THE UNIVERSITY OF THE STATE OF NEW YORK

GRADE 8

INTERMEDIATE-LEVEL SCIENCE TEST

WRITTEN TEST

JUNE 5, 2017

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.

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

Part I

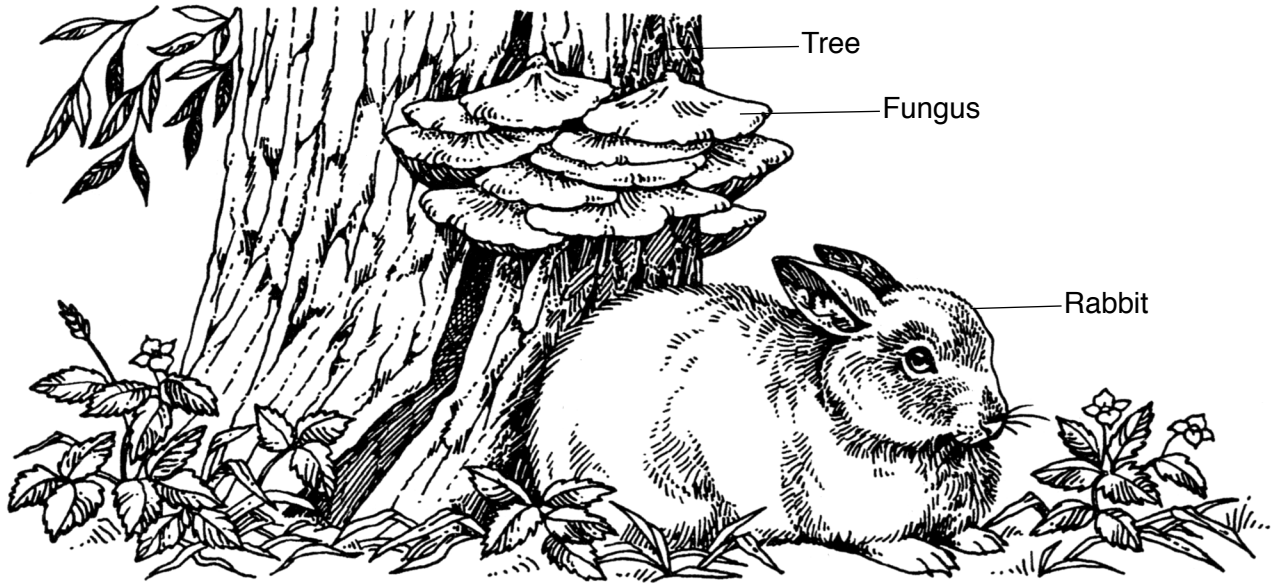
1 Which cell structure is found in plant cells, but *not* in animal cells?

(1) cell wall
(2) cell membrane
(3) nucleus
(4) cytoplasm

2 Amebas are single-celled organisms that need to obtain food in order to

(1) release oxygen into the air
(2) protect themselves from other living things
(3) get the energy they need to carry out life functions
(4) remove harmful chemicals from the environment

3 Three living organisms are labeled in the diagram below.



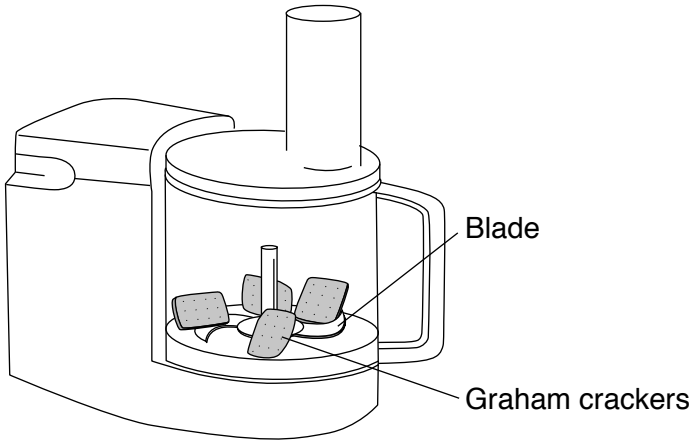
What do the rabbit, fungus, and tree have in common?

(1) They are all producers.
(2) They are all omnivores.
(3) They all belong to the same kingdom.
(4) They are all multicellular organisms.

4 Which term identifies a group of cells of the same type working together to perform a common function?

(1) microbe
(2) gene
(3) tissue
(4) hormone

5 The diagram below represents graham crackers in a food processor. When the processor is turned on, the blades will break the crackers into smaller pieces.

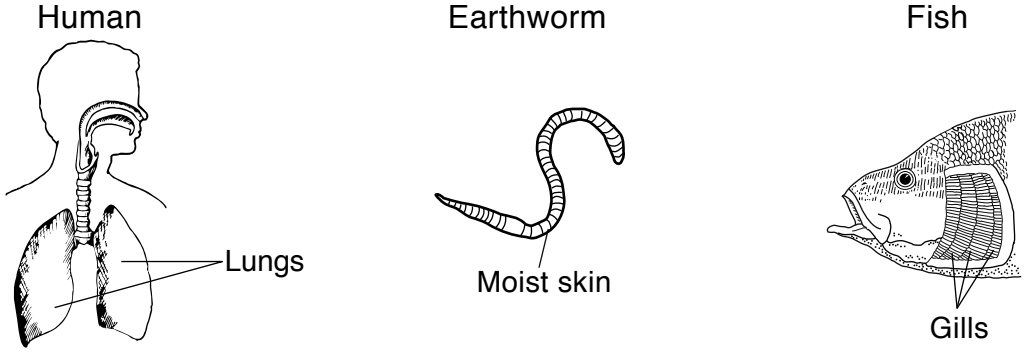


(Not drawn to scale)

Which human digestive process is most similar to this activity?

(1) mechanical digestion
(2) chemical digestion
(3) solid waste elimination
(4) liquid waste elimination

6 The diagrams below represent some respiratory structures in three organisms. The labeled structures in these organisms all have a similar function.



(Not drawn to scale)

What is the main function of the labeled structure(s) in each organism?

(1) circulation of blood
(2) digestion of food
(3) production of hormones
(4) exchange of gases

7 One function of the human excretory system is

(1) making materials that the body cells need
(2) removing excess heat energy from the body
(3) moving substances to and from body cells
(4) controlling the body's responses to stimuli

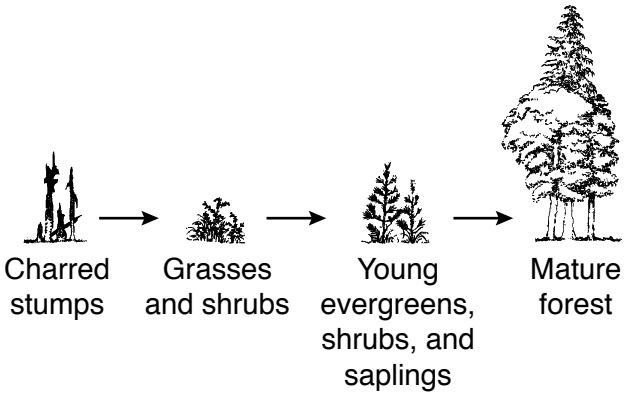
8 Which term is used to describe the sum of all the chemical processes in the human body?

(1) equilibrium
(2) inheritance
(3) metamorphosis
(4) metabolism

9 Why is an organism that reproduces *asexually* genetically identical to its parent?

(1) All of the offspring's genes came from the parent.
(2) All of the offspring's genes mutated to look like the parent's genes.
(3) The offspring inherited only half of the parent's genes.
(4) The offspring inherited only the parent's dominant genes.

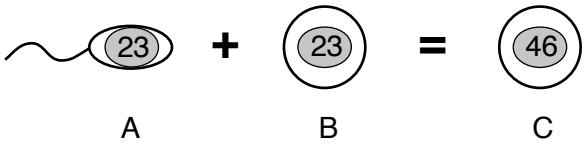
10 The sequence of diagrams below represents the plants present in the same area at different times over a 200-year period following a forest fire.



Which process is best represented by this sequence of diagrams?

(1) selective breeding
(2) ecological succession
(3) habitat destruction
(4) feeding relationships

11 The diagram below represents an event in human reproduction.



(Not drawn to scale)

The numbers in the drawing represent the number of

(1) genes
(2) cells
(3) chromosomes
(4) DNA

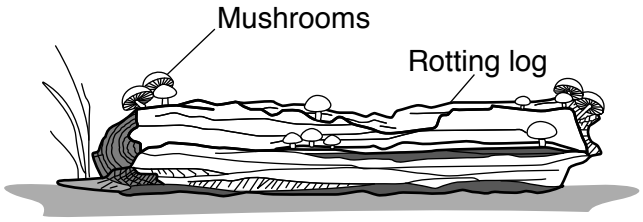
12 Abnormal cell division causes which health problem?

(1) infection
(2) cancer
(3) aging
(4) weight gain

13 Organisms are classified as producers or consumers according to the way they

(1) obtain energy
(2) release wastes
(3) produce offspring
(4) move from place to place

14 The diagram below shows mushrooms, a type of decomposer, growing on a rotting log.



Which statement best describes the relationship between the mushrooms and the log?

(1) The log uses the mushrooms as a source of oxygen.
(2) The log uses the mushrooms as a food source.
(3) The mushrooms use the log as a source of oxygen.
(4) The mushrooms use the log as a food source.

Base your answers to questions 15 and 16 on the diagram and information below and on your knowledge of science.

The diagram shows two variations of the same species of peppered moth resting on a tree. Originally, most peppered moths were light-colored and blended in with the light-colored bark of the trees in their environment. Due to pollution during the Industrial Revolution, the trees became blackened by soot. As a result, the population of light-colored moths decreased, due to predators. At the same time, the population of dark-colored moths increased, because they were less visible to predators.

(Not drawn to scale)

15 Which process is responsible for this type of adaptation over time?

(1) natural selection
(2) genetic engineering
(3) metamorphosis
(4) dynamic equilibrium

16 Which adaptation protected the dark-colored moths from predators?

(1) breeding
(2) camouflage
(3) migration
(4) hibernation

---

17 What causes infectious diseases in the human population?

(1) allergic reactions
(2) poor dietary habits
(3) toxic chemicals
(4) microorganisms

18 A Calorie is a unit used to measure

(1) energy
(2) vitamins
(3) density
(4) mass

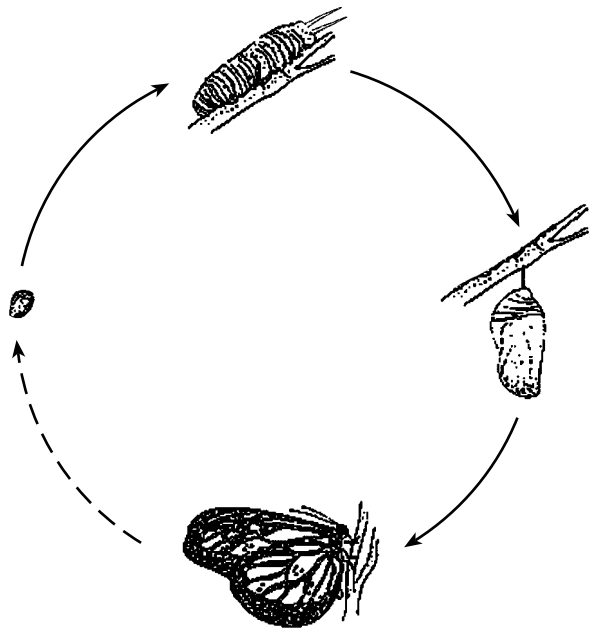
19 A community is composed of

(1) organisms of the same species in an area
(2) an organism's food supply in an area
(3) all of the different organisms living in an area
(4) the living and nonliving components in an area

20 The African savanna is a large grassland region with few trees that is hot and seasonally dry. A population of lions and a population of wild dogs living there are most likely to compete with each other for

(1) mates
(2) water
(3) air
(4) sunlight

21 The diagram below represents stages of development in a butterfly.



(Not drawn to scale)

This diagram represents the process of

(1) selective breeding
(2) natural selection
(3) metamorphosis
(4) germination

22 The inference that Earth's interior has an outer core and an inner core is based on studies of

(1) earthquake wave data
(2) glacier core samples
(3) recent fossil discoveries
(4) celestial observations

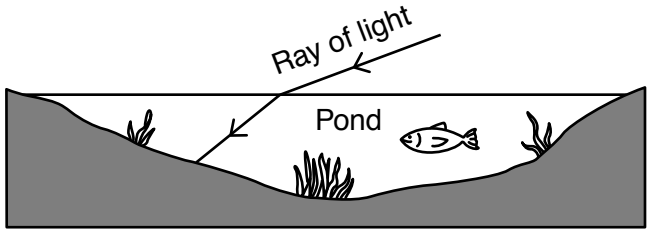
23 Why does the Sun generally appear to rise in the east, move across the sky, and set in the west each day?

(1) Earth rotates on its axis.
(2) Earth revolves around the Sun.
(3) The Sun rotates on its axis.
(4) The Sun revolves around Earth.

24 Which property of a mineral is tested by scratching it on a glass plate?

(1) conductivity
(2) melting point
(3) density
(4) hardness

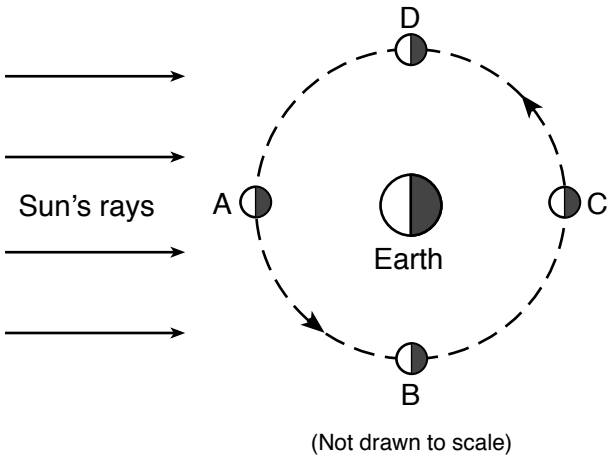
25 The diagram below represents the path of a ray of light as it passes from air into the water in a pond.



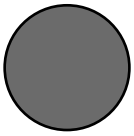
The change in the direction of the ray of light as it enters the water is called

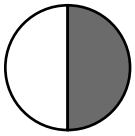
(1) absorption
(2) reflection
(3) refraction
(4) transmission

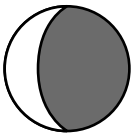
Base your answers to questions 26 and 27 on the diagram below and on your knowledge of science. The letters *A*, *B*, *C*, and *D* represent four positions of the Moon in its orbit around Earth. The nighttime sides of the Moon and Earth are shaded.

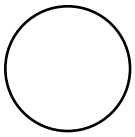


26 Which Moon phase will be seen from Earth when the Moon is at position *C*?


(1)


(3)


(2)


(4)

27 Approximately how many weeks will it take the Moon to move from position *B* to position *D*?

(1) one
(2) two
(3) three
(4) four

28 The gravitational force between two objects is most affected by their

(1) motion and volume
(2) motion and distance apart
(3) mass and volume
(4) mass and distance apart

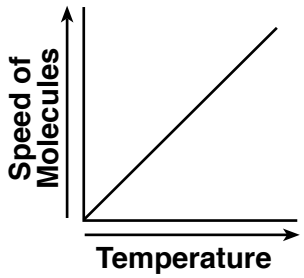
29 Earth's surface has a relatively thin, solid outer shell called the

(1) atmosphere
(2) lithosphere
(3) mantle
(4) outer core

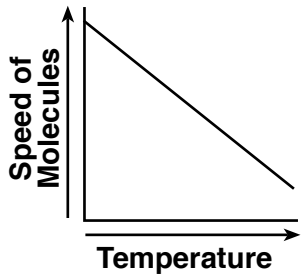
30 Which process results in the formation of water on the outside of a cold glass of iced tea on a warm day?

(1) boiling
(2) freezing
(3) condensation
(4) evaporation

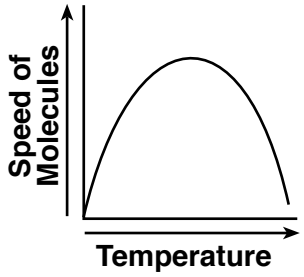
31 Which graph best shows the general relationship between the temperature of a gas and the speed of the molecules in that gas?



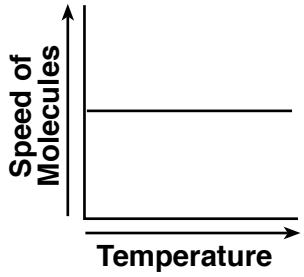
(1)



(3)

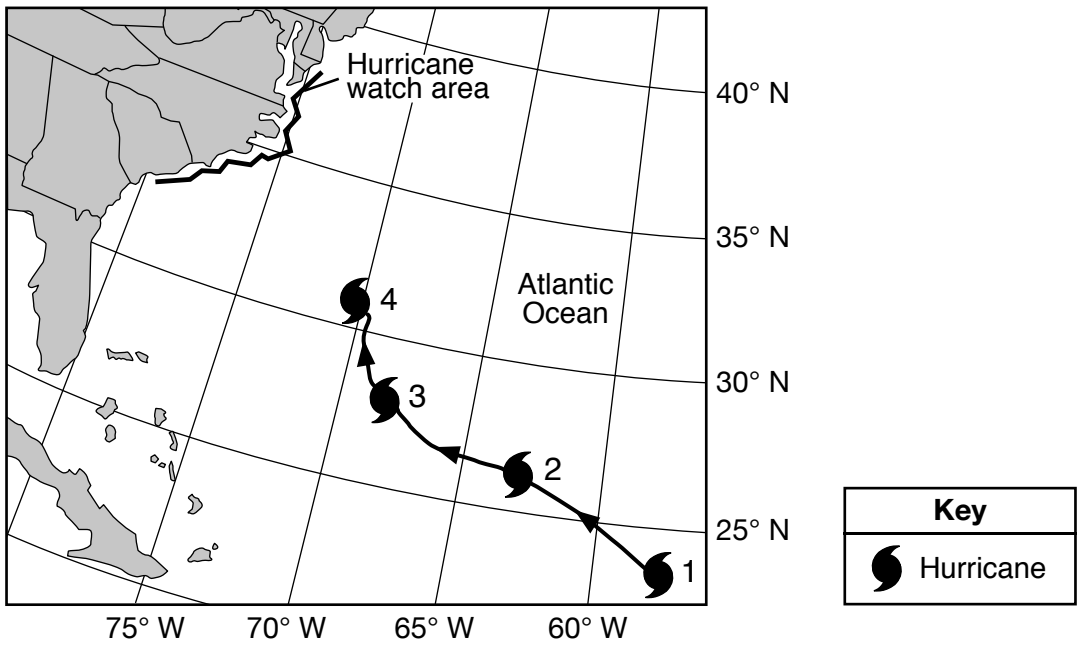


(2)



(4)

Base your answers to questions 32 and 33 on the map below and on your knowledge of science. The map shows the partial storm track of a hurricane and the hurricane watch area where it is predicted to reach land. Numbers 1 through 4 show positions of the hurricane on four different days at 12 noon.



32 Why was a hurricane watch posted for the coastal areas shown?

(1) to tell people where the hurricane started
(2) to encourage residents to travel to the watch area
(3) to warn people of life-threatening conditions
(4) to alert residents of climate changes

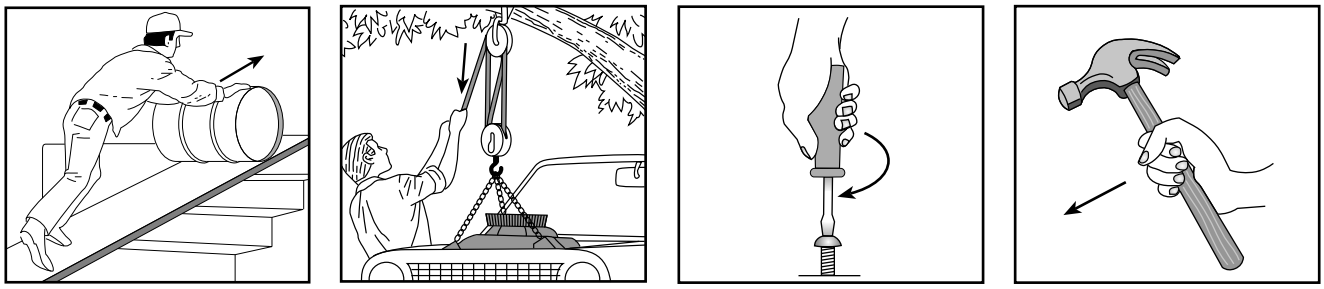
33 In which compass direction did the hurricane travel from day 1 to day 4?

(1) northwest
(2) northeast
(3) southwest
(4) southeast

---

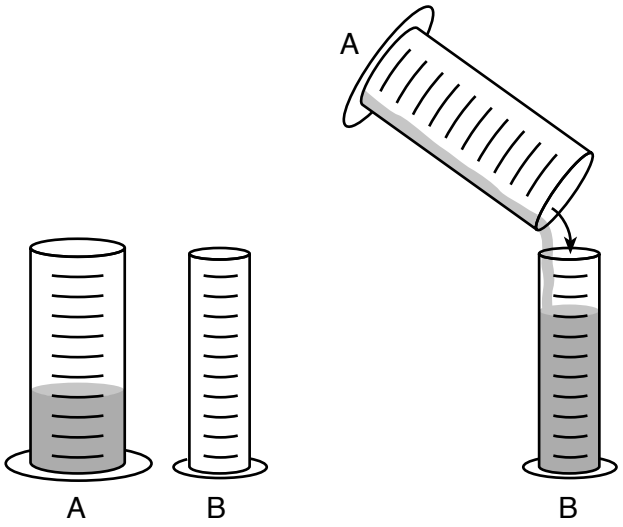
34 The diagrams below represent four simple machines. The arrows in each diagram indicate the direction of the force being applied.

Which machine is changing the direction of the force being applied by the person?



(1) (2) (3) (4)

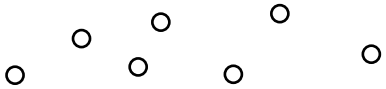
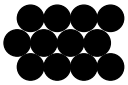
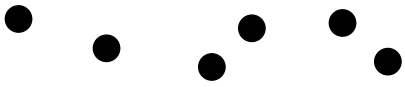
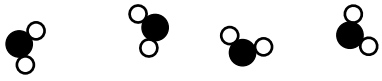
35 The diagrams below represent two cylinders. One hundred milliliters of a liquid was completely transferred from cylinder *A* to cylinder *B*.



Compared to the liquid that was in cylinder *A*, the liquid in cylinder *B* will have

(1) less mass and more volume
(2) less mass and the same volume
(3) the same mass and more volume
(4) the same mass and the same volume

Base your answers to questions 36 and 37 on the four models below that represent the arrangement of atoms in four samples of matter.

Model	Arrangement of Atoms
A	
B	
C	
D	

Key
○ = an atom of element X
● = an atom of element Y

36 Which model best represents the arrangement of atoms in a solid?

(1) *A*
(2) *B*
(3) *C*
(4) *D*

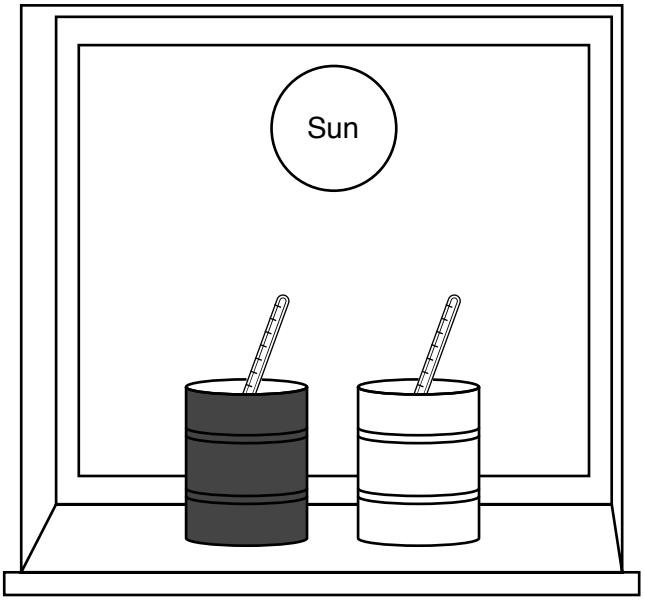
37 Which model best represents the arrangement of atoms in a compound?

(1) *A*
(2) *B*
(3) *C*
(4) *D*

38 Warm air rising in the atmosphere is an example of heat being transferred by

(1) absorption
(2) conduction
(3) convection
(4) radiation

39 The diagram below represents two cans of water at the same temperature. One can is painted black and the other can is painted white. The cans are placed on a sunny windowsill, and a thermometer is placed in each can to measure the water temperature.



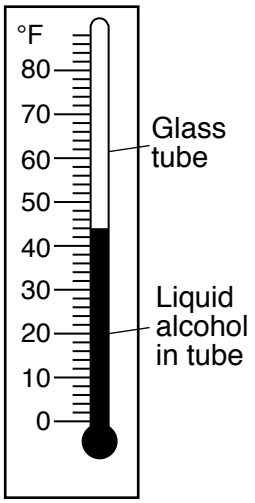
After four hours in the sunlight, the temperatures of the water in the cans will most likely be

(1) the same as when the cans were placed there
(2) higher, with the same temperature in both cans
(3) higher in the white can than in the black can
(4) higher in the black can than in the white can

40 As a candle burns, the chemical energy stored in the wax is transformed into

(1) heat and light
(2) heat and magnetism
(3) electricity and light
(4) electricity and magnetism

41 The diagram below represents a thermometer.



Which principle best explains how this thermometer works?

(1) A liquid changes to a gas when heated.
(2) A gas changes to a liquid when heated.
(3) A liquid expands when heated and contracts when cooled.
(4) A liquid contracts when heated and expands when cooled.

42 The diagrams below represent the same two magnets placed in four different positions. The North (N) and South (S) poles are labeled. At which position will the force of attraction between these two magnets be greatest?

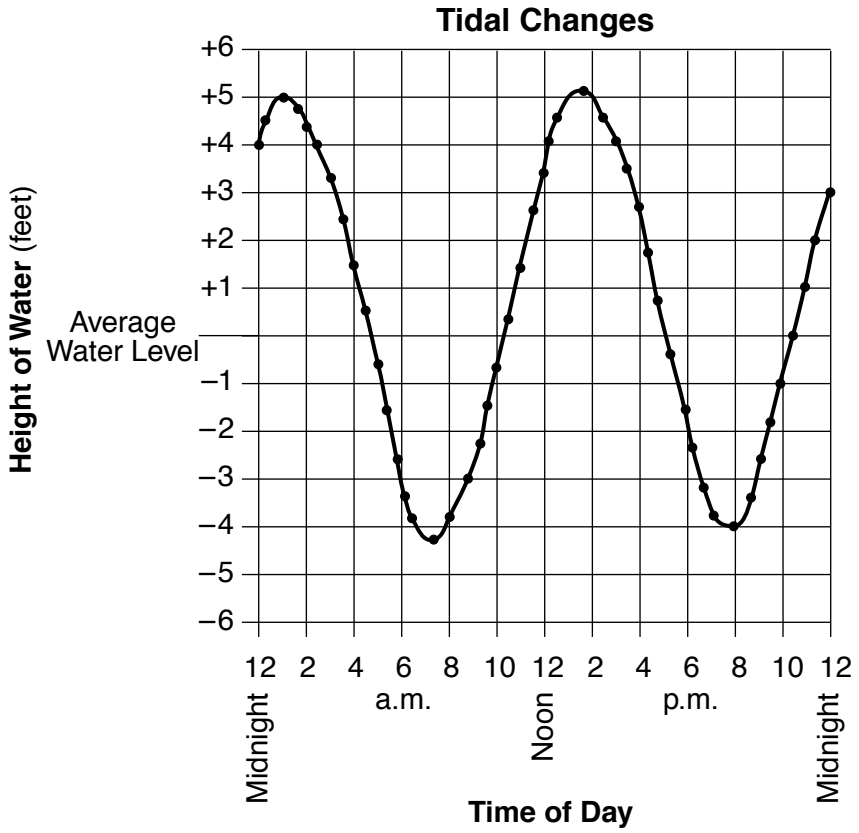
(1) S S

(2) N S

(3) N N

(4) N S

43 The graph below shows tidal changes at an ocean beach over a 24-hour time period.



What is the approximate time interval between the two high tides?

(1) 6 hours
(2) 9 hours
(3) 13 hours
(4) 24 hours

44 The label below shows the nutrition facts for a certain food.

Nutrition Facts

Serving Size 1/2 cup (30g)
Servings Per Container about 9

Amount Per Serving	
Calories 130	Calories from Fat 30
	% Daily Value*
Total Fat 3g	5%
Saturated Fat 0.5g	3%
Cholesterol 0mg	0%
Sodium 300mg	13%
Total Carbohydrate 21g	7%
Dietary Fiber 1g	4%
Sugars 1g	
Protein 4g	

How many servings of this food would a person need to eat to get approximately 8% of the recommended daily value of dietary fiber?

(1) 25
(2) 2
(3) 30
(4) 4

45 The data table below shows the yield of vegetables in a school's garden for three years. The yield is the number of pounds of vegetables harvested. The same number of each type of vegetable was planted every year.

Data Table

Type of Vegetable	Yield per Year (pounds)		
	2011	2012	2013
acorn squash	139	143	52
beet	93	122	81
butternut squash	147	103	30
onion	143	134	83
spinach	102	137	0

Which statement is an inference?

(1) The onion yield was greater than the beet yield in 2013.
(2) The butternut squash yield increased from 2011 to 2012.
(3) The spinach yield was 102 pounds in 2011 and 137 pounds in 2012.
(4) The acorn squash yield decreased from 2012 to 2013 due to lower temperatures.

Part II

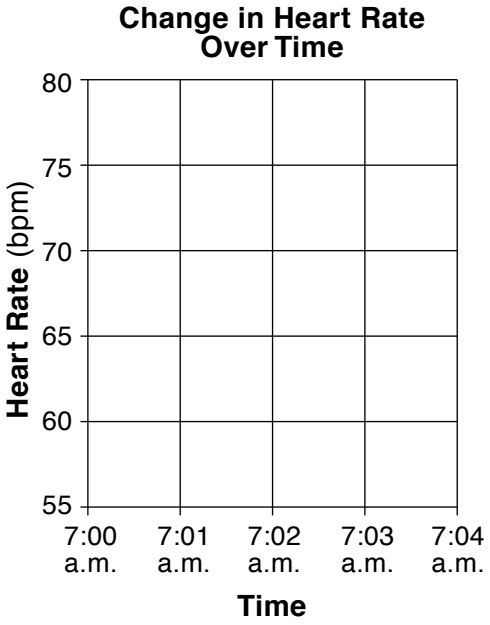
Directions (46–85): Record your answers in the spaces provided below each question.

46 The data table below shows a person's heart rate measured in beats per minute (bpm) at five different times in the beginning of a day.

Change in Heart Rate Over Time

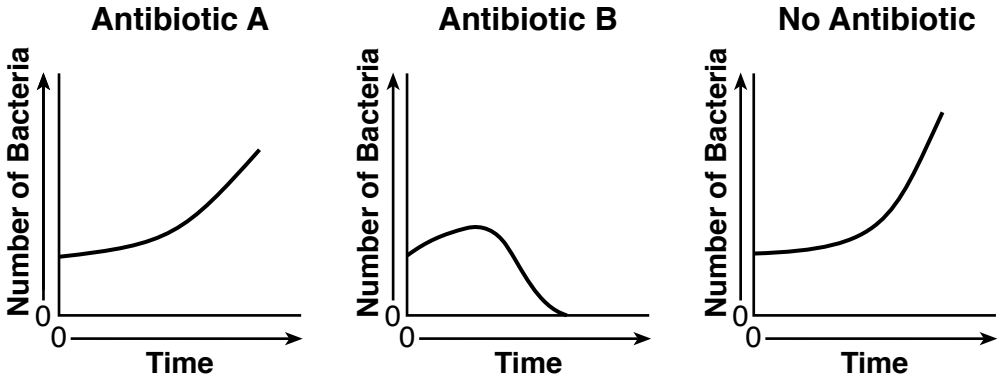
Time	Heart Rate (bpm)	Activity
7:00 a.m.	60	sleeping
7:01 a.m.	62	waking up
7:02 a.m.	65	sitting up in bed
7:03 a.m.	68	getting out of bed
7:04 a.m.	75	walking around bedroom

On the grid below, use an **X** to plot the heart rate for each time shown in the data table. Connect the **X**s with a line. [1]



Base your answers to questions 47 and 48 on the information and graphs below and on your knowledge of science.

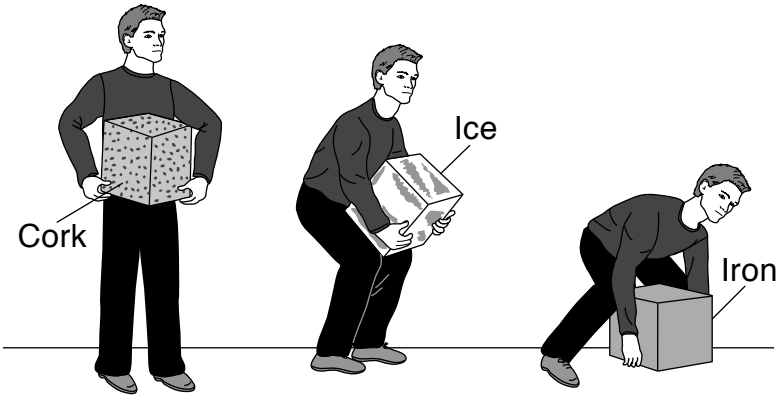
An antibiotic is a drug prescribed to people who are sick due to a bacterial infection. *Streptococcus* bacteria may cause a throat infection in humans. An experiment was designed to test the effects of two different antibiotics, *A* and *B*, on samples of *Streptococcus* bacteria. The graphs below show the results of this experiment.



47 Describe how the graph for antibiotic *B* shows that it was the most successful in controlling the number of bacteria. [1]

48 Explain why *no* antibiotic was added to one of the bacteria samples. [1]

Base your answers to questions 49 and 50 on the diagram below and on your knowledge of science. The diagram represents how easily a student is able to lift blocks of equal volumes that are made of different materials.



49 Describe *one* way that the student can determine the exact volume of one of the three blocks. [1]

_____

_____

_____

50 Identify the property of the iron block that makes it more difficult to lift than the cork block. [1]

_____

Base your answers to questions 51 and 52 on the information below and on your knowledge of science.

A student dissolved a 40-gram block of a salt in 100 grams of warm water at 45°C. The solution was allowed to cool down to 24°C. The student noticed that some of the salt came out of the solution and settled to the bottom of the beaker. It is later determined that 12 grams of the salt came out of the solution.

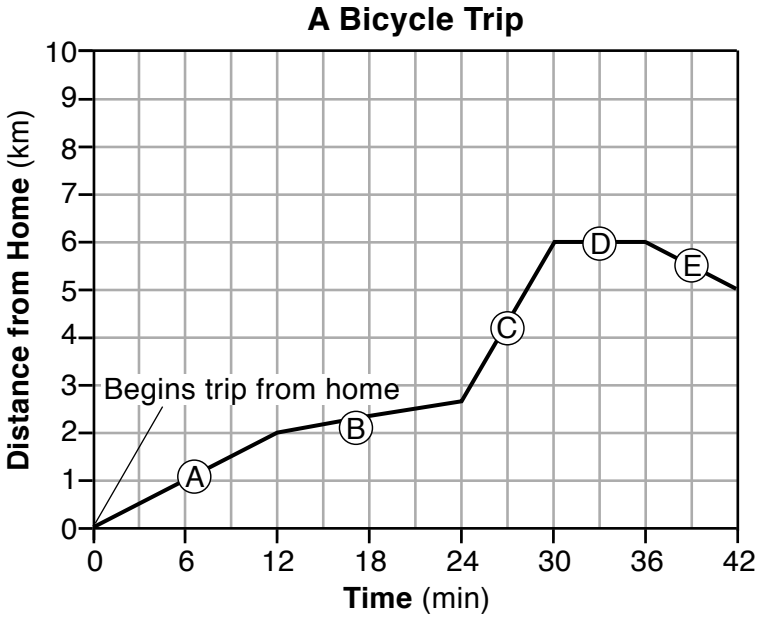
51 How many grams of the salt were dissolved in the solution at 24°C? [1]

_____ **g**

52 State the general relationship between the temperature of the water and the amount of the salt that will dissolve in the water. [1]

_____

Base your answers to questions 53 and 54 on the graph below and on your knowledge of science. The graph shows the position (distance from home) of a bicycle rider on a 42-minute trip. Letters *A* through *E* are time intervals during the trip. The key defines the length of each interval.



Key to Intervals
A 0-12 minutes
B 12-24 minutes
C 24-30 minutes
D 30-36 minutes
E 36-42 minutes

53 Use the equation below to calculate the bicycle rider's average speed in kilometers per minute for the first 30 minutes of the trip. [1]

$$\frac{\text{distance (km)}}{\text{time (min)}} = \text{average speed}$$

_____ **km/min**

54 Describe how the graph shows that the rider stopped during time interval *D*. [1]

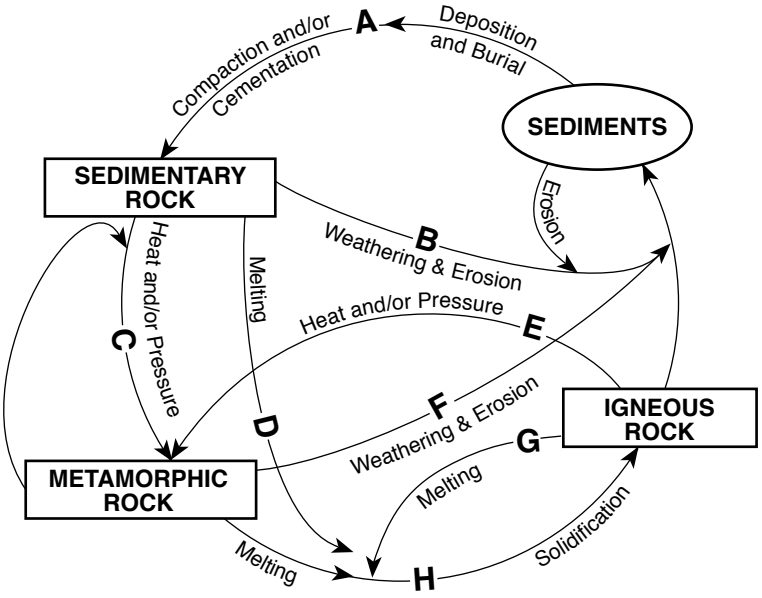
_____

_____

_____

Base your answers to questions 55 and 56 on the model of the rock cycle below and on your knowledge of science. The model represents the processes involved in the formation of different types of rocks. Some of these processes are labeled *A* through *H*.

Rock Cycle in Earth's Crust



55 Complete the table below by writing the letter of the process from the rock cycle diagram that is being described by each statement in the table. [1]

Rock Cycle Statement	Letter of Process from Rock Cycle Diagram
Pieces of igneous rock are compressed and glued together to form a sedimentary rock.	
Metamorphic rock becomes liquid and crystallizes to form igneous rock.	
Sedimentary rock is broken down into sediments and transported by a stream.	

56 Based on the rock cycle diagram, identify *one* process involved in the formation of metamorphic rock. [1]

_____

_____

Base your answers to questions 57 through 59 on the information below and on your knowledge of science.

A student placed three identical plant seedlings in soil in three identical containers and gave each seedling a different amount of water each day. The student measured the height of each seedling every day for four days. The results are shown in the data table below.

Data Table

Seedling	**Amount of Water Given Daily** (milliliters)	**Height of Seedling** (centimeters)			
		Day 1	**Day 2**	**Day 3**	**Day 4**
1	5	2.0	2.3	2.5	2.8
2	10	2.0	2.5	3.0	3.5
3	20	2.0	3.0	4.0	5.0

57 Identify the dependent (responding) variable in this experiment. [1]

_____

58 Describe the general relationship between the amount of water each seedling received and its height on day 4. [1]

_____

_____

59 The plant seedlings and containers were identical. Identify *one* additional factor that should be held constant in this experiment. [1]

_____

Base your answers to questions 60 through 62 on the information below and on your knowledge of science.

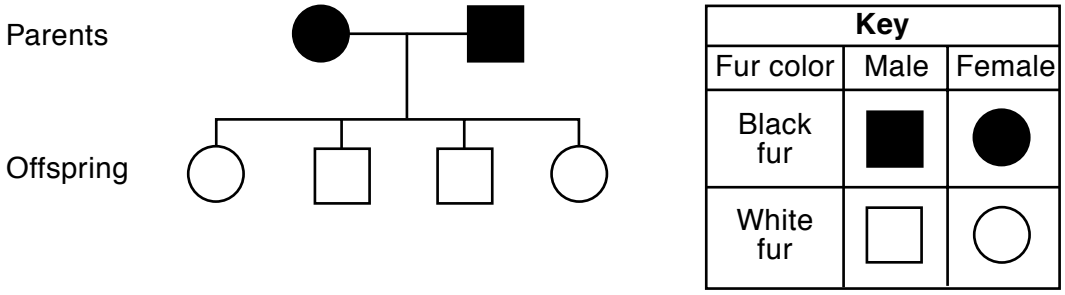
In mice, the gene for black fur, *B*, is dominant over the gene for white fur, *b*. The Punnett square below shows the probability of the results of a cross between two mice, $BB \times Bb$.

	B	*B*
B	*BB*	*BB*
b	*Bb*	*Bb*

Key
B = black b = white

60 The pedigree chart for the $BB \times Bb$ cross is shown below. The shading for the parents is shown.

Complete the pedigree chart to show fur color of the offspring by either shading or not shading each circle and square. [1]



61 How many generations of mice are shown in the pedigree chart? [1]

_____ **generations**

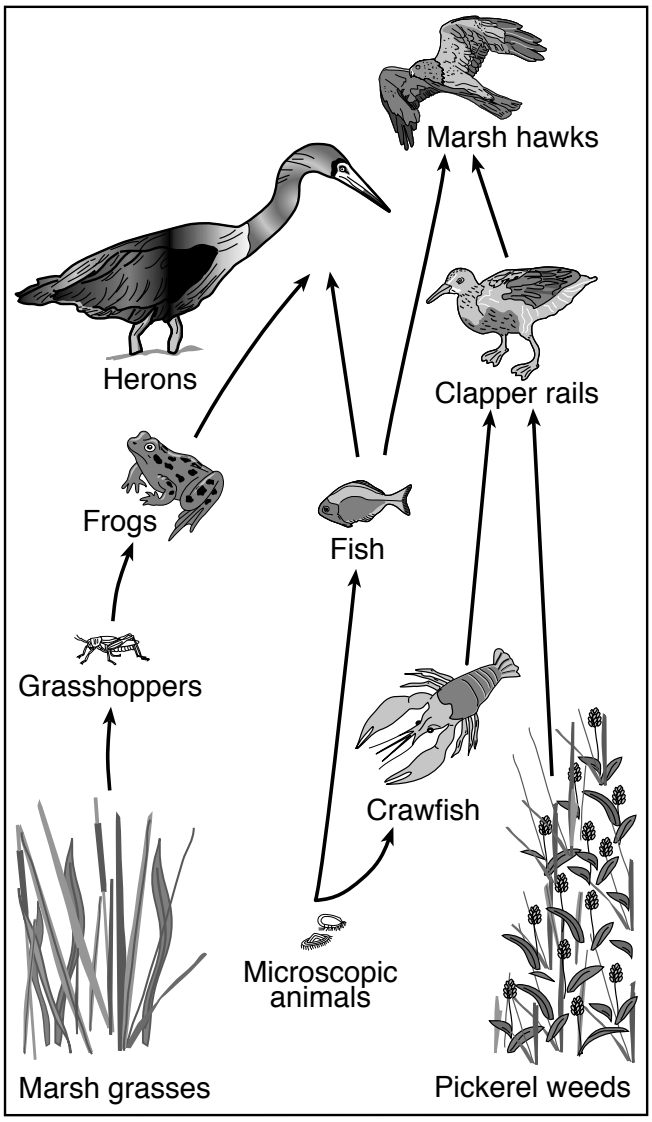
62 Which information about the offspring does the pedigree chart provide that is *not* provided by the Punnett square above? [1]

_____

_____

_____

Base your answers to questions 63 through 64 on the diagram of the partial food web below and on your knowledge of science.



(Not drawn to scale)

63 Identify the *two* organisms in this food web that belong to the plant kingdom. [1]

_____ and _____

64 Explain *one* reason why the population of marsh grasses might *increase* if the population of herons *decreased*. [1]

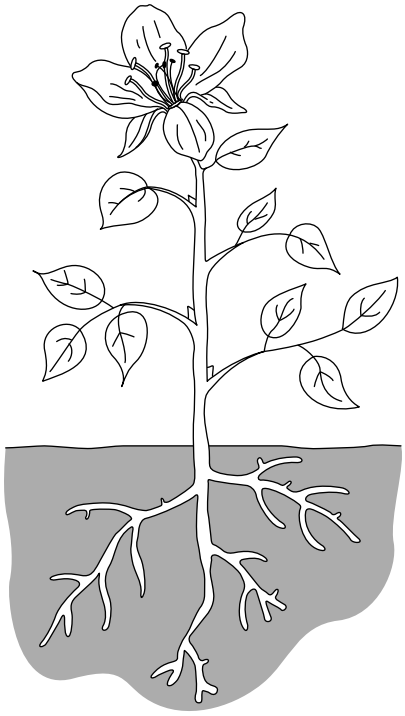
_____

_____

_____

_____

Base your answers to questions 65 through 67 on the diagram below and on your knowledge of science. The diagram represents a plant growing in soil.



65 Describe *one* function of the plant's stem. [1]

_____

_____

66 People sometimes use certain chemicals to kill unwanted plants. These chemicals seep into the ground and damage the roots. Explain why damage to the roots could kill the plant. [1]

_____

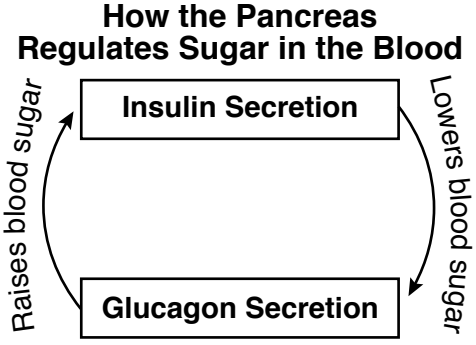
_____

_____

67 Identify the process carried out by the plant that produces a sugar (glucose). [1]

_____

68 The pancreas is a human body organ. One of its functions is to secrete the hormones insulin and glucagon. The diagram below represents how these two hormones work together to regulate the amount of sugar in a person's blood.



Describe the function of the hormone insulin. [1]

Base your answers to questions 69 and 70 on the data table below and on your knowledge of science. A student recorded the number of Calories that he consumed and calculated the number of Calories that he burned each day. The data collected for five days are shown below.

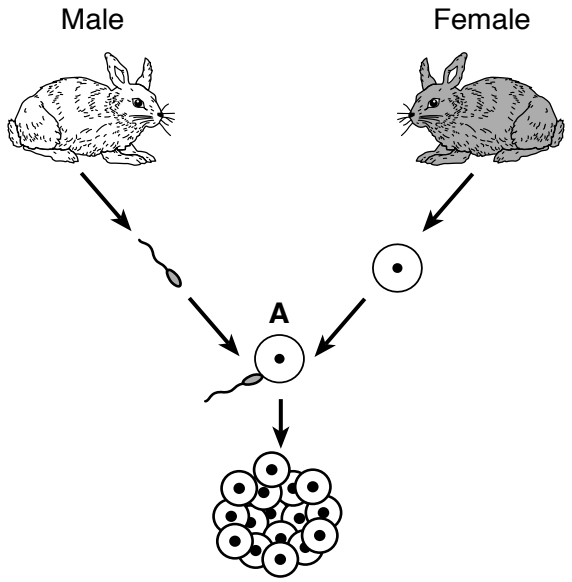
Data Table

Day	Calories Consumed	Calories Burned
1	2500	1800
2	2200	1700
3	2100	1700
4	2600	1500
5	1900	1600

69 The student noticed that he had a slight weight gain at the end of the five days. Using data from the table, give *one* reason why his weight increased. [1]

70 Describe *one* lifestyle change the student could make to keep his weight stable. [1]

Base your answers to questions 71 and 72 on the diagram below and on your knowledge of science. The diagram represents the sexual reproduction and development of rabbits. One process is labeled *A*.

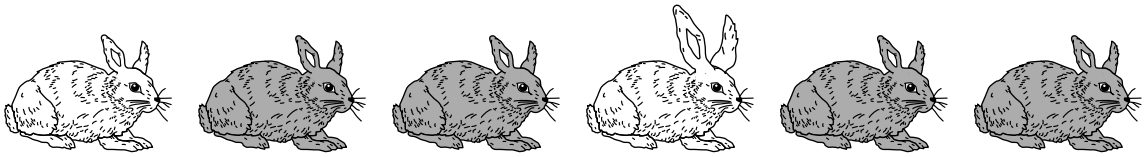


(Not drawn to scale)

71 Identify the sexual reproductive process represented at *A*. [1]

_____

72 Some of the offspring from these rabbits are represented in the diagram below. One of them has longer ears than the others.



Neither parent has the gene that causes longer ears. Identify *one* process that might cause the appearance of this new trait in the offspring. [1]

_____

Base your answers to questions 73 and 74 on the chart below and on your knowledge of science. The chart lists the year of and some reasons for the extinction of three species.

Extinct Species	Year of Extinction	One Reason for Extinction
Darwin's rice rat	1930	introduction of brown and black European rats to the area
Palestinian painted frog	1950	marsh habitat was drained
black-spotted damselfish	1984	increase in ocean water temperatures

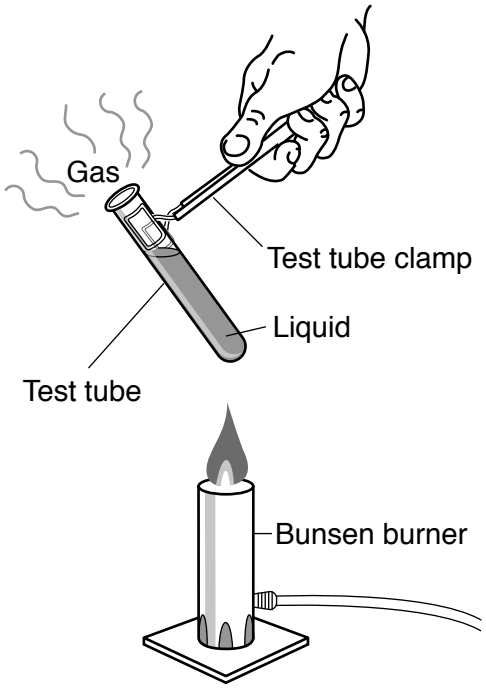
73 Describe *one* reason why the introduction of brown and black European rats may have led to the extinction of Darwin's rice rat. [1]

_____

74 Identify *one* piece of evidence that scientists use to prove that these three organisms once existed on Earth. [1]

_____

Base your answers to questions 75 and 76 on the diagram below and on your knowledge of science. The diagram represents an experiment during which a liquid is heated in a test tube until it turns into a gas.



(Not drawn to scale)

75 Describe *one* safety procedure that students should follow during this experiment. [1]

_____

_____

76 Explain why the liquid evaporating to a gas is an example of a physical change, rather than a chemical change. [1]

_____

_____

_____

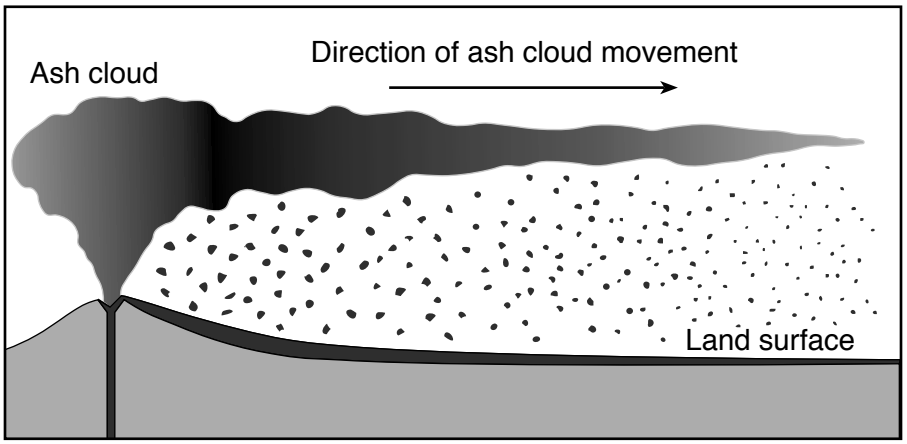
Base your answers to questions 77 and 78 on the information and diagram below and on your knowledge of science.

Volcanic Eruption

In 1783, a volcano in Iceland erupted with enormous force, pouring out large amounts of lava and volcanic ash. After the eruption, a cloud of suspended ash particles shadowed western Europe for months, resulting in unusually cold weather that summer.

The diagram below represents a side view of a volcanic eruption similar to the one that occurred in 1783. The arrow on the diagram represents the direction that the ash cloud spread after the volcanic eruption occurred.

Volcanic Eruption



77 Identify *one* factor that caused the ash cloud to spread in the direction indicated by the arrow in the diagram. [1]

_____

78 Explain how the ash cloud caused the unusually cold summer in western Europe in 1783. [1]

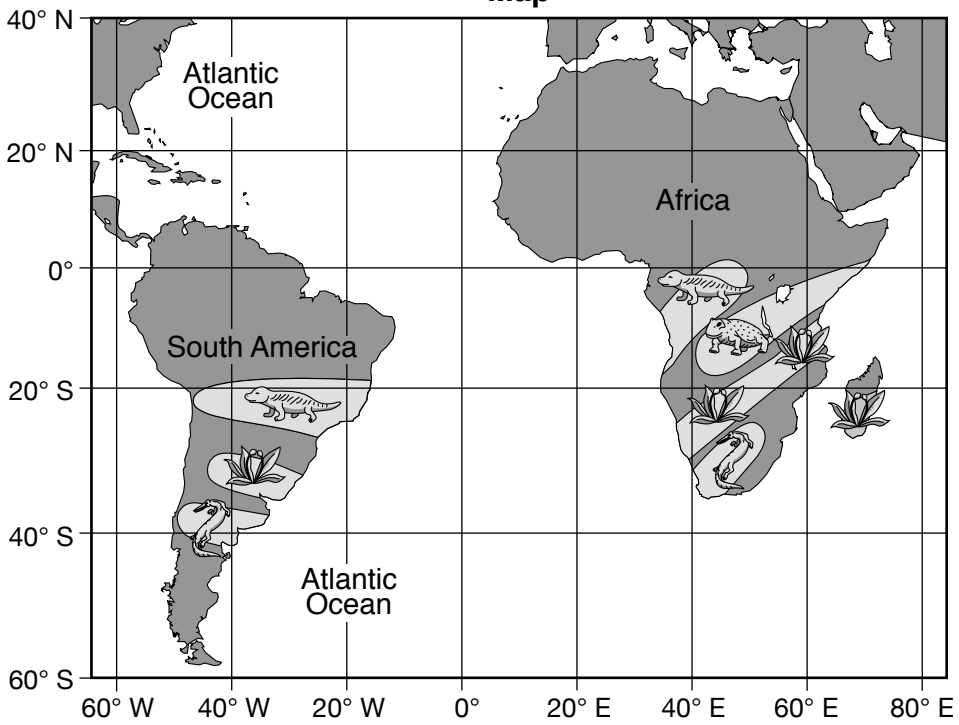
_____

_____

_____

Base your answers to questions 79 and 80 on the map below and on your knowledge of science. The map shows four fossils found in South America and Africa. Lighter-shaded areas and symbols on the continents represent regions where these four fossils are found. The key shows the name and symbol representing each fossil on the map.

Map



Key

Fossil Symbol				
Fossil Name	*Cynognathus*	*Glossopteris*	*Lystrosaurus*	*Mesosaurus*

79 Identify the fossil that would most likely be found at 20° S, 40° W. [1]

_____

80 Describe how the fossil locations on the map provide evidence that the continents of South America and Africa were once connected. [1]

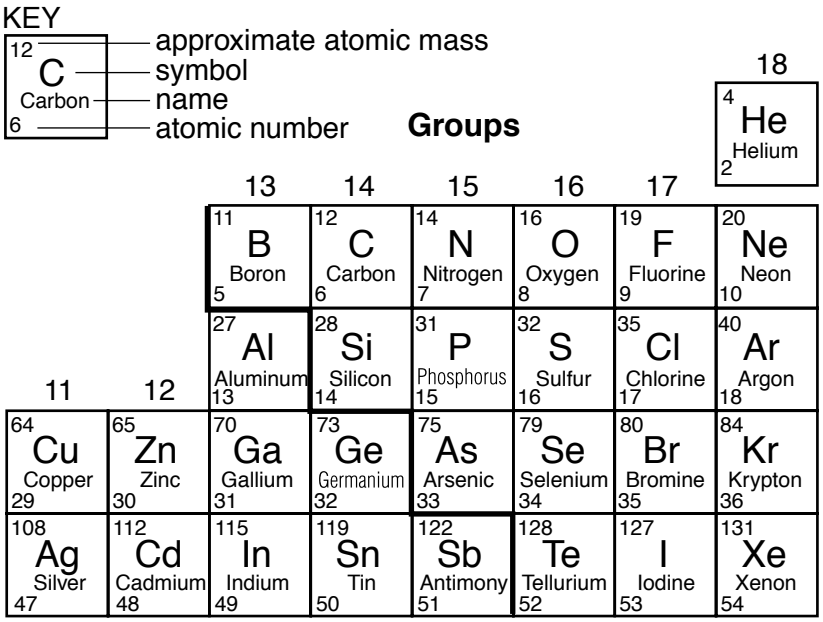
_____

_____

_____

81 A portion of the Periodic Table of the Elements is shown below.

Portion of the Periodic Table of the Elements



A student constructed the following chart to classify the elements Cl, C, Ag, Zn, He, and P.

Element Classification	Element Symbol	
metals	Zn	Ag
nonmetals	P	C
noble gases	Cl	He

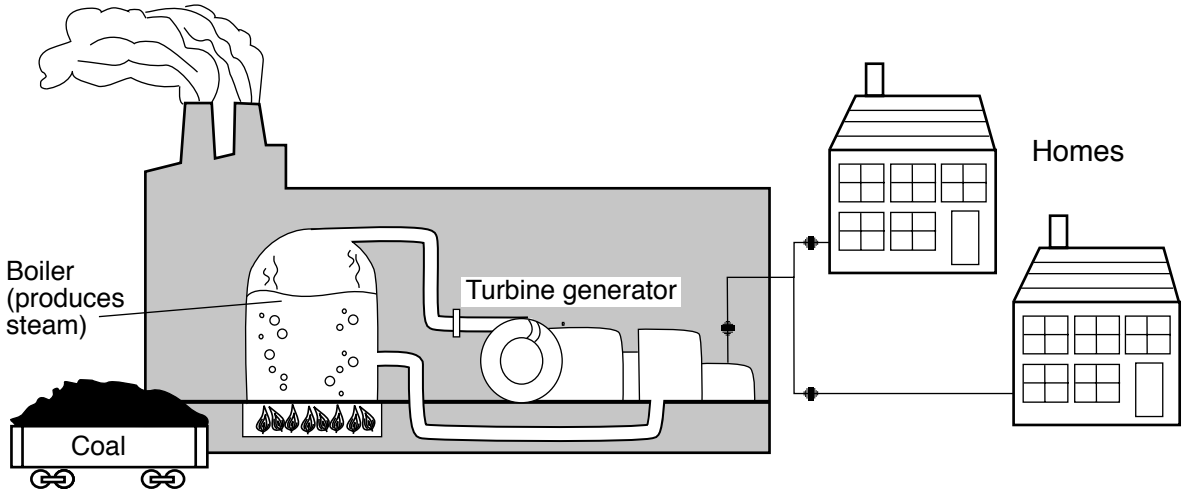
Identify the element that the student classified *incorrectly* in this chart. Explain your answer. [1]

Element: _____

Explanation: _____

_____

Base your answers to questions 82 and 83 on the diagram below and on your knowledge of science. The diagram represents the steps necessary to provide electricity to area homes. In a power facility, coal is burned to produce heat energy to boil water. The steam produced is used to power the generator, which produces electricity.

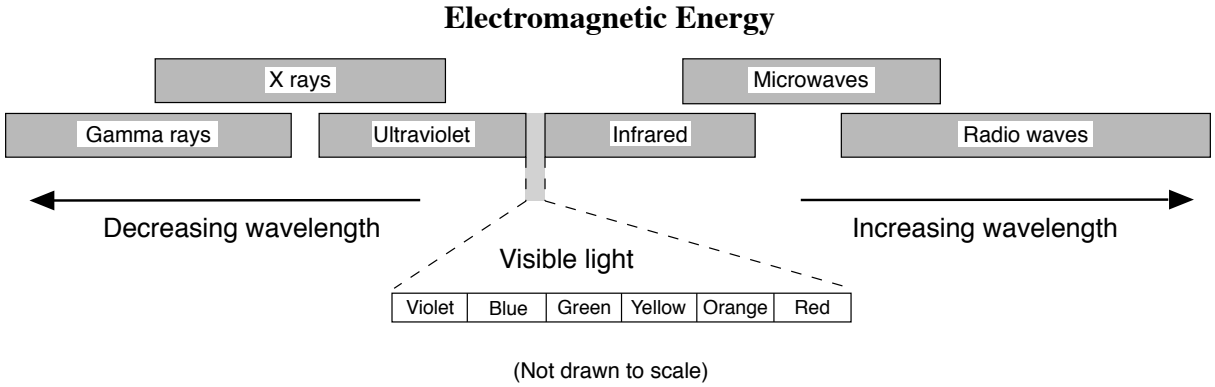


(Not drawn to scale)

82 Describe *one negative* effect that the burning of coal to produce electricity has on the environment. [1]

83 Describe *one* action that area homeowners could take to *reduce* the amount of coal needed by the power facility. [1]

84 The model below represents the relative wavelengths of different forms of electromagnetic energy.

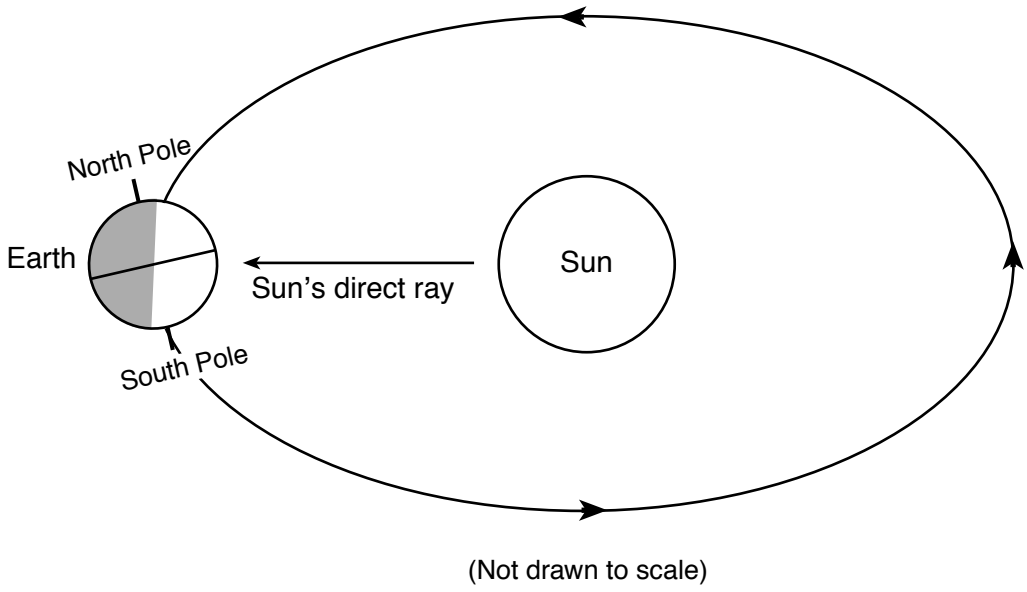


List *two* forms of electromagnetic energy that have shorter wavelengths than visible light. [1]

(1) _____

(2) _____

85 The diagram below represents Earth in one position in its orbit around the Sun.



Describe *one* piece of evidence shown in the diagram that indicates the winter season is occurring in the Northern Hemisphere. [1]

_____

_____

_____

UNIVERSITY OF THE STATE OF NEW YORK

GRADE 8

INTERMEDIATE-LEVEL SCIENCE TEST

JUNE 2017 WRITTEN TEST

FOR TEACHERS ONLY

SCORING KEY AND RATING GUIDE

Note: All schools (public, nonpublic, and charter) administering the Grade 8 Intermediate-Level Science Test 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:

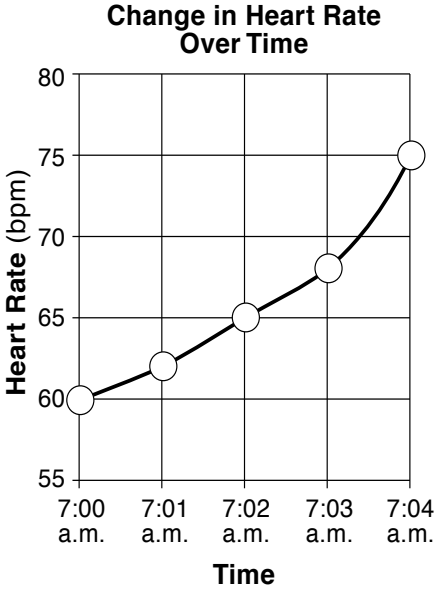
1. One credit will be awarded for each correct response.
2. Credit will not be allowed if two or more answers have been marked for the same question.
3. The raw score for Part I will be determined by counting the number of correct responses.

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

Question Number	Correct Response	Question Number	Correct Response	Question Number	Correct Response
1	1	16	2	31	1
2	3	17	4	32	3
3	4	18	1	33	1
4	3	19	3	34	2
5	1	20	2	35	4
6	4	21	3	36	2
7	2	22	1	37	4
8	4	23	1	38	3
9	1	24	4	39	4
10	2	25	3	40	1
11	3	26	4	41	3
12	2	27	2	42	2
13	1	28	4	43	3
14	4	29	2	44	2
15	1	30	3	45	4

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

46 [1] Allow 1 credit if the centers of *all five* **X**s are within or touch the circles shown and correctly connected with a line that passes within or touches the circles.



Note: Allow credit if a symbol other than an **X** is used to plot the data.
Do *not* allow credit for a bar graph.
Do *not* allow credit if no line is drawn.
It is recommended that an overlay of the same scale as the student test booklet be used to ensure reliability in rating.

47 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The number of bacteria decreased to 0.

— The bacteria treated with antibiotic *B* all died.

— Antibiotic *B* killed all of the bacteria.

— The number of bacteria decreased.

— The line started to rise then fell.

48 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— It is the control in the experiment.

— It is needed to see what happens without treatment.

49 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Find the length, width, and height, and then multiply.

— Calculate the volume by using L × W × H.

— Measure the amount/volume of water displaced.

Note: Allow credit for "s^3" since the block looks like a cube. Do *not* allow credit for "measure length, width, and height" alone as it does not specify multiplication.

50 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— density

— mass

— weight

— It is heavier.

51 [1] Allow 1 credit for 28 grams.

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

— As temperature increases, solubility increases.

— As the temperature decreases, the amount of salt that can be dissolved decreases.

— a direct relationship

— More salt dissolves as the temperature gets hotter.

53 [1] Allow 1 credit for 0.2 *or* .2 *or* $\frac{1}{5}$ km/min.

Note: Do *not* allow credit for $\frac{6}{30}$ (shows a substitution but not a calculation).

54 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The distance did not change.

— The graph line is horizontal during that time./plateau on graph

— The speed was 0 during interval *D*.

Note: Do *not* allow credit for "it was a straight line" (all intervals are straight lines); "it was constant" (all intervals shown have constant slopes).

55 [1] Allow 1 credit if *all three* process letters are correctly filled in as shown in the table below.

Example of a 1-credit response:

Rock Cycle Statement	Letter of Process from Rock Cycle Diagram
Pieces of igneous rock are compressed and glued together to form a sedimentary rock.	*A*
Metamorphic rock becomes liquid and crystallizes to form igneous rock.	*H*
Sedimentary rock is broken down into sediments and transported by a stream.	*B*

Note: Allow credit if student writes out description of process instead of using the letter.

56 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— heating/heat
— pressuring/pressure
— heat and/or pressure
— *C*
— *E*

57 [1] Allow 1 credit for height of seedlings *or* height.

58 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The seedlings that received the most water grew the most.
— The more water the seedlings got, the taller they grew.
— Height increased with more water.
— The seedlings that got less water did not grow as tall.
— direct relationship
— the more water, the faster it grows

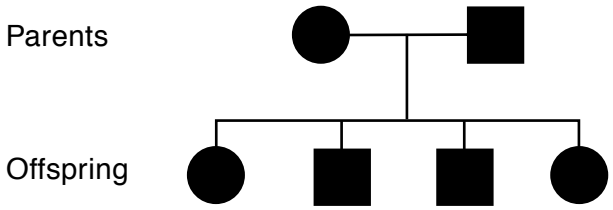
59 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— sunlight/amount of sunlight seedlings are exposed to
— kind of fertilizer given
— air temperature
— water temperature
— amount of soil
— type of soil
— same tool to measure/same ruler
— grown in the same location
— Measure the heights of all the plants at the same time each day.
— same type of water

Note: Do *not* allow credit for water *or* amount of water (Water is the independent variable.).

60 [1] Allow 1 credit if *all four* of the offspring are shaded in.

Example of a 1-credit response:



Key		
Fur color	Male	Female
Black fur	■	●
White fur	□	○

61 [1] Allow 1 credit for two *or* 2 generations.

62 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The pedigree chart shows male/female.
— The pedigree chart shows the number of offspring, whereas the Punnett square only shows probability.

Note: Do *not* allow credit for "phenotype" or "what they look like" because this information can also be inferred from a Punnett square.

63 [1] Allow 1 credit for *two* acceptable answers: marsh grasses/grasses *and* pickerel weeds/weeds.

64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— There will be more frogs, so they will eat more grasshoppers and there will be fewer grasshoppers to eat the marsh grasses.

— Herons eat frogs, so the population of frogs will increase. Frogs eat grasshoppers, so the population of grasshoppers will decrease. Then there will be fewer grasshoppers to eat the grasses.

Note: Do *not* allow credit for "herons eat frogs, frogs eat grasshoppers" (It only illustrates feeding relationships in the food web, and does not explain how one population may affect the others.).

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

— provides support

— transports water to the leaves and flowers

— moves nutrients through the plant

— A green stem can carry out photosynthesis/release oxygen.

— storing water

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

— The roots might not be able to take in water.

— The damaged roots could not provide support for/anchor the plant.

— The roots will not absorb nutrients.

— The roots might not be able to store food.

67 [1] Allow 1 credit for photosynthesis.

68 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— lowers the amount of sugar in the blood

— removes sugar from the blood

— Insulin stimulates cells to absorb sugar from the blood.

— lowers blood sugar for people with diabetes

Note: Do *not* allow credit for control/regulate blood sugar (both insulin and glucagon regulate blood sugar).

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

— The student was eating too much.

— The student had been eating more Calories than he had been burning each day.

— The student was not active enough.

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

— Consume fewer Calories.

— Get more exercise/activity.

— Eat less.

— Select lower-Calorie foods.

— Go on a diet.

— Burn the same number of Calories that the student consumes each day.

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

— fertilization

— The sperm and egg are joining together.

— A zygote is forming.

— conception

72 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— mutation

— change in DNA

— change in genetic material

Note: Do *not* allow credit for adaptation/evolution (the trait has not been selected for by nature in the diagram).

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

— There was increased competition for food and resources.

— They carried a disease that killed Darwin's rats.

— The European rats preyed on the rice rats.

74 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— preserved specimens
— animal remains/skeletons
— photographs or illustrations
— textbooks
— fossils

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

— Monitor the flame at all times.
— Wear safety goggles.
— Point the test tube away from everyone.
— Tie back long hair/loose clothing.
— Wear an apron.
— Wear protective clothing.
— Wear insulated gloves.
— Read and follow directions.
— Do not fool around.

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

— The liquid has changed only its state of matter/phase.
— It is still the same type of matter.
— No new substances have been formed.
— because it's only changing form, not its substance
— The gas is still the same substance, it's only changing its phase.

77 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— wind direction
— prevailing winds
— global wind patterns
— upper air currents/jet stream
— wind

78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Sunlight could not get through.

— The ash cloud blocked sunlight.

— Some of the Sun's rays were absorbed and/or reflected by the ash particles.

79 [1] Allow 1 credit for *Cynognathus*.

80 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— When South America and Africa are placed together, the fossil locations match.

— The South American fossils are also found in Africa.

— The fossils on the east coast of South America match the fossils on the west coast of Africa.

— Fossils are found on both continents/both locations.

— Fossil locations match up.

Note: Do *not* allow credit for "the continents fit together like a puzzle." (This does not explain fossil evidence.)

81 [1] Allow 1 credit for Cl (chlorine) *and* an acceptable response. Acceptable responses include, but are not limited to:

— Cl is not a noble gas.

— Chlorine is in group 17, not group 18.

— Cl is not in group 18.

— Cl is a nonmetal.

Note: Do *not* allow credit for "Chlorine because it is not a gas." (Cl is not a noble gas, but is a gas at room temperature.)

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

— pollution

— acid rain

— global warming/increased carbon dioxide or other greenhouse gases

— Mining coal can disrupt habitats.

— smoke particles in air

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

— Use less electricity.
— Use a different source of energy.
— Insulate their homes.
— Homeowners could install solar panels.
— Homeowners could install energy-efficient appliances.
— Turn off lights and appliances when not in use.

84 [1] Allow 1 credit for *two* acceptable responses: ultraviolet light (UV) *or* x rays *or* gamma rays.

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

— The Northern Hemisphere is tilted away from the Sun.
— The Sun's direct ray strikes Earth below the equator.
— The South Pole is tilted toward the Sun.
— The Northern Hemisphere is more shaded./has more nighttime than daytime.
— The North Pole is in complete darkness.
— It is tilted away from the Sun.

Note: Do *not* allow credit for:

— The dark side of Earth is not facing the Sun.
(This explains day and night, not seasons.)
— Northern Hemisphere is facing away from the Sun.
(Both hemispheres are facing away.)
— The Northern Hemisphere is farther away from the Sun.
(distance from the Sun does not determine seasons)