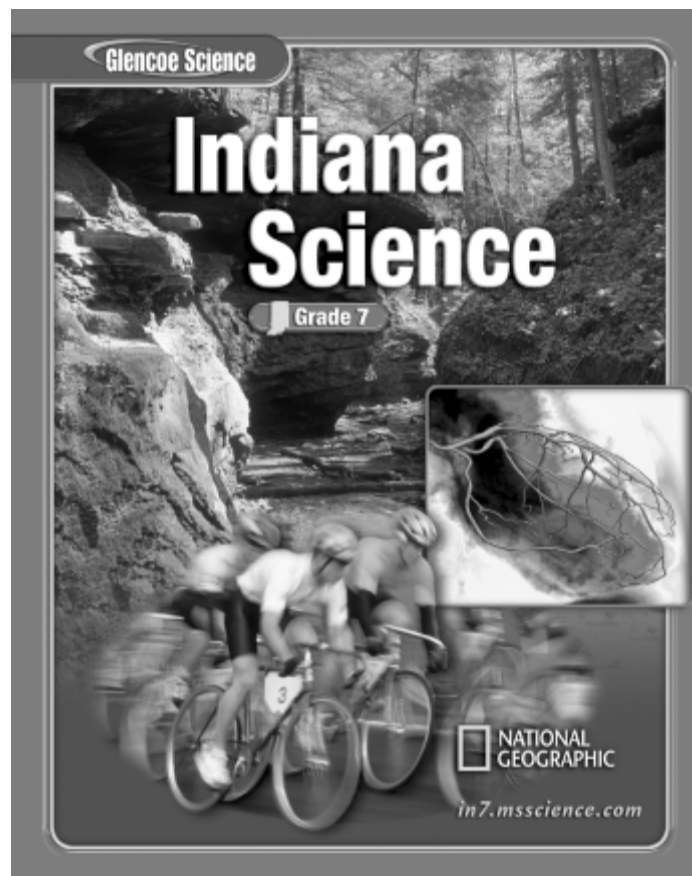


Study Guide and Reinforcement

Student Edition

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Glencoe

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



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Glencoe/McGraw-Hill
8787 Orion Place
Columbus, OH 43240

ISBN 0-07-867064-0
Printed in the United States of America
1 2 3 4 5 6 7 8 9 10 045 09 08 07 06 05 04

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SECTION
1

Study Guide

What is science?

Chapter

1

Directions: Use the word bank provided to complete the summary paragraph.

critical thinking
scientific law

International System of Units
scientific methods

science
theory

(1) _____ is an organized way of studying things and finding answers to questions. The way you use skills to solve problems is referred to as (2) _____, When scientists conduct experiments, they are careful to accurately measure temperature, mass, volume, and length using the (3) _____, or SI. Scientists, and all problem solvers, may use organization that takes the form of a seven-step series of procedures called the (4) _____. This method of study and experimentation allows scientists to propose hypotheses, test their ideas for many trials, and report their results. An explanation of things or events, based on scientific knowledge resulting from many observations and experiments may become a (5) _____. A statement about how things work in nature that seem to be true all the time, that may tell you what will happen, but not necessarily why it happens, is considered a (6) _____.

Directions: Identify the following symbols using information from the chart in the front of the textbook.



Directions: List in order the seven steps scientists use in the scientific method. The last step has been written for you. (Hint: Refer to Figure 2 in your text for additional help.)

13. The Scientific Method

_____ Report your results

SECTION

2

Study Guide

Living Things

Chapter

1

Directions: After each statement, write the feature of life that is illustrated.

1. "That boy shot up five inches in only one year." _____
2. "Our cat had a litter of kittens yesterday." _____
3. "To win at that sport, her muscle cells need to be worked hard every day."

4. "My dog has become much less clumsy now that he is a year old."

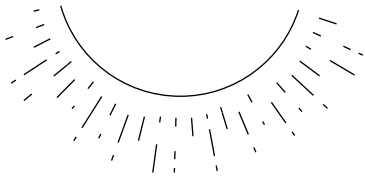
5. "Eat a good breakfast and you'll feel better through the morning."

6. "When that car pulled into the driveway, my cat ran to hide under the porch."

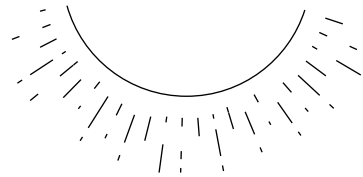
7. "The fish died after living in the aquarium for many years."

8. "The bee collected nectar from the flowers." _____

Directions: Answer the following questions on the lines provided.



A



B

9. In Figure A, the Sun is what to the plant?

10. In Figure B, the plant leans toward the Sun. What is this reaction an example of?

11. Your body normally maintains a temperature of 37° C. This is an example of what?

12. What are the smallest units that carry on the functions of life?

SECTION
3**Study Guide****Where does life come from?****Chapter****1**

Directions: Describe what the following scientists showed by their experiments.

1. Francesco Redi

2. Lazzaro Spallanzani

3. Louis Pasteur

Directions: Answer the following questions on the lines provided.

4. What is the theory of spontaneous generation?

5. What is the theory of biogenesis?

6. What did Oparin believe caused the early gases of Earth to combine?

7. What did Oparin think happened to these compounds after they fell into the hot seas?

SECTION
4

Study Guide

How are living things classified?

Chapter

1

Directions: Answer the following questions using information from the textbook.

1. Why don't scientists use common names to identify organisms?

2. Why are scientific names important? Give four functions for scientific names.

- a. _____
- b. _____
- c. _____
- d. _____

Directions: Use the key to species of birch trees below to answer the questions that follow.

Key to Species of Birch Trees

1. a. bark dark, reddish-brown, yellowish-brown to black, go to 2
b. bark creamy white, pinkish, or gray, go to 6
2. a. bark and twigs with wintergreen fragrance when cut, go to 3
b. bark and twigs without a fragrance when cut, go to 5
3. a. leaves with 8-12 pairs of veins, go to 4
b. leaves with 4-6 pairs of veins, *Betula uber*
4. a. bark dark red to almost black; scales smooth, 6-12 mm long, *Betula lenta*
b. bark reddish brown, peeling in loose, ragged sheets, scales hairy, 5-7 mm, *Betula alleghaniensis*
5. a. branchlets covered near tip with many small glands, Rocky Mountains or Western Canada, *Betula occidentalis*
b. branchlets smooth, shiny, no glands present, eastern U.S., *Betula nigra*
6. a. leaves hairy on lower surface, go to 7
b. leaves smooth, hairless underside, go to 8
7. a. leaves 5-13 cm long, pointed tip, *Betula papyrifera*
b. leaves 3-7 cm long, pointed tip, winter buds shiny, *Betula pendula*
8. a. bark dull gray to grayish-white, smooth and not peeling, *Betula populifolia*
b. bark white to pinkish-white, peeling, go to 9
9. a. leaves 6-10 cm, round base, *Betula caerulea*
b. leaves 3-5 cm, squared base, *Betula pubescens*

3. Are the leaves of *Betula populifolia* hairy or smooth on the lower surface? _____

4. How many pairs of veins are on the leaves of *Betula lenta*? _____

5. What is a characteristic of the bark of *Betula alleghaniensis*? _____

6. When a twig of *Betula nigra* is broken, does it give off a wintergreen fragrance? _____

SECTION
1

Study Guide

Cell Structure

Chapter

2

Directions: Use the word bank provided to complete the following section summary.

cell	cell membrane	cell wall
circulatory system	cytoplasm	endoplasmic reticulum
eukaryotic	Golgi bodies	lysosome
mitochondria	nucleus	organ
organelles	prokaryotic	ribosomes
tissue	vacuoles	water

The smallest unit of an organism that can carry on life functions is a(n) (1)_____. All cells have a protective covering, called the (2)_____, that allows food particles, (3)_____, and wastes to move in and out of the cell. Many important chemical reactions take place in the gelatin-like substance within cells called (4)_____. To manufacture proteins all cells also contain (5)_____. The (6)_____ give some cells a tough, rigid outer covering to protect the cell and give it shape. Cells are separated into two groups. Cells without membrane-bound structures are (7)_____. Cells containing membrane-bound structures are (8)_____. These structures, called (9)_____, perform many different jobs. The (10)_____ directs all the activities. The (11)_____ breaks down food to release energy. A folded membrane, the (12)_____, processes and moves materials around in the cell. (13)_____ sort proteins, packaging them into vesicles for movement within the cell. Serving as temporary storage units for food, water, and wastes, (14)_____ may join with a(n) (15)_____ containing digestive chemicals.

A group of similar cells, such as muscle cells, works together in a(n) (16)_____. When two or more of these work together, it is a(n) (17)_____. An organ system, such as the (18)_____ works to perform a specific function—such as carrying blood to all parts of the body.

SECTION
3**Study Guide****Viruses****Chapter****2**

1. Listed below are the steps by which an active virus copies itself and destroys a cell. Number the steps in the correct order in the blanks provided at the left.

- _____ a. The cell bursts open and hundreds of new virus particles are released. These new virus particles go on to infect other cells.
- _____ b. A specific virus attaches to the surface of a specific host cell.
- _____ c. The viral hereditary material takes control of the host cell and the cell begins to make new virus particles.
- _____ d. The hereditary material of the virus entering the host cell.

Directions: Answer the following questions using complete sentences.

2. Explain what a latent virus does when it enters a cell.

3. Discuss several ways to prevent viral infections.

4. What are vaccines made from?

5. How does gene therapy work?

SECTION
1

Study Guide

Chemistry of Life

Chapter

3

Directions: Write the correct term from the word bank on the line next to its definition.

atom
element
mixture
nucleus

compounds
ionic compounds
molecular compound
solution

electrons
ion
molecule
suspension

- _____ 1. a group of atoms held together by the energy of chemical bonds
- _____ 2. negatively charged particles moving around outside a nucleus
- _____ 3. two or more substances dissolved evenly throughout another substance
- _____ 4. smallest particle that makes up all matter solid, liquid, or gas; usually neutrally charged
- _____ 5. made up of two or more elements in specific proportions
- _____ 6. occur when different atoms share their outermost electrons
- _____ 7. opposite charges attract to form an electrically neutral compound
- _____ 8. two or more substances evenly spread throughout a solution, but will eventually settle out
- _____ 9. combination of substances that retain their own properties
- _____ 10. atoms of the same kind that are bonded together
- _____ 11. center of an atom, that contains protons and neutrons
- _____ 12. an electrically charged atom that has lost or gained an electron

Directions: Use the information in the textbook to complete the chart about organic and inorganic compounds.

	Type of Compound	Contains	Usually Found in
13.			living things
14.		elements other than carbon	

Directions: Explain three ways water is important to all living things.

15. _____
16. _____
17. _____

SECTION
2
Study Guide
Moving Cellular Materials
Chapter
3

Directions: Answer the following questions on the lines provided.

1. What is osmosis?

2. How does osmosis explain the fact that a watery syrup forms when you put sugar on strawberries?

3. a. How are glucose molecules moved into a cell?

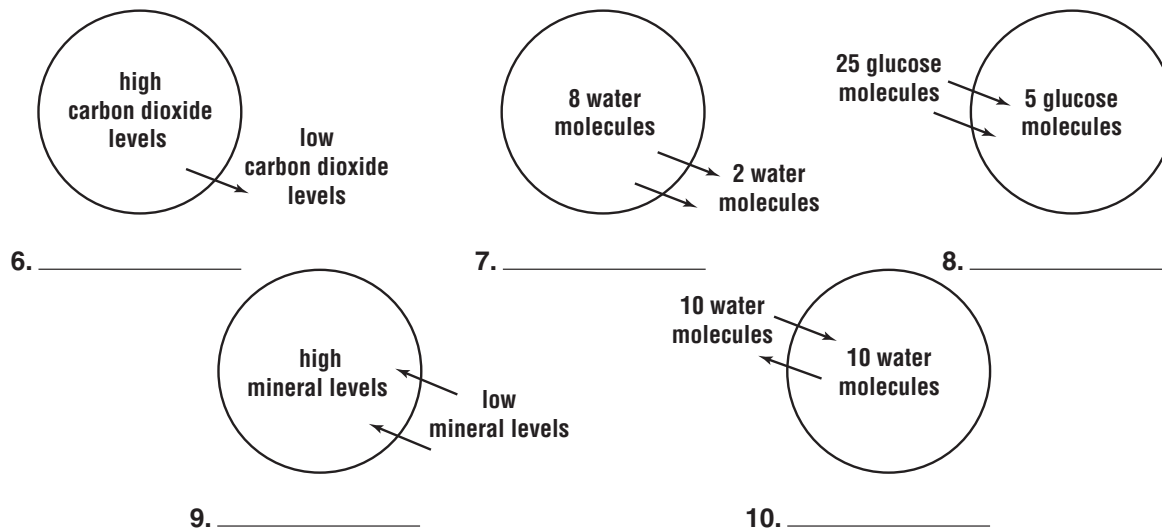
b. What type of transport is this? _____

4. a. What are vesicles?

b. What happens to a vesicle in exocytosis?

5. What is a selectively permeable membrane?

Directions: Label the diagrams of cells with the terms **diffusion**, **active transport**, **osmosis**, **equilibrium**, **facilitated diffusion**. The arrows show the direction of transport.



SECTION
3

Study Guide

Energy for Life

Chapter

3

Directions: Answer the following questions on the lines provided.

1. How do producers make their own food?

2. Fill in the following equation for photosynthesis.

_____ + water + carbon dioxide + chlorophyll → _____ + _____

3. What are the end products of respiration?

4. How does yeast cause bread to rise?

5. How do your muscles continue to get energy during high levels of activity when there is not enough oxygen?

Directions: For each of the following, write the letter of the term that best completes each statement.

- _____ 6. Fermentation releases energy without using _____.
 a. oxygen b. glucose c. energy d. carbon dioxide
- _____ 7. What process occurs in the mitochondria?
 a. fermentation b. photosynthesis c. respiration d. metabolism
- _____ 8. During respiration some energy is released as _____.
 a. chemical energy c. heat
 b. light energy d. carbon dioxide
- _____ 9. When muscles are overworked, soreness is caused by a buildup of _____.
 a. glucose b. carbon dioxide c. lactic acid d. energy
- _____ 10. The green plant pigment that traps light energy from the Sun is called _____.
 a. glucose b. chlorophyll c. oxygen d. water
- _____ 11. During photosynthesis, plants produce glucose and release _____.
 a. carbon dioxide b. energy c. oxygen d. water
- _____ 12. The energy used by all living things starts with _____.
 a. producers b. consumers c. respiration d. sunlight
- _____ 13. The total of all chemical reactions in an organism is called _____.
 a. metabolism b. respiration c. enzymes d. photosynthesis

SECTION
1

Study Guide

Cell Division and Mitosis

Chapter

4

Directions: Use the information in the text, Figure 2, and Figure 5 to complete the animal cell division chart below.

	Phase	Characteristics of the Phase
	1.	growth and development of cell, prepare for mitosis, chromosomes duplicate
Phases of Mitosis	2. Prophase	
	3.	chromatid pairs line up in the center of the cell and become attached to spindle fibers
	4. Anaphase	
	5. Telophase	
	6.	23 pairs of chromosomes in the nucleus containing hereditary material; cell grows and develops again

Directions: Use the word bank provided to complete the following paragraph on sexual and asexual reproduction.

asexual

budding

cell division

fission

identical

regeneration

reproduction

sexual

Two types of (7) _____ have been defined by scientists. During (8) _____ reproduction, two sex cells join together to develop into a genetically unique individual. In contrast, during (9) _____ reproduction, a new organism develops from only one organism. The new generation is genetically (10) _____ to the original organism. This process can be accomplished three ways. (11) _____ produces a small organism that breaks off from the original organism to live on its own. (12) _____ uses cell division to regrow body parts. Eukaryotic cells may use (13) _____ to reproduce. However, a special type of cell division, called (14) _____, is used by prokaryotic bacteria cells.

Directions: Explain three reasons cell division is important to the survival of an organism.

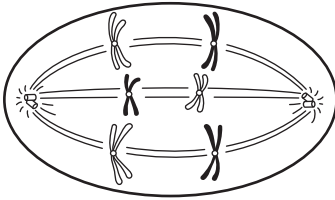
15. _____

16. _____

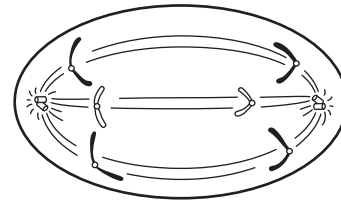
17. _____

SECTION
2
Study Guide
**Sexual Reproduction
and Meiosis**
Chapter
4

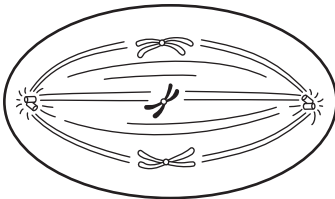
Directions: Study the following diagrams. Then label the appropriate steps of meiosis.



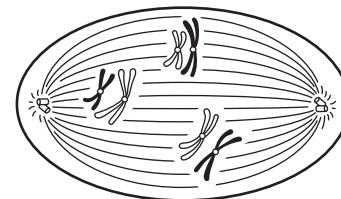
1. _____



2. _____



3. _____



4. _____

Directions: Answer the following questions on the lines provided.

5. In what way is meiosis II similar to mitosis?

6. What is a cell with pairs of chromosomes called? A cell with no pairs (single set)? of chromosomes?

7. Do centromeres divide at anaphase I or II?

8. Starting with one diploid cell, how many haploid sperm cells have formed after both phases of meiosis have been completed?

9. How are sex cells different from other cells in the body?

10. What happens during fertilization?

SECTION
3**Study Guide****DNA****Chapter****4**

Directions: Answer the following questions on the lines provided.

1. Write the letter of the DNA bases that pair with the following DNA strand.

T: _____

G: _____

A: _____

T: _____

C: _____

2. Write the name of the RNA bases that pair with the following DNA strand.

A: _____

C: _____

T: _____

G: _____

A: _____

3. What structure contains the instructions for making specific protein?

4. What makes up the sides of the “ladder” of a DNA molecule?

5. How is RNA different from DNA?

6. What role does RNA play in cell life?

7. What are the three kinds of RNA and what does each do?

8. What can cause mutations?

SECTION
1

Study Guide

The Digestive System

Chapter

5

Directions: Use the terms from the word bank to fill in the blanks in front of the correct phrases below.

bacteria
blood
chyme

digestion
enzyme
epiglottis

esophagus
ingestion
nutrients

peristalsis
stomach
villi

- _____ 1. substances that contain energy and materials used in cell development, growth, and repair
- _____ 2. the fluid that carries nutrients to cells
- _____ 3. waves of muscle contractions that move food through the digestive tract
- _____ 4. the movement of food into your body by chewing and swallowing
- _____ 5. important organisms that produce vitamins and break down food molecules in the intestine
- _____ 6. a type of protein that speeds up chemical reactions in your body, are involved in energy reactions, and aid in blood clotting
- _____ 7. a 25-cm tube that can work even if you're standing on your head
- _____ 8. thin, watery, liquid in your stomach that used to be your food
- _____ 9. a mechanical and chemical process that processes food that is used by your body
- _____ 10. projections into your small intestine that greatly increase the surface area and results in nutrient absorption
- _____ 11. a flap of tissue that closes your windpipe when you swallow food
- _____ 12. a sausage-shaped muscular bag that contains enzymes and strong hydrochloric acid

Directions: Explain the difference between chemical and mechanical digestion.

13. _____
- _____

	Body Part	Digestive Function
14.	Liver	
15.	Gall bladder	
16.	Pancreas	
17.	Salivary glands	

SECTION
2

Study Guide

Nutrition

Chapter

5

Directions: *Name the six nutrients available in food and briefly describe each.*

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Directions: *Answer the following questions on the lines provided.*

7. What foods supply saturated fats? Unsaturated fats?

8. How much of a human body is water? _____
9. What are the five food groups?

10. What tools will help you make wise nutrition decisions?

Directions: *Use the tables in your textbook to answer the following questions.*

11. Which minerals help make strong bones? _____
12. Which vitamin is needed to make blood clot? _____
13. In what way do we lose the most water? _____
14. Through which organ is water lost as sweat? _____
15. Which two minerals are involved in nerve impulse conduction? _____
16. How does a person get iodine? _____

SECTION
3

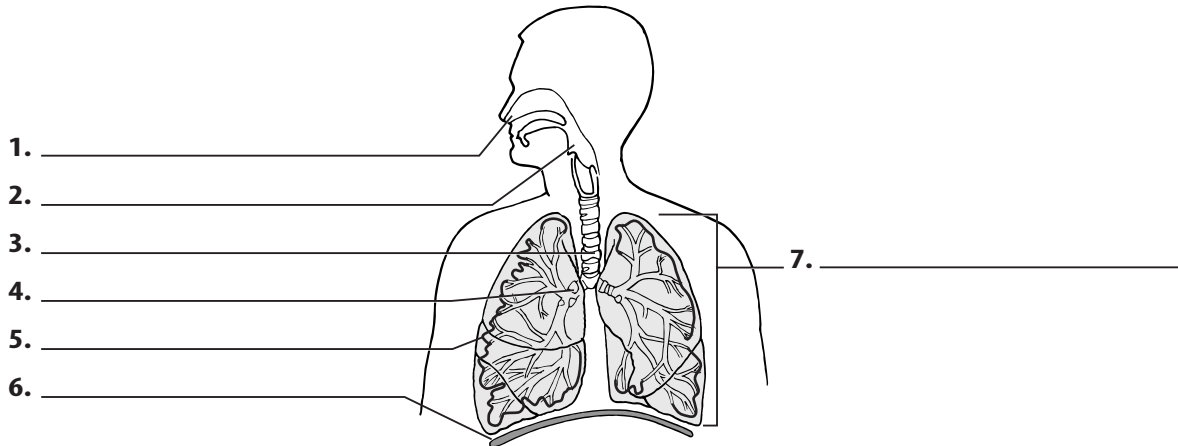
Study Guide

The Respiratory System

Chapter

5

Directions: Label the parts of the respiratory system shown in the diagram below.



Directions: In the space provided below, write the name of the structure indicated.

- _____ 8. warms and moistens air; filters dust particles
- _____ 9. tube that transports air to the bronchi
- _____ 10. prevents food from entering the trachea
- _____ 11. oxygen passes into the capillaries that surround these sacs
- _____ 12. organ made up of masses of alveoli
- _____ 13. a sheet of muscle across the bottom of the chest cavity
- _____ 14. a division of the trachea

Directions: Label each statement below as a description of either *inhalation* or *exhalation*. Write the word **inhale** or **exhale** in the space provided below.

- _____ 15. The diaphragm contracts.
- _____ 16. Air pressure in the chest cavity increases.
- _____ 17. The gases inside the lungs are pushed out through air passages.
- _____ 18. Air pressure in the chest cavity decreases.
- _____ 19. The volume of the chest cavity increases.

SECTION
4

Study Guide

The Excretory System

Chapter

5

Directions: Answer the following questions on the lines provided.

1. What functions does the urinary system perform? _____

2. What are three of the excretory organs of the body? _____

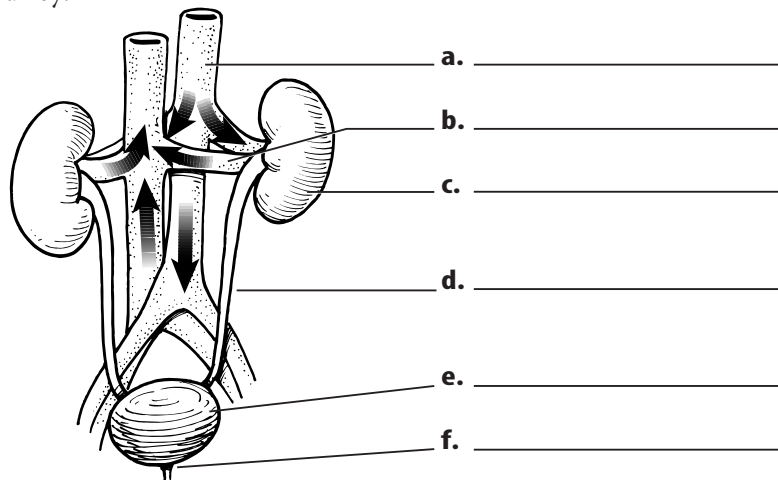
3. What happens when the kidneys don't work? _____

4. Why is skin considered an excretory organ? _____

5. Why do you see your breath on a cold day? _____

6. Number the following events to place them in the correct order.

<p>_____ a. Urine flows from ureters to the bladder.</p> <p>_____ b. Blood enters the nephrons.</p> <p>_____ c. Blood enters the kidneys through the renal artery.</p> <p>_____ d. Urine drains from each collecting tubule into funnel-shaped areas of the kidney.</p> <p>_____ e. Capillaries reabsorb most of the water, sugar, and salt.</p> <p>_____ f. Water, sugar, salt, and wastes in the blood enter a cuplike structure.</p>	<p>_____ g. The renal vein returns purified blood to be circulated.</p> <p>_____ h. Urine flows from the bladder through the urethra and out of the body.</p>
---	---
7. Label the parts of the urinary system shown in the diagram below using the following terms: urethra, ureter, bladder, kidney, aorta, renal vein. (Arrows show the direction of blood flow.)



SECTION

1

Study Guide

Blood

Chapter

6

Directions: List four important functions of blood.

1. _____
2. _____
3. _____
4. _____

Directions: Name and describe four parts of blood, the function of each part, the concentration of each in the blood system, and the life span of each part.

	Part of Blood	Function	Concentration	Life Span
5.				
6.				
7.				
8.				

Directions: Name and explain the symptoms of three blood diseases.

9. _____
10. _____
11. _____

Directions: Fill in each box in the chart with "yes" or "no" if the blood type on the left side can receive a blood donation from the blood type along the top of the chart.

	Type	A-	B-	AB-	O-	A+	B+	AB+	O+
12.	A-	yes							
13.	B-								
14.	AB-								
15.	O-								
16.	A+								
17.	B+								
18.	AB+								
19.	O+								

SECTION
2

Study Guide

Circulation

Chapter

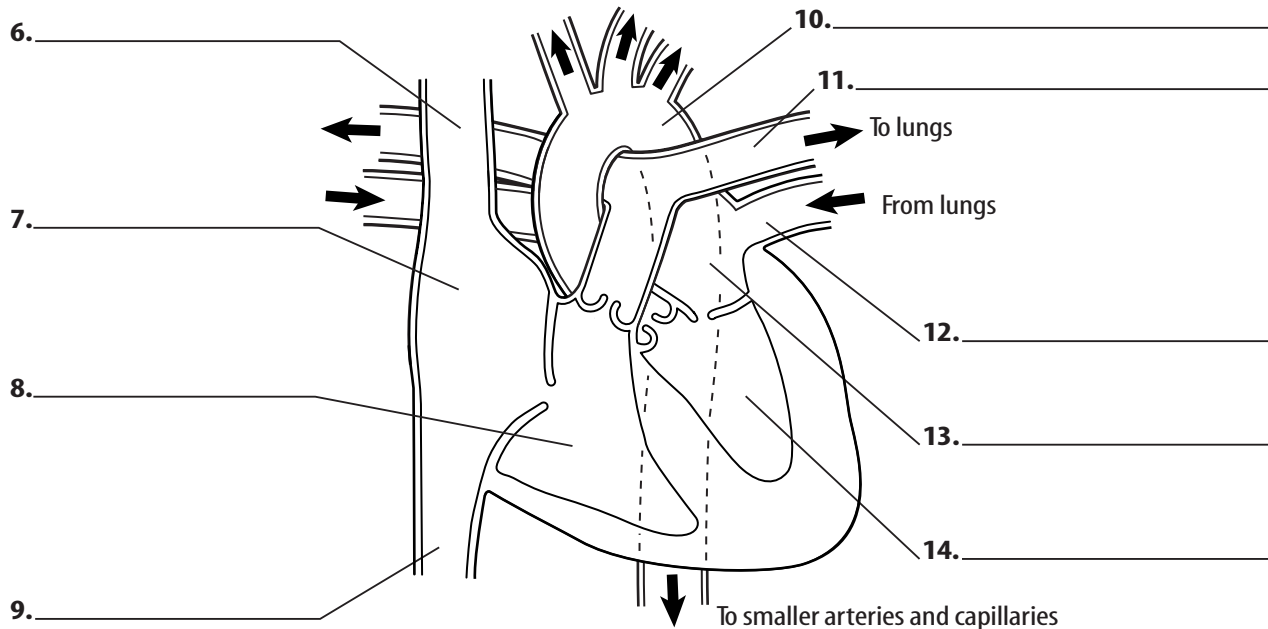
6

Directions: Fill in the blanks with the correct terms for questions 1–3.

1. Valves inside the veins prevent blood from flowing _____ the heart.
2. Blood in _____ carries wastes away from the cells of the body back to the heart.
3. The force of the blood on the walls of blood vessels is called _____.
4. What are three main functions of the lymphatic system?

5. What is pulmonary circulation and what is its function? _____

Directions Label the diagram of the heart. Include the following terms on your diagram: **right atrium, right ventricle, left atrium, left ventricle, superior vena cava, inferior vena cava, pulmonary artery, pulmonary vein, aorta.** Use a pencil to draw arrows showing the path of oxygen-rich blood. Use a pen to show the path of oxygen-poor blood.



SECTION
3**Study Guide****Immunity****Chapter****6**

Directions: Answer the following questions on the lines provided.

1. What is an antibody and how does it function?

2. What is one source of passive immunity?

3. What is the difference between active immunity and passive immunity?

4. What happens if disease-causing bacteria get through a break in the skin and enter the circulatory system?

5. What are vaccines made from?

6. How are pathogens trapped by and expelled from the respiratory system?

7. What are your body's first-line defenses against pathogens in general?

8. a. How do vaccines work?

- b. What is this type of immunity called?

- c. What is another way to get this type of immunity?

9. What defenses does the digestive system have against pathogens?

10. What is an antigen?



Study Guide

Diseases

Chapter

6

Directions: Robert Koch developed a set of rules for figuring out which pathogen caused a particular disease. Use the following terms to complete his rules listed below.

disease	original organism	present	host
suspected	culture		same

- In every case of a particular disease, the organism thought to cause the _____ must be _____.
- The _____ pathogen must be separated from all other organisms and grown in a _____ with no other organisms present.
- When the suspected pathogen from the pure culture is placed in a healthy _____, it must cause the same disease.
- When the suspected pathogen is removed from the host and grown again, it must be compared with the _____ to see if they are the _____.

Directions: Write the letter of the term or phrase that best completes the sentence.

- Diseases that are not caused by pathogens are _____.
a. infectious b. chronic c. noninfectious d. viral
- A tumor is usually located _____.
a. anywhere in the body c. near the surface of the body
b. deep inside the body d. on the skin
- All of the following are noninfectious diseases EXCEPT _____.
a. asthma b. cancer c. heart disease d. AIDS
- Substances that increase your chance of developing cancer are called _____.
a. lymphocytes b. carcinogens c. allergens d. antigens
- When you come in contact with an allergen, your immune system forms _____.
a. hormones b. lymphocytes c. antibodies d. antigens
- An allergy is a strong reaction of the _____.
a. immune system c. respiratory system
b. circulatory system d. digestive system
- Some noninfectious diseases are called chronic diseases because _____.
a. they are present at birth c. they are short-lived
b. they are inherited d. they last a long time
- Cigarette smoke has been linked with all of the following EXCEPT _____.
a. cancer b. lung diseases c. heart disease d. arthritis

SECTION
1

Study Guide

The Environment

Chapter

7

Directions: Give an example for each level of organization in the living world. You may use *Figure 6* to help you.

	Organization Level	Example
1.		
2.		
3.		
4.		
5.		
6.		

Directions: Match terms from the word bank with the statements below.

4,500 m

biomes

community

pollution

11,000 m

biosphere

ecosystem

population

abiotic factors

biotic factors

organism

sunlight

- _____ 7. all of the species that live in a pond
- _____ 8. the height that living things have so far been found in the atmosphere
- _____ 9. other living things in the environment that affect an organism
- _____ 10. an abiotic factor that is limited on a forest floor
- _____ 11. includes the crust, the water, the air, and all the biomes
- _____ 12. all the individuals of one species who might reproduce together
- _____ 13. the depth that living things have so far been found in the oceans
- _____ 14. just one penguin
- _____ 15. a rocky, sunny coastal area with populations of trees, sea weeds, fish, birds, and crabs
- _____ 16. water, sunlight, temperature, air, and soil, which determine what types of organisms can live in a particular environment
- _____ 17. savanna, desert, mountain, grassland, taiga, tundra, and tropical rain forest
- _____ 18. a factor that can harm life on Earth

SECTION
2

Study Guide

**Interactions Among
Living Organisms**

Chapter

7

Directions: *Select the term from the following list that matches each description.*

**spacing
potential**

**predation
limiting**

**size
density**

- _____ 1. number of individuals in a population
- _____ 2. regulates a population when organisms feed on other organisms
- _____ 3. maximum rate at which a population increases
- _____ 4. a factor that limits the number of individuals in a population
- _____ 5. the number of individuals that live in a defined space
- _____ 6. the arrangement of organisms in a given area

Directions: *In the table below, write the type of symbiosis practiced by the organisms in the left-hand column and describe their relationships.*

Organisms	Type of symbiosis	Description of relationship
7. Mistletoe and tree		
8. Flatworm and horseshoe crab		
9. Yucca and yucca moth		

SECTION
3**Study Guide****Matter and Energy****Chapter****7**

Directions: Find the mistakes in the statements below. Underline the incorrect word(s) and write the correct word on the line provided.

1. Consumers capture and use energy from the Sun.

2. A series of overlapping food chains is called a food niche.

3. A model of energy transfer is an ecological biome.

4. A model of energy available in a predator chain is an energy pyramid.

5. At the top of the energy pyramid, energy is slightly reduced.

6. Photosynthesis involves the production of food and oxygen by bacteria using chemical compounds.

7. Molecules of water that encounter colder air temperatures speed up.

8. The movement of carbon through Earth's ecosystem is called the fixation cycle.

9. Nitrogen is used by organisms to make fats.

10. Nitrogen and carbon are used up by the processes of a biosphere.

11. Mushrooms are classified as producers.

12. When a carnivore eats a plant, it gains some of the plant's energy.

13. Producers take in energy from nitrogen.

SECTION
1

Study Guide

Resources

Chapter

8

Directions: Write the correct term on the line next to its definition.

fossil fuels
inexhaustible resources
nuclear
solar cells

geothermal
natural resources
petroleum
solar

hydroelectric power
nonrenewable resources
renewable resources
wind power

- _____ 1. a mineral formed mostly from the remains of microscopic marine organisms buried in Earth's crust
- _____ 2. natural resources that are recycled or replaced constantly by nature
- _____ 3. resources used up more quickly than they can be replaced by nature
- _____ 4. constant supplies of energy
- _____ 5. fuels formed in Earth's crust over hundreds of millions of years
- _____ 6. energy released when billions of atomic nuclei from uranium are split apart in a nuclear fission reaction
- _____ 7. heat energy contained in Earth's crust in molten rock
- _____ 8. harnessed air currents traveling at 32 km/h
- _____ 9. electricity that is produced when the energy of falling water is used to turn the turbines of an electric generator
- _____ 10. expensive photovoltaic cells that use sunlight to make energy
- _____ 11. most inexhaustible source of energy
- _____ 12. the parts of the environment that are useful or necessary for the survival of living organisms

Directions: List three examples of renewable energy resources.

13. _____
14. _____
15. _____

Directions: List three examples of nonrenewable resources.

16. _____
17. _____
18. _____

SECTION
2**Study Guide****Pollution****Chapter****8**

Directions: Answer the following questions on the lines provided.

1. What is smog?

2. What are some pollutants produced by the burning of fuels?

3. How does acid precipitation form?

4. Explain how ozone in the upper atmosphere is helpful to life on Earth.

5. What types of chemical pollutants are responsible for ozone depletion? Where do these chemicals come from?

6. Draw and label an illustration of the greenhouse effect.

SECTION
3**Study Guide****The Three Rs of Conservation****Chapter****8**

Directions: *What are the three Rs of conservation? Write your answers on the lines provided and give three examples of each.*

1. _____

Examples a. _____

b. _____

c. _____

2. _____

Examples a. _____

b. _____

c. _____

3. _____

Examples a. _____

b. _____

c. _____

Directions: *Answer the following question on the lines provided.*

4. Why is conservation important?

SECTION
1

Study Guide

Structure of Matter

Chapter

9

Directions: *List five things that are matter and five things that are not matter.*

Matter	Not Matter
1.	
2.	
3.	
4.	
5.	

Directions: *List the five main points of Democritus' atom theory.*

6. _____
7. _____
8. _____
9. _____
10. _____

Directions: *Use the word bank to fill in the blanks to match the phrases below.*

- | | | | | |
|---------------------|-----------------|-----------------------|---------------|-------------------|
| atom | Chadwick | electron cloud | orbits | Rutherford |
| atomic model | electron | neutron | proton | Thomson |
- _____ 11. a neutral particle that is located in the nucleus
- _____ 12. a negative particle that orbits the nucleus
- _____ 13. a positive particle that is located in the nucleus
- _____ 14. the area where modern scientists think electrons are likely to be found
- _____ 15. scientist who discovered that atoms contained electric charge
- _____ 16. a student of Niels Bohr who discovered neutrons in the nucleus
- _____ 17. the place where Bohr thought electrons would be found
- _____ 18. the smallest piece of matter that keeps the properties of the element to which it belongs
- _____ 19. scientist who proposed the idea of a nucleus
- _____ 20. a way of thinking about the structure of the atom

SECTION
2
Study Guide
The Simplest Matter
Chapter
9

Directions: Complete the table by writing in the appropriate characteristics for metals, metalloids, and nonmetals.

Characteristics	Metals	Metalloids	Nonmetals
1. State of matter at room temperature			
2. Shininess			
3. Conductor of heat or electricity			
4. Malleability			
5. Ductility			
6. Location on periodic table			

Directions: The square below represents one element from the periodic table. Identify and describe the numbered items. Then answer the questions below.

7. _____

8. _____

9. _____

10. What is the atom's mass number?

11. What are isotopes?

SECTION
3

Study Guide

Compounds and Mixtures

Chapter

9

Directions: *Select the term below that best describes each food listed.*

homogeneous mixture

compound

heterogeneous mixture

- | | |
|--------------------|-------------------|
| 1. milk _____ | 6. popsicle _____ |
| 2. salt _____ | 7. chili _____ |
| 3. sugar _____ | 8. taco _____ |
| 4. soda pop _____ | 9. pizza _____ |
| 5. ice cream _____ | 10. water _____ |

Directions: *Answer the following questions on the lines provided.*

11. Describe what a compound's formula tells us about the compound.

12. Both compounds and mixtures contain more than one kind of atom. Explain how a compound is different from a mixture.

Directions: *Draw a line from the term on the right to its definition or description on the left.*

- | | |
|---|-----------------------|
| 13. a sample of matter that has the same composition and properties throughout | heterogeneous mixture |
| 14. a pure substance whose smallest unit is made up of atoms of more than one element | homogeneous mixture |
| 15. two or more substances that are together but do not combine to form a new, pure substance | compound |
| 16. a mixture that is the same throughout | substance |
| 17. a mixture with visible components | mixture |

SECTION
1

Study Guide

What is a solution?

Chapter

10

Directions: Match the terms in the word bank with the phrases below by writing the word in the blank. You must use all the words and may use each word only once.

alloy	homogeneous mixture	stalactite
compound	precipitate	solute
heterogeneous mixture	stalagmite	solvent

- | | |
|-------|---|
| _____ | 1. for example, sugar in cola |
| _____ | 2. a hanging icicle of rock formed by dripping water in a cave |
| _____ | 3. a solid-solid solution, such as brass |
| _____ | 4. for example, mixed fruit salad |
| _____ | 5. a solid formed when two solutions mix, such as soap scum |
| _____ | 6. a column of rock that forms upward from the floor of a cave as water with dissolved rock drips on it |
| _____ | 7. something that dissolves a solute, such as the water in the ocean |
| _____ | 8. two or more substances that are evenly mixed on a molecular level but are not bonded |
| _____ | 9. for example, water, which always has the same ratio of hydrogen and oxygen atoms |

Directions: Decide if each process is a physical or chemical process and write your answer in the column. Decide what kind of mixture is described in each case and name it in the second column. Identify the parts of the mixture.

		Physical or Chemical?	Kind of Mixture	Parts of Mixture
10.	a chef caramelizing sugar and butter for a sauce			
11.	a carpenter pounding nails into a house frame			
12.	a painter mixing two colors of paint together			
13.	a clown blowing up balloons			
14.	a cleaner using bleach to clean stains from clothes			

SECTION
2**Study Guide****Solubility****Chapter****10**

Directions: Write **true** in the blank if the statement is true. If the statement is false, replace the italicized word with a word or term that makes the statement true. Write this new word in the blank.

- _____ 1. In the water molecule, electrons are *equally* shared by hydrogen atoms and oxygen atoms.
- _____ 2. Solutions for which water is the solvent are called *aqueous* solutions.
- _____ 3. If electrons are shared *equally* between atoms that compose a molecule, that molecule is said to be polar.
- _____ 4. Water readily dissolves most *polar* compounds.
- _____ 5. Table salt, NaCl, is a *molecular* compound.
- _____ 6. In an *ionic* compound, one or more atoms loses electrons, and one or more atoms gains electrons.
- _____ 7. In solution, the charged regions of water molecules can pull a(n) *ionic* compound apart.
- _____ 8. Chemists say, "Like dissolves like." This means that dissolution tends to occur when the *solid* and the solute are similar in nature.
- _____ 9. Most oils tend to dissolve best in *nonpolar* solvents.
- _____ 10. Solubility tells you how *fast* a solute will dissolve.

Directions: Answer the following questions on the lines provided.

11. How is the solubility of a substance usually described?

12. What is an unsaturated solution?

13. How can a solution become supersaturated?

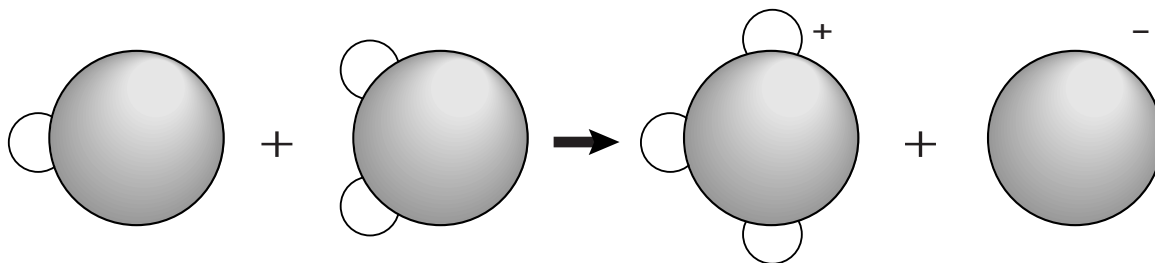
14. What happens if you continue to add solute to a saturated solution?

15. Can pressure affect the solubility of a substance in solution? Explain.

16. How does temperature affect the solubility of a solute in solvent?

SECTION
3**Study Guide****Acidic and Basic Solutions****Chapter****10**

Directions: Use the diagram below to answer questions 1 through 5.



Directions: Look at the left side of the diagram.

1. What common substance is a three-atom molecule like the one in this illustration?

Directions: Look at the right side of the diagram.

2. Explain what has happened to the two-atom molecule.
- _____
3. Identify the four-atom ion formed if the ion from the two-atom molecule is a hydrogen ion.
- _____
4. What kind of solution—acid or basic—has been produced?
- _____
5. Will this solution conduct electricity? Why or why not?
- _____

Directions: Answer the following questions on the lines provided.

6. List three properties of acidic solutions.
- _____
7. List three properties of basic solutions.
- _____
8. Which ion increases in concentration when a strong acid is added to water?
- _____
9. Which ion increases in concentration when a strong base is added to water?
- _____
10. How are the relative strengths of acids and bases compared?
- _____
11. Name the process that occurs when you drop an antacid tablet into a glass of lemonade.
- _____

SECTION

1

Study Guide

What is motion?

Chapter

11

Directions: Fill in the chart using information from the chapter.

	Term	Definition	Includes Direction?
1.	distance		
2.	displacement		
3.	average speed		
4.	instantaneous speed		
5.	velocity		

Directions: List three ways the velocity of a car can change.

6. _____
7. _____
8. _____

Directions: Explain how the speed of an object is changing if the line representing the object's motion on a distance-time graph becomes steeper.

9. _____
- _____
- _____

Directions: Explain how the displacement of an object could be zero while the distance the object travels is 150 m.

10. _____
- _____
- _____

SECTION 2

Study Guide

Acceleration

Chapter

11

Directions: *In the space provided, substitute a word for the word in italics to make the statement correct.*

- _____ 1. *Velocity* is a change in an object's motion.
- _____ 2. Acceleration is the rate of change of velocity with *distance*.
- _____ 3. When an object slows down, it has *no* acceleration.

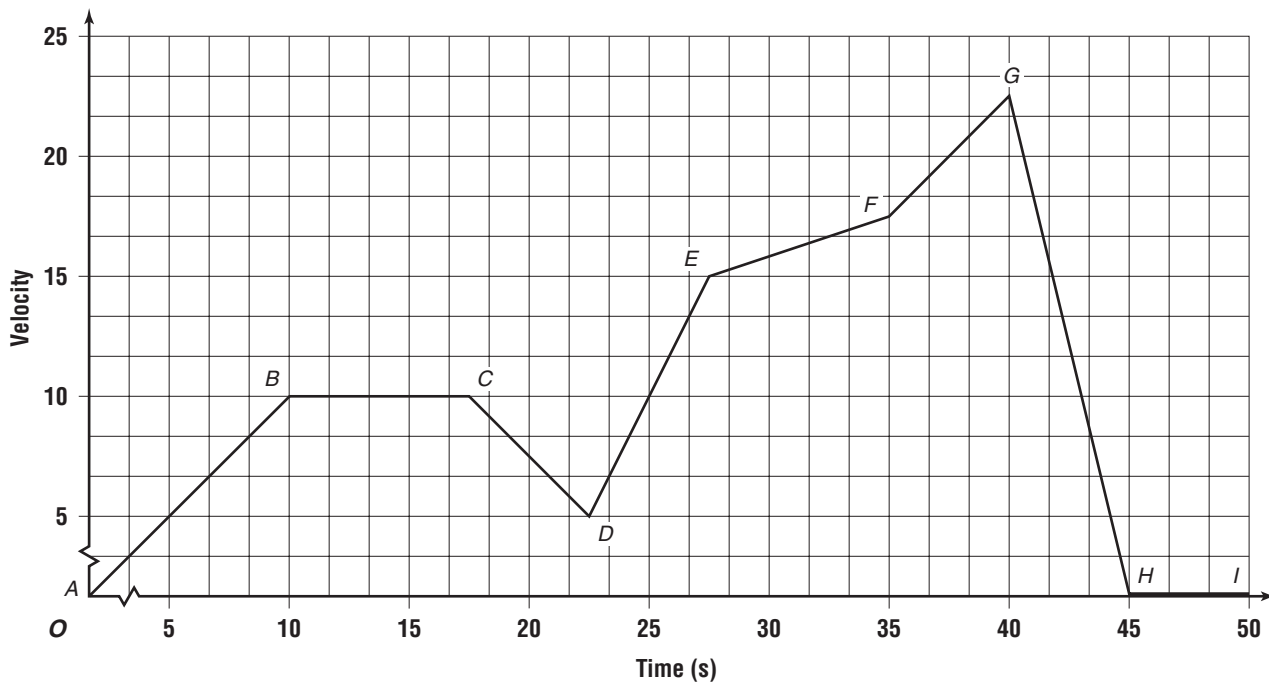
Directions: *Answer the following questions on the lines provided.*

4. A merry-go-round horse travels at a constant speed. Is it accelerating? Explain.

5. What is the unit for speed? For acceleration?

6. If an object has an acceleration of -3 m/s^2 , describe its motion.

Directions: *Study the velocity-time graph for an object in motion. Then answer the following questions.*



7. In what interval does the object have the fastest acceleration?

8. Over what interval(s) does the object have a negative acceleration?

9. Over what interval is the object stopped?

SECTION
3

Study Guide

Momentum

Chapter

11

Directions: In question 1, below, a code letter has been substituted for every letter of the alphabet. To find out what the sentence says, use the following key to decode it. In the key, the code letters are shown directly below the letters they stand for. Write the correct letter above each code letter, then read the sentence.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
L V Y Q G Z M O B P F S R J D T E N I H X C K M A U

1.
H O G H D H L S R D R G J H X R D Z D V P G Y H I H O L H
- Y D S S B Q G K B H O G L Y O D H O G N Q D G I J D H Y O L J M G

2. What is the law that is stated above?
- _____

Directions: Correctly complete each sentence by underlining the best of the three choices in parentheses.

3. A feather floating in the air has (more, less, the same) momentum as a bowling ball on a shelf.
4. The momentum of an object depends on its mass and (velocity, acceleration, inertia).
5. The tendency for an object to resist change in its motion, is its (momentum, inertia, weight).
6. We say that momentum is conserved, yet objects slow down after collisions. This is because of (inertia, friction, mass).

Directions: Answer the following questions on the lines provided.

7. A 500 g model train car traveling at 0.8 m/s collides with a 300 g stationary car. The cars hook up and move off down the track together. How fast are they going?
- _____
- _____

8. Which has a greater momentum, a car or a bike moving at the same speed?
- _____

9. What happens when two objects with the same mass collide?
- _____
- _____

SECTION
1

Study Guide

Newton's First Law

Chapter

12

Directions: Use the terms from the word bank to fill in the blanks in front of the correct phrases below.

**balanced
force
friction**

**net force
Newton's first
rolling**

**static
sliding
unbalanced**

- _____ 1. the force that brings nearly everything to a stop, also useful for mountain climbers and baseball players
- _____ 2. the type of friction that acts on a rolling wheel, easier to overcome than static friction
- _____ 3. the combination of all forces acting on an object
- _____ 4. the law that describes the motion of objects that experience balanced forces
- _____ 5. the forces acting on an object whose motion is not
- _____ 6. the type of friction that you have to overcome to push a stationary object
- _____ 7. the type of friction acting on surfaces sliding on each other
- _____ 8. a push or pull
- _____ 9. the forces that cause the motion of an object to change

Directions: Unscramble the words to fill in the blanks in this paragraph that explains how Galileo Galilei's ideas helped Isaac Newton to understand the nature of motion.

Galileo realized that an object could be in motion even if the (10) _____ (ecsfro) acting on it were (11) _____ (aebcdln). In real life, (12) _____ (cinotfri) is the force that (13) _____ (lswso) objects down and causes them to (14) _____ (sptso). Newton's (15) _____ (srift) law of motion described how forces cause the motion of objects to (16) _____ (aehncg): An object at rest remains at rest and an object in motion continues to move in a (17) _____ (gsahitr) line with constant (18) _____ (pedes) if the net force acting on it is (19) _____ (ozer).

SECTION 2

Study Guide

Newton's Second Law

Chapter

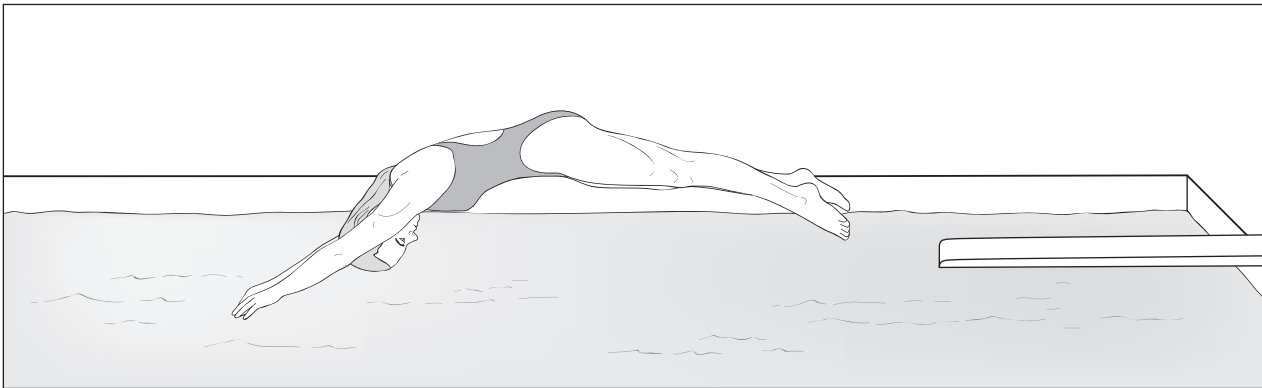
12

Directions: Select the term from the following list that matches each description. Some terms will not be used.

- | | | |
|-------------|---|----------------------------------|
| a. 16 N | e. $a = \frac{F}{m}$ | i. 600 N |
| b. -16 N | f. normal forces | j. Newton's second law of motion |
| c. gravity | g. air resistance | k. terminal velocity |
| d. $F = ma$ | h. $F = m\left(\frac{9.8 \text{ m}}{\text{s}^2}\right)$ | l. Newton's first law of motion |

- _____ 1. acts against the direction of motion and gets larger as an object moves faster
- _____ 2. Force is equal to mass times acceleration.
- _____ 3. An object acted upon by a net force will accelerate in the direction of that force.
- _____ 4. the gravitational force on any object near Earth's surface
- _____ 5. the outward forces exerted by a surface
- _____ 6. the speed an object reaches when the force of gravity is balanced by the force of air resistance
- _____ 7. What force must be applied to a 60-kg object to make it accelerate at 10 m/s²?

Directions: Study the illustration of the diver. Then identify each statement as **true** or **false**. If the statement is false, change the word(s) in *italics* to make it true.



- _____ 8. After the diver jumps forward from the diving board, the force of gravity will accelerate the diver *parallel* to the direction of motion.
- _____ 9. When the diver hits the water, the force of the water against her body can stop it about *five times faster* than the pull of gravity that accelerated it.
- _____ 10. If the diver doesn't have the correct form when she enters the water, the force of the water can *accelerate* her speed.
- _____ 11. *Air resistance* prevents the diver from moving in a straight line once she jumps from the platform.

SECTION
3

Study Guide

Newton's Third Law

Chapter

12

Directions: Complete the table by naming the action and reaction forces in the following examples.

Example	Action force	Reaction force
1. A flying bird		
2. Two bumper cars collide		
3. Holding your hand out the window of a moving car		
4. Walking		
5. Touching your finger to your nose		

Directions: Complete the following sentences using the correct terms or phrases.

- Newton's third law states, "For every action, there is an equal but _____."
- There is no _____ in time between the action and the reaction.
- One reason it's often easy to miss an action-reaction pair is because of the _____ of one of the objects.
- Action-reaction forces are always the same _____ but are in opposite _____.
- When you swim in water, your arms push the water _____. The water reacts by pushing _____ on your arms, causing your body to accelerate _____.

Directions: Answer the following question using complete sentences.

- How could the action force of a canoe moving through water be increased?

SECTION
1**Study Guide****What is energy?****Chapter****13**

Directions: Label each situation with the type of energy it describes. Some situations may have more than one answer.

**chemical
potential****electrical
radiant****kinetic
thermal****nuclear**

- _____ 1. sunshine
- _____ 2. a rolling ball gains more of this kind of energy when it moves faster
- _____ 3. the ocean affects climate because it has so much of this kind of energy
- _____ 4. a rock balanced on a ledge has this kind of energy
- _____ 5. energy in the nuclei of atoms
- _____ 6. energy stored in chemical bonds
- _____ 7. energy produced in your body's cells
- _____ 8. energy that operates a toaster
- _____ 9. energy emitted by a toaster
- _____ 10. energy emitted by a lightbulb
- _____ 11. as objects become hotter, they have more of this type of energy
- _____ 12. three kinds of energy a match can help you get from firewood
- _____ 13. energy of moving objects
- _____ 14. energy of position
- _____ 15. energy stored in gasoline

Directions: List two types of energy that depend on the mass of an object.

16. _____

17. _____

Directions: State the type of energy that is carried by light.

18. _____

SECTION
2

Study Guide

Energy Transformations

Chapter

13

Directions: Fill in the blanks with the terms that best complete the statements.

1. In every energy transformation, some _____ is released.
2. When you climb a rope, you change _____ energy into _____ energy.
3. Energy can never be created or destroyed, just _____ or _____.
4. As temperature increases, _____ energy increases.
5. Fireworks change _____ into _____ and _____ energy.
6. When a pendulum swings, if it is not continuously pushed, it will stop eventually because some of its energy is changed into _____ energy.
7. In the muscle cells in your body, _____ energy is changed into _____ energy.

Directions: Answer the following questions on the lines provided.

8. Trace the energy transformations from a hamburger you eat to riding your bike.

9. In most forms of generation of electrical energy in power plants, the last two steps are the same. What are they?

10. Trace the energy transformations from a radio signal to the music you hear.

SECTION
3**Study Guide****Sources of Energy****Chapter****13**

Directions: Circle the term in parentheses that correctly completes the following statements.

1. (Oil, Wind, Water) is a fossil fuel.
2. As you go deeper into Earth, the temperature (increases, decreases, stays the same).
3. (Coal, Oil, Water) is a renewable resource.
4. (Geothermal energy, Fossil fuels, Hydroelectric energy) cause acid rain.
5. A mountainous region would be a likely source for (nuclear, hydroelectric, wind) energy.

Directions: Determine whether each of the following statements is true or false. If it is true, write **true** on the line. If it is false, change the underlined term to make it true.

6. Fossil fuels cause air pollution.

7. Geothermal energy is caused by falling water.

8. A thermal cell produces electricity directly from sunlight.

9. A reflecting panel uses the kinetic energy of moving air.

10. About 68% of the electrical energy in the United States is produced by nuclear fuel.

Directions: Answer the following questions on the lines provided.

11. Explain why it would be necessary for a home using solar energy to have some type of an energy storage device.

12. Explain how hydroelectric energy works.

13. Give two advantages and two disadvantages of using fossil fuels.

SECTION
1

Study Guide

Waves

Chapter

14

Directions: Match the words from the list with the descriptions below.

amplitude
compression
crest
diffraction

electromagnetic wave
frequency
mechanical wave
rarefaction

refraction
trough
wave
wave speed

- _____ 1. a disturbance that moves through matter or space
- _____ 2. low point in a transverse wave
- _____ 3. region where coils are farthest apart for a compressional wave on a spring coil
- _____ 4. type of wave that can travel through matter and empty space
- _____ 5. depends on the energy carried by a wave
- _____ 6. equals the wavelength times the frequency
- _____ 7. region where coils are closest together for a compressional wave on a spring coil
- _____ 8. a change in wave direction that occurs when a wave passes from one material to another and changes speed
- _____ 9. the bending of waves around an object
- _____ 10. a high point in a transverse wave
- _____ 11. the number of wavelengths that pass a point in a given time interval, measured in units of Hertz, which is the same as 1/s
- _____ 12. type of wave that can travel only through matter, including seismic waves

Directions: Fill in the blanks by unscrambling the words.

In water waves, energy is transferred by collisions between water (13) _____ (sloceemul). The (14) _____ (nactolsio) of the particles hardly (15) _____ (hcnesga) at all.

Waves are usually produced by something (16) _____ (gomvin) back and forth or (17) _____, (tgivibnra).

The (18) _____ (siopterper) of waves depend on the (19) _____ (tonsbrivia) that produce them.

SECTION
2**Study Guide****Sound Waves****Chapter****14**

Directions: Answer the questions on the lines provided.

1. How does a vibrating drum produce a sound wave?

2. Does sound travel outside Earth's atmosphere in space? Explain.

3. Explain how intensity, sound, and energy are related.

4. What are the three main parts of the human ear and what is the function of each?

5. Explain why sound travels faster through iron than through air.

SECTION
3**Study Guide****Light****Chapter****14**

Directions: Answer the questions on the lines provided.

1. Compare and contrast light waves and sound waves.

2. Describe the electromagnetic spectrum.

3. What are ultraviolet waves, X-rays, and gamma rays used for?

4. How do the cornea, lens, and retina aid in the vision process?

5. What are rod and cone cells?

SECTION
1

Study Guide

Electronics

Chapter

15

Directions: Fill in the summary chart below with information from the chapter.

	Type of Signal	Analog	Digital
1.	Description of signal		
2.	Example of signal		
3.	Devices that use that type of signal		

Directions: List four things that information from an electronic signal can be used to produce.

4. _____

Directions: Unscramble the words to complete the section summary statements.

A changing electric current that carries information is called an (5) _____
(cnoirtlcee ainslg).

You could make a digital signal by measuring the temperature every (6) _____
(uroh) and making a graph with the results. Another way would be to (7) _____
(alemsp) an analog signal at intervals.

Old televisions used (8) _____ (umcavu) tubes. They were
(9) _____ (lubyk), used a lot of electrical (10) _____ (wrope),
and created a lot of (11) _____ (athe).

Modern electronic devices use (12) _____ (omoissecdtrn), which may be
n-type or p-type. A (13) _____ (oddie) is a device that only allows current to
flow in one direction. A (14) _____ (ansorrtti) is a device that can be used to
amplify signals or as an electronic switch.

SECTION
2**Study Guide****Computers****Chapter****15**

Directions: Answer the following questions on the lines provided.

1. What is a computer?

2. Name three places not mentioned in the text where you could find computers.

Directions: Fill in the blanks with the term that best completes each statement.

3. Computers store information as _____ information.
4. 0 and 1 are the digits in the _____ system.
5. Each 0 or 1 is called a _____ and eight of these make one _____.
6. Each position in a binary number is based on a(n) _____ of 2.
7. Our everyday number system is based on _____, the binary system is based on 2.
8. The binary number 1011 is _____ in the base 10 system.
9. In a computer, the digits 0 and 1 represent switch positions of _____ and _____.
10. A computer's temporary memory is called _____ or _____.
11. The material stored in RAM will be _____ when the computer is turned off.
12. Information that tells a computer how to operate is stored in _____ or _____.
13. A microprocessor is also called a (n) _____.
14. A _____ is a list of instructions that tells a computer what to do.
15. Computer hardware consists of _____, _____, _____, and a central processing unit.
16. Information on a hard disk or on a floppy disk is stored _____.
17. The Internet is a collection of linked _____.

SECTION
1

Study Guide

Stars

Chapter

16

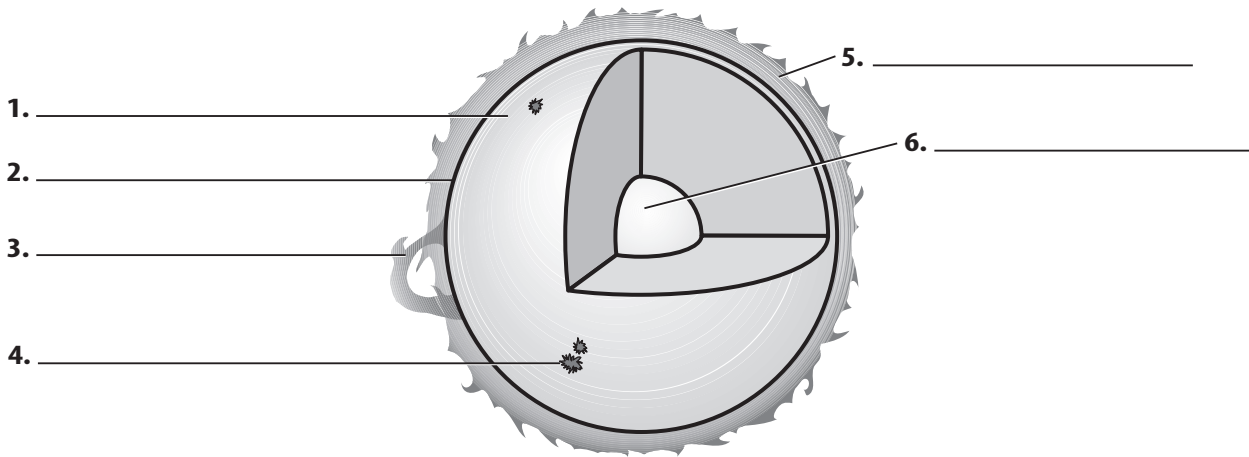
Directions: Use the vocabulary terms to complete the summary paragraph about stars.

24 hours	chemical elements	Polaris
88 constellations	circumpolar constellations	Proxima Centauri
absolute magnitude	constellation	spectroscope
apparent magnitude	light-year	stars
atmosphere	parallax	temperature

Modern astronomy has divided the sky into (1)_____. A (2)_____ is defined as a pattern of stars in the sky that looks like a familiar object. However, the (3)_____ in the constellation have no relationship to each other in space—some may be close, and some light-years away. The North Star, also called (4)_____, is positioned almost directly over Earth’s north pole. Some constellations can be viewed all year round near Earth’s poles. (5)_____ appear to rotate above the pole one full circle in the sky every (6)_____ as Earth rotates on its axis. Scientists measure the brightness of stars to determine a star’s age and chemical makeup. They are able to measure the actual amount of light the star gives off, called (7)_____, as well as the amount of light received on Earth, called (8)_____. The distance a star is from Earth can be measured by studying the apparent shift in position of the star when viewed from two different positions—referred to as (9)_____. The nearer the object is to the observer, the greater the apparent shift in position. Scientists are able to measure the distances between Earth and stars such as (10)_____ which is 4.3 light-years away and is the closest star to Earth, excluding the Sun. A (11)_____ is the distance light travels in one year. Astronomers are also interested in the color of a star, as it indicates the (12)_____ and age of a star. When attached to a telescope, a (13)_____ acts like a prism and spreads light out into a band of colors called a spectrum. As light from the star passes out of the star’s atmosphere, (14)_____ in the star’s atmosphere absorb specific wavelengths of light, producing a unique pattern of dark lines. These patterns of lines can be used to identify which chemical elements are in the star’s (15)_____.

SECTION
2
Study Guide
The Sun
Chapter
16

Directions: *The diagram shows interior and outer features of the Sun. Write the name of each feature on the lines provided in the diagram.*



Directions: *Answer the questions in complete sentences.*

7. How can the Sun be classified?

8. How is the energy of the Sun produced?

9. How does our Sun differ from most other main sequence stars?

10. How do CMEs (coronal mass ejections) affect Earth?

11. How are sunspots related to prominences and solar flares?

SECTION
3

Study Guide

Evolution of Stars

Chapter

16

Directions: Circle the term in the puzzle that fits each clue. Then write the term on the line. In the puzzle, the terms read across or down.

E I B L A C K H O L E N S
H N E U T R O N S T A R T
R M A I N S E Q U E N C E
D C E I E N P R P O P O G
I O S E B L U E E D T H I
A L A T U M A S R S C A A
G O Y E L L O W G N B E N
R R C O A N V E I R T E T
A W H I T E D W A R F D I
M N T S U P E R N O V A O
E N F U S I O N T E R G Y

1. A _____ is a large cloud of dust and gas that becomes a star.
2. A graph that shows the relationship between a star's absolute magnitude and temperature is an _____.
3. A star that is a _____ has exhausted its supply of hydrogen.
4. The _____ of atoms powers the Sun and other stars.
5. The temperature and brightness of stars are indicated by their _____.
6. About 90 percent of the stars, including our Sun, are _____ stars.
7. A _____ is produced when the outer core of a star explodes after the core collapses.
8. The hottest, brightest stars are _____ and white.
9. Medium hot and bright stars like our Sun are _____ in color.
10. When a star has no fuel left and its outer layers escape into space, it is a _____.
11. As heavier elements are formed by fusion, a massive star expands into a _____.
12. When a collapsed core becomes so dense only neutrons can exist there, a _____ is formed.
13. A _____ is so dense that nothing, including light, can escape its gravity field.
14. Write the remaining letters in the puzzle in the order in which they appear to reveal a famous scientist's theory. _____

SECTION
4

Study Guide

Galaxies and the Universe

Chapter

16

Directions: Use the terms below to complete the following sentences.

Milky Way	one trillion	Andromeda
Local Group	Steady state theory	galaxy
Doppler shift	Big Bang theory	irregular
elliptical	Clouds of Magellan	Oscillating model
		cluster
		spiral

- The two types of _____ galaxies are barred and normal.
- A _____ is a group of galaxies.
- _____ galaxies have many different shapes and are usually smaller and less common than other types of galaxies.
- An elliptical galaxy about 2.9 million light-years away is in the constellation of _____.
- Galaxies shaped like footballs are _____ galaxies.
- Two irregular galaxies called the _____ orbit the Milky Way.
- A _____ is a large group of stars, gas, and dust held together by gravity.
- The _____ is an explanation for the formation of the universe.
- The solar system in which we live is in the _____ Galaxy.
- The Milky Way Galaxy may contain _____.
- The Andromeda Galaxy is a member of the _____.
- The _____ causes changes in the light coming from distant stars and galaxies.
- One model of the origin of the universe is the _____, which proposes that the universe was always as it is now.
- Another model of the origin of the universe is the _____, which believes that the universe expands and contracts in a regular pattern.

SECTION
1

Study Guide

Minerals

Chapter

17

Directions: Place the letter of the term beside the correct definition.

Definition

- _____ 1. naturally occurring, inorganic solid with a definite chemical composition and an orderly arrangement of atoms
- _____ 2. salt formed by the natural evaporation of seawater
- _____ 3. describes atoms arranged in a pattern over and over
- _____ 4. a solid in which the atoms are arranged in an orderly, repeating pattern
- _____ 5. melted rock that forms crystals
- _____ 6. the part of a solution that evaporates, leaving a mineral
- _____ 7. the process, in a dry climate, where the solution leaves the mineral
- _____ 8. number of common elements in Earth's crust
- _____ 9. group of rocks forming minerals that contain silicon and oxygen
- _____ 10. two most abundant elements in Earth's crust

Vocabulary

- a. crystal
- b. crystalline
- c. eight
- d. evaporation
- e. five
- f. halite
- g. magma
- h. mineral
- i. oxygen
- j. silicon
- k. silicate
- l. water

Directions: List four characteristics of a mineral.

11. _____
12. _____
13. _____
14. _____

Directions: Arrange the eight most common elements in Earth's crust from most common to least common. (Hint: refer to Figure 5 in your textbook for additional help.)

Most common

Least common

15.	16.	17.	18.	19.	20.	21.	22.
-----	-----	-----	-----	-----	-----	-----	-----

SECTION
2

Study Guide

Mineral Identification

Chapter

17

Directions: *In the blank at the left, put a check mark (✓) next to each statement that agrees with the textbook.*

- _____ 1. The physical properties of a mineral can be seen or measured in some way.
- _____ 2. The physical properties of a mineral make it possible to identify the mineral.
- _____ 3. Any mineral can be identified by a careful check of one physical characteristic.
- _____ 4. Hardness is a measure of how easily a mineral can be located.
- _____ 5. Friedrich Mohs developed a scale which lists minerals according to their hardness.
- _____ 6. Quartz will scratch a piece of copper, so quartz is harder than copper.
- _____ 7. The luster of a mineral is described as metallic or nonmetallic.
- _____ 8. The luster of chrome would be described as nonmetallic.
- _____ 9. Color alone is not usually enough to identify a mineral.
- _____ 10. When some minerals are rubbed across unglazed porcelain, they leave a streak of powdered material.
- _____ 11. Graphite is a mineral that does not leave a clear streak.
- _____ 12. Topaz is a mineral that does not leave a clear streak.
- _____ 13. Most minerals cannot be broken.
- _____ 14. Mica shows clear cleavage.
- _____ 15. Quartz is a mineral with cleavage.

Directions: *Match the mineral names in Column I with the descriptions in Column II. Write the letter of the correct description in the blank at the left.*

Column I

- _____ 16. magnetite
- _____ 17. pyrite
- _____ 18. talc
- _____ 19. calcite
- _____ 20. gold

Column II

- a. light yellow color; metallic luster; greenish-black streak
- b. light color; fingernail will scratch it; leaves thick, powdery streak
- c. black color; black streak; dull metallic luster; is attracted to magnets
- d. yellow color; scratched by copper penny; often found in flakes
- e. glassy luster; hardness of 3

SECTION
3**Study Guide****Uses of Minerals****Chapter****17**

Directions: Answer the following questions on the lines provided.

1. Why are diamonds and rubies valuable? What are minerals like these called?

2. What characteristics make gemstones beautiful?

3. Quartz crystals can be used as gems. What other more practical uses can quartz crystals have?

4. What useful material may be obtained from bauxite? What useful material may be obtained from hematite? What are bauxite and hematite called, since they produce useful materials?

5. Where are vein mineral deposits found? How did they get there?

6. What is titanium and why is it useful?

SECTION
1

Study Guide

The Rock Cycle

Chapter

18

Directions: Place the letter of the term beside the correct definition.

Definition

- _____ 1. a mixture of minerals, volcanic glass, organic material, or other materials
- _____ 2. illustrates the processes that create and change rocks
- _____ 3. formed when particles and bits of rock are cemented together
- _____ 4. formed when heat, pressure, or fluids act on other types of rock and affect their composition
- _____ 5. formed when hot magma cools and hardens (may be intrusive or extrusive rock)
- _____ 6. rock fragments, mineral grains, or organic remains that have been moved by wind, water, ice, or gravity
- _____ 7. principle that illustrates chemical elements from minerals and rocks are not lost or destroyed, but changed to a new form
- _____ 8. location where scientists first recognized the rock cycle

Vocabulary

- a. conservation of matter
- b. igneous rock
- c. James Hutton
- d. metamorphic rock
- e. Mt. Rushmore, South Dakota
- f. rock
- g. rock cycle
- h. sediments
- i. sedimentary rock
- j. Siccar Point, Scotland
- k. volcanic

Directions: List possible changes for each type of rock. (Hint: Refer to Figure 2 in your textbook for additional help.)

	Type of Rock	May Change To	Or May Change To
9.	Igneous	magma	
10.	Sedimentary		
11.	Metamorphic	sediments	
12.	Sediments		

SECTION 2

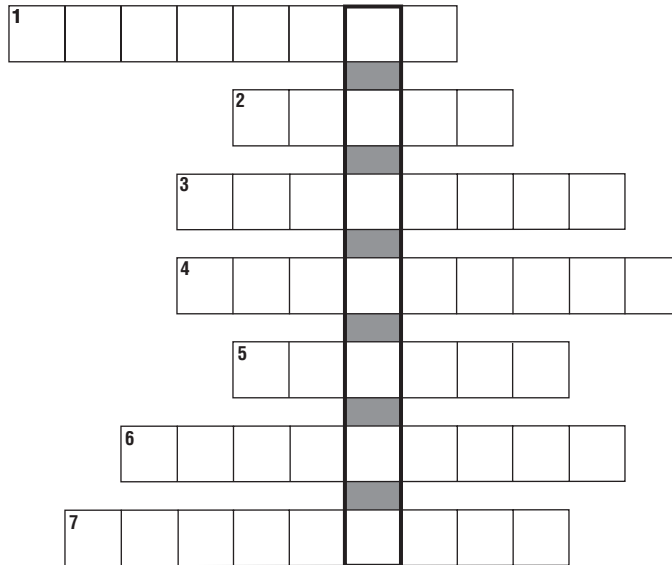
Study Guide

Igneous Rocks

Chapter

18

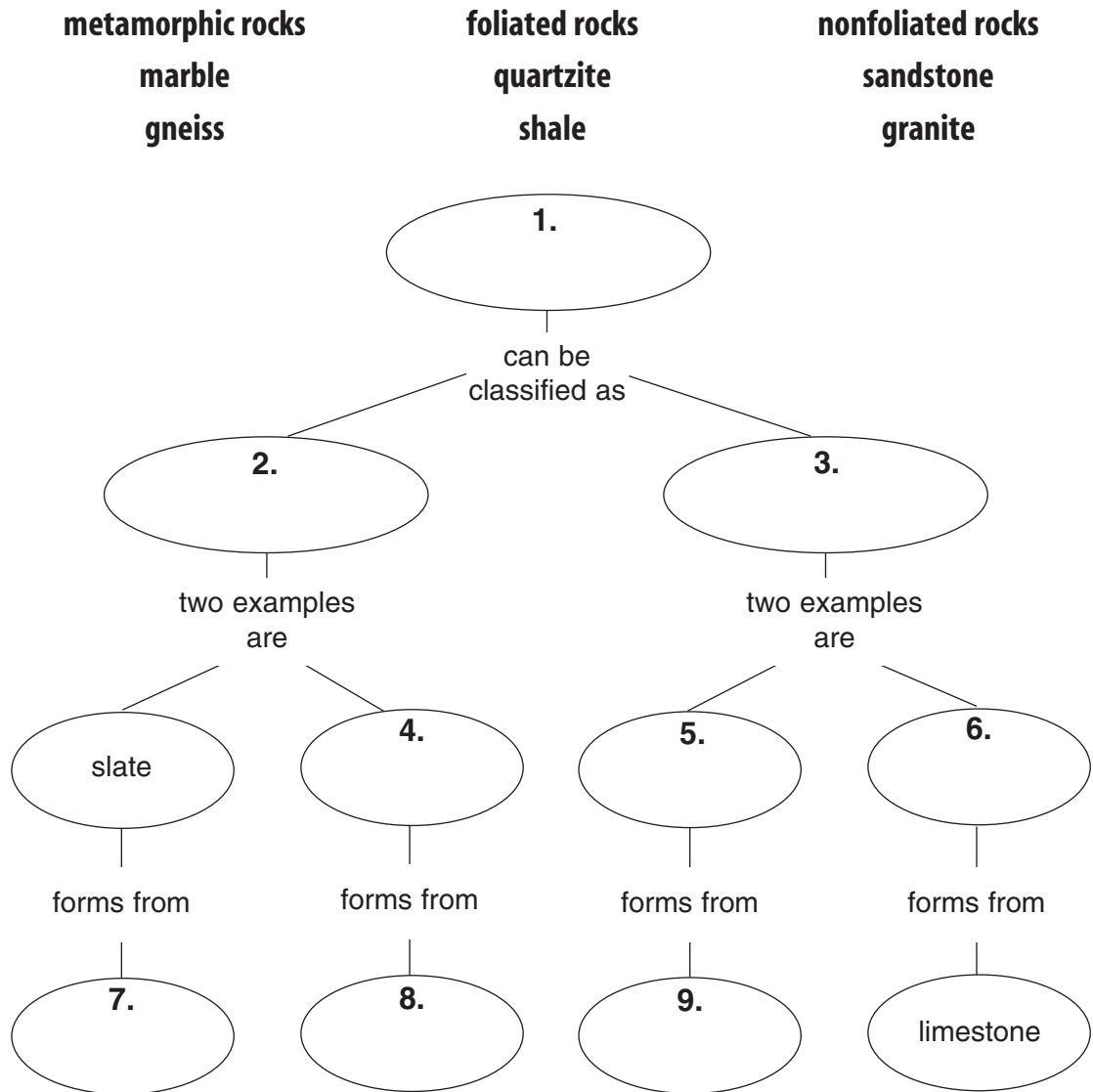
Directions: Write the term that matches each description below on the spaces provided. The boxed letters should spell the kind of rocks that form from magma.



1. Igneous rocks that are dense and dark-colored. They form from magma that is rich in iron and magnesium and poor in silica.
2. Thick, gooey, molten material inside a volcano or deep inside Earth
3. Igneous rocks that are light-colored and have a lower density. They form from thick, stiff magma that contains lots of silica and lesser amounts of iron and magnesium.
4. Igneous rocks that have mineral compositions between those of granitic and basaltic rocks
5. One kind of volcanic glass that has holes caused by pockets of gas
6. The kind of igneous rock that forms below Earth's surface
7. The kind of igneous rock that forms on or near Earth's surface
8. Magma forms this kind of rock. _____

SECTION
3
Study Guide
Metamorphic Rocks
Chapter
18

Directions: Complete the concept map using the terms below.



Directions: Write **T** if the statement is true. Write **F** if the statement is false.

- _____ 10. Metamorphic rocks form only from igneous rocks.
- _____ 11. An igneous rock like granite can be formed into a metamorphic rock like gneiss.
- _____ 12. Heat and pressure have no effect on rocks.
- _____ 13. One type of rock, such as shale, can change into several different kinds of metamorphic rock.

SECTION
4

Study Guide

Sedimentary Rocks

Chapter

18

Directions: Complete the outline by filling in the blanks.

Sedimentary Rocks

I. Materials that make up sediments

A. _____

B. _____

C. _____

II. Ways sedimentary rocks can form

A. _____

Definition: _____

B. _____

Definition: _____

C. _____

Definition: _____

III. Classification of sedimentary rocks

A. _____

Examples: _____

B. _____

Examples: _____

C. _____

Examples: _____

SECTION
1

Study Guide

Earth's Moving Plates

Chapter

19

Directions: Match the terms from the word bank with the phrases below.

Arabian plate
asthenosphere
colliding plates
convection
crust

erupting lava
inner core
lithosphere
mantle

mountain ranges
outer core
seismic waves
separating plates

South American plate
subduction
transform boundary
volcanoes

- _____ 1. the part of Earth that makes up two thirds of its mass and flows slowly like putty
- _____ 2. a layer of Earth that is like plastic. It rests under the lithosphere and the plates move on it.
- _____ 3. the kind of plates that cause mountains to form
- _____ 4. these are formed when oceanic plates slide under continental plates
- _____ 5. what occurs when two plates of different densities are colliding
- _____ 6. the area where two plates slide past each other
- _____ 7. the plate that the Nazca plate is moving toward
- _____ 8. plates may move because of this type of movement in the mantle
- _____ 9. the highest-pressure, hottest part of Earth that is mostly solid iron
- _____ 10. these can form when plates of similar density are colliding
- _____ 11. the part of Earth that is made of the crust and upper mantle and rests on the asthenosphere.
- _____ 12. islands can be formed near ocean trenches by this
- _____ 13. the kind of plates that cause rift zones or high ridges to form under the sea
- _____ 14. the part of Earth that contains the mountains and the valleys. It is the least dense and thinnest layer and is thicker on the continents than under the oceans.
- _____ 15. the part of the Earth that stops or slows down seismic waves because it is made of liquid metal
- _____ 16. a plate that the African plate is moving toward
- _____ 17. energy disturbances that travel through rock, and can speed up, slow down, and be bent or stopped

SECTION
2

Study Guide

Uplift of Earth's Crust

Chapter

19

Directions: Complete the table by describing the type of mountain and giving an example of that type of mountain.

Type of mountain	Description	Example
1. Fault-block		
2. Folded		
3. Upwarped		
4. Volcanic		

Directions: Complete the following sentences using the correct terms.

- The principle of isostasy states that Earth's crust and _____ float on the upper part of the mantle.
- Mountains grow _____ and sink farther down into the mantle.
- Icebergs are largest when they break off of a _____.
- The Hawaiian Islands are volcanic mountains that formed from lava eruptions on the _____.

SECTION
1

Study Guide

Earthquakes

Chapter

20

Directions: Match the terms from the word bank with the phrases below.

elastic rebound
epicenter
fault
focus

magnitude
Mercalli
P-wave
Richter

seismic safe
seismic wave
strain

surface wave
S-wave
tsunami

- _____ 1. the point where the movement occurs that causes the wave energy to start
- _____ 2. the type of earthquake wave that does damage to roads and buildings
- _____ 3. a type of seismic wave that causes particles to vibrate perpendicular to the direction of the wave
- _____ 4. surface of a break along which rocks move
- _____ 5. the snapping back of rock when it breaks apart
- _____ 6. a consequence of earthquakes that occur on the ocean floor
- _____ 7. point on Earth's surface above an earthquake's focus
- _____ 8. the fastest type of seismic wave, which causes rock to vibrate in the same direction the wave is moving
- _____ 9. a scale of magnitude that tells how much energy an earthquake releases
- _____ 10. waves that travel through Earth
- _____ 11. a scale that describes the intensity of an earthquake by the amount of geologic and structural damage it causes
- _____ 12. something measured by the height of lines traced on a seismograph by the energy of an earthquake
- _____ 13. the kind of energy that builds up as rock bends and is released when rock breaks
- _____ 14. a description for buildings that can stand up to the vibrations of an earthquake

Directions: List three types of faults and how they form.

15. _____
16. _____
17. _____

SECTION
2

Study Guide

Volcanoes

Chapter

20

Directions: *Indicate whether each statement refers to a shield volcano (sh), a cinder cone volcano (cc), or a composite volcano (cv).*

- _____ 1. moderate to violent eruptions throwing volcanic ash, cinders, and lava high into the air
- _____ 2. largest type of volcano
- _____ 3. a relatively small cone of volcanic material formed from tephra
- _____ 4. sometimes erupts violently, forming a layer of tephra; sometimes a quieter eruption forming a lava layer
- _____ 5. forms along subduction zones
- _____ 6. buildup of basaltic layers, forming a broad volcano with gently sloping sides
- _____ 7. forms where magma is being forced up from the extreme depths within Earth, or in areas where Earth's plates are moving apart
- _____ 8. Sunset Crater, near Flagstaff, Arizona
- _____ 9. Mount St. Helens, in Washington
- _____ 10. a steep-sided mountain composed of alternating layers of lava and tephra

Directions: *Match the descriptions in Column II with the items in Column I. Write the letter of the correct description in the blank at the left.*

Column I

- _____ 11. pyroclastic flow
- _____ 12. mudflows
- _____ 13. lava
- _____ 14. lava rich in silica
- _____ 15. lava rich in iron and magnesium
- _____ 16. tephra

Column II

- a. magma when it reaches Earth's surface
- b. ash, cinders, solidified lava
- c. tends to flow easily
- d. tends to be thicker and is more resistant to flow
- e. hot, glowing rock flows on cushion of hot gases
- f. often accompany eruptions, and can be brought on by heavy rain

SECTION
3

Study Guide

**Earthquakes, Volcanoes, and
Plate Tectonics**

Chapter

20

Directions: Answer the following questions on the lines provided.

1. Describe the lithosphere.

2. What are rifts? What kinds of eruptions would you expect there?

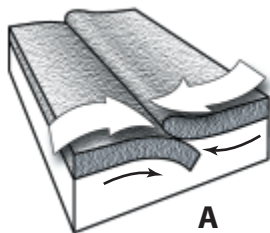
3. What happens at a convergent plate boundary? How does this set up conditions that form volcanoes?

4. Where do most volcanoes form? How did the Hawaiian Islands form?

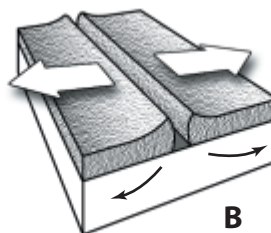
5. Where and how do earthquakes form?

6. Describe the convection theory of tectonic plate movement.

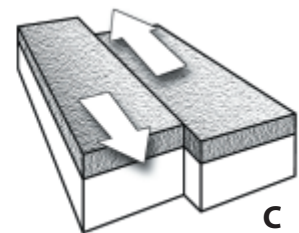
Directions: Use the drawings to identify the types of plate boundaries.



A



B



C

7. transform boundary _____

8. convergent boundary _____

9. divergent boundary _____

SECTION
1**Study Guide****What is climate?****Chapter****21**

Directions: Answer the question below.

1. Define climate and explain how climate differs from weather.

Directions: Explain how each of the following factors affects the climate of the surrounding area.

2. Large bodies of water: _____

3. Ocean currents: _____

4. Mountains: _____

5. Rain shadows: _____

- a. Windward side of mountain: _____

- b. Leeward side of mountain: _____

6. Cities: _____

Directions: List the five factors used to determine climate.

7. _____

8. _____

9. _____

10. _____

11. _____

SECTION
2

Study Guide

Climate Types

Chapter

21

Directions: Complete the following sentences using the correct terms.

- The type of plants found in a region depends on the region's _____.
- The fur of mammals _____ them from the cold.
- A(n) _____ is a characteristic that helps an organism survive.
- Desert turtles and lizards obtain the moisture they need from their _____.
- Some mammals survive cold winters in a state of reduced activity called _____.
- Lungfish survive intense heat in an inactive state called _____.
- A body structure that helps an organism survive in its environment is a(n) _____ adaptation.
- In the Köppen System, climate groups are classified according to temperature and _____.

Directions: Answer the following questions on the lines provided.

9. What is an adaptation?

10. What behavioral adaptations help snakes survive in hot, dry places?

11. What are three body structures that help cactus plants survive in dry climates?

12. How do the body structures you listed above help the cactus plants survive in dry climates?

13. Name the six groups of climates in the Köppen classification system.

SECTION
3**Study Guide****Climatic Changes****Chapter****21**

Directions: Answer the following questions on the lines provided.

1. In the illustration, what season is it in the northern hemispheres? In the southern hemisphere?

2. Where on Earth are the seasonal variations of temperature and day length greatest? Least?

3. What are the effects of El Niño?

4. What is global warming?

5. How might global warming affect Earth?

6. What are some possible causes for climatic changes in the past?

7. What is the greenhouse effect?

8. How does the greenhouse effect influence Earth?

9. How do scientists know what Earth's climate was like in earlier geologic eras?

To
Sun ←



SECTION
1

Study Guide

Fossils

Chapter

22

Directions: Write the correct Earth science term from the word bank on the line next to its definition.

carbon films

cast

coal

fossils

index fossils

mineral replacement

mold

original remains

permineralized remains

trace fossils

- _____ 1. thin film of carbon residue forming a silhouette of the original organism
- _____ 2. soft spaces inside an organism are filled with minerals from groundwater
- _____ 3. hard, outer cavity in the rock where fossil has been dissolved
- _____ 4. fossilized tracks and evidence of activity of organisms
- _____ 5. traces of species that existed on Earth, used to judge climate, environment, and geologic time
- _____ 6. minerals or sediments fill a fossil mold
- _____ 7. totally carbonized remains, now used as fuel source
- _____ 8. the replacement of hard and soft parts of an organism
- _____ 9. remains, imprints, or traces of prehistoric organisms
- _____ 10. entire, complete organism found in amber, ice, or natural tar pit

Directions: List three requirements for a fossil to be considered an index fossil.

11. _____
12. _____
13. _____

Directions: Discuss three things scientists studying fossils might learn about the environment.

14. _____
- _____
- _____
- _____

SECTION 2

Study Guide

Relative Ages of Rocks

Chapter

22

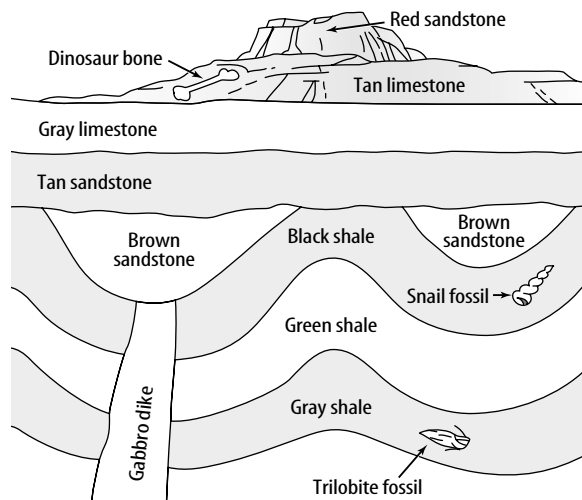
Directions: In the blank at the left, write the term that completes each statement.

- _____ 1. Natural laws govern the way geologists determine the age of rock deposits. This technique is called _____.
- _____ 2. The principle of _____ states that an older rock layer and things buried in it occur beneath younger layers unless the layers have been disturbed.
- _____ 3. Some rock layers are incomplete. The gaps are called _____.
- _____ 4. A common cause of gaps in rock layers is _____.

Directions: Look at the cross-sectional view of the rock layers shown in Figure 1. For each question, decide which of the two named materials is older. Assume the layers have not been overturned. Write the name of the older material on the line provided.

- _____ 5. tan sandstone and brown sandstone
- _____ 6. brown sandstone and gray limestone
- _____ 7. gabbro dike and brown sandstone
- _____ 8. gabbro dike and gray shale
- _____ 9. snail fossil and trilobite fossil
- _____ 10. snail fossil and dinosaur bone
- _____ 11. snail fossil and green shale
- _____ 12. dinosaur bone and red sandstone
- _____ 13. red sandstone and gray limestone
- _____ 14. tan limestone and tan sandstone
- _____ 15. tan limestone and gray limestone
- _____ 16. The type of unconformity shown in Figure 1 is a(n) _____.

Figure 1





Study Guide

Absolute Ages of Rocks

Chapter

22

Directions: Match the terms in Column I with their definitions in Column II. Write the letter of the correct phrase in the blank at the left.

Column I

- _____ 1. absolute dating
 _____ 2. half-life
 _____ 3. radioactive decay
 _____ 4. radiometric dating
 _____ 5. uniformitarianism

Column II

- a. time it takes for half of the atoms in an isotope to decay
 b. breaking down of a neutron into a proton and an electron
 c. principle that Earth processes occurring today are similar to those that occurred in the past
 d. process that uses the properties of atoms in rocks and other objects to determine their ages
 e. calculating the absolute age of a rock by measuring the amounts of parent and daughter materials in a rock and by knowing the half-life of the parent material

Directions: Follow the steps below to demonstrate the radioactive decay of carbon-14. Then answer the questions.

1. Cut a strip of paper 8 cm long. Think of the paper as all of the carbon-14 in an animal when it died.
2. The idea is to show how you find the age of a rock that contains an animal fossil by using the half-lives of isotopes. Cut the strip of paper in half.
3. Discard one half of the paper. This represents the decayed material. Record the cut in Item 6 below with an X.
4. Continue by cutting the second half of the paper in half. Record the cut below with an X.
5. Continue Steps 3 and 4 until the paper is so small you cannot make another cut. Record each cut you make with an X.

6. Number of cuts: _____

7. What is the total number of times you were able (practically) to cut the sample in half?

8. Each cut represents the half-life of carbon-14. What is the total amount of time represented by each cut?

9. Multiply the number of cuts by the half-life of carbon-14. What is the total amount of time represented by the cuts?

10. Could using the half-life of carbon-14 determine when dinosaurs died? Explain.
