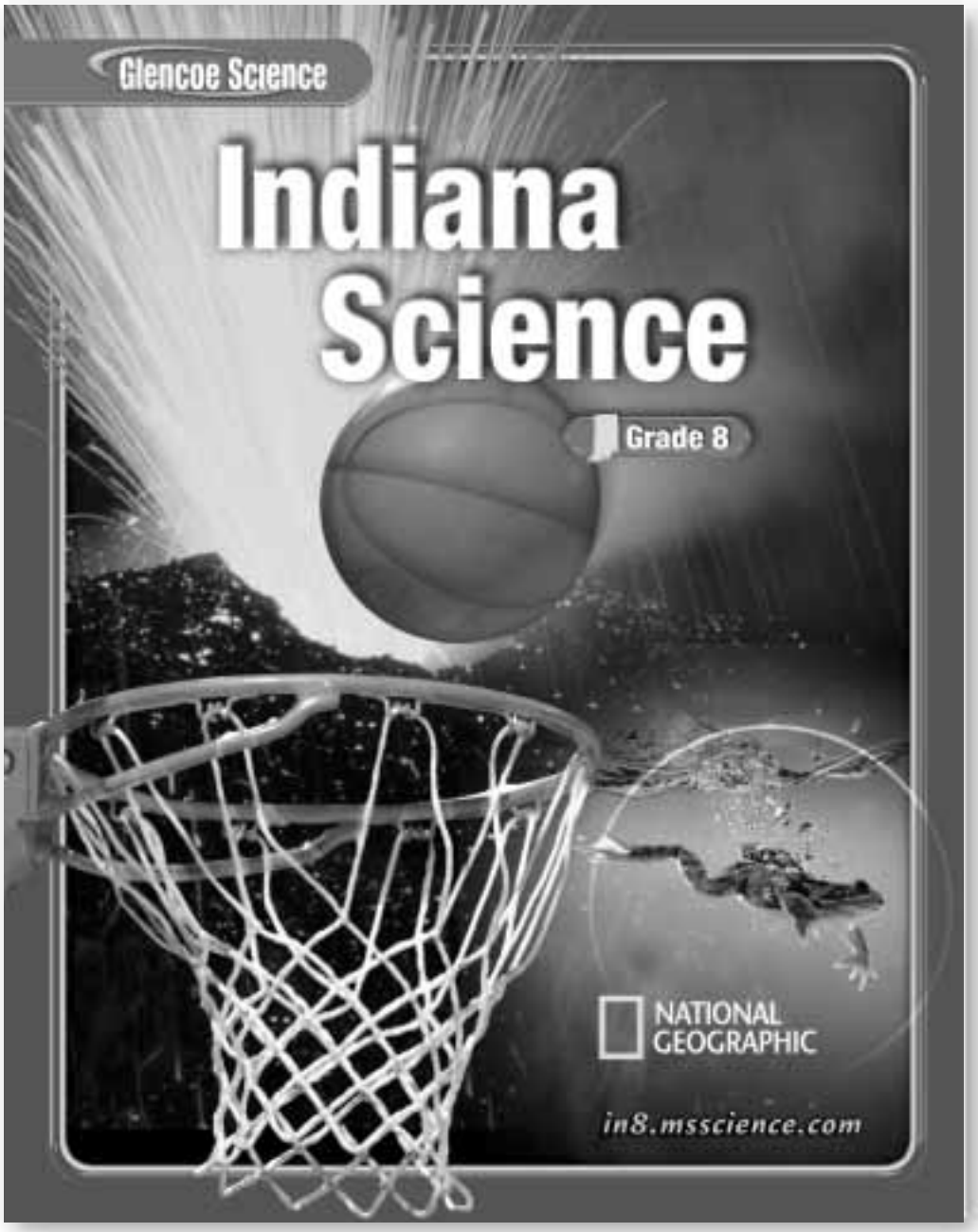
Mastering the Grade 8 Indiana Science Standards

Student Edition



Glencoe

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

Glencoe

The McGraw-Hill Companies

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

ISBN 0-07-867047-0

Printed in the United States of America.

1 2 3 4 5 6 7 8 9 024 06 05 04

Contents

Introduction

What is in this book?

Welcome to the Student Edition of *Mastering the Grade 8 Indiana Science Standards.*

There are two sections in this workbook:

- ***Task Regimen***

  This section provides you with methods to tackle test questions. Using the methods in this section, you will learn how to use the process of elimination, how to identify important information in the tests' graphs, charts, and tables, as well as other skills that can help you succeed on tests. Carefully study the methods in this section before you begin the test questions in this workbook. Each task has an assignment for you to do on your own at home and one to do in class.

- ***Test Practice: ISTEP+ Review, Practice, and Preparation***

  The questions in this section are designed to prepare you for the ISTEP+. The format of the questions found in these practice tests is very similar to the format of the questions found in the ISTEP+.

Task Regimen

A unique three-part **Task Regimen** designed to maximize the benefits of using this workbook is presented in this section. Each of the three tasks is designed to help you identify challenges and improve your performance.

Each task has an assignment for you to do on your own at home and one to do in class. Often the homework and the in-class activities will be coordinated, so it is important that you concentrate on both equally.

TASK	At-Home Assignment	In-Class Assignment
Task 1	For each question you missed, find the pages in the textbook that cover the material and explain what specific information was needed to answer the question correctly. If you cannot find any helpful information in the textbook, write out three questions about the test question that you did not understand.	Work in a group to discuss any confusing questions and content areas. Then work through the confusing questions together.
Task 2	For every incorrect question, go through each answer choice and explain why it is correct or incorrect. Include any tips or hints you noticed that helped you eliminate choices. Place a question mark beside any question you cannot figure out and bring it to class for discussion.	Your teacher will lead a discussion for each question. Share your ideas and observations with the class. Keep notes of the discussion to help your review.
Task 3	Your teacher will provide you with a list of questions to work on. For each question, make observations and write down all of the information given in the test in the form of a graphic, a passage, or otherwise. Write the information directly onto the test.	Work in a group to discuss each question. Make sure to note the location in the textbook where helpful information was found.

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **Based on recent findings, some scientists now argue that life may have existed on Mars at one time. This is an example of _____.**

A a scientific law

B a scientific certainty

C a scientific theory

D a scientific hypothesis

2 **The gray wolf is classified as *Canis lupus*. The domestic dog, formerly classified as *Canis familiaris*, is now classified as *Canis lupus familiaris*. This change reflects biologists' new belief that the domestic dog and the gray wolf belong to the same _____.**

A kingdom

B genus

C species

D phylum

3 **All of these are examples of ways in which models can help scientists EXCEPT _____.**

A communicating observations and ideas

B saving time, money, equipment, and lives

C predicting exactly what will happen

D predicting possible outcomes

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

A keep feeding cats with the specific brand of cat food and record the results

B mix together the specific brand of cat food with another brand of food and feed to cats

C let some of the cats drink water with the specific brand of food

D feed some cats with the specific brand of cat food and other cats with another brand

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

5 **A student conducted an experiment to find out what type of soap kills the most *Escherichia coli* bacteria. In the experiment, each test group of bacteria was exposed to a different amount of a different soap. Explain why the results from this experiment do not accurately measure each soap's ability to kill bacteria.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

6 **Experimental results are compared against the results of controls. Controls improve an experiment by _____.**

A allowing the effects of the variable to be determined

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

C making sure that everything in the experiment remains constant

D guaranteeing that the experimental outcome verifies the hypothesis

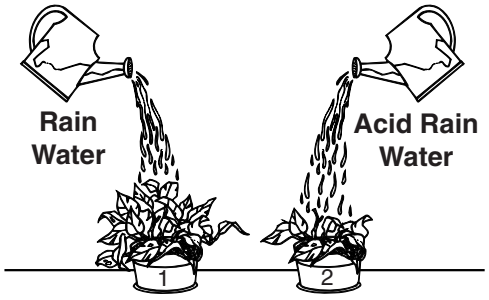
7 **When scientists complete an experiment, they write detailed papers that describe what they did, what the results were, and what the experiment proved. Then other scientists and experts review the papers and check to see if the information is reliable enough to publish in a scientific journal. A research paper might NOT get published or taken seriously if _____.**

A all measurements and data are accurate

B it makes a new scientific discovery

C the experiment cannot be replicated with similar results

D it uses only the scientific names and terms for objects or processes



Plant	Experiment Duration (days)	Height Increase During Experiment (cm)	Mass of Pot and Plant at End of Experiment (kg)
1	240	18	22.5
2	240	11	16.1

8 **The picture above demonstrates how a scientist filled out the data table. To improve this experiment, the scientist could have also recorded the _____.**

A highest and lowest water temperature

B mass of the plant at the start of the experiment

C average soil temperature throughout the 240 days

D mass of the water

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

9 **Before a new drug can be sold to the public, its effectiveness and safety must be tested on human subjects. Explain why all participants in these research studies must be volunteers.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

10 **The waste from nuclear power plants must be handled according to special rules. Why are these precautions taken?**

A to prevent radiation from leaking out

B to prevent people from slipping and falling

C to prevent people from being tired at work

D to prevent competition from other plants

11 **Meg wants to know how much pressure five books will exert on a shelf. In order to find the answer, she needs to know _____.**

A the height of the books and the length of the shelf

B the weight and height of the books

C the area and volume of the shelf

D the weight of the books and the area of contact with the shelf

12 **Identify a reason why people would NOT use a particular energy source.**

A Coal is cheap and easily obtainable.

B Wind is abundant in many regions.

C Hydropower dams do not emit greenhouse gases.

D Solar panels are expensive.

13 **Scientists have invented new chemicals that can be used instead of CFCs in refrigerators and air conditioners. This may affect human health by _____.**

A decreasing water pollution

B increasing the greenhouse effect

C decreasing the rate of ozone depletion

D increasing the number of cases of lung cancer

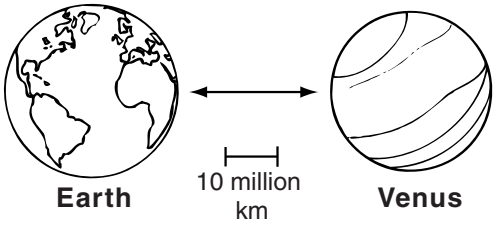
CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

14 **For thousands of years, people were convinced that Earth was flat. Eventually, they saw enough evidence to convince them that Earth was shaped like a sphere. Give an example of current scientific knowledge that might not have been developed if people still believed that Earth was flat.**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



1 **Approximately how far apart are Venus and Earth in the picture above?**

A 30 million km

B 40 million km

C 50 million km

D 60 million km

2 **Density is a measurement of a substance's mass per unit of volume. The density of gold is _____.**

A 19.28 m/s^2

B 19.28 g/cm^3

C 19.28 kg/cm^2

D 19.28 cm/g^3

3 **Scientists observed an object that traveled 60 m in 30 s. Given this information, which of the following is the object's velocity?**

A 10 m/s **B** 2 kg/hr

C 2 m/s **D** 2 s/km^2

Month	Blood Donated (liters)
January	50.14
February	50.10
March	100.60
April	98.71
May	72.34
June	71.89
July	57.83
August	57.28
September	50.09
October	50.20
November	78.57
December	83.26

4 **According to the table, the mean of all blood donations from January through December is 68.42. What are the correct units for the mean?**

A liters

B liters/year

C liters/month

D monthly donations

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

5 **On one map of Alaska, Juneau and Anchorage are located about 16 cm apart. The map is drawn to the scale of 50 km per cm. What is the real distance in km between the two cities?**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

End of Hour	Number of Cells
1	2
2	4
3	8
4	?

6 **These data were collected by watching a cell go through mitosis many times. If everything remains the same, what will be the number of cells present at the end of the fourth hour?**

A 8

B 10

C 16

D 32

Object	Mass	Velocity
Runner	100 kg	4.0 m/s north
Football player	300 kg	8.5 m/s south
Car	900 kg	20 m/s west
Truck	2500 kg	2 m/s east

7 **According to this information, which object has the greatest momentum (momentum = mass × velocity)?**

A runner

B car

C football player

D truck

8 **A car accelerates from 10 m/s to 20 m/s in 5 s. Which of the following represents the car's acceleration?**

A 10 m/s

B 20 m/s^2

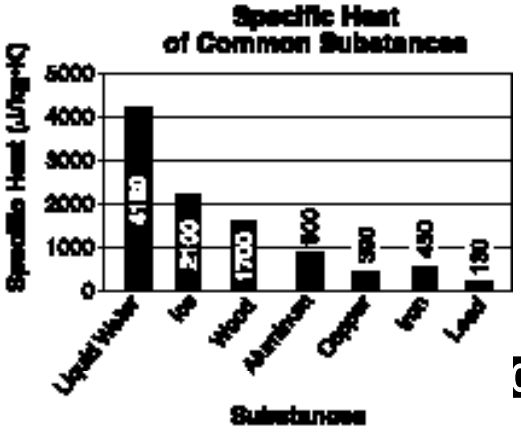
C 10 m/s^2

D 2 m/s^2

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

9 **The specific heat of a substance is the amount of energy required to raise the temperature of 1 kg of that substance 1 K. According to the data in the graph, does copper require more or less energy than water for raising its temperature by 1 K. Explain why?**



O ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

Effects of Acid Rain on a Lake

Year	pH level	Number of fish
1940	5.9	abundant
1950	5.5	many
1960	4.9	few
1970	4.2	very few

10 **Which of the following conclusions can be made by examining the table above?**

A The pH level of the lake increased through the time span.

B The lake never had any fish living in it.

C As the pH level decreased, the number of fish increased.

D As the pH level decreased, the number of fish decreased.

11 **The validity of the information in the table could be questioned if it were discovered that _____.**

A the water samples tested for pH levels were taken at a different location and depth each year

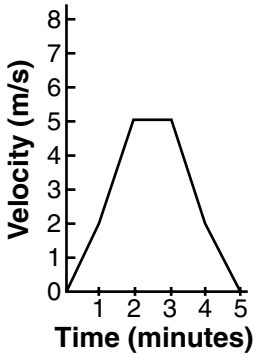
B a different species of fish was counted each year

C the lake first became a popular fishing site in 1960

D all of the above

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.



12 **The graph shows Emilio's velocity as he walked to school. Using the information in the graph, Lisa concluded that Emilio stopped walking during the time interval between 2 and 3 minutes. Why is Lisa's conclusion wrong?**

Name: Date: Class:

Standards 1 & 2 (8.1.1–8.2.10)

Benchmark Test

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **Which of the following questions CANNOT be addressed using the scientific method?**

A How far is the Moon from the Sun?

B Why do dogs wag their tails?

C Who is the nicest girl in class?

D When did dinosaurs roam Earth?

2 **Alicia wants to study the effect of light on the growth of bean seedlings. How should she set up her experiment?**

A She should grow ten bean seedlings in a lighted area.

B She should grow ten bean seedlings in a dark area.

C She should grow five bean seedlings in a lighted area and five radish seedlings in a dark area.

D She should grow five bean seedlings in a lighted area and five bean seedlings in a dark area.

Characteristics of Some Planets

Planet	Distance from the Sun (millions of km)	Diameter (km)
Mercury	58	4,880
Venus	108	12,104
Earth	149	12,756
Mars	228	6,787

3 **Given the information in the table, about how long would it take a spacecraft traveling at 12 million km/h to fly between the Sun and Mars?**

A 8,000 h **B** 12,000 h

C 19,000 h **D** 22,000 h

4 **Explain what is wrong with the following argument: Studies show that new Model A mountain bikes perform better compared with one other bike on a test course. Therefore, a Model A mountain bike is the most durable bike.**

A The Model A bike is only compared to one other bike.

B The course tested the performance and not the durability of the bike.

C The Model A bike is new and doesn't have a long-term track record.

D all of the above

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

5 **John believes that aside from Earth, Mars is the only planet in the solar system that is capable of supporting life. His conclusion is based on the fact that Mars, like Earth, is an inner planet with a rocky surface. What is a major flaw in John's reasoning?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **Which of the following statements is true of both asteroids and meteoroids?**

A They are made of frozen gases and dust.

B They are rocky objects that vary widely in size and orbit the Sun.

C They are pieces of debris from the Big Bang that orbit Earth.

D Most of them are grouped together in a belt between the orbits of Earth and the Moon.

2 **People who see meteors burning up in Earth's atmosphere often confuse them with stars. The objects that people refer to as shooting stars often are meteors. People probably confuse meteors with stars because meteors**

A appear as tiny, bright lights in the sky

B are as large as stars

C are pieces that break off from comets

D travel at very high speeds

3 **A science class has studied the characteristics of different asteroids. Which of the following is the best explanation for an asteroid with many craters?**

A Craters are revealed when an asteroid's crust burns up in the atmosphere.

B Craters were made when the asteroid was collected by scientists.

C The asteroid has had many collisions over a long period of time.

D The asteroid is composed of very fragile materials.

CONSTRUCTED-RESPONSE QUESTION

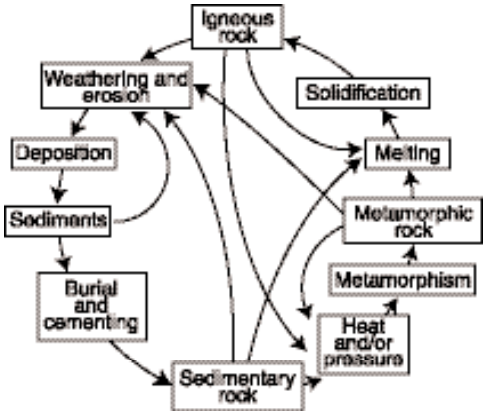
Write your answer to the following question on the lined answer sheet provided by your teacher.

4 **Scientists are studying the structure and composition of asteroids. Explain how studying asteroids can help scientists better understand how Earth was formed.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



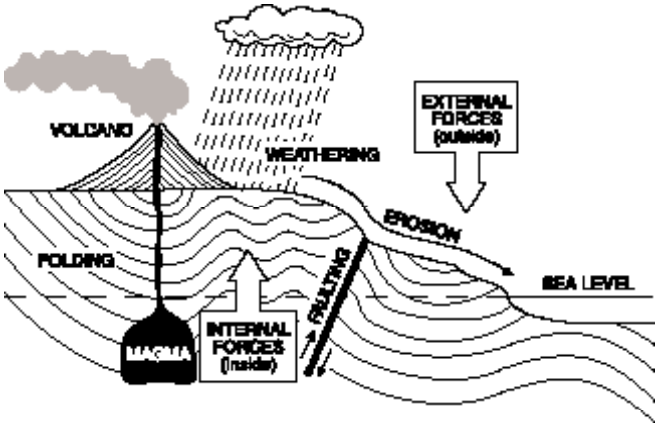
5 **Which statement is best supported by the information shown in the diagram?**

A Igneous rocks form by the solidification of magma.

B Metamorphic rocks form by burial and cementing of sediments.

C Sedimentary rocks form as heat and pressure are applied to other rocks.

D Igneous rocks form by weathering and erosion of other rocks.



6 **Which statement is the BEST description of what is happening in the diagram?**

A Earth's surface changes very little over time.

B Earth's surface will become nearly flat over time.

C Earth's surface is worn away by external forces and built up by internal forces.

D Earth's surface is worn away by internal forces and built up by external forces.

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

7 **Inside Earth's inner core, pressures are about three million times the atmospheric pressures at sea level, and temperatures range between 4,000°C and 5,000°C. How do these conditions help shape the surface of Earth?**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

8 **Which of the following statements is NOT true about the plates that make up Earth's crust?**

A The plates have not moved since the Earth was first formed.

B Most plates lie below a combination of continent and ocean floor.

C The plates move slowly around the planet at different speeds.

D Different plates move around the Earth in different directions.

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

A How to Clean and Prepare Fossils

B Alfred Wegener and Continental Drift

C The Movement of Glaciers

D All You Need to Know About the Asthenosphere

10 **The layer over which the tectonic plates move is the _____.**

A lithosphere

B asthenosphere

C core

D crust

11 **In the process called sea-floor spreading, the plates below an ocean basin pull apart and _____.**

A a new floor is created by magma that fills the rift

B pressure inside the Earth creates geysers of water on the surface

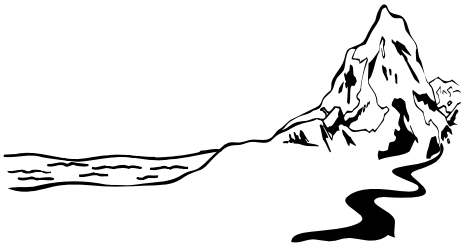
C cause tides to develop

D the continental plates move closer together

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

12 **The mountains in the diagram are located near an ocean coast. What is a possible explanation for how the mountains were formed?**



GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

13 **When tectonic plates move they sometimes collide, placing a lot of stress on rocks. Breaking rocks produce vibrations that can cause _____.**

A gravity

B volcanoes

C earthquakes

D radiation

14 **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.

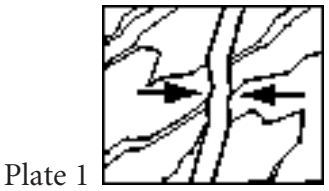
B Tectonic plates collide near the Mariana Islands.

C The Mariana Islands are larger than most islands.

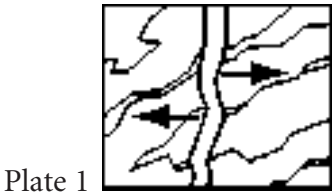
D The Mariana Islands are uninhabited.

15 **Some mountains are formed by the collision of two tectonic plates. If the arrows indicate the direction of plate movement, which of the diagrams below shows a situation that would result in the formation of such mountains?**

A



B



C

D

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

16 **What is the most likely cause of volcanic activity on the island of Iceland shown on the right?**

STOP

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **The gravitational force between an object and Earth depends on _____.**

A the mass of Earth and the mass of the Sun

B Earth's mass and the object's mass only

C the distance of the object from Earth and the Sun

D Earth's mass, the object's mass, and the distance of the object from Earth

2 **Two hikers are climbing up Mt. Everest. As they climb, the force of Earth's gravity on them _____.**

A propels them upward

B stays exactly the same

C increases slightly

D decreases slightly

3 **The gravitational force between an object and Earth is also called _____.**

A mass

B weight

C momentum

D frictional force

4 **The acceleration due to gravity on Earth is _____.**

A 98 m/s^2

B 9.8 m/s^2

C 9.8 m/s

D 0.98 m/s

CONSTRUCTED-RESPONSE QUESTION

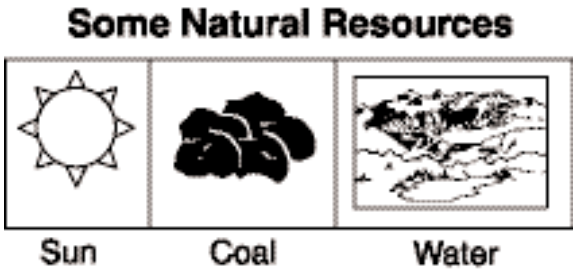
Write your answer to the following question on the lined answer sheet provided by your teacher.

5 **Marcia is a skydiver who jumps out of a plane. She falls very quickly for a couple of seconds. Then she opens her parachute and her speed decreases to a slower, steady rate until she reaches the ground. Explain what a force is and what forces were acting on Marcia during her jump.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



6 **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.

7 **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

8 **The Dust Bowl storms of the 1930s destroyed much of the fertile farmland in the southern Plains states. Why were the storms able to cause so much damage?**

A Record amounts of rain washed away all the nutrients in the soil.

B Long periods of drought and poor farming practices destroyed the crops that held the soil in place.

C The farmers added too much organic matter to the soil.

D The farmers planted too many trees and the crops died in the shade.

CONSTRUCTED-RESPONSE QUESTION

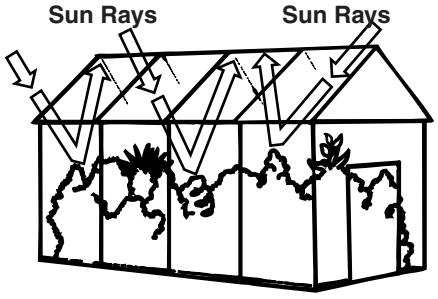
Write your answer to the following question on the lined answer sheet provided by your teacher.

9 **Trees are important because they remove carbon dioxide from the air and release oxygen. They are also home to many types of living things. Humans have cut down many forests. What positive and negative effects could this have?**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



10 **The picture shows how a greenhouse traps energy from the Sun. If Earth's atmosphere acted similarly, what would happen to our climate?**

A many more plants would grow

B an ice age would occur

C it might get warmer

D nothing would change

11 **The evening news reports that modern technology is going to help reduce the problems of smog and the greenhouse effect. Which of these is the news report talking about?**

A finding replacements for CFCs

B composting more garbage

C using alternatives to fossil fuels

D building containers for nuclear waste

12 **Which of the following can cause acid precipitation?**

A the use of solar panels

B the use of hydroelectricity

C burning coal

D all of the above

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

13 **Three years ago, the temperature of the water in a large river varied during the year from 12°C to 24°C. At that time, researchers studied the population of different fish in the river. Their results are shown in the table below.**

The following year, a nuclear power plant opened and began discharging heated water into the river. The average water temperature rose 8°C. What is the most likely distribution of fish in the river two years after the nuclear plant opened?

Type of Fish	Percent of Population	Preferred Temp.	Lethal Temp.
Carp	15%	26°–29°C	44°C
Perch	35%	13°–16°C	35°C
Skipjack	35%	22°–26°C	38°C
Whitefish	15%	10°–14°C	25°C

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **Craters on the Moon and similar impact sites on Earth are created by _____.**

A comets that are often confused with shooting stars

B bursts of solar radiation

C the launching of space shuttles

D asteroids and meteors that escaped their solar orbits

2 **Seismographs measure and record the movements and vibrations, or seismic waves, within the Earth. Which statement is NOT true about seismic waves?**

A They are often produced by earthquakes.

B Different waves travel at different speeds.

C Some waves can travel through rock but not through liquid.

D All seismic waves occur close to the surface of the Earth.

3 **Which of the following is NOT caused by plate tectonics?**

A earthquakes

B volcanoes

C mountains

D tidal cycles

4 **Which statement best explains why the continents and oceans on Earth have changed so greatly in shape and location over time?**

A The gravitational forces of the Moon pulled them out of shape as the Moon orbited Earth.

B Heat from the Sun evaporated smaller bodies of water and exposed more ocean floor as land.

C Erosion redistributed the soil, causing mountains to form.

D Separate plates beneath the continents and oceans pulled apart and pressed together.

5 **The mid-ocean ridge is a series of underwater mountain ranges that crosses the deep ocean floor. These mountains were created by _____.**

A volcanic activity

B accumulation of sedimentary rock

C erosion of surrounding areas

D water pressure collapsing surrounding areas

GO ON

Name: Date: Class:

Standard 3 (8.3.1–8.3.7)

Benchmark Test

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

6 **Objects have weight on Earth because _____.**

A they are made of atoms and molecules

B they have mass that they wouldn't have on the Moon

C the gravitational force of the Earth pulls on them

D radiation from the Sun pushes them back toward Earth

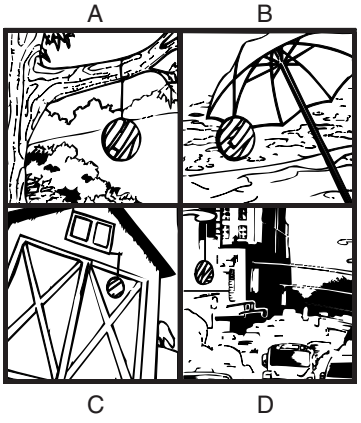
7 **Increasing the carbon dioxide content of the atmosphere may cause Earth's surface temperature to warm because carbon dioxide is _____.**

A produced by plants

B heavier than air

C transparent

D a greenhouse gas



8 **The pictures above show simple smog-collecting disks hanging in four different locations. During the day, the sticky disks will catch smog at different rates. When left for one day, which location is likely to have the most smog on its collecting disk?**

A A

B B

C C

D D

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

9 **Acid precipitation causes acidification of lakes and streams and contributes to the damage of trees at high elevations and sensitive forest soils. Acid precipitation creates many hazards, including the reduction of fish populations and the elimination of fish species from a body of water, thus decreasing biodiversity.**

Suggest two ways in which acid precipitation can be prevented. One should explain what society in general can do, while the other should explain what individuals can do.

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

Elements

Element	Number of Protons	Number of Neutrons
Hydrogen	1	0
Carbon	6	6
Oxygen	8	8
Uranium	92	142

1 **The mass number of an atom is equal to the number of protons and neutrons in its nucleus. According to this definition, which of the elements in the table has the highest mass number?**

A Hydrogen

B Carbon

C Oxygen

D Uranium

2 **Which of the following statements is NOT true?**

A All matter is composed of atoms.

B All atoms of an element have the same chemical properties.

C Atoms are visible under a regular light microscope.

D Atoms can join together to form molecules.

3 **All of the following are ways in which atoms can form bonds with other atoms EXCEPT _____.**

A losing electrons

B sharing electrons

C sharing neutrons

D gaining electrons

CONSTRUCTED-RESPONSE QUESTION

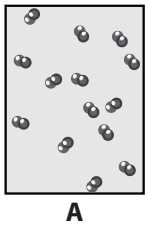
Write your answer to the following question on the lined answer sheet provided by your teacher.

4 **All substances have chemical formulas that tell about what is inside them. The chemical formula for water is H_20. What do the numbers and letters in the chemical formula for water tell about water?**

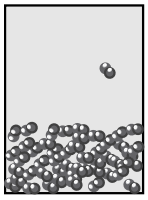
GO ON

MULTIPLE-CHOICE QUESTIONS

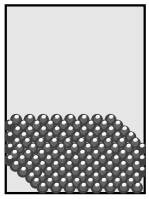
Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



A



B



C

5 **The substance in container C above is most likely in the _____ state.**

A solid

B liquid

C gas

D plasma

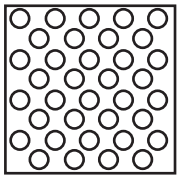
6 **The molecules in gases move _____ the molecules in liquids or solids, due to their greater average kinetic energy.**

A in different directions than

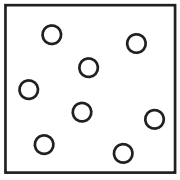
B at the same speed as

C slower than

D faster than



0°C



120°C

7 **According to the diagram, which statement best describes what happens to water molecules when they are heated?**

A They move further apart.

B They move at a slower speed.

C They bond with each other.

D Their energy level decreases.

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

8 **A hot air balloon consists of three main parts: the balloon or air envelope, propane burners to heat the air inside the balloon, and a basket for carrying passengers. Why does heating the air inside the balloon make the balloon rise?**

GO ON

MULTIPLE-CHOICE QUESTIONS

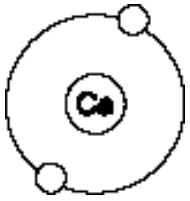
Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

Bonding Electrons Available for Some Elements

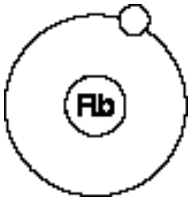
Element	Number of Bonding Electrons
Calcium	2
Boron	3
Oxygen	6
Potassium	1

9 **The number of bonding electrons an element has determines the chemical properties of that element. According to this information, which of the following is most likely to have properties similar to potassium?**

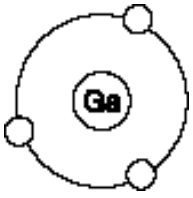
A



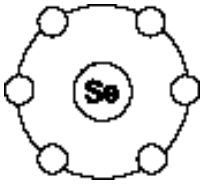
B



C



D



10 **A chemist performed a series of experiments on an element and found that it did not react with any other element, no matter what the chemist did. The element was most likely _____.**

A a noble gas

B a halogen

C an alkaline earth metal

D an alkali metal

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

11 **The maker of the periodic table placed the elements in groups. Describe the criteria he used to place the elements into the groups.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

12 **Which of the following is NOT a metal?**

A iron

B calcium

C sulfur

D nickel

13 **Which of the following is a property of a nonmetal?**

A It has a hard and shiny surface.

B It can be bent into different shapes.

C It is a poor conductor of electricity.

D It is a good conductor of heat.

14 **According to the law of conservation of mass, how does the mass of the products in a chemical reaction compare to the mass of the reactants?**

A There is no relationship.

B The mass of products is sometimes greater.

C The mass of reactants is greater.

D The masses are always equal.

$$Zn + Ag_2S \longrightarrow ZnS + ?Ag$$

15 **All chemical equations follow the law of conservation of mass. Which number should be used in place of the question mark to balance the equation?**

A 1

B 2

C 0

D 4

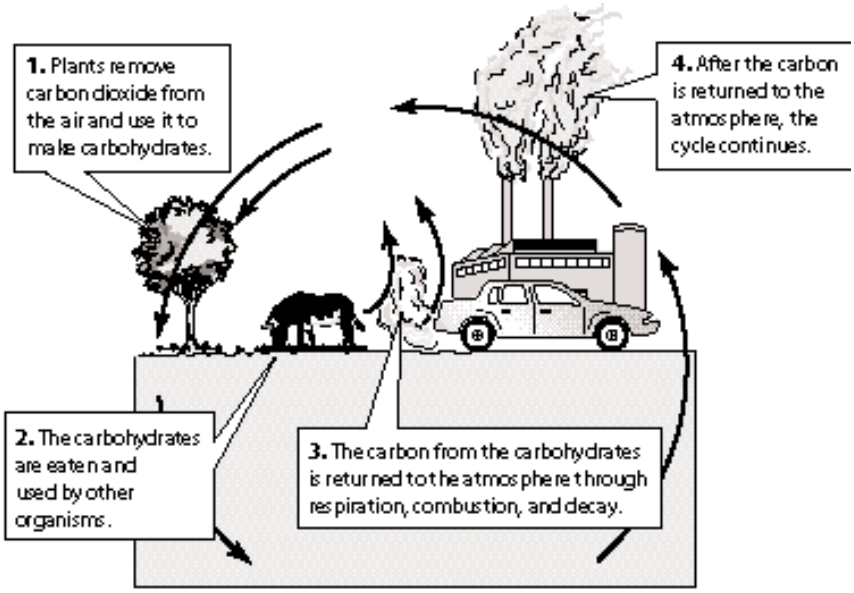
CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

16 **Like carbon, nitrogen undergoes various chemical processes as it cycles through ecosystems, getting used over and over again in different forms. However, the total amounts of carbon and nitrogen on Earth remain the same over time. What does this suggest about the total mass of any substance within a closed system?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



1 **The diagram above shows the basic steps of the carbon cycle. At which step is light energy converted into chemical energy?**

A step 1

B step 2

C step 3

D step 4

2 **A photovoltaic cell is designed to convert _____.**

A electrical energy to radiant energy

B radiant energy to thermal energy

C chemical energy to chemical energy

D radiant energy to electrical energy

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

3 **When driving a car, the chemical energy in gasoline is converted to heat (thermal energy) in the engine. Most of this thermal energy is then converted to mechanical energy, which makes the car move. What happens to the rest of the thermal energy?**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

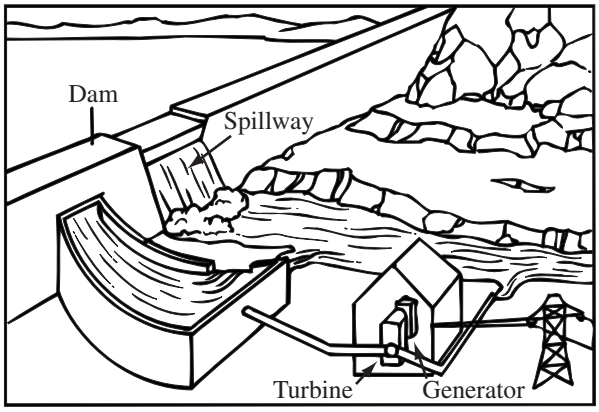
4 **In a nuclear power plant, nuclear energy is first changed to _____ energy.**

A electrical

B thermal

C chemical

D radiant



5 **The structure above produces power for use in the home by converting _____.**

A chemical energy into mechanical energy

B electrical energy into mechanical energy

C chemical energy into electrical energy

D mechanical energy into electrical energy

6 **The main way that heat is transferred in the atmosphere is by _____.**

A convection

B conduction

C transmission

D diffusion

7 **Which of the following statements describes the flow of heat?**

A Heat moves from a warmer object to a cooler object.

B Heat moves from a cooler object to a warmer object.

C Heat moves only between two warm objects.

D Heat moves only between two cold objects.

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

8 **Explain the difference between conduction and convection heat transfer, and give an example of each.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

Group A

Energy Source	Percent of Energy Consumed in the U.S.
Coal	25%
Natural gas	25%
Petroleum	35%
Nuclear	8%

Group B

Energy Source	Percent of Energy Consumed in the U.S.
Hydroelectric	3%
Wind	less than 1%
Solar	less than 1%
Geothermal	less than 1%
Biomass	less than 1%

9 **The energy sources in Group A are different from the energy sources in Group B because only the energy sources in Group B are _____.**

A renewable resources

B non-renewable resources

C fossil fuels

D harmful to the environment

10 **During _____, energy is transferred through electromagnetic waves that travel through space until they are absorbed.**

A conduction

B convection

C radiation

D expansion

11 **Which source of energy can produce electricity without producing waste products or pollutants?**

A wind

B geothermal

C coal

D nuclear

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

12 **Nuclear energy is produced by splitting the atomic bonds in the nuclei of certain elements. People value nuclear energy because it is highly efficient and inexpensive once all the necessary equipment is in place. However, what are the environmental and health risks associated with nuclear energy and power plants?**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

13 **If the distance between Earth and the Moon were doubled, the gravitational force between them would be _____.**

A one-fourth as great

B one-half as great

C two times greater

D four times greater

14 **The weight of an object on the Moon is _____.**

A the gravitational force between the object and the Moon

B the gravitational force between the object and Earth

C the gravitational force between Earth and the Moon

D the centripetal force of Earth

15 **According to Newton's second law of motion, _____.**

A $a = F_{net}/m$

B $a = m/F_{net}$

C $a = m \times F_{net} \times s$

D $a = s \times m$

16 **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 and gravity

D only gravity

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

17 **Newton's Universal Law of Gravitation states that all objects attract each other with a gravitational force. In general, this gravitational force is proportional to the masses of the objects and inversely proportional to the distance between them. Given this information, how is the force of gravity between two objects changed if the mass of one is increased? How is the force changed if the distance between the objects in increased?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **A scientist is attempting to classify a large object in space. The scientist has determined that the object is in orbit around the planet Jupiter. The object is most likely a _____.**

A planet

B star

C moon

D meteor

2 **Kepler's three laws of planetary motion describe the motion of planets in our solar system. Which of the following statements is one of Kepler's laws?**

A The shape of a planet's orbit depends on how many moons it has.

B The planets orbit the Sun in an elliptical path.

C All planets orbit the Sun at the same speed.

D The orbit of each planet never changes.

3 **Planets orbit the Sun because _____.**

A of the Sun's gravitational pull

B the planets exert magnetic force on each other

C each planet has centripetal force

D they are pushed away from the Moon

4 **Which statement best explains why moons orbit planets, instead of the other way around?**

A Planets have greater mass than the moons orbiting them, and exert greater gravitational force.

B Moons do not have their own gravitational force.

C Planets can support life, while moons cannot.

D Moons travel at faster speeds than planets.

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

5 **Satellites are spacecraft that orbit the Earth. Explain why gravity is necessary to keep satellites in orbit after they are launched.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

6 **Which of the following statements about magnets is NOT true?**

A The north and south poles of magnets repel each other.

B Most magnets are made of iron.

C Magnetic fields allow magnets to attract objects without direct contact.

D Magnetic forces weaken if the distance between the magnet and an object are increased.

7 **Every moving charge is surrounded by _____.**

A static electricity

B an insulating material

C an oppositely charged field

D both a magnetic field and an electric field

8 **An electromagnet is produced by running an electric current through a coil of wire. Wrapping the coil around an iron core will _____ the strength of the electromagnet.**

A decrease

B increase

C not affect

D cancel out

9 **Which of the following would be the best for conducting electricity?**

A copper

B oxygen

C wood

D paper

CONSTRUCTED-RESPONSE QUESTION

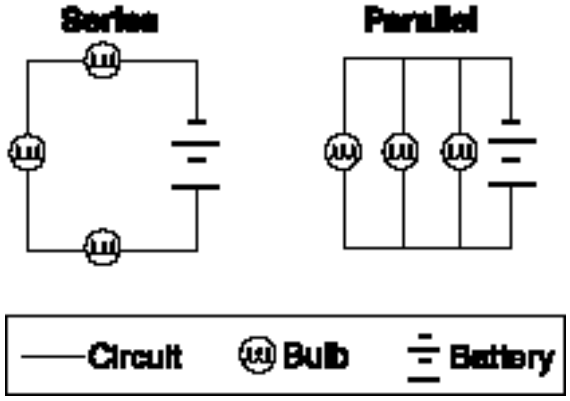
Write your answer to the following question on the lined answer sheet provided by your teacher.

10 **Explain why a balloon will stick to a wall after it is rubbed on a wool carpet or wool sweater, and then eventually fall away.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



11 **The diagram shows two different ways of creating a closed circuit. What is the main difference between the series and parallel circuits?**

A the size battery needed

B the amount of wire used

C the way separate components are connected

D the amount of light produced

12 **In a series circuit, electrons flow through a single path. As a result, light bulbs connected to the circuit _____ when the switch is closed.**

A will not light up

B will light up simultaneously

C will not light up as brightly as the same number of bulbs in a parallel circuit

D will light up more brightly than the same number of bulbs in a parallel circuit

13 **In a parallel circuit, electrons flow simultaneously through separate paths or branches. What happens when one of several light bulbs connected to a parallel circuit is unscrewed?**

A the other bulbs remain lit

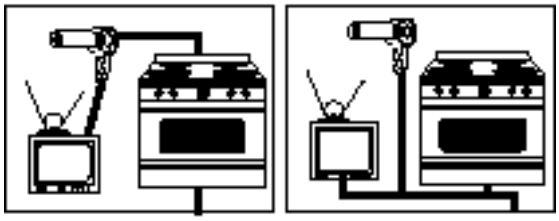
B the other bulbs become dimmer

C the bulb closest to the unscrewed bulb goes out

D all the bulbs go out

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.



14 **Most homes are wired with parallel circuits. What are the advantages of using a parallel circuit instead of a series circuit?**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

15 **Which list shows the electrical devices in the correct order of power consumption, from least to greatest?**

A television, computer, refrigerator, dishwasher

B refrigerator, television, computer, dishwasher

C computer, television, dishwasher, refrigerator

D television, refrigerator, computer, dishwasher

16 **Many appliances with external power sources, remote controls, and LCD clock displays use standby power when they are turned off. For example, the average television uses 21.6 kilowatts per hour (kWh) when shut off by remote with the main switch left on. This is about the same amount of energy that powers a(n) _____.**

A electric shaver

B blender

C clock

D hair dryer

17 **With most household appliances, larger machines tend to _____.**

A use fewer kilowatts per hour

B use more kilowatts per hour

C use less kilowatts per hour as they get older

D draw kilowatts away from smaller machines

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

18 **A standard clothes washer uses about twice the energy needed to run an energy-efficient model. Standard washers also require more water and soap. How is water usage related to the difference in power consumption between standard and energy-efficient washers?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

Characteristics of Some Solids

Solid	Atomic Number	Atomic Mass
Sodium	11	22.99
Potassium	19	39.10
Carbon	6	12.01
Sulfur	16	32.07

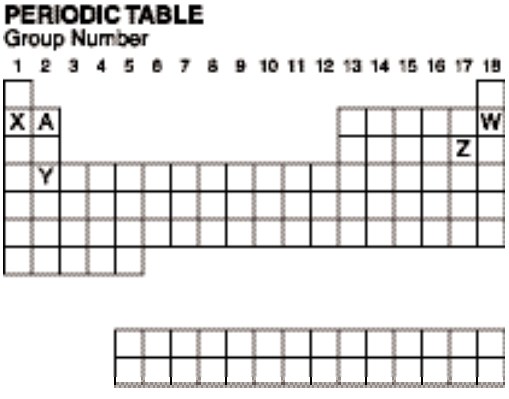
1 **According to this information, which solid has fewer than 10 protons in its nucleus?**

A sodium

B potassium

C carbon

D sulfur



2 **The diagram above shows the periodic table and has elements in various locations noted by letters. Which element has chemical properties similar to those of element A?**

A W

B X

C Y

D Z

3 **The number of atoms of a particular element at the beginning of a reaction must _____ the number of atoms of that element when the reaction is complete.**

A exceed

B be less than

C equal

D increase

4 **During the water cycle, some of the surface water in oceans, lakes, and rivers evaporates and rises into the atmosphere as water vapor. What method of heat transfer is involved in this process?**

A convection

B conduction

C radiation

D magnetism

5 **Which of the following is NOT an inexhaustible energy resource?**

A fossil fuels

B solar energy

C wind energy

D hydroelectric energy

GO ON

Name: Date: Class:

Standard 3 (8.3.8–8.3.20)

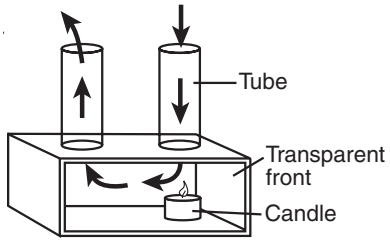
Benchmark Test

MULTIPLE-CHOICE QUESTIONS

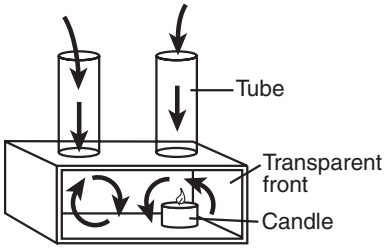
Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

6 **Unequal heating of Earth's surface creates convection currents in the atmosphere, which produce winds. If the arrows represent air flow, which of the following diagrams shows an experiment that best illustrates convection currents?**

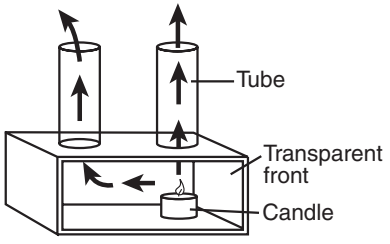
A



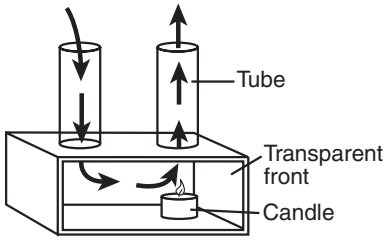
B



C



D



7 **The gravitational pull of the Moon has a greater effect than the pull of the Sun on the tidal changes in Earth's oceans. The most likely reason for this is _____.**

A the Sun is closer to Earth

B the Moon is closer to Earth

C the Sun is larger than the Moon

D Earth is larger than the Moon

8 **Two bulbs in a series circuit will not light up as brightly as those in a parallel circuit because _____.**

A parallel circuits use more energy

B the filaments in these bulbs have greater resistance

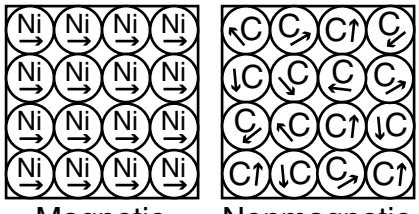
C the available voltage is shared between them

D the bulbs must be smaller

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

9 **Use the diagram to explain why the nickel is magnetic and the carbon is not.**



Magnetic Nonmagnetic

STOP

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **Karen has two pet guinea pigs with black fur. When her guinea pigs mated, one of their four offspring had white fur, while the others had black fur. Which of the following conclusions is most likely true for Karen's guinea pigs?**

A Both parents are heterozygous for the white-fur trait, which is dominant.

B Both parents are heterozygous for the white-fur trait, which is recessive.

C Both parents are homozygous for the white-fur trait, which is dominant.

D Both parents are homozygous for the white-fur trait, which is recessive.

2 **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 fish with wide fins?**

A *WW* and *ww*

B *WW* and *Ww*

C *Ww* and *ww*

D all of the above

3 **Genetic information is passed from parent to offspring during _____.**

A DNA

B chromosomes

C mitosis

D reproduction

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

4 **Name one trait that is inherited and one skill that is acquired but probably not inherited.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

5 **In a certain plant, the green-pod parent (*Gg*) will produce two types of gametes: *G* and *g*. The red-pod parent (*gg*) will produce *g* gametes. On scrap paper, create a Punnett square showing possible gamete combinations. What percent of the offspring will be green-pod?**

A 25 percent

B 50 percent

C 75 percent

D 100 percent

6 **Which of the following is NOT a type of asexual reproduction?**

A bud

B seed

C clone

D cell division

Observations of Pea Plants

Trait	Dominant Allele	Recessive Allele
Plant Height	Tall	Short
Flower Color	Purple	White
Seed Color	Yellow	Black
Seed Texture	Smooth	Rough

7 **According to the chart, when a pea plant with two purple-flower alleles is mated with a white-flowered pea plant, the offspring plants will have _____.**

A purple flowers

B yellow seeds

C tall stems

D all of the above

8 **The material that controls heredity in almost every living thing on Earth is _____.**

A DNA

B RNA

C trait

D nucleus

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

9 **Explain the difference between offspring produced by asexual vs. sexual reproduction.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

10 **Selective breeding allows breeders to _____.**

A increase the chance of desirable traits in offspring

B develop perfect offspring

C completely predict all traits in offspring

D eliminate every negative trait in every offspring

11 **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

12 **People are born with differently colored hair because of _____.**

A spontaneous mutation

B genetic variation

C environmental factors

D asexual regeneration

13 **Which of the following results in an offspring that has traits that are NOT inherited from the offspring's parents?**

A mutation

B competition

C natural selection

D isolation

CONSTRUCTED-RESPONSE QUESTION

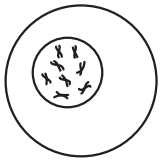
Write your answer to the following question on the lined answer sheet provided by your teacher.

14 **Animals such as cows, horses, and dogs have often been selectively bred. How does selective breeding work and what are its effects?**

GO ON

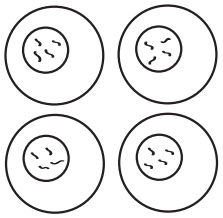
MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

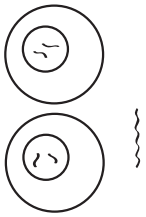


15 **The picture above shows a cell. Which of these shows what will form when the cell goes through meiosis?**

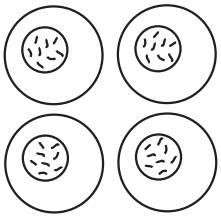
A



B



C



D

16 **Which of the following is an example of a mutation?**

A a baby looking like both of its parents

B a hydra producing an identical offspring by budding

C a four-leaf clover plant being produced by a three-leaf clover plant

D a human egg and sperm cell joining and resulting in a full set of 46 chromosomes

17 **Robert crossbreeds two plants, one with red flowers and one with white flowers. Weeks later the offspring plants produce red flowers. Robert determines that _____.**

A the red flower allele is dominant

B the white flower allele is dominant

C the red color of the offspring is the result of incomplete dominance

D the red color of the offspring is the result of incomplete recessiveness

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

18 **Asexual reproduction can occur by budding, regeneration, and cloning. Explain the differences and similarities between these three asexual reproduction methods.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

19 **Maria Rosa crossbreeds two plants, one with dark blue flowers and one with white flowers. Weeks later she discovers that the offspring plants have light blue flowers. Maria Rosa determines that _____.**

A the dark blue flower allele is dominant

B the light blue flower allele is dominant

C the offspring color is the result of incomplete dominance

D the offspring color is the result of incomplete recessiveness

20 **Dennis and Drake are identical twins. Dennis likes apples best, but Drake likes oranges. Their fruit preference is _____.**

A inherited

B genetic

C recessive

D acquired

21 **The ancestor of corn had a very small cob with small kernels. Today's variety of corn was developed using _____.**

A natural selection

B selective breeding

C recessive genes

D asexual reproduction

22 **A farmer saves the seeds from a plant that was resistant to aphids. It is likely that _____ produced from those seeds will be resistant to aphids.**

A all of the plants

B none of the plants

C some of the plants

D a large majority of the plants

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

23 **Some people like green beans, while others dislike them. How could a scientist determine whether a preference for green beans was inherited or merely acquired by experience?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

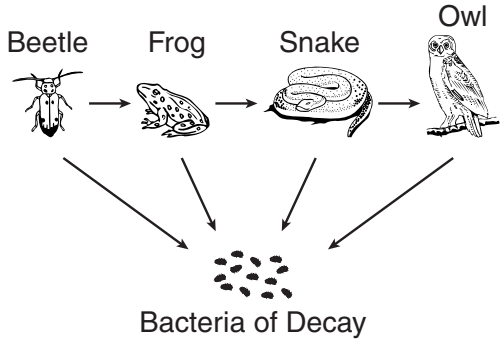
1 **The total amount of carbon on Earth remains the same through time. Animals acquire the carbon stored in plants when they eat carbohydrates. Carbon returns to the atmosphere when animals exhale carbon dioxide as a by-product of respiration. This carbon dioxide gas is used by plants to manufacture complex carbohydrates through the process of _____.**

A photosynthesis

B protein synthesis

C respiration

D transpiration



2 **What type of organism is NOT included in the food chain above?**

A carnivore

B predator

C decomposer

D producer

3 **In a food web, energy is transferred from _____.**

A herbivore to carnivore

B secondary producer to primary producer

C decomposer to carnivore

D top to bottom

CONSTRUCTED-RESPONSE QUESTION

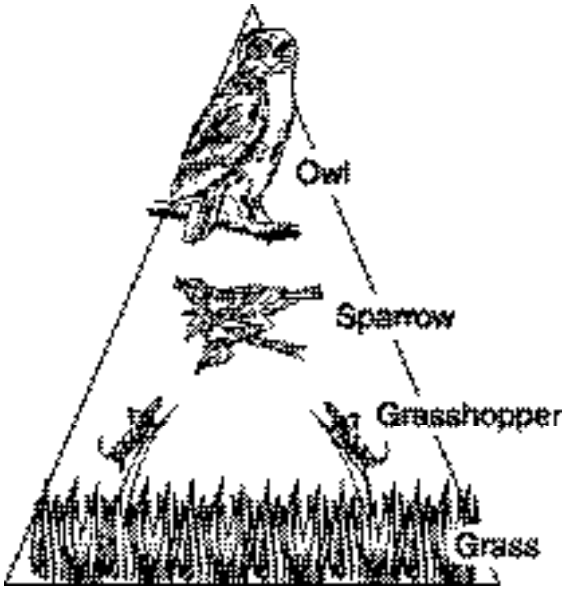
Write your answer to the following question on the lined answer sheet provided by your teacher.

4 **Describe what happens to the energy contained in a sunflower seed when a blackbird eats it.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



5 **The food pyramid above is a way of showing the flow of energy in an ecosystem from one organism to another. Based on this pyramid, which organism has the LOWEST trophic level?**

A grass

B sparrow

C grasshopper

D owl

6 **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.

7 **Which of the following is the most accurate way to determine whether snakes evolved from fish?**

A analyze their tissues with radioactive dating

B apply Lamarck's theory of acquired characteristics

C compare their skeletons

D compare each organism's DNA

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

8 **Natural selection favors organisms with useful adaptations. Discuss how one well-adapted organism can give rise to a new species.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

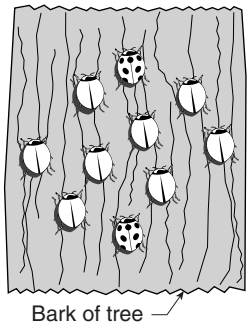
9 **In a certain aquatic ecosystem, low concentrations of pesticides in the water led to high concentrations of pesticides in organisms at the top of the food chain. This can BEST be explained by the fact that organisms at the highest level of the food chain _____.**

A are more susceptible to pesticide toxicity

B consume a large number of organisms from lower levels

C live longer than organisms at lower levels and are thus exposed to more pesticides over time

D produce more offspring



10 **What would happen to the beetle population if, over a period of many years, the bark on all the trees of this type became spotted?**

A The population of spotted beetles would increase and the population of plain beetles would decrease.

B The population of plain beetles would increase and the population of spotted beetles would decrease.

C The population of spotted beetles would increase and the population of plain beetles would increase.

D The population of plain beetles would increase and the population of spotted beetles would stay the same.

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

11 **Determining the age of rocks found near fossils is an important step in understanding evolution. Discuss how relative and radiometric dating are used to determine the age of a fossil.**

STOP

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **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*

2 **Many complex life forms reproduce sexually. Sexual reproduction results in offspring that _____.**

A are identical to the mother

B are identical to both parents

C are identical to one parent but are completely different from the other

D share some traits with each parent but are not identical to either one

3 **Which of the following ARE NOT a product of selective breeding?**

A the many types of dogs

B the different species of wild cats

C ornamental maple trees

D race horses

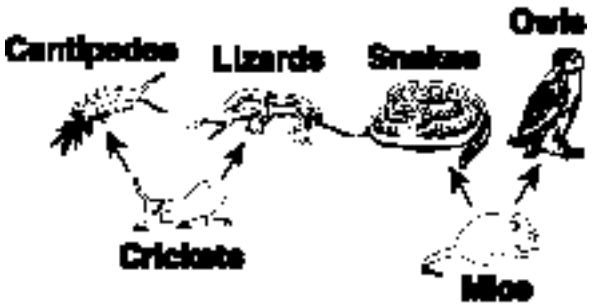
4 **Alligators in wetland regions normally feed on animals such as shorebirds. Shorebirds usually feed on small fish and frogs. Recently, scientists released a large number of alligators into a wetland region. Scientists expected that as a result of this increase in the alligator population, the population of small fish and frogs would _____.**

A remain about the same

B rapidly decrease

C become extinct

D noticeably increase



5 **In this food chain, energy is transferred _____.**

A from crickets to mice

B from lizards to crickets

C from snakes to lizards

D from mice to snakes

GO ON

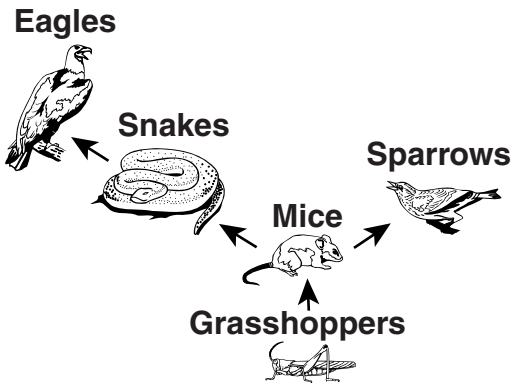
Name: Date: Class:

Standard 4 (8.4.1–8.4.9)

Benchmark Test

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



6 **Based on the diagram above, which of these statements is FALSE?**

A Energy transfers from mice to sparrows.

B Energy transfers from grasshoppers to sparrows.

C Energy transfers from mice to grasshoppers.

D Energy transfers from grasshoppers to eagles.

7 **Australopithecines, Neanderthals, Cro-Magnons, and modern humans are all considered to be _____.**

A primates

B hominids

C bipedal

D all of the above

8 **Some Galápagos finches have heavy strong beaks, while others have small pointed beaks. Each of these different species most likely evolved in response to _____.**

A a food source

B a predator

C climate

D sexual selection

9 **Which statement best explains how natural selection occurs?**

A Natural selection occurs when genetic variation in a population produces different rates of survival and reproduction.

B Natural selection occurs when organisms are geographically isolated.

C Natural selection occurs when an organism's offspring grow vestigial structures.

D Natural selection occurs when characteristics from the parent organism are inherited.

CONSTRUCTED-RESPONSE QUESTION

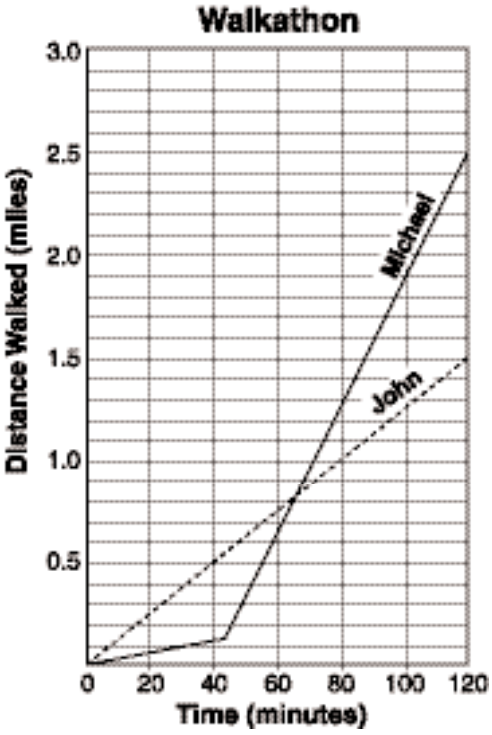
Write your answer to the following question on the lined answer sheet provided by your teacher.

10 **Explain what happens to energy as it travels up a food chain.**

STOP

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



1 **The graph shows the distance traveled by two different walkers during a two-hour walkathon. According to the graph, _____.**

A John had walked farther than Michael at the 40-minute mark.

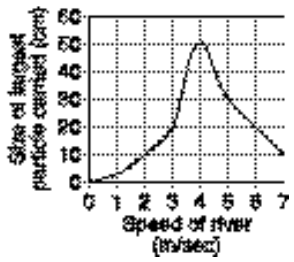
B Michael and John walked an equal distance.

C Michael had walked half his total distance after 60 minutes.

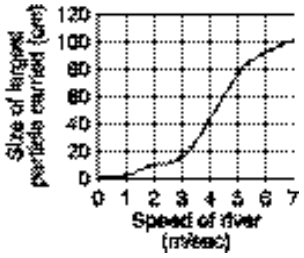
D only Michael finished the walkathon.

2 **Rivers and streams carry sediments from one location to another. Which graph shows that the faster a river flows, the larger the particle the river can carry?**

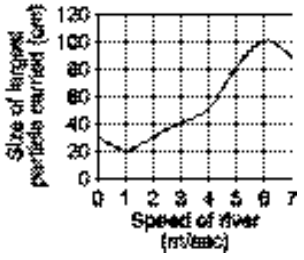
A



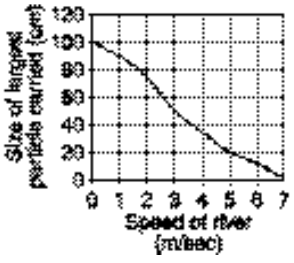
B



C



D



CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

3 **Rodney measured the tails of 15 of his friends' cats to try to determine a cat's average tail length. He finds that the shortest tail is 27.0 cm, and the longest is 33.2 cm. He then calculates the mean to be 30.28 cm. Explain why his calculation of the mean is incorrect, based on what you know about significant figures.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

4 **A bird flies for 121 minutes at a constant speed of 34.2 km/h. How far did it fly?**

A 69 km

B 70 km

C 69.0 km

D 68.97 km

5 **Locations on a globe are identified using _____.**

A latitude and depth

B latitude and longitude

C altitude and declination

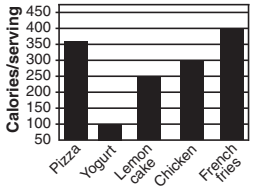
D latitude and altitude

Calories per Serving

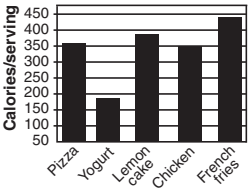
Food Item	Calories per Serving
Pizza	360
Yogurt	180
Lemon cake	380
Chicken	350
French fries	440

6 **The chart above shows the number of calories per serving for five food items. Which of these graphs best represents the data?**

A

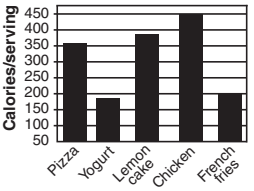


B



C

D



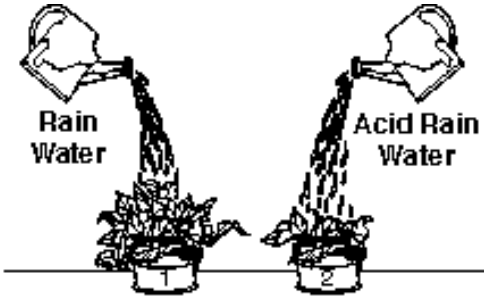
CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

7 **Weight and exercise are two variables that are often negatively related to each other. What would a graph of these two variables probably look like?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



Plant	Experiment Duration (days)	Height Increase During Experiment (cm)	Mass of Pot and Plant at End of Experiment (kg)
1	240	18	22.5
2	240	11	16.1

1 **The experiment above indicates that acid rain may have a negative effect on plant growth. How could this experiment be improved?**

A increase the number of plants tested

B increase the amount of water used

C decrease the acidity of the acid rain water

D eliminate the plant treated with rain water

2 **Officials in a rural county want to determine whether spraying an insecticide really lowers mosquito populations. They set up a population count in sprayed areas and control areas. How would they process the data to reach a reasonable conclusion?**

A compare the total number of mosquitoes in all control areas to the total in all sprayed areas

B compare the mean number of mosquitoes in the control groups to the mean in the sprayed groups

C count only mosquitoes in the sprayed groups

D subtract the total number of mosquitoes in all the sprayed groups from the total number in all the control groups

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

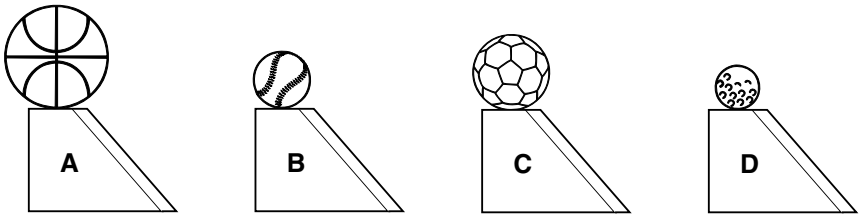
3 **Explain how scientists can understand how the atmosphere has changed by studying gas bubbles trapped in ice cores.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

A group of students is studying the way balls move down ramps. You can see their experiment below. Use the information in the table to answer numbers 4–5 below.



Ball	Trial 1	Trial 2	Trial 3
Ball A	130 cm	135 cm	132 cm
Ball B	90 cm	89 cm	95 cm
Ball C	120 cm	129 cm	127 cm
Ball D	150 cm	148 cm	159 cm

4 **What was the mean distance traveled by ball C?**

A 120 cm

B 125 cm

C 127 cm

D 129 cm

5 **What was the median distance traveled by balls A, B and C in Trial 3?**

A 95 cm

B 116 cm

C 127 cm

D 132 cm

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

6 **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?**

A 27 cm

B 28 cm

C 29 cm

D 30 cm

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

7 **Lila conducts an experiment to see how phosphorus affects the growth of a variety of plants. She finds that the growth of some of her plants increased with more phosphorus, but growth stayed the same for others. What could she conclude from the study?**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

8 **In statistics, the _____ is the average value of the numbers in a data set and the _____ is the most common value.**

A median, mode

B mean, median

C median, mean

D mean, mode

Nerve Fibers

Axon Type	Diameter (μm)	Speed (m/s)
A	13–20	80–120
B	8–12	35–75
C	1–5	5–35
D	0.2–1.5	0.5–2.0

9 **According to the table, a nerve impulse in an axon of diameter 7.2 μm would probably NOT attain a speed of _____.**

A 36 m/s

B 42 m/s

C 75 m/s

D 82 m/s

10 **Rita examines fifteen years of bird nesting data collected in a park near her school. She observes that the number of bird nests counted dropped by 45% between the first and last years of the study. What conclusion can she draw?**

A All bird species have declined by 45%.

B Birds species in her area are becoming endangered.

C Bird reproduction has declined by almost half in the park near her school.

D Bird species are in trouble.

11 **Jack writes a report about robins and learns that a robin's diet is almost 100% invertebrates and fruits. He then observes a robin eating birdseed. What has Jack learned?**

A Some books are incorrect.

B Robins actually prefer birdseed over invertebrates and fruits.

C Observation can show that some individuals are different from the majority.

D The robin he observed was a mutant.

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

12 **If Peter observes that his goldfish hides whenever the light is turned on over the aquarium, does that mean that all goldfish avoid light? Why or why not?**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

13 **During a September field study, Tanney counts 45 flowering asters per acre. In October, he counts 12 flowering asters in the same field. In November, no asters are flowering in the field. What conclusion can he draw from this study?**

A Asters do not bloom in November.

B Most asters bloom in September.

C Most asters in the area studied bloom in September.

D Asters begin to bloom in September.

14 **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 conclusion is _____.**

A based on sound evidence

B based on the scientific method

C flawed but correct

D based on too few data points

Movement of the North American Continent: 1998–2000

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

15 **Scientists studying plate tectonics compiled the chart above showing the distance that the North American continent moves from year to year. What does the 1999 measurement represent in this data set?**

A the distance moved each year

B the mean and the mode of the data set

C the mean and the median of the data set

D the spread of the data

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

16 **Dane observes that the woodlot next to his house is composed mainly of maple trees. From this observation, he decides that all woods in his area must contain mostly maples. What is wrong with this conclusion, and how could he make it more accurate?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **Andrew determines that his dog can run 123 m in 6.2 s. Using significant digits, determine his dog's speed.**

A 19 m/s

B 20 m/s

C 19.8 m/s

D 19.84 m/s

Object	Mass	Velocity
Runner	100 kg	4.0 m/s north
Football player	300 kg	8.5 m/s south
Car	900 kg	20 m/s west
Truck	2500 kg	2 m/s east

2 **Momentum is equal to the mass of an object times its velocity, or $M = mv$. Using the table above, find the momentum of the truck.**

A 400 kg × m/s

B 1800 kg × m/s

C 5000 kg × m/s

D 8500 kg × m/s

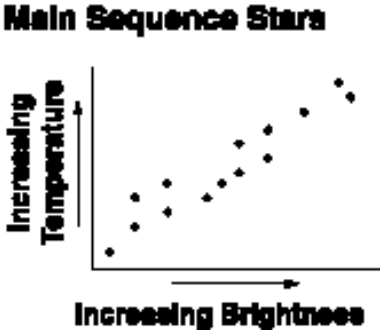
3 **A change in velocity involves a _____.**

A change in time or speed

B change in speed or direction

C change in direction and time

D change in speed and momentum



4 **Using the graph above, it is possible to make the following statement about main sequence stars:**

A As brightness increases, temperature decreases.

B As brightness increases, temperature increases.

C There is no relationship between brightness and temperature.

D There is a negative relationship between brightness and temperature.

5 **When comparing the weights of mice fed a vitamin supplement vs. regular laboratory food, Gen calculated the mean weight and standard deviation for each group. Mean and standard deviation are measures of _____.**

A difference and error

B standardized response

C central tendency and spread

D central tendency and difference

GO ON

Name: Date: Class:

Standard 5 (8.5.1–8.5.10)

Benchmark Test

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

Average Monthly Temperature in Temperate Deciduous Forest

Month	Average Temperature (°C)
January	–18
February	–10
March	–9
April	5
May	15
June	25
July	32
August	33
September	28

6 **According to the table, what is the mean temperature during the summer (June, July and August) in the temperate deciduous forest?**

A 25°C **B** 28°C

C 30°C **D** 33°C

7 **At the zoo, Cindy notices that the tigers spend about 65% of their time sleeping. She concludes that tigers in the wild spend about 65% of their time sleeping. Cindy's conclusion should be based on _____.**

A evidence collected in the wild

B evidence collected at more zoos

C more observation of the same individuals

D observations made by Cindy's friends

Average Precipitation Amounts

Month	Precipitation (cm)
March	10.63
April	11.47
May	14.68
June	9.32
July	5.87
August	4.99

8 **Using the chart of average precipitation amounts in the past, which would be the WORST estimate of precipitation for a particular month next year?**

A 12.22 cm in April

B 4.99 cm in July

C 10.54 cm in March

D 10.01 cm in May

9 **After DNA testing, Tanisha determines that 10,000 blue butterflies and 3 green butterflies actually belong to the same species. What can she conclude?**

A The butterfly species is blue.

B The butterfly species can be green.

C The green butterflies are a different subspecies.

D The green butterflies will become a different species.

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

10 **Explain how you would find the location of any corner in your town on a map.**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

1 **The French scientist Antoine Lavoisier introduced the principle that the mass of the reactants in a chemical reaction must be _____ the mass of the products.**

A greater than

B less than

C equal to

D twice

2 **Before Lavoisier's experiments with combustion and his discovery of oxygen, scientists believed that air was _____ instead of a mixture of gases.**

A a fluid

B a solid

C an element

D a compound

3 **In the early 1900s, Marie and Pierre Curie discovered the elements radium and polonium by examining a _____ ore.**

A dense

B reactive

C pure

D radioactive

4 **Marie and Pierre Curie observed that when radioactive elements decay, _____.**

A sound is released

B light is released

C isotopes are released

D energy is released

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

5 **How did the discovery of radioactivity as the heat energy of Earth explain why Earth's interior is still hot after billions of years?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

6 **Because Antoine Lavoisier always weighed his materials whenever he conducted an experiment, he discovered that mass is _____.**

A usually lost

B usually gained

C rarely conserved

D always conserved

7 **Henri Becquerel discovered radioactivity by observing how uranium interacted with a photographic plate. Radioactive uranium is a _____.**

A disintegrator

B radioisotope

C beta particle

D stable isotope

8 **Even though Marie Curie did not witness any change of state of any of the radioactive materials she first studied, later study showed that radioactive material _____.**

A remains the same

B decays

C breaks apart

D melts

9 **Because the element curium is named after Marie Curie, you can guess that this element is _____.**

A stable

B radioactive

C light

D old

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

10 **Explain how a radioactive element interacts with a photographic plate.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

11 **The number of atoms of a particular element at the beginning of a reaction must _____ the number of atoms of that element when the reaction is complete.**

A exceed

B be less than

C equal

D increase

12 **When in the presence of some elements, photographic film is exposed, even though it is protected from light. These elements must be _____.**

A producing light

B emitting radiation

C creating mass

D disrupting a field

13 **When working with radioactive elements, Marie Curie noted that the powerful rays given off by the elements were _____.**

A invisible

B highly visible

C fragmented

D sporadic

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

14 **In the 17th century, scientists believed that an element was a substance that could not be broken down into simpler substances. Why did this definition change with the study of elements such as uranium?**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

This chart shows information from a pond collected over several months as its pH was changed by acid rain. Use the information in the chart to answer Numbers 1–2 below.

Month	pH Level	Number of Fish	Number of Lily Pads	Visibility	Temp. (°C)
May	5.9	50	200	very cloudy	16
June	5.5	30	165	a little cloudy	17
July	4.9	20	100	clear	17
Aug.	4.2	5	33	clear	17

1 **Which variable had the smallest change between May and August?**

A number of fish

B number of lily pads

C visibility

D temperature

2 **A neighboring pond that is a similar size is somewhat cloudy and has 31 fish, 150 lily pads, and a temperature of 16°C. Based on the data in the table, what might you hypothesize is the pH of this pond?**

A 5.9

B 5.5

C 4.9

D 4.2

3 **During El Niño, wind and precipitation patterns are affected around the world. Which of the following changes can occur as a result?**

A floods in Australia and Africa

B storms in California

C droughts in the southern United States

D decrease in ocean temperatures

CONSTRUCTED-RESPONSE QUESTION

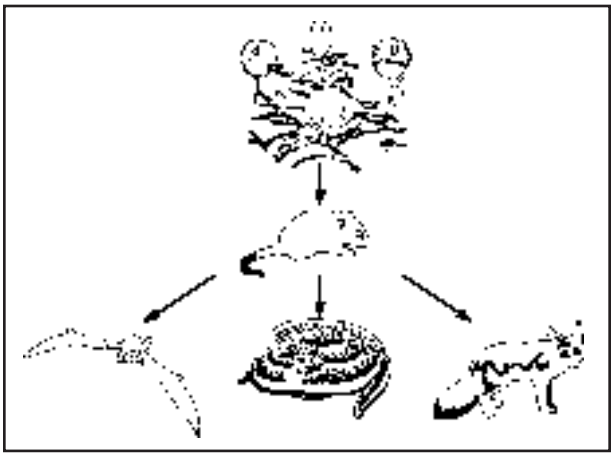
Write your answer to the following question on the lined answer sheet provided by your teacher.

4 **Oxygen and hydrogen react chemically to produce water. Describe one characteristic water possesses that its component elements do not.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



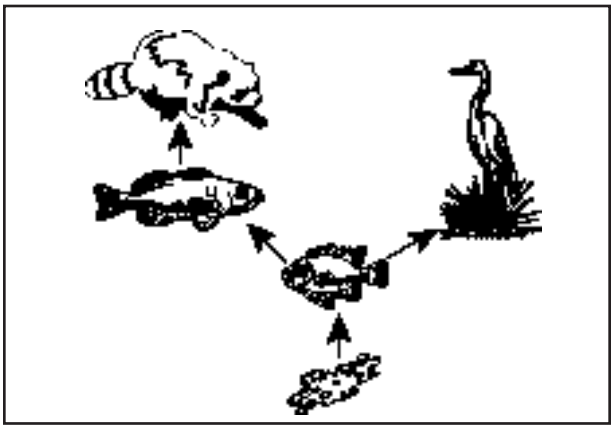
5 **Even though the mouse population increased in the region represented above, the fox population remained the same. What is the most likely explanation?**

A Mice have become better at hiding in this region.

B Bat or snake populations have increased.

C Plants have decreased in the region.

D Fox have lost their ability to hunt in this region.



6 **The food web pictured above contains water birds because it also contains _____.**

A raccoons

B small fish

C large predator fish

D other birds

7 **Which of the following occurs when Earth is positioned directly between the Sun and the Moon, making the Moon invisible to observers on Earth?**

A a lunar eclipse

B a solar eclipse

C a full Moon

D a waxing Moon

CONSTRUCTED-RESPONSE QUESTION

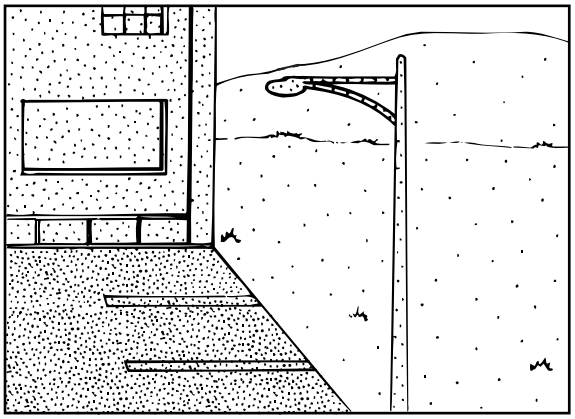
Write your answer to the following question on the lined answer sheet provided by your teacher.

8 **Scientists are studying the structure and composition of asteroids. Explain how studying asteroids can help scientists better understand how Earth was formed.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



9 **Which area in the picture would probably contribute most to a temperature increase in the city?**

A grassy area

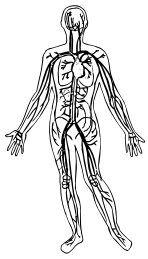
B building

C light posts

D parking lot

10 **Which of the following systems of the body is part of the immune system?**

A

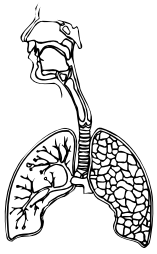


Circulatory System

B

Digestive System

C



Respiratory System

D none of the above

11 **Within an example ecosystem, the extinction of an animal leads to the unexpected extinction of a fruiting plant. What is a likely explanation of this occurrence?**

A A change in any system has predictable results.

B A change in any system always has unpredictable results.

C Species within a system are not connected.

D A change in any system may have unpredictable results.

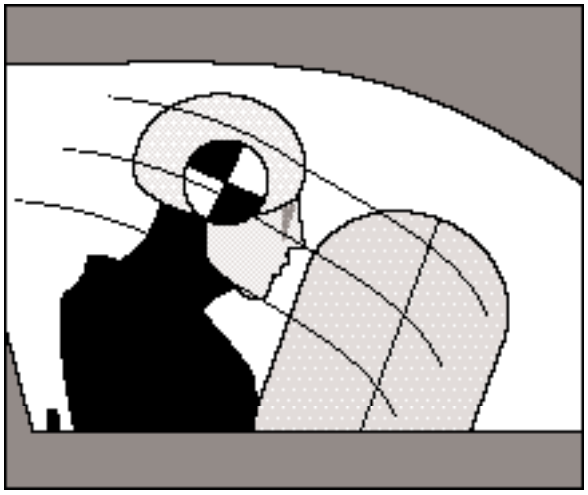
CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

12 **Animals rely on their habitats for food and shelter. Sometimes habitats are lost or divided. Discuss the possible impacts of both habitat loss and habitat division on animals.**

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



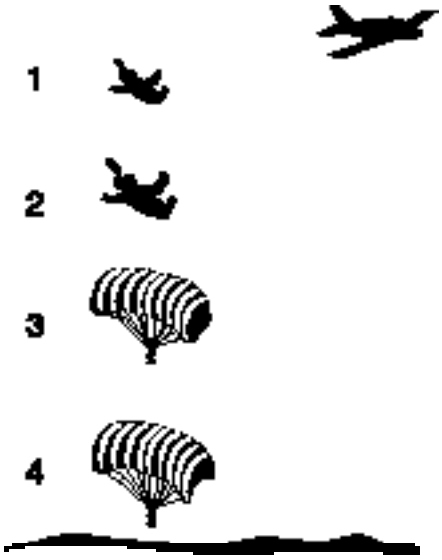
1 **The picture above shows a crash dummy moving forward at the moment of impact as the airbag deploys. Which of the following explains the interaction between the dummy and the airbag?**

A An object at rest requires a force to remain at rest.

B The force acting on the dummy is proportional to the velocity on the car.

C For every action, there is an equal and opposite reaction.

D none of the above



2 **The diagram above shows a sky diver in four different phases of a jump. Point 1 shows the sky diver just after jumping from the plane. Point 2 shows the sky diver experiencing free fall at terminal velocity. Point 3 shows the sky diver just after opening the parachute. Point 4 shows the sky diver falling at a constant rate just before landing. At which points during the jump does the sky diver's acceleration equal zero?**

A Points 1 and 3

B Points 1 and 4

C Points 2 and 4

D Points 3 and 4

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

3 **A year is defined as the time it takes for a planet to make one revolution around the Sun. Use what you know about the positions of the planets to explain why a year on Mars is nearly twice as long as a year on Earth.**

GO ON

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

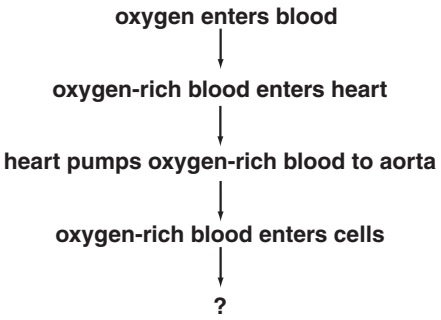
4 **The fact that Earth's axis is tilted 23.5° is responsible for _____.**

A the change between day and night

B the changing of the seasons

C solar eclipses

D lunar eclipses



5 **Which of the following would be the next stage in the above chart?**

A oxygen-poor blood enters the veins

B oxygen-rich blood enters the aorta

C oxygen-poor blood enters the aorta

D oxygen-rich blood enters the vena cava

6 **Humans and ants both have _____.**

A asymmetry

B radial symmetry

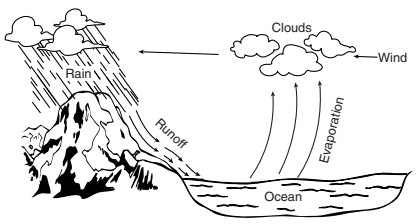
C bilateral symmetry

D imperfect symmetry

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

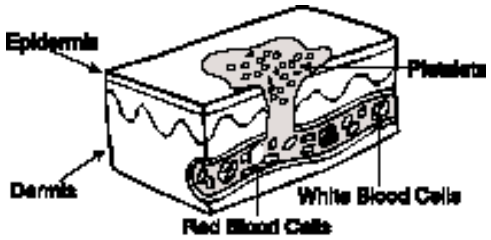
7 **Describe the cycle shown.**



STOP

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.



1 **Which process is taking place in the picture above?**

A spleen cleaning the blood

B white blood cells fighting bacteria

C blood clotting

D oxygen attaching to hemoglobin

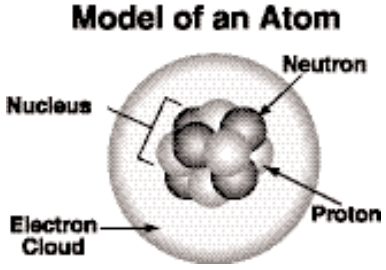
2 **Like Earth, the planet Mars has seasons. The most likely reason for this is _____.**

A Mars is the same distance from the Sun as the Earth

B Mars is tilted on its axis in the same way as Earth

C Mars is traveling at the same speed as Earth

D Mars is the same size as Earth



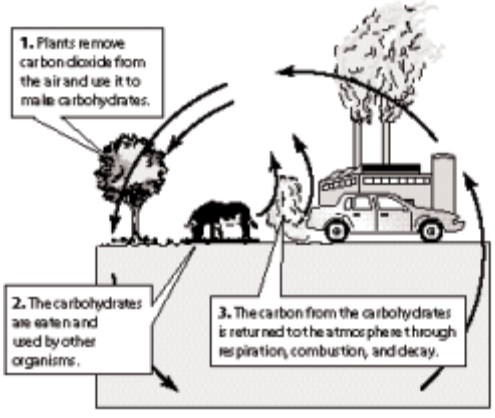
3 **In which part of the atom are protons located?**

A electron cloud

B neutron

C nucleus

D electron



4 **The diagram shows a model of the carbon cycle. According to the model, an increase in the number of coal-fired power plants would most affect the cycle at _____.**

A step 1

B step 2

C step 3

D an increase in coal-fired power plants would not affect the carbon cycle

GO ON

Name: Date: Class:

Standards 6 & 7 (8.6.1–8.7.7)

Benchmark Test

MULTIPLE-CHOICE QUESTIONS

Choose the best answer for each of the following questions. Mark your answers on the answer sheet provided by your teacher.

5 **In his experiments with combustion, Antoine Lavoisier determined that metal combined with an element in air to produce _____.**

A nitride

B oxide

C soot

D vapor

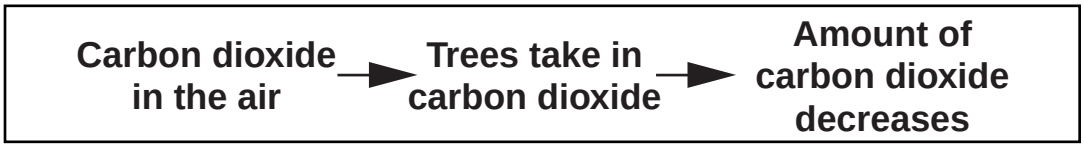
6 **Polonium was named after Madame Curie's birth country, Poland. It was one of two radioactive and _____ elements discovered by Marie and Pierre Curie.**

A stable

B artificial

C unstable

D light



7 **Which of the following human activities would most affect the cycle shown above?**

A burning fossil fuels

B deforestation

C pollution

D farming

CONSTRUCTED-RESPONSE QUESTION

Write your answer to the following question on the lined answer sheet provided by your teacher.

8 **Explain the importance of Antoine Lavoisier's analytical methods to modern chemistry.**

The McGraw-Hill Companies

ISBN 0-07-867047-0

9 780078 670473 90000

Mc Graw Hill Glencoe

Science Online
in8.msscience.com