Section 15.2 Evidence of Evolution (continued)

Main Idea _____

Details _____

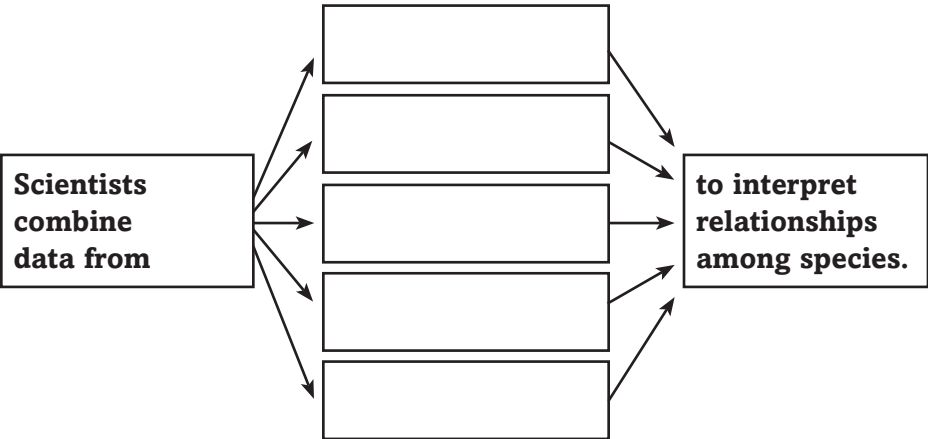
Support for Evolution

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

Adaptation

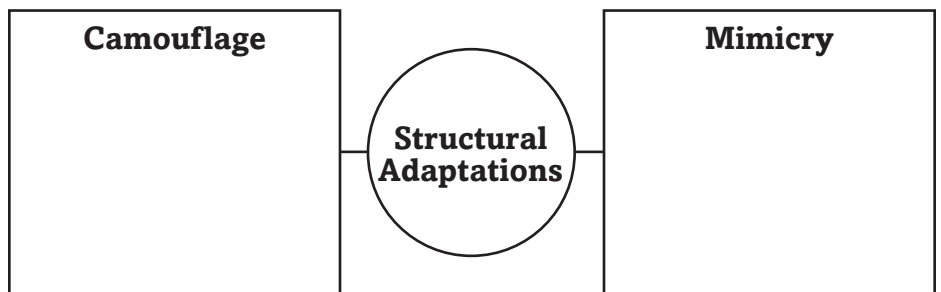
I found this information
on page _____.

Details

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.

SUMMARIZE

Explain why fossils are important tools in understanding evolution.

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

allele

Use your book or dictionary to define 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

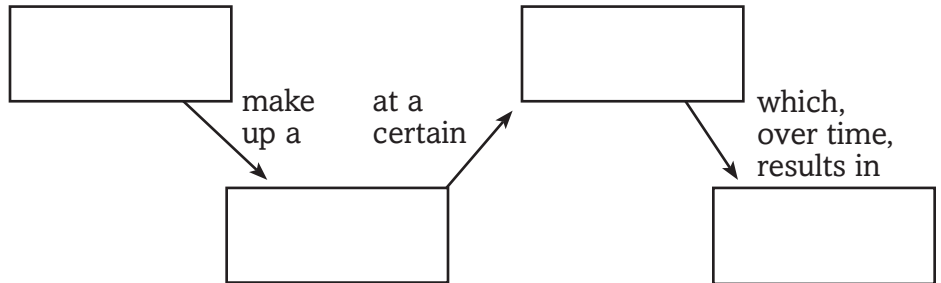
I found this information on page _____.

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.

	Species Changes Based on	Increases Fitness?
Natural selection		
Sexual selection		

Section 15.3 Shaping Evolutionary Theory (continued)

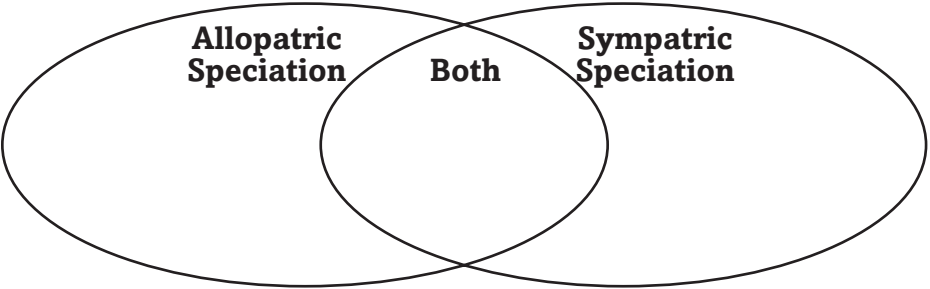
Main Idea _____

Details _____

Speciation

I found this information
on page _____.

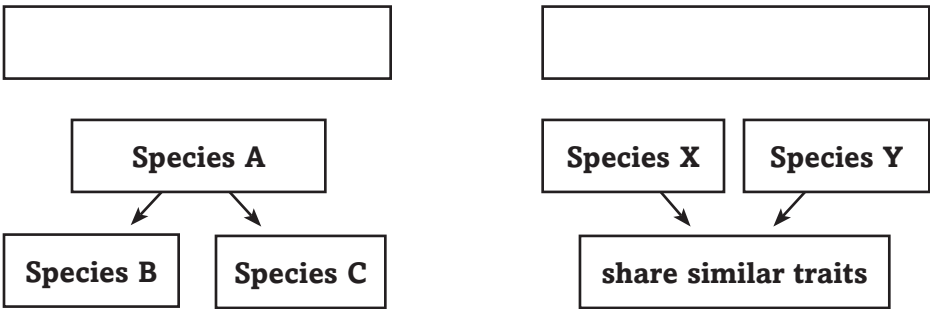
Compare *allopatric speciation* and *sympatric speciation* by writing
one fact in each segment of the Venn diagram below.



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.

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.

Primate Evolution

Section 16.1 Primates

Main Idea

Details

Review Vocabulary

extinction

New Vocabulary

anthropoid

arboreal

binocular vision

diurnal

hominin

nocturnal

opposable first digit

prehensile tail

Academic Vocabulary

diverge

Scan the title and main idea of Section 1. List two things that might be discussed in this section.

1. _____

2. _____

Use your book or dictionary to define extinction.

Use your book or dictionary to define each term.

Define diverge to show its scientific meaning.

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

160 Primate Evolution

Section 16.1 Primates (continued)

Main Idea

Characteristics of Primates

I found this information on page _____.

Details

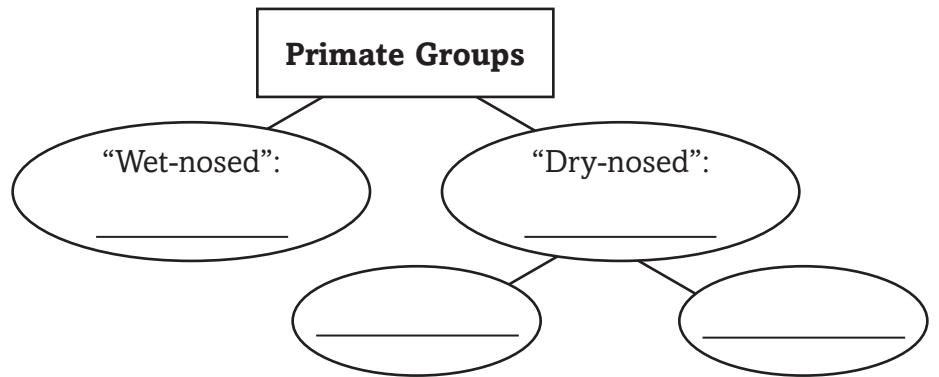
Identify the benefits of the following primate characteristics.

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.

Section 16.1 Primates (continued)

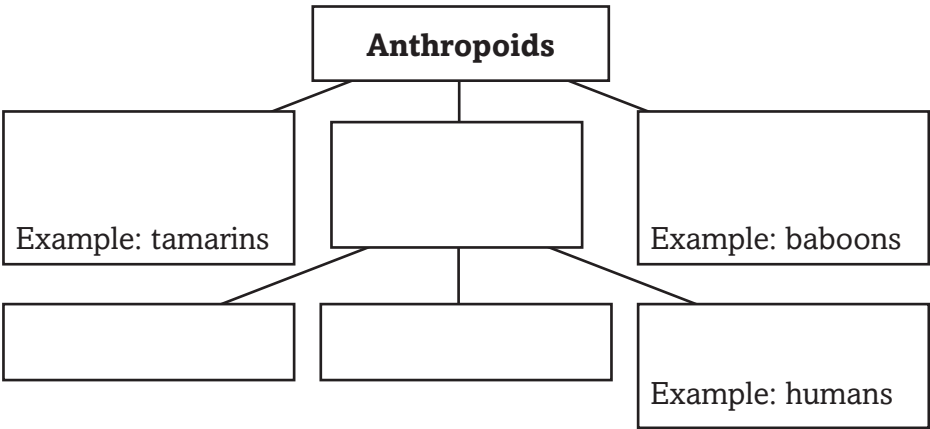
Main Idea _____

Details _____

Haplorhines

I found this information
on page _____.

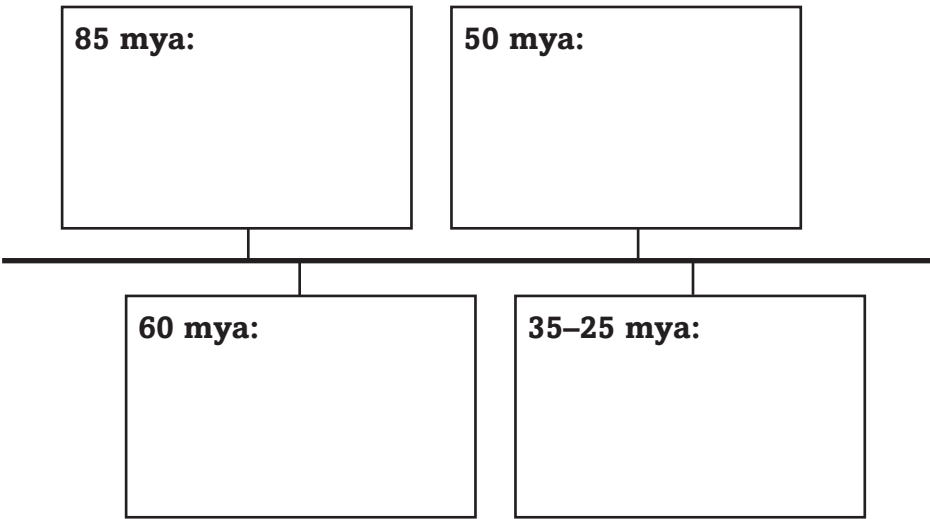
Classify the subgroups of anthropoids by completing the diagram.



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.

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

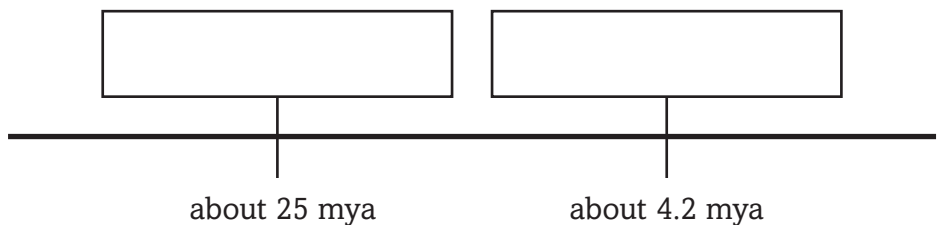
Use your book or dictionary to define each term.

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 _____

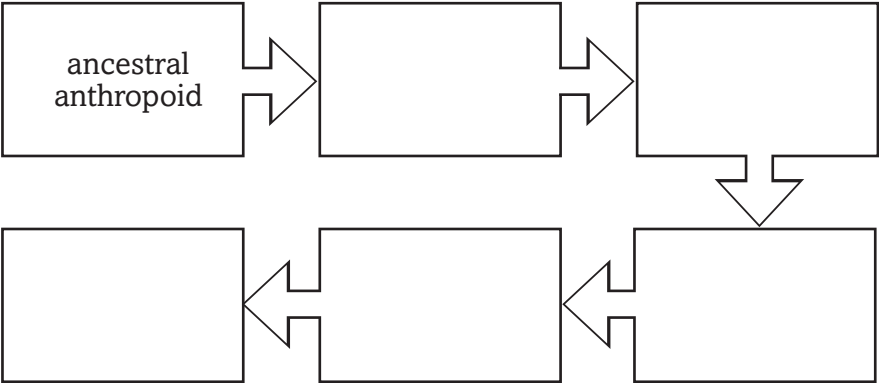
Details _____

Hominoids

I found this information
on page _____.

Sequence *hominoid divergence by placing the primates listed below in the proper location on the flowchart.*

- gorillas
 - humans
- gibbons
 - orangutans
- chimpanzees and bonobos

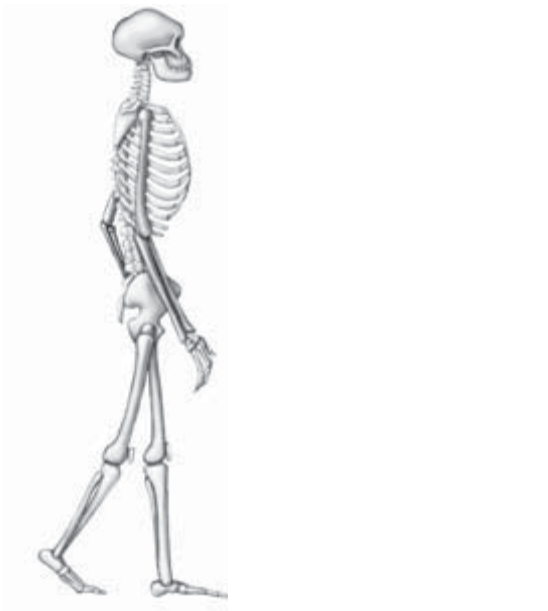


Describe *why the Proconsul species was an important find for scientists.*

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.

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 _____

Details _____

Emergence of Modern Humans

I found this information on page _____.

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 is inherited only from the mother |
| • mitochondrial DNA changes very little over time | • 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.

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

morphology

Use your book or dictionary to define morphology.

New Vocabulary

binominal nomenclature
class
division
domain
family
genus
kingdom
order
phylum

Classify each term at the left as being part of Linnaeus’ two-word naming system or a taxonomic group.

Linnaeus’ System	Taxonomic Group

Use your book to define each term.

classification _____

taxon _____

taxonomy _____

Section 17.1 The History of Classification (continued)

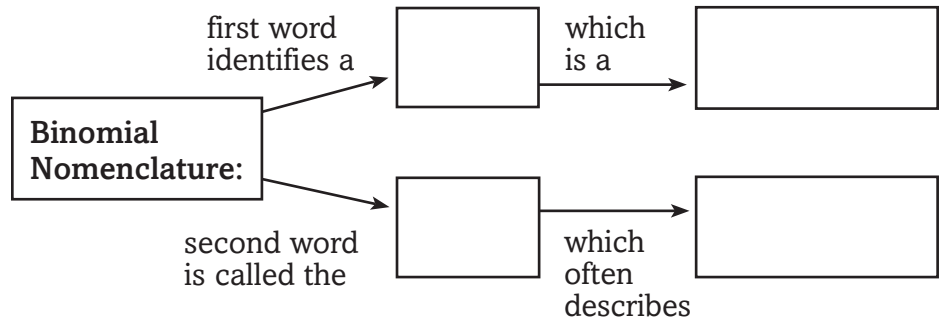
Main Idea

Early Systems of Classification

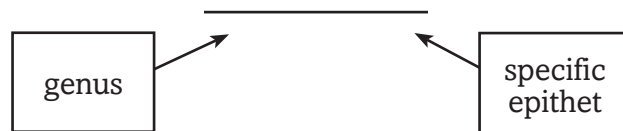
I found this information on page _____.

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.



Taxonomic Categories

I found this information on page _____.

- Compare data in the table below to determine which two animals are most closely related. Support your reasoning.

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

- Analyze at which level the blue whale diverges from the other animals on the table.

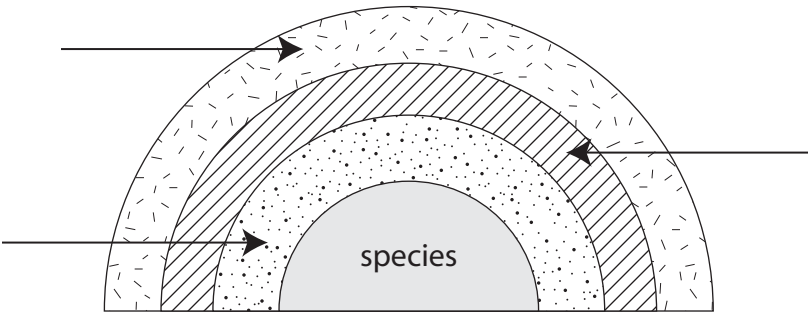
Section 17.1 The History of Classification (continued)

Main Idea _____

Details _____

I found this information
on page _____.

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)

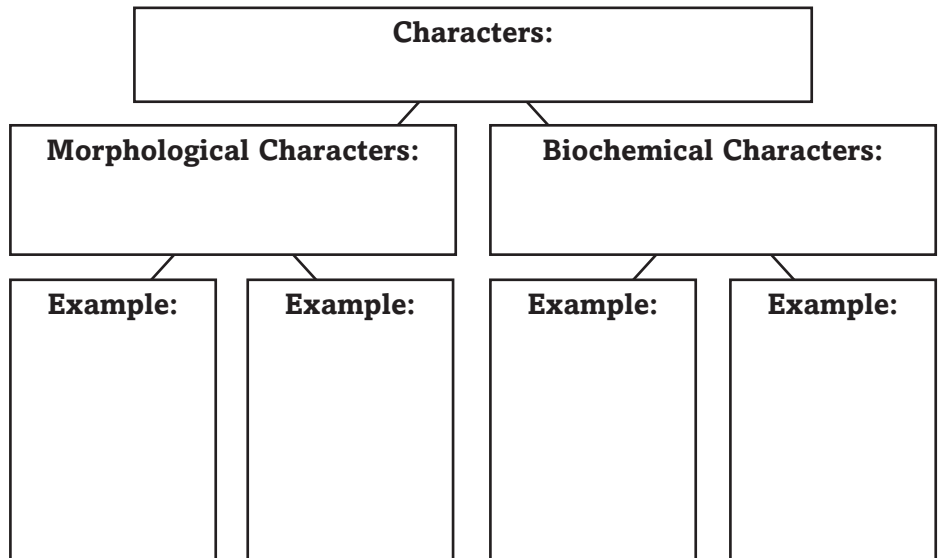
Main Idea

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.

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 _____

Grouping Species

I found this information
on page _____.

Domain Bacteria

I found this information
on page _____.

Domain Archaea

I found this information
on page _____.

Domain Eukarya

I found this information
on page _____.

Details _____

Rephrase why the members formerly in the Kingdom Monera were separated into the two new domains Bacteria and Archaea.

Model the cell walls of eubacteria. Label the features of eubacteria.

Analyze why archaeobacteria are sometimes called extremophiles.

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

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	Bacteria and Viruses	After You Read
	<ul style="list-style-type: none">• Bacteria can live in a thermal vent on the ocean floor, where temperatures top 80°C.	
	<ul style="list-style-type: none">• If you have bacteria in your intestines, you will get sick.	
	<ul style="list-style-type: none">• Some viruses remain inactive for years inside human cells.	
	<ul style="list-style-type: none">• <i>Mad cow</i> disease is caused by a protein.	

Science Journal

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

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

Use your book or dictionary to define each term.

bacteria

binary fission

capsule

conjugation

endospore

nucleoid

pilus

Section 18.1 Bacteria (continued)

Main Idea _____

Details _____

Diversity of Prokaryotes

I found this information on page _____.

Summarize *three general environments where archaebacteria live, and give one example of each environment.*

1. _____
2. _____
3. _____

Prokaryote Structure

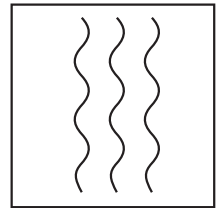
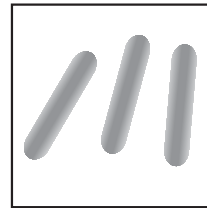
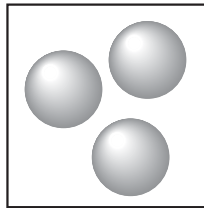
I found this information on page _____.

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
<div></div>	<div></div>
<div></div>	<div></div>

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

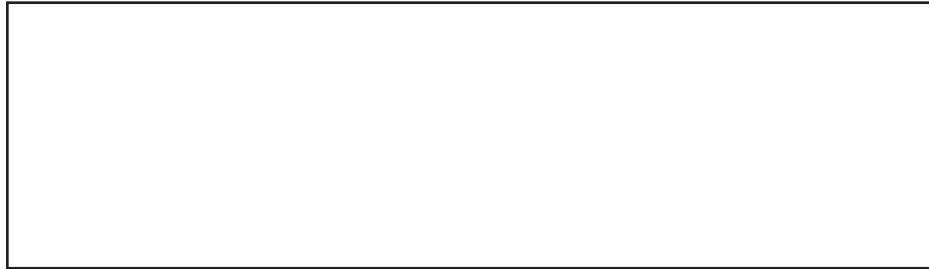
Section 18.2 Viruses and Prions (continued)

Main Idea _____ **Details** _____

Viruses

I found this information
on page _____.

Model of one type of virus. Label its parts.



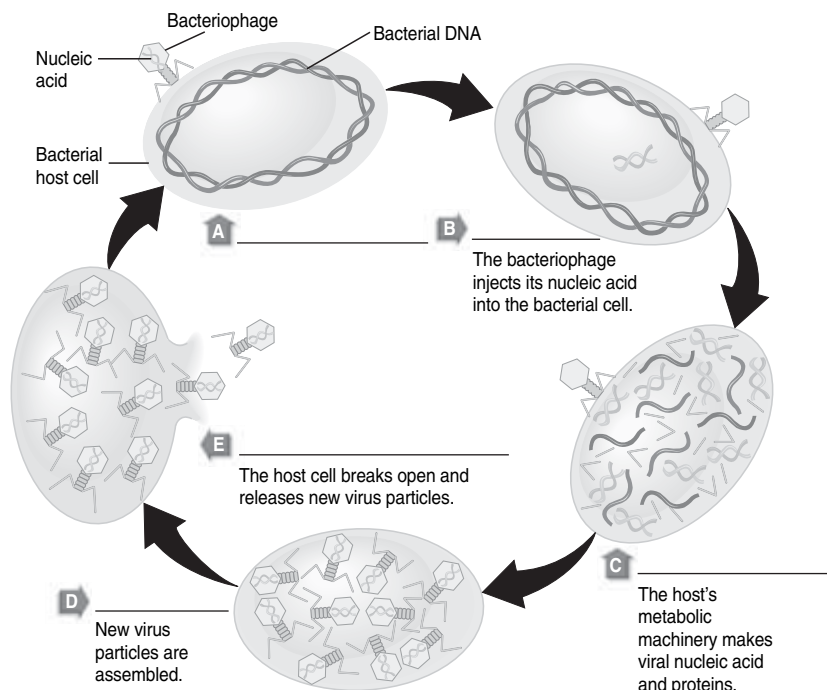
Viral Infection

I found this information
on page _____.

Synthesize why many viruses cannot pass from one species to another.

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



Section 18.2 Viruses and Prions (continued)

Main Idea _____ **Details** _____

Sequence *the steps of a lysogenic cycle.*

Viral DNA integrates into a chromosome of a host cell.







Retroviruses

I found this information on page _____.

Evaluate and discuss *the role of reverse transcriptase in the replication cycle of HIV.*

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.

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
	• Protists are not animals, plants, or fungi.	
	• Some amoebas have a hard covering like a shell.	
	• Protists cannot make their own food.	
	• A type of downy mildew was responsible for widespread starvation in 19th century Ireland.	

Science Journal

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

Protists

Section 19.1 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

heterotroph

Use your book or dictionary to define heterotroph. Then use the term in a sentence to show its scientific meaning.

New Vocabulary

microsporidium

Use your book or dictionary to define each vocabulary term. Then use each term in a sentence.

protozoan

Section 19.1 Introduction to Protists (continued)

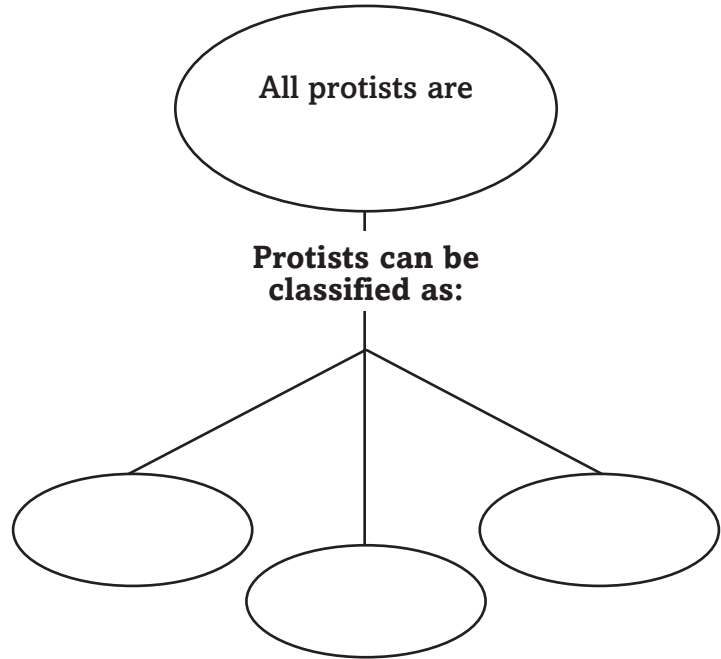
Main Idea

Protists

I found this information
on page _____.

Details

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

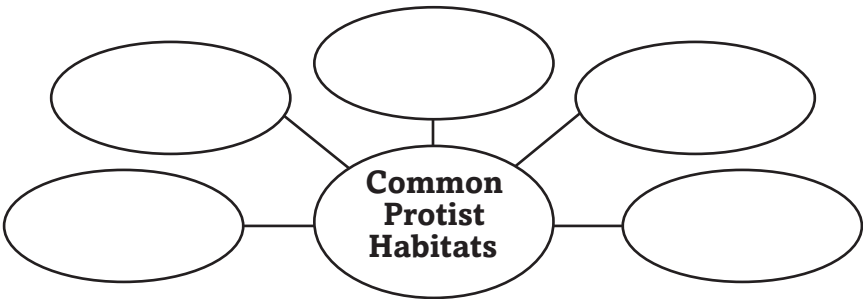
Section 19.1 Introduction to Protists (continued)

Main Idea _____

Details _____

I found this information
on page _____.

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.

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 _____

Details _____

Ciliophora

I found this information
on page _____.

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)

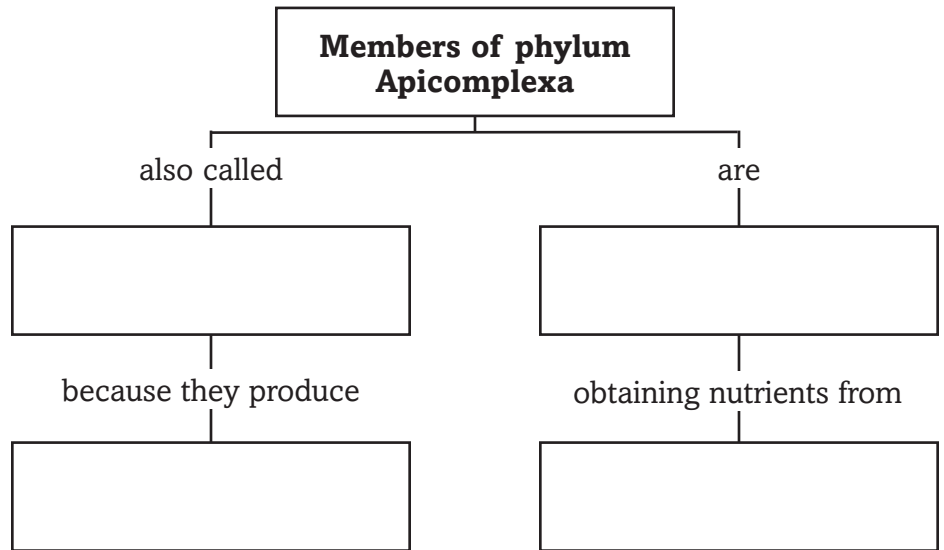
Main Idea

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:	<div></div>	<div></div>
Passes to human from insect's:	<div></div>	<div></div>
Can damage host's:	<div></div>	<div></div>

SUMMARIZE

Compare the habitats and methods of movement among the three phyla of protozoans.

Protists

Section 19.3 Algae—Plantlike Protists

Main Idea

Details

Review Vocabulary

chloroplasts

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

1. _____

2. _____

New Vocabulary

alternation of generations

Use your book or dictionary to define chloroplasts.

bioluminescent

colony

Academic Vocabulary

suspension

Use your book or dictionary to define each vocabulary term. Then write a sentence for each term to show its scientific meaning.

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.

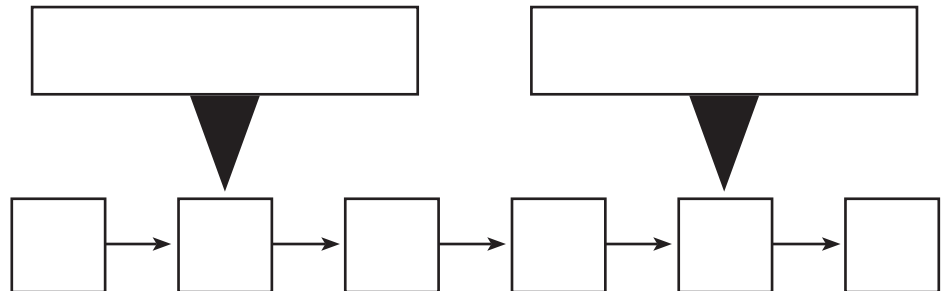
Algae	
Like plants:	Unlike plants:
Function of secondary pigments:	Found in many colors because:

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 | d. gametes released |
| b. meiosis | e. wall formation around cell |
| c. mitosis | f. zygote |



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

Like plants 1. _____ _____ 2. _____ _____	Euglenoids	Like animals 1. _____ _____ 2. _____ _____
--	-------------------	---

Section 19.3 Algae—Plantlike Protists (continued)

Main Idea _____

Details _____

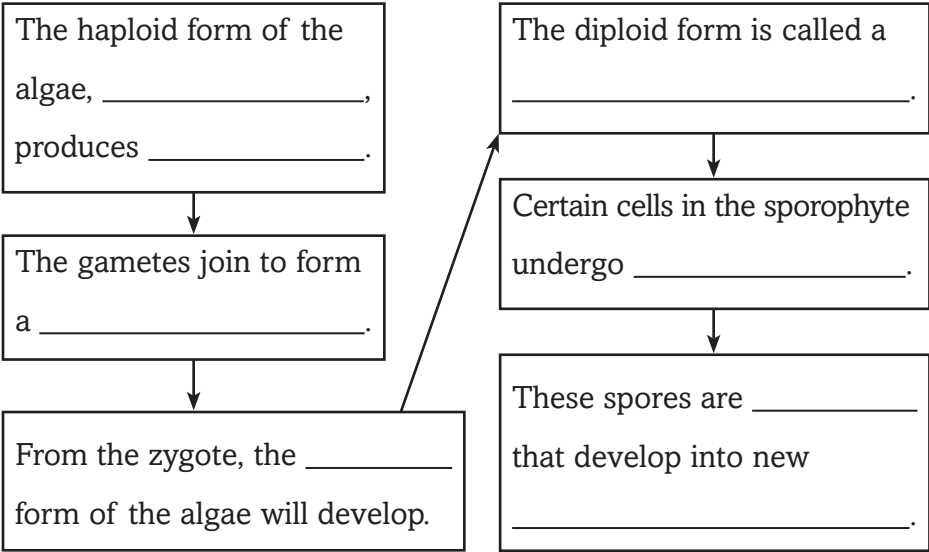
Uses for Algae
I found this information on page _____.

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.*

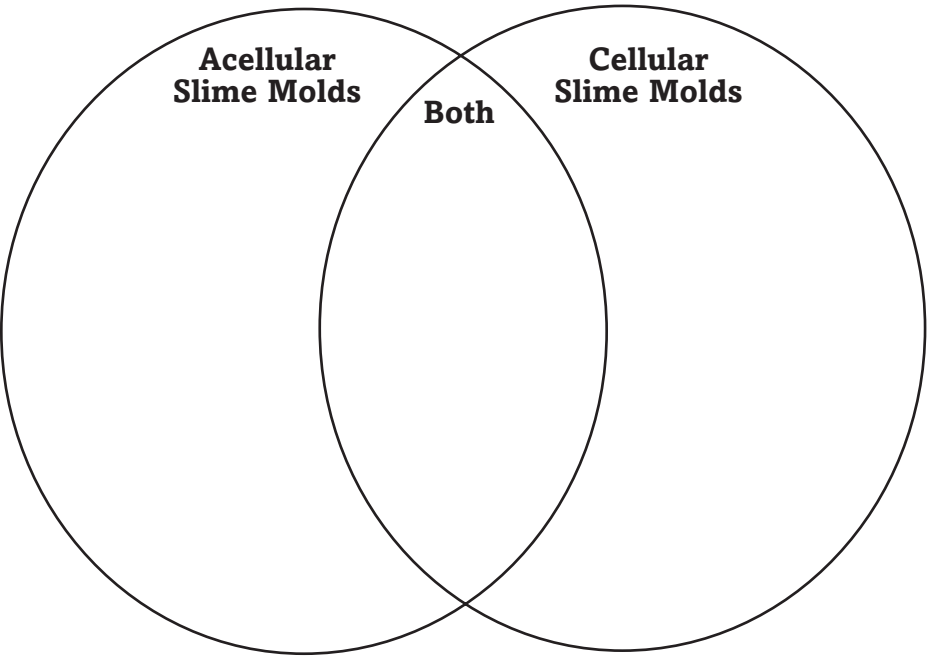
Similarities in Slime Molds and Fungi
Reproduce using:
Feed on:
Absorb nutrients through:

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.

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

saprobe

Use your book or dictionary to define saprobe.

New Vocabulary

chitin

Use your book or dictionary to define each term.

fruiting body

haustoria

hyphae

mycelium

septa

sporangium

spore

Section 20.1 Introduction to Fungi (continued)

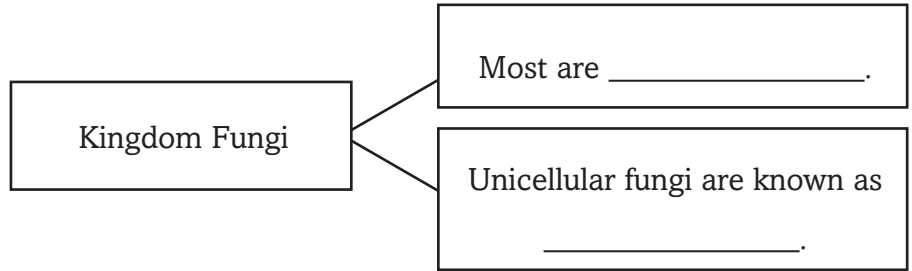
Main Idea

Characteristics of Fungi/Major Features of Fungi

I found this information on page _____.

Details

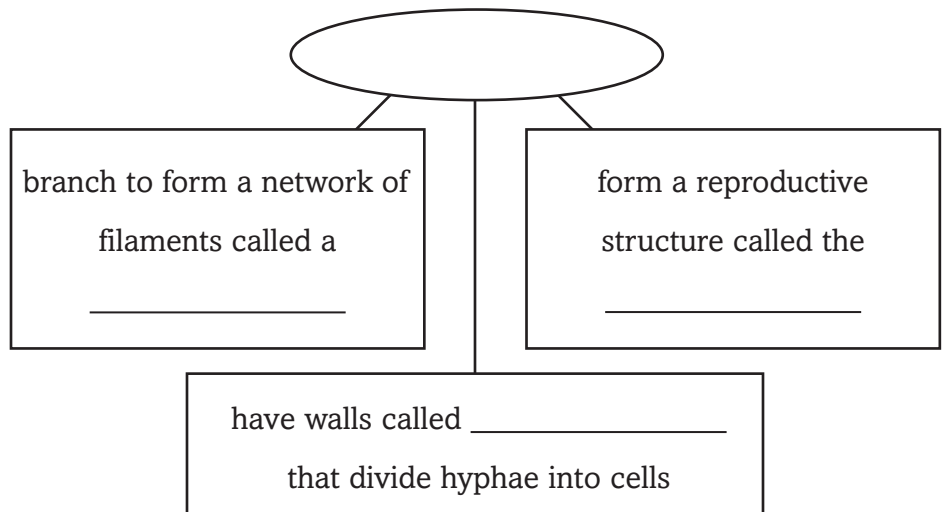
Describe *the kingdom Fungi.*



List *three features of fungi that distinguish them from plants.*

Features that distinguish fungi 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.*

Saprophytes	
Mutualists	
Parasites	

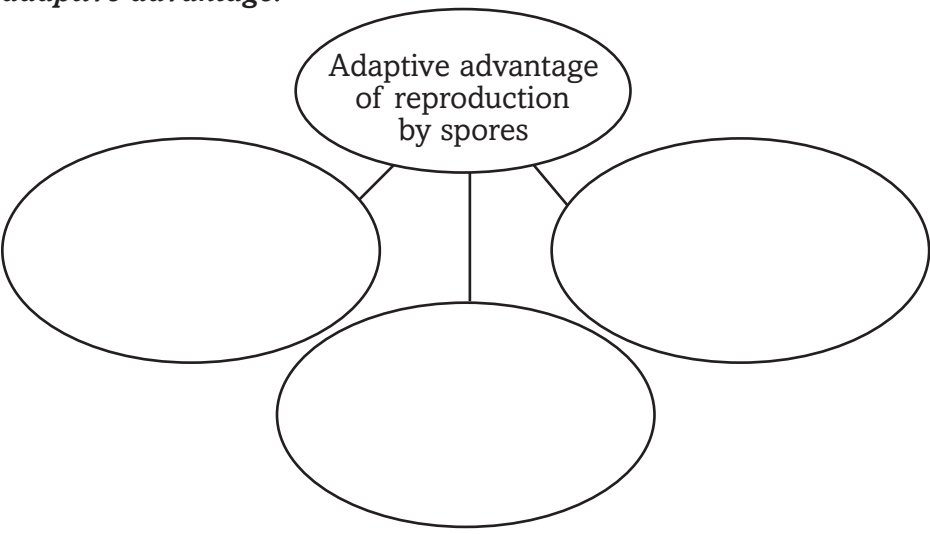
Reproduction in Fungi

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.

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 _____.

Details

Model a phylogenetic tree for fungi and label the major phyla.

Chytrids

I found this information on page _____.

Summarize the evidence supporting the initial classification of chytrids as protists and later reclassification as fungi.

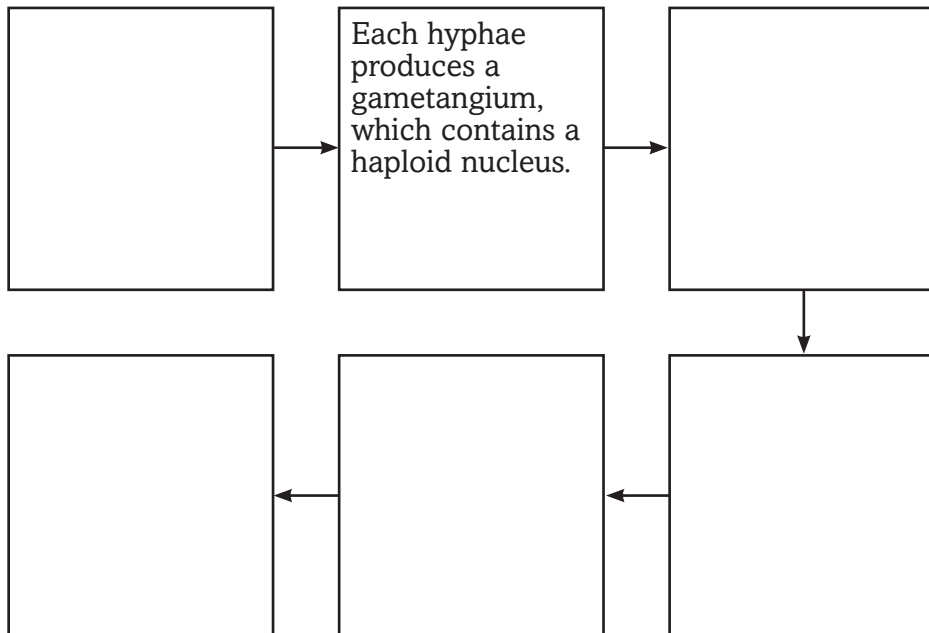
Chytrids are like protists.

Chytrids are like fungi.

Common Molds

I found this information on page _____.

Sequence how zygomycetes reproduce sexually, by completing the graphic organizer.



Section 20.2 Diversity of Fungi (continued)

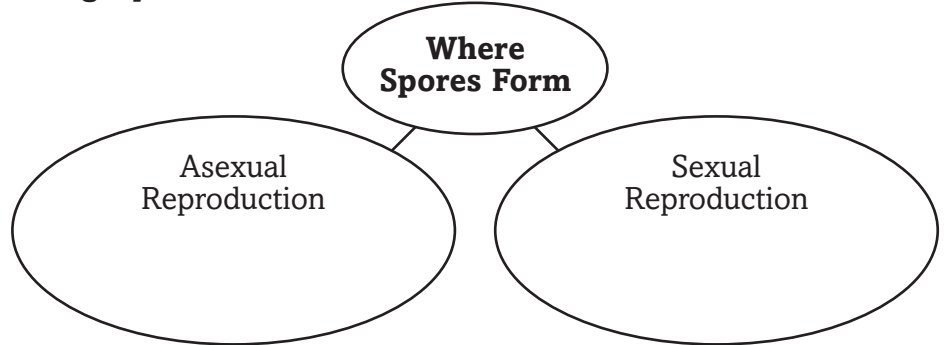
Main Idea

Sac Fungi

I found this information
on page _____.

Details

Organize information about where the spores of sac fungi form during reproduction.



Club Fungi

I found this information
on page _____.

Model a club fungi. Label the basidiocarp and the basidia.

Other Fungi

I found this information
on page _____.

Predict what might happen to the phylum Deuteromycota as scientists continue to study its species. Explain your reasoning.

SUMMARIZE

Explain the adaptive advantages of zygospores that help ensure the survival of the species.

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)

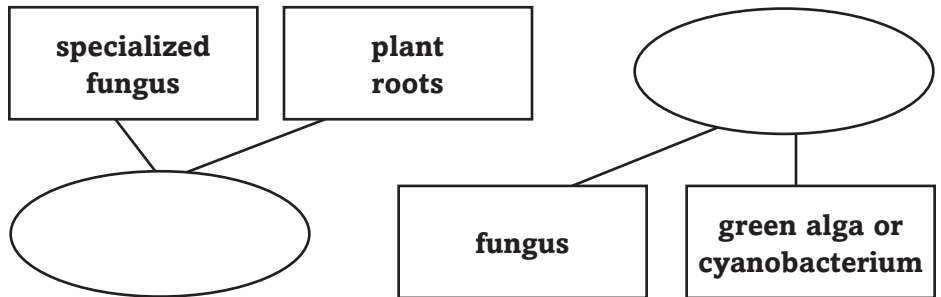
Main Idea

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 . . .

food for animals	
pioneers	
bioindicators	

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.

Role of Fungi	Benefits to Humans
as decomposers	
in medicine	
in foods	
in bioremediation	

Describe the harmful effects of fungi on each of the following.

Plants	Humans

SUMMARIZE

Compare and contrast mycorrhizae and lichens.

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.

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

Use your book or dictionary to define limiting factor.

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
- no plants
- algae in oceans
- simple plants appear

--	--	--	--

↑
1 billion years ago

↑
400 million years ago

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

_____ anthophytes

_____ coniferophytes

_____ pterophytes

_____ hepaticophytes
- _____ anthocerophytes

_____ bryophytes

_____ ginkgophytes

_____ gnetophytes

_____ lycophytes

SUMMARIZE

Contrast how the sperm reaches the egg differently in seed plants than in non-seed plants.

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.*

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.

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

Section 21.3 Seedless Vascular Plants (continued)

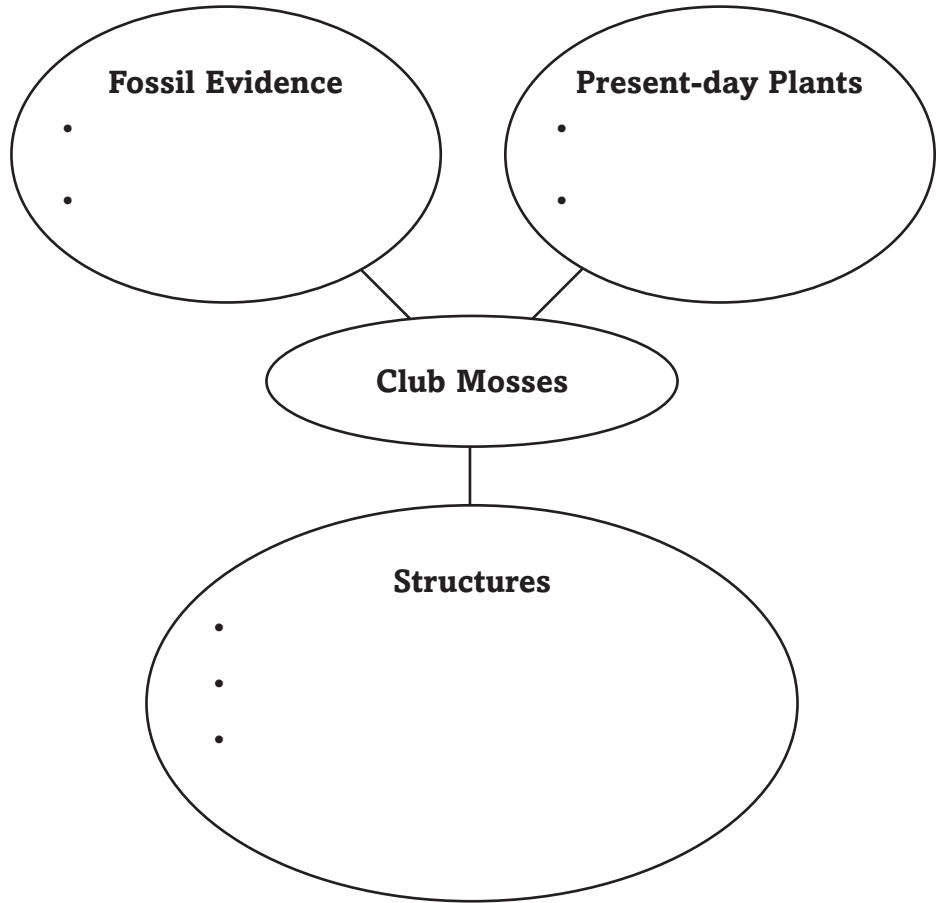
Main Idea _____

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.*

	Ferns	Horsetails
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

_____ spike moss

_____ tropical tree fern

_____ sorus

_____ epiphyte
- _____ strobilus

_____ rhizome

_____ frond

_____ scouring rushes

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
	<p>Scan the illustrations and read the captions. List two conclusions that you can draw about seeds and cones.</p> <p>1. _____</p> <p>_____</p> <p>2. _____</p> <p>_____</p>
<p>Review Vocabulary</p> <p><i>parasite</i></p>	<p>Use your book or dictionary to define parasite.</p> <p>_____</p> <p>_____</p>
<p>New Vocabulary</p> <p><i>annual</i></p> <p><i>biennial</i></p> <p><i>cone</i></p> <p><i>cotyledon</i></p> <p><i>perennial</i></p>	<p>Use your book or dictionary to define each term.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

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.

	Reproduction	Environment	Examples
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.

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.

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.

	Cells (8 terms)	Tissues (7 terms)
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		

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 _____

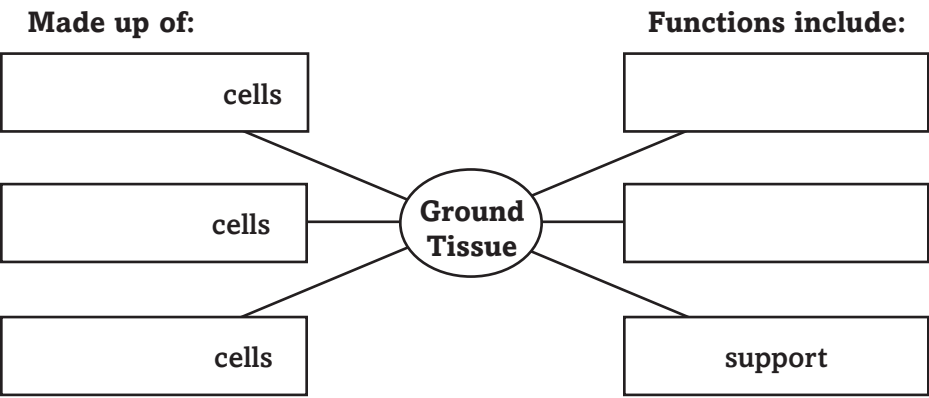
Details _____

I found this information
on page _____.

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

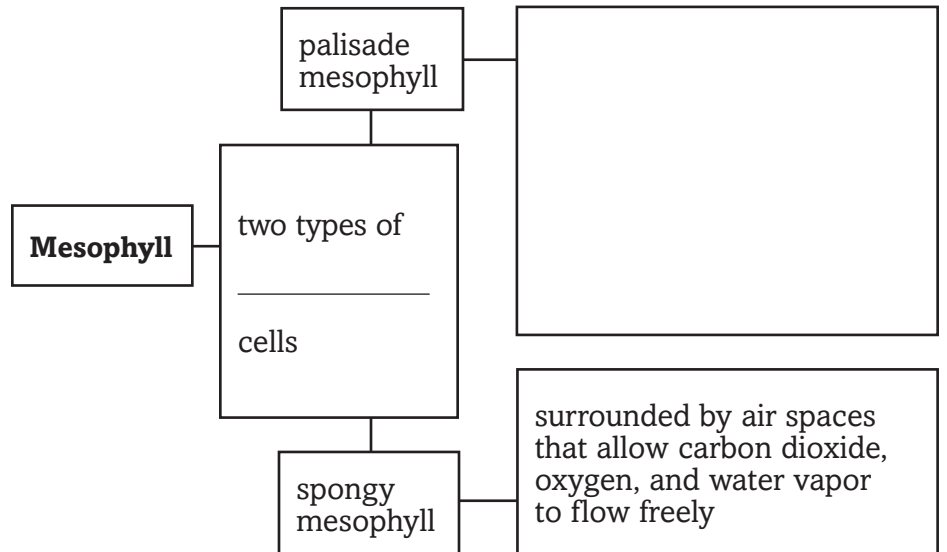
I found this information
on page _____.

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

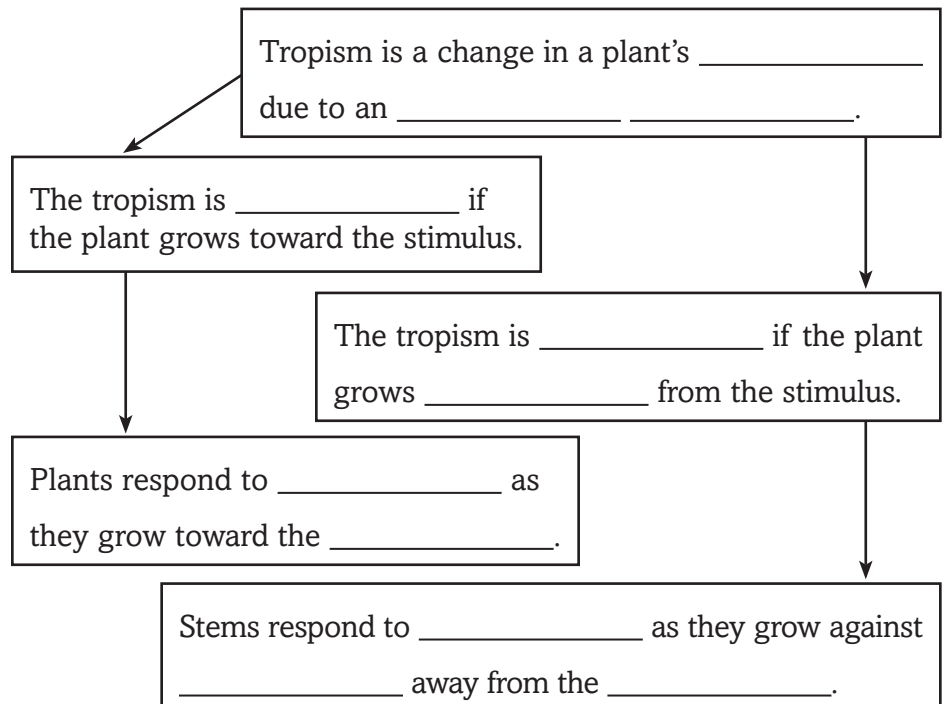
Compare four plant hormones by completing the table below.

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)

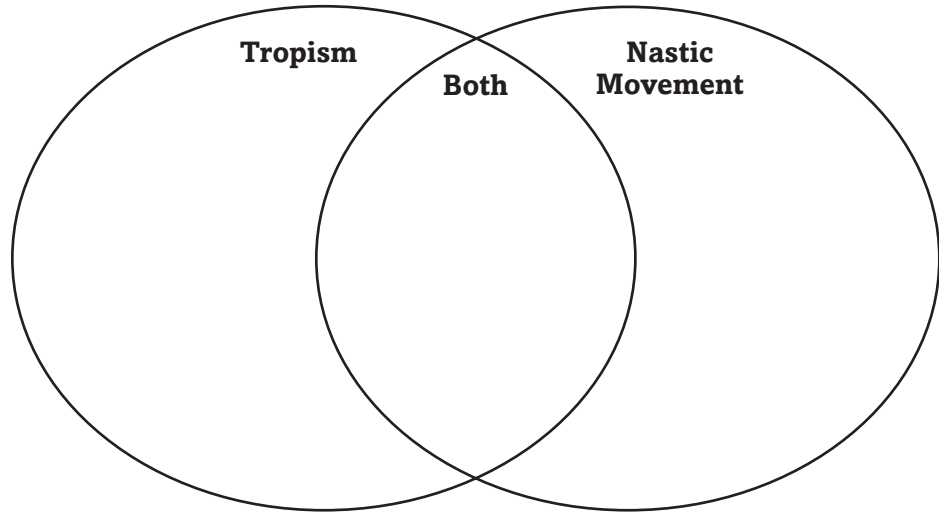
Main Idea

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.

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.

Reproduction in Plants

Section 23.1 Introduction to Plant Reproduction

Main Idea _____

Details _____

Review Vocabulary

flagellated

New Vocabulary

chemotaxis

heterosporous

megaspore

micropyle

microspore

prothallus

protonema

vegetative reproduction

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

1. _____

2. _____

Use your book or dictionary to define flagellated.

Use your book or dictionary to define each term.

236

Reproduction in Plants

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Section 23.1 Introduction to Plant Reproduction (continued)

Main Idea

Vegetative Reproduction

I found this information
on page _____.

Details

List three examples of vegetative reproduction.

1. _____

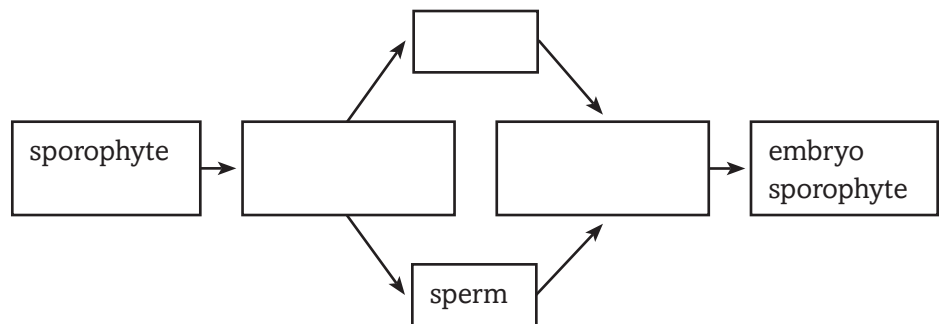
2. _____

3. _____

Alternation of Generations

I found this information
on page _____.

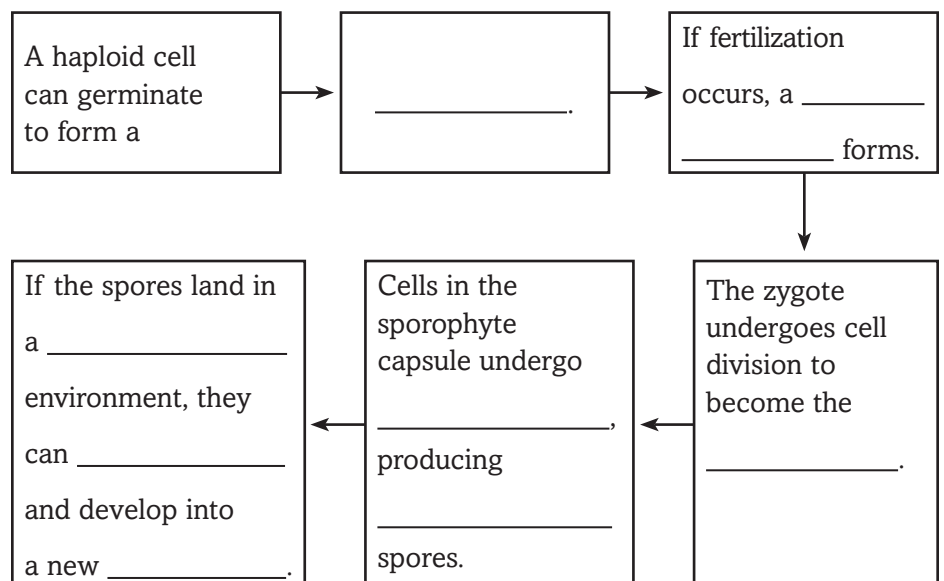
Summarize the alternation of generations in the flowchart below.
Use the words eggs, diploid zygote, and haploid gametophyte.



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 _____

Details _____

**Fern
Reproduction
and Life Cycle**

I found this information
on page _____.

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.

day-neutral plant

intermediate-day plant

long-day plant

petal

pistil

sepal

short-day plant

stamen

Type of Flowering Plant (4 terms)	Part of Flowering Plant (4 terms)

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)

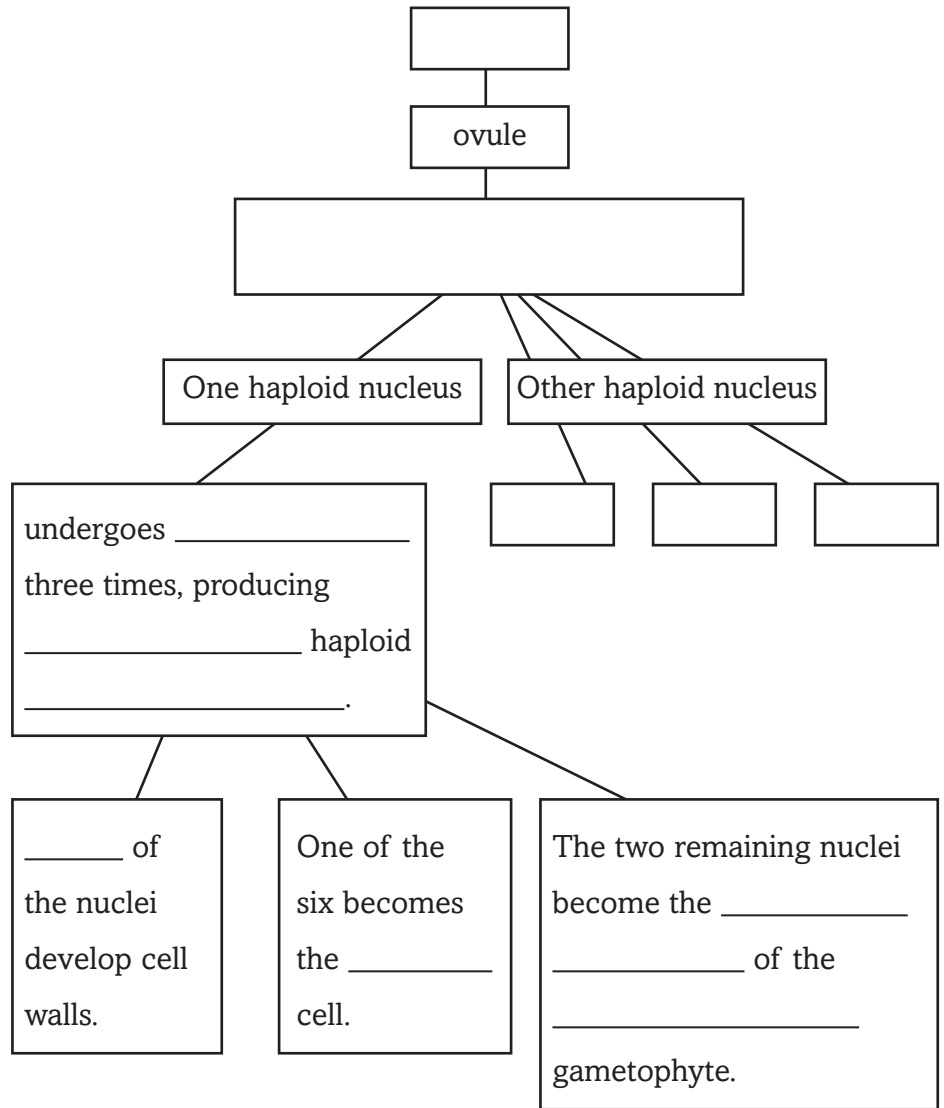
Main Idea

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.

	Structure	Formation	Benefit to Plant
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.

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

bilateral symmetry

cephalization

coelom

deuterostome

dorsal

posterior

protostome

pseudocoelom

radial symmetry

symmetry

ventral

anterior	posterior	dorsal	ventral
cephalization			

symmetry	
bilateral	radial

protostome	deuterostome
------------	--------------

coelom	acoelomate	pseudocoelom
--------	------------	--------------

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 _____.

Symmetry

I found this information
on page _____.

Model an evolutionary tree, and show what the trunk, branches, and branching points represent.

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 _____.

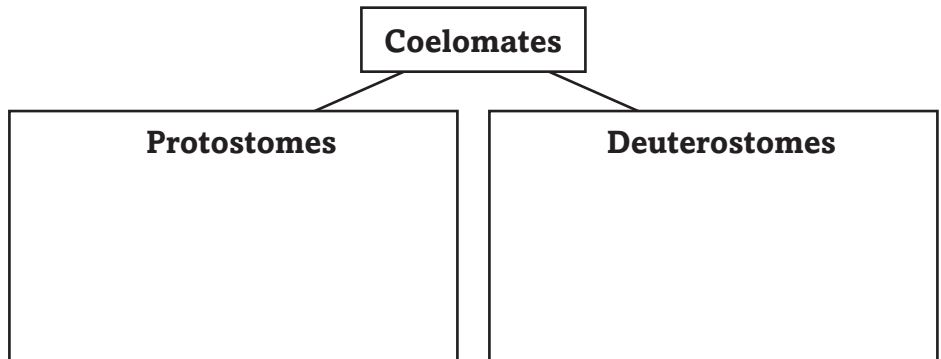
Model each type of body cavity labeled below.

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.

- _____
- _____

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

Review Vocabulary

diploid

New Vocabulary

cnidocyte

filter feeder

gastrovascular cavity

medusa

nematocyst

nerve net

polyp

sessile

Academic Vocabulary

survive

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

1. _____

2. _____

Use your book or dictionary to define diploid.

Use your book or dictionary to define each term.

Define survive to show its scientific meaning.

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.

	Polyp	Medusa
Body shape		
Position of mouth		
Position of tentacles		

Model the complete life cycle of a jellyfish.

SUMMARIZE

Compare cnidarians and sponges.

Worms and Mollusks

Section 25.1 Flatworms

Main Idea _____	Details _____
	<p>Scan the illustrations and read the captions in Section 1 of the chapter. List three characteristics of flatworms that you discovered.</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p>
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 _____

Details _____

Diversity of Flatworms

I found this information on page _____.

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.

Locations: 1. 2.	← Cilia →	Uses: 1. 2.
-----------------------------------	-----------	------------------------------

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 _____

Review Vocabulary

herbivore

New Vocabulary

closed circulatory system

gills

mantle

nephridia

open circulatory system

radula

siphon

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

1. _____

2. _____

Use your book or dictionary to define herbivore.

Use your book or dictionary to define each term.

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

262

Worms and Mollusks

Section 25.3 Mollusks (continued)

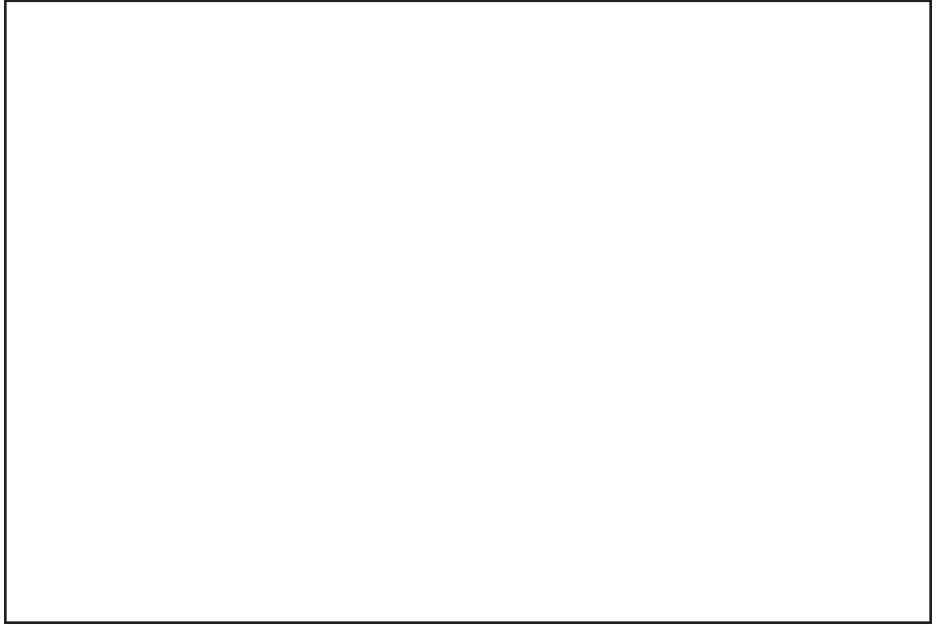
Main Idea _____

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:

Section 25.3 Mollusks (continued)

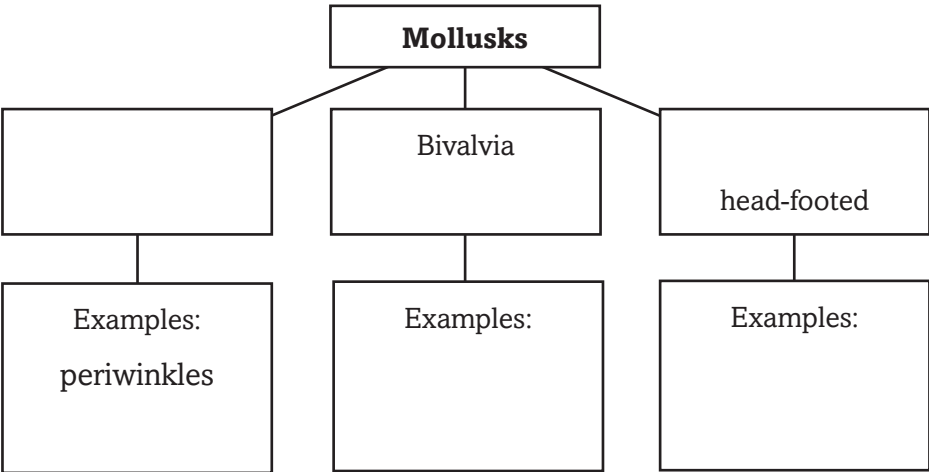
Main Idea _____

Details _____

Diversity of
Mollusks,
Ecology of
Mollusks

I found this information
on page _____.

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.

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

protostome

Use your book or dictionary to define protostome.

New Vocabulary

clitellum

Use your book or dictionary to define each term.

crop

gizzard

setae

Academic Vocabulary

convert

Define convert to show its scientific meaning.

Section 25.4 Segmented Worms (continued)

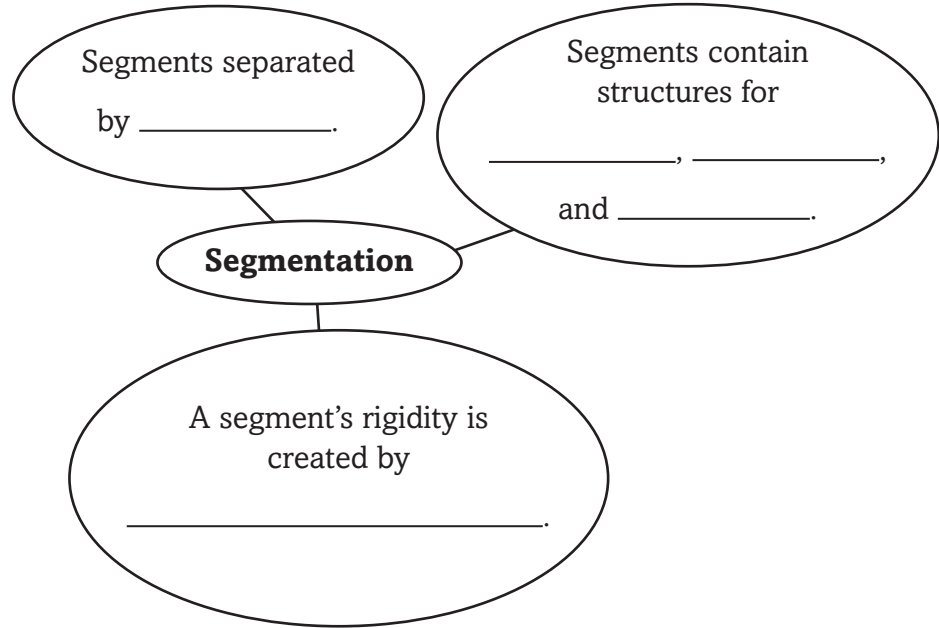
Main Idea _____

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.

Tie It Together

SUMMARIZE

Create a mini poster that highlights the diversity of worms.

Arthropods

Section 26.1 Arthropod Characteristics

Main Idea _____

Details _____

Review Vocabulary

ganglion

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

1. _____

2. _____

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

transport

Define transport to show its scientific meaning.

270 Arthropods

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Section 26.1 Arthropod Characteristics (continued)

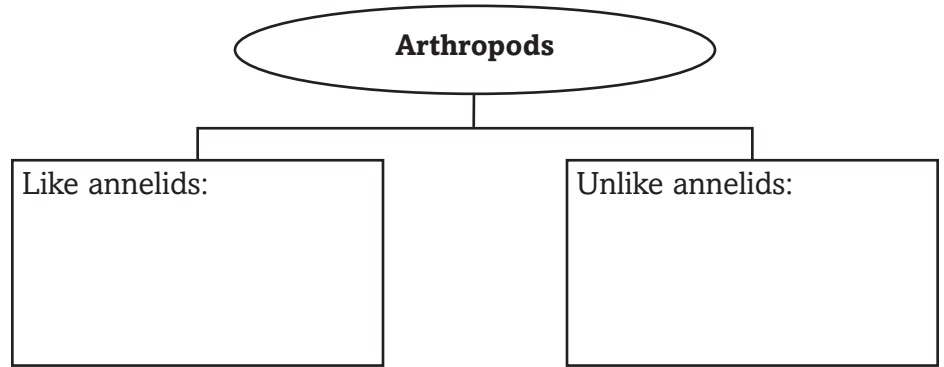
Main Idea

Arthropod Features

I found this information on page _____.

Details

Compare *arthropods to annelids by listing characteristics below.*



Identify *the structures attached to or contained in the main body regions of arthropods.*

Anterior:	Middle:	Posterior:
-----------	---------	------------

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.*

<div>Structure: _____</div> <div>Habitat: _____</div>	<div>Structure: _____</div> <div>Habitat: _____</div>	<div>Structure: _____</div> <div>Habitat: _____</div>
---	---	---

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)

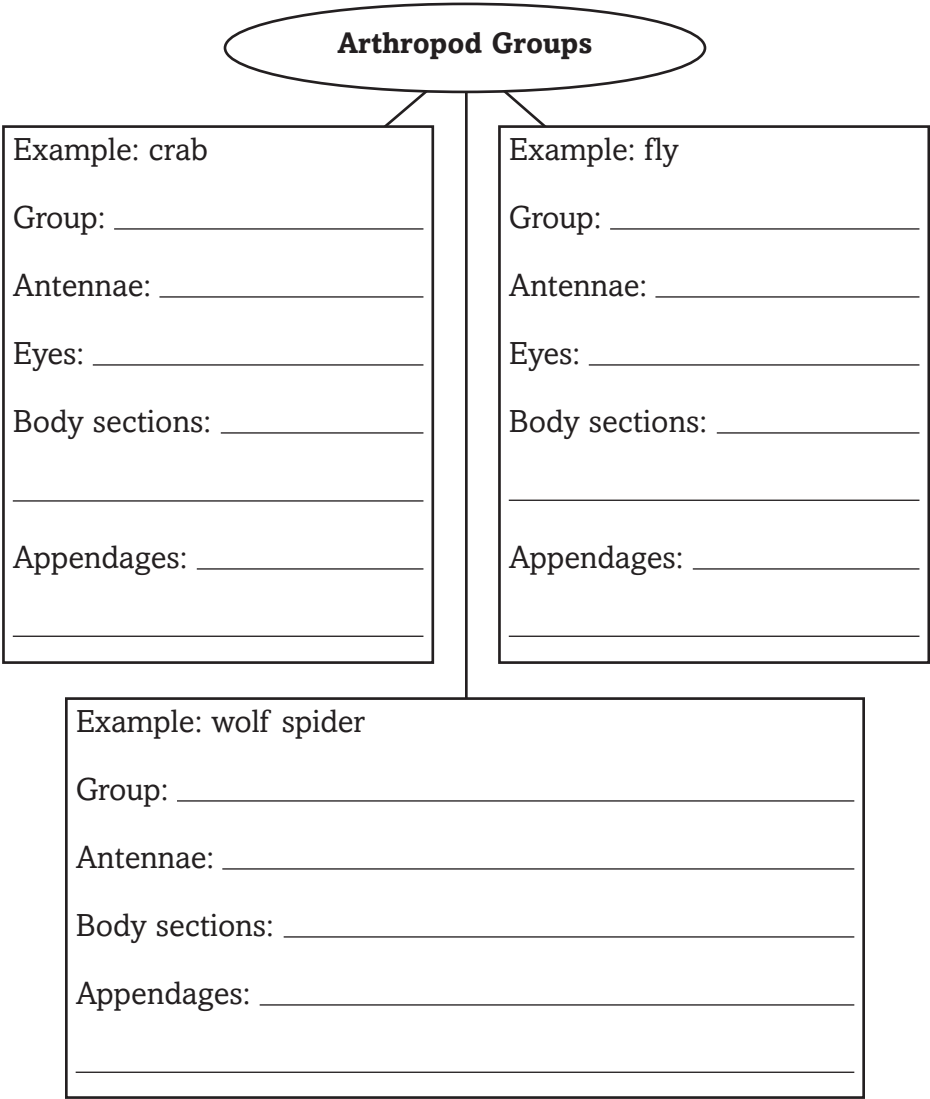
Main Idea _____

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 _____

Spiders and Their Relatives

I found this information on page _____.

Details _____

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

subphylum

Use your book or dictionary to define subphylum.

New Vocabulary

caste

metamorphosis

nymph

pupa

Section 26.3 Insects and their Relatives (continued)

Main Idea

Diversity of Insects

I found this information on page _____.

External Features

I found this information on page _____.

Insect Adaptations

I found this information on page _____.

Details

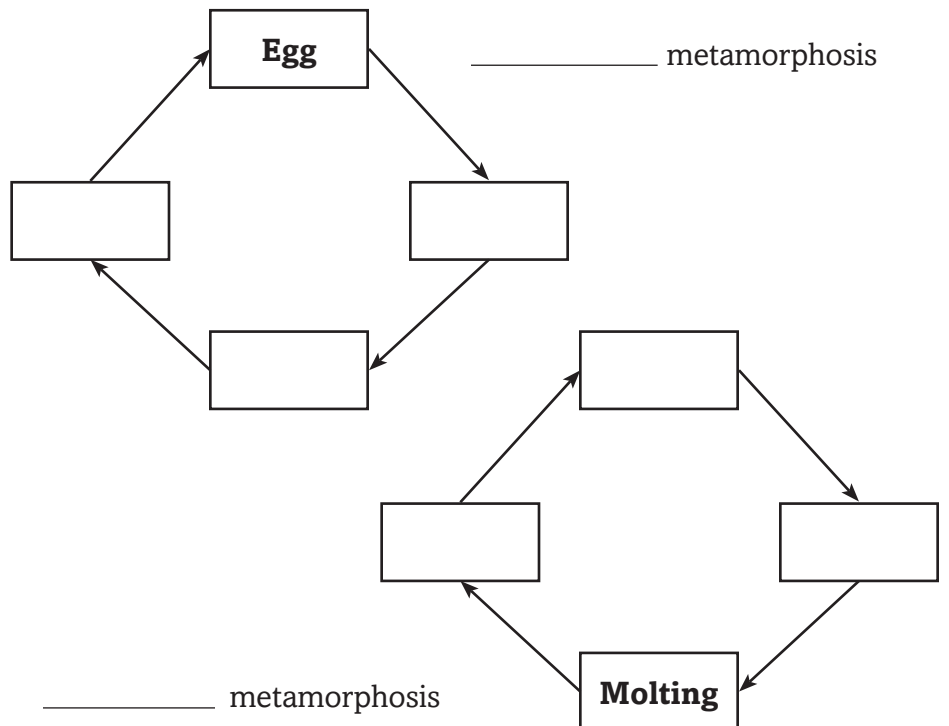
Conclude *how insects can live in many habitats.*

- _____
- _____
- _____
- _____

Model *a cricket and label its external features.*



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 _____

Details _____

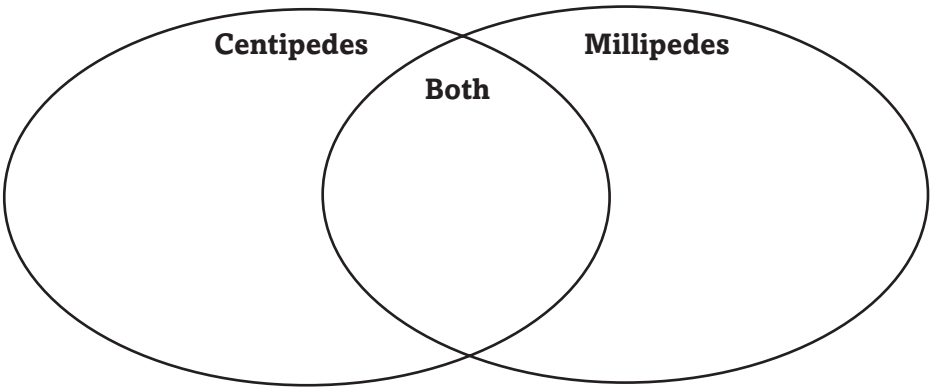
I found this information
on page _____.

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.

SUMMARIZE

Compare and contrast insect features to other arthropod groups.

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">• A sea star can make its stomach come out of its mouth.	
	<ul style="list-style-type: none">• Many echinoderms can regrow lost body parts.	
	<ul style="list-style-type: none">• A lancelet's body organs are visible through its skin.	
	<ul style="list-style-type: none">• A tunicate is called a sea squirt because it is the smallest creature in the sea.	

Science Journal

Write what you know or stories you have heard about sea stars, sea urchins, and other spiny sea creatures.

Echinoderms and Invertebrate Chordates

Section 27.1 Echinoderm Characteristics

Main Idea

Details

Review Vocabulary

endoskeleton

New Vocabulary

ampulla

madreporite

pedicellaria

tube foot

water-vascular system

Academic Vocabulary

aid

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

1. _____

2. _____

3. _____

Use your book or dictionary to define endoskeleton.

Use your book or dictionary to define each term.

Define aid to show its scientific meaning.

Section 27.1 Echinoderm Characteristics (continued)

Main Idea

Echinoderms Are Deuterostomes

I found this information on page _____.

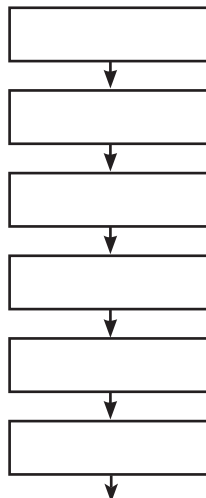
Body Structure

I found this information on page _____.

Details

Analyze the importance of deuterostome development.

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.

Echinoderm	Movement
	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 _____

Details _____

Echinoderm Diversity

I found this information on page _____.

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 _____
	<p>Scan the illustrations and read the captions in Section 2. Write two facts you discovered about invertebrate chordates.</p> <p>1. _____</p> <p>2. _____</p>
Review Vocabulary <i>deuterostome</i>	<p>Use your book or dictionary to define deuterostome.</p> <p>_____</p> <p>_____</p>
New Vocabulary <i>chordate</i>	<p>Use your book or dictionary to define each term.</p> <p>_____</p> <p>_____</p> <p>_____</p>
<i>dorsal tubular nerve cord</i>	<p>_____</p> <p>_____</p>
<i>invertebrate chordate</i>	<p>_____</p> <p>_____</p> <p>_____</p>
<i>notochord</i>	<p>_____</p> <p>_____</p>
<i>pharyngeal pouch</i>	<p>_____</p> <p>_____</p>
<i>postanal tail</i>	<p>_____</p> <p>_____</p>

Section 27.2 Invertebrate Chordates (continued)

Main Idea _____

Details _____

Invertebrate
Chordate
Features

I found this information
on page _____.

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.*

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?

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.

<div>Sea Star:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>	<div>Brittle Star:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>
<div>Sea Urchin:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>	<div>Sand Dollar:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>
<div>Sea Lily:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>	<div>Feather Star:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>
<div>Sea Cucumber:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>	<div>Lancelet:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>
<div>Tunicate:</div> <div><div>•</div><div></div><div></div><div></div><div></div><div>•</div><div></div><div></div><div></div><div></div></div>	

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.

Fishes and Amphibians

Section 28.1 Fishes

Main Idea _____	Details _____
	<p>Skim Section 1 of the chapter. Write two questions that come to mind from reading the headings and the illustration captions.</p> <p>1. _____</p> <p>2. _____</p>
<div>Review Vocabulary</div> <p>notochord</p>	<p>Use your book or dictionary to define notochord.</p> <p>_____</p>
<div>New Vocabulary</div>	<p>Write the correct term in the left column for each definition below.</p> <p>_____ receptors that enable fishes to detect movement in the water and help keep them upright and balanced</p> <p>_____ external fertilization in which male and female fishes release their gametes near each other in the water</p> <p>_____ chamber of the heart that pumps blood to the gills</p> <p>_____ in vertebrates, group of cells that develop from the nerve cord and contribute to the development of other important features</p> <p>_____ chamber of the heart that receives blood from the body</p> <p>_____ small, flat, platelike structure near the skin surface of most fishes</p> <p>_____ gas-filled space in bony fishes that allows a fish to control its depth</p> <p>_____ tough, flexible material making up the skeletons or parts of skeletons of vertebrates</p> <p>_____ movable flap that covers the gills and protects them</p> <p>_____ filtering unit within the kidney that helps maintain the salt and water balance of the body and remove cellular waste</p>
<div>Academic Vocabulary</div> <p>precision</p> <p>propulsion</p>	<p>Define these terms to show their scientific meaning.</p> <p>_____</p> <p>_____</p>

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
Formation		
Functions		

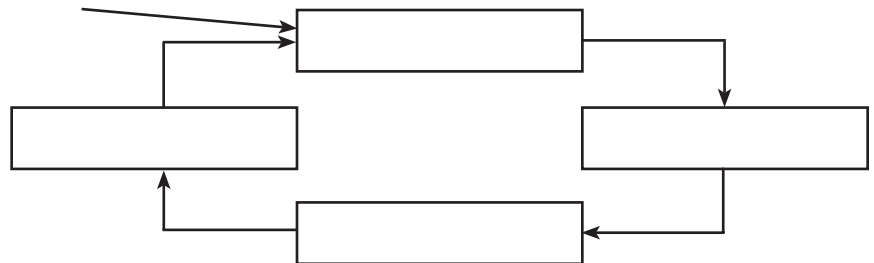
Characteristics of Fishes

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.

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.

New Vocabulary

tetrapod

Use your book or dictionary to define the following term.

Use tetrapod in a sentence describing its possible place in the evolution of fishes.

Section 28.2 Diversity of Today’s Fishes (continued)

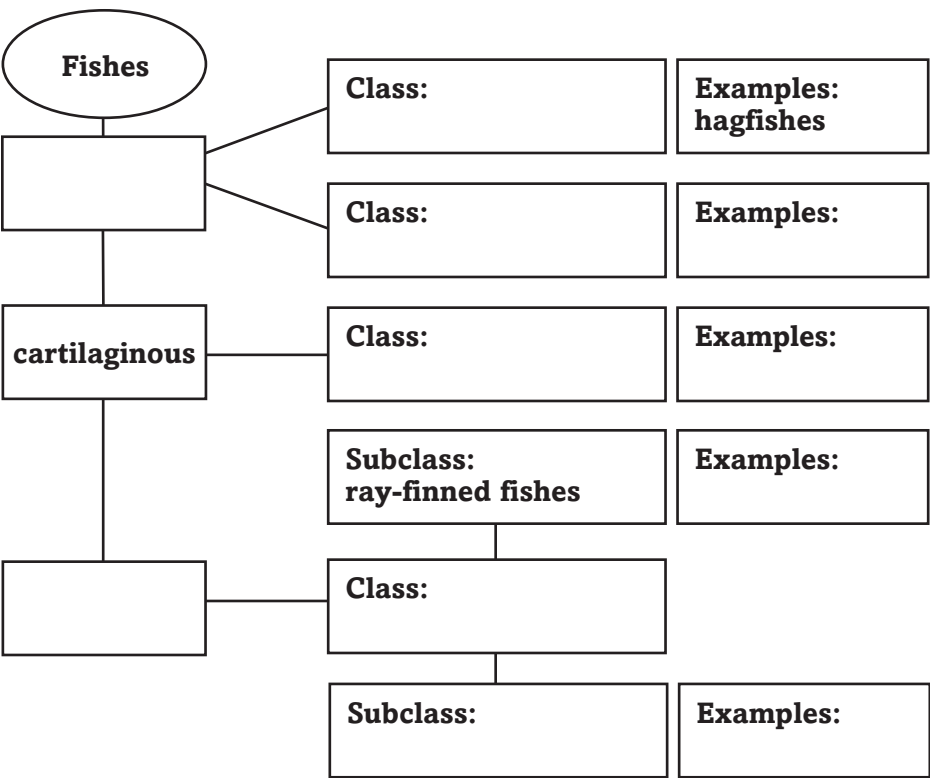
Main Idea _____

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

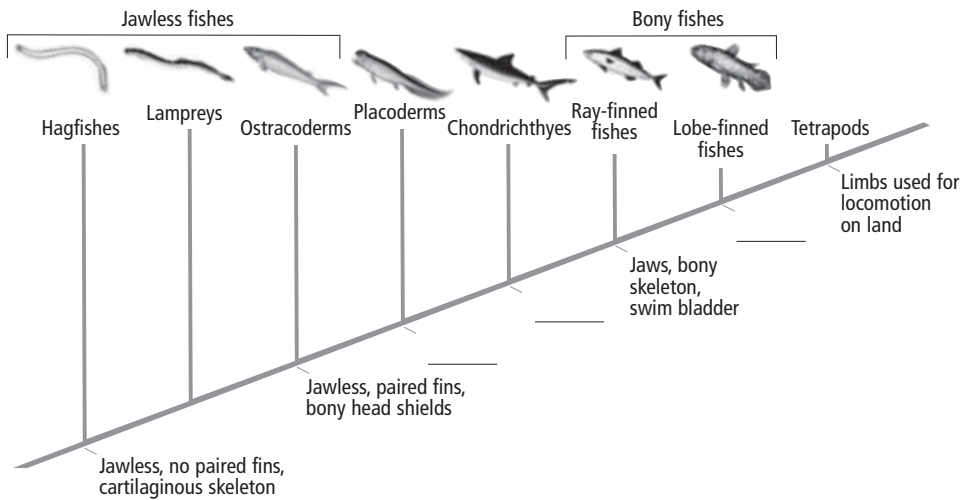
Details

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.

- jaws, bony skeleton, primitive lung
- jaws, paired fins, bony plates covering body
- 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 _____

Review Vocabulary

metamorphosis

Skim Section 3 of the chapter. Name two characteristics of amphibians.

1. _____

2. _____

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 _____.

Identify three adaptations that helped amphibians leave water for life on land.

1. _____
2. _____
3. _____

Characteristics of Amphibians

I found this information on page _____.

Summarize the characteristics of amphibians.

Characteristics of Amphibians
Feeding and digestion:
Excretion:
Respiration:
Circulation:
Brain and senses:
Reproduction:

Amphibian Diversity

I found this information on page _____.

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
	• Snakes flick their tongue to smell odors.	
	• Some scientists hypothesize that a meteorite crashed to Earth, causing extinction of the dinosaurs.	
	• All birds have feathers.	
	• All birds can fly.	

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?

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

embryo

Use your book or dictionary to define embryo.

New Vocabulary

amnion

Use your book or dictionary to define each term.

amniotic egg

carapace

Jacobson's organ

plastron

Academic Vocabulary

interpretation

Define interpretation to show its scientific meaning.

Section 29.1 Reptiles (continued)

Main Idea

Characteristics of Reptiles

I found this information on page _____.

Details

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.

Section 29.1 Reptiles (continued)

Main Idea _____

Details _____

Diversity of Modern Reptiles

I found this information on page _____.

Evolution of Reptiles

I found this information on page _____.

Ecology of Reptiles

I found this information on page _____.

Contrast *characteristics of each order in class Reptilia.*

Squamata examples: key features:	Crocodylia examples: key features:
Testudinata examples: key features:	Sphenodonta examples: key features:

Identify *each animal's ancestors as diapsids, anapsids, or synapsids.*

_____ → birds

_____ → lizards

_____ → mammals

_____ → turtles

Analyze *how loss of a reptile species could upset the balance of an ecosystem.*

SUMMARIZE

Evaluate whether a meteorite crashing to Earth could have doomed the dinosaurs. Discuss the catastrophic effects of such a crash and adaptations needed to survive the event.

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.

Review Vocabulary

Use your book or dictionary to define terrestrial.

terrestrial

New Vocabulary

Use your book or dictionary to define each term.

air sac

contour feather

down feather

endotherm

feather

incubate

preen gland

sternum

Section 29.2 Birds (continued)

Main Idea _____

Details _____

Characteristics
of Birds

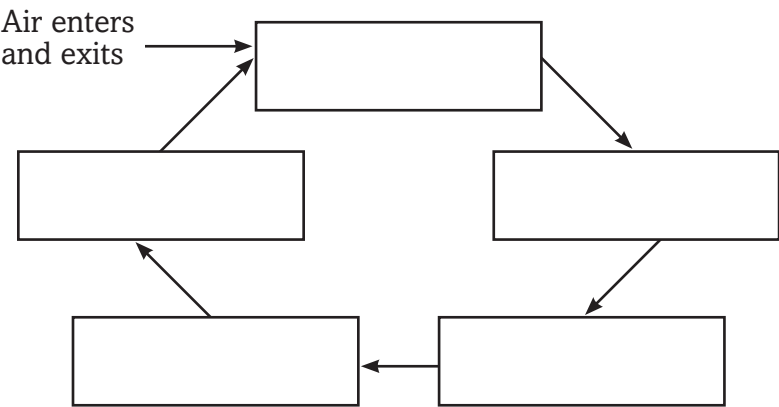
I found this information
on page _____.

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
 - posterior air sacs
- anterior air sacs
 - trachea



Analyze how eye position reflects a bird's life habits.

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.

Ecology of Birds

I found this information on page _____.

Analyze how birds are key to the survival of many plants.

SUMMARIZE

Compare and contrast ectothermy and endothermy.

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
	• If an animal has hair, it is a mammal.	
	• Mammals produce their body heat internally.	
	• A duck-billed platypus is not a true mammal because it lays eggs.	
	• The first mammals probably evolved from reptiles.	

Science Journal

Mammals are one of the most successful groups of animals on Earth. Think about a specific mammal and some of its characteristics. Write about how you think some of these characteristics help the mammal to survive and be successful.

Mammals

Section 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

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

Section 30.1 Mammalian Characteristics (continued)

Main Idea _____

Details _____

Hair and Mammary Glands

I found this information on page _____.

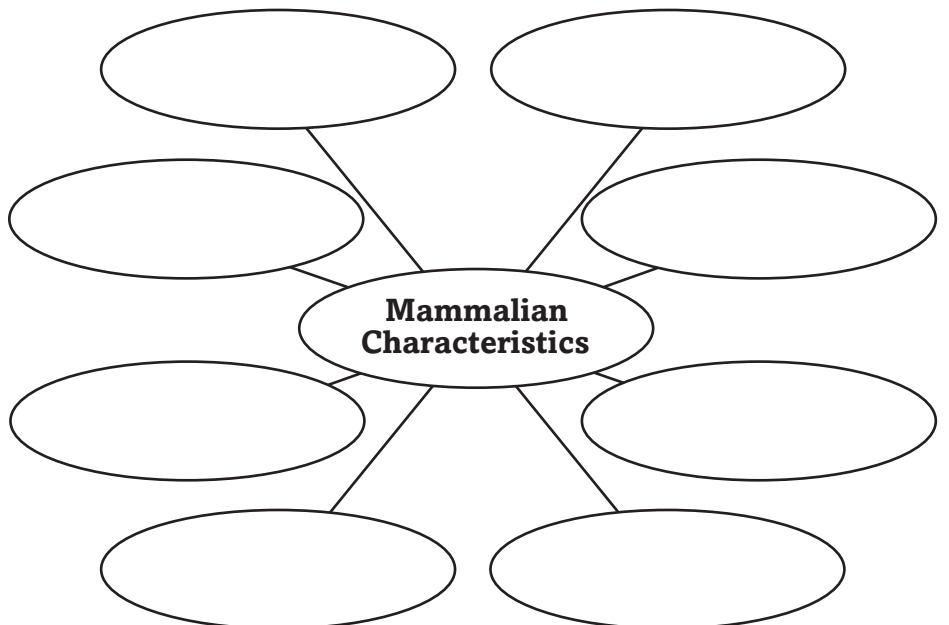
Analyze the importance of hair by identifying the six functions of hair and giving an example of each function.

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 _____

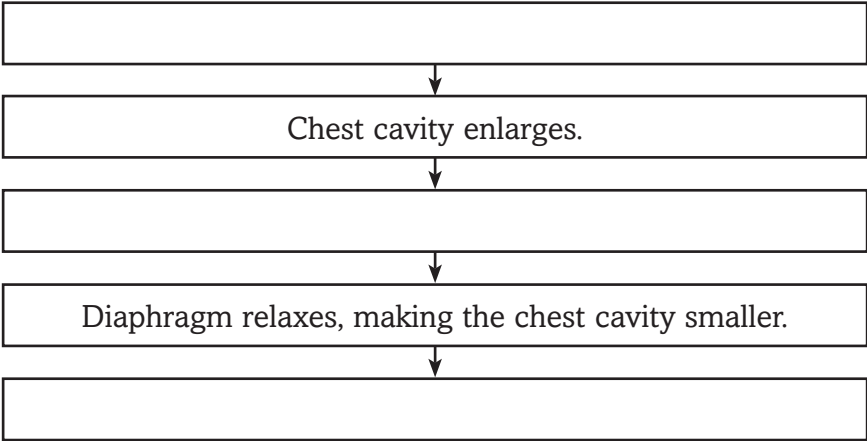
Details _____

I found this information
on page _____.

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)

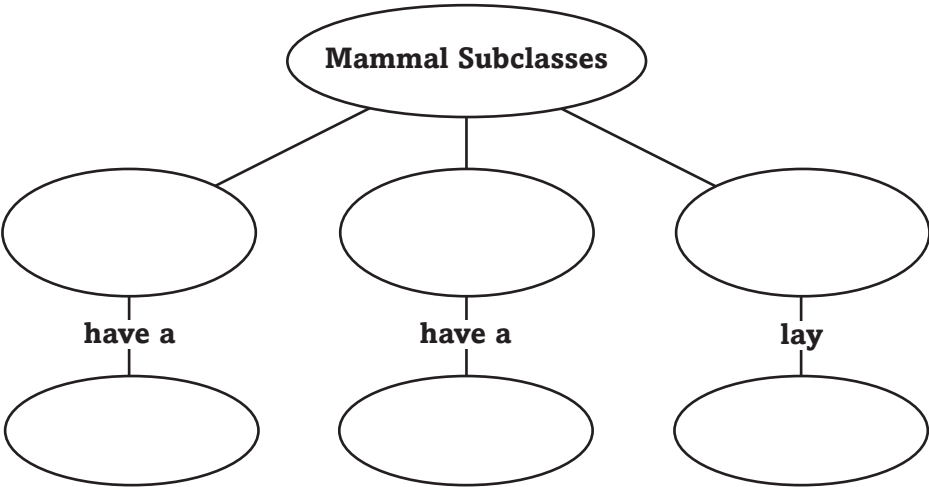
Main Idea _____

Details _____

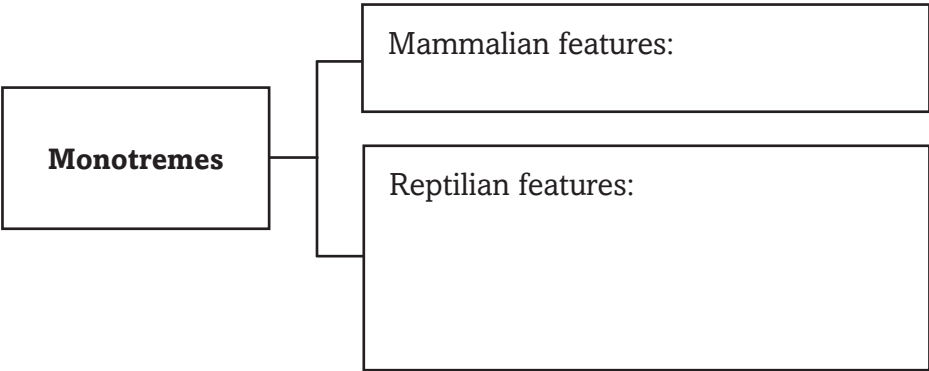
Mammal
Classification

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.

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.

Animal Behavior

Section 31.1 Basic Behaviors

Main Idea

Details

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

Any way that an animal responds to a stimulus is _____.

Some behaviors, such as _____, are genetically based.

classical conditioning

An animal that carries out a specific set of actions, in the same order,

cognitive behavior

in response to a stimulus is exhibiting a _____.

fixed action pattern

Behavior that results from an interaction between genetically based

behaviors and past experiences is _____. An

example is _____, in which the response decreases after

habituation

repeated exposure to a stimulus that has no positive or

imprinting

negative effects. An animal can learn to associate two different

innate behavior

kinds of stimuli through _____. Learning through

learned behavior

_____ involves rewards and punishments. One

operant conditioning

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)

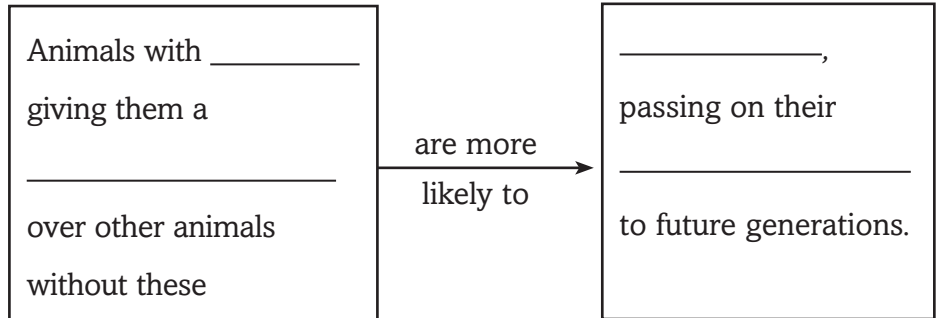
Main Idea _____

Details _____

Behavior

I found this information
on page _____.

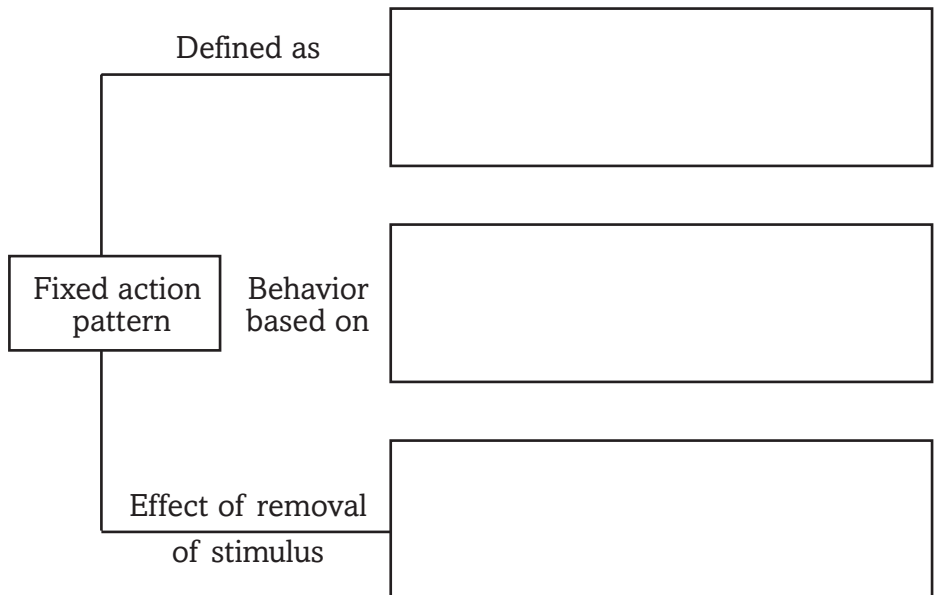
Analyze the relationship of behavior and natural selection by completing the graphic organizer.



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.

Section 31.1 Basic Behaviors (continued)

Main Idea _____

Details _____

I found this information
on page _____.

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.

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

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)

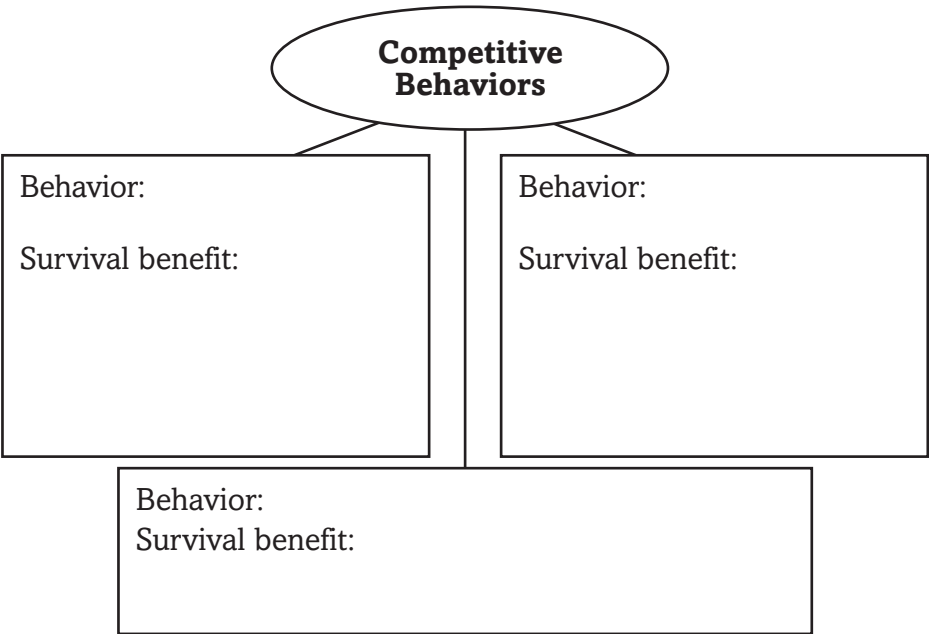
Main Idea _____

Details _____

Types of Behaviors

I found this information on page _____.

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.

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.

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.

Advantages and Disadvantages

I found this information on page _____.

Organize the costs and benefits for survival and reproductive success of the behaviors listed below.

Behavior	Benefit	Cost
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.

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">• Skin is an organ.	
	<ul style="list-style-type: none">• Use of a tanning bed will not put you at risk for skin cancer.	
	<ul style="list-style-type: none">• All joints of the skeleton allow the bones to move.	
	<ul style="list-style-type: none">• Some muscles in your body are not under your conscious control.	

Science Journal

Think about a sport you or someone you know plays. Describe how your skin, skeleton, and muscles help you play that sport.

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

integument

Use your book or dictionary to define 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

function

Define function, then write a sentence to show its scientific meaning.

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

322 Integumentary, Skeletal, and Muscular Systems

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
- has inner and outer portions
- contains dead cells that shed
- contains keratin
- contains melanin
- contains muscle fibers, nerve cells, sweat glands, and oil glands
- outer layer of skin
- inner, thicker portion of skin

Main Layers of Skin	
Dermis	Epidermis

Summarize the diagram of the integumentary system in your book.

Section 32.1 The Integumentary System (continued)

Main Idea _____ Details _____

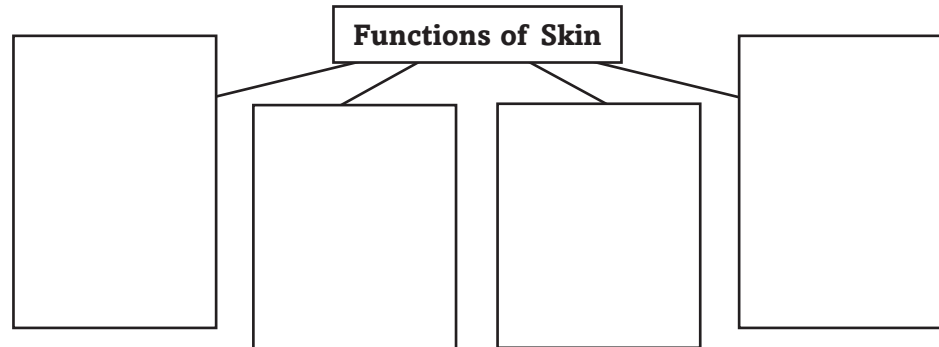
Functions of the Integumentary System

I found this information on page _____.

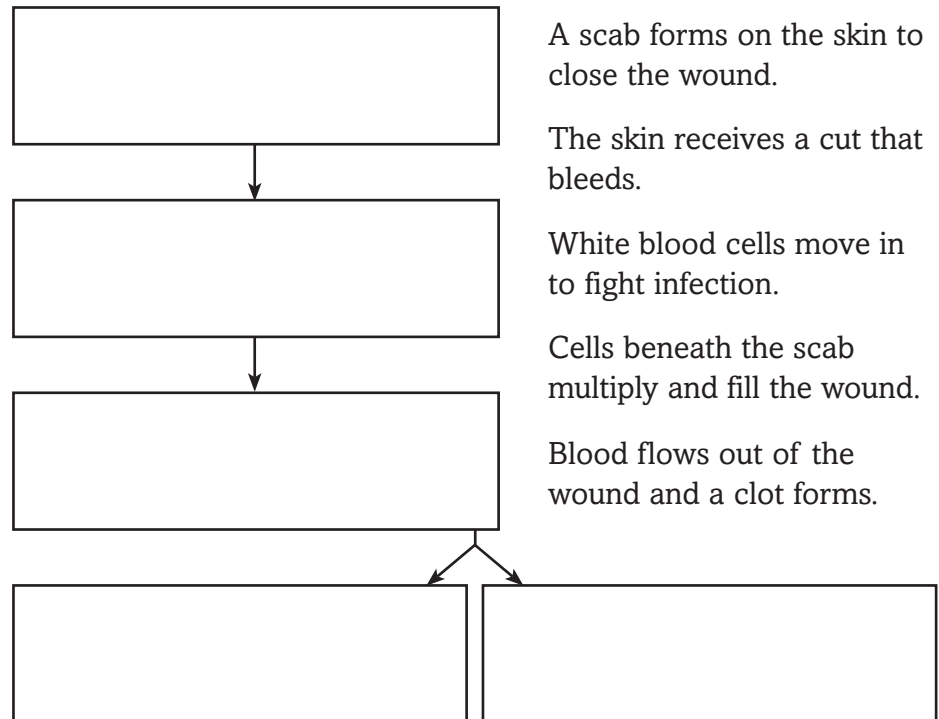
Damage to the Skin

I found this information on page _____.

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.

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

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

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.*

1. Endorphins flood the area of injury.	→	2.	→	3.
4.	→	5.	→	6.

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 _____

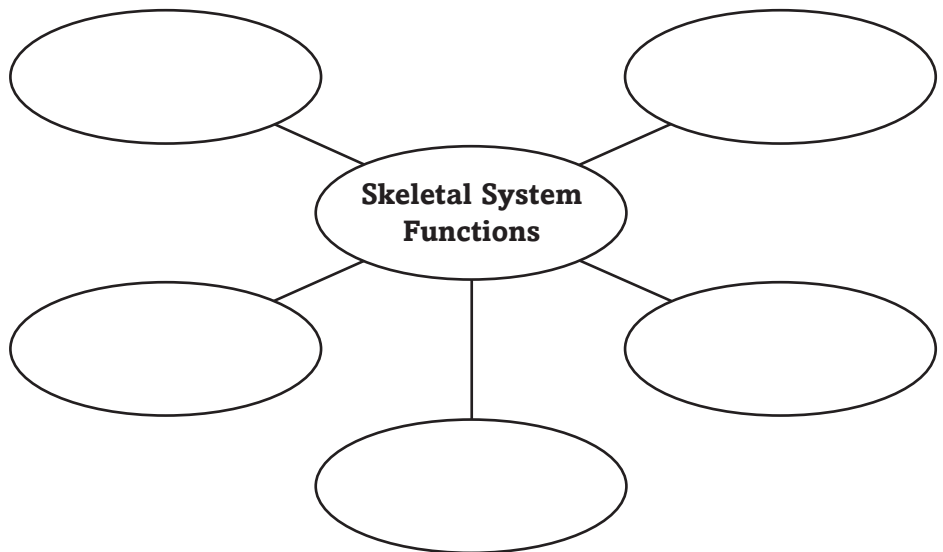
hip joint _____ wrist joint _____

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.

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

anaerobic

Use your book or dictionary to define anaerobic.

New Vocabulary

actin

Use your book or dictionary to define each term.

cardiac muscle

involuntary muscle

myofibril

myosin

sarcomere

skeletal muscle

smooth muscle

tendon

voluntary muscle

Section 32.3 The Muscular System (continued)

Main Idea _____

Three Types of Muscle

I found this information on page _____.

Details _____

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)

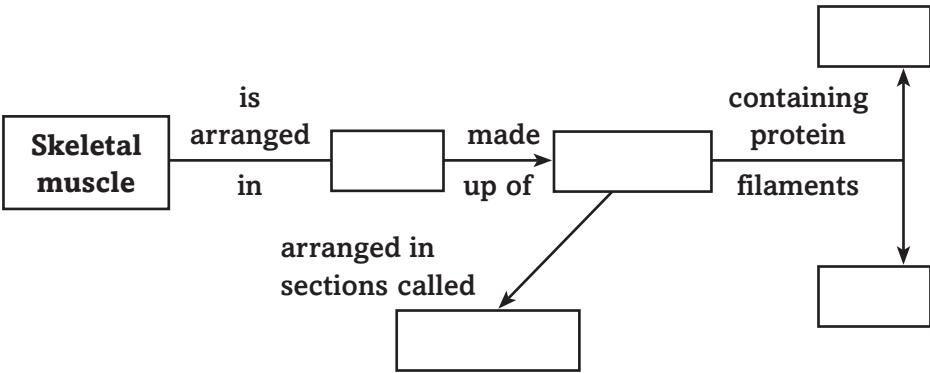
Main Idea _____

Details _____

Skeletal Muscle Contraction

I found this information on page _____.

Analyze muscle tissue by completing the graphic organizer.



Summarize the sliding filament theory.

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.

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.

Nervous System

Section 33.1 Structure of the Nervous System

Main Idea _____

Details _____

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)

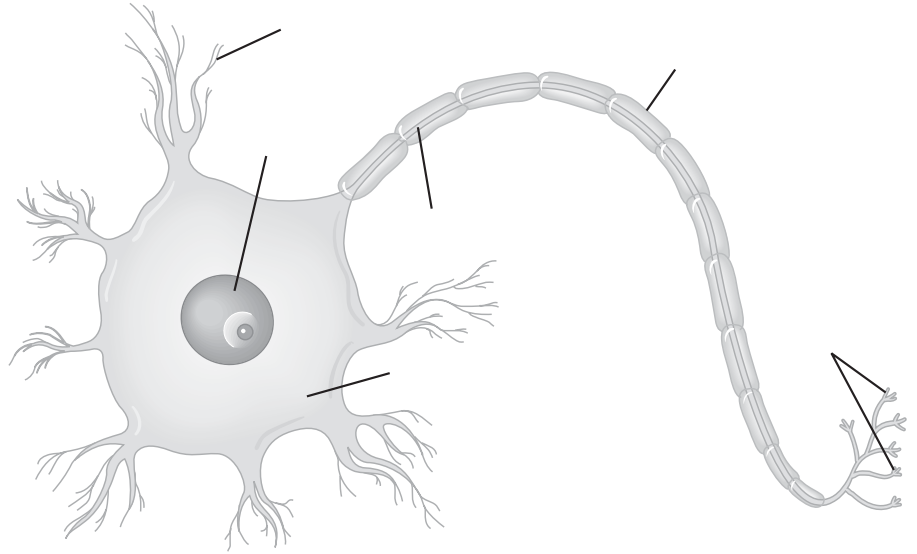
Main Idea _____

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.

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 _____

Details _____

I found this information
on page _____.

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.

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.*

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

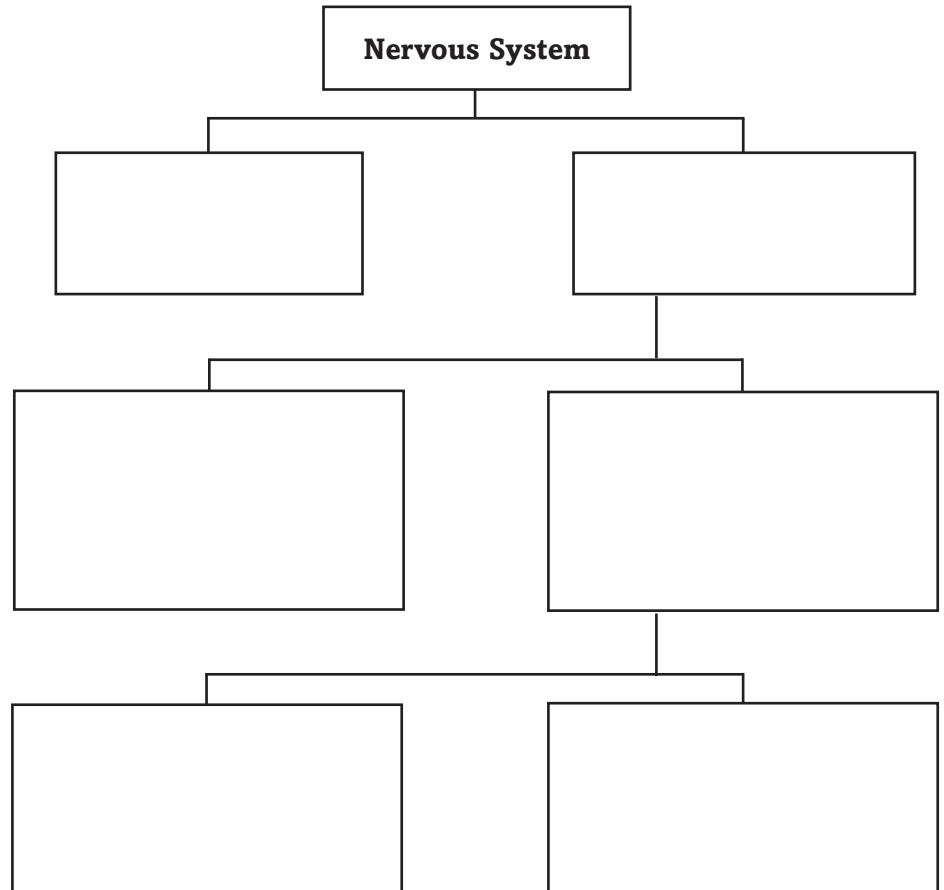
The Peripheral Nervous System

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.

Section 33.3 The Senses (continued)

Main Idea

Taste and Smell

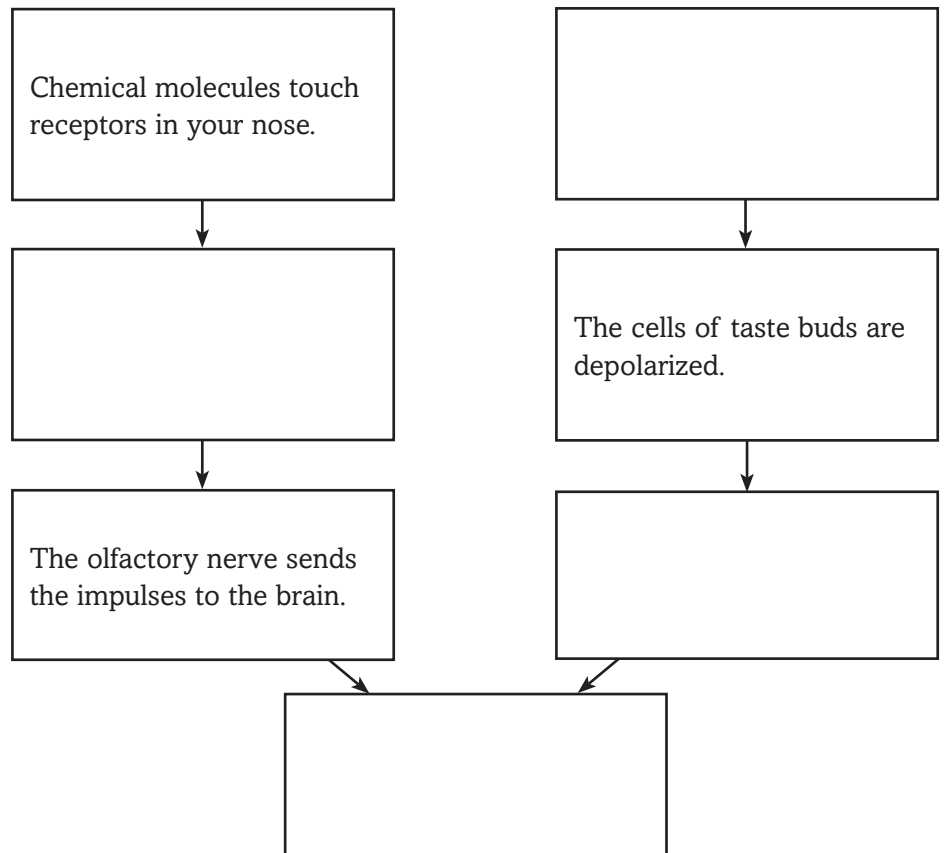
I found this information
on page _____.

Details

Identify the sensory receptors in the mouth and nasal cavity.

Sensory
receptors

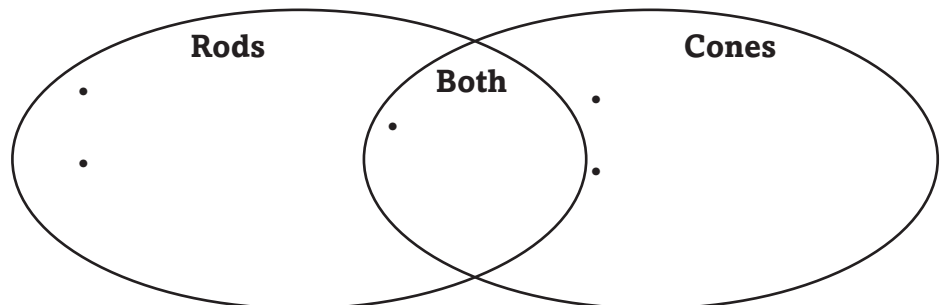
Compare the steps in smelling and tasting. Write the steps for smelling on the left. Write the steps for tasting on the right. Some steps have been completed for you.



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 _____

Details _____

**Hearing and
Balance and
Touch**

*I found this information
on page _____.*

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.

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

New Vocabulary

Use your book or dictionary to define the following terms.

addiction

depressant

dopamine

drug

stimulant

tolerance

Section 33.4 Effects of Drugs (continued)

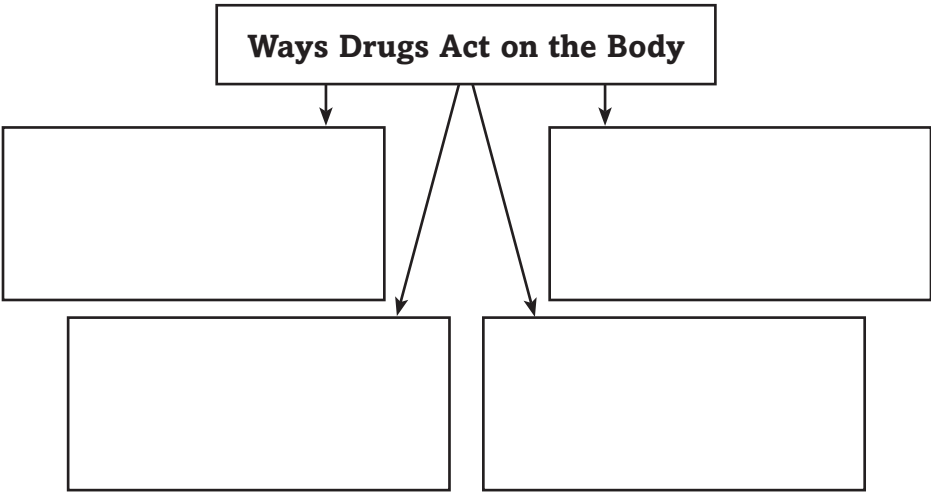
Main Idea _____

Details _____

How Drugs Work

I found this information on page _____.

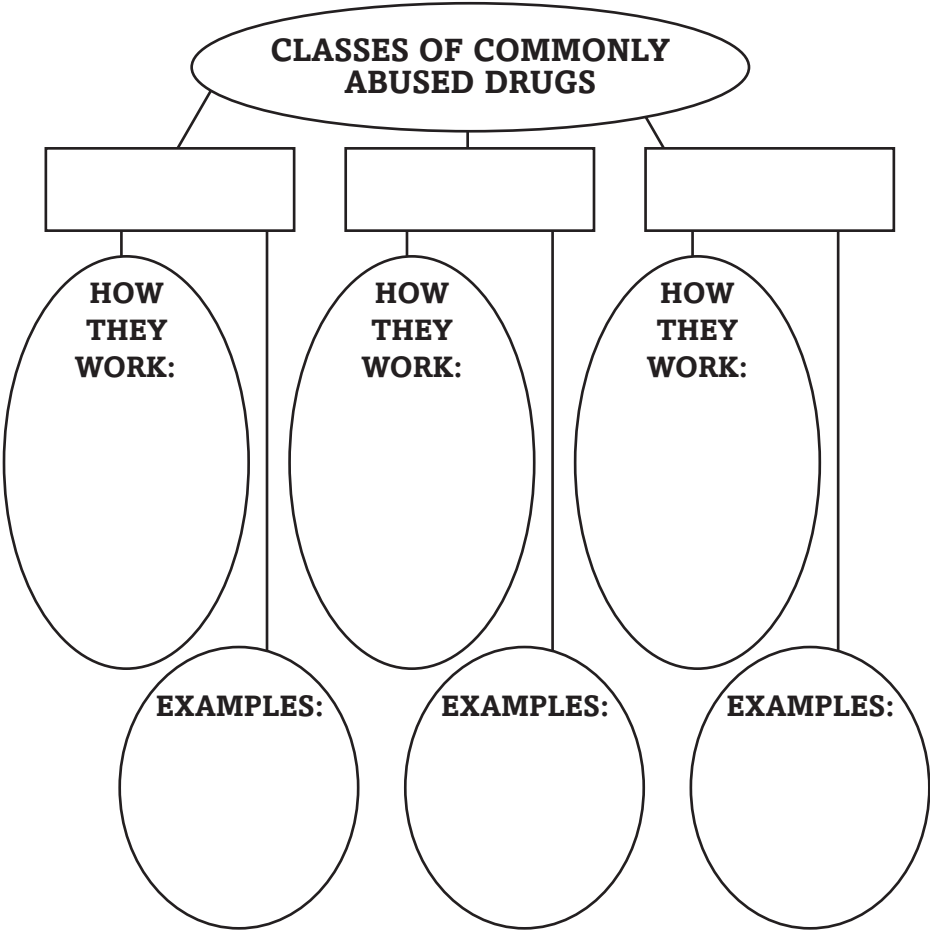
Summarize *four ways drugs can act on the body.*



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">• Your pulse rate is the number of times your heart beats each minute.	
	<ul style="list-style-type: none">• If you need a blood transfusion, the donated blood must be the same type as yours.	
	<ul style="list-style-type: none">• Breathing and respiration are two names for the same process.	
	<ul style="list-style-type: none">• The components of the excretory system are the lungs, skin, and kidneys.	

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.

Circulatory, Respiratory, and Excretory Systems

Section 34.1 Circulatory System

Main Idea	Details
	<p>Scan Section 1 of the chapter. Identify and list the functions of blood.</p> <ul style="list-style-type: none">• _____• _____• _____• _____• _____• _____
<p>Review Vocabulary</p> <p><i>muscle contraction</i></p>	<p>Use your book or dictionary to define muscle contraction.</p> <p>_____</p>
<p>New Vocabulary</p> <p><i>arteries</i></p> <p><i>atherosclerosis</i></p> <p><i>capillaries</i></p> <p><i>heart</i></p> <p><i>pacemaker</i></p> <p><i>plasma</i></p> <p><i>platelets</i></p> <p><i>red blood cells</i></p> <p><i>valves</i></p> <p><i>veins</i></p> <p><i>white blood cells</i></p>	<p>Use the new vocabulary terms to complete the paragraph below.</p> <p>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 _____.</p>

Section 34.1 Circulatory System (continued)

Main Idea

Functions of the Circulatory System

I found this information on page _____.

Blood Vessels and The Heart

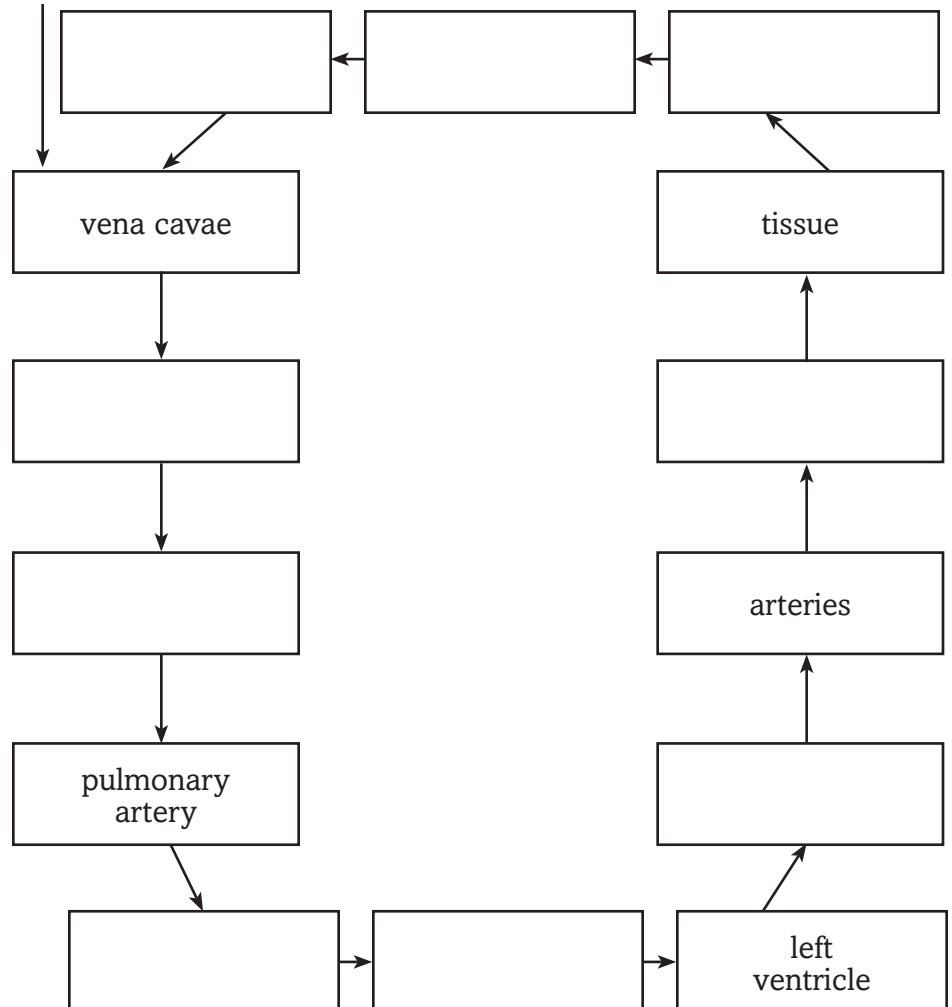
I found this information on page _____.

Details

Analyze how the circulatory system functions as the body's transport system.

Sequence the path blood takes through the human body by completing the flowchart below.

Enters



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
Causes		
Effects		

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 _____.

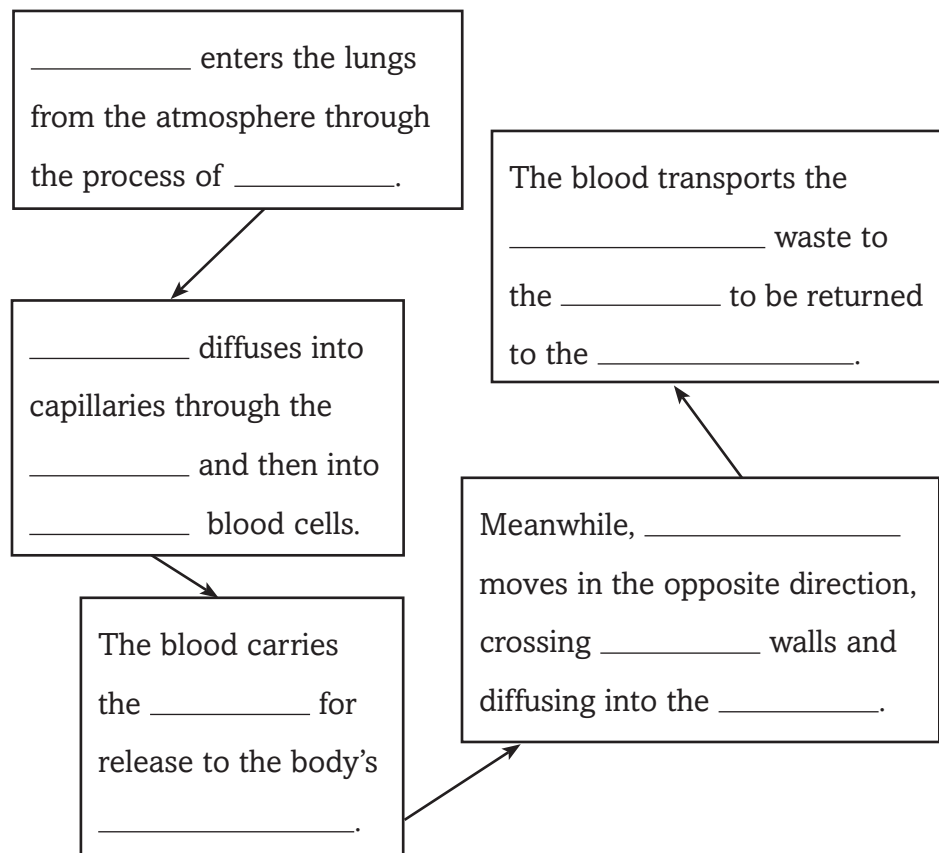
Details _____

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.*



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

Use your book or dictionary to define pH.

pH

New Vocabulary

Use your book or dictionary to define each term.

kidney

urea

Academic Vocabulary

Define inhibit to show its scientific meaning.

inhibit

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

352 Circulatory, Respiratory, and Excretory Systems

Section 34.3 Excretory System (continued)

Main Idea _____

Parts of the Excretory System

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.*

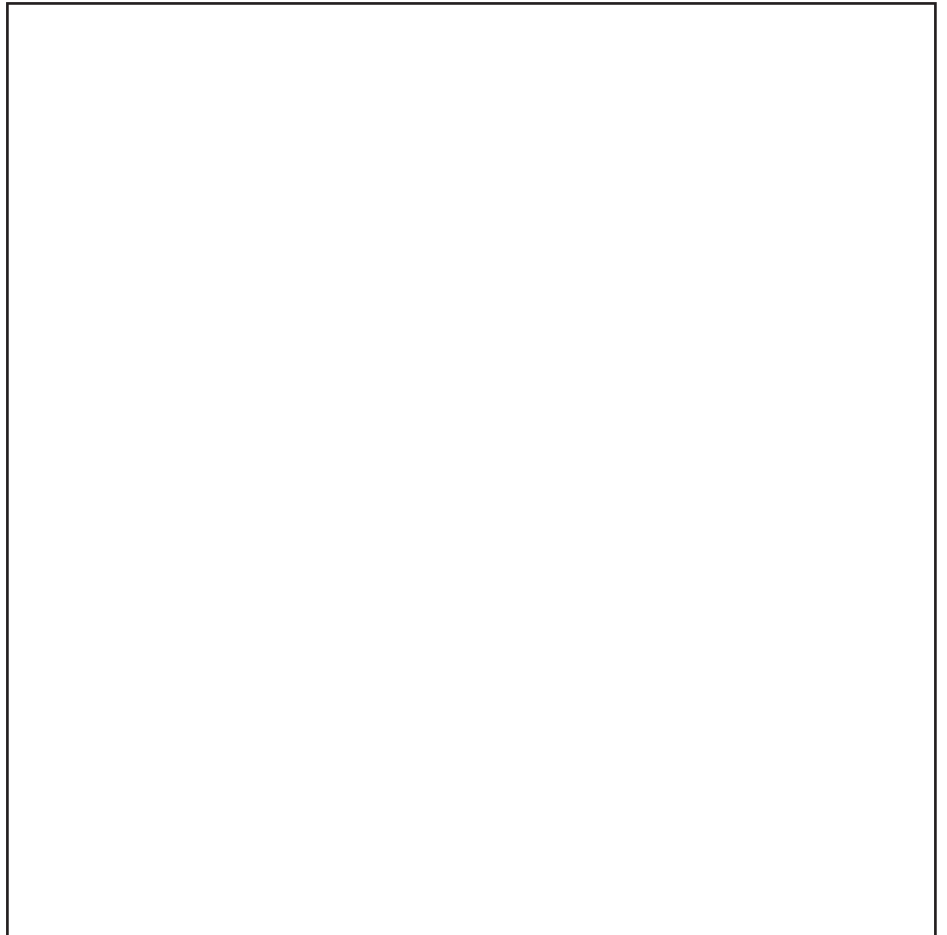
lungs: _____

skin: _____

The Kidneys

I found this information on page _____.

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. kidneys
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
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.

Section 35.1 The Digestive System

Details

1. _____

2. _____

Use your book or dictionary to define nutrients.

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

end portion of the digestive tract, which includes the colon, rectum, and appendix

Section 35.1 The Digestive System (continued)

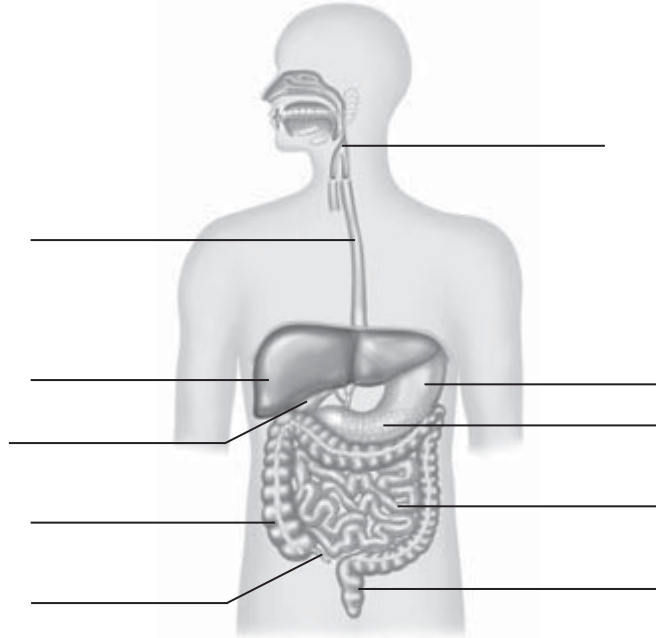
Main Idea _____

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	

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.

	Break Down Into	Importance to the Body
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.

Grains	Fruits	Milk
Vegetables	Oils	Meat and Beans

Section 35.2 Nutrition (continued)

Main Idea _____ **Details** _____

Vitamins and Minerals and Nutrition Labels

I found this information on page _____.

Examine the food label below, and complete the table below assuming you ate the contents of the entire container.

NUTRITION FACTS	
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.

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

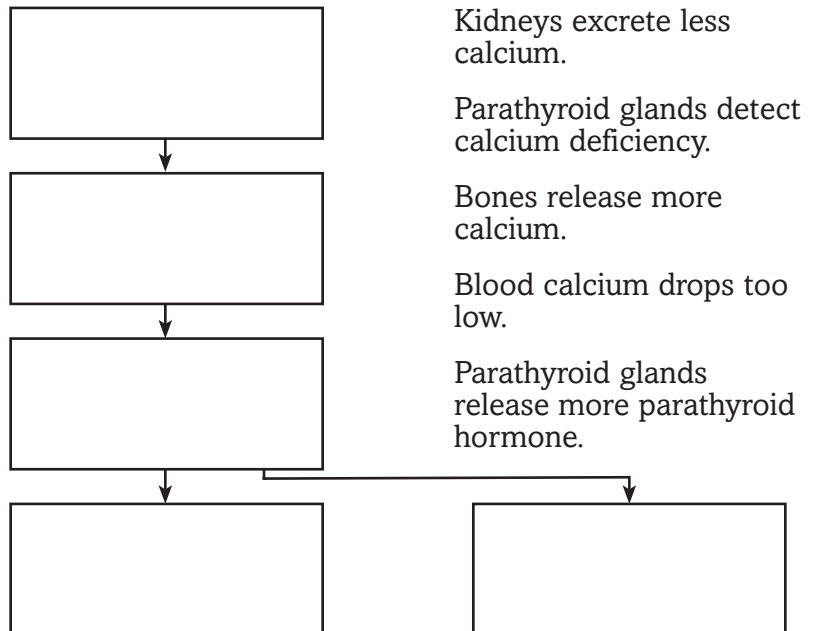
I found this information on page _____.

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 _____

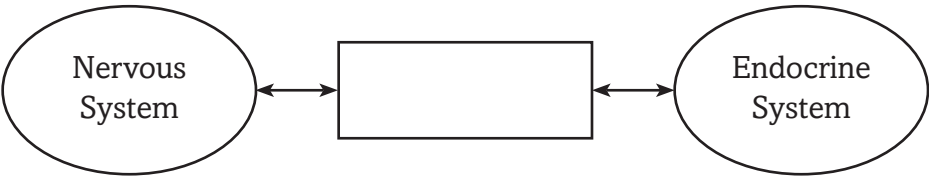
**Links to the Endocrine/
Nervous System**

*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

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

hypothalamus

Use your book or dictionary to define 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.

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 _____.

The Menstrual Cycle

I found this information on page _____.

Summarize *the results of each meiotic division in the production of eggs.*

First Meiotic Division	Second Meiotic Division

Sequence *the steps in the menstrual cycle. Describe the changes in hormones, the uterus, and the ovary at each stage.*

1.		
Hormone Changes	Uterine Changes	Ovary Changes
2.		
Hormone Changes	Uterine Changes	Ovary Changes
3.		
Hormone Changes	Uterine Changes	Ovary Changes

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.

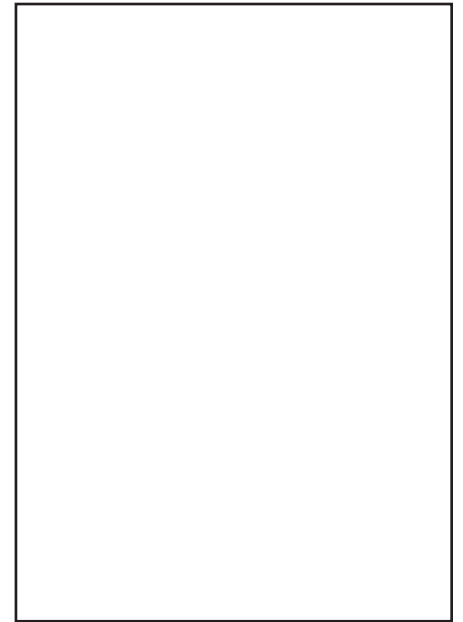
New Vocabulary

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.

SUMMARIZE

Use the analogy of plant growth to compare to the growth and development of a fetus over nine months.

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

growth

Use your book or dictionary to define growth.

New Vocabulary

adolescence

Use your book or dictionary to define the following terms.

adulthood

dilation

expulsion stage

infancy

labor

placental stage

Section 36.3 Birth, Growth, and Aging (continued)

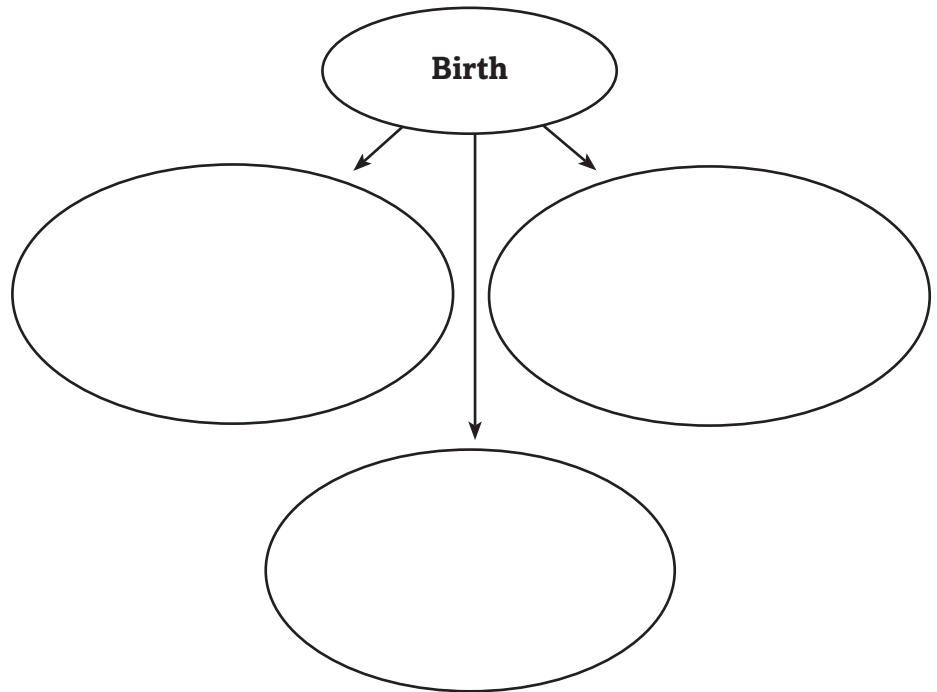
Main Idea _____

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 _____

Details _____

I found this information
on page _____.

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.

The Immune System

Section 37.1 Infectious Diseases

Main Idea _____

Details _____

Review Vocabulary

protozoan

New Vocabulary

antibiotic

endemic disease

epidemic

infectious disease

Koch's postulates

pandemic

pathogen

reservoir

Skim Section 1 of the chapter and list three ways that diseases spread from person to person.

1. _____

2. _____

3. _____

Use your book or dictionary to define protozoan.

Use your book or dictionary to define each term.

376

The Immune System

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

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.

<p>Five types of pathogens:</p> <ol style="list-style-type: none"> 1. 2. 3. 4. 5. 	<p>Four places that helpful microorganisms live in your body:</p> <ol style="list-style-type: none"> 1. 2. 3. 4.
--	--

Design the experimental steps you would use to identify the virus that caused bird flu in a flock of chickens using Koch's postulates.

1.
2.
3.
4.

Analyze how diseases spread.

<p>Three disease reservoirs:</p> <ol style="list-style-type: none"> 1. 2. 3. 	<p>Four main ways diseases are transmitted to humans:</p> <ol style="list-style-type: none"> 1. 2. 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.*

SUMMARIZE

Critique what people can do to help keep antibiotics effective in disease fighting.

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

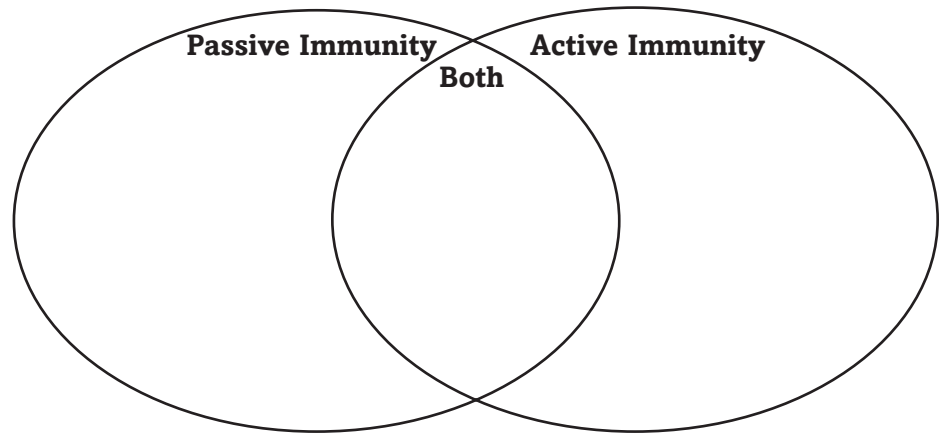
I found this information
on page _____.

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.*

SUMMARIZE

Classify AIDS as an endemic, an epidemic, or a pandemic disease. Explain your reasoning.

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.

New Vocabulary

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

- 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 | • sickle cell anemia |
| • Down syndrome | • Type 1 diabetes |
| • coronary artery disease | • leukemia |
| • hemophilia | • 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.

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.