Tennessee Science

Grade 7

Mastering the Tennessee Comprehensive Assessment (TCAP)

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Introduction to the Student

On the first day of science class, you will receive a copy of the academic standards for the Tennessee Comprehensive Assessment Program (TCAP) for science. Your teachers will incorporate the standards and the appropriate course content into the classroom curriculum.

The questions in this workbook are aligned with the State Performance Indicators and are designed to assess your mastery of these standards. These academic standards and questions encompass Inquiry, Technology and Engineering, Life Science, Earth and Space Science, and Physical Science.

The sample questions in this workbook are representative of the questions used on the TCAP Achievement Test. These questions are only a sample of what you should expect to encounter on the actual examination.

Overview

The material in this workbook is designed to prepare you for the science portion of the TCAP Achievement Test. It contains:

- a Student Recording Chart,
- the Tennessee Science State Performance Indicators,
- a Diagnostic Test,
- indicator practice for each indicator,
- and a Posttest.

How to Use this Book

Diagnostic Test This test will help you identify any content that you need to review as you prepare to take the TCAP Achievement Test. Once you have taken the Diagnostic Test and it has been graded, complete the Student Recording Chart on page vi. Circle each question that you answered incorrectly. If there is a circle marked for an indicator, write **YES** in the **Need Practice?** question box. Then complete the page of practice questions for that indicator.

Standards Practice If you incorrectly answered questions for a particular indicator, you could probably use some extra practice with that indicator. The Student Recording Chart lists a practice page for each indicator. Complete the appropriate practice page. If you are unsure about how to answer some of the questions, you might want to refer to your science book.

Posttest After you have completed the practice worksheet(s), take the Posttest on pages 41–46.

Test-Taking Tips

Before the Test:

- Be sure to get plenty of sleep the week before the test. A healthy amount of sleep is eight to nine hours every night.
- On the night before the test, try to do something relaxing but stimulating, such as playing a board game, exercising, or reading an enjoyable book. Cramming the night before the test can hamper your memory and make you tired.
- On the morning of the test, eat a healthy breakfast with fresh foods.
- On the morning of the test, clear your mind of any outside distractions so that you will be better able to focus on the test. If breaks are given during the test, use that time to relax and clear your mind.

During the Test:

- Listen and read all directions.
- Be sure you understand the questions before reading the answer choices. Then, make sure to read and consider **every** answer choice.
- Remember to carefully consider all the information presented in the test's graphics.
- If the test is timed, be sure to pace yourself.
- Always choose an answer. By eliminating as many incorrect choices as possible, you will have a good chance at guessing correctly and obtaining more points.

Name _____

Student Recording Chart

Directions: Circle each question from the Diagnostic Test that you answered incorrectly. If there is a circle marked for an indicator, write **Yes** in the **Need Practice?** box. Then complete the practice page for that indicator.

Indicator	Inq.1	Inq.2	Inq.3	Inq.4	Inq.5
Test Question	1	2	4	5	3
Need Practice?					
Practice Page	7	8	9	10	11

Indicator	T/E.1	T/E.2	T/E.3	T/E.4
Test Question	6	7	9	8
Need Practice?				
Practice Page	12	13	14	15

Indicator	1.1	1.2	1.3	1.4	1.5
Test Question	10	11	12	13	14
Need Practice?					
Practice Page	16	17	18	19	20

Indicator	3.1	3.2
Test Question	15	17
Need Practice?		
Practice Page	21	22

Name _____

Student Recording Chart *(continued)*

Indicator	4.1	4.2	4.3	4.4
Test Question	16	18	19	20
Need Practice?				
Practice Page	23	24	25	26

Indicator	7.1	7.2	7.3	7.4	7.5	7.6	7.7
Test Question	21	23	22	24	25	26	27
Need Practice?							
Practice Page	27	28	29	30	31	32	33

Indicator	11.1	11.2	11.3	11.4	11.5	11.6
Test Question	28	29	30	31	32	33
Need Practice?						
Practice Page	34	35	36	37	38	39

Tennessee Science Standards, Grade 7

Inquiry

Guiding Question: What tools, skills, knowledge, and dispositions are needed to conduct scientific inquiry?

Indicators

Inq.1 Design a simple experimental procedure with an identified control and appropriate variables.

Inq.2 Select tools and procedures needed to conduct a moderately complex experiment.

Inq.3 Interpret and translate data into a table, graph, or diagram.

Inq.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.

Inq.5 Identify a faulty interpretation of data that is due to bias or experimental error.

Technology and Engineering

Guiding Question: How do science concepts, engineering skills, and applications of technology improve the quality of life?

Indicators

T/E.1 Identify the tools and procedures needed to test the design features of a prototype.

T/E.2 Evaluate a protocol to determine if the engineering design process was successfully applied.

T/E.3 Distinguish between the intended benefits and unintended consequences of a new technology.

T/E.4 Differentiate between adaptive and assistive bioengineered products (e.g., food, biofuels, medicines, integrated pest management).

Life Science

Standard 1: Cells

Guiding Question 1: How are plant and animal cells organized to carry on the processes of life?

Indicators

1.1 Identify and describe the function of the major plant organelles.

1.2 Interpret a chart to explain the integrated relationships that exist among cells, tissues, organs and organ systems.

1.3 Explain the basic functions of a major organ system.

1.4 Sequence a series of diagrams that depict chromosome movement during plant cell division.

1.5 Explain how materials move through simple diffusion.

Tennessee Science Standards, Grade 7

Flow of Matter and Energy

Guiding Question 3: What scientific information explains how matter and energy flow through the biosphere?

Indicators

3.1 Compare the chemical compounds that make up the reactants and products of photosynthesis and respiration.

3.2 Interpret a diagram to explain how oxygen and carbon dioxide are exchanged between living things and the environment.

Heredity

Guiding Question 4: What are the principal mechanisms by which living things reproduce and transmit information between parents and offspring?

Indicators

4.1 Classify methods of reproduction as sexual or asexual.

4.2 Match flower parts with their reproductive functions.

4.3 Describe the relationship among genes, chromosomes, and inherited traits.

4.4 Interpret a Punnett square to predict possible genetic combinations passed from parents to offspring during sexual reproduction.

Earth and Space Science

Standard 7: The Earth

Guiding Question 7: How is the earth affected by long-term and short term geological cycles and the influence of man?

Indicators

7.1 Use a table of physical properties to classify minerals.

7.2 Label a diagram that depicts the three different rock types.

7.3 Identify the major processes that drive the rock cycle.

7.4 Differentiate among the characteristics of the earth's three layers.

7.5 Recognize that lithospheric plates on the scale of continents and oceans continually move at rates of centimeters per year.

7.6 Describe the relationship between plate movements and earthquakes, mountain building, volcanoes, and sea floor spreading.

7.7 Analyze and evaluate the impact of man's use of earth's land, water, and atmospheric resources.

Tennessee Science Standards, Grade 7

Motion

Guiding Question 11: What causes objects to move differently under different circumstances?

Indicators

11.1 Differentiate between the six simple machines.

11.2 Determine the amount of force needed to do work using different simple machines.

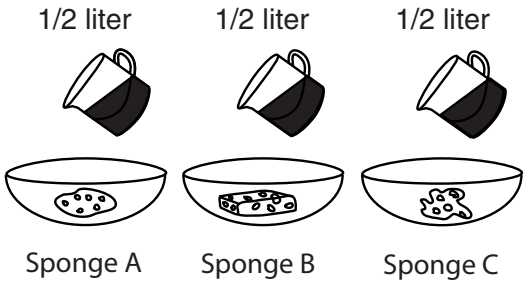
11.3 Apply proper equations to solve basic problems pertaining to distance, time, speed, and velocity.

11.4 Identify and explain how Newton's laws of motion relate to the movement of objects.

11.5 Compare and contrast the different parts of a wave.

11.6 Differentiated between transverse and longitudinal waves in terms of how they are produced and transmitted.

Diagnostic Test



1 Which of these questions would most likely be answered by this experimental setup?

A How does room temperature affect water?
B Which sponge is the most absorbent?
C How fast will the water evaporate?
D Which sponge cleans the best?

2 In an experiment designed to determine if a specific brand of cat food is causing cats to meow excessively, it would be best to

F keep feeding cats with the specific brand of cat food and record the results.
G mix together the specific brand of cat food with another brand of cat food and feed to cats.
H let some of the cats drink water with the specific brand of cat food.
J feed some cats with the specific brand of cat food and other cats with another brand.

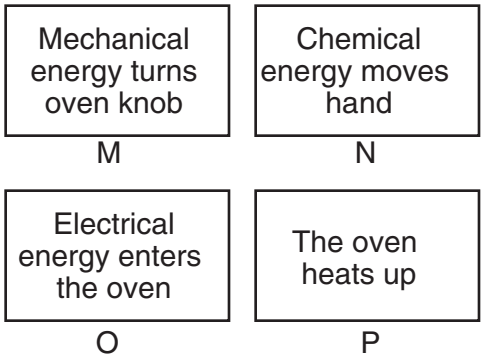
3 Bob wants to measure an airplane's potential energy. He measures the plane's speed but that does not give him the plane's potential energy. What should Bob have measured?

A the mass of the airplane
B the weight of the plane without passengers
C the plane's distance from the airport
D the airplane's altitude

Atomic Mass	Density

4 The chart above would most likely be used in an experiment designed to answer which of the following questions?

F Does an element's density increase when its temperature is increased?
G Which substances will float on water?
H Does an element's density increase as its atomic mass increases?
J Are solids more dense than liquids?



5 Which of these sequences correctly represents the energy flow used to turn on an oven?

A M, N, O, P
B O, M, N, P
C N, M, O, P
D P, O, N, M

Go on

6 You are the head of the research division of a company that grows vegetables using hydroponic technology. Hydroponic technology involves growing plants in containers of growth solution in a greenhouse. No soil is used. The growth solution that the company uses contains water, nitrogen, and phosphorous. The company wants to know whether adding iron to this formula will improve the growth of lettuce. What is the hypothesis to be tested in this experiment?

F If soil is used, the lettuce will grow at a faster rate.

G If the plants are moved outdoors, the lettuce will grow at a faster rate.

H If iron is added to the hydroponic solution, the lettuce will grow at a faster rate.

J If nitrogen is removed from the solution, the lettuce will grow at a faster rate.

7 When Thomas Edison was developing the light bulb, he went through about 600 different filaments until he found the one that worked the best. By 1880, he had found a filament that would burn at 16 watts for 1500 hours. Why was it critical that Edison take careful notes during his experiments?

A so no one would use the same methods he used

B so no one else would steal his thoughts and ideas

C so his efforts could be correctly replicated when it worked

D so he would be recognized for his lengthy experimental process

Ethanol

Pros	Cons
Good for farm economy	Farm land switched from food to fuel production, increasing the cost of grain
Lower price per gallon than gasoline in some regions	Lower energy content than gas; cost per mile may be higher
Cuts carbon monoxide emissions	Uses huge amounts of fresh water
May reduce imports of foreign oil	May use more energy to make (in fossil fuels) than it produces
Made from renewable resources (corn or other plant material)	

8 Akemi is concerned about the environment. Since she has a flex-fuel car, she decided to fill it with a fuel called E85 which is a blend of 85 percent ethanol and 15 percent gasoline. Akemi decided to research the pros and cons of ethanol. Her notes are shown in the chart above. She recently read that scientists are trying to develop better ways of producing ethanol. The current process makes ethanol from starch and sugars. Scientists are developing ways to make ethanol from cellulose using other plants instead of corn. What can you conclude from Akemi's research?

F New technologies are seldom reevaluated.

G New technologies are often reevaluated.

H Ethanol does not work as an alternative fuel.

J Ethanol production gets rid of unwanted plants.

Go on

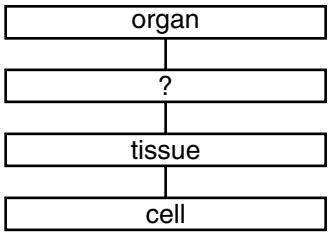
Diagnostic Test *(continued)*

9 To meet a high demand for energy, a hydroelectric dam is being proposed in an area. Which of the following describes a possible risk?

A The dam would produce renewable energy.
B The dam could harm or destroy some aquatic wildlife.
C The dam produces no toxic hydrocarbons.
D The dam produces no radioactive waste.

10 Which of the following is an organelle?

F chlorophyll
G tissue
H cell wall projection
J chloroplast

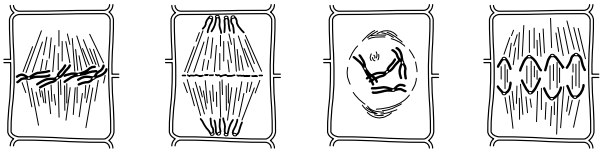


11 Which of the following do groups of different tissues form?

A organ
B organelle
C organ system
D organism

12 The heart, arteries, veins, and capillaries working together are an example of

F a tissue system.
G an organelle system.
H an organ system.
J an inorganic system.



Metaphase **Telophase** **Prophase** **Anaphase**

13 During which stage of mitosis do the chromosomes line up along the center of the cell?

A prophase
B metaphase
C anaphase
D telophase

14 What is the process by which molecules move from an area of higher density to an area of lower density?

F diffraction
G reflection
H refraction
J diffusion

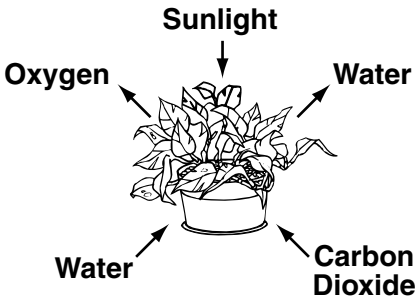
15 Margareta has learned that plants take in water (H_2O) and carbon dioxide (CO_2) to produce sugar ($C_6H_{12}O_6$) and give off oxygen (O_2). Based on this information, which of the following is the chemical equation for photosynthesis?

A $O_2 + H_2O \rightarrow C_6H_{12}O_6 + CO_2$
B $CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$
C $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$
D $CO_2 + O_2 \rightarrow C_6H_{12}O_6 + H_2O$

16 Which of the following does NOT result in offspring that are identical to the parent?

F budding
G asexual reproduction
H sexual reproduction
J fission

Go on

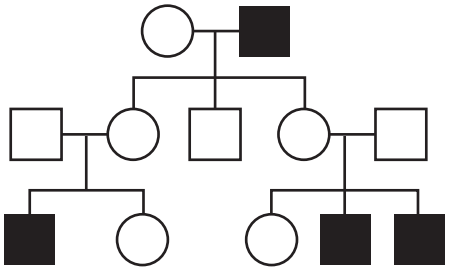


17 Which of the following statements is true?

A Plants absorb oxygen.
B Plants release carbon dioxide.
C Plants take in and release sunlight.
D Plants release oxygen.

18 In general, sepals are important parts of a plant because they

F provide food for the seed.
G attract insects.
H protect the flower when it is a bud.
J absorb water from the ground for the plant.



19 What can you conclude about the trait followed in the pedigree above?

A It is incompletely dominant in every other generation.
B It is coded for a sex-linked gene.
C It only affects females.
D The trait shows polygenic inheritance.

20 In the Punnett square, the R and the r represent

F alleles.
G hybrids.
H environmental factors.
J dominance.

Moh's Scale

Hardness	Mineral
1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Feldspar
7	Quartz
8	Topaz
9	Corundum
10	Diamond

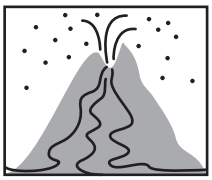
21 According to Moh's scale, the mineral with a hardness of 7 is

A talc.
B calcite.
C topaz.
D quartz.

22 During the rock cycle, what process acts upon sedimentary rock to create metamorphic rock?

F melting
G cooling
H wearing away by wind, water, and ice
J heat and pressure

Go on



23 Which type of rock is being formed in the diagram above?

A sedimentary
B metamorphic
C igneous
D composite

24 Which is the outermost of the three layers that make up the earth?

F mantle
G core
H crust
J lithosphere

25 The rigid plates of the _____ move slowly around on the asthenosphere.

A lithosphere
B fissure
C core
D lower mantle

26 The most likely cause of earthquake activity on the West Coast of the United States is

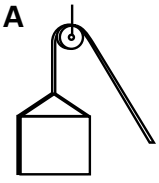
F landslides from coastal mountains.
G the slipping of tectonic plates.
H tidal effects from the Pacific Ocean.
J seasonal temperature changes.

Some Natural Resources

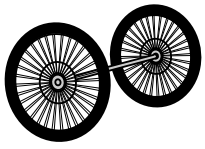
27 The picture shows some natural resources. Which of the following is the major characteristic of all natural resources?

A They are parts of the environment that we need or use to live.
B They are parts of the environment that are found underground.
C They are parts of the environment that give us energy.
D They are parts of the environment that cannot be recycled or reused.

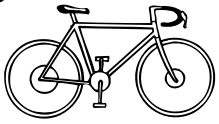
A



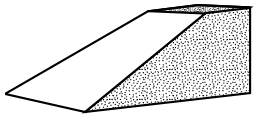
B



C



D



28 All of these are simple machines EXCEPT

F A
G B
H C
J D

Go on

29 Work is only done when the force exerted on an object is in the same direction as the object's motion. According to this definition, which of these illustrates work being done?

A

B

C

D

30 A car accelerates from 10 meters per second to 20 meters per second in 5 seconds. Which of the following represents the car's acceleration?

F 2 m/s^2

G 20 m/s^2

H 10 m/s^2

J 0.2 m/s^2

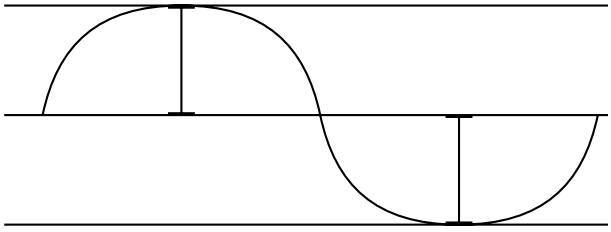
31 According to Newton's first law of motion, if forces acting on an object at rest are balanced, then the object

A moves forward.

B remains at rest.

C moves backward.

D falls to the ground.



32 In the model of a transverse wave above, the amplitude is

F the distance between two adjacent crests

G the distance between two adjacent troughs

H one half the distance between the top of a crest and the bottom of a trough

J the energy carried by the wave

33 In a transverse wave, the energy makes the medium move

A perpendicular to the direction of the wave.

B through space where there is no matter.

C parallel to the direction of the wave.

D up and down diagonally to the direction of the wave.

Stop

State Performance Indicator: Inquiry

SPI 0707.Inq.1

Design a simple experimental procedure with an identified control and appropriate variables.

1 Geena wanted to find out if seeds from different types of plants have different germination rates. She planted corn seeds and bean seeds in some soil. She watered the corn seeds every day and watered the bean seeds every other day. She watched to see how long they took to sprout. This experiment could be improved by

A using grass seeds instead of corn seeds.
B watering all of the seeds the same amount.
C putting the seeds by the window.
D using seeds from only one kind of plant.

A	Form a hypothesis
B	Gather information
C	Perform an experiment
D	State the problem
E	Analyze the data

2 Above is a list of steps in a scientific method. Which sequence shows the correct order?

F A, B, C, D, E
G D, C, A, E, B
H D, B, A, C, E
J C, B, A, D, E

3 Chelsea wants to know which brand of potting soil is most nutritious for plants. She decides to design an experiment to test different types of soil. Which of the following is an important step in designing her reliable experiment?

A making sure there have not been experiments like it
B making a guess as to the outcome, without prior research
C making sure that the outcome matches the expected results
D making sure to test one variable while controlling all others

4 Cameron wanted to learn if bananas would ripen more quickly in an enclosed space than in an open space. He placed a bunch of bananas in a paper bag on the counter. This experiment could be improved by placing a second bunch of bananas

F in a plastic bag.
G in a paper bag outdoors.
H underwater.
J out in the open.

5 Maria wanted to find out if pond plants would grow better in the light or in the dark. She put some pond plants in a container of water in a dark closet. This experiment could be improved by putting a second group of pond plants in a container of water

A under a light-colored cloth.
B in a different closet.
C under an electric blanket.
D in the sunlight.

Go on

State Performance Indicator: Inquiry

(continued)

SPI 0707.Inq.2

Select tools and procedures needed to conduct a moderately complex experiment.

Record of Fruit Fly Experiment

Male Eye Color	Female Eye Color	Number of Offspring	
		Red Eyes	White Eyes
Red	Red		
White	Red		
Red	White		
White	White		

1 The chart above was made to record data from an experiment investigating inherited traits in fruit flies. This experiment probably tests which of the following hypotheses?

A Females with white eyes lay eggs sooner than females with red eyes.

B Eye color is controlled by a sex-linked gene.

C Females with red eyes do not lay eggs.

D White-eyed females only breed with white-eyed males.

2 A scientist is investigating genetic mutations by growing bacteria in two dishes. One dish receives several minutes of X-rays every day, and the other receives several hours of sunlight every day. If the experiment is designed to find out if X-rays or sunlight cause genetic mutations, the scientist should

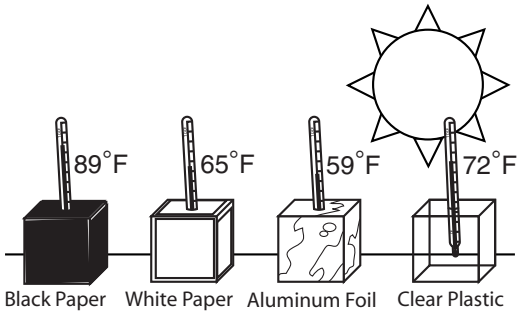
F use additional dishes to create mutations with chemicals.

G record the amount of X-rays and sunlight that reach the dishes.

H record the weight of each dish.

J use a third dish that doesn't receive X-rays or sunlight.

The picture below shows an experiment that explores how the Sun heats up different materials. The boxes in the picture are filled with air. Use the information in the picture to answer Numbers 3 and 4 below.



3 Which of the following would be the dependent variable in this experiment?

A the temperature inside the boxes

B the material covering the boxes

C the Sun

D the size of the boxes

4 A fifth box covered with red paper was added to the experiment. The thermometer coming out of this box had a reading of 66°F. Red paper seems to have an effect most similar to

F black paper.

G white paper.

H aluminum foil.

J clear plastic.

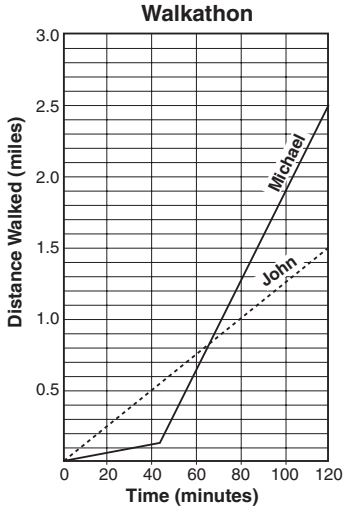
Go on

State Performance Indicator: Inquiry

(continued)

SPI 0707.Inq.3

Interpret and translate data into a table, graph, or diagram.



1 The graph shows the distance traveled by two different walkers during a two-hour walkathon. A reasonable hypothesis based on these data is that John

A had walked farther than Michael after one hour.

B walked faster and farther than Michael for the entire two hours.

C is a better walker than Michael.

D started faster than Michael did but walked fewer total miles.

Preventing Food From Spoiling

Treatment	Temperature (°C)	Time Preserved
Freezing	–18 to –29	2–3 months
Refrigeration	2 to 5	3–5 days
Pasteurization	70 to 72	1–2 weeks
Sterilization	100	1–2 years

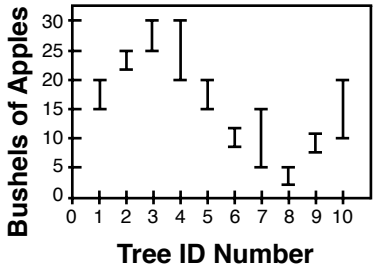
2 According to the information in the chart, which treatment can preserve food for a period of time greater than one year?

F freezing

G refrigeration

H pasteurization

J sterilization



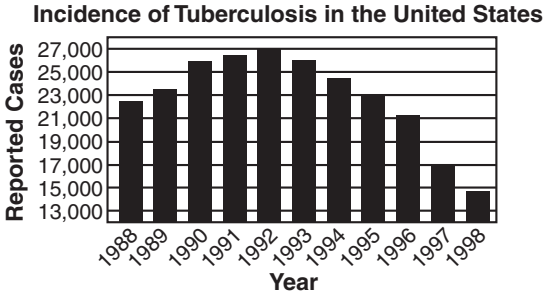
3 Diego wants to grow apple trees. He knows that if a particular tree produces many apples every year, its offspring probably will produce many apples. He has recorded the number of bushels of apples harvested from 10 trees every year for several years. According to his data, which tree is most likely to produce fewer than 12 bushels of apples in any given year?

A Tree 7

B Tree 8

C Tree 9

D Tree 10



4 About how many fewer cases of tuberculosis were reported in 1997 than in 1992?

F 2,000

G 5,000

H 10,000

J 12,000

Go on

State Performance Indicator: Inquiry

SPI 0707.Inq.4 *(continued)*

Draw a conclusion that establishes a cause and effect relationship supported by evidence.

1 During a storm, several butterfly-eating birds were blown to a distant island. The island, which previously had no birds, was filled with butterflies of all colors. One year later, all the butterflies are dark green and brown. Which of the following is the most likely explanation for the change in the butterfly population?

A Gradualism is selecting against red, yellow, and blue butterflies.

B Natural selection favored the dark green and brown butterflies.

C Primates like to eat all the other butterflies.

D A genetic mutation led to punctuated equilibrium.

End of Week	Circumference of Upper Arm (cm)
1	20
2	23
3	26
4	?

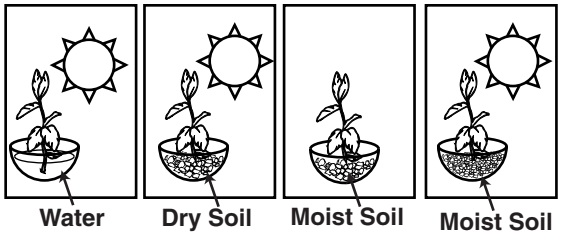
2 These data were collected by a weightlifter after each week of exercise. If everything remains the same, what will be the circumference of the weightlifter's upper arm after the fourth week?

F 27 cm

G 28 cm

H 29 cm

J 30 cm



3 The picture shows four plants set up in an experiment. When left under these conditions for a week, which plant will probably have grown the most?

A plant in box A

B plant in box B

C plant in box C

D plant in box D

4 Acid rain is caused by automobile exhaust and factory smoke. Acid rain can be harmful to people, animals, and plants. Which of the following actions would decrease the occurrence of acid rain?

F moving factories closer together

G building highways closer to cities

H driving automobiles less often

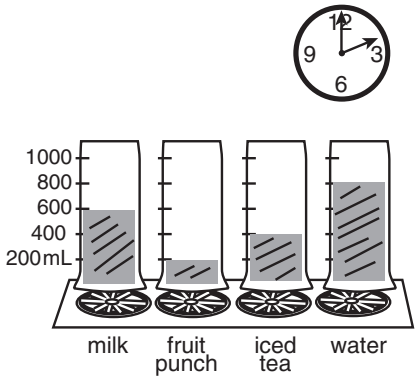
J increasing the hours of factory operation

Go on

State Performance Indicator: Inquiry

SPI 0707.Inq.5 *(continued)*

Identify a faulty interpretation of data that is due to bias or experimental error.



1 This picture shows an experiment used to determine which liquid will boil first. Which of the following would make this a better-designed experiment?

A Put a thermometer in each beaker.
B Use the same amount of liquid in each beaker.
C Cover each beaker with clear plastic.
D Use a different size hotplate for each beaker.

2 Kaylie wanted to find out which type of sunscreen best protected her skin from UV radiation. She put one type of sunscreen on her right arm and another type of sunscreen on her left arm. Then she sat near a window with her right arm in the sunlight and her left arm in the shadow. Her experiment could have been improved by

F placing her left arm near a bright lamp.
G sitting near the window during the sunniest hours of the day.
H putting more types of sunscreen on her arms.
J placing both arms in an equal amount of sunlight.

3 Gregg measures the average temperature in June and July for two years, and notices that the average temperature for each month has increased by 2°C. From this observation, he decides that the climate in his area is warming. Gregg's experiment is

A based on sound scientific method.
B based on flawed assumptions.
C flawed but correct.
D based on too few data points.

4 Taylor wanted to find out which brand of "C" batteries lasted the longest. He put one brand of "C" batteries into his radio. He put another brand of "C" batteries into a remote-controlled car. He timed how long each battery lasted before it ran out. His experiment could have been improved by

F testing all the batteries in the same piece of equipment.
G using "AAA" batteries in the car instead.
H weighing the batteries before he started.
J measuring how loud the radio could play.

5 A scientific experiment must have a control as part of the design so that

A the experiment does not last too long.
B the experiment is done safely.
C there is something to compare the results to.
D the experiment will definitely get the right answer.

Go on

State Performance Indicator: Technology and Engineering

SPI 0707.T/E.1

Identify the tools and procedures needed to test the design features of a prototype.

1 Your class must set up a weather station. What sort of criteria must you consider when you evaluate the design of your station?

A cost of weather instruments, variety of materials used, accuracy of weather-related measurements and predictions

B size of weather station, cost of weather instruments, number of measurements taken each day

C number of people involved, accuracy of weather-related measurements and predictions, length of experiment

D number of measurements taken each day, number of people involved, number of instruments used

2 All of these are examples of ways in which models can help scientists EXCEPT

F communicating observations and ideas.

G saving time, money, equipment, and lives.

H predicting exactly what will happen.

J predicting possible outcomes.

3 A protein bar claims on its packaging that it is all natural. Which of these sources might be the most helpful in determining whether this claim is entirely true?

A television advertisements

B the taste of the bar

C the list of ingredients

D the manager of a grocery store

4 Which of these is a limitation of using models in science?

F delaying the outcome of an experiment

G hindering experimenters from testing their hypotheses

H basing models on an incomplete or inaccurate observation

J inhibiting the ability of scientists to communicate with each other

5 Experimental results are compared against the results of controls. Controls improve an experiment by

A ensuring that the experiment tests only one variable.

B allowing for the experiment to test as many variables as possible.

C making sure everything in the experiment remains constant.

D guaranteeing that the experimental outcome verifies the hypothesis.

6 In an experiment, a model can help a scientist

F create a hypothesis.

G make the experimental setup match reality as close as possible.

H test a situation that is otherwise too complex to observe.

J draw a conclusion from experimental results.

Go on

State Performance Indicator: Technology & Engineering *(continued)*

SPI 0707.T/E.2

Evaluate a protocol to determine if the engineering design process was successfully applied.

1 You plan to build a solar stove. What criteria would best help you evaluate how well your model works?

A the location of the test
B the cost of the model
C the size of the stove
D the time it took to cook food

2 Your group plans to build a model desalination plant. When should you decide upon the criteria you will use to test your technological design?

F after the model is tested
G as the report describing the test is written
H before the model is built
J after the model is built

3 Which of the following might be a design feature of an ergonomic office chair that reduces strain on the back?

A The chair is molded to fit the human body more precisely.
B The chair is lightweight.
C The chair has a stylish all-wood design with no upholstery.
D none of the above

1. Clearly identify the problem or need.
2. Search for and evaluate possible solutions.
3. Select the best possible solution.
4. Develop a process or procedure for a prototype.
5. ?
6. Communicate the results.
7. Redesign and retest as necessary.

4 An automobile assembly plant is having problems with a robotic arm in the assembly line. The engineers need to design a new arm. Look at the above steps. What actions would the engineers take during Step 5?

F Negotiate the best price.
G Review the purpose of the robotic arm.
H Test and evaluate the prototype.
J Locate a supplier.

5 Engineers in a sewage treatment plant need to replace a broken pump. They will be using the above steps to find the best replacement pump. During Step 2, which will the engineers most likely NOT be considering?

A the noise level of the new pumps
B the color of the new pump
C the cost of each pump
D the ease of installation of the new pumps

Go on

State Performance Indicator: Technology & Engineering *(continued)*

SPI 0707.T/E.3

Distinguish between the intended benefits and the unintended consequences of a new technology.

Read the following passage. Choose the best answer for each of the following questions.

An increasing world population has resulted in a dramatic increase in global energy consumption. Between 1970 and 2000, global energy consumption nearly doubled. In 2000, almost 90% of the energy used worldwide was obtained from fossil fuels.

Fossil fuels are a nonrenewable resource. As a result, the amounts of petroleum, coal, and natural gas on Earth continue to decrease as fossil fuels continue to be used at an increasing rate. Some experts predict that by 2050, the amount of petroleum pumped from wells will only be about 20% of what is pumped currently. By this time not only will fuels like gasoline be more expensive, but also products like plastics that are made from chemical compounds found in petroleum.

Continued rates of fossil fuel consumption cause environmental problems such as air pollution, water pollution, and global warming. Alternative energy sources might reduce the environmental impact of increasing energy consumption.

1 Based on the passage, which of the following might be a benefit resulting from the increasing use of alternative energy sources?

A Global energy use will decrease.
B Gasoline will become less expensive
C Global population will decrease
D The global supply of fossil fuels will decrease more slowly.

2 Based on the passage, which of the following can cause air pollution?

F the use of solar panels
G the use of hydroelectricity
H burning coal
J all of the above

3 According to the passage, what are two disadvantages to using fossil fuels?

A They are composed of inorganic materials and are readily available.
B They are scarce and inexpensive.
C They are nonrenewable and they cause pollution.
D They burn inefficiently and are easily obtained.

Go on

State Performance Indicator: Technology & Engineering *(continued)*

SPI 0707.T/E.4

Differentiate between adaptive and assistive bioengineered products (e.g., food, biofuels, medicines, integrated pest management).

Food Irradiation Facts

Used for preservation and sterilization	Regulated by the Food and Drug Administration (FDA)
Reduces bacteria, allowing a greater shelf life for products	Produces no significant loss of nutrients
Reduces cases of food borne illness	Does not change the taste or other characteristics of food
Kills insects in wheat, fruits, vegetables. Kills bacteria in meat and poultry.	Irradiation is a type of radiant energy. Irradiated food is not radioactive.

1 Kurt bought strawberries at a local grocery. When he got home, he noticed a sticker on the package that said the fruit had been treated by irradiation. Kurt wanted to learn more about irradiation, so he researched the subject. He made the list of facts shown in the chart. Based on the chart, what may have been part of the original statement of the problem that scientists wished to address with this process?

A Food spoilage can be reduced through refrigeration.

B Food spoilage is costly to both producers and consumers.

C Irradiation can make many foods more flavorful.

D Irradiation can make many foods more nutritious.

2 Angelica noticed tiny bugs on her peach trees. Because she sells her peaches at an organic fruit market, she decided not to use a chemical pesticide. Instead, she consulted Tom, an expert in integrated pest management (IPM). Tom identified the bugs as aphids and told Angelica that she could remove many of the aphids from the trees with water sprayed from a garden hose. Since in her area, ladybugs are natural predators of aphids, Tom also gave Angelica the name of a web site where she could buy ladybug larva. How does IPM differ from traditional pest control?

F IPM recommends using ladybugs as a solution for all pest problems.

G IPM develops specific solutions by analyzing each situation.

H IPM recommends spraying with a garden hose as a solution for all pest problems.

J IPM develops experimental solutions for unusual pest situations.

Go on

State Performance Indicator: Life Science: Cells

SPI 0707.1.1

Identify and describe the function of the major plant and animal cell organelles.

1 Which of these statements about cells is true?

A All cells respond to light.
B Most living things are not made of cells.
C Cells take in materials from their surroundings.
D Cells do not contain any hereditary material.

2 Which organelle is most responsible for making the cell's proteins?

F mitochondria
G chloroplasts
H recycling organelles
J ribosomes

3 Which structure supplies energy through aerobic respiration?

A the nucleus
B ribosomes
C the endoplasmic reticulum
D mitochondrion

4 Cells perform all the different functions in an organism. Within a cell, _____ is/are the command center of its activity.

F ribosomes
G the nucleus
H vacuoles
J the endoplasmic reticulum

5 Which of the following cell structures would you expect to be the most involved in photosynthesis?

A cell wall
B flagella
C chloroplasts
D ribosomes

6 What is the major characteristic of the Golgi bodies?

F They are folded membranes that can be rough or smooth and can move material through the cell.
G They are flattened membranes that package cellular substances in the cell.
H They store wastes, water, food, and other cellular material.
J They produce vaccines that allow the body to fight infections.

Go on

State Performance Indicator: Life Science

(continued)

SPI 0707.1.2

Interpret a chart to explain the integrated relationships that exist among cells, tissues, organs, and organ systems.

1 Cells carry out which of the following functions in an organism?

A They provide structure.
B They contain genetic material.
C They extract energy from organic molecules.
D all of the above

2 Which group of organelles could be observed in an *Elodea* leaf using the low-power objective of a compound microscope?

F chloroplasts, nuclei, and mitochondria
G cell walls, chloroplast, and nuclei
H cell walls, nuclei, and ribosomes
J endoplasmic reticula, chloroplasts, and nuclei

3 Which of the following is an organelle?

A chlorophyll
B tissue
C cell wall projection
D chloroplast

4 The liver, which is made of a variety of different cell types, helps digest food. The liver is a type of

F organelle.
G species.
H cell theory.
J organ.

5 Which of the following is the correct order for the levels of organization of the human body, from simplest to most complex?

A cell → tissue → organ → organ system
B tissue → organ system → organ → cell
C organ → cell → tissue → organ system
D organ system → organ → tissue → cell

6 In complex animals most cells are differentiated so that they can perform a very specific function in the body. Stem cells have the ability to

F become any other type of cell in the organism as need dictates.
G lower cholesterol.
H pass through the blood/brain barrier.
J fight infections and disease.

Go on

State Performance Indicator: Life Science

(continued)

SPI 0707.1.3

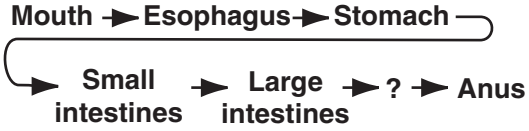
Explain the basic functions of a major organ system.

1 In which of the following systems do the mouth, the stomach, and the intestines belong?

A nervous system
B respiratory system
C digestive system
D skeletal system

2 What characteristic do these organisms have in common?

F They produce milk for their young.
G They sense the world around them using an advanced nervous system.
H They walk on two legs.
J Their digestive systems convert food into small molecules that can be used for energy.



3 Which organ of the digestive tract is missing?

A spleen
B gall bladder
C teeth
D rectum

Body Part	?
Bones	Yes
Joints	Yes
Stomach	No
Cartilage	Yes
Ligaments	Yes
Small Intestines	No

4 What could be used as the missing heading?

F Part of Nervous System?
G Part of Digestive System?
H Part of Skeletal System?
J Part of Circulatory System

5 The human body is made up of many systems. Which system is most involved when a person feels pain?

A muscular
B digestive
C nervous
D circulatory

6 Ms. Thomas likes to drink coffee in the morning. Assuming that the coffee is caffeinated, Ms. Thomas's central nervous system will most likely

F slow down.
G become numb.
H speed up.
J stop working.

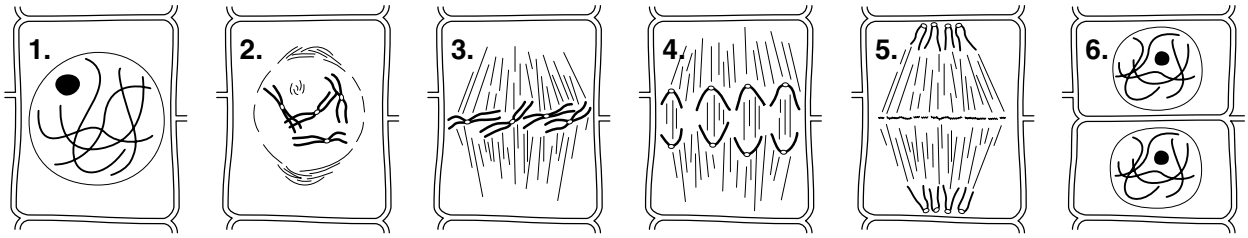
Go on

State Performance Indicator: Life Science

(continued)

SPI 0707.1.4

Sequence a series of diagrams that depict chromosome movement during plant cell division.



1 In the diagram above, step 1 is the phase of plant cell division called

A telophase
B prophase
C interphase
D anaphase

2 In the diagram above, step 2 is the phase of plant cell division called

F metaphase
G prophase
H interphase
J anaphase

3 In the diagram above, step 3 is the phase of plant cell division called

A telophase
B prophase
C interphase
D metaphase

4 In the diagram above, step 4 is the phase of plant cell division called

F telophase
G prophase
H interphase
J anaphase

5 In the diagram above, step 5 is the phase of plant cell division called

A telophase
B prophase
C interphase
D anaphase

6 In the diagram above, step 6 is the phase of plant cell division called

F telophase
G metaphase
H interphase
J anaphase

7 The cell division process that creates sex cells is different from the cell division process that makes all other kinds of cells. Which of these is the process that creates sex cells?

A mitosis
B meiosis
C chromosome
D allele

Go on

State Performance Indicator: Life Science

(continued)

SPI 0707.1.5

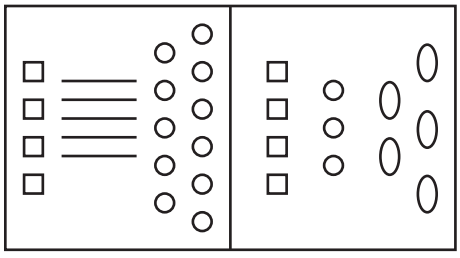
Explain how materials move through simple diffusion.

1 In some one-celled organisms, waste is usually disposed of through _____, thus requiring very little use of energy.

A diffusion
B a sodium-potassium pump
C the endoplasmic reticulum
D the nucleus

2 Diffusion occurs until the system reaches

F equilibrium.
G osmosis.
H metamorphosis.
J photosynthesis.



3 Which shape has diffused to reach equilibrium in the diagram above?

A circles
B ovals
C squares
D rectangles

4 Jonathan has learned that salt and other nutrients can travel into and out of a cell. Which process allows salt to travel into a cell?

F active transport
G diffusion
H osmosis
J reproduction

5 A cell biologist is studying how cells use a particular substance. If energy is used to move this substance across a cell membrane, then

A the cells may be using passive transport.
B facilitated diffusion may be involved.
C the cells must be using active transport.
D the cells must rely on diffusion.

6 Which statement best explains osmosis?

F Osmosis is the movement of water.
G Osmosis is the diffusion of water.
H Osmosis is the diffusion of water through a mixture.
J Osmosis is the diffusion of water through a membrane.

Go on

State Performance Indicator: Flow of Matter and Energy

SPI 0707.3.1

Compare the chemical compounds that make up the reactants and products of photosynthesis and respiration.

1 During the process of photosynthesis,

A water and oxygen create carbon dioxide and sugar.

B sugar and water create carbon dioxide and oxygen.

C carbon dioxide and water create sugar and oxygen.

D carbon dioxide and sugar create water and oxygen.

2 _____ is a chemical reaction that makes food. _____ is a chemical reaction that releases the energy in food.

F Photosynthesis; Respiration

G Respiration; Photosynthesis

H Fermentation; Metabolism

J Metabolism; Fermentation

Metabolism

Photosynthesis	Respiration
Fermentation	

3 Based on the information in the chart, which of these statements is true?

A Photosynthesis is part of fermentation.

B Metabolism is part of photosynthesis.

C Metabolism is part of respiration.

D Photosynthesis is part of metabolism.

4 Information about chlorophyll would most likely be found under which heading in a table of contents?

F Vascular Plants

G Nonvascular Plants

H Photosynthesis

J Root systems

5 A biologist is studying a single-celled organism found in a pond. The biologist finds out that the organism does not require oxygen to survive and concludes that the organism

A does not use photosynthesis.

B does not respire.

C does not ferment.

D does not endocytose.

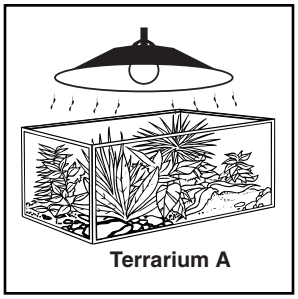
6 Plants have chlorophyll. The chlorophyll

F disguises the plants from predators.

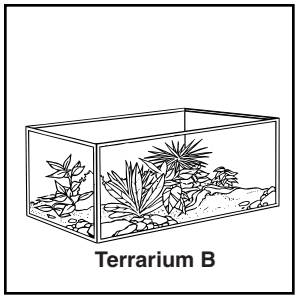
G protects the plants from sunlight.

H captures energy from sunlight for the plants.

D absorbs oxygen from the air for the plants.



Terrarium A



Terrarium B

7 The plants in Terrarium A are healthy, but the plants in Terrarium B are not. Which of these would most likely improve the health of the plants in Terrarium B?

A decreasing the amount of water

B increasing the amount of light

C decreasing the amount of soil

D increasing the number of plants

Go on

State Performance Indicator: Flow of Matter and Energy *(continued)*

SPI 0707.3.2

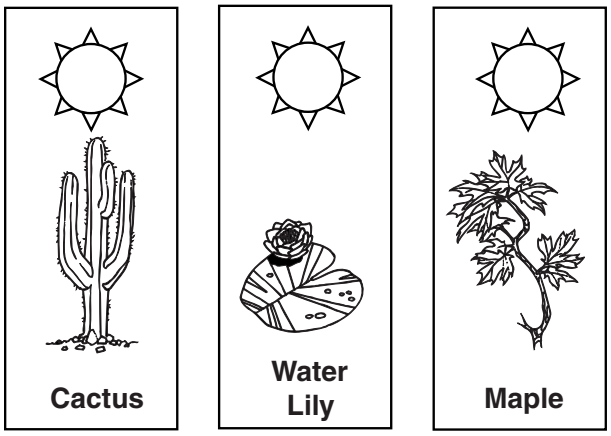
Interpret a diagram to explain how oxygen and carbon dioxide are exchanged between living things and the environment.

1 Carbon dioxide is removed from the air by producers during

A. combustion.
B respiration.
C photosynthesis.
D condensation.

2 Which of these can a human live without for the shortest amount of time?

F water
G food
H oxygen
J carbon dioxide

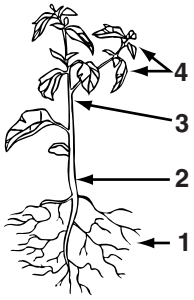


3 Which process do the plants have in common?

A surviving in dry environments
B making food by photosynthesis
C absorbing water through extensive root systems
D releasing carbon dioxide into the air

4 When we exercise, our bodies have to work harder. Our tissues require more oxygen to function. Our bodies respond by

F decreasing heart rate.
G decreasing breathing rate.
H increasing carbon dioxide intake.
J increasing breathing rate.



5 This diagram shows the main parts of a plant. Which part of the plant is best adapted for capturing energy?

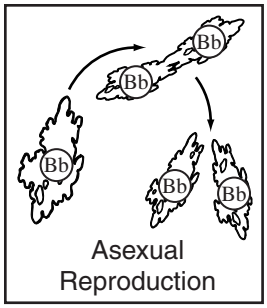
A 1
B 2
C 3
D 4

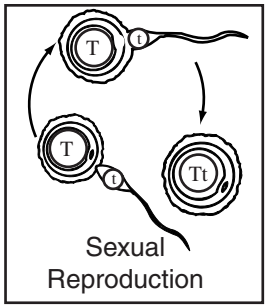
Go on

State Performance Indicator: Heredity

SPI 0707.4.1

Classify methods of reproduction as sexual or asexual.





1 According to the pictures, asexual reproduction results in new bacteria whose genetic material is

A identical to that of the parent.
B not identical to that of the parent.
C half-identical to both parents.
D identical to another parent.

2 Information about haploid cells would most likely be found under which heading in a table of contents?

F Asexual Reproduction
G Zygotes
H Sexual Reproduction
J Protein Building

3 All of the following are types of asexual reproduction EXCEPT

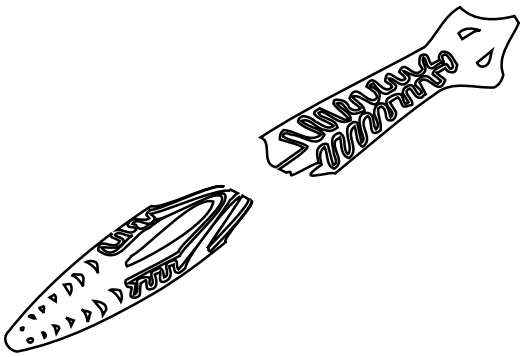
A budding.
B fertilization.
C regeneration.
D fission.

4 Which of the following does NOT result in offspring that are identical to the parent?

F budding
G asexual reproduction
H sexual reproduction
J fission

5 Toshiko wants to determine what type of reproduction a particular organism undergoes. She finds out that all of the organism's offspring look identical to the original organism. She determines that this organism reproduces

A asexually.
B frequently.
C sexually.
D rarely.



6 What can you conclude about the above animal's reproduction?

F It is sexual reproduction.
G It is mimicry.
H It is asexual reproduction
J It requires both an egg and sperm.

Go on

State Performance Indicator: Heredity

(continued)

SPI 0707.4.2

Match flower parts with their reproductive functions.

STAMEN	PISTIL	PETAL

1 Which of these belongs with the group above?

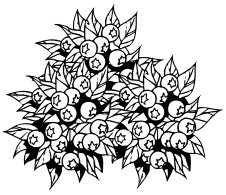
A moss
B fern
C sepal
D frond

2 Angiosperms are plants that use flowers as part of their reproductive cycles. All of these plants belong to the angiosperm family EXCEPT

F

G

H



J

3 Which of the following is responsible for reproduction in seedless plants?

A flowers
B roots
C spores
D beans

4 Angiosperms are vascular, flowering plants with seed-containing fruit. According to this information, all of these plants are angiosperms EXCEPT

F

H

G

J

5 Lilly was gathering plant samples for a science project. She made observations of one of her plant samples. Which observation would mean that the plant sample was NOT a gymnosperm?

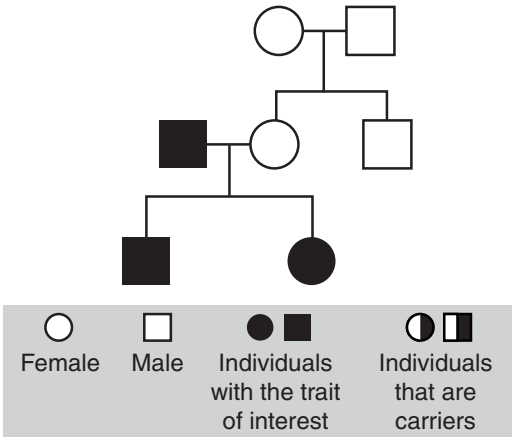
A seeds that are not protected by fruit
B a hard cone
C seeds that are contained in fruit
D needlelike leaves

Go on

State Performance Indicator: Heredity

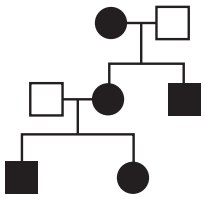
SPI 0707.4.3 *(continued)*

Describe the relationship among genes, chromosomes, and inherited traits.

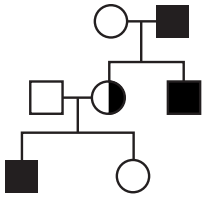


1 The pedigree above shows how geneticists depict the inheritance of a trait through a family. Which of the following shows the most likely inheritance of a sex-linked recessive trait?

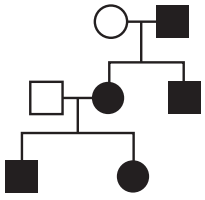
A



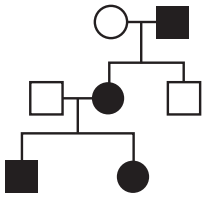
B

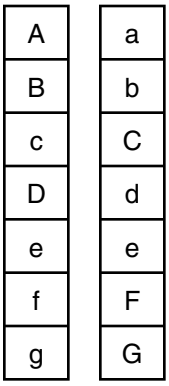


C



D





A chromosome pair

2 Genes are located on chromosomes. Some of the chromosomes in a pair have the same alleles for certain genes and some have different alleles. Based on the diagram, which of the following is a list of heterozygous genes?

F A, B, and E
G C, B, and E
H E, F, and G
J A, B, and G

3 Drawings from hundreds of years ago depict horses that are much smaller than horses are today. Which of the following is the best explanation for the increased size of horses?

A Horses have been genetically engineered.
B Selective breeding has removed shorter horses from the gene pool.
C Genetic therapies have been used to make horses larger.
D Certain sex-linked genes have been lost.

Go on

State Performance Indicator: Heredity

(continued)

SPI 0707.4.4

Interpret a Punnett square to predict possible genetic combinations passed from parents to offspring during sexual reproduction.

rr x RR

	R	R
r	Rr	Rr
r	Rr	Rr

1 In the Punnett square, the R and the r represent

A alleles
B hybrids
C environmental factors
D dominance

2 By analyzing a blood sample, a doctor can tell a patient whether his or her children might inherit a genetic condition. This is true even if the patient doesn't have that condition. This type of analysis tells the doctor about a patient's

F phenotype
G recombinant DNA
H pedigree
J genotype

3 In a certain kind of fish, the allele for wide fins (W) is dominant over the allele for narrow fins (w). Which of the following genotypes will produce a fish with wide fins?

A WW and ww
B WW and Ww
C Ww and ww
D ww and wW

	B	b
B	?	Bb
b	Bb	bb

4 In humans, the allele for brown eyes (B) is dominant over the allele for blue eyes (b). Which of these genotypes will complete this Punnett square?

F BB
G Bb
H bB
J bb

5 For a certain kind of bird, the allele for long beaks (L) is dominant over the allele for short beaks (l). Which of the following genotypes will produce a bird with a short beak?

A Ll
B lL
C ll
D LL

Go on

State Performance Indicator: Earth and Space Science: The Earth

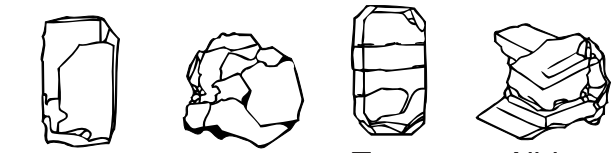
SPI 0707.7.1

Use a table of physical properties to classify minerals.

Mineral	Cleavage/Fracture	Color	Streak	Luster
Biotite Mica	Cleavage thin	Black to brown	Green	Glassy
Calcite	Cleavage rhombic	White to clear	White	Glassy
Fluorite	Cleavage 90°	Purple to clear	White	Glassy
Galena	Cleavage 90°	Silver to gray	Black	Metallic

1 Which of these could have a glassy luster, a white streak, a clear color, and a cleavage at 90°?

A biotite mica
B alcite
C fluorite
D galena



Orthoclase Mica Topaz Albite

2 What property is being shown in all of the minerals above?

F metallic luster
G fracture
H cleavage
J streak

3 A mineral is a naturally occurring, inorganic, crystalline solid with a definite chemical composition. Which of the following is not a mineral?

A calcite
B coal
C halite
D talc

4 Which statement provides the best description of the mineral property called streak?

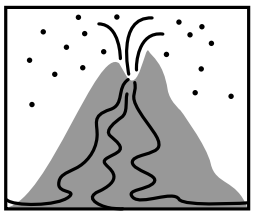
F Streak is the way a mineral reflects light from its surface.
G Streak is the color of the powder left by a mineral when it is rubbed against a surface.
H Streak is the ability of a mineral to resist being scratched.
J Streak is the tendency of a mineral to easily break along a smooth, definite surface.

Go on

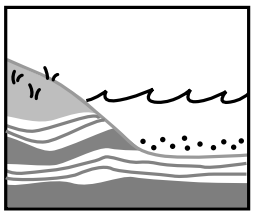
State Performance Indicator: Earth and Space Science *(continued)*

SPI 0707.7.2

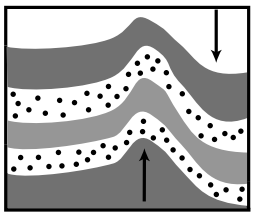
Label a diagram that depicts the three different rock types.



A



B



C

1 Which process is taking place in all three pictures?

A rock formation
B volcanic activity
C ocean creation
D sedimentation

2 Which type of rock will be formed in the process illustrated in diagram A?

F sedimentary
G igneous
H composite
J metamorphic

3 Which type of rock will be formed in the process illustrated in diagram B?

A sedimentary
B igneous
C composite
D metamorphic

4 Which type of rock will be formed in the process illustrated in diagram C?

F sedimentary
G igneous
H composite
J metamorphic

5 Which factor would have the LEAST effect on the formation of a rock?

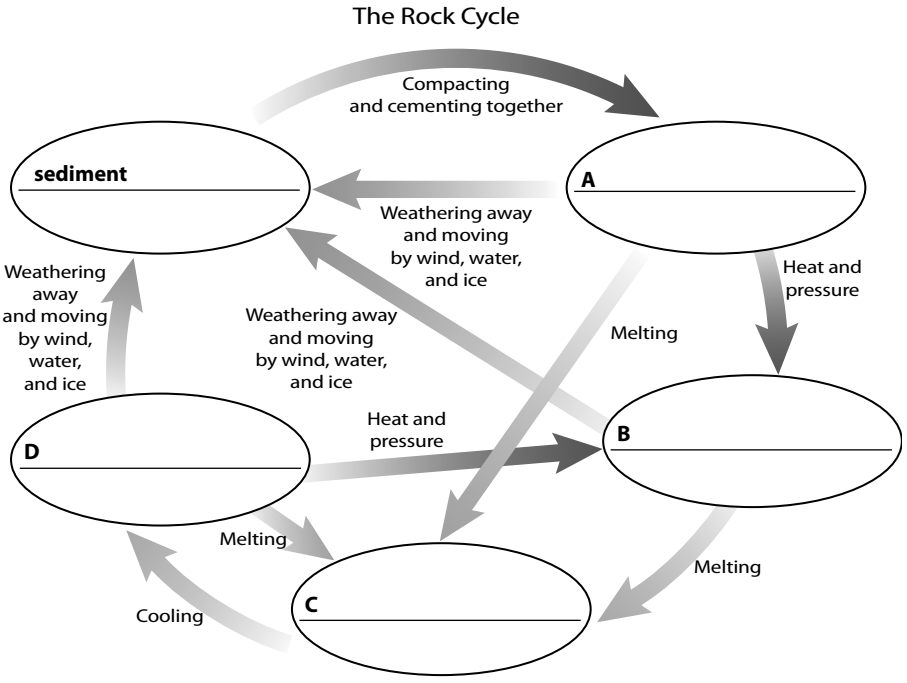
A weathering
B pressure
C melting
D radiation

Go on

State Performance Indicator: Earth and Space Science *(continued)*

SPI 0707.7.3

Identify the major processes that drive the rock cycle.



1 In the rock cycle picture above, what type of rock would occur in position A?

- **A** metamorphic rock
- **B** igneous rock
- **C** sedimentary rock
- **D** magma

2 In the rock cycle picture above, what type of rock would occur in position B?

- **F** metamorphic rock
- **G** igneous rock
- **H** sedimentary rock
- **J** magma

3 By which process does metamorphic rock become sediment?

- **A** heat and pressure
- **B** cooling
- **C** weathering away and moving by wind, water, and ice
- **D** melting

4 In the rock cycle picture above, what type of rock would occur in position C?

- **F** metamorphic rock
- **G** igneous rock
- **H** sedimentary rock
- **J** magma

5 By what process does magma become igneous rock?

- **A** heat and pressure
- **B** melting
- **C** cooling
- **D** compacting and cementing together

6 In the rock cycle picture above, what type of rock would occur in position D?

- **F** metamorphic rock
- **G** igneous rock
- **H** sedimentary rock
- **J** magma

Go on

State Performance Indicator: Earth and Space Science *(continued)*

SPI 0707.7.4

Differentiate among the characteristics of the earth's three layers.

1 The _____ is the outermost layer of Earth.

A core
B mantle
C crust
D aesthenosphere

2 Most but not all of the layer of Earth known as the _____ is solid.

F core
G mantle
H crust
J lithosphere

3 The _____ is the innermost layer of Earth.

A core
B mantle
C crust
D lithosphere

4 Compared to other layers of Earth, the mantle layer is very

F thin.
G liquid.
H brittle.
J thick.

5 The core is subdivided into the outer core which is _____ and the inner core which is _____.

A liquid; solid
B thin; thick
C thick; thin
D solid; liquid

6 Compared to other layers of Earth, the crust is very

F thick and uneven.
G thin and rocky.
H hot and liquid.
J porous and thick.

Go on

State Performance Indicator: Earth and Space Science *(continued)*

SPI 0707.7.5

Recognize that lithospheric plates on the scale of continents and oceans continually move at rates of centimeters per year.

Movement of the North American Continent: 1998–2001

Year	Distance Moved from First Measurement
1998	5.2
1999	10.4
2000	15.6
2001	?

1 Scientists studying plate tectonics compiled the chart above showing the distance that the North American continent moved from year to year. Based on this information, how far will the continent have moved from the first measurement in the year 2001?

A 10.4 cm
B 15.6 cm
C 20.8 cm
D 26.0 cm

2 A scientist measured the distance moved by a tectonic plate over the course of a year. The distance would best be recorded in what units?

F kilometers
G centimeters
H liters
J miles

3 Which of the following is NOT evidence used to support the theory that Earth's continents were once connected?

A The continents can support animal life.
B Similar geological features are found on widely separated continents.
C The coastlines of some continents fit together like puzzle pieces.
D Similar fossils are found on widely separated continents.

4 Under which of the following headings in a table of contents would the most information about Pangaea be found?

F How to Clean and Prepare Fossil Samples
G Alfred Wegener and Continental Drift
H The Movement of Glaciers
J All You Need to Know About the Asthenosphere

5 The gradual movement of the continents across the surface of Earth is best explained by which of the following?

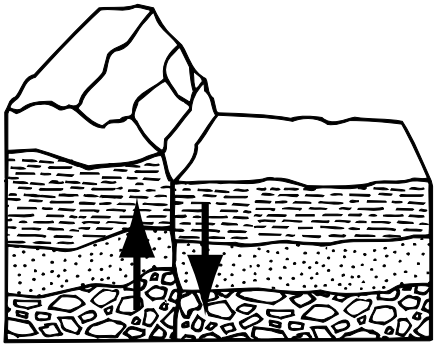
A gravitational attraction
B plate tectonics
C solar radiation
D the greenhouse effect

Go on

State Performance Indicator: Earth and Space Science *(continued)*

SPI 0707.7.6

Describe the relationship between plate movements and earthquakes, mountain building, volcanoes, and sea floor spreading.



1 Which process is taking place in the picture above?

A soil erosion
B river flooding
C iceberg creation
D mountain building

2 Which of the following is NOT caused by plate tectonics?

F earthquakes
G volcanoes
H mountain building
J tidal cycles

3 The Mariana Islands in the Pacific Ocean were formed by volcanic action. Which of the following is most likely true?

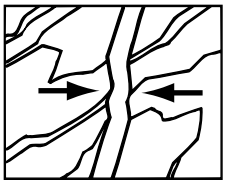
A There are glaciers near the Mariana Islands.
B Tectonic plates collide near the Mariana Islands.
C The Mariana Islands are larger than most islands.
D The Mariana Islands are uninhabited.

4 The most likely cause of earthquake activity on the West Coast of the United States is

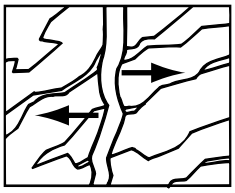
F landslides from coastal mountains.
G the slipping of tectonic plates.
H tidal effects from the Pacific Ocean.
J seasonal temperature changes.

5 Some mountains are formed by the collision of two tectonic plates. Which of the diagrams below shows a situation that would result in the formation of such mountains?

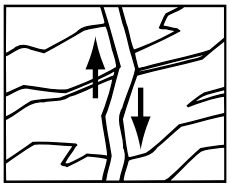
A



B



C



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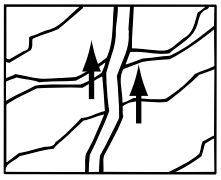


Go on

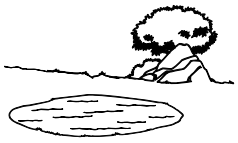
State Performance Indicator: Earth and Space Science *(continued)*

SPI 0707.7.7

Analyze and evaluate the impact of man's use of earth's land, water, and atmospheric resources.

1 Nonrenewable resources are natural resources that cannot be replaced quickly by nature when they get used up. According to this definition, which of these is a nonrenewable resource?

A



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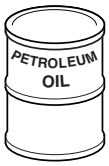
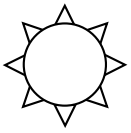


B

D

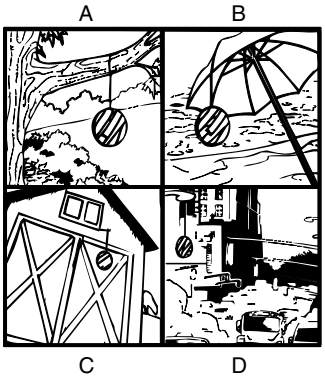


2 Government regulation has forced automobile manufacturers to produce cars that get better gas mileage than those produced in the past. Which has been the greatest benefit of this improved gas mileage?

F developing recycling programs
G improving traffic safety
H raising new car prices
J conserving energy resources

3 In which of the following book chapters would you most likely find information about composting?

A Benefits of Recycling
B Human Population Growth
C Common Water Pollutants
D Yard Wastes and Decomposition



4 The pictures show simple smog-collecting disks hanging in four different locations. When collected after hanging for one day, the disk from which location will have collected the most smog?

F A
G B
H C
J D

5 Which of the following methods of insect pest control would have the LEAST harmful effect on the environment?

A pulling out all the plants that the insect pests feed on
B spraying pesticides over all the plants
C setting traps that contain concentrated insecticide
D releasing insects that are natural predators of the insect pests

Go on

State Performance Indicator: Motion

SPI 0707.11.1

Differentiate between the six simple machines.

1 Under which heading in a table of contents would the most information about inclined planes be found?

A Form and function of a Hockey Stick
B Egyptian Ramps
C Expert Use of Sailing Pulleys
D The Force of a Softball Pitch

2 Why would you use a long thin wedge rather than a short thick wedge?

F to decrease the distance over which a force needs to be applied
G to make the wedge lighter and easier to carry
H to increase the mechanical advantage
J to help the wedge to stay clean and well-lubricated

3 Which of these would most likely make a screw easier to use?

A increasing the length of its thread
B decreasing the length of its thread
C increasing its width
D decreasing its width

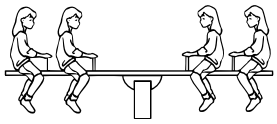
4 How can you increase the mechanical advantage of a wheel and axle?

F turn the wheel harder
G increase the length of the axle in proportion to the wheel
H increase the diameter of the wheel in proportion to the axle
J increase the diameter of the axle in proportion to the wheel

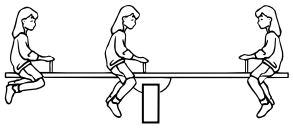
5 In a pulley system, the mechanical advantage is _____ the number of sections of rope pulling up on the object

A a multiple of
B greater than
C equal to
D less than

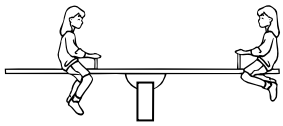
F



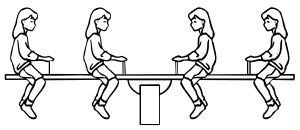
G



H



J



6 Which of these seesaws is most likely to tip to the left?

F F
G G
H H
J J

Go on

State Performance Indicator: Motion

(continued)

SPI 0707.11.2

Determine the amount of force needed to do work using different simple machines.

1 One way to evaluate the effectiveness of a simple machine is by computing the ratio of output force to input force. This ratio is called the

A mechanical advantage.
B machine proportion.
C motive force.
D utility fraction.

2 Which is NOT an important consideration when calculating work?

F motion
G distance
H efficiency
J force

3 The amount of work done in a specific amount of time is known as

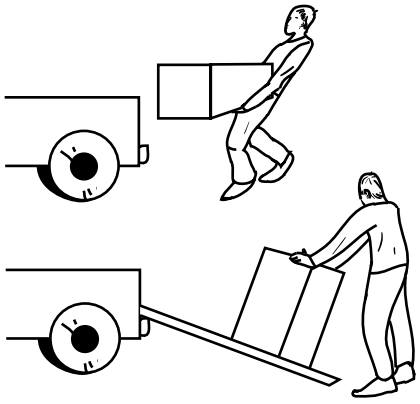
A force.
B power.
C energy.
D time.

4 A scientist measured the amount of work done by a series of simple machines. The work the scientist recorded was most likely measured in

F joules.
G centimeters.
H seconds.
J kilograms.

5 As Keshia picks the cat up from the floor, her arms

A act as a type of inclined plane.
B apply a force perpendicular to the direction of lift.
C do work against gravity.
D exert power on the cat.



6 Based on the illustration above, which statement is accurate?

F Simple machines make work easier to do, even though the amount of work actually done is the same.
G Simple machines make work easier to do by decreasing the amount of work done.
H Simple machines make work harder to do by increasing the amount of work done.
J Simple machines do not affect the perceived difficulty level of work.

Go on

State Performance Indicator: Motion

(continued)

SPI 0707.11.3

Apply proper equations to solve basic problems pertaining to distance, time, speed, and velocity.

Train Position	
Time (minutes)	**Position (meters)**
0.0	0
0.5	200
1.0	400
1.5	600
2.0	800

1 Kyle notices a train passing by. He is curious to know how fast the train is traveling so he notes several positions and times of the engine as shown in the table above. How fast is the train traveling in meters per minute?

A 800
B 600
C 400
D 200

2 A truck travels at a constant speed of 45 kilometers per hour. How far does the truck travel in 20 minutes?

F 15 kilometers
G 20 kilometers
H 25 kilometers
J 30 kilometers

3 Kim's father presses the gas pedal in his car and speeds up from 10 meters per second (m/s) to 35 m/s in 5 seconds. What is the car's change in velocity?

A 10
B 25
C 30
D 35

4 An airplane is flying from Dallas, Texas to Pensacola, Florida. Flying at maximum velocity, it encounters strong winds moving at half the speed of the plane in the opposite direction. How long will it take the plane to travel to Pensacola, relative to the original travel time?

F It will take half the time.
G It will take twice as long.
H It will take 1.5 times as long.
J It will take three times as long.

Bay School Runners		
Name	**Distance**	**Time**
David	200 meters	20 seconds
Jolene	100 meters	10 seconds
Pooja	300 meters	20 seconds
Henry	100 meters	20 seconds

5 According to the information in the chart above, what was Henry's speed?

A 10 m/s
B 15 m/s
C 5 m/s
D 20 m/s

6 According to the information in the chart above, which runner had a speed of 15 m/s?

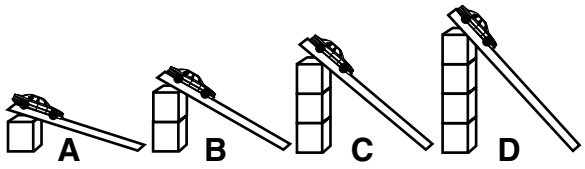
F David
G Henry
H Jolene
J Pooja

Go on

State Performance Indicator: Motion

SPI 0707.11.4 *(continued)*

Identify and explain how Newton's laws of motion relate to the movement of objects.



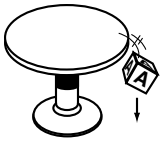
1 The picture above shows four identical toy cars at the tops of four different ramps. When all of the toy cars are pushed down the ramps with the same force, which toy car will travel the farthest from the bottom of its ramp?

A A
B B
C C
D D

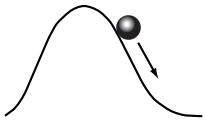
2 All of these pictures show unbalanced forces EXCEPT

F

H



G



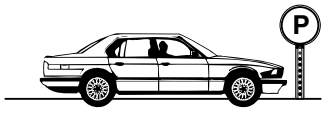
J

3 What is the purpose of using a parachute when skydiving?

A to create an upward force of air resistance and slow down
B to reduce the fiction force and speed up
C to go faster than terminal velocity
D to balance out the forces and stop the skydiver from moving

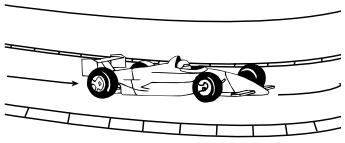
4 Acceleration occurs whenever an object speeds up, slows down, or changes the direction in which it is moving. According to this definition, all of these are examples of acceleration EXCEPT

F



G

H



J

5 This picture shows a girl holding a ball. According to this picture, what is exerting a force on the ball?

A only rolling friction
B only magnetism
C the girl's hands and gravity
D only gravity

6 When a person pushes on a wall, why doesn't the wall fall over?

F The wall cannot exert a force on anything.
G The wall is pushing back with the same force.
H The wall is pulling on the person.
J The forces are not balanced enough.

Go on

State Performance Indicator: Motion

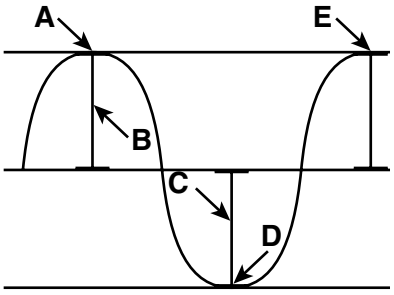
(continued)

SPI 0707.11.5

Compare and contrast the different parts of a wave.

1 A wave is a disturbance that carries energy

A with increasing amplitude.
B without carrying matter.
C with decreasing energy.
D by diffraction.

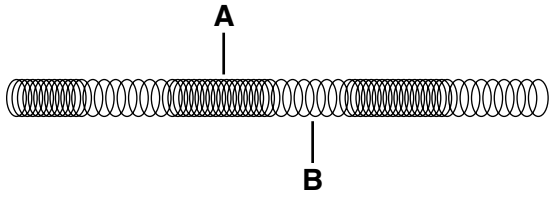


2 What is measured at point A in the diagram of a wave above?

F crest
G trough
H amplitude
J compression

3 What is measured from point A to point E in the diagram of a wave above?

A crest
B rarefaction
C amplitude
D wavelength

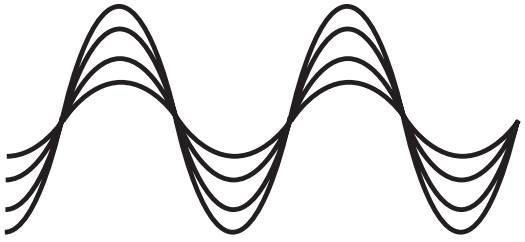


4 What is measured at point A in the diagram of a wave above?

F compression
G trough
H rarefaction
J wavelength

5 What is measured at point B in the diagram of a wave above?

A crest
B compression
C rarefaction
D wavelength



6 Four sound waves reached a source at the same time, as shown in the picture above. Which of the following do the waves NOT have in common?

F amplitude
G frequency
H speed
J wavelength

Go on

State Performance Indicator: Motion

SPI 0707.11.6 *(continued)*

Differentiate between transverse and longitudinal waves in terms of how they are produced and transmitted.

1 In a _____ wave, matter in the medium moves back and forth at right angles to the direction the wave travels.

A refracted
B reflected
C transverse
D longitudinal

2 In a _____ wave, matter in the medium moves forward and backward in the same direction as the wave.

F transverse
G longitudinal
H refracted
J reflected

3 Transverse and longitudinal waves are both examples of _____ waves.

A mechanical
B electromagnetic
C energetic
D frequent

4 A wave of sound is an example of a _____ wave.

F transverse
G longitudinal
H refracted
J reflected

5 A wave of water is an example of a _____ wave.

A refracted
B reflected
C transverse
D longitudinal

6 In a longitudinal wave, the wavelength can be measured from the center of one _____ to the next.

F trough
G rarefaction
H amplitude
J frequency

Stop

Posttest

1 If you want to demonstrate that like charges repel, it would be best to

A place two positively charged objects near each other.

B place two neutral objects near each other.

C place one positive and one negative object near each other.

D place one negative and one neutral object near each other.

2 Chelsea wants to know which brand of potting soil is most nutritious for plants. She decides to design an experiment to test different types of soil. Which of the following is an important step in designing her reliable experiment?

F making sure there have not been experiments like it

G making a guess as to the outcome, without prior research

H making sure that the outcome matches the expected results

J making sure to test one variable while controlling all others

Power Requirements for Household Appliances

Appliance	Power (in watts)
Coffeemaker	1,625
Blender	800
Toaster	950
Microwave	625

3 In the table shown above, the appliance that draws the most current is the

A microwave.

B blender.

C coffeemaker.

D toaster.

4 Naomi placed one end of a spoon in a beaker of water and heated the beaker of water. Which hypothesis is best tested by Naomi's experiment?

F What kind of reaction is a fire?

G Can hands detect very cold temperatures?

H Why doesn't the metal burn?

J How well does metal conduct heat?

5 Which statement below is the benefit which is directly related to buying a car with a hybrid gasoline-electric engine?

A You would pay less money for gasoline.

B The ride would be more comfortable.

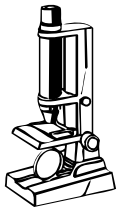
C The car would be very fast.

D The hybrid engine produces more toxic emissions than other car engines.

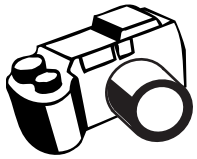
6 Which of the following pieces of equipment would be best to use for observing changes to the DNA of a genetically modified fruit or vegetable?

F

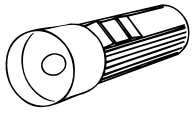
G



H



J



Go on

7 Engineers have developed experiments to test the abilities of different building materials to withstand earthquakes. Which factor would have the LEAST effect on the results of these experiments?

- **A** the strength of the material
- **B** the forces applied to the material
- **C** the color of the material
- **D** the surface on which the material is placed

8 One drawback of wind technology is that

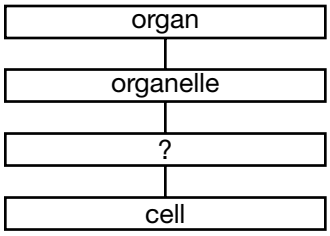
- **F** it produces toxic hydrocarbons.
- **G** it harms local aquatic life.
- **H** wind speeds are not constant, and fluctuate over time.
- **J** wind power has not been perfected, and some generators have been known to explode suddenly.

9 In 1982, the Federal Drug Administration approved human insulin, the first genetically engineered drug. Why did scientists develop a new kind of genetically engineered insulin when people were already being treated with insulin taken from animals?

- **A** Animal insulin could not be processed by humans.
- **B** Genetically engineered insulin is superior to human insulin.
- **C** Doctors were worried that animal insulin might not cure the disease.
- **D** Doctors were worried about the long-term effects of taking animal insulin.

10 Which two-part organelle is most responsible for making the cell's proteins?

- **F** mitochondrion
- **G** ribosome
- **H** recycling organelle
- **J** chloroplast

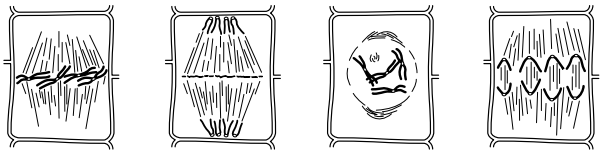


11 What is a group of similar cells that work together?

- **A** tissue
- **B** organ
- **C** organ system
- **D** organism

12 In humans, the respiratory system consists of organs that work together to

- **F** regulate the movement of blood throughout the body.
- **G** regulate the movement of air into and out of the body.
- **H** coordinate the muscles and bones within the body.
- **J** coordinate electrical impulses to the brain.

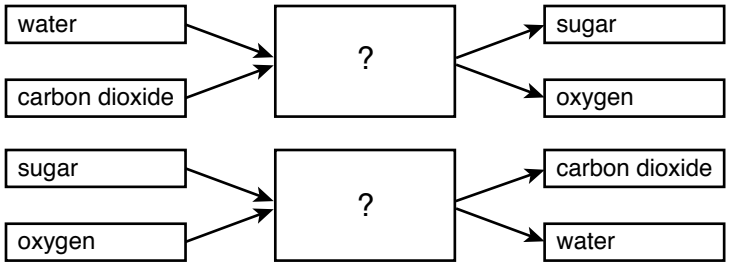


Metaphase **Telophase** **Prophase** **Anaphase**

13 Which of the following lists the stages of mitosis in the correct order?

- **A** metaphase, anaphase, prophase, telophase
- **B** anaphase, telophase, prophase, metaphase
- **C** telophase, anaphase, metaphase, prophase
- **D** prophase, metaphase, anaphase, telophase

Go on



14 During the process of _____, cells break down sugars to create carbon dioxide.

F osmosis
G diffusion
H photosynthesis
J cellular respiration

	Nitrogen	Oxygen	Carbon Dioxide	Other Gases
Inhaled Air	78%	21%	0.03%	0.97%
Exhaled Air	78%	16%	4%	2%

15 Based on the data in the table above, which substances are excreted by the lungs?

A carbon dioxide and oxygen only
B nitrogen and oxygen only
C carbon dioxide and other gases
D nitrogen only

16 What is diffusion?

F movement of a vesicle into the cytoplasm
G movement of a vesicle out of the cytoplasm
H movement of molecules from an area of lower density to an area of higher density
J movement of molecules from an area of higher density to an area of lower density

17 All of the following are types of asexual reproduction EXCEPT

A budding.
B fertilization.
C generalization.
D fission.

18 Which sentence gives the best definition of pollination?

F Pollination occurs when bees collect plant nectar to make honey.
G Pollination occurs when pollen from one plant lands on the pistol of another plant.
H Pollination occurs when a flower turns into a fruit.
J Pollination occurs when a seed is transported to a new area by an animal's digestive tract.

19 All of these can be used to describe types of inheritance patterns EXCEPT

A polygenic inheritance.
B incomplete dominance.
C sex linkage.
D recombinant DNA.

Go on

	B	b
B	?	Bb
b	Bb	bb

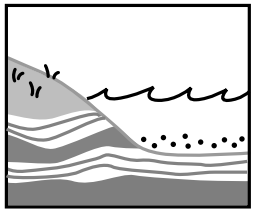
20 In humans, the allele for brown eyes (B) is dominant over the allele for blue eyes (b). Which of these genotypes will complete this Punnett square?

F BB
G Bb
H bB
J bb

1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Orthoclase feldspar
7	Quartz
8	Topaz
9	Corundum
10	Diamond

21 Which of these statements is true?

A Apatite can scratch fluorite.
B Diamond can be scratched by corundrum.
C Calcite can scratch quartz.
D Topaz can be scratched by quartz.



22 Which type of rock is being formed in the diagram above?

F sedimentary
G metamorphic
H igneous
D composite

23 During the rock cycle, what process acts upon magma to create igneous rock?

A melting
B cooling
C wearing away by wind, water, and ice
D heat and pressure

24 Which is the innermost of the three layers that make up Earth?

F mantle
G core
H crust
J lithosphere

25 A scientist measured the distance moved by a tectonic plate over the course of a year. The distance would best be recorded in what units?

A kilometers
B centimeters
C liters
D miles

Go on

26 When tectonic plates collide, molten rock from beneath Earth's crust is sometimes forced up through the surface. When this occurs, it is called

F a mountain.
G an earthquake.
H a rift.
J a volcano.

27 Factory wastewater can be an environmental problem when it

A is released into the air around the factory.
B is released into rivers and contaminates them.
C is recycled into new materials.
D is sent into the ozone layer.

28 What is one way in which simple machines make work easier?

F improving the quality of axles used in cars
G eliminating the need for workers to apply any force when completing tasks
H decreasing the amount of force necessary to complete a task
J creating the need for more workers

29 One way to evaluate the effectiveness of a simple machine is by computing the ratio of output force to input force. This ratio is called the

A mechanical advantage.
B machine proportion.
C motive force.
D utility fraction.

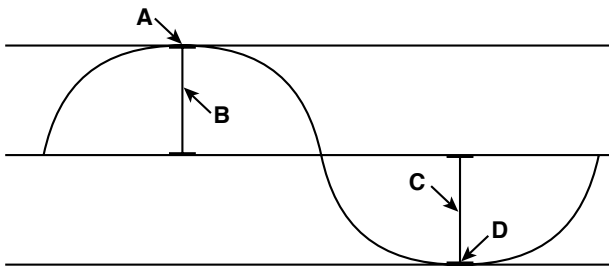
30 Which statement best describes the difference between speed and velocity?

F Speed is distance divided by time, and velocity is total distance.
G Speed is how fast an object is moving, and velocity includes speed and direction.
H Velocity is how fast an object is moving, and velocity includes speed and direction.
J Speed and velocity are in units of meters per second.

31 According to Newton's second law of motion, acceleration of an object depends on the mass of the object and the

A net weight of the object.
B net force acting on the object.
C gravity of the object.
D trajectory of the object.

Go on



32 In the model of a transverse wave above, point D is the _____ of the wave.

F trough
G amplitude
H crest
J frequency

33 In a compressional or longitudinal wave, the energy makes the medium move

A perpendicular to the direction of the wave.
B through space where there is no matter.
C parallel to the direction of the wave.
D up and down diagonally to the direction of the wave.

Stop

Science Notebook

Glencoe Science

Tennessee Science

Grade 7

Consultant
Douglas Fisher, Ph.D.

Mc Graw Hill Glencoe

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.

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Note-Taking Tips

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

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

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

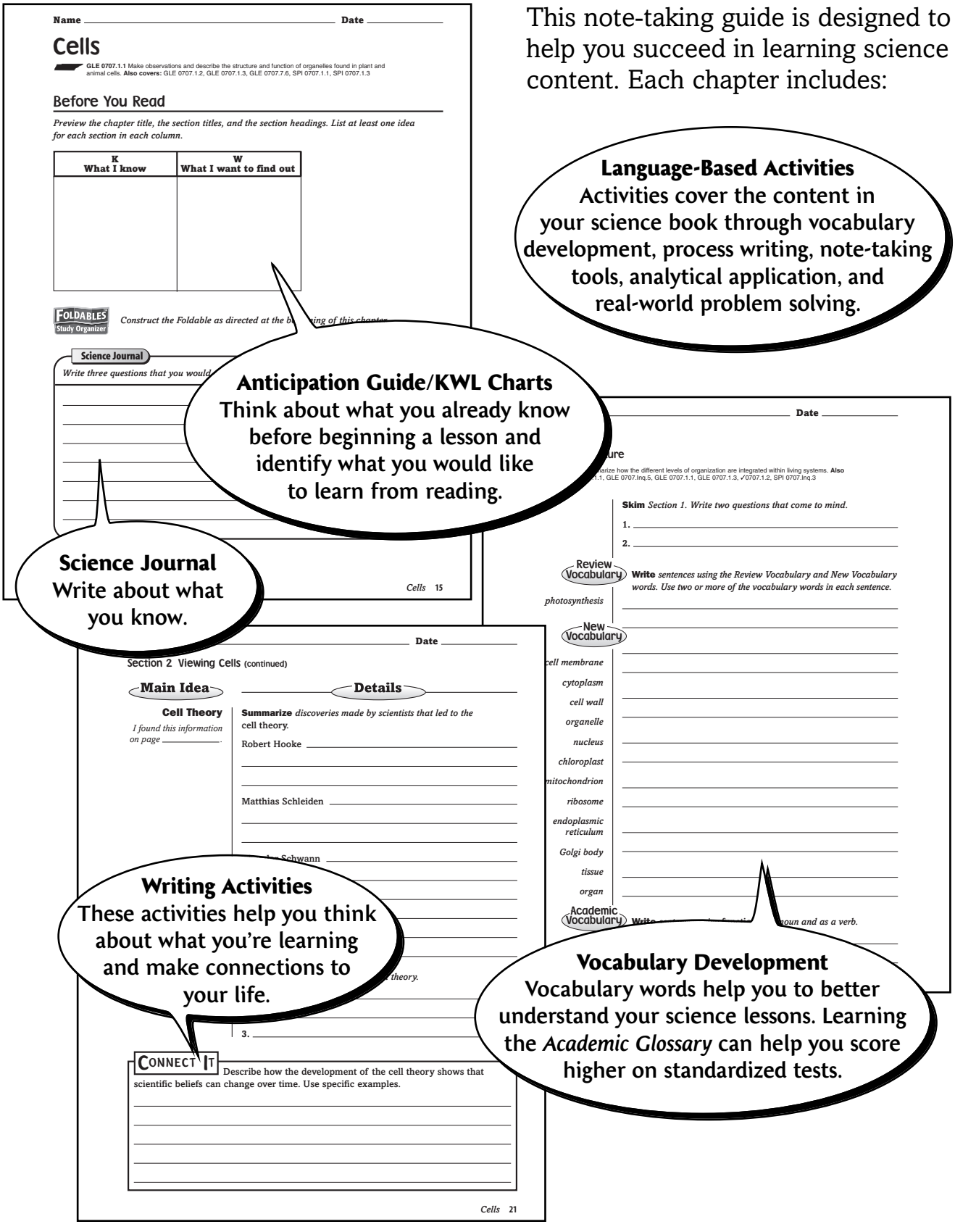
Word or Phrase	Symbol or Abbreviation
and	+
approximately	≈
therefore	∴
versus	vs

- Use a symbol such as a star (★) or an asterisk (*) to 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.

Note-Taking Don'ts

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

Using Your Science Notebook



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

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

Anticipation Guide/KWL Charts
Think about what you already know before beginning a lesson and identify what you would like to learn from reading.

Science Journal
Write about what you know.

Writing Activities
These activities help you think about what you're learning and make connections to your life.

Vocabulary Development
Vocabulary words help you to better understand your science lessons. Learning the *Academic Glossary* can help you score higher on standardized tests.

Name _____ Date _____

Section 2 Viewing Cells (continued)

Main Idea — **Details**

Magnifying Cells

I found this information on page _____.

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

_____

_____

_____

I found this information on page _____.

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

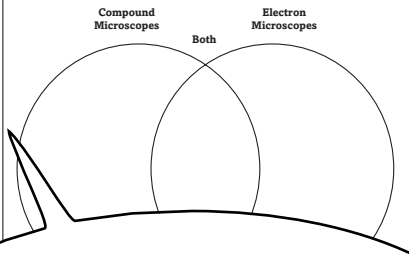
total magnification =

_____

total magnification = _____

I found this information on page _____.

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



20

Note-Taking Based on the Cornell Two-Column Format
Practice effective note-taking through the use of graphic organizers, outlines, and written summaries.

Chapter Wrap-Up
This brings the information together for you. Revisiting what you thought at the beginning of the chapter provides another opportunity for you to discuss what you have learned.

Name _____ Date _____

Cells Chapter Wrap-Up

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

K What I know	W What I want to find out	L What I learned

Review

Use this checklist to help you study.

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

SUMMARIZE IT What

_____

_____

_____

_____

_____

_____

26 *Cells*

Review Checklist
This list helps you assess what you have learned and prepare for your chapter tests.

Name _____ Date _____

Section 1 Cell Structure (continued)

Main Idea — **Details**

Common Cell Traits

I found this information on page _____.

Define cell *by completing the following statement.*

A cell is _____

_____.

I found this information on page _____.

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

Prokaryotic Cell	Eukaryotic Cell

Cell Organization

I found this information on page _____.

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

Part	Description
Cell wall	
Nucleus	
Chloroplast	
Mitochondria	
Ribosomes	
Endoplasmic reticulum	
Golgi bodies	
Lysosomes	

Cells 17

Graphic Organizers
A variety of visual organizers help you to analyze and summarize information and remember content.

Name _____ Date _____

The Nature of Science

GLE 0707.Inq.1 Design and conduct open-ended scientific investigations. **Also covers:** GLE 0707.Inq.2, GLE 0707.Inq.3, GLE 0707.Inq.4, GLE 0707.Inq.5, GLE 0707.T/E.1, GLE 0707.1.3, ✓0707.Inq.1, ✓0707.Inq.2, ✓0707.Inq.3

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	The Nature of Science
	• Science and technology are independent of one another.
	• Only scientists use science skills.
	• Scientific theories can change if new information becomes available.
	• Science experiments that are done by professional scientists do not need to be repeated.

FOLDABLES™ Study Organizer

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

Science Journal

Write down three examples of science in your everyday life.

Name _____ **Date** _____

The Nature of Science

Section 1 What is science?

GLE 0707.T/E.1 Explore how technology responds to social, political, and economic needs. ✓**0707.1.7** Explain how different organ systems interact to enable complex multicellular organisms to survive.
Also covers: GLE 0707.1.3

Skim *through Section 1 of your text. Write three questions that come to mind from reading the headings and looking at the illustrations.*

1. _____

2. _____

3. _____

Review Vocabulary

Define theory *using your book or a dictionary. Write a sentence about a* theory *you have heard people talk about in everyday life.*

theory _____

New Vocabulary

Write the correct key term from your text next to each definition.

_____ an explanation of a pattern observed repeatedly in the natural world

_____ a way of learning more about the natural world

_____ a collection of structures, cycles, and processes that relate to and interact with each other

_____ a rule that describes a pattern in nature

Academic Vocabulary

Use a dictionary to help you write a scientific definition of the word cycle.

cycle _____

Name _____ **Date** _____

Section 1 What is science? (continued)

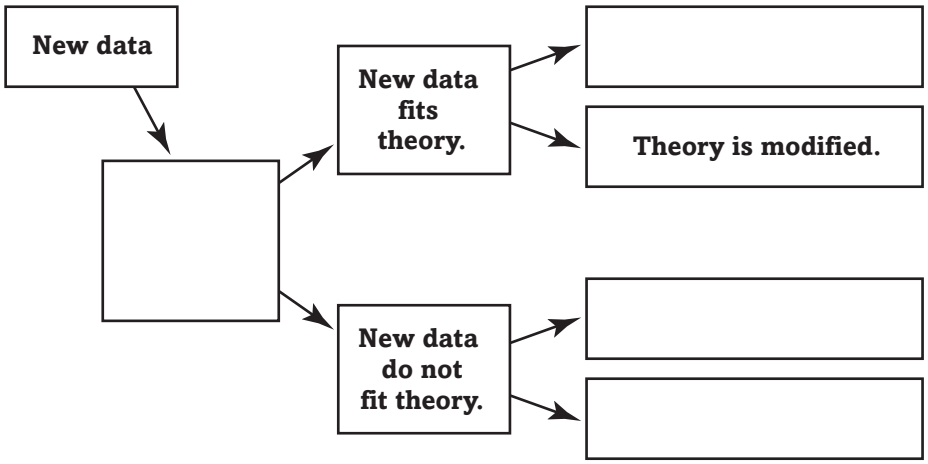
Main Idea | **Details**

Learning About the World

I found this information on page _____.

Complete *the graphic organizer to show what may happen to a* scientific theory *when new data are discovered. Use the following phrases:*

- Evaluate scientific theory.
- Theory is discarded.
- Theory is modified.
- Theory stays same.



Systems in Science

I found this information on page _____.

Synthesize *information from your book to list some of the* structures, cycles, *and* processes *in your school day.*

Structures	Cycles	Processes

Choose at least one structure, one cycle, and one process from your list and describe the ways they interact.

_____

_____

_____

_____

_____

Name _____ **Date** _____

Section 1 What is science? (continued)

Main Idea

Details

The Branches of Science

I found this information on page _____.

Classify *which branch of science*—physical science, Earth science, *or* life science—*includes each of the following examples. Then, write one additional example studied by that science.*

Example	Branch of Science	Additional Example
Soil		
Fish		
Light		
Meteors		
Chemical reactions		
Body systems		
Plants		
Clouds		

Science and Technology

I found this information on page _____.

Complete *the following paragraph about the relationship between* science *and* technology.

_____ is a way to learn about the natural world. To use these answers for helping people, however, they must be applied in some way. _____ is the practical use of _____ in our everyday lives.

CONNECT IT

Write about a time that you used science to figure out a problem in your everyday life. Include an additional question about this topic that you might like to investigate.

_____

_____

_____

_____

Name _____ **Date** _____

The Nature of Science

Section 2 Science in Action

GLE 0707.Inq.3 Synthesize information to determine cause and effect relationships between evidence and explanations. **Also covers:** GLE 0707.Inq.1, GLE 0707.Inq.2, GLE 0707.Inq.5, SPI 0707.Inq.1, SPI 0707.Inq.2, SPI 0707.Inq.3

Skim *the headings in Section 2. Then make three predictions about what you will learn.*

1. _____
2. _____
3. _____

Review Vocabulary

Define observation *and give an example of an observation you made today.*

observation _____

New Vocabulary

Use your book or a dictionary to define the following key terms.

hypothesis _____

infer _____

controlled experiment _____

variable _____

constant _____

Academic Vocabulary

Use a dictionary to define chart *as it refers to science.*

chart _____

Name _____ **Date** _____

Section 2 Science in Action (continued)

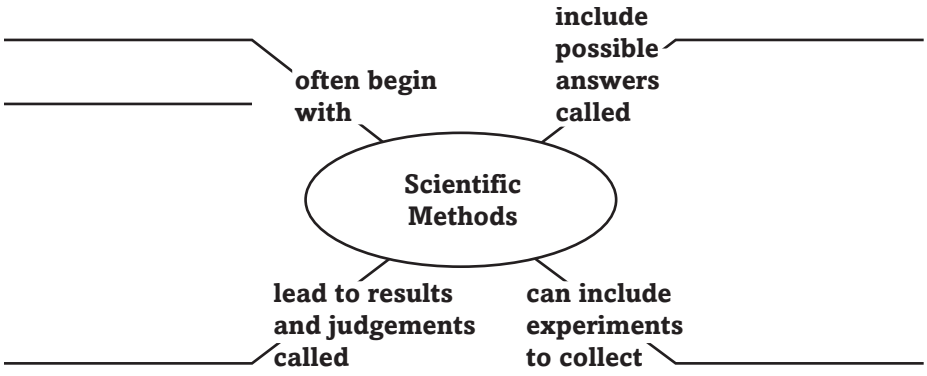
Main Idea

Details

Science Skills

I found this information on page _____.

Connect *concepts by completing the concept map below about* scientific methods.



Drawing Conclusions

I found this information on page _____.

Complete *the outline below by writing answers on the lines.*

Making Conclusions and Communicating

I. Conclusions

A. Definition of conclusion

1. _____

_____

2. _____

_____

B. Reasons why scientists often test the conclusions of another scientist

1. _____

_____

2. _____

_____

II. Communicating—Reasons why it is important for scientists to communicate

A. _____

B. _____

Name _____ **Date** _____

Section 2 Science in Action (continued)

Main Idea

Experiments

I found this information on page _____.

Details

Compare and contrast *types of* variables *by writing a sentence that describes each type.*

How Variables Change	
Type of Variable	**Description**
Independent variable	
Dependent variable	
Constant	

Laboratory Safety

I found this information on page _____.

Analyze *each procedure below and write the precautions you should take to keep safe.*

Heating a liquid on a hot plate: _____

_____

_____

Going outside to observe nature: _____

_____

_____

Handling plants or animals in the lab: _____

_____

_____

CONNECT IT

Think of a scientific question that you would like to answer. Then, write three hypotheses, or possible answers, to your question. How could you test your hypotheses?

_____

_____

_____

Name _____ **Date** _____

The Nature of Science

Section 3 Models in Science

GLE 0707.Inq.5 Communicate scientific understanding using descriptions, explanations, and models.
✓0707.Inq.5 Design a method to explain the results of an investigation using descriptions, explanations, or models.

Scan *Section 3 of your book. Then write three questions that you have about the use of models in science. Try to answer your questions as you read.*

1. _____
2. _____
3. _____

Review Vocabulary

Define scientific method *using your book or a dictionary. Then give an example of the scientific method in action.*

scientific method _____

New Vocabulary

Use your book or a dictionary to define model. *Then give some examples of real-life and scientific models.*

model _____

Academic Vocabulary

Use a dictionary to define encounter. *Then use the term in an original sentence that shows its scientific meaning.*

encounter _____

Name _____ **Date** _____

Section 3 Models in Science (continued)

Main Idea

Why are models necessary?

I found this information on page _____.

Summarize *how* models *are helpful.*

_____

_____

_____

Types of Models

I found this information on page _____.

Organize *information in the chart to describe the three types of models and their uses.*

Models		
Type	**Description**	**Use**
Physical		
	built using computer software	
		help people understand abstract concepts that often are beyond common experience

Making Models

I found this information on page _____.

Create *a diagram of the building in which you live. Provide as much detail as possible so that your model will be accurate. Identify uses for this model.*

Details

_____

_____

Name _____ **Date** _____

Section 3 Models in Science (continued)

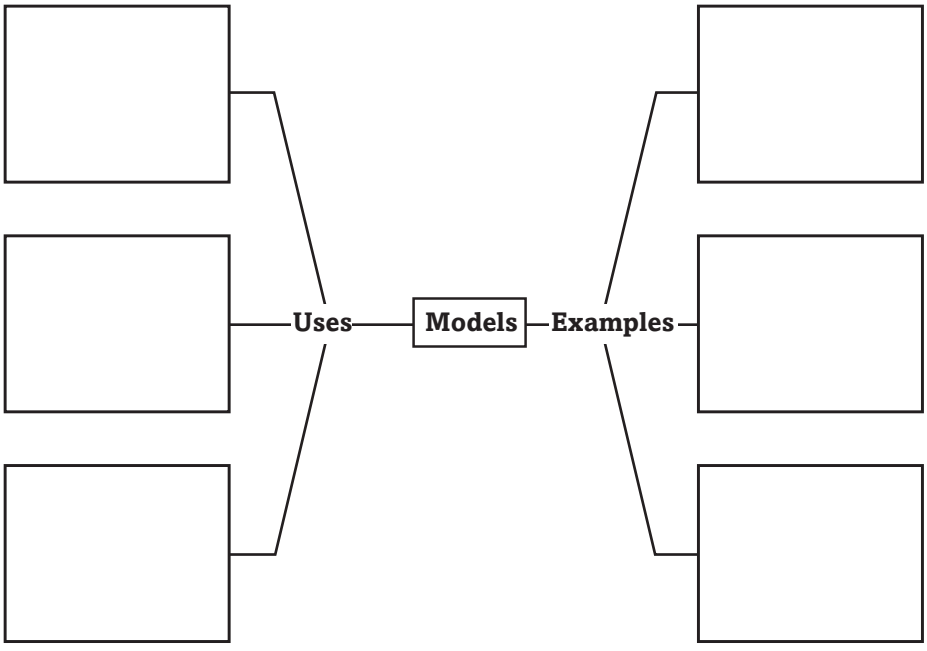
Main Idea

Details

Using Models

I found this information on page _____.

Complete *the graphic organizer about three ways that models are useful and three examples of scientific models.*



Limitations of Models

I found this information on page _____.

Identify *two reasons that models have limitations and list an example of a model for each reason.*

1. _____

2. _____

CONNECT IT

As more has been learned about the solar system, the models used to represent it have changed. What are some other models that might have changed over time as new discoveries were made?

_____

_____

Name _____ **Date** _____

The Nature of Science

Section 4 Evaluating Scientific Explanation

GLE 0707.Inq.4 Recognize possible sources of bias and error, alternative explanations, and questions for further exploration. **SPI 0707.Inq.5** Identify a faulty interpretation of data that is due to bias or experimental error.

Skim *through the section. Read the headings and look at the illustrations. Then write three questions that come to mind. Add to these impressions as you read the section.*

1. _____

2. _____

3. _____

Review Vocabulary

Define prediction *using your book. Write a scientific sentence to give an example of a prediction.*

prediction _____

New Vocabulary

Use your book to define the following terms.

critical thinking _____

data _____

Academic Vocabulary

Use evaluate *in a scientific sentence.*

evaluate _____

Name _____ **Date** _____

Section 4 Evaluating Scientific Explanation (continued)

Main Idea	Details

Believe it or not?

I found this information on page _____.

Complete *the following sentences using these terms.*

sense inferences evaluate observations
conclusions accurate critical

You can _____ an explanation using _____ thinking. First, you should examine the _____ and decide if you believe they are _____. Then, look at the _____ or _____ made about the data and decide if they make _____.

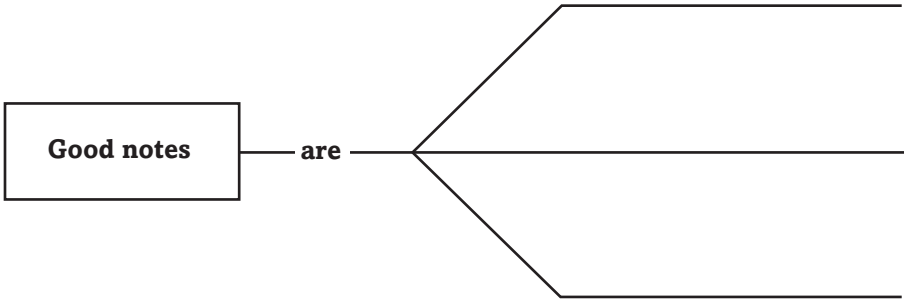
Evaluating the Data

I found this information on page _____.

Summarize *three features of* **reliable data.**

1. _____
2. _____
3. _____

Organize *three characteristics of* **good notes.**



Name _____ **Date** _____

Section 4 Evaluating Scientific Explanation (continued)

Main Idea

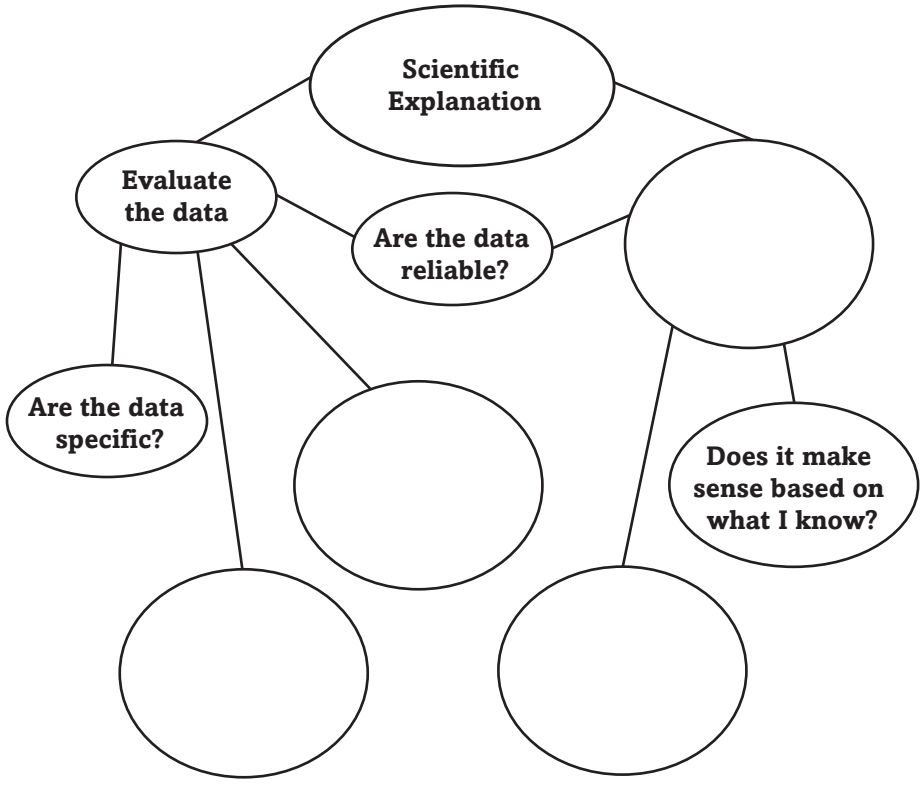
Evaluating the Conclusions

I found this information on page _____.

Details

Complete *the concept web to show the steps you might use when evaluating a* scientific explanation. *Use phrases:*

- Are there good notes?
- Can the data be repeated?
- Could there be another explanation?
- Evaluate the conclusion.



Connect It

Create your own advertisement for a wrinkle cream. Include claims about the product's safety and effectiveness, and use information that might help support those claims. List reasons why another person should or should not believe your ad.

Advertisement: _____

_____

_____

Reasons: _____

_____

_____

Name _____ **Date** _____

The Nature of Science Chapter Wrap-Up

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

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

The Nature of Science	After You Read
• Science and technology are independent of one another.	
• •Only scientists use science skills.	
• Scientific theories can change if new information becomes available.	
• Science experiments that are done by professional scientists do not need to be repeated.	

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about the nature of scientific investigation.

_____

_____

_____

_____

Name _____ Date _____

Cells

GLE 0707.1.1 Make observations and describe the structure and function of organelles found in plant and animal cells. **Also covers:** GLE 0707.1.2, GLE 0707.1.3, GLE 0707.7.6, SPI 0707.1.1, SPI 0707.1.3

Before You Read

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

K What I know	W What I want to find out

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

Science Journal

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

Name _____ **Date** _____

Cells

Section 1 Cell Structure

GLE 0707.1.2 Summarize how the different levels of organization are integrated within living systems.
Also covers: GLE 0707.lnq.5, GLE 0707.1.1, GLE 0707.1.3, ✓0707.1.2, SPI 0707.lnq.3, SPI 0707.1.1

Skim *Section 1. Write two questions that come to mind.*

1. _____

2. _____

Review Vocabulary

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

photosynthesis _____

New Vocabulary

_____

cell membrane _____

cytoplasm _____

cell wall _____

organelle _____

nucleus _____

chloroplast _____

mitochondrion _____

ribosome _____

endoplasmic reticulum _____

Golgi body _____

tissue _____

organ _____

Academic Vocabulary

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

function

Noun: _____

Verb: _____

Name _____ **Date** _____

Section 1 Cell Structure (continued)

Main Idea	Details

Common Cell Traits

I found this information on page _____.

I found this information on page _____.

Define cell *by completing the following statement.*

A cell is _____

_____.

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

Prokaryotic Cell	Eukaryotic Cell

Cell Organization

I found this information on page _____.

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

Part	Description
Cell wall	
Nucleus	
Chloroplast	
Mitochondria	
Ribosomes	
Endoplasmic reticulum	
Golgi bodies	
Lysosomes	

Name _____ **Date** _____

Section 1 Cell Structure (continued)

Main Idea

From Cell to Organism

I found this information on page _____.

Details

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

tissue organism cell organ system organ

Term: _____ **Example:** _____

Definition: _____

↓

Term: _____ **Example:** _____

Definition: _____

↓

Term: _____ **Example:** _____

Definition: _____

↓

Term: _____ **Example:** _____

Definition: _____

↓

Term: _____ **Example:** _____

Definition: _____

SYNTHESIZE IT

Compare and contrast animal and plant cells.

_____

_____

_____

Name _____ **Date** _____

Cells

Section 2 Viewing Cells

GLE 0707.Inq.2 Use appropriate tools and techniques to gather, organize, analyze, and interpret data.
✓0707.1.1 Examine and describe plant and animal cells using compound microscopes.
Also covers: GLE 0707.T/E.1, ✓0707.Inq.2

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

1. _____
2. _____
3. _____

Review Vocabulary

magnify

Use magnify *in a sentence.*

_____

_____

New Vocabulary

cell theory

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

_____

_____

Academic Vocabulary

compound

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

_____

_____

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

_____

_____

_____

Name _____ **Date** _____

Section 2 Viewing Cells (continued)

Main Idea

Details

Magnifying Cells

I found this information on page _____.

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

_____

_____

_____

I found this information on page _____.

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

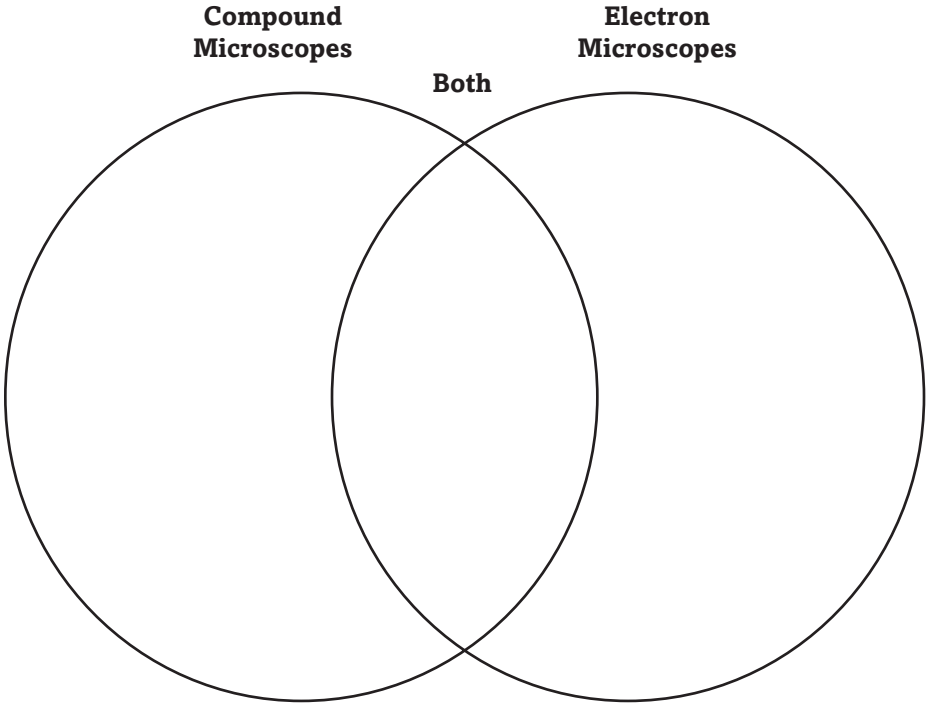
total magnification =

_____

total magnification = _____

I found this information on page _____.

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



Name _____ **Date** _____

Section 2 Viewing Cells (continued)

Main Idea	Details
Cell Theory *I found this information on page _____.*	**Summarize** *discoveries made by scientists that led to the* cell theory. Robert Hooke _____ Matthias Schleiden _____ Theodor Schwann _____ Rudolf Virchow _____
I found this information on page _____.	**List** *the 3 main principles of the cell theory.* **1.** _____ **2.** _____ **3.** _____

CONNECT IT

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

Name _____ **Date** _____

Cells

Section 3 Viruses

GLE 0707.T/E.1 Explore how technology responds to social, political, and economic needs.
Also covers: SPI 0707.Inq.3

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

1. _____
2. _____
3. _____

Review Vocabulary

Define disease *using your book or a dictionary.*

disease _____

New Vocabulary

Use your book to define each new vocabulary term.

virus _____

host cell _____

Academic Vocabulary

Use a dictionary to define apparent.

apparent _____

Explain what the following sentence means.

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

_____

Name _____ Date _____

Section 3 Viruses (continued)

Main Idea **Details**

What are viruses?

I found this information on page _____.

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

Viruses

I. Definition: _____

_____

II. Description:

A. Size: _____

B. Shapes: _____

III. Diseases caused by viruses

A. _____ **C.** _____

B. _____ **D.** _____

How do viruses multiply?

I found this information on page _____.

Summarize *what a virus needs to reproduce.*

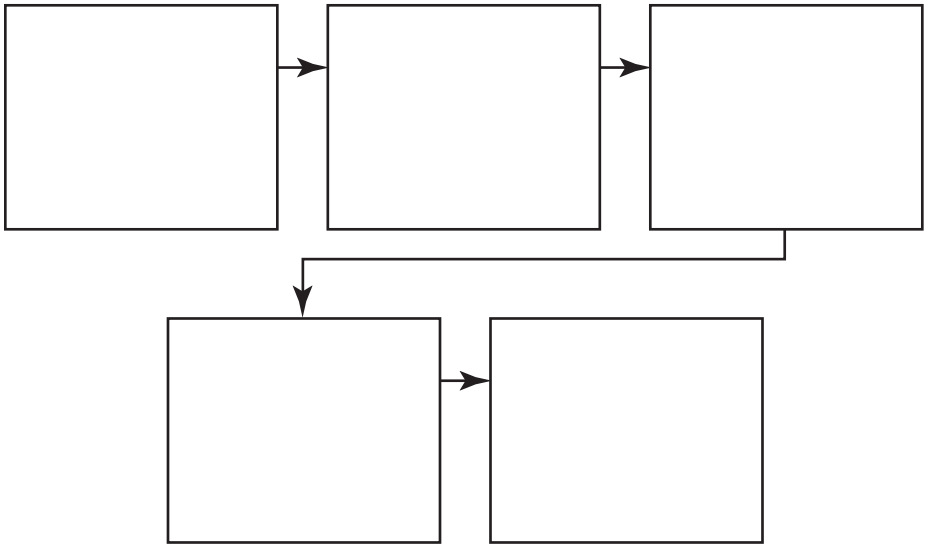
_____

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

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

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

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



Name _____ **Date** _____

Section 3 Viruses (continued)

Main Idea	Details
How do viruses affect organisms? *I found this information on page _____.*	**Define** bacteriophage *and explain what it does to a* bacterium.
Fighting Viruses *I found this information on page _____.*	**Sequence** *the steps by which* interferons *work.*
Research with Viruses *I found this information on page _____.*	**Summarize** *how scientists use viruses in* gene therapy.

CONNECT IT

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

Name _____ **Date** _____

Tie It Together

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

Name _____ **Date** _____

Cells Chapter Wrap-Up

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

K What I know	W What I want to find out	L What I learned

Review

Use this checklist to help you study.

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

SUMMARIZE IT

What are the three most important ideas in the chapter?

_____

_____

_____

_____

_____

_____

Name _____ Date _____

Cell Processes

GLE 0707.3.1 Distinguish between the basic features of photosynthesis and respiration.
Also covers: GLE 0707.Inq.1, GLE 0707.Inq.2, GLE 0707.Inq.5, GLE 0707.1.1, GLE 0707.1.5, GLE 0707.3.1, GLE 0707.3.2, GLE 0707.7.6

Before You Read

Before you read the chapter, respond to these statements.

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

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

FOLDABLES™ Study Organizer

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

Science Journal

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

Name _____ **Date** _____

Cell Processes

Section 1 Chemistry of Life

GLE 0707.7.6 Evaluate how human activities affect the Earth's land, oceans, and atmosphere.
Also covers: GLE 0707.Inq.1, GLE 0707.Inq.5, SPI 0707.7.7

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

1. _____

2. _____

3. _____

Review Vocabulary

Define cell *to show its scientific meaning.*

cell _____

New Vocabulary

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

mixture _____

organic compound _____

enzyme _____

inorganic compound _____

Academic Vocabulary

Use a dictionary to define chemical bond.

chemical bond _____

Name _____ **Date** _____

Main Idea

Details

The Nature of Matter

I found this information on page _____.

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

	Elements	Compounds
Number of types of atom		
Example		

I found this information on page _____.

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

_____ has positively and negatively charged ions

_____ share outermost electrons to bond

_____ salt

_____ sugar

_____ involved in many life processes

_____ have different properties than the elements from which they are made

Mixtures

I found this information on page _____.

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

A mixture is _____

_____

Both solutions and suspensions _____

_____

In a solution, _____

_____

In a suspension, _____

_____

Name _____ **Date** _____

Main Idea

Details

Organic Compounds

I found this information on page _____.

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

Organic Compounds in Living Things	
Compound	**Function**
Carbohydrates	
Lipids	
Proteins	
Nucleic acids	

Inorganic Compounds

I found this information on page _____.

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

Characteristic	Organic	Inorganic
Contains carbon?		
Role in living things		

I found this information on page _____.

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

1. _____

2. _____

3. _____

Name _____ **Date** _____

Cell Processes

Section 2 Moving Cellular Materials

GLE 0707.1.5 Observe and explain how materials move through simple diffusion. **SPI 0707.1.5** Explain how materials move through simple diffusion. **Also covers:** GLE 0707.1.1, SPI 0707.Inq.4, SPI 0707.1.1

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

1. _____
2. _____
3. _____

Review Vocabulary

Define cytoplasm *to show its scientific meaning.*

cytoplasm _____

_____

New Vocabulary

Write the vocabulary term that matches each definition.

_____ movement of substances through a cell membrane without the use of energy

_____ occurs when molecules of one substance are spread evenly throughout another substance

_____ energy-requiring process in which transport proteins bind with particles and move them through a cell membrane

_____ process by which a cell takes in a substance by surrounding it with the cell membrane

_____ process by which vesicles release their contents outside the cell

_____ type of passive transport in which molecules move from where there are more of them to where there are fewer of them

_____ type of passive transport that occurs when water diffuses through a cell membrane

Academic Vocabulary

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

facilitate _____

_____

Name _____ **Date** _____

Section 2 Moving Cellular Materials (continued)

Main Idea | **Details**

Passive Transport

I found this information on page _____.

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

I found this information on page _____.

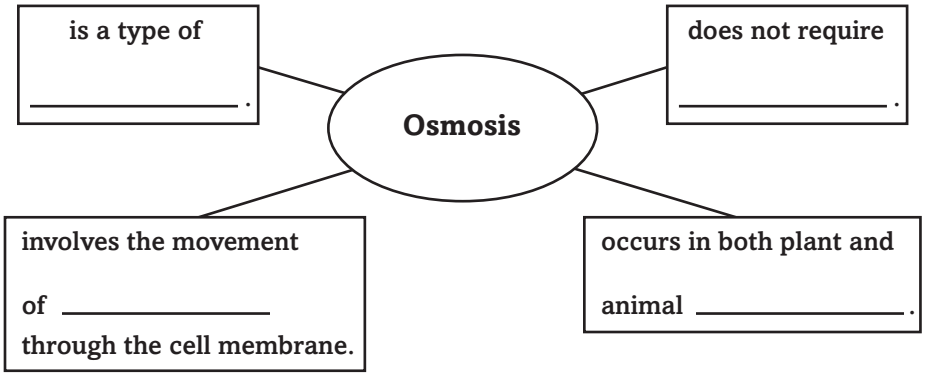
Write a short caption on how oxygen moves from the lungs to toe cells.

_____

_____

_____

Complete *the concept map of* osmosis.



I found this information on page _____.

List *three facts about* facilitated diffusion.

1. _____
2. _____
3. _____

Name _____ **Date** _____

Section 2 Moving Cellular Materials (continued)

Main Idea	Details

Active Transport

I found this information on page _____.

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

1. _____
2. _____
3. _____

I found this information on page _____.

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

	Facilitated Diffusion	Active Transport
Uses transport proteins?		
Transports materials across cell membrane?		
Requires energy?		
Able to move materials from an area with less of the material to an area with more of the material?		

Endocytosis and Exocytosis

I found this information on page _____.

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

	Process	Description
Materials entering cell		
Materials being expelled from cell		

Name _____ **Date** _____

Cell Processes

Section 3 Energy for Life

GLE 0707.3.2 Investigate the exchange of oxygen and carbon dioxide between living things and the environment. **Also covers:** GLE 0707.3.1, ✓0707.3.3, ✓0707.T/E, SPI 0707.3.1

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

1. _____
2. _____
3. _____

Review Vocabulary

Define mitochondrion *to show its scientific meaning.*

mitochondrion _____

_____

New Vocabulary

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

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

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

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

_____ total of all chemical reactions in an organism

Academic Vocabulary

Use a dictionary to define **obtain**.

obtain _____

_____

Name _____ **Date** _____

Section 3 Energy for Life (continued)

Main Idea

Details

Trapping and Using Energy

I found this information on page _____.

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

I found this information on page _____.

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

Material	Role in Photosynthesis
Water	
Carbon dioxide	
	products of photosynthesis
Chlorophyll	

I found this information on page _____.

Analyze *why photosynthesis is important to animals.*

Name _____ **Date** _____

Section 3 Energy for Life (continued)

Main Idea

I found this information on page _____.

Details

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

_____

_____

_____

I found this information on page _____.

Compare **fermentation** ***with cellular respiration.***

Comparing Fermentation and Cellular Respiration		
Process	**Fermentation**	**Cellular Respiration**
What gets broken down?		
Where does breakdown occur?		
Is energy released?		
What wastes are produced?	if insufficient O_2 in muscle cells: _____; in yeast cells: _____	

Synthesize It

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

carbon dioxide consumer energy oxygen photosynthesis producer cellular respiration

_____

_____

_____

_____

Name _____ **Date** _____

Tie It Together

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

Name _____ **Date** _____

Cell Processes Chapter Wrap-Up

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

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

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

Review

Use this checklist to help you study.

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

SUMMARIZE IT

List three important ideas in the chapter.

_____

_____

_____

_____

_____

Name _____ Date _____

Plants

GLE 0707.1.1 Make observations and describe the structure and function of organelles found in plant and animal cells. **Also covers:** GLE 0707.1.1, GLE 0707.1.2, GLE 0707.1.3, GLE 0707.7.6, GLE 0707.Inq.1, GLE 0707.Inq.2

Before You Read

Before you read the chapter, respond to these statements.

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

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

FOLDABLES™ Study Organizer

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

Science Journal

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

Name _____ **Date** _____

Plants

Section 1 An Overview of Plants

GLE 0707.1.2 Summarize how different levels of organization are integrated within living systems.
Also covers: GLE 0707.1.1, GLE 0707.4.2, ✓0707.1.2, SPI 0707.1.1

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

1. _____
2. _____
3. _____

Review Vocabulary

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

species _____

New Vocabulary

Use your book to define the following key terms.

cuticle _____

cellulose _____

vascular plant _____

nonvascular plant _____

Academic Vocabulary

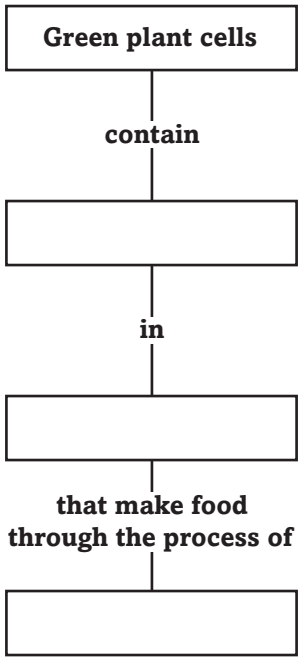
Use a dictionary to define adapt *to reflect its scientific meaning.*

adapt _____

Name _____ Date _____

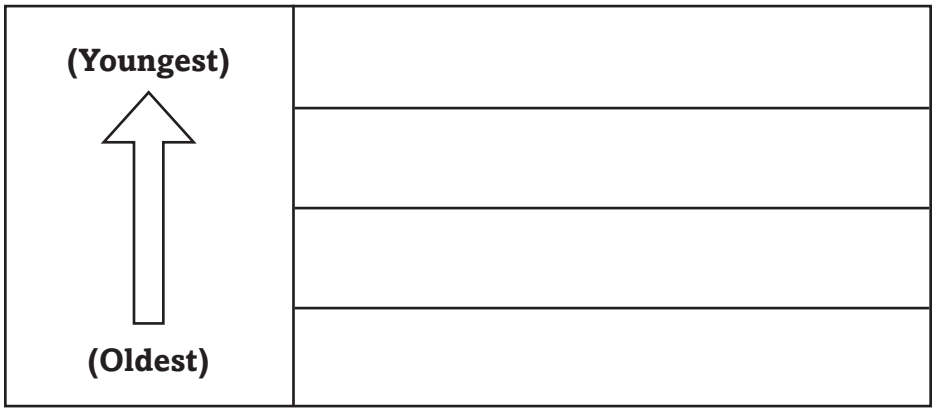
Section 1 An Overview of Plants (continued)

Main Idea	Details
What is a plant? *I found this information on page _____.*	**Summarize** *how plants make food by completing the concept map below. Use these terms:* photosynthesis, chlorophyll, chloroplasts.
Origin and Evolution of Plants *I found this information on page _____.*	**Sequence** *the events in the table below. Write the oldest event at the bottom of the table and the youngest event at the top of the table.*



Events

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



Name _____ **Date** _____

Section 1 An Overview of Plants (continued)

Main Idea	Details

Life on Land

I found this information on page _____.

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

_____

_____

_____

Adaptations to Land

I found this information on page _____.

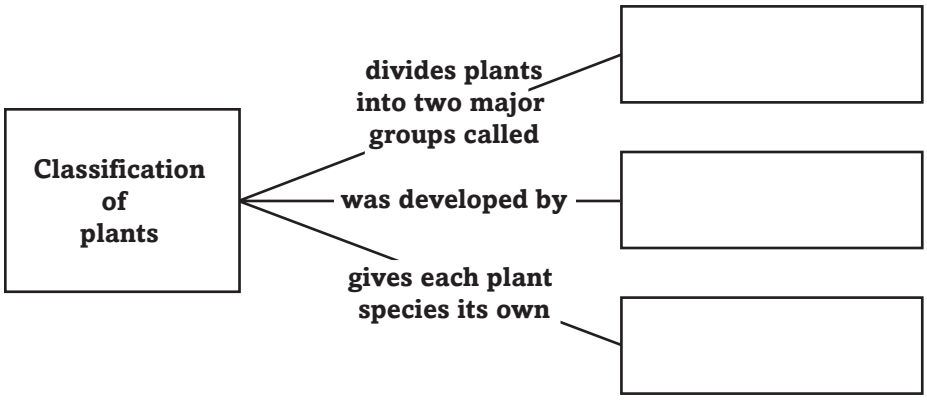
Identify *the four adaptations that make it possible for plants to live on land.*

Plant Adaptations to Land	
Structure	Function

Classification of Plants

I found this information on page _____.

Complete *the concept map below about plant classification.*



CONNECT IT

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

_____

_____

Name _____ **Date** _____

Plants

Section 2 Seedless Plants

GLE 0707.Inq.1 Design and conduct open-ended scientific investigations. **Also covers:** GLE 0707.Inq.2, GLE 0707.Inq.5, GLE 0707.1.2, GLE 0707.7.6, ✓0707.7.9, SPI 0707.7.7

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

1. _____
2. _____
3. _____

Review Vocabulary

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

spore _____

New Vocabulary

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

rhizoid _____

pioneer species _____

Academic Vocabulary

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

soil _____

Name _____ **Date** _____

Section 2 Seedless Plants (continued)

Main Idea

Details

Seedless Nonvascular Plants

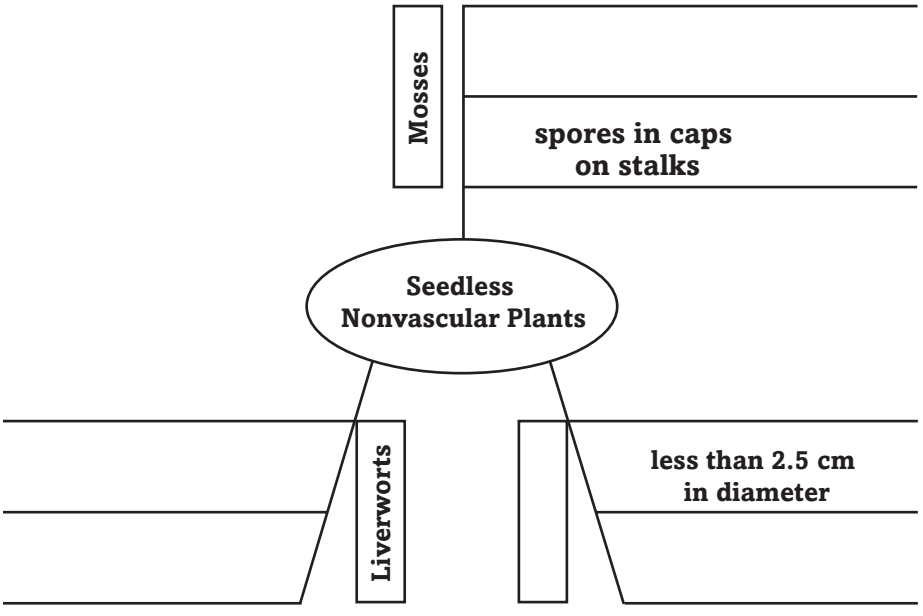
I found this information on page _____.

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

Characteristics of Seedless Nonvascular Plants	
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

I found this information on page _____.

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



Name _____ **Date** _____

Section 2 Seedless Plants (continued)

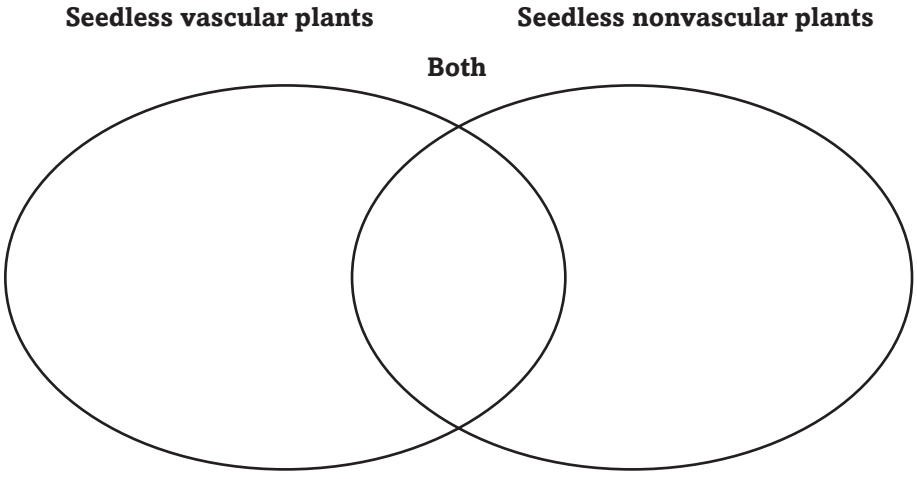
Main Idea

Details

Seedless Vascular Plants

I found this information on page _____.

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



Importance of Seedless Plants

I found this information on page _____.

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

Importance of Seedless Plants	
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Connect It

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

_____

_____

_____

Name _____ **Date** _____

Plants

Section 3 Seed Plants

GLE 0707.4.2 Demonstrate an understanding of sexual reproduction in flowering plants.
Also covers: GLE 0707.Inq.1, GLE 0707.1.2, GLE 0707.1.3, GLE 0707.7.6, ✓0707.7.9, SPI 0707.7.7

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

1. _____
2. _____
3. _____

Review Vocabulary

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

seed _____

_____

New Vocabulary

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

_____ a vascular plant that produces seeds that are not protected by fruit

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

_____ a plant with one cotyledon inside its seeds

_____ a plant with two cotyledons inside its seeds

Academic Vocabulary

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

annual _____

_____

Name _____ **Date** _____

Section 3 Seed Plants (continued)

Main Idea

Characteristics of Seed Plants

I found this information on page _____.

Details

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

I found this information on page _____.

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

Structure	Function
Leaves	
Stems	
Roots	
Vascular tissue	

Name _____ **Date** _____

Section 3 Seed Plants (continued)

Main Idea

Details

Gymnosperms

I found this information on page _____.

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

Gymnosperms	
Divisions	Seeds
Flowers	Leaves

Angiosperms

I found this information on page _____.

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

Angiosperms	
Division	Seeds
Flowers	Fruits

Importance of Seed Plants

I found this information on page _____.

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

Gymnosperms:

1. _____

2. _____

Angiosperms:

1. _____

2. _____

Name _____ **Date** _____

Tie It Together

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

Name _____ **Date** _____

Plants Chapter Wrap-Up

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

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

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

Review

Use this checklist to help you study.

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

SUMMARIZE IT

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

_____

_____

_____

_____

Name _____ Date _____

Animals

GLE 0707.1.2 Summarize how the different levels of organization are integrated within living systems.
Also covers: GLE 0707.Inq.1, GLE 0707.Inq.2, GLE 0707.Inq.3, GLE 0707.Inq.5, GLE 0707.T/E.2, GLE 0707.1.3, GLE 0707.4.1

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	Classifying Animals
	• Most animals have a backbone.
	• Animals are made up of many cells and have many different types of cells.
	• Animals can make their own food.
	• All animals can digest their food.
	• All animals can move from place to place.

FOLDABLES™ Study Organizer

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

Science Journal

Describe similarities and differences between you and a coral.

Name _____ **Date** _____

Animals

Section 1 What is an animal?

SPI 0707.1.1 Identify and describe the function of the major plant and animal cell organelles.
✓0707.1.2 Identify the function of the major plant and animal cellular organelles.
Also covers: GLE 0707.lnq.5, GLE 0707.1.2

Preview *Section 1 by reading the headings. Write three questions you have about the content of the section.*

1. _____
2. _____
3. _____

Review Vocabulary

Define organelle *to show its scientific meaning.*

organelle _____

New Vocabulary

Define the following key terms. Below each definition, copy one sentence from Section 1 of your book that uses the word. Do not copy the sentence that gives the definition.

vertebrate _____

invertebrate _____

Academic Vocabulary

Use a dictionary to define indicate.

indicate _____

Name _____ Date _____

Section 1 What is an animal? (continued)

Main Idea

Details

Animal Characteristics

I found this information on page _____.

Complete *the following chart by writing a statement about each* characteristic of animals.

Animals	
Characteristic	**Statement**
Cells	
Nucleus and organelles	
Obtaining energy	
Digesting food	
Movement	

I found this information on page _____.

Compare *forms of* animal symmetry *by drawing an example for each of the three types of symmetry below.*

Asymmetry	Bilateral Symmetry	Radial Symmetry

Name _____ **Date** _____

Section 1 What is an animal? (continued)

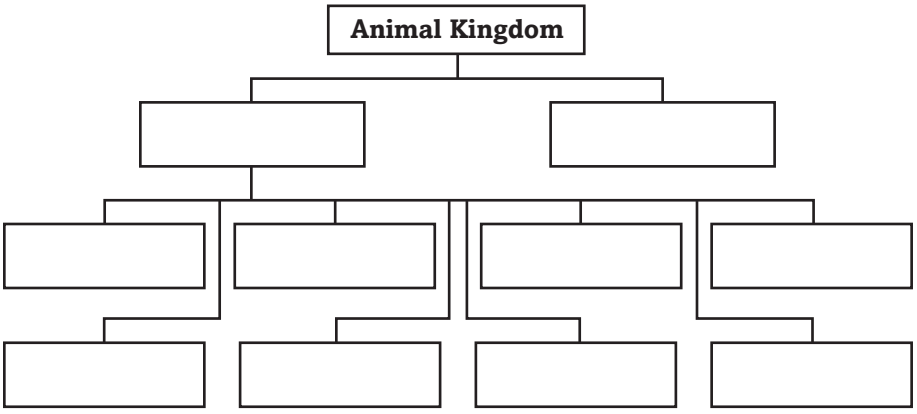
Main Idea

Animal Classification

I found this information on page _____.

Details

Classify *the* types of animals. *Complete the graphic organizer.*



CONNECT IT

Design an imaginary animal species. Keep in mind the five common characteristics of animals. Give your animal species a name. Draw it and label its parts.

My animal species: _____

Name _____ **Date** _____

Animals

Section 2 Invertebrate Animals

GLE 0707.1.3 Describe the function of different organ systems and how collectively they enable complex multicellular organisms to survive. **Also covers:** GLE 0707.4.1, GLE 0707.1.2, ✓0707.4.1, SPI 0707.4.1

Scan *the section headings in Section 2 of your book. Write three questions that come to your mind.*

1. _____
2. _____
3. _____

Review Vocabulary

Define species *to show its scientific meaning.*

species _____

New Vocabulary

Use your book to define the following terms.

open circulatory system _____

closed circulatory system _____

appendage _____

exoskeleton _____

metamorphosis _____

Academic Vocabulary

Use your book or a dictionary to define adult.

adult _____

Name _____ **Date** _____

Section 2 Invertebrate Animals (continued)

Main Idea | **Details**

Sponges

I found this information on page _____.

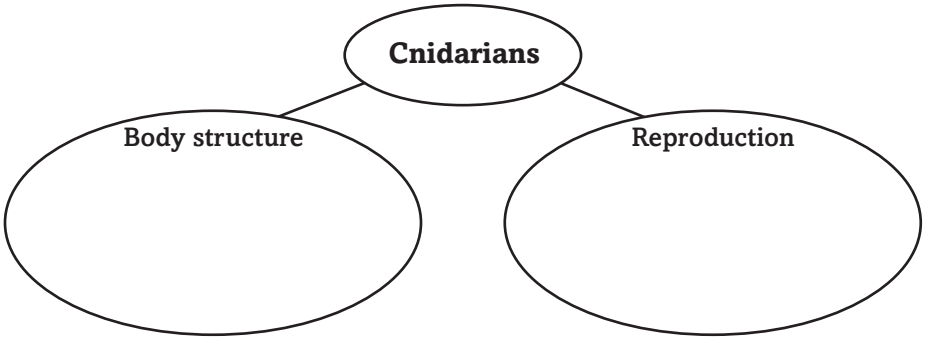
Summarize *key facts about* sponges. *Fill in the missing information.*

Sponges have _____ layers of cells. Flagella move _____, carrying _____. Sponges use _____ and _____ for protection. Sponges can reproduce _____ or _____ through _____.

Cnidarians

I found this information on page _____.

Organize *information about* cnidarians. *Complete the graphic organizer.*



Flatworms and Roundworms

I found this information on page _____.

Compare and contrast flatworms *and* roundworms. *Complete the table.*

	Flatworms	Roundworms
Body shape		
Body layers		
Digestive system openings		

Mollusks

I found this information on page _____.

Distinguish *key features of* mollusks.

1. Body structures: _____

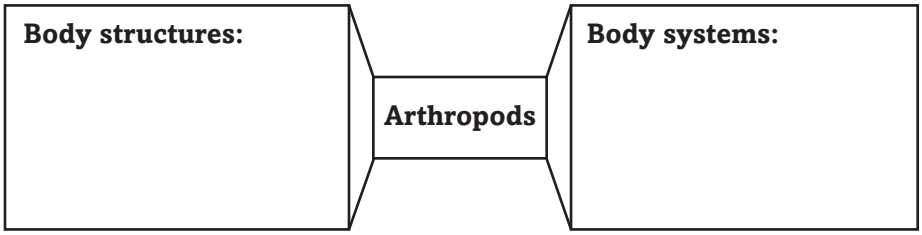
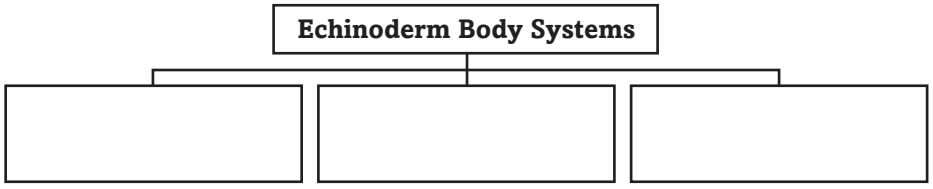
_____

2. Body systems: _____

_____

Name _____ **Date** _____

Section 2 Invertebrate Animals (continued)

Main Idea	Details
Segmented Worms *I found this information on page _____.*	**Summarize** *four characteristics of* segmented worms. **1.** _____ **2.** _____ **3.** _____ **4.** _____
Arthropods *I found this information on page _____.*	**Organize** *information about* arthropods. *Complete the graphic organizer.*  **Contrast** complete *and* incomplete metamorphosis. **Complete metamorphosis** includes _____ stages: _____. **Incomplete metamorphosis** includes _____ stages: _____.
Echinoderms *I found this information on page _____.*	**Identify** *three body systems found in echinoderms.* 

CONNECT IT **Evaluate how the ability to move from place to place would give an invertebrate an advantage in getting food and reproducing.**

_____

_____

_____

Name _____ **Date** _____

Animals

Section 3 Vertebrate Animals

✓**0707.1.7** Explain how different organ systems interact to enable complex multicellular organisms to survive. **Also covers:** GLE 0707.Inq.1, GLE 0707.Inq.2, GLE 0707.Inq.3, GLE 0707.1.2, GLE 0707.1.3, GLE 0707.T/E.2

Scan *Section 3 of your book. Then write two facts that you learned about vertebrate animals.*

1. _____

2. _____

Review Vocabulary

Define life cycle *to show its scientific meaning.*

life cycle _____

_____

New Vocabulary

Match each vocabulary term to its definition.

_____ animal that has a notochord, a nerve cord, and pharyngeal pouches at some time during its development

_____ warm-blooded animal

_____ cold-blooded animal

_____ egg with a yolk and protective shell

_____ animal that eats meat

_____ animal that eats plants

_____ animal that eats plants and animals

Academic Vocabulary

Use a dictionary to define **hierarchy.**

hierarchy _____

_____

Name _____ **Date** _____

Section 3 Vertebrate Animals (continued)

Main Idea	Details

What is a chordate?

I found this information on page _____.

Distinguish *the three characteristics all chordates share.*

1. _____
2. _____
3. _____

I found this information on page _____.

Compare and contrast ectotherms *and* endotherms.

Ectotherms' body temperature _____

_____. Endotherms' body temperature _____

_____.

Fish

I found this information on page _____.

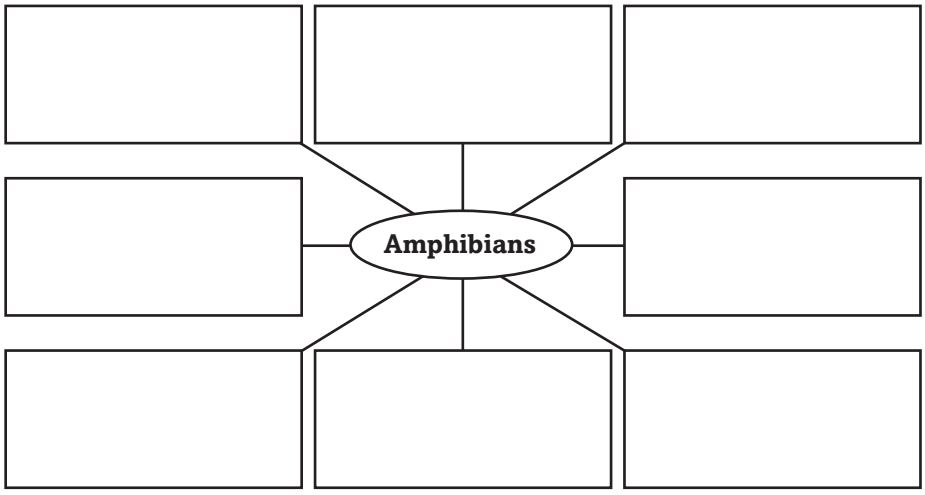
Complete *the table to summarize important information about* fish.

Classes	
Oxygen	
Motion	
Skin	

Amphibians

I found this information on page _____.

Organize *information about* amphibian characteristics *and* development. *Complete the concept map.*



Name _____ **Date** _____

Section 3 Vertebrate Animals (continued)

Main Idea

Details

Reptiles

I found this information on page _____.

Summarize *four important* reptile adaptations.

Adaptation	Purpose

Birds

I found this information on page _____.

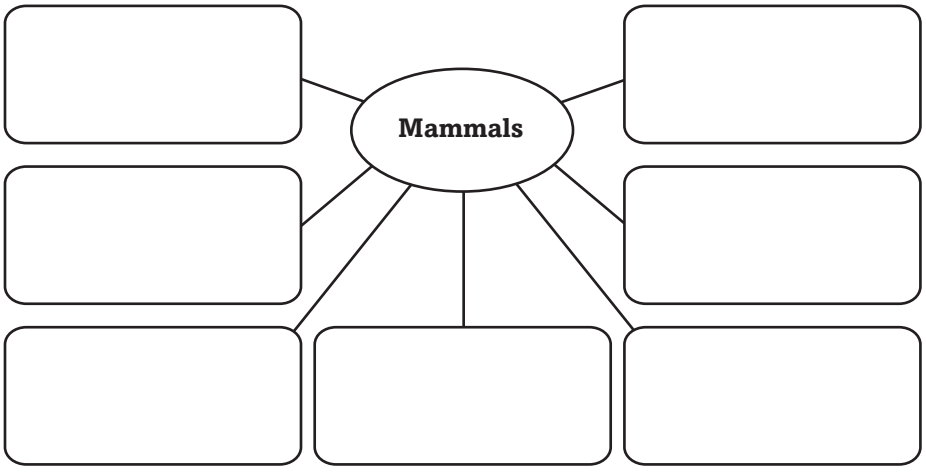
Distinguish *six characteristics of* birds.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Mammals

I found this information on page _____.

Organize *information about* mammal structures *and* body systems.



Synthesize It

Why is being an endotherm useful for mammals and birds?

_____

_____

Name _____ **Date** _____

Tie It Together

Make a Field Guide

Choose three wild animals with which you are familiar. At least one of your animals should be an invertebrate. Make a field guide describing each animal. Include information about the animal's body structures and body systems, where it lives, what it eats, and how it is adapted to its environment. Include illustrations if possible. Use the space below to plan your guide.

Animal 1: _____

Information: _____

Animal 2: _____

Information: _____

Animal 3: _____

Information: _____

Name _____ **Date** _____

Animals Chapter Wrap-Up

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

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

Classifying Animals	After You Read
• Most animals have a backbone.	
• Animals are made up of many cells and have many different types of cells.	
• Animals can make their own food.	
• All animals can digest their food.	
• All animals can move from place to place.	

Review

Use this checklist to help you study.

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

SUMMARIZE IT **After reading this chapter, identify three things that you have learned about animals.**

_____

_____

_____

Name _____ Date _____

Cell Reproduction

✓**0707.4.4** Investigate the relationship among DNA, genes, and chromosomes.
Also covers: GLE 0707.Inq.2, GLE 0707.Inq.5, GLE 0707.T/E.1, GLE 0707.1.4, GLE 0707.4.1, GLE 0707.4.3, GLE 0707.4.4, ✓0707.Inq.2, ✓0707.Inq.5

Before You Read

Before you read the chapter, respond to these statements.

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

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

FOLDABLES™ Study Organizer

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

Science Journal

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

Name _____ **Date** _____

Cell Reproduction

Section 1 Cell Division and Mitosis

GLE 0707.1.4 Illustrate how cell division occurs in sequential stages to maintain the chromosome number of a species. **Also covers:** GLE 0707.4.1, GLE 0707.4.3, ✓0707.1.9

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

1. _____
2. _____
3. _____

Review Vocabulary

Define nucleus *to show its scientific meaning.*

nucleus _____

New Vocabulary

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

mitosis _____

chromosome _____

asexual reproduction _____

Academic Vocabulary

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

cycle _____

Name _____ **Date** _____

Section 1 Cell Division and Mitosis (continued)

Main Idea	Details
Why is cell division important? *I found this information on page _____.*	**Identify** *the three reasons* **cell division** *is important.* **1.** _____ **2.** _____ **3.** _____
The Cell Cycle *I found this information on page _____.*	**Summarize** *information about* **interphase in eukaryotic cells** *in the following paragraph.* Interphase is the _____ part of the cell cycle. During interphase, cells _____ and _____. During interphase, cells that are still dividing copy their _____ and prepare for _____. Cells no longer dividing are _____ _____.
Mitosis *I found this information on page _____.*	**Sequence** *the steps of* **mitosis**, *and write a short description of what takes place in each phase.* **1.** _____ **2.** _____ **3.** _____ **4.** _____ **5.** _____ **6.** _____

Name _____ **Date** _____

Section 1 Cell Division and Mitosis (continued)

Main Idea

I found this information on page _____.

Details

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

Feature	Cell Type
Centrioles	
Spindle fibers	
Cell plate	
Cell wall	

I found this information on page _____.

Organize ***important concepts about mitosis.***

1. Mitosis is the division of a _____.

2. Mitosis produces two new nuclei that are identical both to _____ and to _____.

3. A nucleus with 46 chromosomes that undergoes mitosis will produce _____ nuclei, each with _____ chromosomes.

Asexual Reproduction

I found this information on page _____.

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

_____ the method by which bacteria reproduce

_____ new organism growing from body of the parent

_____ to regrow body parts that are lost or damaged

CONNECT IT

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

_____

_____

_____

Name _____ **Date** _____

Cell Reproduction

Section 2 Sexual Reproduction and Meiosis

GLE 0707.4.1 Compare and contrast the fundamental features of sexual and asexual reproduction.
Also covers: GLE 0707.1.4, GLE 0707.T/E.1

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

1. _____
2. _____
3. _____

Review Vocabulary

Define organism *to show its scientific meaning.*

organism _____

New Vocabulary

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

_____ in sexual reproduction, the joining of a sperm and egg

_____ new diploid cell formed when a sperm fertilizes an egg; will divide by mitosis and develop into a new organism

_____ sex cell formed in the female reproductive organs

_____ cell whose similar chromosomes occur in pairs

_____ reproductive process that produces haploid cells

_____ haploid sex cell formed in the male reproductive organs

_____ cells that have only half of each pair of chromosomes

_____ type of reproduction in which two sex cells join to form a zygote

Academic Vocabulary

Use a dictionary to write a definition of **similar.**

similar _____

Name _____ **Date** _____

Section 2 Sexual Reproduction and Meiosis (continued)

Main Idea	Details

Sexual Reproduction

I found this information on page _____.

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

Types of Human Cells		
	Diploid	Haploid
Number of chromosomes		
Process that produces them		
Examples		

Meiosis and Sex Cells

I found this information on page _____.

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

Meiosis I	
Prophase I	Metaphase I
Anaphase I	Telophase I

Name _____ **Date** _____

Section 2 Sexual Reproduction and Meiosis (continued)

Main Idea

I found this information on page _____.

Details

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

Meiosis II	
Prophase II	Metaphase II
Anaphase II	Telophase II

I found this information on page _____.

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

	Meiosis I	Meiosis II
How many cells result?		
Is a haploid cell formed?		
Do chromatids separate?		

Synthesize It

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

_____

_____

Name _____ **Date** _____

Cell Reproduction

Section 3 DNA

GLE 0707.4.3 Explain the relationship among genes, chromosomes, and inherited traits.
✓0707.4.4 Investigate the relationship among DNA, genes, and chromosomes.
Also covers: GLE 0707.Inq.5, GLE 0707.T/E.1

Scan *the list below to preview Section 3.*

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

Review Vocabulary

Define heredity *to show its scientific meaning.*

heredity _____

_____

New Vocabulary

Write the correct vocabulary term next to each definition.

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

_____ section of DNA that contains instructions for making specific proteins

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

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

Academic Vocabulary

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

code

Noun: _____

_____

Verb: _____

_____

Name _____ **Date** _____

Section 3 DNA (continued)

Main Idea	Details

What is DNA?

I found this information on page _____.

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

1. _____ 3. _____

2. _____ 4. _____

I found this information on page _____.

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

I found this information on page _____.

Summarize *how DNA copies itself.*

_____

_____

_____

_____

Genes

I found this information on page _____.

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

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

Name _____ **Date** _____

Section 3 DNA (continued)

Main Idea

Details

I found this information on page _____.

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

Type of RNA	Function
	carries the code to make proteins from the nucleus to the cytoplasm
transfer RNA (tRNA)	
	type of RNA contained in ribosomes

I found this information on page _____.

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

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

Mutations

I found this information on page _____.

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

_____

_____

CONNECT IT

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

_____

_____

Name _____ **Date** _____

Tie It Together

Synthesize

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

Name _____ **Date** _____

Cell Reproduction Chapter Wrap-Up

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

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

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

Review

Use this checklist to help you study.

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

SUMMARIZE IT

List three important ideas from this chapter.

_____

_____

_____

_____

_____

Name _____ Date _____

Plant Reproduction

GLE 0707.4.1 Compare and contrast the fundamental features of sexual and asexual reproduction.
Also covers: GLE 0707.Inq.1, GLE 0707.Inq.2, GLE 0707.Inq.3, GLE 0707.T/E.1, GLE 0707.T/E.3, GLE 0707.1.2, GLE 0707.4.2

Before You Read

Before you read the chapter, respond to these statements.

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

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

FOLDABLES™ Study Organizer

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

Science Journal

List three plants that reproduce by forming seeds.

Name _____ **Date** _____

Plant Reproduction

Section 1 Introduction to Plant Reproduction

✓**0707.4.1** Classify organisms according to whether they reproduce sexually or asexually.
GLE 0707.4.2 Demonstrate an understanding of sexual reproduction in flowering plants.
Also covers: GLE 0707.4.1, SPI 0707.4.2

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

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

Write three facts that you discovered about plant reproduction as you scanned this section.

1. _____

2. _____

3. _____

Review Vocabulary

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

fertilization _____

New Vocabulary

Use your book to define the following terms.

spore _____

_____

gametophyte stage _____

_____

sporophyte stage _____

_____

Academic Vocabulary

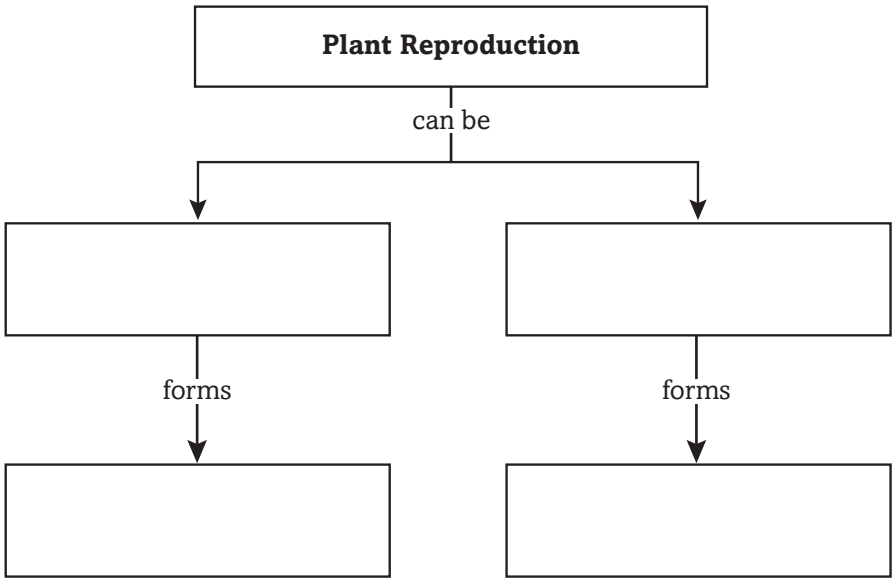
Use a dictionary to define identical.

identical _____

Name _____ **Date** _____

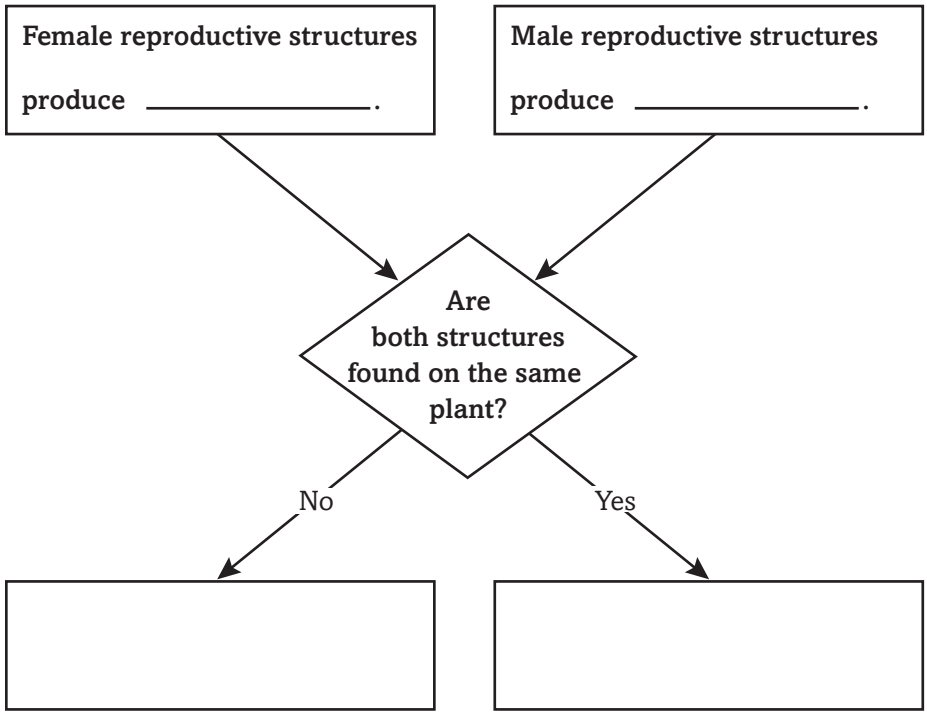
Section 1 Introduction to Plant Reproduction (continued)

Main Idea	Details
Types of Reproduction *I found this information on page* _____.	**Compare and contrast** *two ways that plants reproduce.*



I found this information on page _____.

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



Name _____ **Date** _____

Section 1 Introduction to Plant Reproduction (continued)

Main Idea

Plant Life Cycles

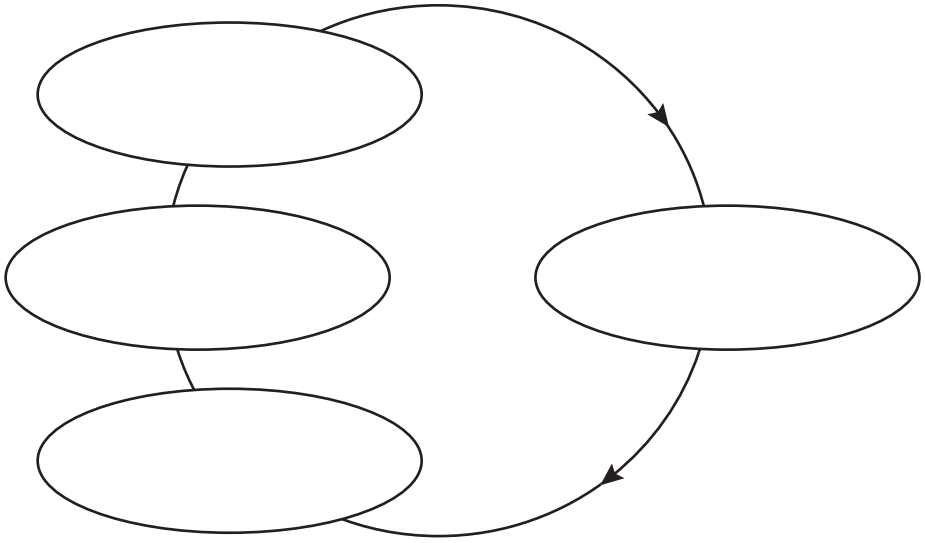
I found this information on page _____.

Details

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

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

Fertilization



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

Stage	Cell type	Reproductive cells formed	How reproductive cells form
Gametophyte			
Sporophyte			

Connect It

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

_____

_____

_____

Name _____ **Date** _____

Plant Reproduction

Section 2 Seedless Reproduction

SPI 0707.4.1 Classify methods of reproduction as sexual or asexual. **GLE 0707.4.1** Compare and contrast the fundamental features of sexual and asexual reproduction. **Also covers:** GLE 0707.T/E.1, GLE 0707.1.2

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

1. _____
2. _____
3. _____

Review Vocabulary

Define photosynthesis *using your book or a dictionary.*

photosynthesis _____

New Vocabulary

Use your book to define the following terms.

frond _____

rhizome _____

sori _____

prothallus _____

Academic Vocabulary

Use a dictionary to define widespread.

widespread _____

Name _____ **Date** _____

Section 2 Seedless Reproduction (continued)

Main Idea	Details

The Importance of Spores

I found this information on page _____.

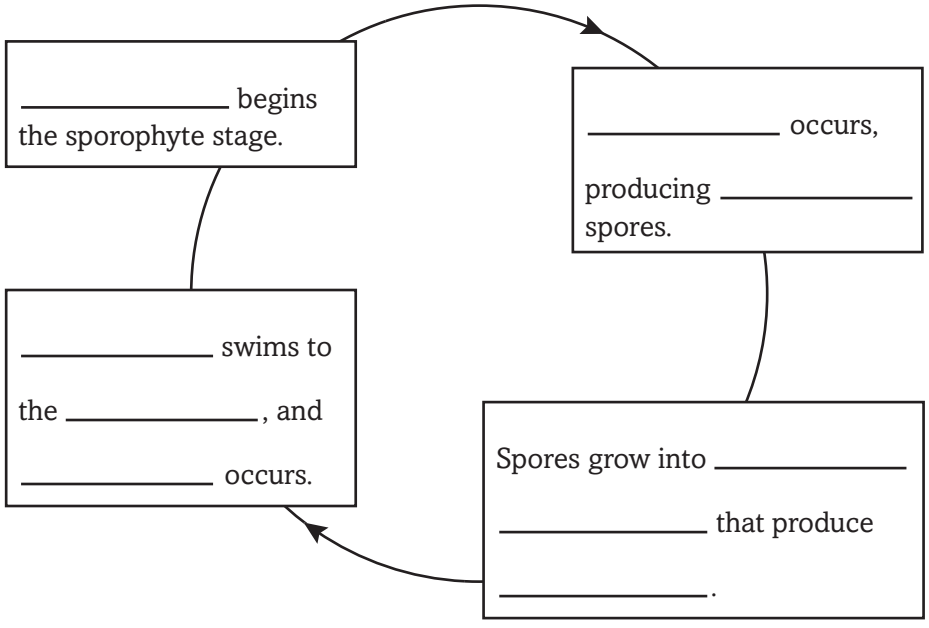
Summarize *the role of* spores *in plant reproduction.*

Spores are used by _____ _____ to reproduce. The _____ stage of the plant produces _____ spores in _____. These _____, and the spores are spread by _____. The spores grow into _____ that can produce _____.

Nonvascular Seedless Plants

I found this information on page _____.

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



I found this information on page _____.

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

Type of Plant	Asexual Reproduction Process
moss	
liverwort	

Name _____ **Date** _____

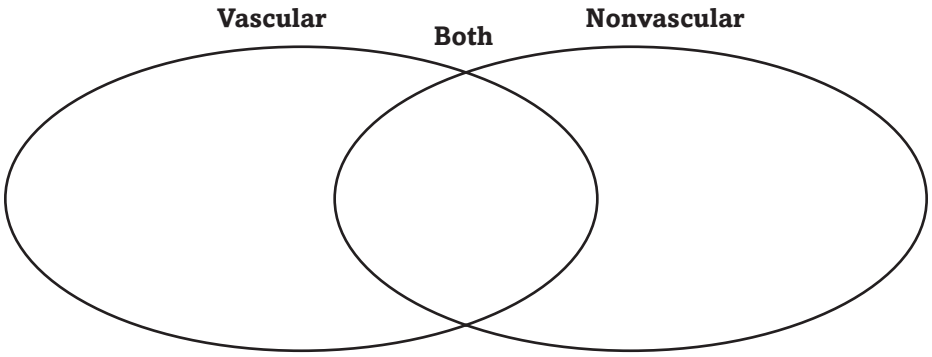
Section 2 Seedless Reproduction (continued)

Main Idea | **Details**

Vascular Seedless Plants

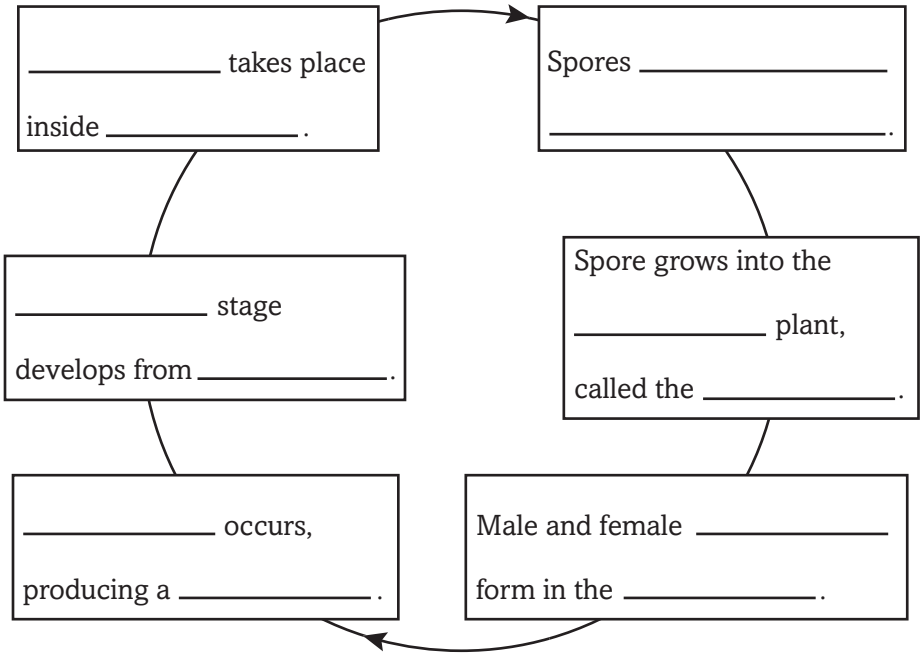
I found this information on page _____.

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



I found this information on page _____.

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



CONNECT IT

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

_____

_____

_____

Name _____ **Date** _____

Plant Reproduction

Section 3 Seed Reproduction

✓**0707.4.3** Describe various methods of plant pollination. **SPI 0707.4.2** Match flower parts with their reproductive functions. **Also covers:** GLE 0707.Inq.5, GLE 0707.T/E.1, GLE 0707.4.1, GLE 0707.4.2, ✓0707.Inq.5, ✓0707.4.2

Predict *three things that will be discussed in Section 3.*

1. _____
2. _____
3. _____

Review Vocabulary

Define gymnosperms *using your book or a dictionary.*

gymnosperms

_____

_____

_____

_____

New Vocabulary

Match each vocabulary term to its definition.

_____ small structure produced by the male reproductive organs of a seed plant

_____ transfer of pollen grains to the female part of a seed plant

_____ series of events that results in the growth of a plant from a seed

_____ part of a plant that produces the egg

_____ male reproductive organ in a flower

_____ female reproductive organ in a flower

_____ part of a flower in which ovules are found

Academic Vocabulary

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

structure

_____

_____

_____

Name _____ **Date** _____

Section 3 Seed Reproduction (continued)

Main Idea | **Details**

The Importance of Pollen and Seeds

I found this information on page _____.

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

Pollen and Pollination in Seed Plants

I. Pollen grains

A. _____

B. _____

II. Pollination

A. _____

_____

B. _____

_____

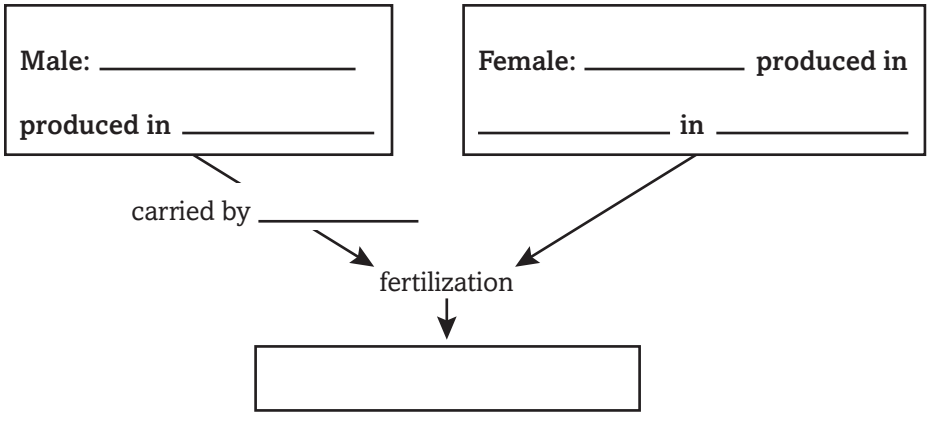
I found this information on page _____.

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

Gymnosperm Reproduction

I found this information on page _____.

Sequence *steps of* gymnosperm seed formation *in the flow chart.*



Name _____ **Date** _____

Section 3 Seed Reproduction (continued)

Main Idea

Details

Angiosperm Reproduction

I found this information on page _____.

Model *a flower by drawing and labeling its parts. Then write a brief caption to identify the male and female reproductive organs and to describe how each organ functions during fertilization.*

Seed Dispersal

I found this information on page _____.

Sequence *the events of* fertilization *and* germination *in angiosperms.*

1. Flower is _____.
2. _____.
3. _____.
4. Seed is _____.
5. Conditions become right for _____.
6. _____.
7. _____.
8. Root grows from _____.
9. _____.
10. Photosynthesis begins.

CONNECT IT

The seeds of horse chestnut trees are covered with a prickly outer layer. Propose a way that you think these seeds might be dispersed.

_____

_____

Name _____ **Date** _____

Tie It Together

Describe a Plant

Suppose that you are an explorer who has discovered a new species of plant.

- *Draw and describe the plant below.*
- *Be sure to indicate whether your plant is vascular or nonvascular.*
- *If it does reproduce with seeds, identify it as an angiosperm or a gymnosperm.*
- *Include a diagram that shows the plant's life cycle.*
- *Draw a cross-section of the plant that identifies its reproductive structures.*

Name _____ **Date** _____

Plant Reproduction Chapter Wrap-Up

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

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

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

Review

Use this checklist to help you study.

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

SUMMARIZE IT **After reading this chapter, identify three things that you have learned about plant reproduction.**

_____

_____

_____

_____

Name _____ Date _____

Heredity

GLE 0707.4.3 Explain the relationship among genes, chromosomes, and inherited traits.
Also covers: GLE 0707.Inq.1, GLE 0707.Inq.2, GLE 0707.Inq.5, GLE 0707.T/E.1, GLE 0707.T/E.3, GLE 0707.4.4, ✓0707.Inq.1, ✓0707.Inq.2

Before You Read

Before you read the chapter, respond to these statements.

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

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

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

Science Journal

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

Name _____ **Date** _____

Heredity

Section 1 Genetics

✓0707.4.5 Explain the differences between dominant and recessive traits. **✓0707.4.6** Use a Punnett square to predict the genotypes of offspring resulting from a monohybrid cross. **Also covers:** GLE 0707.4.3, GLE 0707.4.4

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

1. _____

2. _____

Review Vocabulary

Define meiosis.

meiosis _____

New Vocabulary

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

heredity _____

genetics _____

allele _____

dominant _____

recessive _____

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

Punnett square _____

genotype _____

phenotype _____

homozygous _____

heterozygous _____

Academic Vocabulary

Use a dictionary to define physical *as it applies to life science.*

physical _____

Name _____ **Date** _____

Section 1 Genetics (continued)

Main Idea	Details
Inheriting Traits *I found this information on page _____.*	**Summarize** *what* alleles *are and how they are inherited.*
Mendel—The Father of Genetics *I found this information on page _____.*	**Identify** *three things Mendel did that made his work more useful than previous studies of* heredity. **1.** _____ **2.** _____ **3.** _____
Genetics in a Garden *I found this information on page _____.*	**Analyze** *one* trait *that Mendel studied.* • Identify the *dominant* and *recessive* forms of the trait. • Predict how an organism would look if it had two dominant alleles, two recessive alleles, or one of each allele.

Trait	
Dominant form	
Recessive form	
Two dominant alleles	
Two recessive alleles	
One of each allele	

Name _____ **Date** _____

Section 1 Genetics (continued)

Main Idea

I found this information on page _____.

Details

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

		Black dog	
		B	b
Blond dog	b		
	b		

Analyze *the Punnett square to complete the sentences.*

The black dog carries _____ black-fur traits. The blond dog carries _____ blond-fur traits. The chance that the offspring will have black fur is _____, or _____ in _____.

I found this information on page _____.

Summarize *Mendel's three* **principles of heredity.**

1. _____

_____

2. _____

_____

3. _____

_____

Connect It

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

_____

_____

_____

Name _____ **Date** _____

Heredity

Section 2 Genetics Since Mendel

GLE 0707.4.4 Predict the probable appearance of offspring based on the genetic characteristics of the parents. **Also covers:** GLE 0707.Inq.2, GLE 0707.T/E.1, GLE 0707.4.3, SPI 0707.Inq.3

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

1. _____

2. _____

Review Vocabulary

Define gene *to show its scientific meaning.*

gene _____

New Vocabulary

Define each vocabulary term.

incomplete dominance _____

polygenic inheritance _____

sex-linked gene _____

Academic Vocabulary

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

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

intermediate _____

Name _____ **Date** _____

Section 2 Genetics Since Mendel (continued)

Main Idea

Details

Incomplete Dominance

I found this information on page _____.

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

		Red four-o'clock	
		R	R
White four-o'clock	R′		
	R′		

Summarize incomplete dominance.

_____

_____

I found this information on page _____.

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

_____

_____

_____

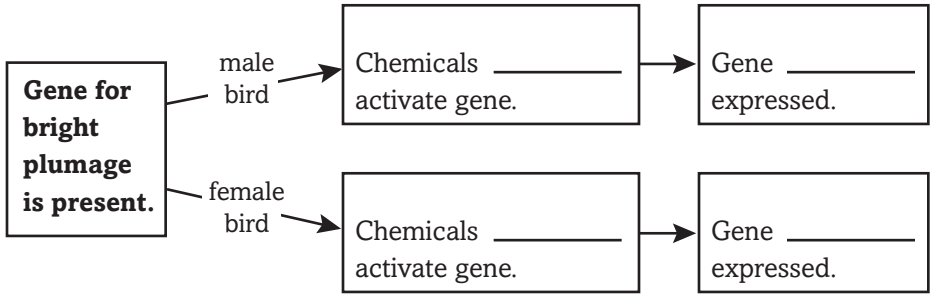
_____

_____

Polygenic Inheritance

I found this information on page _____.

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



Name _____ **Date** _____

Section 2 Genetics Since Mendel (continued)

Main Idea	Details
Human Genes and Mutations *I found this information on page* _____.	**Analyze** *how* chromosome disorders *occur.* A chromosome disorder occurs as a result of a _____ _____. It causes an organism to have _____ chromosomes than normal.
Recessive Genetic Disorders *I found this information on page* _____.	**Model** *how two heterozygous parents who do not have a recessive disorder can have a child with the disorder. Use* C *for a dominant allele and* c *for a recessive allele.* **Mother's genotype:** _____ **Father's genotype:** _____ **Child's genotype:** _____
Sex-Linked Disorders *I found this information on page* _____.	**Complete** *the statements about* sex-linked traits. Sex-linked disorders usually result from _____ alleles on the _____ chromosome. A man will have the disorder when _____. A woman will have the disorder when _____ _____.
Pedigrees Trace Traits *I found this information on page* _____.	**Summarize** *why* pedigrees *are useful to geneticists.* _____ _____ _____

SYNTHESIZE IT

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

Name _____ **Date** _____

Heredity

Section 3 Advances in Genetics

GLE 0707.T/E.3 Compare the intended benefits with the unintended consequences of a new technology.
Also covers: GLE 0707.T/E.1, ✓0707.T/E.3

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

1. _____

2. _____

3. _____

Review Vocabulary

DNA

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

_____

New Vocabulary

genetic engineering

Define genetic engineering.

_____

Academic Vocabulary

insert

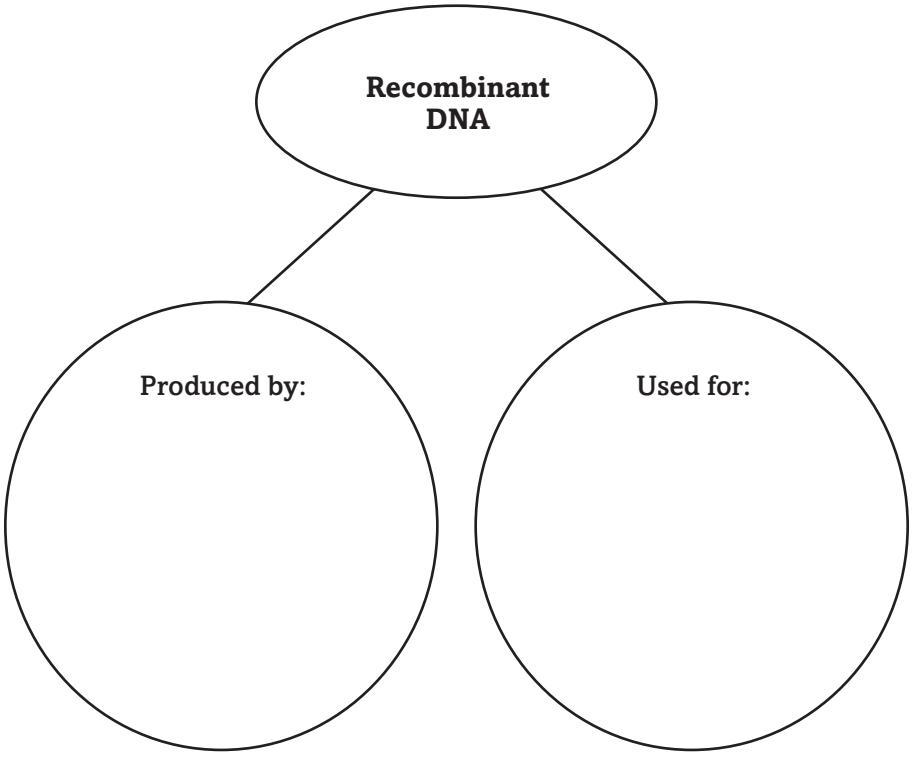
Use a dictionary to define insert *as a verb. Then find a sentence in Section 3 that uses the term or a form of the term.*

_____

Name _____ **Date** _____

Section 3 Advances in Genetics (continued)

Main Idea	Details
Genetic Engineering *I found this information on page _____.*	**Distinguish** *three uses for* genetic engineering. **1.** _____ **2.** _____ **3.** _____
I found this information on page _____.	**Organize** *information about* recombinant DNA. ***Complete the graphic organizer.***
I found this information on page _____.	**Summarize** *how* gene therapy *may be used in the future.*



Name _____ **Date** _____

Section 3 Advances in Genetics (continued)

Main Idea

I found this information on page _____.

I found this information on page _____.

Details

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

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

1. _____
2. _____
3. _____

Evaluate *the benefits and potential risks of genetic engineering of crop plants.*

Benefits	Risks

Connect It

Describe how viruses are useful tools in genetic engineering.

_____

_____

_____

_____

Name _____ **Date** _____

Tie It Together

Explain Genetics

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

Name _____ **Date** _____

Heredity Chapter Wrap-Up

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

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

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

Review

Use this checklist to help you study.

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

SUMMARIZE IT

Identify the three most important ideas in this chapter.

_____

_____

_____

_____

Name _____ Date _____

Rocks and Minerals

✓**0707.7.1** Organize and explain information about the properties of minerals and their uses.
Also covers: GLE 0707.7.1, GLE 0707.7.2, ✓0707.Inq.1

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	Rocks and Minerals
	• Minerals are made by people.
	• Most rocks consist of one or more minerals.
	• Rocks are classified in three major groups.
	• Rocks have stopped forming on Earth.
	• Rocks and minerals have many uses in society.

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

Science Journal

Observe a rock or mineral sample. Write three characteristics about it.

Name _____ Date _____

Rocks and Minerals

Section 1 Minerals—Earth's Jewels

GLE 0707.7.1 Describe the physical properties of minerals. **✓0707.7.1** Organize and explain information about the properties of minerals and their uses. **SPI 0707.7.1** Use a table of physical properties to classify minerals.

Scan *Section 1 of your book. Then, write three questions that you have about minerals. Try to answer your questions as you read.*

1. _____
2. _____
3. _____

Review Vocabulary

Define physical property *with the help of your book or a dictionary.*

physical property _____

New Vocabulary

Write the correct vocabulary word from your book next to each definition.

_____ a solid material that has an orderly, repeating pattern of atoms

_____ a mineral that contains enough of a useful substance that it can be mined at a profit

_____ a rare, valuable mineral that can be cut and polished to give it a beautiful appearance

_____ a solid that is usually made up of two or more minerals

Academic Vocabulary

Use a dictionary to find the definition of refine *as it applies to metals. Write the definition below in your own words.*

refine _____

Name _____ **Date** _____

Section 1 Minerals—Earth's Jewels (continued)

Main Idea	Details

What is a mineral?

I found this information on page _____.

Complete *the chart below about minerals.*

Minerals
Definition:
Examples:
Ways minerals form: **1.** **2.** **3.**

Properties of Minerals

I found this information on page _____.

Contrast *cleavage and fracture by writing three different characteristics of each in the following chart.*

Cleavage	Fracture

I found this information on page _____.

Contrast *the qualities of mineral color and luster.*

Color _____

_____

_____

Luster _____

_____

_____

Name _____ **Date** _____

Section 1 Minerals—Earth's Jewels (continued)

Main Idea

Common Minerals

I found this information on page _____.

I found this information on page _____.

Details

Sequence *four steps that describe how copper ore is turned into useful products. The first step has been completed for you.*

1. Copper ore is mined and crushed.
2. _____
3. _____
4. _____

List *characteristics of a gem and an ore in the chart below.*

Gem	Ore

CONNECT IT **Write the names of six objects in your classroom that are made using minerals. Then explain how minerals are important in your everyday life.**

1. _____ 2. _____ 3. _____
4. _____ 5. _____ 6. _____

_____

_____

_____

_____

Name _____ **Date** _____

Rocks and Minerals

Section 2 Igneous and Sedimentary Rocks

✓**0707.7.3** Distinguish among sedimentary, igneous, and metamorphic rocks and relate these to a simple diagram of the rock cycle. **Also covers:** ✓0707.lnq.1

Skim *the headings in Section 2. Then make three predictions about what you will learn.*

1. _____
2. _____
3. _____

Review Vocabulary

Define *the following terms using your book or a dictionary.*

lava _____

New Vocabulary

igneous rock _____

extrusive _____

intrusive _____

sedimentary rock _____

Academic Vocabulary

process _____

Name _____ **Date** _____

Section 2 Igneous and Sedimentary Rocks (continued)

Main Idea | **Details**

Igneous Rocks

I found this information on page _____.

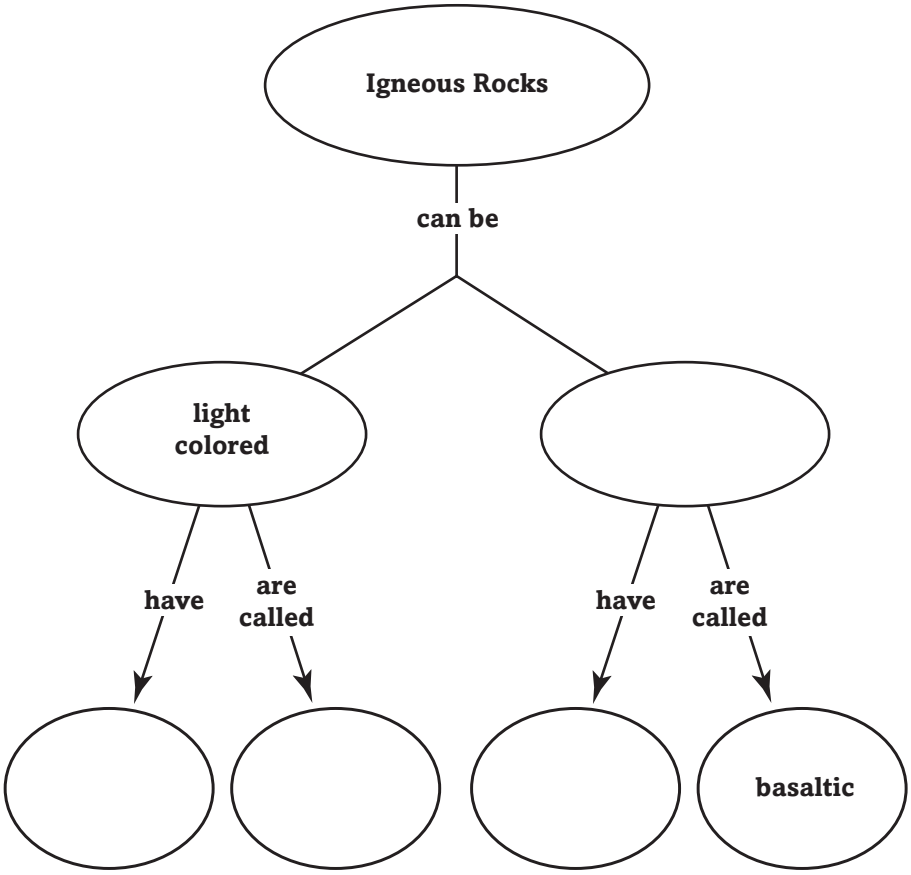
Contrast *extrusive and intrusive igneous rocks in the chart.*

Igneous Rocks			
Type	Form from molten rock called	Have cooling rate that is	Have crystal size that is
Extrusive			
Intrusive			

I found this information on page _____.

Organize *a concept map about igneous rocks using these words and phrases.*

- high silica content
- low silica content
- granitic
- dark colored



Name _____ **Date** _____

Section 2 Igneous and Sedimentary Rocks (continued)

Main Idea

Sedimentary Rocks

I found this information on page _____.

Details

Classify *sedimentary rocks by some of their characteristics.*

	Detrital	Chemical	Organic
Form from			
How form			
Where form			
Examples			

CONNECT IT

Choose a sedimentary or igneous rock. You might pick basalt, granite, shale, or sandstone. Write a story from the rock's perspective about how the rock formed. When writing your story, you should pretend that you are the rock.

Name _____ **Date** _____

Rocks and Minerals

Section 3 Metamorphic Rocks and the Rock Cycle

GLE 0707.7.2 Summarize the basic events that occur during the rock cycle. **Also covers:** SPI 0707.Inq.3, SPI 0707.7.2, SPI 0707.3

Scan *the headings in Section 3. Write three predictions about what you will learn in this section.*

1. _____
2. _____
3. _____

Review Vocabulary

Define *each vocabulary word. Then, write a sentence reflecting the scientific meaning of each of the words.*

pressure _____

New Vocabulary

metamorphic rock _____

foliated _____

nonfoliated _____

rock cycle _____

Academic Vocabulary

layer _____

Name _____ **Date** _____

Section 3 Metamorphic Rocks and the Rock Cycle (continued)

Main Idea

New Rock from Old

I found this information on page _____.

I found this information on page _____.

Details

Summarize *the conditions under which rocks experience metamorphism as you complete the chart below.*

Conditions of Metamorphic Rock Formation	
temperature	
pressure	
time	

Draw *a metamorphic rock with a foliated texture and a metamorphic rock with a nonfoliated texture below. Show and label two characteristics of each type of rock in the top boxes, and list an example of each type in the bottom boxes.*

Foliated texture	Nonfoliated texture
Examples:	Examples:

Name _____ **Date** _____

Section 3 Metamorphic Rocks and the Rock Cycle (continued)

Main Idea | **Details**

Rock Cycle

I found this information on page _____.

Create *a diagram of the rock cycle below.*

- Label each type of rock in your diagram.
- Label the processes in your diagram. Use the words *melting, cooling, weathering and erosion, compaction and cementation,* and *heat and pressure.*

Identify *two other cycles that occur in nature.*

1. _____

2. _____

CONNECT IT

While on a leisurely hike, a geologist from the nearby university noticed that the gravel in a sedimentary rock consists of pieces of both igneous and metamorphic rock. As the geologist, write a brief report explaining how this is possible.

_____

_____

_____

Name _____ **Date** _____

Tie It Together

Design

Some artists specialize in making art from rock and mineral pieces. The different colors, textures, and other properties of the rocks and minerals can produce spectacular displays. In the space below, design your own rock and mineral art. It might be mounted on a wall, make up the courtyard of a building, or be a large monument. You may use any rock or mineral shown in your book in your art.

Name _____ Date _____

Rocks and Minerals Chapter Wrap-Up

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

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

Rocks and Minerals	After You Read
• Minerals are made by people.	
• Most rocks consist of one or more minerals.	
• Rocks are classified in three major groups.	
• Rocks have stopped forming on Earth.	
• Rocks and minerals have many uses in society.	

Review

Use this checklist to help you study.

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

SUMMARIZE IT **After reading this chapter, identify three things that you have learned about rocks and minerals.**

_____

_____

_____

_____

Name _____ Date _____

Plate Tectonics

GLE 0707.7.3 Analyze the characteristics of the earth's layers and the location of the major plates.
Also covers: GLE 0707.7.4, ✓0707.Inq.1, SPI 0707.7.5, SPI 0707.7.6

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	Plate Tectonics
	• Fossil evidence provides support for the idea that continents have moved over time.
	• New seafloor is continuously forming while old seafloor is being destroyed.
	• Earth's crust is broken into sections called plates.
	• Rock flows deep inside Earth.

FOLDABLES™ Study Organizer

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

Science Journal

Pretend you're a journalist with an audience that assumes the continents have never moved. Write about the kinds of evidence you'll need to convince people otherwise.

Name _____ **Date** _____

Plate Tectonics

Section 1 Continental Drift

SPI 0707.7.5 Recognize that lithospheric plates on the scale of continents and oceans continually move at rates of centimeters per year. **Also covers:** ✓0707.Inq.1

Skim *through Section 1 of your book. Write three questions that come to mind from reading the headings and examining the illustrations.*

1. _____

2. _____

3. _____

Review Vocabulary

Define continent *to show its scientific meaning.*

continent _____

New Vocabulary

Use your book to define the following terms. Then write an original sentence using each term.

continental drift _____

Pangaea _____

Academic Vocabulary

Use a dictionary to define controversy.

controversy _____

Name _____ **Date** _____

Section 1 Continental Drift (continued)

Main Idea | **Details**

Evidence for Continental Drift

I found this information on page _____.

Summarize Alfred Wegener's hypothesis *about Earth's continents.*

_____

_____

_____

_____

_____

I found this information on page _____.

Create *a graphic organizer to identify the three types of clues that are evidence for* **continental drift.**

I found this information on page _____.

Analyze *the clue in the left column below. Then describe how Alfred Wegener would have explained it in the right column.*

Clue	Wegener's Response
Fossils of Mesosaurus found in South America and Africa	
Fossil plant found in five continents, including Antarctica	
Fossils of warm weather plants found on Arctic island	
Glacial deposits found in Africa, India, and Australia	

Name _____ **Date** _____

Section 1 Continental Drift (continued)

Main Idea

I found this information on page _____.

Details

Model *what the continents may have looked like 250 million years ago.*

How could continents drift?

I found this information on page _____.

Summarize *Wegener's explanations of how and why continental drift occurs.*

Wegener's explanation for continental drift

How: _____

_____

Why: _____

_____

Evaluate It

Do you think it was reasonable for scientists initially to reject the hypothesis of continental drift? Explain your response.

_____

_____

_____

_____

_____

Name _____ **Date** _____

Plate Tectonics

Section 2 Seafloor Spreading

✓**0707.7.7** Analyze the relationship between plate movements, volcanoes, and sea floor spreading.
Also covers: GLE 0707.7.4, SPI 0707.7.6

Predict *three things that might be discussed in Section 2 after reading its headings.*

1. _____
2. _____
3. _____

Review Vocabulary

seafloor

Define seafloor. *Then use the word in a sentence.*

_____

_____

_____

_____

New Vocabulary

seafloor spreading

Use your book to define seafloor spreading. *Then use the term in a sentence.*

_____

_____

_____

_____

Academic Vocabulary

interval

Use a dictionary to define interval. *Then use the word in a sentence about magnetic clues to seafloor spreading.*

_____

_____

_____

_____

Name _____ **Date** _____

Section 2 Seafloor Spreading (continued)

Main Idea

Details

Mapping the Ocean Floor

I found this information on page _____.

Summarize *how sound waves are used to map the seafloor.*

_____

_____

_____

_____

_____

I found this information on page _____.

Model *the process of* seafloor spreading *by drawing a cross section of a mid-ocean ridge and the magma below it. Use arrows to indicate the directions of motion.*

Sequence *steps describing seafloor spreading.*

Hot, less dense material below Earth's crust rises toward the surface at a mid-ocean ridge.

↓

The less dense material flows _____

_____.

↓

As the seafloor spreads apart, magma is _____

_____.

Name _____ **Date** _____

Section 2 Seafloor Spreading (continued)

Main Idea

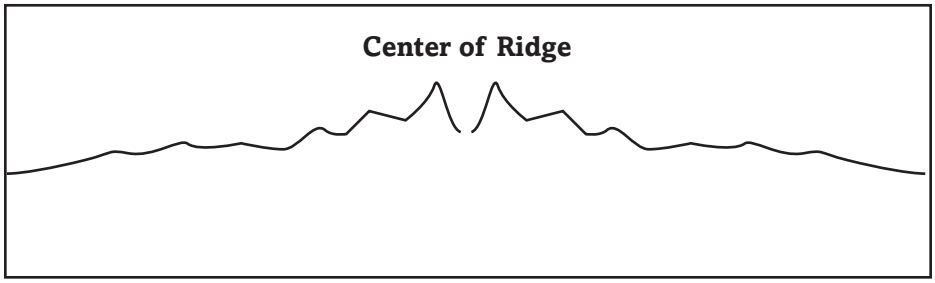
Evidence for Spreading

I found this information on page _____.

I found this information on page _____.

Details

Label ***the diagram below to identify evidence for seafloor spreading. Add arrows to show the direction of spreading, and indicate where older rock and newer rock occur.***



Model ***the polarity of Earth's magnetic field today.***

- Draw a sphere to represent Earth.
- Label the north pole and south pole.
- Draw arrows indicating the direction in which magnetic lines of force enter and leave Earth.

Summarize ***how reversals in the direction of Earth's magnetic field have provided evidence of seafloor spreading.***

At times, the _____ that pass through Earth have _____. _____ of Earth's magnetic field are recorded in _____ that forms along _____. Scientists can detect _____ that are _____ to mid-ocean ridges. This occurs on _____.

Name _____ **Date** _____

Plate Tectonics

Section 3 Theory of Plate Tectonics

GLE 0707.7.3 Analyze the characteristics of the earth's layers and the location of the major plates.
Also covers: SPI 0707.7.6, GLE 0707.7.4, ✓0707.Inq.1

Scan *the headings and illustrations in Section 3. List four features caused by plate tectonics.*

1. _____ 3. _____

2. _____ 4. _____

Review Vocabulary

Define *the review terms to show their scientific meanings.*

converge _____

diverge _____

transform _____

New Vocabulary

Use your book to define the following terms.

plate _____

_____

plate tectonics _____

_____

lithosphere _____

_____

asthenosphere _____

_____

convection current _____

_____

Academic Vocabulary

Use a dictionary to define rigid.

rigid _____

Name _____ Date _____

Section 3 Theory of Plate Tectonics (continued)

Main Idea | **Details**

Plate Tectonics

I found this information on page _____.

Complete ***the following outline on the theory of*** **plate tectonics.**

I. A new theory

A. In the 1960s, a new theory called _____ was developed.

B. Earth's _____ and part of the _____ are broken into sections called _____, that move slowly.

II. Details about the theory

A. The layer of Earth that is broken into sections is called the _____.

B. The _____ is the plasticlike layer below the _____.

C. The rigid plates move over the _____.

Plate Boundaries

I found this information on page _____.

Compare and contrast ***the different plate boundaries by defining them side by side. Draw the plates of the world. Identify plate motion by using arrows.***

Divergent	Convergent	Transform

Name _____ **Date** _____

Section 3 Theory of Plate Tectonics (continued)

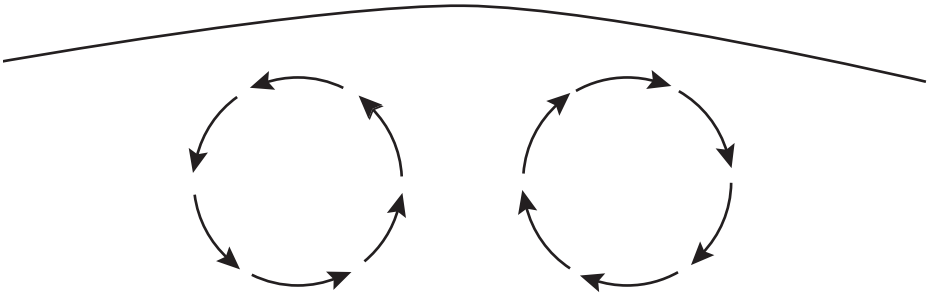
Main Idea

Details

Causes of Plate Tectonics

I found this information on page _____.

Label *the convection currents depicted below with heating, rising, cooling, and sinking.*



Features Caused by Plate Tectonics

I found this information on page _____.

Organize *information to describe features caused by plate tectonics. Fill in the chart below.*

Feature	Description
Rift valley	
Folded and faulted mountains	
Strike-slip faults	

Testing for Plate Tectonics

I found this information on page _____.

Summarize *how the Satellite Laser Ranging System measures plate movement.*

_____

_____

_____

_____

_____

Name _____ **Date** _____

Tie It Together

Synthesize It

Your book has a picture showing how continents may have drifted. It shows their positions 250 million years ago, 125 million years ago, and at the present. Work with a partner to trace the paths that the continents have taken. Then extend their paths forward in time to project where they may be 125 million years from now. Draw a map in the space below, showing your prediction.

Name _____ Date _____

Plate Tectonics Chapter Wrap-Up

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

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

Plate Tectonics	After You Read
• Fossil evidence provides support for the idea that continents have moved over time.	
• New seafloor is continuously forming while old seafloor is being destroyed.	
• Earth's crust is broken into sections called plates.	
• Rock flows deep inside Earth.	

Review

Use this checklist to help you study.

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

SUMMARIZE IT

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

_____

_____

_____

_____

Name _____ Date _____

Earthquakes and Volcanoes

✓**0707.7.5** Analyze the relationship between plate movements and areas of earthquake activity.
Also covers: ✓0707.Inq.1, SPI 0707.Inq.3, SPI 0707.7.6

Before You Read

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

K What I know	W What I want to learn

FOLDABLES™ Study Organizer

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

Science Journal

Are earthquakes and volcanoes completely unrelated, or could there be a possible connection? Propose several ideas that might explain what causes these events.

Name _____ **Date** _____

Earthquakes and Volcanoes

Section 1 Earthquakes

✓**0707.7.5** Analyze the relationship between plate movements and areas of earthquake activity.
Also covers: ✓0707.Inq.1

Scan *the headings in Section 1 and write three questions you have about earthquakes.*

1. _____
2. _____
3. _____

Review Vocabulary

energy

Write six original sentences with at least two vocabulary terms in each. Include the review, new, and academic vocabulary items. Underline the vocabulary terms that you use. Words may be used more than once. Use all of the words.

New Vocabulary

earthquake

fault

seismic wave

focus

epicenter

seismograph

magnitude

tsunami

seismic safe

Academic Vocabulary

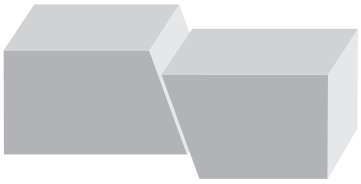
collapse

Name _____ **Date** _____

Section 1 Earthquakes (continued)

Main Idea	Details
What causes earthquakes? *I found this information on page _____.*	**Model** *the direction of motion in the three types of* faults *below. Use arrows to indicate direction of force and direction of movement. Label the arrows.*

Normal Fault



Reverse Fault

Strike-slip Fault

Making Waves

I found this information on page _____.

Compare *primary, secondary, and surface* seismic waves *by completing the chart below. Put an* **X** *in the column of the type of wave that causes the most damage.*

Seismic Waves			
	Primary	Secondary	Surface
Most damage			
Relative speed			
Motion			
Where they travel			

Name _____ **Date** _____

Section 1 Earthquakes (continued)

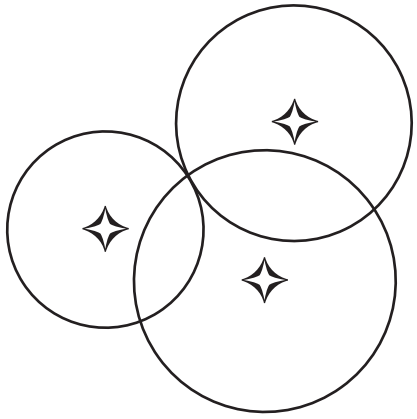
Main Idea

Details

Learning from Earthquakes

I found this information on page _____.

Model *how an earthquake's* epicenter *is located. The stars in the diagram indicate* seismograph *stations. The circles show their distance from the epicenter. Mark the epicenter with an* **X**, *and use arrows to show the directions in which* seismic waves *travel.*



How strong are earthquakes?

I found this information on page _____.

Compare *the Richter scale and the Mercalli scale in the chart.*

Comparing Earthquake Scales	
Richter	Mercalli

Earthquake Safety

I found this information on page _____.

Organize *information by listing two things that individuals can do and two things that cities can do to prepare for earthquakes.*

Individuals

1. _____

2. _____

Cities

1. _____

2. _____

Name _____ Date _____

Earthquakes and Volcanoes

Section 2 Volcanoes

SPI 0707.7.6 Describe the relationship between plate movements and earthquakes, mountain building, volcanoes, and sea floor spreading. **Also covers:** ✓0707.Inq.1

Predict *what you'll learn in this section by reading the* What You'll Learn *statements. Rewrite each statement as a question. Use these questions as a guide to the content of Section 2.*

1. _____

2. _____

3. _____

Review Vocabulary

Define plate *to show its scientific meaning.*

plate _____

_____

New Vocabulary

Write the correct vocabulary term from your book next to each definition.

_____ cone-shaped hill or mountain formed when hot magma, solids, and gases erupt onto Earth's surface

_____ molten rock flowing onto Earth's surface

_____ large, broad volcano with gently sloping sides that is formed by the build up of basaltic layers

_____ relatively small volcano formed by moderate to explosive eruptions of tephra

_____ steep-sided volcano formed from alternating layers of tephra and lava

Academic Vocabulary

Read the sentence below. Use a dictionary to determine how the term factor *is being used.*

Different factors affect volcanic eruptions.

In this sentence, the word factor *means:*

factor _____

_____

Name _____ **Date** _____

Main Idea

Details

How do volcanoes form?

I found this information on page _____.

Sequence *the events that result in volcanic eruptions where plates collide by filling in the blanks below.*

1. An older, denser plate _____ a less dense plate.
2. Rock in and above the sinking plate _____.
3. _____ form.
4. The magma _____ to form _____.

Forms of Volcanoes

I found this information on page _____.

Analyze *the way silica content helps determine how a volcano erupts to complete the following chart.*

How the composition of magma affects eruptions		
	High silica	**Low silica**
Consistency and flow		
Eruption		

I found this information on page _____.

Model *the 3 types of volcanoes by drawing a cross-section of each in the boxes on this page and the next. To the right of each drawing, write a caption that includes*

- how this type of volcano forms
- what this type of volcano is made of

Shield volcano	_____
	_____
	_____
	_____
	_____
	_____

Name _____ **Date** _____

Section 2 Volcanoes (continued)

Main Idea	Details
	Cinder cone volcano
	Composite volcano
I found this information on page _____.	**Describe** *a* fissure eruption, *and give an example.*

CONNECT IT

What type of volcano do you think appears most in the news? Why? Identify any real-life volcanoes you have heard about.

Name _____ **Date** _____

Earthquakes and Volcanoes

Section 3 Earthquakes, Volcanoes, and Plate Tectonics

SPI 0707.7.6 Describe the relationship between plate movements and earthquakes, mountain building, volcanoes, and sea floor spreading. **Also covers:** ✓0707.7.7

Skim *Section 3. Predict three things that you will learn.*

1. _____
2. _____
3. _____

Review Vocabulary

Define asthenosphere, *then use a dictionary to break down the word into its two parts and give the meaning of each part.*

asthenosphere _____

asthenes: _____

sphere: _____

New Vocabulary

Find the definitions of rift *and* hot spot *in your book. Then locate another sentence in the section that uses these terms and write it in the space below.*

rift

Definition: _____

_____

_____

Sentence: _____

_____

hot spot

Definition: _____

_____

_____

Sentence: _____

_____

Academic Vocabulary

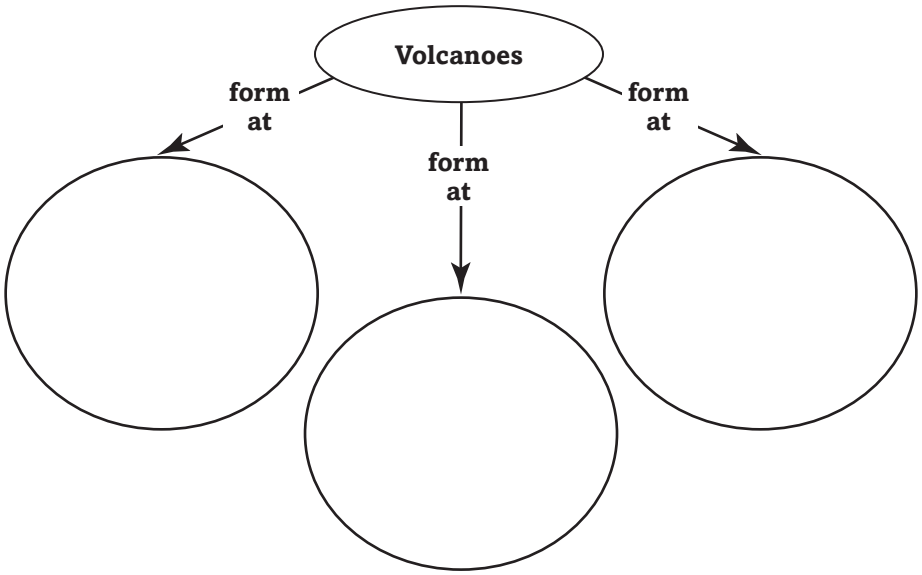
Use a dictionary to define occur.

occur _____

Name _____ Date _____

Section 3 Earthquakes, Volcanoes, and Plate Tectonics (continued)

Main Idea	Details
Earth's Moving Plates *I found this information on page _____.*	**Model** *the plates of Earth's lithosphere that contribute to earthquake and volcanic activity in North America. Draw a simple map of North America and its plate and the boundaries with the plates that surround it. Label the plates.*
Where Volcanoes Form *I found this information on page _____.*	**Organize** *information about where volcanoes form by completing the concept map.*



Name _____ **Date** _____

Main Idea

Details

Moving Plates Cause Earthquakes

I found this information on page _____.

Identify *three places where earthquakes frequently occur.*

1. _____

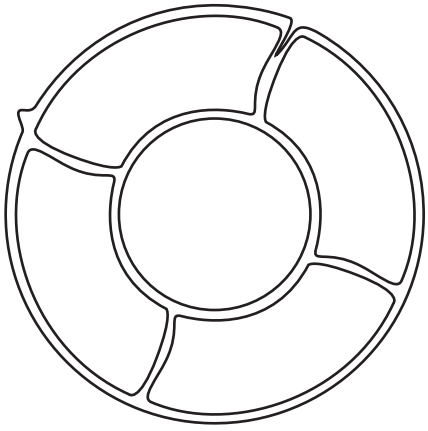
2. _____

3. _____

I found this information on page _____.

Model *what drives Earth's plates.*

- In the diagram below, label Earth's core and mantle.
- Draw three convection currents. Use arrows to show the direction of flow.
- Show a convergent boundary between two currents and a divergent boundary between two currents.



SYNTHESIZE IT

In your own words, explain how seismic waves help scientists learn about Earth's layers.

_____

_____

_____

_____

Name _____ Date _____

Tie It Together

Summarize

Create a concept map or other diagram to connect concepts you have learned about volcanoes and earthquakes. Include information about

- why they occur
- how they affect humans
- how scientists measure and observe them
- what scientists know about them.

Name _____ **Date** _____

Earthquakes and Volcanoes

Chapter Wrap-Up

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

K What I know	W What I want to learn	L What I learned

Review

Use this checklist to help you study.

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

SUMMARIZE IT

After reading this chapter, identify three things that you have learned about earthquakes and volcanoes.

_____

_____

_____

_____

Name _____ Date _____

Conserving Resources

GLE 0707.7.6 Evaluate how human activities affect the earth's land, oceans, and atmosphere.
Also covers: GLE 0707.7.5, ✓0707.Inq.1, ✓0707.7.8, SPI 0707.7.7

Before You Read

Before you read the chapter, respond to these statements.

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

Before You Read	Conserving Resources
	• There is an unlimited supply of fossil fuels.
	• Sun, wind, and heat within Earth's crust can be used to generate power.
	• Acid precipitation washes nutrients from the soil.
	• The ozone layer emits radiation that can harm living cells.

FOLDABLES™ Study Organizer

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

Science Journal

List some resources, other than water, air, and fossil fuels, that we depend on and describe how we use them.

Name _____ Date _____

Conserving Resources

Section 1 Resources

GLE 0707.7.5 Differentiate between renewable and nonrenewable resources in terms of their use by man.

Predict *the topics that will be discussed in Section 1 after reading the headings and looking at the illustrations.*

1. _____
2. _____
3. _____

Review Vocabulary

Define geyser *to show its scientific meaning.*

geyser _____

New Vocabulary

Define the following terms to show their scientific meanings.

natural resource _____

hydroelectric power _____

nuclear energy _____

geothermal energy _____

Academic Vocabulary

Define modify. *Then use it in an original sentence to show its scientific meaning.*

modify _____

Name _____ **Date** _____

Section 1 Resources (continued)

Main Idea	Details

Natural Resources

I found this information on page _____.

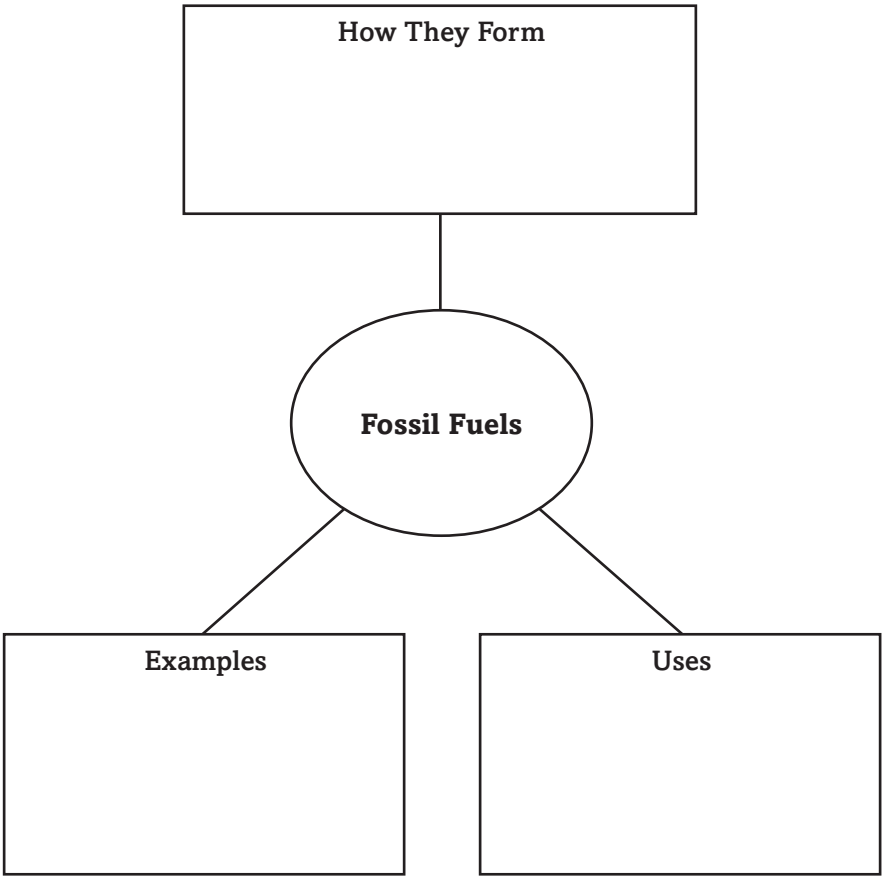
Compare renewable *and* nonrenewable resources *by completing the chart below.*

Type of Resource	Description	Examples
Renewable		
Nonrenewable		

Fossil Fuels

I found this information on page _____.

Organize *information about* fossil fuels *in the concept web below.*



Name _____ **Date** _____

Section 1 Resources (continued)

Main Idea

I found this information on page _____.

Details

Summarize *three reasons that fossil fuels need to be conserved.*

1. _____
2. _____
3. _____

Alternatives to Fossil Fuels

I found this information on page _____.

Organize *information about* alternative energy resources *below.*

Alternative Energy Resource	Important Information
Hydroelectric power	
Wind energy	
Geothermal energy	
Nuclear power	
Solar energy	

Summarize It

Examine the circle graph in your book showing energy usage in the United States. Explain why so much of the United States' energy comes from fossil fuels in spite of the fact that fossil fuels cause pollution and are limited in supply.

_____

_____

_____

Name _____ **Date** _____

Conserving Resources

Section 2 Pollution

GLE 0707.7.6 Evaluate how human activities affect the earth's land, oceans, and atmosphere.
✓0707.7.9 Evaluate how human activities affect the condition of the earth's land, water, and atmosphere.
Also covers: SPI 0707.7.7

Skim *the headings of Section 2 to determine three main types of pollution that will be discussed.*

1. _____

2. _____

3. _____

Review Vocabulary

Define atmosphere *to show its scientific meaning.*

atmosphere _____

_____

New Vocabulary

Read each definition below. Write the correct vocabulary term in the blank to the left.

_____ substance that contaminates the environment

_____ precipitation that has a pH below 5.6

_____ trapping of heat from the Sun by Earth's atmosphere

_____ waste materials that are harmful to human health or poisonous to living organisms

Academic Vocabulary

Define **affect** *to show its scientific meaning.*

affect _____

_____

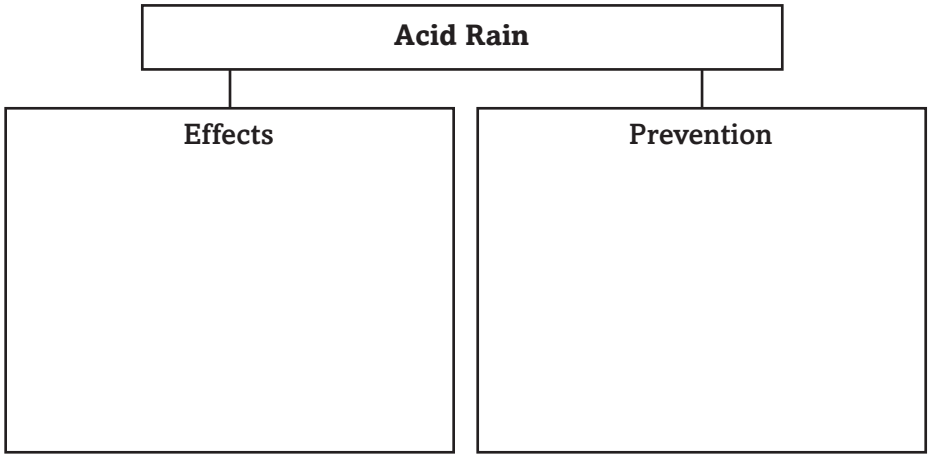
Main Idea

Details

Acid Precipitation

I found this information on page _____.

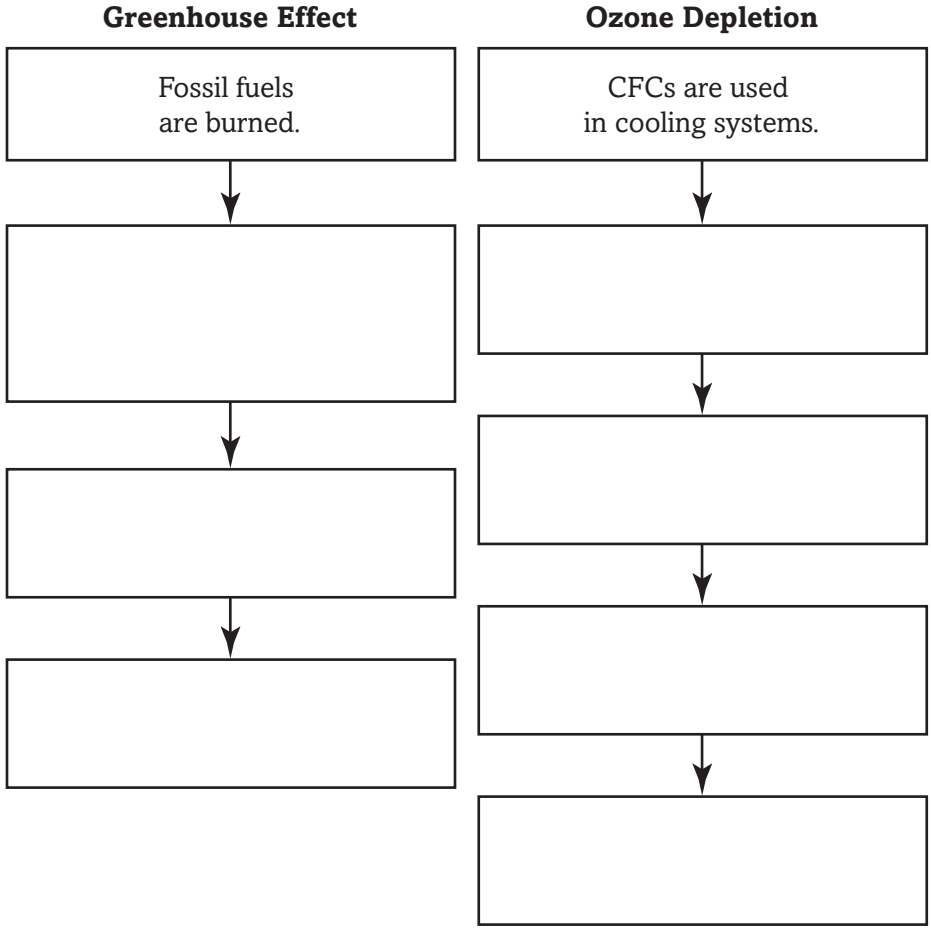
Complete *the graphic organizer below to identify the effects of* acid rain *and ways to prevent acid rain.*



Greenhouse Effect and Ozone Depletion

I found this information on page _____.

Sequence *the events that cause the* greenhouse effect *and* ozone depletion *by completing the following graphic organizers.*



Name _____ **Date** _____

Section 2 Pollution (continued)

Main Idea — Details

Indoor Air Pollution

I found this information on page _____.

Compare and contrast *carbon monoxide and radon as sources of* indoor air pollution *by completing the following chart.*

Gas	Source	Effect
Carbon monoxide		
Radon		

Water Pollution

I found this information on page _____.

Identify *causes of the following three examples of* water pollution.

1. Surface water pollution: _____

2. Ocean water pollution: _____

3. Groundwater pollution: _____

Soil Loss and Soil Pollution

I found this information on page _____.

Analyze *causes of* soil loss *and* soil pollution.

A. Causes of soil loss

1. _____
2. _____

B. Causes of soil pollution

1. _____
2. _____

CONNECT IT

Explain in one sentence why people are concerned about pollution.

_____

_____

_____

Name _____ **Date** _____

Conserving Resources

Section 3 The Three Rs of Conservation

✓**0707.7.8** Determine the impact of man's use of renewable and nonrenewable resources on future supplies.

Scan *the headings of Section 3. List the* three Rs of conservation *below.*

1. _____
2. _____
3. _____

Review Vocabulary

Define *the following terms. Then write a paragraph that includes the scientific meaning of all three terms.*

reprocessing _____

_____

New Vocabulary

recycling _____

_____

Academic Vocabulary

participate _____

_____

Paragraph: _____

_____

_____

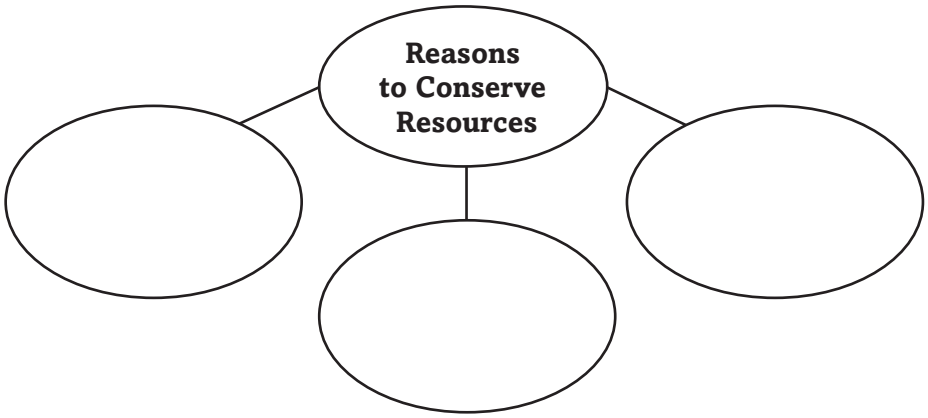
_____

_____

_____

Name _____ **Date** _____

Section 3 The Three Rs of Conservation (continued)

Main Idea	Details
Conservation *I found this information on page _____.*	**Identify** *reasons for conserving resources by completing the graphic organizer below.* 
Reduce *I found this information on page _____.*	**Summarize** *four ways to reduce your own use of natural resources.* **1.** _____ **2.** _____ **3.** _____ **4.** _____
Reuse *I found this information on page _____.*	**Define** reusing an item. *Then identify at least two examples of ways to reuse items.* **Definition:** _____ _____ **Examples:** _____ _____ _____ _____ _____

Name _____ **Date** _____

Section 3 The Three Rs of Conservation (continued)

Main Idea

Recycle

I found this information on page _____.

Details

Summarize recycling *in the following chart.*

Recycling	
Definition:	
Items that can be recycled	
Advantages of recycling	
How recycling is done	

Analyze ***the graph that describes the recycling rates of key household items. Then complete the statements.***

The percentages of _____, _____, and _____ being recycled increased from 1990 to 2000.

The percentages of _____, _____, and _____ being recycled decreased from 1995 to 2000.

Synthesize It

In a small group, discuss why some people do not recycle. Summarize your discussion in the space below.

_____

_____

_____

_____

Name _____ **Date** _____

Tie It Together

Conservation

Brainstorm ways to increase the level of conservation practiced in your school. Set a conservation, reuse, or recycling goal. Write a plan to change the school's behavior to meet your goal. If new resources would be needed to implement your plan, hypothesize how you could raise money for what you need.

- Decide which method of conservation you are most concerned about.
- Describe the benefits of practicing that method of conservation in your school.
- Identify practical ways that students can practice conservation.

Name _____ **Date** _____

Conserving Resources Chapter Wrap-Up

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

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

Conserving Resources	After You Read
• There is an unlimited supply of fossil fuels.	
• Sun, wind, and heat within Earth's crust can be used to generate power.	
• Acid precipitation washes nutrients from the soil.	
• The ozone layer emits radiation that can harm living cells.	

Review

Use this checklist to help you study.

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

SUMMARIZE IT **After reading this chapter, identify three new ways you could practice conservation.**

_____

_____

_____

_____

Name _____ Date _____

Forces and Changes in Motion

GLE 0707.11.3 Distinguish between speed and velocity. ✓**0707.11.4** Recognize how a net force impacts an object's motion. **Also covers:** GLE 0707.Inq.1, GLE 0707.Inq.2, GLE 0707.Inq.3, GLE 0707.T/E.1, GLE 0707.11.4

Before You Read

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

K What I know	W What I want to find out

FOLDABLES™ Study Organizer

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

Science Journal

List three questions that you would ask an astronaut about space flight.

Name _____ **Date** _____

Forces and Changes in Motion

Section 1 Motion

✓0707.11.3 Summarize the difference between the speed and velocity based on the distance and amount of time traveled. **Also covers:** GLE 0707.Inq.2, GLE 0707.Inq.5, GLE 0707.11.3, SPI 0707.11.3

Scan *Section 1 of your book.*

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

Write two facts that you discovered about motion as you scanned the section.

1. _____

_____

2. _____

_____

Review Vocabulary

meter

Define meter *in a sentence to show its scientific meaning.*

_____

_____

New Vocabulary

Match the vocabulary term to the correct definition.

_____ distance and direction between starting and ending positions

_____ displacement divided by time

_____ distance divided by time

_____ change in velocity divided by the amount of time required for the change to occur

Academic Vocabulary

initial

Use a dictionary to define **initial.**

_____

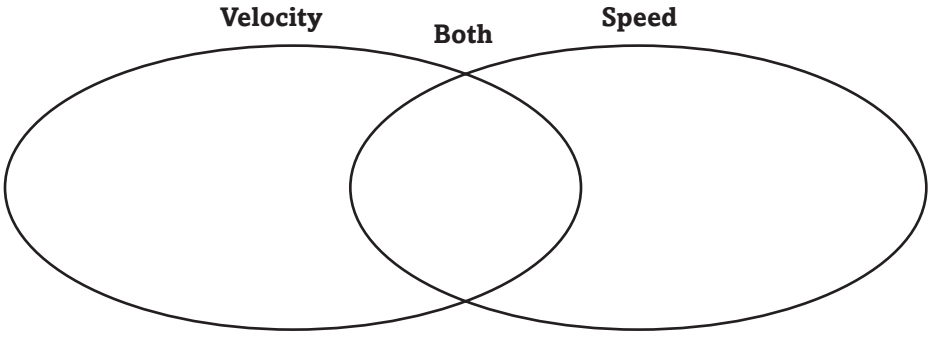
_____

Name _____ **Date** _____

Main Idea	Details
What is motion? *I found this information on page* _____.	**Create** *an original drawing that shows the difference between* distance *and* displacement. *Then explain the difference between these terms in the spaces provided.*
Speed *I found this information on page* _____.	**Complete** *the mathematical equation to show how speed is calculated.* speed (in meters/second) = _____ (in meters) / _____ (in seconds) OR s = _____
I found this information on page _____.	**Distinguish** *between* speed, constant speed, *and* instantaneous speed. Speed: _____ Constant speed: _____ Instantaneous speed: _____

Name _____ **Date** _____

Section 1 Motion (continued)

Main Idea	Details
Velocity *I found this information on page _____.*	**Organize** *information by placing each phrase in the Venn diagram.* • how fast displacement changes • rate of change • how fast distance changes 
I found this information on page _____.	**Complete** *the equation to show how velocity is calculated.* velocity = $\frac{\text{\_\_\_\_\_}}{\text{\_\_\_\_\_}}$
Acceleration *I found this information on page _____.*	**Complete** *the graphic organizer by listing the 2 factors that affect acceleration.* Acceleration is a change in _____ and/or _____

CONNECT IT **Identify examples of when you may have used information about speed, distance, or displacement in your everyday life.**

_____

_____

_____

Name _____ **Date** _____

Forces and Changes in Motion

Section 2 Forces and Motion

✓0707.11.4 Recognize how a net force impacts an object's motion. **Also covers:** GLE 0707.Inq.2, GLE 0707.Inq.3, GLE 0707.Inq.5, SPI 0707.Inq.3

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

1. _____
2. _____
3. _____

Review Vocabulary

Define mass *to show its scientific meaning.*

mass _____

New Vocabulary

Use your book to define the key terms.

force _____

gravity _____

friction _____

air resistance _____

Academic Vocabulary

Use a dictionary to define individual *to show its scientific meaning.*

individual _____

Name _____ **Date** _____

Section 2 Forces and Motion (continued)

Main Idea

Details

Force

I found this information on page _____.

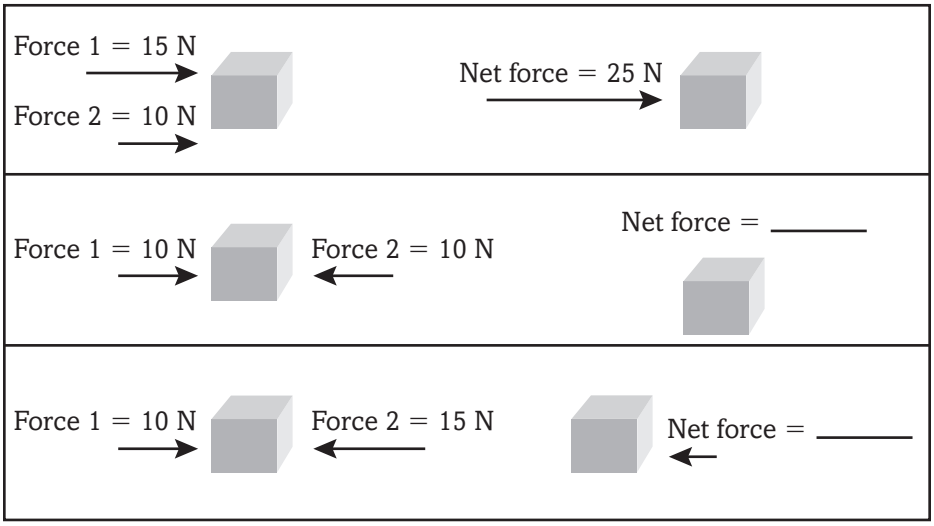
Summarize forces *by completing the list below.*

1. A force is _____.
2. Every force has _____.
3. Every force has _____.

How Forces Combine and Balanced and Unbalanced Forces

I found this information on page _____.

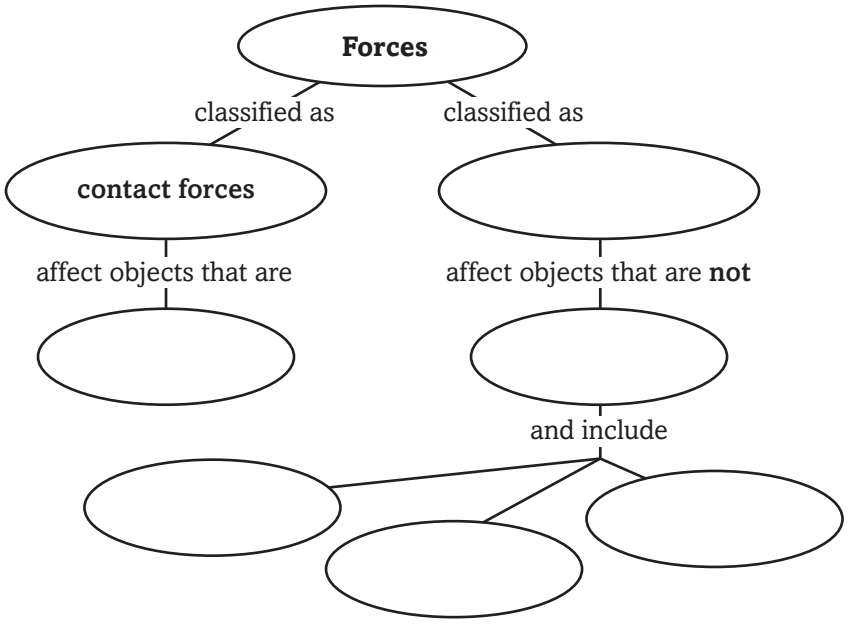
Identify *the net force applied to the objects in the diagrams below.*



Contact and Non-contact Forces and Gravity

I found this information on page _____.

Analyze *the information in your book about contact and non-contact forces to complete the graphic organizer below.*



Name _____ Date _____

Section 2 Forces and Motion (continued)

Main Idea

Details

Friction

I found this information on page _____.

Compare *the types of friction by completing the table.*

Type of Friction	Description	Example
static		
sliding		

The Buoyant Force and Air Resistance

I found this information on page _____.

Model *the buoyant force and air resistance by sketching an example of each below. Include arrows indicating the direction of the force of gravity, the buoyant force, and the force of air resistance.*

The Buoyant Force	Air Resistance

CONNECT IT

Give an example of each type of friction, the buoyant force, and air resistance that you have experienced in daily life.

_____

_____

_____

_____

Name _____ **Date** _____

Forces and Changes in Motion

Section 3 The Laws of Motion

GLE 0707.11.4 Investigate how Newton's laws of motion explain an object's movement.
SPI 0707.11.4 Identify and explain how Newton's laws of motion relate to the movement of objects.
Also covers: SPI 0707.7.5

Analyze *the objectives listed under* What You'll Learn *for this section. Change the statements into questions.*

1. _____

2. _____

3. _____

Review Vocabulary

Use your book or a dictionary to define inertia.

inertia _____

New Vocabulary

Define the key terms using a dictionary or your book.

first law of motion _____

second law of motion _____

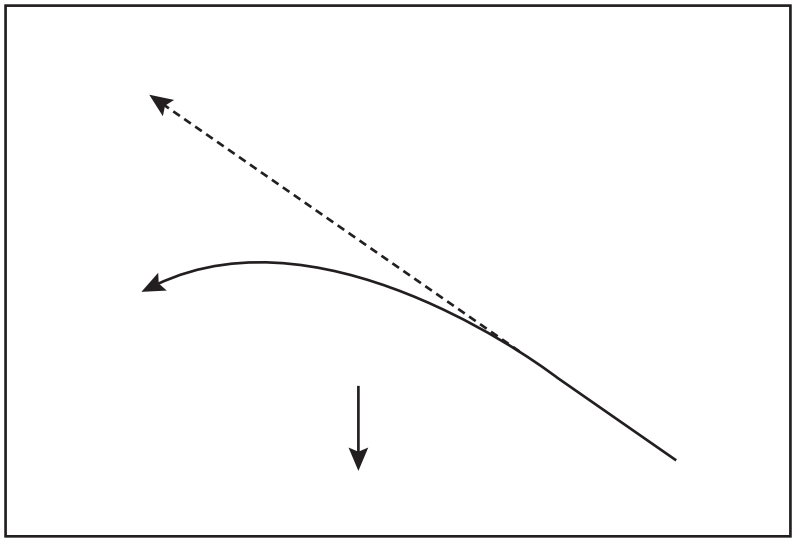
Academic Vocabulary

Use a dictionary to define principle *to show its scientific meaning.*

principle _____

Name _____ **Date** _____

Section 3 The Laws of Motion (continued)

Main Idea	Details
Newton's Laws of Motion *I found this information on page* _____.	**Summarize** *Newton's laws of motion.* Changes in objects' motion are caused by _____. Newton's laws of motion consist of _____ rules. These rules can be used to _____ the motion of _____ objects.
The First Law of Motion *I found this information on page* _____.	**Model** *the path of a thrown ball as explained by Newton's first law of motion. Label the arrows in the diagram with numbers to indicate:* **1.** the path of the ball **2.** the direction of the force of gravity **3.** the path that the ball would follow if the forces acting on it were balanced 
The Second Law of Motion *I found this information on page* _____.	**Complete** *the graphic organizer by listing the two factors that affect acceleration.* Acceleration of an object depends on _____ and _____

Name _____ **Date** _____

Section 3 The Laws of Motion (continued)

Main Idea	Details

The Third Law of Motion

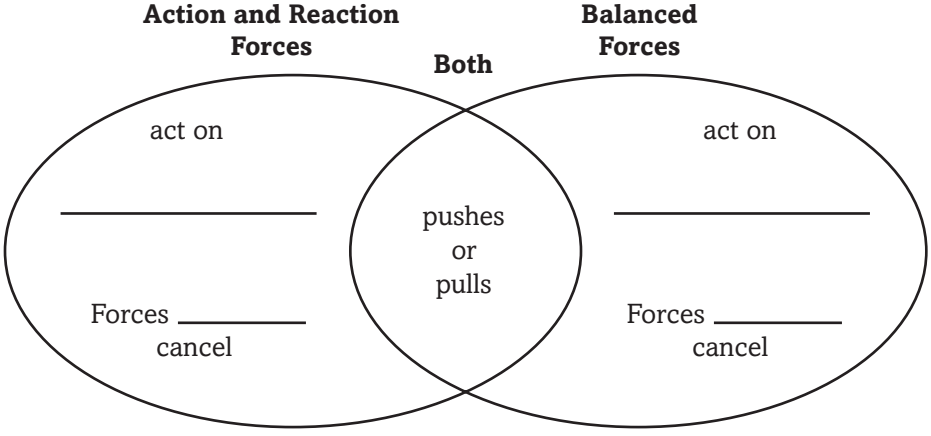
I found this information on page _____.

Model action *and* reaction forces.

- Use arrows to show action and reaction forces.
- Label the action force and the reaction force in your model.

I found this information on page _____.

Compare *action and reaction forces with balanced forces by completing the Venn diagram below.*



Combining the Laws

I found this information on page _____.

Create *a drawing that shows a situation described by all three laws of motion.*

- Use arrows to show the size and direction of the forces involved.
- Label your drawing to explain how each law of motion is demonstrated.

Name _____ **Date** _____

Tie It Together

Sports and Forces

Choose a ball sport, such as baseball, soccer, or tennis. Describe the path of the ball during a brief period of play, and identify the forces and changes in motion that act on it as it follows that path. Try to include as many of the concepts presented in this chapter as possible.

Name _____ Date _____

Forces and Changes in Motion

Chapter Wrap-Up

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

K What I know	W What I want to find out	L What I learned

Review

Use this checklist to help you study.

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

SUMMARIZE IT **After studying this chapter, identify three main concepts you have learned about motion.**

_____

_____

_____

Name _____ Date _____

Work and Simple Machines

GLE 0707.11.1 Identify six types of simple machines. **Also covers:** GLE 0707.Inq.2, GLE 0707.Inq.3, GLE 0707.Inq.5, GLE 0707.T/E.1, GLE 0707.1.3, GLE 0707.11.2, ✓0707.11.1, ✓0707.11.2, SPI 0707.11.2

Before You Read

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

K What I know	W What I want to find out

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

Science Journal

Describe three machines you used today and how they made doing a task easier.

Name _____ **Date** _____

Work and Simple Machines

Section 1 Work and Power

GLE 0707.11.2 Apply the equation for work in experiments with simple machines to determine the amount of force needed to do work. **Also covers:** GLE 0707.Inq.5, GLE 0707.T/E.1, ✓0707.11.4

Review *the objectives for Section 1. Write three questions that come to mind from reading these statements. Look for answers to each question as you read the section.*

1. _____

2. _____

3. _____

Review Vocabulary

Define force *to show its scientific meaning.*

force _____

New Vocabulary

Use each key term in a scientific sentence.

work _____

power _____

Academic Vocabulary

Use a dictionary to define version. *Use* version *in an original sentence to show its scientific meaning.*

version _____

Name _____ **Date** _____

Section 1 Work and Power (continued)

Main Idea

What is work?

I found this information on page _____.

I found this information on page _____.

Details

Summarize *what must occur for* work *to be done.*

_____

_____

_____

Model ***the relationship between an applied force and work by sketching two drawings in the boxes provided. In the top box, show a situation in which work is done. In the bottom box, show a situation in which no work is done.***

- Use arrows to show the direction of the applied force and any motion that results.
- Write a caption explaining each illustration.

Work is done.
Caption:

Work is not done.
Caption:

Name _____ **Date** _____

Main Idea

Details

Calculating Work

I found this information on page _____.

Complete *the mathematical equation describing how work is calculated. Complete the same equation below it, using the units in which each measurement is recorded. Then write the same equation using the correct symbols.*

work = _____ × _____

joules = _____ × _____

_____ = _____

What is power?

I found this information on page _____.

Define *the term* **power.** *Complete the mathematical equation describing how power is calculated in word and symbol form.*

Power is _____.

$$\text{power} = \frac{\text{\_\_\_\_\_}}{\text{\_\_\_\_\_}} \qquad P = \frac{\text{\_\_\_\_\_}}{\text{\_\_\_\_\_}}$$

Identify *the unit in which power is measured.*

_____

I found this information on page _____.

Summarize *the way in which* **work, energy,** *and* **power** *are related by filling in the blanks below.*

When you do _____ on an object, you _____ the energy of that object. Energy is _____ from yourself to _____. Power is equal to the amount of _____ transferred over a certain _____.

Connect It

Consider an active sport. Describe the work that is done by people as they play the sport.

_____

_____

_____

Name _____ **Date** _____

Work and Simple Machines

Section 2 Using Machines

SPI 0707.11.2 Determine the amount of force needed to do work using different simple machines.
Also covers: GLE 0707.T/E.1, GLE 0707.1.3, GLE 0707.11.1

Predict *three things that might be discussed in Section 2 after reading the headings in this section.*

1. _____

2. _____

3. _____

Review Vocabulary

friction

Define friction *to show its scientific meaning.*

_____

New Vocabulary

Write the correct vocabulary term next to its definition.

_____ output work divided by input work

_____ force exerted on a machine

_____ number of times that a machine increases the input force; equal to the output force divided by the input force

_____ force exerted by a machine

Academic Vocabulary

device

Use a dictionary to define device *to show its scientific meaning.*

_____

Name _____ **Date** _____

Main Idea

Details

What is a machine? and Mechanical Advantage

I found this information on page _____.

Organize *information by listing the three ways a machine can make work easier.*

A machine makes work easier by changing

1. _____.

2. _____.

3. _____.

Summarize mechanical advantage. *Then write the formula for calculating it.*

Mechanical advantage is _____

_____.

The equation for calculating mechanical advantage is

$$\text{mechanical advantage} = \frac{\qquad\qquad}{\qquad\qquad}$$

I found this information on page _____.

Analyze *the diagrams in your book that show the three ways machines make work easier. Complete the chart by describing the effect of the machine on the* output force.

What Machine Does	How Force Is Changed
Increases force	
Increases distance	
Changes direction of force	

Name _____ **Date** _____

Section 2 Using Machines (continued)

Main Idea	Details
Efficiency *I found this information on page _____.*	**Summarize** ***the relationship between*** **efficiency** ***and*** **friction** ***by completing the paragraph.*** The _____ of a machine is the ratio of the _____ work to the _____ work. _____ is a force that _____ the motion of one object sliding over another. This _____ a machine's _____.
I found this information on page _____.	**Complete** ***the mathematical equation that describes how*** **efficiency** ***is calculated.*** efficiency (in percent) = $\frac{\text{\_\_\_\_\_}}{\text{\_\_\_\_\_}} \times 100\%$
I found this information on page _____.	**Model** ***how oil reduces the friction between two surfaces. Sketch a cross-section view of two horizontal surfaces sliding past each other. Indicate contact points on the upper and lower surfaces and a layer of oil between them.***

CONNECT IT **Think of some machines that you use. List the machines and the parts that may be affected by friction.**

_____

_____

_____

_____

_____

Name _____ **Date** _____

Work and Simple Machines

Section 3 Simple Machines

GLE 0707.11.1 Identify six types of simple machines. **✓0707.11.1** Compare the six types of simple machines. **SPI 0707.11.1** Differentiate between the six simple machines. **Also covers:** GLE 0707.Inq.2, SPI 0707.11.2

Scan *Use the checklist below to preview Section 3 of your book.*

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

Write two facts you discovered about simple machines.

1. _____

2. _____

Review Vocabulary

Define *the term* **compound** *to show its scientific meaning.*

compound _____

New Vocabulary

Write the correct vocabulary term next to its definition.

_____ a grooved wheel with a rope or cable wrapped around the groove

_____ machine that does work only with one movement

_____ an inclined plane that moves

_____ a flat, sloped surface, or ramp

_____ an inclined plane wrapped around a cylinder or post

_____ machine made up of two or more simple machines

_____ two circular objects of different sizes that rotate together

_____ a rigid rod or plank that pivots about a point called the fulcrum

Academic Vocabulary

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

section _____

_____

Name _____ Date _____

Section 3 Simple Machines (continued)

Main Idea | **Details**

What is a simple machine?

I found this information on page _____.

Contrast simple *and* compound machines *by completing the chart.*

	Simple Machine	Compound Machine
Description		
Examples		

Inclined Plane

I found this information on page _____.

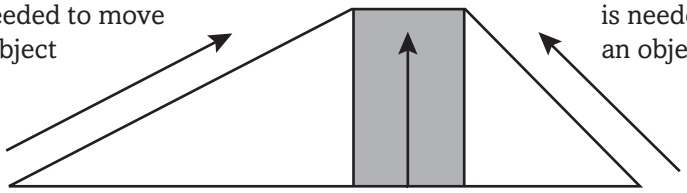
Compare *how the amount of force needed to move an object changes with the length of the* inclined plane. *Complete the phrases below with* less, more, *and* the most.

Longer Inclined Plane:

_____ force is needed to move an object

Shorter Inclined Plane:

_____ force is needed to move an object



Lifting Without an Inclined Plane:

_____ force is needed to move the object

Lever

I found this information on page _____.

Model *how changing the location of a* fulcrum *in a* lever *affects its* mechanical advantage. *Draw two levers of the same length but with fulcrums at different points.*

- Label the input force, output force, and fulcrum in your drawings as well as the distances between the fulcrum and each force.
- Show a calculation of the mechanical advantage of each.

Name _____ **Date** _____

Section 3 Simple Machines (continued)

Main Idea

Wheel and Axle

I found this information on page _____.

Pulley

I found this information on page _____.

Details

Analyze ***the*** **wheel and axle** ***by completing the paragraph below.***

If the input force is applied to the axle, the mechanical advantage is _____ one. If the input force is applied to the wheel, the mechanical advantage is almost always _____ one.

Classify ***the three types of*** **pulleys** ***by completing the chart.***

Pulleys		
Type of pulley	**Effect on force**	**Mechanical advantage**
Fixed pulley		
Movable pulley		
Pulley system		

Connect It

Analyze what types of wheel and axles are on a bicycle. List and describe them in terms of their mechanical advantage.

Name _____ **Date** _____

Tie It Together

Synthesize It

You will be loading heavy crates into a truck. The crates are too heavy to lift to the bed of the truck by yourself. Make use of as many simple machines as you can to help you. Explain how you would use them.

Name _____ **Date** _____

Work and Simple Machines

Chapter Wrap-Up

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

K What I know	W What I want to find out	L What I learned

Review

Use this checklist to help you study.

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

SUMMARIZE IT **After reading this chapter, identify three things that you have learned about work and simple machines.**

_____

_____

_____

_____

Name _____ Date _____

Waves

GLE 0707.11.5 Compare and contrast the basic parts of a wave. **GLE 0707.11.6** Investigate the types and fundamental properties of waves. **Also covers:** GLE 0707.Inq.2, GLE 0707.Inq.3, GLE 0707.Inq.5, GLE 0707.T/E.1

Before You Read

Before you read the chapter, read each statement below.

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

Before You Read	Waves
	• Waves carry matter and energy.
	• There is more than one kind of wave.
	• Waves carry different amounts of energy.
	• All waves travel at the same speed.

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

Science Journal

Write a paragraph about some places where you have seen water waves.

Name _____ **Date** _____

Waves

Section 1 What are waves?

✓**0707.11.6** Compare how transverse and longitudinal waves are produced and transmitted.
Also covers: SPI 0707.11.6, GLE 0707.Inq.3, GLE 0707.11.5, GLE 0707.11.6

Skim *the title and headings of Section 1. List two things that might be discussed in this section.*

1. _____

2. _____

Review Vocabulary

Define energy *in your own words.*

energy _____

New Vocabulary

Define each vocabulary term using your book or a dictionary.

wave _____

mechanical wave _____

transverse wave _____

compressional wave _____

electromagnetic wave _____

Academic Vocabulary

Use a dictionary to define medium *in its scientific sense.*

medium _____

Name _____ **Date** _____

Section 1 What are waves? (continued)

Main Idea	Details
What is a wave? *I found this information on page _____.* *I found this information on page _____.*	**Identify** *two types of* waves *that carry energy.* **1.** _____ **2.** _____ **Contrast** ***the energy carried in a sound wave and the energy in a moving ball.*** _____ _____
A Model for Waves *I found this information on page _____.*	**Create** ***your own model for a wave. Use information from your book to make a drawing that models how a wave can move energy without moving matter.*** • Label the parts of your drawing that represent matter and energy. • Write a caption to explain your drawing.

My Model for Waves

_____

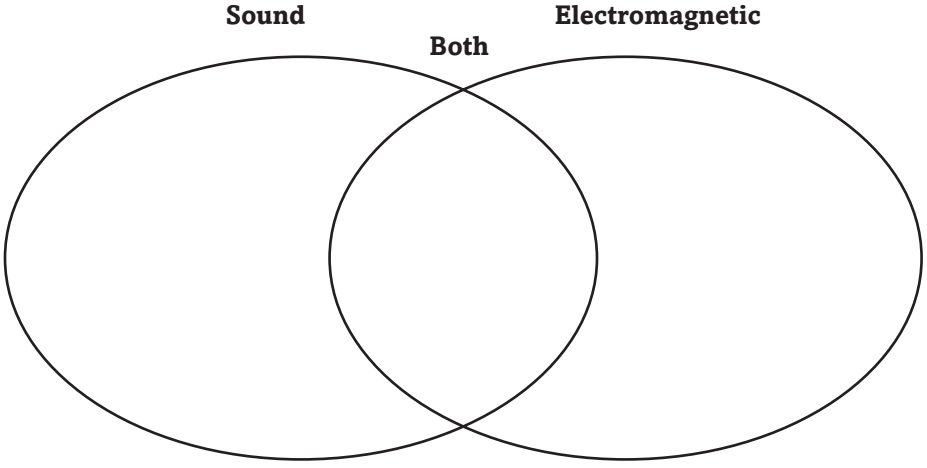
_____

_____

Name _____ **Date** _____

Section 1 What are waves? (continued)

Main Idea	Details
Mechanical Waves *I found this information on page* _____.	**Organize** *information from the section in the outline below.* Mechanical waves—Travel through a _____. **A.** Types of wave mediums **1.** _____ **2.** _____ **3.** _____ **B.** Types of Mechanical Waves **1.** _____ **2.** _____
Sound Waves and **Electromagnetic Waves** *I found this information on page* _____.	**Compare and contrast** *the characteristics of* **sound waves** *and* **electromagnetic waves** *by completing the Venn diagram below.* • carry energy • carry radiant energy • do not need a medium • mechanical waves • move through a medium



CONNECT IT

Evaluate how electromagnetic and mechanical waves are useful in your daily life.

_____

_____

_____

Name _____ **Date** _____

Waves

Section 2 Wave Properties

GLE 0707.11.6 Investigate the types and fundamental properties of waves. **SPI 0707.11.5** Compare and contrast the different parts of a wave. **Also covers:** GLE 0707.11.5, GLE 0707.T/E.1, SPI 0707.Inq.3

Scan *Section 2 of your book. Write three facts you discovered about wave properties as you scanned the section.*

1. _____

2. _____

3. _____

Review Vocabulary

Define *each key term using your book or a dictionary.*

speed _____

New Vocabulary

amplitude _____

wavelength _____

frequency _____

Academic Vocabulary

Use the word parallel *in a scientific sentence.*

parallel _____

Name _____ **Date** _____

Section 2 Wave Properties (continued)

Main Idea	Details

Amplitude

I found this information on page _____.

Create *a* transverse wave *in the space below. Label the* crest, trough, *and* amplitude *of the wave on your drawing.*

Wavelength

I found this information on page _____.

Complete *the descriptions for determining* wavelength *of two types of waves in the chart below.*

Wavelength is the distance:	**Type of Wave**	
	Transverse	Compressional
from one		
to the next		
or from one		
to the next		

Frequency

I found this information on page _____.

Model *the relationship between* frequency *and* wavelength *when wave speed is the same. In the top box, draw a wave with a frequency of one wavelength per second. In the bottom box, draw a wave with a frequency of two wavelengths per second.*

Name _____ **Date** _____

Section 2 Wave Properties (continued)

Main Idea

Wave Speed

I found this information on page _____.

Details

Summarize *how to use the wave speed equation to calculate wave speed by completing the steps below.*

1. The wave speed equation is

   wave speed in m/s =

   _____ × _____

2. To calculate the speed of a wave that has a frequency of 550 Hz and a wavelength of 0.8 m, insert the values into the wave speed equation.

   wave speed = _____ × _____

3. Multiply to find the answer.

   Answer: _____

Compare *the speeds of different types of waves in different mediums by completing the chart below with the words* **gases, liquids,** *or* **solids.**

How mediums affect wave speed		
Wave type	**move fastest through**	**move slowest through**
mechanical waves		
electromagnetic waves		

Connect It

Individual members of a choir sing at different pitches. Analyze the wavelengths of the sound waves produced by soprano, alto, and baritone singers.

_____

_____

_____

_____

Name _____ **Date** _____

Waves

Section 3 Wave Behavior

GLE 0707.11.6 Investigate the types and fundamental properties of waves. **Also covers:** GLE 0707.Inq.2, GLE 0707.Inq.5

Predict *by reading the title and subheadings three things that might be discussed in this section.*

1. _____
2. _____
3. _____

Review Vocabulary

Write a sentence using the word echo *to reflect its scientific use.*

echo _____

New Vocabulary

Use the new vocabulary terms to write your own original scientific sentences.

reflection _____

refraction _____

diffraction _____

interference _____

Academic Vocabulary

Define overlap *using a dictionary.*

overlap _____

Name _____ **Date** _____

Section 3 Wave Behavior (continued)

Main Idea

Details

Reflection

I found this information on page _____.

Skim *the section about* reflection. *In the Question spaces, write two questions you have about reflection. As you read the section, write answers to your questions.*

Question: _____

Answer: _____

_____

Question: _____

Answer: _____

_____

Refraction

I found this information on page _____.

Create *a diagram below showing what happens to a light wave as it passes from water to air. Draw a second picture showing what happens as light passes from air to water. Label the* normal *and the* light ray's direction of travel *in each drawing.*

Summarize *why light* refracts *when it passes from one material to another.*

_____

_____

Sequence *the seven colors into which sunlight separates when it passes through a prism.*

Longest **Wavelength** **Shortest**

Name _____ **Date** _____

Section 3 Wave Behavior (continued)

Main Idea

Details

Diffraction

I found this information on page _____.

Summarize *two factors that affect how much a wave can be* diffracted.

1. _____

2. _____

What happens when waves meet?

I found this information on page _____.

Model constructive *and* destructive interference *in the two boxes below. Label the* crests *and* troughs *of the waves in your model.*

Interference	
Constructive	Destructive

Comparing Waves and Particles

I found this information on page _____.

Contrast *the behavior of* waves *and* particles *by completing the chart below.*

Behavior	Waves	Particles
When they pass through an opening		
When they meet		

CONNECT IT

Use what you have learned about the behavior of waves to evaluate two ways to protect your ears from damage due to loud noises.

_____

_____

_____

Name _____ **Date** _____

Tie It Together

Model Wave Motion

Design a model you could use to study the behavior and properties of waves. Draw your model below.

Answer each question about your model.

1. What medium does your model use?

2. How could you measure the wavelength of the waves in your model?

3. How could you use your model to demonstrate reflection, refraction, and diffraction of waves?

Name _____ **Date** _____

Waves Chapter Wrap-Up

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

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

Waves	After You Read
• Waves carry matter and energy.	
• There is more than one kind of wave.	
• Waves carry different amounts of energy.	
• All waves travel at the same speed.	

Review

Use this checklist to help you study.

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

SUMMARIZE IT

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

_____

_____

_____

_____