

New York NYSTP 2022 Grade 8 Science

Exam Materials  
Pages 2 - 30

Answer Key Materials  
Page 31 - 43

THE UNIVERSITY OF THE STATE OF NEW YORK

# GRADE 8

## INTERMEDIATE-LEVEL SCIENCE TEST

### WRITTEN TEST

**June 6, 2022**

**Student Name** \_\_\_\_\_

**School Name** \_\_\_\_\_

**The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.**

Print your name and the name of your school on the lines above.

The questions on this test measure your knowledge and understanding of science. The test has two parts. Both parts are contained in this test booklet.

**Part I** consists of 45 multiple-choice questions. Record your answers to these questions on the separate answer sheet. Use only a No. 2 pencil on your answer sheet.

**Part II** consists of 40 open-ended questions. Write your answers to these questions in the spaces provided in this test booklet.

You may use a calculator to answer the questions on the test if needed.

You will have two hours to answer the questions on this test.

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.**

Copyright 2022

THE UNIVERSITY OF THE STATE OF NEW YORK  
THE STATE EDUCATION DEPARTMENT  
ALBANY, NEW YORK 12234

## Part I

- 1 All living things are composed of  
A vitamins                            C cells  
B blood                              D organs
- 2 Which process is carried out by both a plant and an animal?  
A eating food  
B growing in size  
C taking in carbon dioxide  
D making oxygen
- 3 The chart below shows the classification of *Felis catus*, the common house cat.

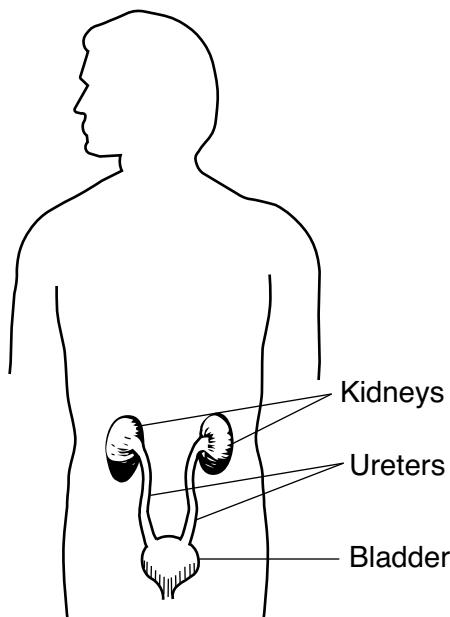
**Classification of Common House Cat**

|         |              |
|---------|--------------|
| Kingdom | Animalia     |
| Phylum  | Chordata     |
| Class   | Mammalia     |
| Order   | Carnivora    |
| Family  | Felidae      |
| Genus   | <i>Felis</i> |
| Species | <i>catus</i> |

- Which level of classification contains organisms that are the most closely related?
- A Family                            C Kingdom  
B Genus                            D Species

- 4 When a person chews food, the teeth grind the food into smaller pieces. This is an example of  
A mechanical digestion  
B chemical change  
C cellular respiration  
D waste removal

- 5 The diagram below represents a human organ system.



What is the function of this system?

- A breakdown of food  
B production of sex cells  
C removal of dissolved wastes  
D coordination of body movement

- 6 The guinea pigs in a certain population all have black fur. The sudden appearance of a guinea pig with white fur in this population may be the result of

- A ozone depletion  
B asexual reproduction  
C gene mutation  
D habitat destruction

- 7 As their environment slowly changes, organisms with certain traits are more likely to survive and produce offspring with those same traits. This statement describes

- A cell division  
B genetic engineering  
C resource conservation  
D natural selection

8 The photograph below shows four different dogs. All four dogs belong to the same species.



The significant differences between these four dogs were caused by humans. These differences are best explained by the process of

- |                         |                 |
|-------------------------|-----------------|
| A biological adaptation | C metamorphosis |
| B selective breeding    | D regulation    |

9 Three birds are represented in the drawings below.

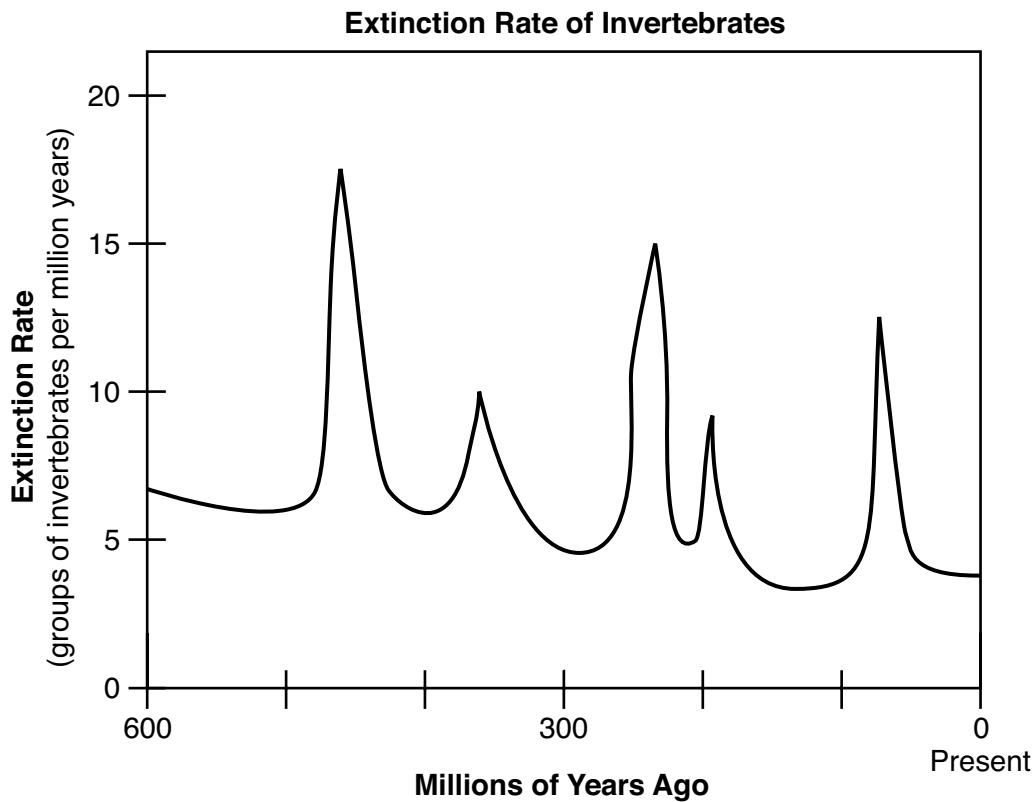


(Not drawn to scale)

Studying the beak of each of these birds would best help a scientist understand

- |                        |                        |
|------------------------|------------------------|
| A how the birds fly    | C what the birds eat   |
| B where the birds live | D if the birds migrate |

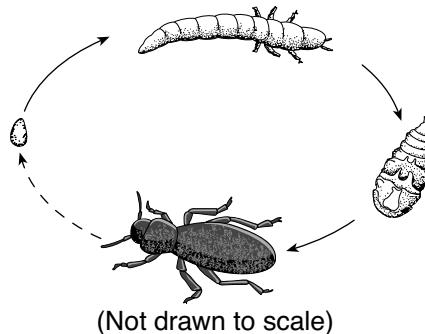
- 10 The graph below represents the extinction rate of invertebrates (animals without a backbone) over the last 600 million years.



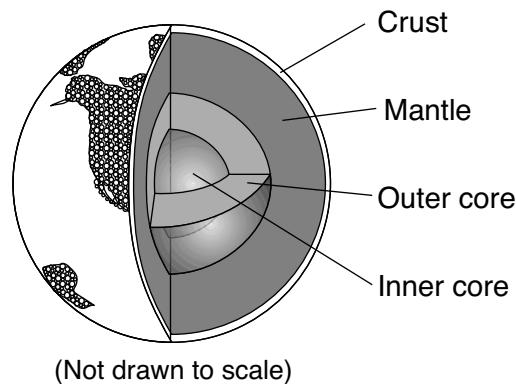
Based on the graph, it might be concluded that

- A there were fewer extinctions 600 million years ago than at present
- B the greatest invertebrate extinction rate occurred about 450 million years ago
- C the most recent peak in extinction rate affected the largest number of groups
- D the five greatest invertebrate extinction rates occurred every 100 million years

- 11 Which process is represented by the diagram below?



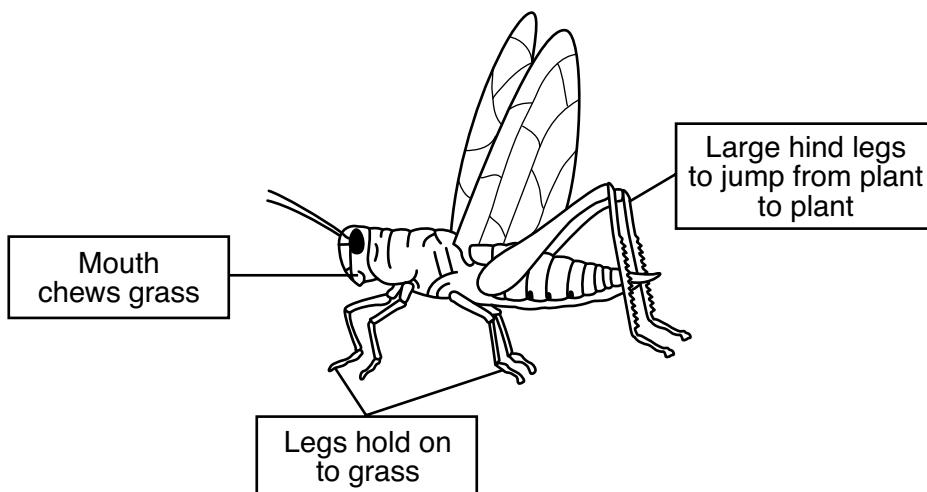
- A photosynthesis
- B metamorphosis
- C digestion
- D succession



This model of Earth is based primarily on the

- A study of ocean tides
  - B analysis of earthquake waves
  - C classification of volcanic eruptions
  - D observation of meteor showers

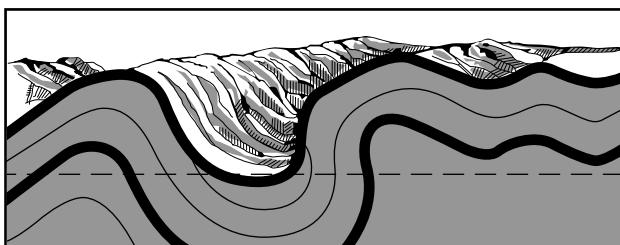
23 The diagram below represents a grasshopper and includes information about some of its body parts.



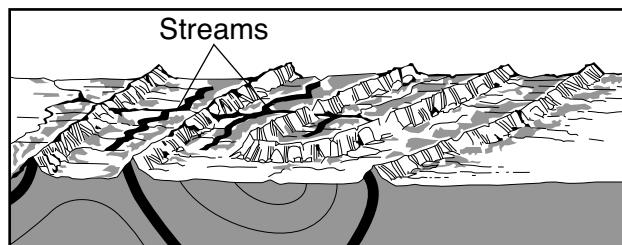
The grasshopper is classified as a

- |              |             |
|--------------|-------------|
| A producer   | C carnivore |
| B decomposer | D herbivore |

24 Cross section 1 below represents deformed rock layers. Cross section 2 below represents the same location millions of years later.



## Cross section 1

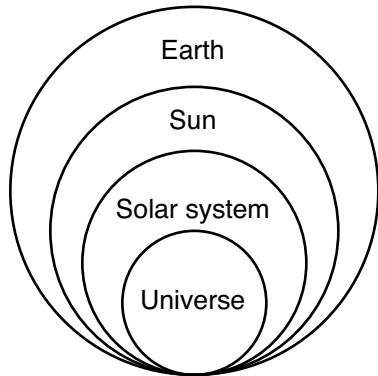


## Cross section 2

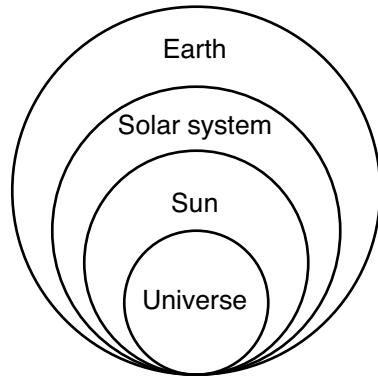
Which two factors are mainly responsible for changing the surface features shown in cross section 1 into the surface features shown in cross section 2?

- A tilting and deposition
  - B melting and evaporation
  - C freezing and condensation
  - D weathering and erosion

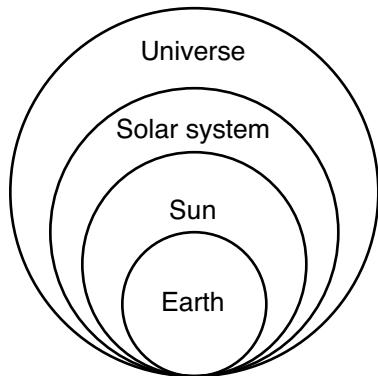
25 Which model below best represents the relative sizes of celestial objects from largest to smallest?



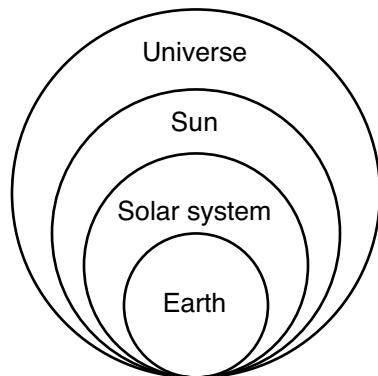
A



C

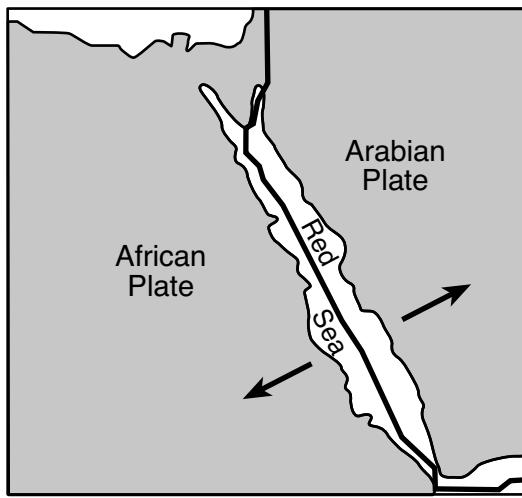


B



D

- 26 The map below shows a portion of Earth's surface where two tectonic plates are located. The arrows indicate the direction of plate movement along the boundary between the two plates.



If the African Plate and Arabian Plate continue to move in the directions the arrows indicate, the Red Sea will most likely become

- A narrower because the two tectonic plates are coming together
- B narrower because the two tectonic plates are moving apart
- C wider because the two tectonic plates are coming together
- D wider because the two tectonic plates are moving apart

- 27 Rocks are classified into one of three major groups according to

- A how they formed
- B the depth where they are found
- C their chemical properties
- D their age

- 28 An air mass that forms over the ocean near the equator will most likely be

- A cold and dry
- B cold and humid
- C warm and dry
- D warm and humid

- 29 Which two factors are most responsible for the movement of air masses over the United States?
- A prevailing winds and upper air currents
  - B prevailing winds and hurricanes
  - C thunderstorms and upper air currents
  - D thunderstorms and hurricanes

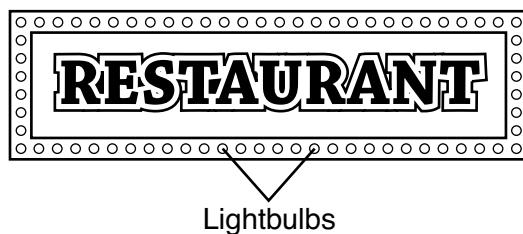
- 30 Sugar will most likely dissolve in water at the fastest rate when the temperature of the water is

- A cool and the solution is stirred
- B cool and the solution is not stirred
- C warm and the solution is stirred
- D warm and the solution is not stirred

- 31 Compared to the particles in liquid water, the particles in solid ice move

- A faster and resist changes in position
- B faster and easily change position
- C slower and resist changes in position
- D slower and easily change position

- 32 The diagram below represents a restaurant sign that is surrounded by a string of lightbulbs.



Which statement might explain why the string of lightbulbs does *not* light when one of the lightbulbs is burned out?

- A Heat is reduced.
- B The circuit is interrupted.
- C A voltmeter is missing.
- D Conduction is taking place.

Base your answers to questions 33 and 34 on the diagram below and on your knowledge of science. A portion of the Periodic Table of the Elements is shown below. The placement of elements on the Periodic Table is based on their properties.

### Portion of the Periodic Table of the Elements

| KEY     |               |
|---------|---------------|
| 28      | Si            |
| Silicon | symbol        |
| 14      | name          |
|         | atomic number |

| Groups   |                            |                            |                             |                             |                             |                              |                           |                           |
|----------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|---------------------------|---------------------------|
|          | 13                         | 14                         | 15                          | 16                          | 17                          |                              |                           |                           |
|          | 11<br>B<br>Boron<br>5      | 12<br>C<br>Carbon<br>6     | 14<br>N<br>Nitrogen<br>7    | 16<br>O<br>Oxygen<br>8      | 19<br>F<br>Fluorine<br>9    | 20<br>Ne<br>Neon<br>10       |                           |                           |
| 11<br>12 | 27<br>Al<br>Aluminum<br>13 | 28<br>Si<br>Silicon<br>14  | 31<br>P<br>Phosphorus<br>15 | 32<br>S<br>Sulfur<br>16     | 35<br>Cl<br>Chlorine<br>17  | 40<br>Ar<br>Argon<br>18      |                           |                           |
|          | 64<br>Cu<br>Copper<br>29   | 65<br>Zn<br>Zinc<br>30     | 70<br>Ga<br>Gallium<br>31   | 73<br>Ge<br>Germanium<br>32 | 75<br>As<br>Arsenic<br>33   | 79<br>Se<br>Selenium<br>34   | 80<br>Br<br>Bromine<br>35 | 84<br>Kr<br>Krypton<br>36 |
|          | 108<br>Ag<br>Silver<br>47  | 112<br>Cd<br>Cadmium<br>48 | 115<br>In<br>Indium<br>49   | 119<br>Sn<br>Tin<br>50      | 122<br>Sb<br>Antimony<br>51 | 128<br>Te<br>Tellurium<br>52 | 127<br>I<br>Iodine<br>53  | 131<br>Xe<br>Xenon<br>54  |

33 Which element reacts in a manner most similar to oxygen?

- |            |              |
|------------|--------------|
| A sulfur   | C phosphorus |
| B fluorine | D neon       |

34 Three categories of elements and an example of each are shown in the table below.

| Metal | Nonmetal | Noble Gas |
|-------|----------|-----------|
| Ag    | N        | He        |

Which table correctly lists the placement of the elements C, Kr, and Cu?

| Metal | Nonmetal | Noble Gas |
|-------|----------|-----------|
| Cu    | Kr       | C         |

| Metal | Nonmetal | Noble Gas |
|-------|----------|-----------|
| Cu    | C        | Kr        |

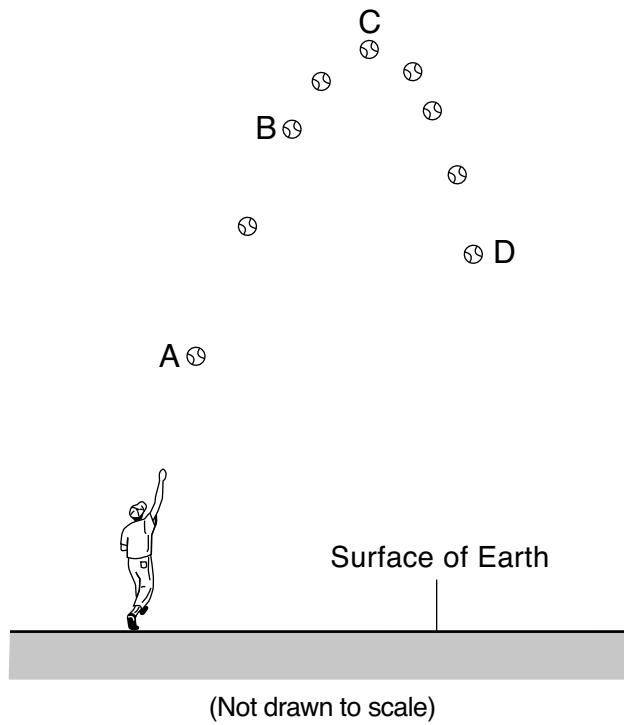
| Metal | Nonmetal | Noble Gas |
|-------|----------|-----------|
| C     | Kr       | Cu        |

| Metal | Nonmetal | Noble Gas |
|-------|----------|-----------|
| C     | Cu       | Kr        |

35 Molecules are made up of

- A cells                    C atoms  
B mixtures                D solids

36 The diagram below represents the path of a ball after it has been thrown. Letters A, B, C, and D represent different locations in the path that the ball traveled.



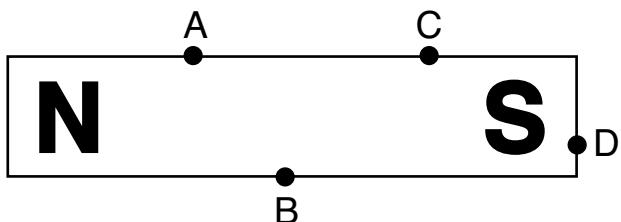
At which location did the ball have the greatest potential energy?

- A A                    C C  
B B                    D D

37 A student sorts and categorizes a group of mineral samples based on their streak, hardness, and luster. Which scientific process is the student using?

- A classifying            C measuring  
B sequencing            D predicting

38 The diagram below represents a bar magnet with the north (N) and south (S) poles labeled. Letters A, B, C, and D represent locations on the surface of the bar magnet.



An iron nail would feel the greatest attractive pull from this bar magnet at point

- A A                    C C  
B B                    D D

39 A group of students is designing an experiment to determine if the temperature of water affects how well laundry detergent cleans clothing. Which statement best describes a hypothesis for this experiment?

- A If more detergent is used, then the water will become colder.  
B If more detergent is used, then the clothes will be cleaner.  
C If the water is hotter, then the detergent will make the clothes cleaner.  
D If the water is hotter, then the detergent will shrink the clothes.

40 Which observation of a plant on a windowsill supports the inference that plants need sunlight?

- A Flowers were produced.  
B Larger leaves wilted.  
C Stems grew toward the window.  
D Roots were visible above the soil.

- 41 The table below shows some minerals, their chemical composition, and some characteristics of these minerals.

## **Characteristics of Some Minerals that Contain a Metal**

| Mineral      | Chemical Composition                             | Characteristic                    |
|--------------|--|-----------------------------------|
| chalcopyrite | $\text{CuFeS}_2$                                 | brass yellow; often tarnished     |
| galena       | $\text{PbS}$                                     | silver-colored; cubic cleavage    |
| hematite     | $\text{Fe}_2\text{O}_3$                          | reddish-brown streak; nonmagnetic |
| limonite     | $\text{FeO}(\text{OH}) \cdot \text{H}_2\text{O}$ | yellow-brown streak; nonmagnetic  |
| magnetite    | $\text{Fe}_3\text{O}_4$                          | black streak; magnetic            |

|            |   |  |
|------------|---|--|
| <b>Key</b> | Al = aluminum<br>Cu = copper<br>Fe = iron<br>H = hydrogen | O = oxygen<br>Pb = lead<br>S = sulfur<br>U = uranium |
|------------|---|--|

What do the minerals hematite, limonite, and magnetite have in common?

- |                |                    |
|----------------|--------------------|
| A brown streak | C contain hydrogen |
| B black streak | D contain iron     |

- 42 The data table below shows the solubility of three gases in water at various temperatures.

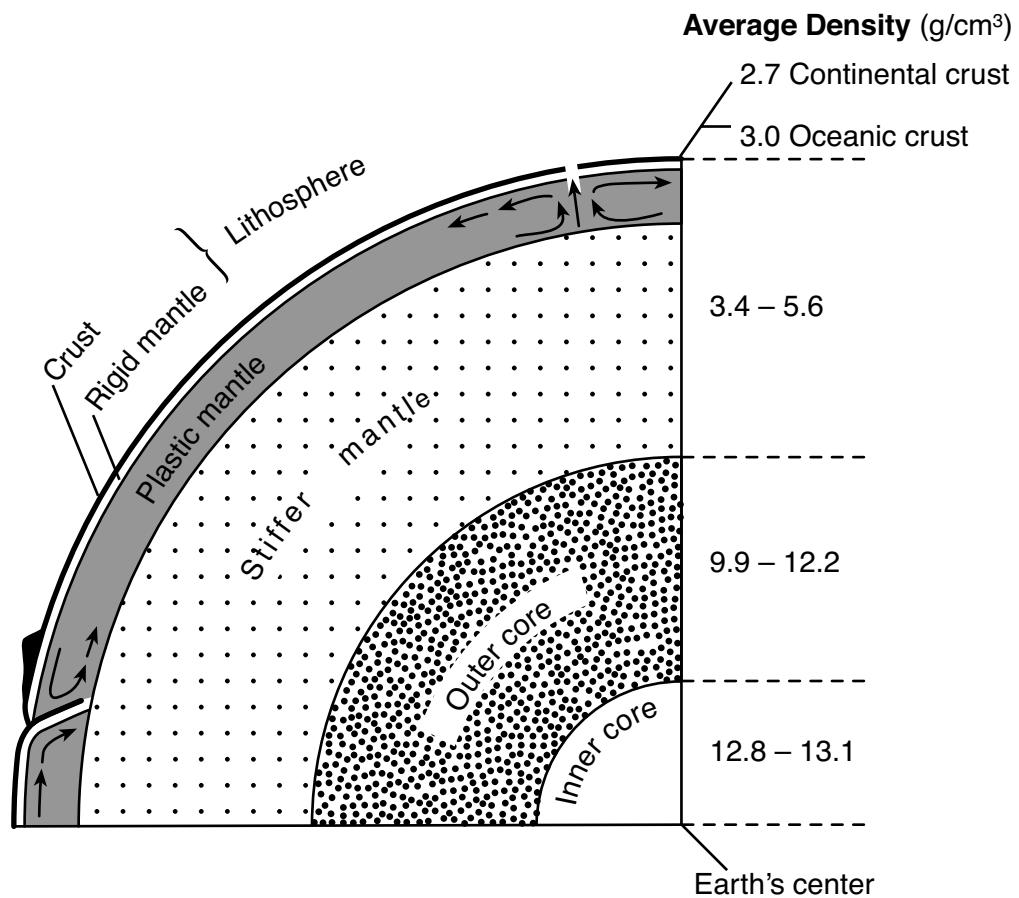
## Data Table

| Water Temperature<br>(°C) | Solubility in Water (grams per liter) |        |                |
|---------------------------|---------------------------------------|--------|----------------|
|                           | Nitrogen                              | Oxygen | Carbon dioxide |
| 0                         | 0.0294                                | 0.0695 | 3.346          |
| 10                        | 0.0231                                | 0.0537 | 2.318          |
| 20                        | 0.0190                                | 0.0434 | 1.688          |
| 30                        | 0.0162                                | 0.0359 | 1.257          |
| 40                        | 0.0139                                | 0.0308 | 0.973          |
| 50                        | 0.0122                                | 0.0266 | 0.761          |

The information in the table shows that the solubility of

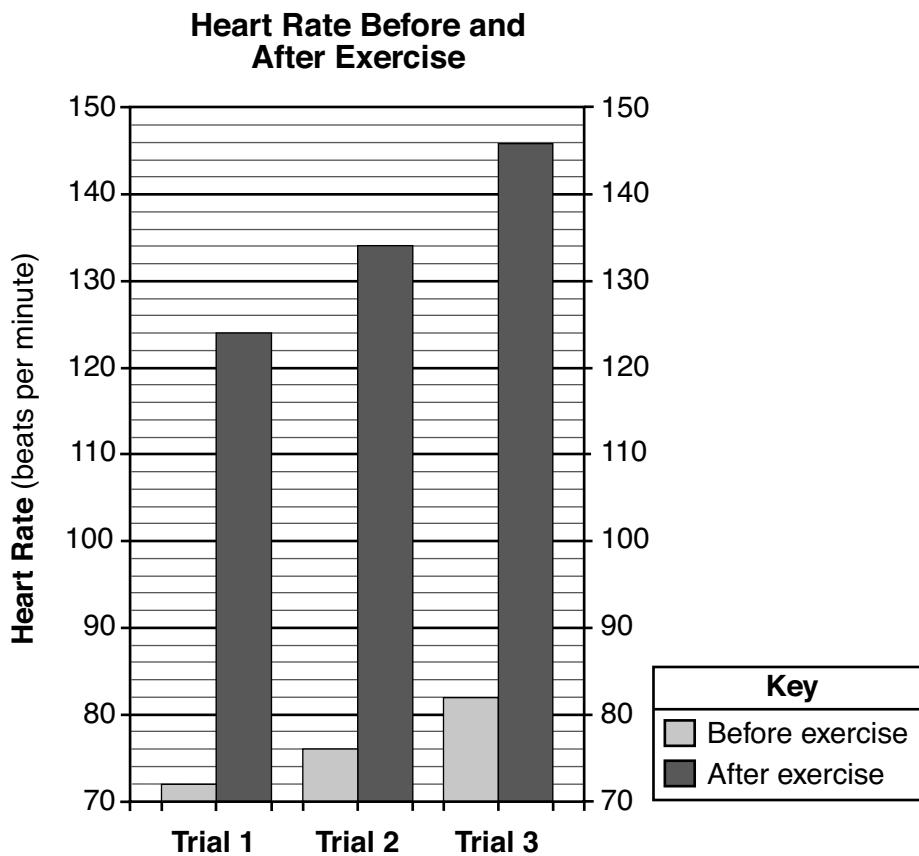
- A nitrogen gas in water is greatest when the water temperature is 30°C
  - B oxygen gas in water increases with increasing water temperature
  - C a gas in water depends primarily on the volume of water
  - D carbon dioxide gas in water decreases with increasing water temperature

Base your answers to questions 43 and 44 on the diagram below and on your knowledge of science. The diagram represents the inferred properties of Earth's interior.



- 43 As the depth below Earth's surface increases, the average density of Earth's interior
- A decreases, only
  - B increases, only
  - C increases and decreases
  - D remains the same
- 44 Which Earth layer contains convection currents that are believed to be responsible for the movement of Earth's tectonic plates?
- A lithosphere
  - B plastic mantle
  - C stiffer mantle
  - D outer core
-

- 45 The graph below shows the results of an experiment in which a student measured her heart rate in beats per minute (bpm) before and after five minutes of exercise. The experiment was repeated three times, with two minutes of rest in between each trial.



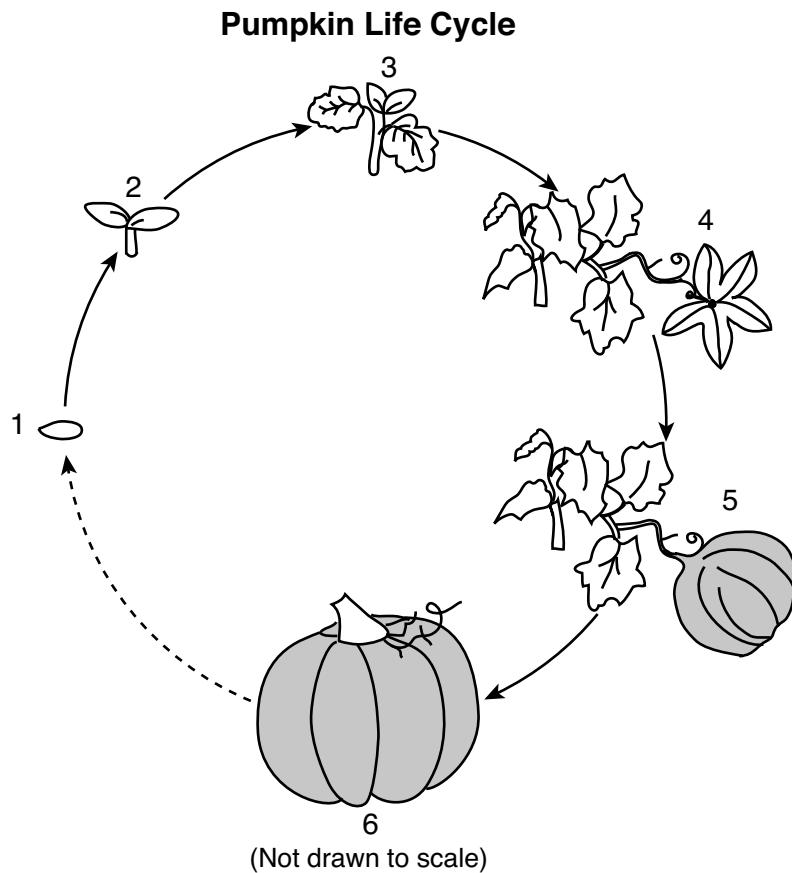
Which conclusion about heart rate can be supported by the data shown in the graph?

- A The before-exercise heart rate in trial 2 was 78 bpm.
  - B The before-exercise heart rate increased 6 bpm after each trial.
  - C The heart rate after exercise increased 10 bpm after each trial.
  - D The heart rate went up 64 bpm after exercise in trial 3.
-

## Part II

Directions (46–85): Record your answers in the spaces provided below each question.

Base your answers to questions 46 and 47 on the diagram below and on your knowledge of science. The diagram represents the life cycle of a pumpkin with the stages labeled 1 through 6.



- 46 Identify the structure shown at stage 1. [1]
- 

- 47 In stages 2 through 5, a part of the pumpkin plant that is *not* shown is located underground. Identify this plant structure and explain its function. [1]

Plant structure: \_\_\_\_\_

Function: \_\_\_\_\_

---

---

Base your answers to questions 48 and 49 on the Punnett square below and on your knowledge of science. The Punnett square shows the possible offspring of a cross between a green pea plant ( $GG$ ) and a yellow pea plant ( $gg$ ).

|                          |      |      |
|--------------------------|------|------|
| $G$                      | $G$  |      |
| $g$                      | $Gg$ | $Gg$ |
| $g$                      | $Gg$ | $Gg$ |
| <b>Key</b>               |      |      |
| $G$ = green (dominant)   |      |      |
| $g$ = yellow (recessive) |      |      |

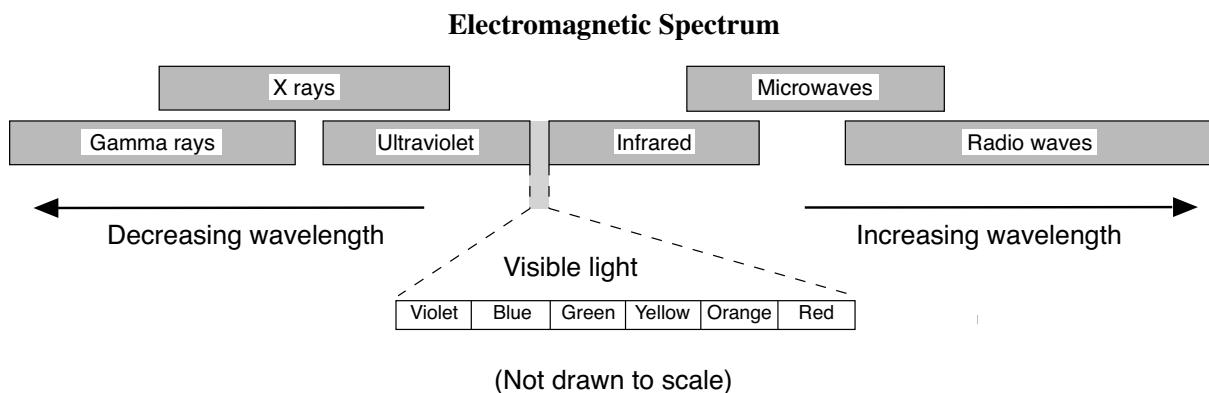
- 48 What percentage of the offspring shown in the Punnett square will be green pea plants? [1]

\_\_\_\_\_ %

- 49 Complete the Punnett square below, which shows a cross between two pea plants that are both  $Gg$ . [1]

|     |     |
|-----|-----|
| $G$ | $g$ |
| $G$ |     |
| $g$ |     |

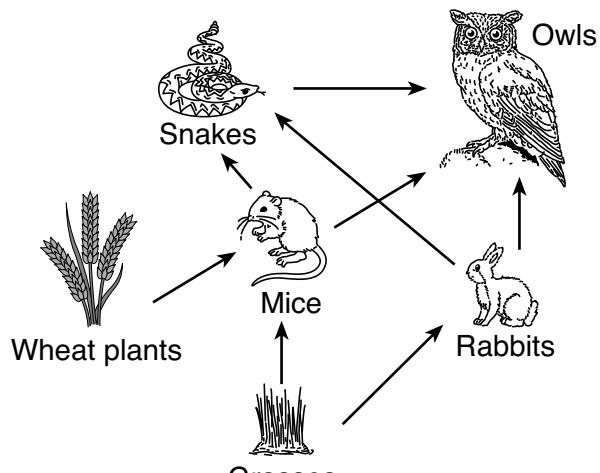
- 50 The diagram below represents different forms of electromagnetic energy in the electromagnetic spectrum.



- Identify the color of visible light that has the longest wavelength. [1]

\_\_\_\_\_

Base your answers to questions 51 through 53 on the diagram below and on your knowledge of science. The diagram represents a partial food web.



(Not drawn to scale)

- 51 Identify the *two* predators that are competing for the same food source. [1]

\_\_\_\_\_ and \_\_\_\_\_

- 52 Explain why the grass population in this food web may *decrease* if the wheat plants were destroyed by disease. [1]

---

---

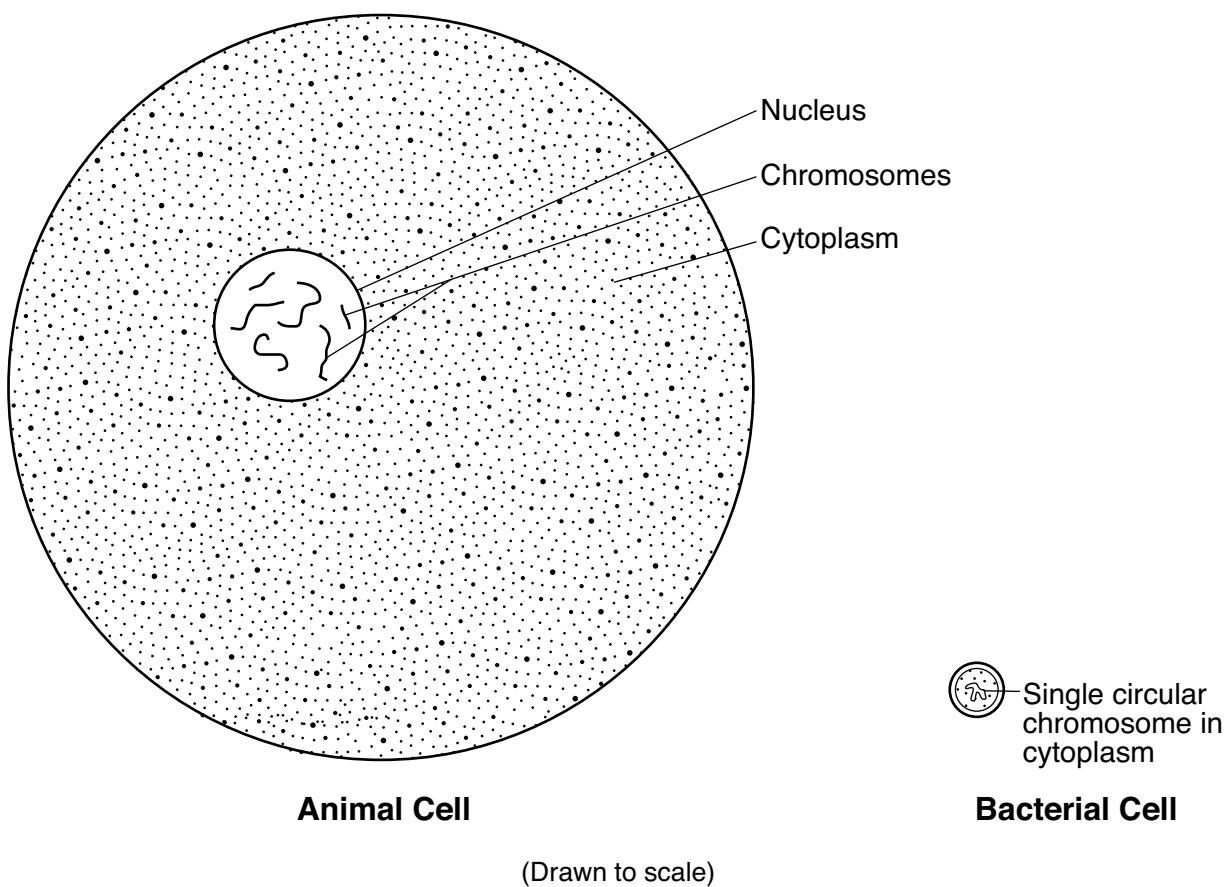
---

- 53 Decomposers play an important role in an ecosystem. Identify *one* type of decomposer that is most likely found in this ecosystem. [1]

---

---

- 54 The diagram below represents an animal cell and a bacterial cell drawn to scale. Some parts of the two different cells are labeled.



Source: <https://www.chegg.com> (adapted)

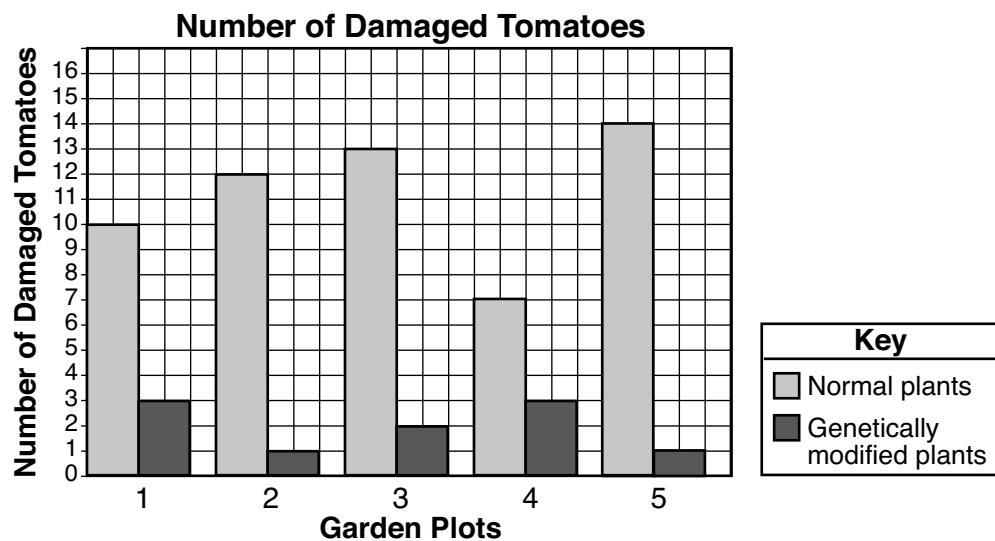
Identify *two* differences between an animal cell and a bacterial cell. [1]

Difference 1: \_\_\_\_\_

Difference 2: \_\_\_\_\_

Base your answers to questions 55 through 58 on the information and graph below, and on your knowledge of science.

An equal number of two types of tomato plants (a normal one and a genetically modified one) were planted in five different garden plots. The genetically modified plants produce a protein that kills caterpillars when the plant is eaten. Each plant received the same amount of water daily. The graph below shows the actual number of damaged tomatoes in each of the five garden plots for both the normal plants and genetically modified plants.



- 55 Explain why the genetically modified plants in the garden plots had a *lower* number of damaged tomatoes. [1]
- 
- 

- 56 Calculate the total number of damaged tomatoes from the genetically modified plants in the five garden plots. [1]

Number of damaged genetically modified tomatoes: \_\_\_\_\_

- 57 Identify *one* variable, other than the number of plants and the amount of water received daily, that should be held constant for all of the tomato plants in the five garden plots. [1]
-

- 58 Using the equation below, calculate the percentage of normal tomatoes that were damaged in garden plot 1. In garden plot 1, there were 40 normal tomatoes before damage occurred. [1]

$$\text{Percent Damaged} = \frac{\text{Number of Damaged Normal Tomatoes}}{\text{Number of Normal Tomatoes Before Damage Occurred}} \times 100$$

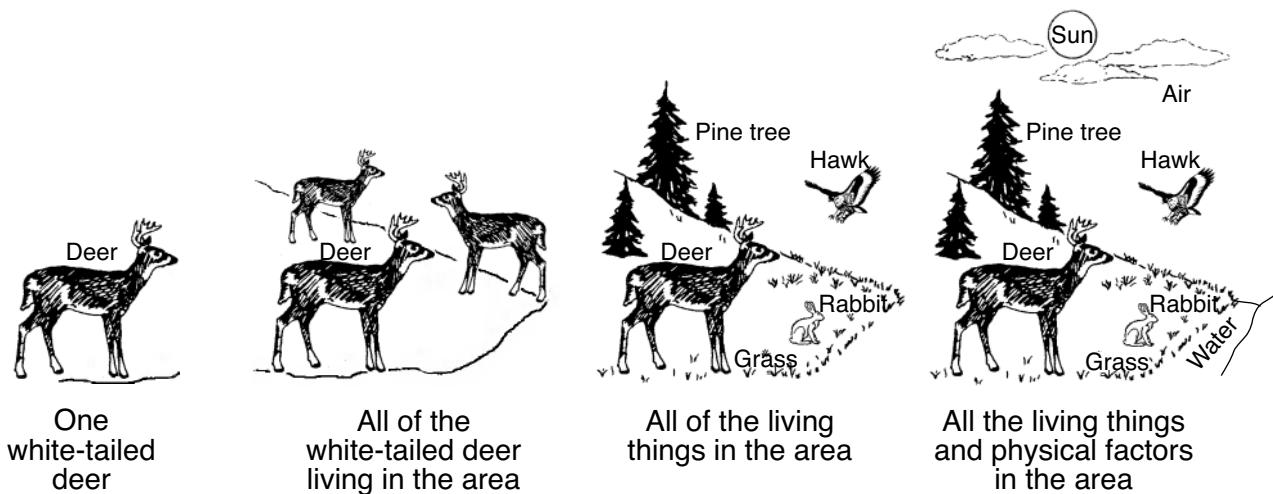
\_\_\_\_\_ %

---

- 59 The chart below shows the behaviors of light, as indicated by the arrows, as light strikes three different surfaces labeled A through C. Place one check mark (✓) in each row to identify the reaction of light as it strikes each surface. [1]

| Behavior<br>of Light | Reaction of Light |         |        |
|----------------------|-------------------|---------|--------|
|                      | Reflect           | Refract | Absorb |
| Surface A            |                   |         |        |
| Surface B            |                   |         |        |
| Surface C            |                   |         |        |

Base your answers to questions 60 and 61 on the diagram below and on your knowledge of science. The diagram represents the organizational levels in an environment. Descriptions of each organizational level are given.

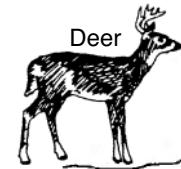


- 60 Complete the diagram below by placing each of the labels below in the appropriate box below its description. [1]

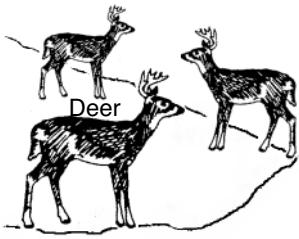
community

ecosystem

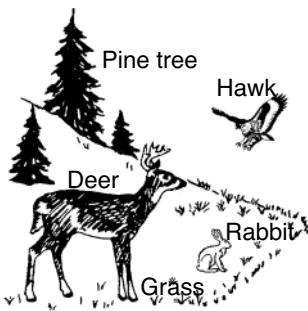
population



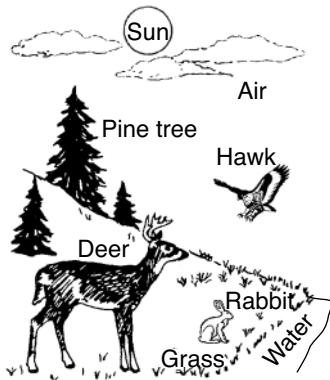
One  
white-tailed  
deer



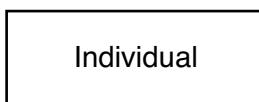
All of the  
white-tailed deer  
living in the area



All of the living  
things in the area

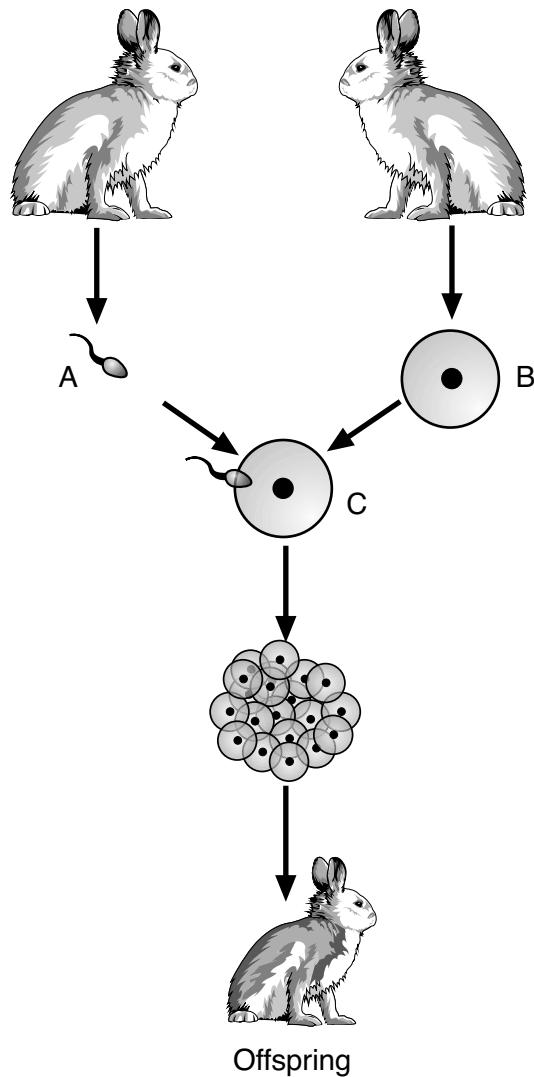


All the living things  
and physical factors  
in the area



- 61 Identify the original source of energy in this environment. [1]

Base your answers to questions 62 and 63 on the diagram below and on your knowledge of science. The diagram represents reproduction and development in rabbits.



(Not drawn to scale)

- 62 Identify the cells labeled A and B, and the process represented by letter C. [1]

Cell A: \_\_\_\_\_

Cell B: \_\_\_\_\_

Process C: \_\_\_\_\_

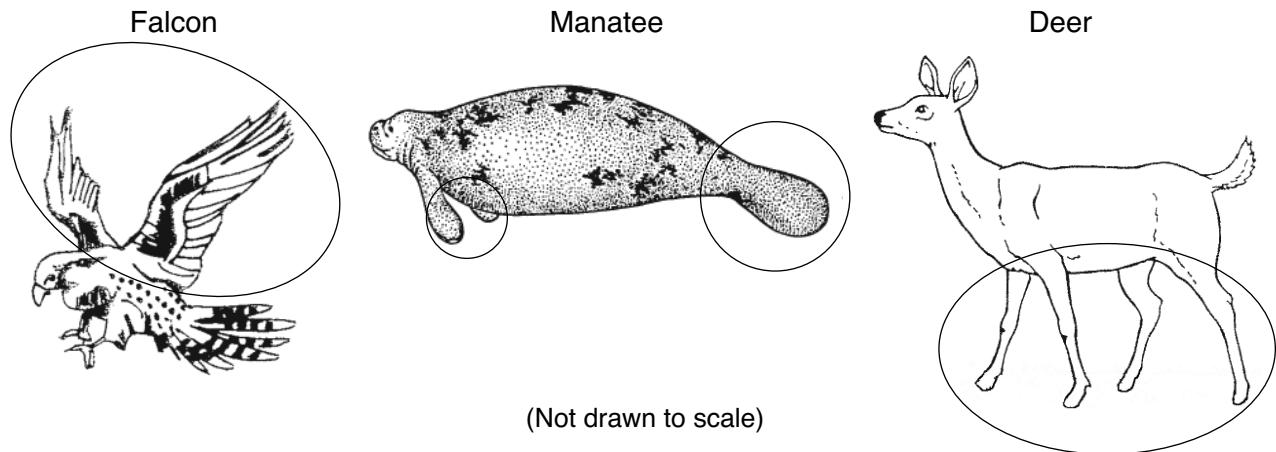
- 63 Explain why the offspring is *not* genetically identical to either parent. [1]

---

---

---

Base your answers to questions 64 and 65 on the diagrams below and on your knowledge of science. The diagrams represent a falcon, a manatee, and a deer. Circles have been drawn around some body parts.



- 64 The circled parts of each organism allow for locomotion. Identify the *two* organ systems directly responsible for locomotion that are coordinated by the nervous system. [1]

\_\_\_\_\_ system and \_\_\_\_\_ system

- 65 Describe how the use of the circled structures is different for the falcon and manatee. [1]

Falcon: \_\_\_\_\_

Manatee: \_\_\_\_\_

Base your answers to questions 66 and 67 on the information below and on your knowledge of science.

Landfills are solid waste sites where garbage and other wastes are deposited and covered over with soil.

- 66 State *one negative* effect on the environment when a landfill is located in an area. [1]

\_\_\_\_\_

- 67 Identify *one* action humans can take to reduce the amount of garbage and other wastes they produce so that solid waste sites do not become overfilled. [1]

\_\_\_\_\_

Base your answers to questions 68 and 69 on the information below and on your knowledge of science.

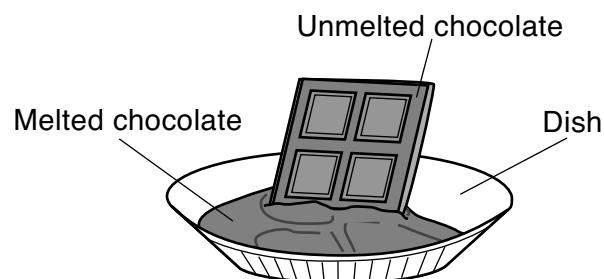
### Carbohydrates and Proteins

Carbohydrates are nutrients that are broken down into simple sugars in the human body. These sugars are carried by the blood to all of the body cells. The cells release energy when the simple sugars are broken down further during the process of cellular respiration. Proteins are nutrients that are broken down by the body into amino acids. Amino acids are important molecules for creating new cells and making other compounds for life processes.

- 68 What nutrient is most directly used in the growth and repair of body tissues? [1]
- 

- 69 The amount of energy in food is measured in Calories. Explain what happens when a person consumes more Calories than the body can use for energy. [1]
- 
- 
- 

Base your answers to questions 70 and 71 on the diagram below and on your knowledge of science. The diagram represents a chocolate bar melting.



- 70 Explain why the melting of the chocolate bar is a physical change and *not* a chemical change. [1]
- 
- 

- 71 At room temperature, chocolate bars are usually a solid, while water is usually a liquid. Explain why different materials can be in different phases at the same temperature. [1]
- 
- 
-

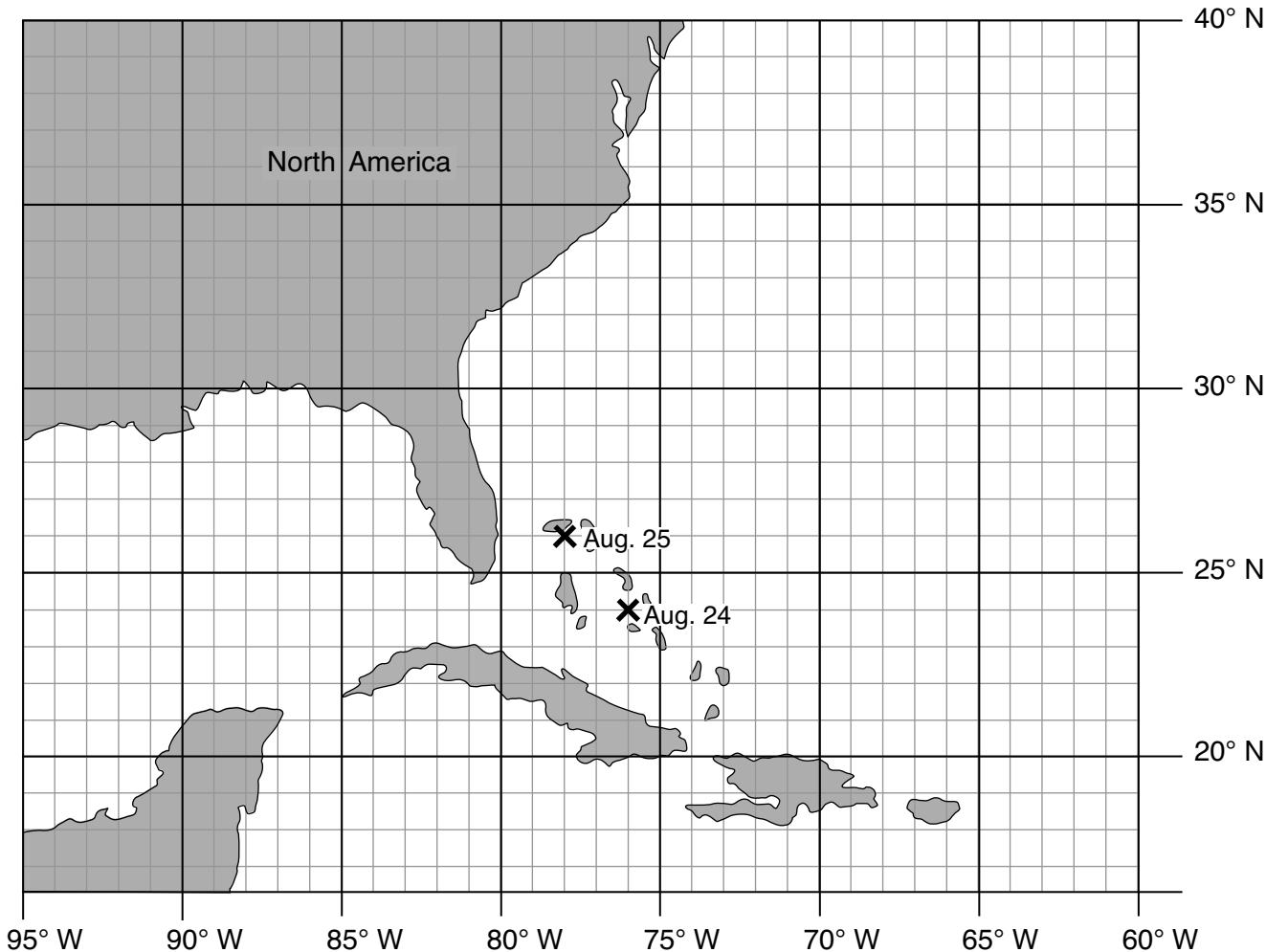
Base your answers to questions 72 and 73 on the table below and on your knowledge of science. The table shows the latitude ( $^{\circ}\text{N}$ ) and longitude ( $^{\circ}\text{W}$ ) of the center of Hurricane Katrina at 1:00 a.m. on several dates in August 2005.

### Location of Hurricane Katrina August 24 – 30, 2005

| Date      | Location at 1:00 a.m.           |                                  |
|-----------|---------------------------------|----------------------------------|
|           | Latitude ( $^{\circ}\text{N}$ ) | Longitude ( $^{\circ}\text{W}$ ) |
| August 24 | 24                              | 76                               |
| August 25 | 26                              | 78                               |
| August 26 | 25                              | 81                               |
| August 27 | 24                              | 84                               |
| August 28 | 25                              | 87                               |
| August 29 | 28                              | 90                               |
| August 30 | 34                              | 88                               |

- 72 The locations for Hurricane Katrina for August 24 and August 25 have been plotted on the hurricane tracking map below. Plot the *five* remaining locations of Hurricane Katrina shown in the data table using an **X** and connect *all seven* plots with a line, starting on August 24, to show the path of Hurricane Katrina. [1]

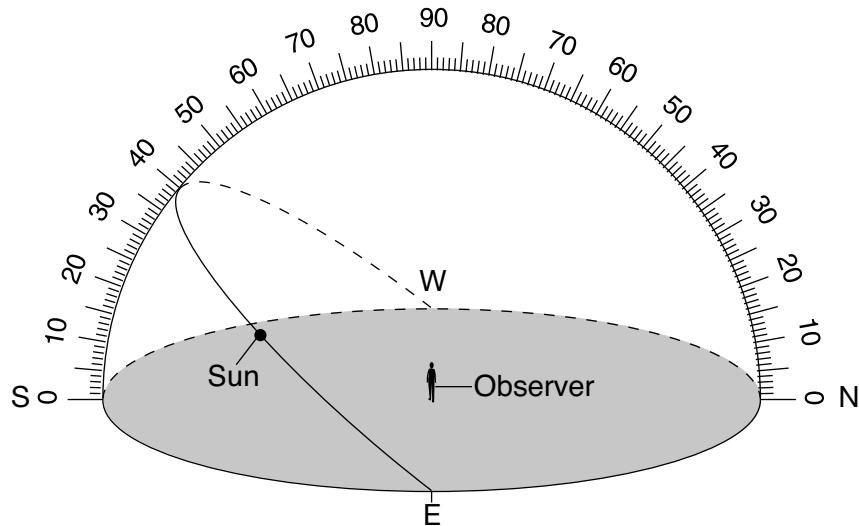
**Hurricane Tracking Map**



- 73 State one way humans can prepare for an approaching hurricane if given sufficient warning. [1]
- 
- 
- 

Base your answers to questions 74 and 75 on the diagram below and on your knowledge of science. The diagram shows the apparent path of the Sun across the sky for an observer in North America on March 21.

**Sun's Apparent Path on March 21**



(Not drawn to scale)

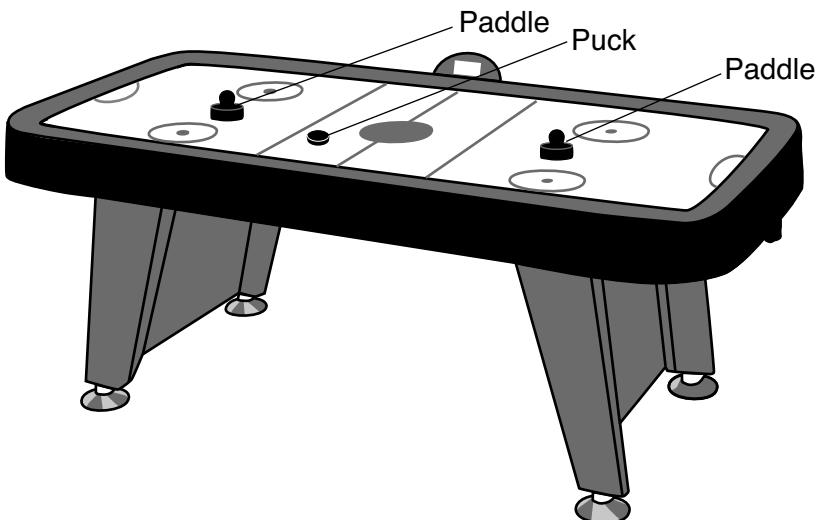
- 74 Identify the compass directions in which the observer will see the sunrise and the sunset on March 21. [1]

Sunrise direction: \_\_\_\_\_

Sunset direction: \_\_\_\_\_

- 75 The observer concludes that the Sun appeared to move across the sky on a daily basis because Earth revolves around the Sun. Explain why the observer's conclusion is *incorrect*. [1]
- 
- 
-

Base your answers to questions 76 through 78 on the diagram and information below, and on your knowledge of science. The diagram represents an air hockey table where a round, flat puck is hit by opposing players using hard, plastic paddles.



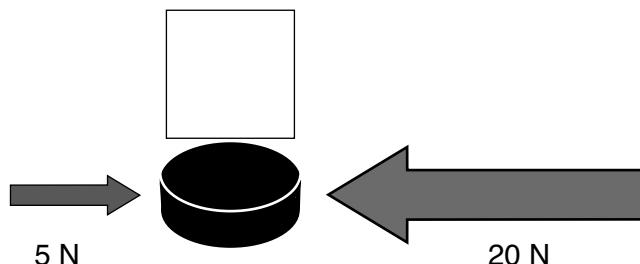
Two players played a game of air hockey while the power to the game was turned off. Each player used a hard, plastic paddle to hit a puck across the table to a scoring area on the other player's side of the table. With the power turned off, the puck moved slowly. When the players turned the power on, air was blown upwards through tiny holes on the surface of the tabletop, allowing the puck to glide on the air. This caused the puck to move very rapidly when hit.

- 76 Describe *one* way, other than turning the table on, that the players could have changed the puck to make it glide more easily. [1]
- 
- 

- 77 Identify the type of energy used when a player's plastic paddle hits the puck and causes it to move. [1]
- 

- 78 In the diagram below, a stationary puck is shown being acted upon by two different forces at the same time.

In the box directly above the puck, draw a third arrow to indicate the direction in which the puck will move when acted upon by these two forces. The forces on the puck are measured in newtons (N). [1]

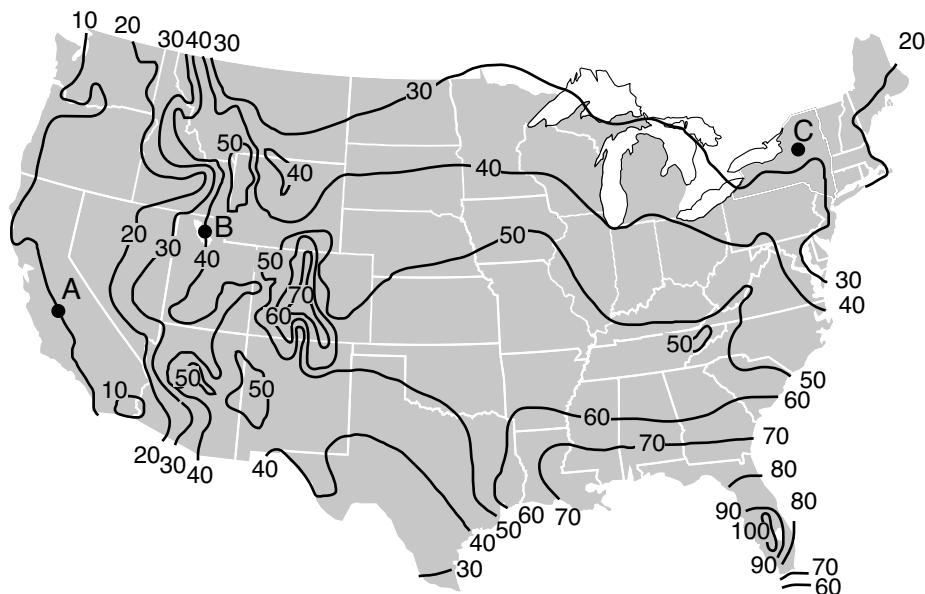


Base your answers to questions 79 through 81 on the passage and map below, and on your knowledge of science. Each line on the map represents the average number of days that thunderstorms occur each year in different locations in the United States. Points A, B, and C represent surface locations.

### Thunderstorms

A thunderstorm is a weather system that is accompanied by lightning and thunder. Some thunderstorms can bring about local flooding and large hail. Strong damaging winds and tornadoes may be produced during severe thunderstorms.

**Average Number of Days that Thunderstorms Occur Each Year in the United States**



- 79 Describe the change in the average number of days each year that thunderstorms are expected to occur as a person travels from location A to location B. [1]

---

---

- 80 Determine the average number of days each year that the thunderstorms occur at location C. [1]

---

---

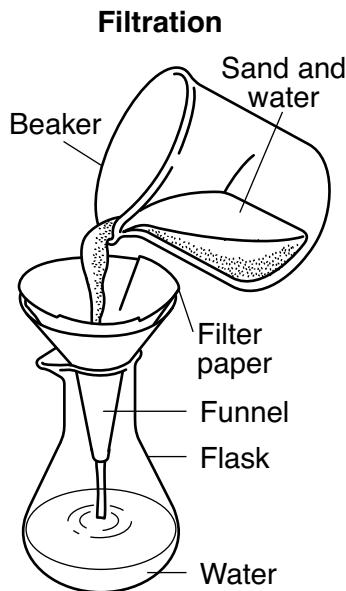
- 81 Identify *two* types of hazardous weather conditions that may accompany severe thunderstorms. [1]

---

and \_\_\_\_\_

---

Base your answers to questions 82 and 83 on the diagram below and on your knowledge of science. The diagram represents the filtration of a mixture of sand and water.



- 82 State why the sand in the sand-and-water mixture is on the bottom of the beaker. [1]

---

---

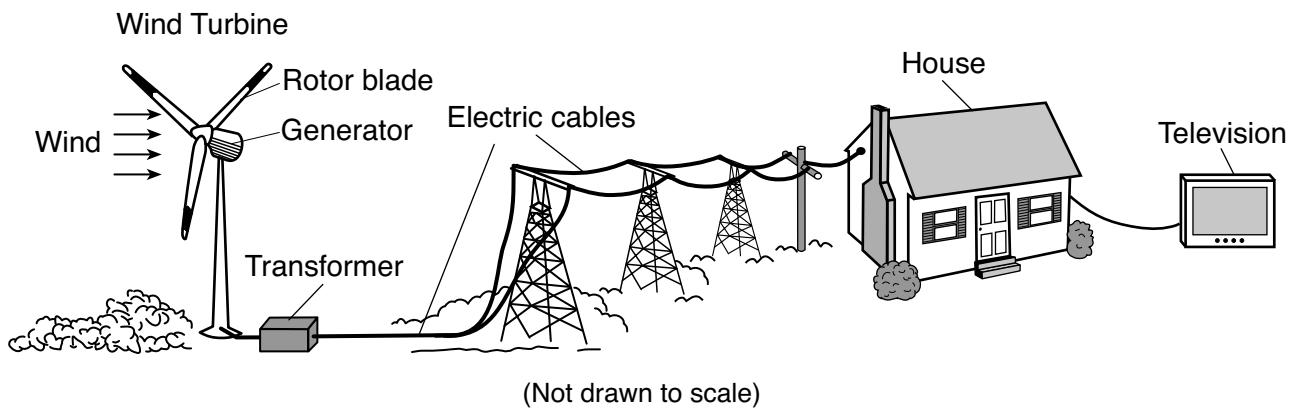
- 83 Describe the purpose of the filter paper in the diagram. [1]

---

---

---

Base your answers to questions 84 and 85 on the diagram below and on your knowledge of science. The diagram represents a wind turbine being used to produce electricity. This electricity provides energy to appliances, such as a television, in a house.



- 84 The television converts electrical energy into other forms of energy. Identify *two* forms of energy that are produced by the television. [1]

(1) \_\_\_\_\_

(2) \_\_\_\_\_

- 85 Describe *one* advantage of producing electricity through the use of a wind turbine instead of through the use of fossil fuels. [1]

---

---

---

---

**Grade 8 Intermediate-Level Science Test****June 2022 Written Test****Answer Key: Part I (Multiple-Choice Questions)**

**Note:** All schools (public, nonpublic, and charter) administering the **Grade 8 Intermediate-Level Science Test** in the 2021–2022 school year are required to make arrangements to obtain answer sheets and associated scanning services from a Regional Information Center (RIC) or a large-city scanning center. These centers will scan and score the answer sheets according to the following criteria:

1. One credit will be awarded for each correct response.
2. Credit will not be allowed if two or more answers have been marked for the same question.
3. The raw score for Part I will be determined by counting the number of correct responses.

For information only, correct responses are listed in the chart below.

| Test        | Date     | Question Number | Correct Response | Question Type | Credit | Weight |
|-------------|----------|-----------------|------------------|---------------|--------|--------|
| Grade 8 ILS | June '22 | 1               | C                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 2               | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 3               | D                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 4               | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 5               | C                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 6               | C                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 7               | D                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 8               | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 9               | C                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 10              | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 11              | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 12              | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 13              | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 14              | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 15              | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 16              | D                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 17              | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 18              | C                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 19              | C                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 20              | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 21              | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 22              | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 23              | D                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 24              | D                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 25              | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 26              | D                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 27              | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 28              | D                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 29              | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 30              | C                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 31              | C                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 32              | B                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 33              | A                | MC            | 1      | 1      |
| Grade 8 ILS | June '22 | 34              | B                | MC            | 1      | 1      |

|             |          |           |          |    |   |   |
|-------------|----------|-----------|----------|----|---|---|
| Grade 8 ILS | June '22 | <b>35</b> | <b>C</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>36</b> | <b>C</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>37</b> | <b>A</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>38</b> | <b>D</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>39</b> | <b>C</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>40</b> | <b>C</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>41</b> | <b>D</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>42</b> | <b>D</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>43</b> | <b>B</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>44</b> | <b>B</b> | MC | 1 | 1 |
| Grade 8 ILS | June '22 | <b>45</b> | <b>D</b> | MC | 1 | 1 |

**Key**

MC = Multiple-choice question

**46** [1] Allow 1 credit for seed.

**47** [1] Allow 1 credit for roots *and* an acceptable function. Acceptable functions include, but are not limited to:

- get water for the pumpkin plant
- hold the pumpkin plant in place
- get minerals/nutrients from the soil
- anchor the plant in the ground

**48** [1] Allow 1 credit for 100%.

**49** [1] Allow 1 credit if *all four* boxes of the Punnett square are filled in correctly, as shown below.

**Example of a 1-credit response:**

|     | $G$  | $g$  |
|-----|------|------|
| $G$ | $GG$ | $Gg$ |
| $g$ | $Gg$ | $gg$ |

**Note:** Allow credit for  $Gg$  or  $gG$ .

**50** [1] Allow 1 credit for red.

**51** [1] Allow 1 credit for snakes *and* owls.

**52** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- With no wheat, the mice can only consume the grasses.
- The mice would need to eat more grasses.
- because there would only be one food source for the mice

**53** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- fungi
- bacteria
- mushrooms
- molds
- worms
- snails
- slugs

**54** [1] Allow 1 credit for *two different* acceptable responses. Acceptable responses include, but are not limited to:

- Animal cells have a nucleus with chromosomes inside, while bacterial cells have a chromosome in the cytoplasm.
- Bacterial cells have only one circular chromosome, while animal cells have more numerous, but noncircular, chromosomes.
- Bacterial cells do not have a nucleus.
- The chromosomes are different.
- Bacterial cells are smaller than animal cells.
- Bacterial cells have a cell wall while animal cells do not.
- size

**Note:** Do *not* accept two responses that state the *same* characteristic being different, e.g.:

- (1) Animal cells have chromosomes in a nucleus.
- (2) Bacterial cells have loose chromosomes.

because location of chromosomes is the same characteristic.

**55** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The genetically modified tomato plants produce a protein that kills caterpillars when they eat the plant.
- These plants are genetically engineered to kill caterpillars.

**56** [1] Allow 1 credit for 10.

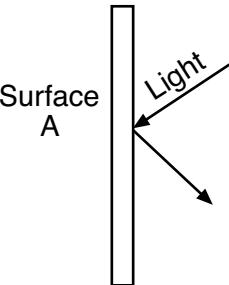
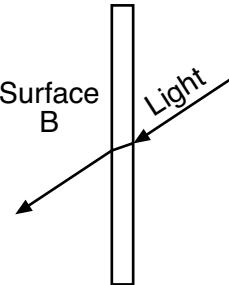
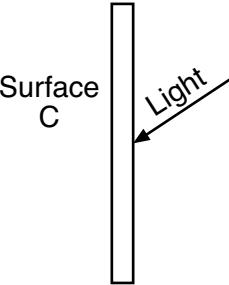
**57** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- type of soil
- amount of sunlight
- temperature

**58** [1] Allow 1 credit for 25%.

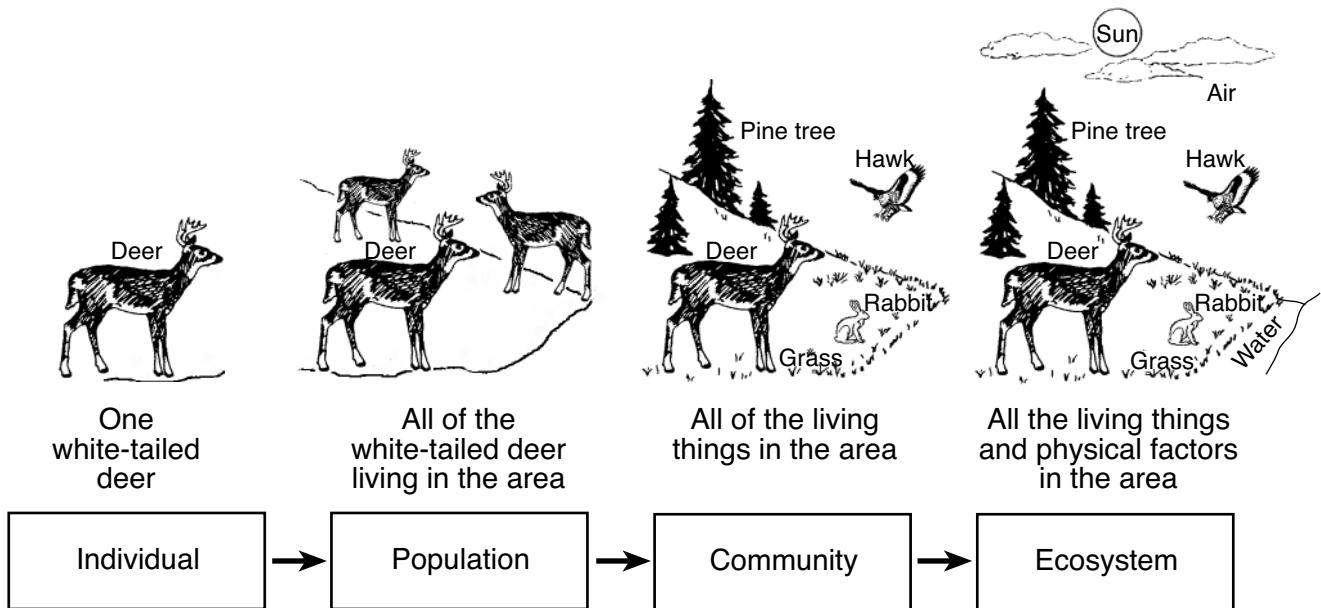
- 59** [1] Allow 1 credit for *three* correct check marks placed only in the three columns, as shown below.

**Example of a 1-credit response:**

| Behavior<br>of Light | Reaction of Light  |         |        |   |
|----------------------|--|---------|--------|---|
|                      | Reflect  | Refract | Absorb |   |
| Surface A            |   | ✓       |        |   |
| Surface B            |   | ✓       |        |   |
| Surface C            |  |         |        | ✓ |

**Note:** Allow credit if a symbol other than a check mark is used.

- 60** [1] Allow 1 credit for a correctly completed diagram, as shown below.



- 61** [1] Allow 1 credit for the Sun or sunlight or solar energy.

- 62** [1] Allow 1 credit for *three* correct responses, as shown below.

Cell A:

- sperm
- male gamete
- male sex cell

Cell B:

- egg
- female gamete
- female sex cell

Process C:

- fertilization
- sexual reproduction/reproduction

- 63** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The offspring receives genes from both parents.
- Genes from the egg and sperm mix to make new combinations of traits.
- Sexual reproduction results in variation.
- Rabbits undergo sexual reproduction.

**64** [1] Allow 1 credit for skeletal system *and* muscular system.

**65** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Falcon: fly/move through the air

Manatee: swim/move through the water

**66** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- pollution
- Runoff from the site can pollute local water.
- odor
- destroys habitats
- attracts rats or other scavengers
- takes up space in the area where things could be living
- Garbage will have to be brought by trucks, which causes fossil fuels to be used.

**67** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- recycle as much as possible
- reuse materials instead of throwing them out
- composting

**68** [1] Allow 1 credit for proteins *or* amino acids.

**69** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- energy will be stored as fat
- The person will gain weight.

**70** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

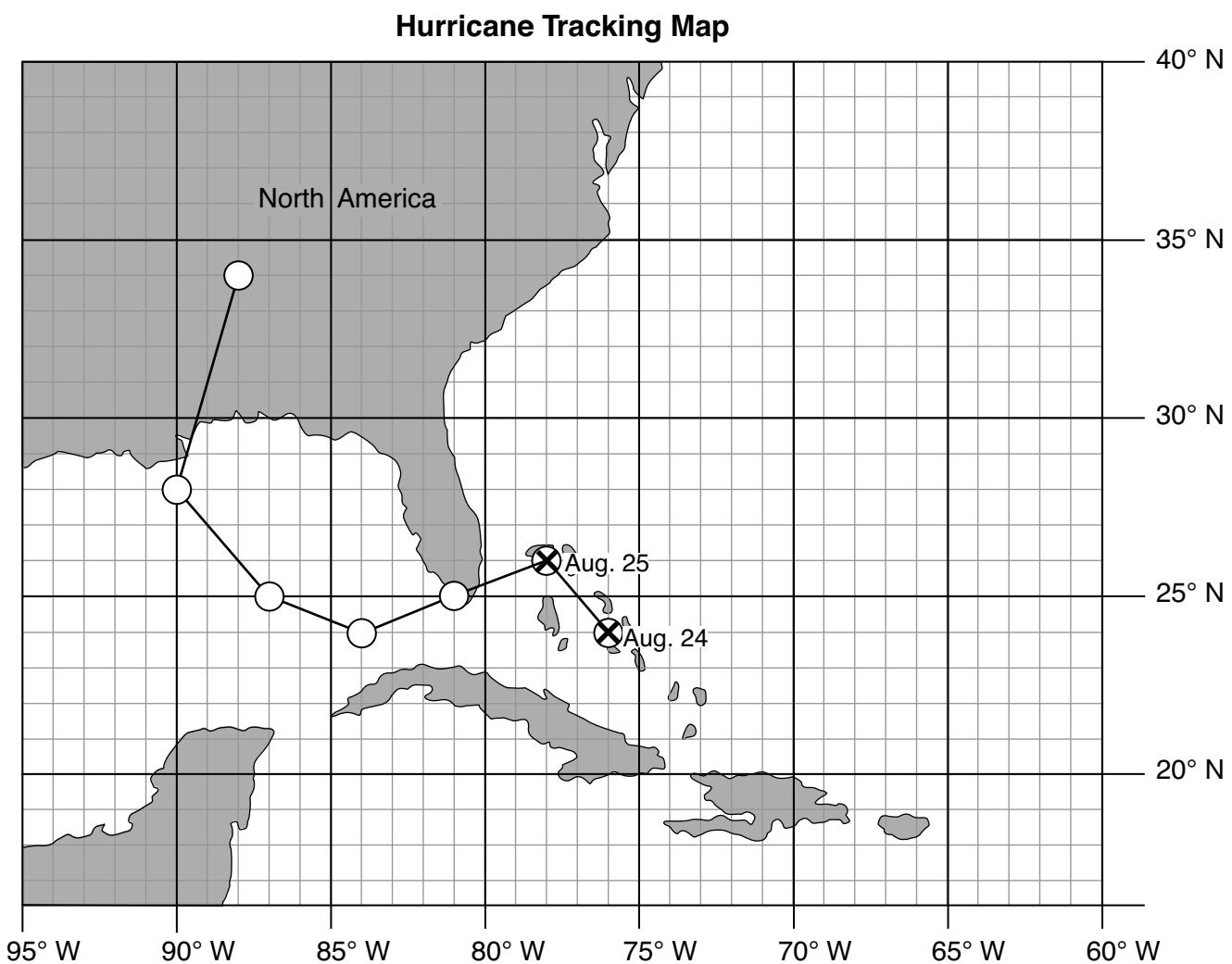
- Its chemical composition remains the same.
- It is still the same substance/chocolate.
- No new substance was formed.
- It just changed its shape.
- Only the state of matter/phase changed.

**71** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- They have different melting/freezing points.
- Their physical properties for melting temperatures differ.
- Some materials need more heat energy to melt.
- different attractive forces between particles
- Different substances have different properties.

- 72** [1] Allow 1 credit if the center of *all five* student-plotted **X**s are within or touch the circles shown and *all seven* **X**s are correctly connected with a line that passes within or touches each circle.

**Example of a 1-credit response:**



**Note:** It is recommended that an overlay of the same scale as the student answer sheet be used to ensure reliability in rating.

Allow credit if a symbol other than an **X** is used.

- 73** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- board up windows
- move to higher ground
- use a preplanned evacuation route
- stock up supplies (food/water/batteries, etc.)
- evacuate

**74** [1] Allow 1 credit if *both* responses are correct.

Sunrise direction: East/E

Sunset direction: West/W

**75** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The Sun appears to move across the sky daily because Earth rotates on its axis, not because it revolves around the Sun.
- The Sun appears to move daily because Earth spins.
- Earth revolving around the Sun causes the seasons, not day and night.
- Earth revolving around the Sun takes a year, not a day.

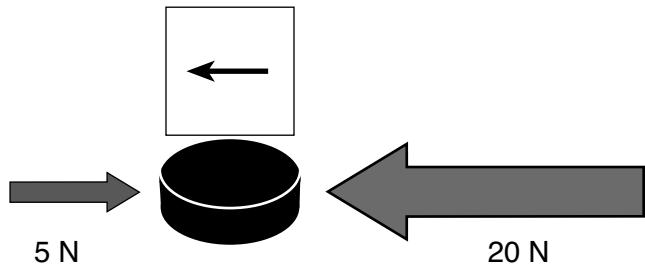
**76** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Wax the bottom of the puck.
- Make puck surface smoother.
- Use a lighter puck.
- Lubricate the puck.

**77** [1] Allow 1 credit for mechanical energy, kinetic energy, or energy of motion.

**78** [1] Allow 1 credit for any arrow that shows that the puck will move to the left.

**Example of a 1-credit response:**



**79** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The number of thunderstorm days increases.
- There are more thunderstorms at *B* than at *A*.
- There are 30 more days at *B* than there are at *A*.
- The number increases.

**80** [1] Allow 1 credit for any value greater than 20 days but less than 30 days.

**81** [1] Allow 1 credit for two correct responses. Acceptable responses include, but are not limited to:

- flooding
- tornadoes
- high or strong winds
- heavy rains
- large hail
- lightning

**82** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The sand is more dense.
- The water is less dense.
- The sand is insoluble in water.
- The sand does not dissolve in water.

**Note:** Do *not* allow credit for “the sand is heavier than water” because heavy objects do not necessarily sink in water.

**83** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The filter paper separates the sand from the water.
- The sand will be left on the filter paper; the water will go through.
- to catch/trap the sand
- to separate the water from the sand

**84** [1] Allow 1 credit for *two* correct forms of energy. Acceptable responses include, but are not limited to:

- light
- sound
- heat
- kinetic
- electromagnetic

**85** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- there is less pollution with a wind turbine
- a wind turbine uses a renewable resource
- fossil fuels are conserved
- fossil fuels are non-renewable
- fewer greenhouse gases are produced
- wind energy is a renewable resource
- more ecofriendly/greener energy
- less harmful to the environment