

THE UNIVERSITY OF THE STATE OF NEW YORK

# GRADE 8

## INTERMEDIATE-LEVEL SCIENCE TEST

### WRITTEN TEST

JUNE 4, 2012

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

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

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 38 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.**

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



## Part I

### DIRECTIONS

There are 45 questions on Part I of the test. Each question is followed by three or four choices, numbered 1 through 4. Read each question carefully. Decide which choice is the best answer. On the separate answer sheet, mark your answer in the row of circles for each question by filling in the circle that has the same number as the answer you have chosen.

Read the sample question below.

#### Sample Question

Earth gets most of its light from

- (1) the stars
- (2) the Sun
- (3) the Moon
- (4) other planets

The correct answer is **the Sun**, which is choice number **2**. On your answer sheet, look at the box showing the row of answer circles for the sample question. Since choice number **2** is the correct answer for the sample question, the circle with the number **2** has been filled in.

Answer all of the questions in Part I in the same way. Mark only one answer for each question. If you want to change an answer, be sure to erase your first mark completely. Then mark the answer you want.

You will not need scrap paper. You may use the pages of this test booklet to work out your answers to the questions.

You may use a calculator if needed.

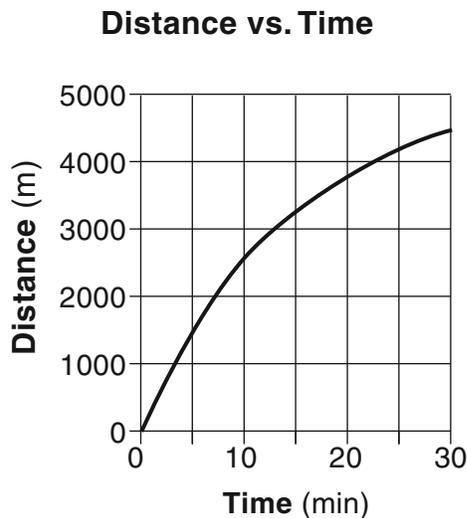
When you are told to start working, turn the page and begin with question 1. Work carefully and answer all of the questions in Part I.

When you have finished Part I, go right on to Part II. Answer all of the questions in Part II.



- 3 Which statement is an inference?
- (1) A thermometer shows that the air temperature is 56°F.
  - (2) A mineral sample of galena produced a gray-black streak when tested.
  - (3) Based on previous data, ten hurricanes may occur in the year 2013.
  - (4) A weather vane indicates the wind is coming from the west.

4 The graph below shows a runner's distance from the starting line during a 30-minute race. Distance was measured in meters (m). Time was measured in minutes (min).



During which time interval was the runner moving at the greatest average speed?

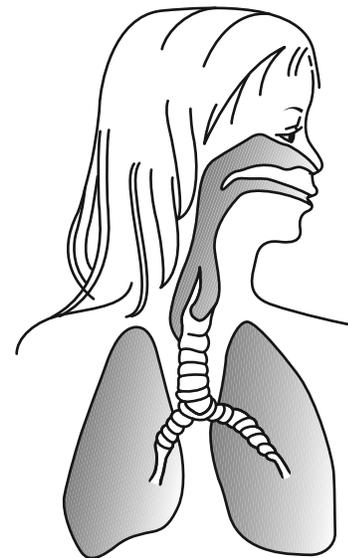
- (1) 0–5 minutes
  - (2) 10–15 minutes
  - (3) 15–20 minutes
  - (4) 25–30 minutes
- 5 Which human organ system produces most of the hormones that regulate body functions?
- (1) digestive
  - (2) nervous
  - (3) muscular
  - (4) endocrine
- 6 The fur of the snowshoe rabbit changes to a lighter color in the winter. This allows the rabbit to blend in with its surroundings. This change is an example of
- (1) extinction
  - (2) competition
  - (3) biological adaptation
  - (4) ecological succession

7 The label below shows the nutrition facts for a snack food.

<b>Nutrition Facts</b>	
Serving Size 1/2 cup (30g)	
Servings Per Container 9	
<b>Amount Per Serving</b>	
<b>Calories</b> 130	Calories from Fat 30
<b>% Daily Value*</b>	
<b>Total Fat</b> 3g	5%
Saturated Fat 0.5g	3%
<b>Cholesterol</b> 0mg	0%
<b>Sodium</b> 300mg	13%
<b>Total Carbohydrate</b> 21g	7%
Dietary Fiber 1g	4%
Sugars 1g	
<b>Protein</b> 4g	

How many grams of fat would be consumed if a person ate the entire box of snack food?

- (1) 3 g
  - (2) 27 g
  - (3) 30 g
  - (4) 65 g
- 8 The diagram below shows a human organ system.

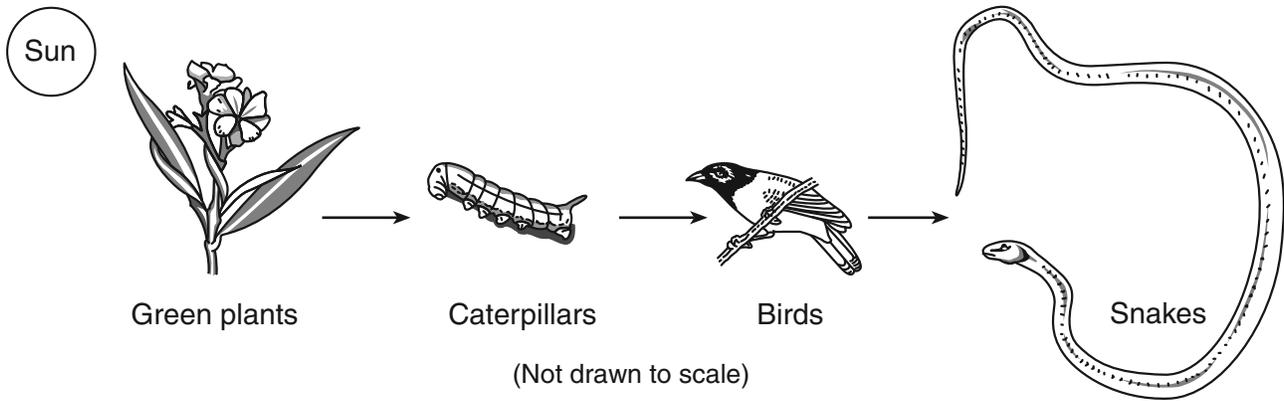


Which human organ system is shown?

- (1) nervous
  - (2) digestive
  - (3) circulatory
  - (4) respiratory
- 9 In living things, traits are passed on from one generation to the next by the transfer of
- (1) blood
  - (2) minerals
  - (3) Calories
  - (4) DNA



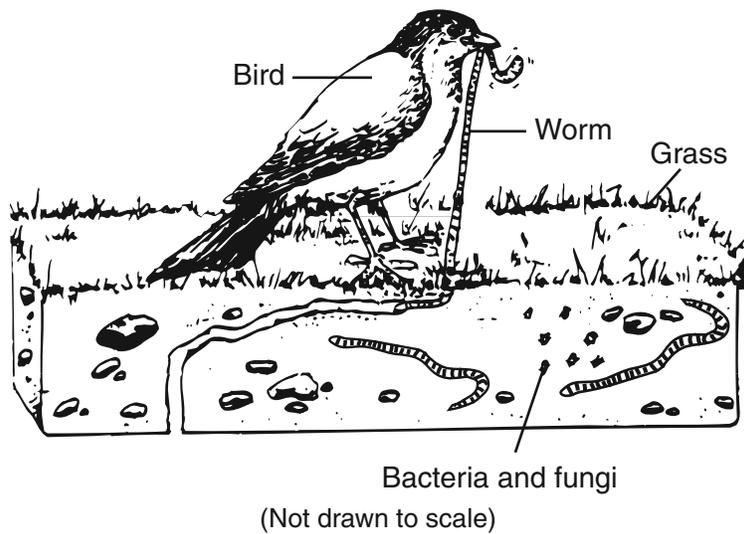
21 The diagram below shows a food chain.



Which organisms in this food chain are herbivores?

- (1) green plants
- (2) caterpillars
- (3) birds
- (4) snakes

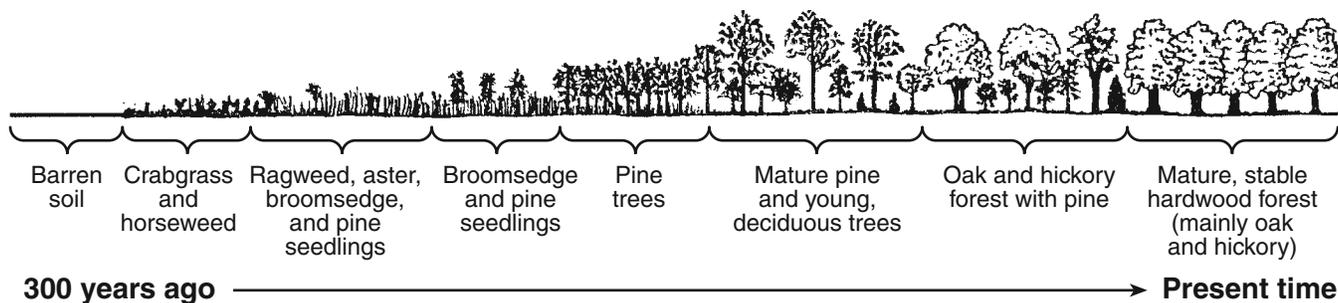
22 The diagram below shows several different organisms found in an area.



The worms in the diagram represent

- (1) a community
- (2) an ecosystem
- (3) a habitat
- (4) a population

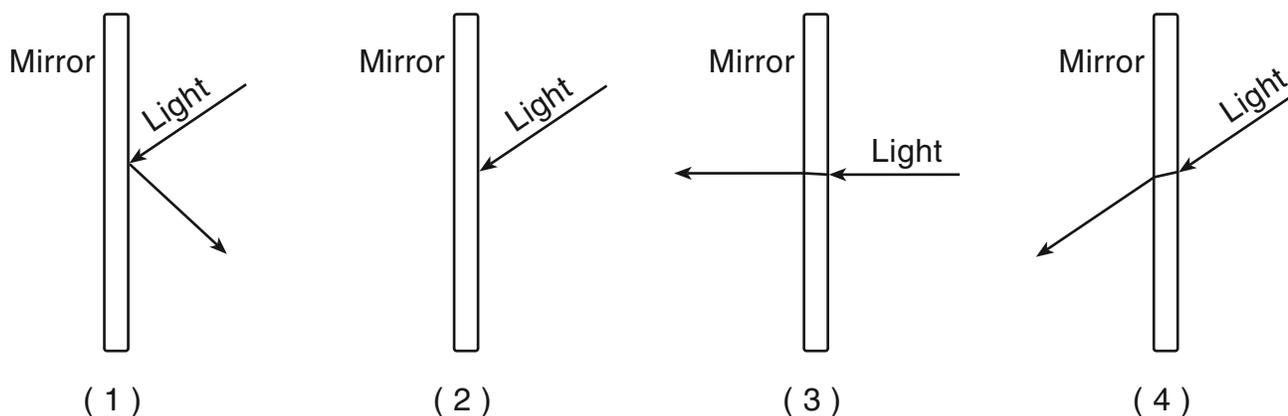
23 The diagram below shows how a plant community changed over 300 years.



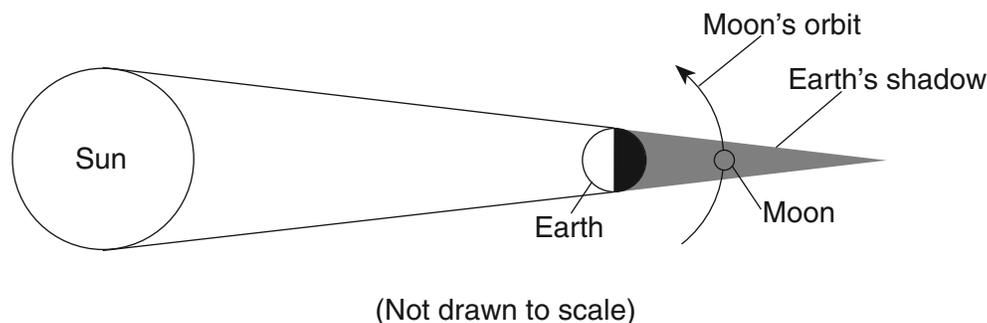
Which process caused the gradual changes shown in this plant community?

- (1) urban growth
- (2) global warming
- (3) environmental pollution
- (4) ecological succession

24 Which diagram best represents light being reflected after striking the flat surface of a mirror?



25 The diagram below shows the positions of the Sun, Earth, and the Moon as seen from space.



Which event is caused by the Moon passing through Earth's shadow?

- (1) a meteor shower
- (2) a change of seasons
- (3) an eclipse
- (4) an earthquake

26 A bright object with a long tail of glowing gases is in orbit around the Sun. This object is most likely

- (1) a planet
- (2) a star
- (3) an asteroid
- (4) a comet

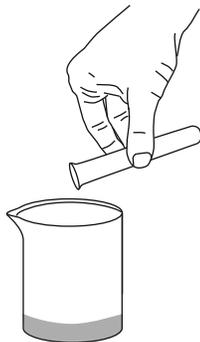
27 The thin layer of rock on Earth's surface is the

- (1) atmosphere
- (2) hemisphere
- (3) hydrosphere
- (4) lithosphere

28 Under which conditions would a sugar cube dissolve most quickly when placed in a liter of water at room temperature?

- (1) A whole sugar cube is added and the water is stirred.
- (2) A whole sugar cube is added and the water is not stirred.
- (3) A crushed sugar cube is added and the water is stirred.
- (4) A crushed sugar cube is added and the water is not stirred.

29 All of the liquid from a test tube is poured into a beaker, as shown in the diagram below.



Compared to the liquid that was in the test tube, the liquid in the beaker has

- (1) a different volume, but the same shape
- (2) a different volume and a different shape
- (3) the same volume, but a different shape
- (4) the same volume and the same shape

30 Rocks are classified as sedimentary, metamorphic, or igneous on the basis of the

- (1) age of the rocks
- (2) way the rocks were formed
- (3) types of fossils the rocks contain
- (4) number of minerals found in the rocks

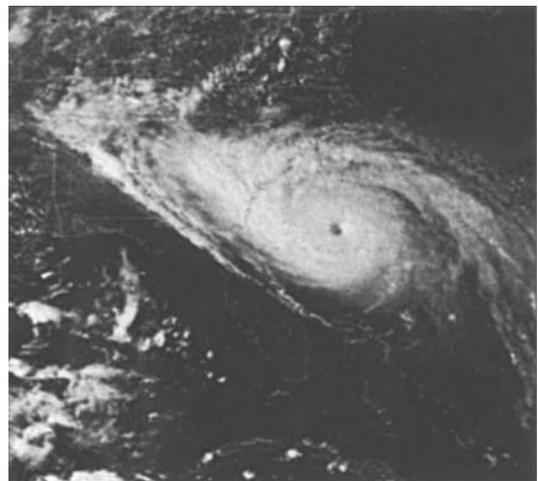
31 Which temperature and moisture conditions describe an air mass that originates over the Atlantic Ocean near the equator?

- (1) warm and dry
- (2) warm and humid
- (3) cool and dry
- (4) cool and humid

32 Which property of a substance indicates whether the substance is a liquid or a solid at room temperature?

- (1) melting point
- (2) electrical conductivity
- (3) flexibility
- (4) solubility

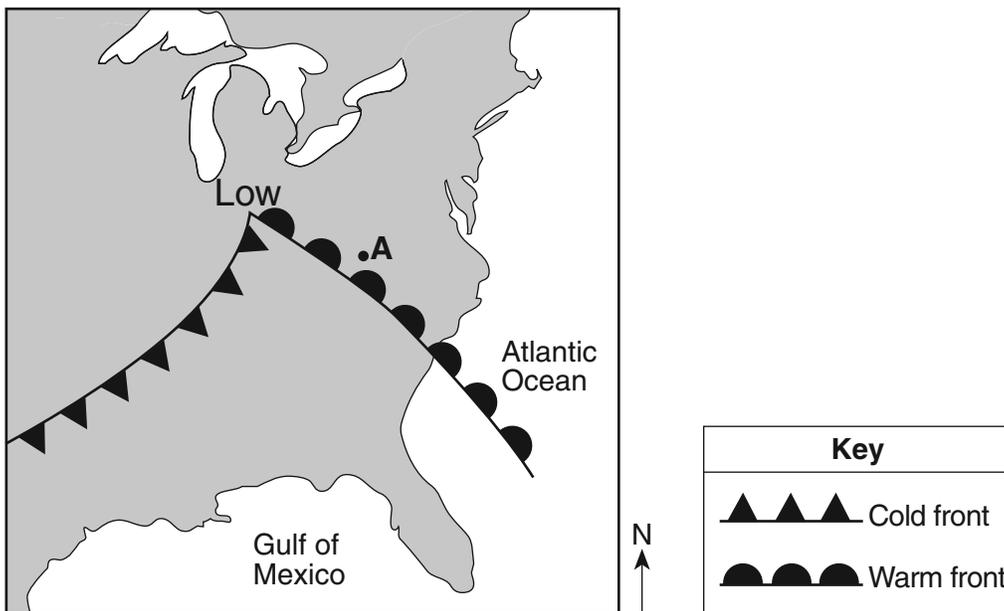
33 The photograph below shows a satellite image of a hurricane.



A satellite image of a hurricane helps weather forecasters to

- (1) warn residents of hazardous weather conditions
- (2) explain the effects of global warming on the ocean currents
- (3) predict the times of high tide and low tide
- (4) predict the total number of storms to occur in one year

Base your answers to questions 34 through 36 on the weather map below and on your knowledge of science. The center of a storm system (**LOW**) over part of the United States and the frontal boundaries associated with this system are shown. Point A represents a location on the map.



34 The word **LOW** on the map refers to

- (1) air temperature
- (2) air pressure
- (3) relative humidity
- (4) amount of cloud coverage

35 Precipitation is most likely occurring at A because it is located

- (1) on a cold ocean surface
- (2) on a warm land surface
- (3) near the cold front
- (4) near the warm front

36 In which compass direction will the storm center (**LOW**) most likely move over the next few days if it follows a typical storm track?

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

37 The photograph below shows a phase of the Moon as seen by an observer in New York State.



Which phase is closest to what will be seen by the observer in New York State 1 month later?



(1)



(2)



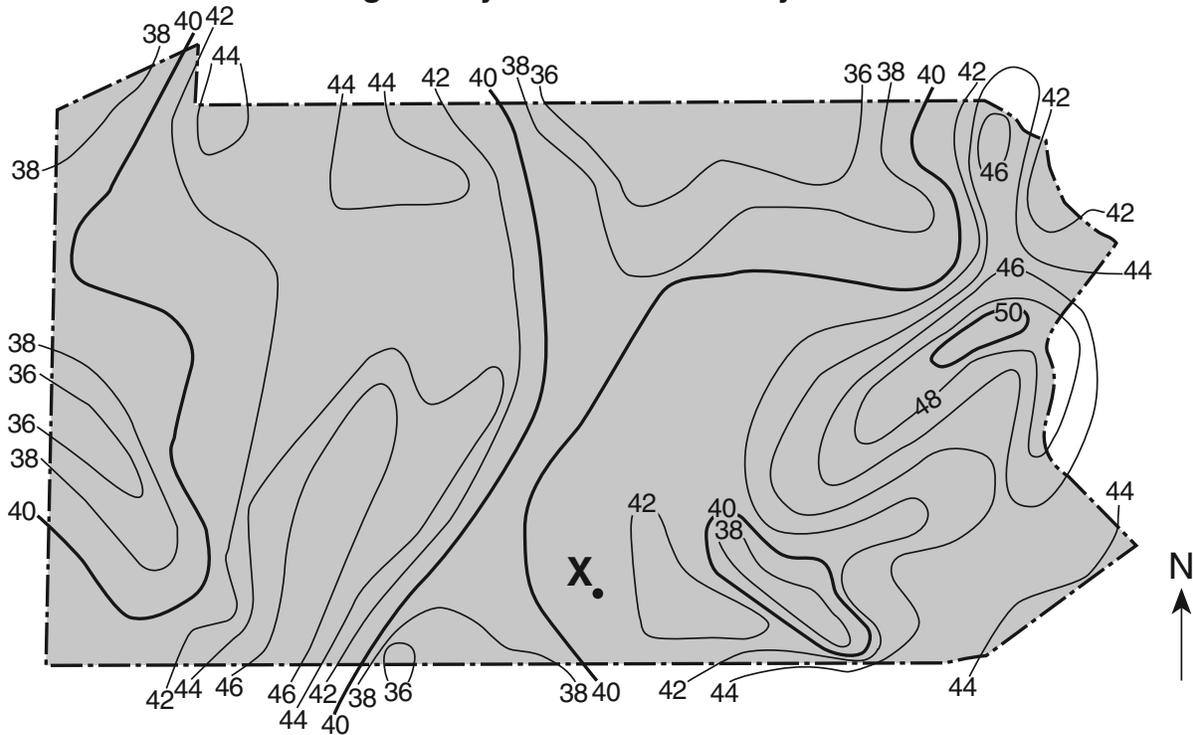
(3)



(4)

Base your answers to questions 38 and 39 on the field map below, which shows average yearly snowfall in the state of Pennsylvania. The solid lines represent amounts of snowfall in inches. Point X represents a location on the map.

**Average Yearly Snowfall in Pennsylvania**



38 Approximately how much snow falls in an average year at location X?

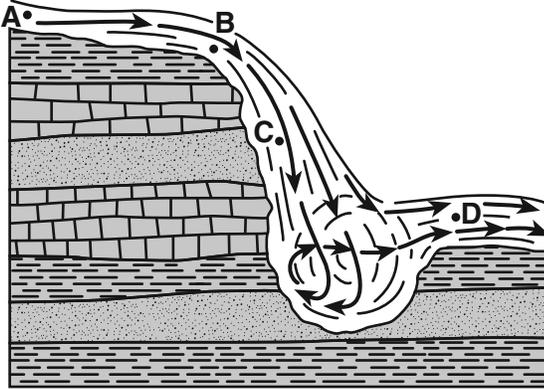
- (1) 39 inches
- (2) 40 inches
- (3) 41 inches
- (4) 42 inches

39 Which part of Pennsylvania has the greatest average yearly snowfall?

- (1) northern
- (2) eastern
- (3) southern
- (4) western

- 40 Fossil fuels are considered *nonrenewable* because they
- (1) produce pollution
  - (2) are no longer used by humans
  - (3) often contain microscopic animals
  - (4) take millions of years to form

- 41 The diagram below shows a cross section of a waterfall. Points A, B, C, and D represent locations in the stream.



At which location does the water have the greatest kinetic energy?

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

**Note that question 42 has only three choices.**

- 42 If the force used to push a shopping cart increases, the cart's acceleration will
- (1) decrease
  - (2) increase
  - (3) remain the same

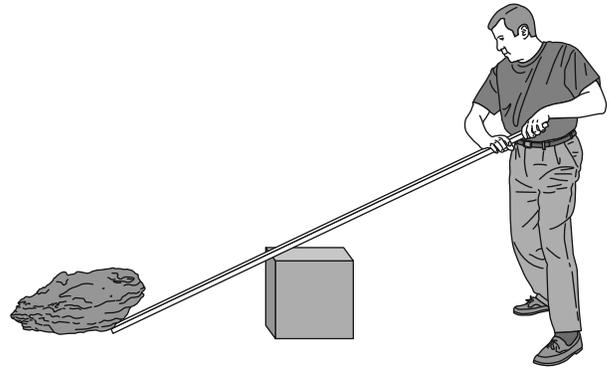
- 43 Sound waves are *not* able to travel through
- (1) a cloud
  - (2) a vacuum
  - (3) metal
  - (4) water

- 44 The diagram below shows two magnets.



If the magnets are brought closer together, they will

- (1) attract each other with a stronger force
  - (2) attract each other with a weaker force
  - (3) repel each other with a stronger force
  - (4) repel each other with a weaker force
- 45 The diagram below shows a person using a simple machine to move a rock.



Which simple machine is the person using?

- (1) pulley
- (2) inclined plane
- (3) wheel and axle
- (4) lever

## Part II

*Directions* (46–83): Record your answers in the space provided below each question.

Base your answers to questions 46 and 47 on the passage below and on your knowledge of science.

A student wondered if different types of plants would produce different amounts of oxygen. A pea plant, a fern, and a cactus were growing in equal-sized containers with equal amounts of soil. The student measured the amount of oxygen produced by each.

46 State *one* possible hypothesis for this experiment. [1]

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47 Identify *two* conditions, other than the size of container and the amount of soil, that should be held constant in this experiment. [1]

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

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

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Base your answers to questions 48 through 50 on the data table below and on your knowledge of science. The data table shows the number of Calories used per hour by a small dog while running at different speeds. Average running speed was recorded in kilometers per hour (km/h).

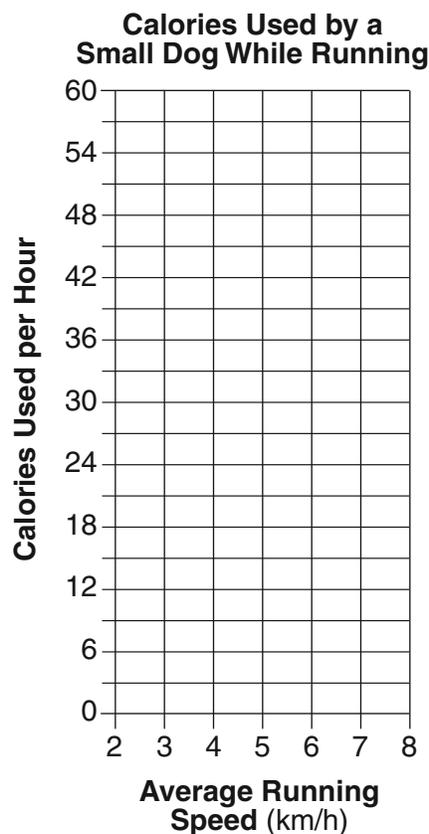
**Calories Used by a Small Dog While Running**

Average Running Speed (km/h)	Calories Used per Hour
2	18
4	27
6	36
8	45

48 If the trend shown in the data table continues, how many Calories per hour will be used by the dog when running at an average speed of 10 km/h? [1]

\_\_\_\_\_ **Calories**

49 Construct a line graph on the grid below. Use an **X** to plot the number of Calories per hour used by the dog for *each* average running speed recorded in the data table. Connect the **X**s with a line. [1]



50 Describe the relationship between the dog's average running speed and the number of Calories used per hour. [1]

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Base your answers to questions 51 and 52 on the data table below and on your knowledge of science. The table shows some properties of five different minerals.

**Data Table**

Mineral	Properties				
	Surface Color	Luster	Streak	Hardness	Density (g/cm <sup>3</sup> )
kaolinite	white	nonmetallic	white	soft	2.6
galena	silver to gray	metallic	gray black	soft	7.6
graphite	silver to gray	metallic	black	soft	2.3
magnetite	silver to black	metallic	black	hard	5.2
olivine	green	nonmetallic	white	hard	3.4

51 Identify the mineral that has the greatest difference between the color of its powder and the color of its outside surface. [1]

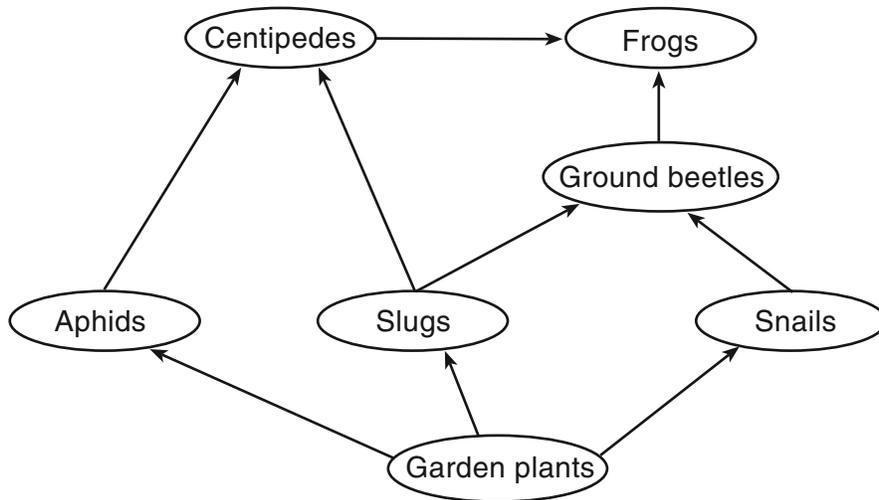
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52 Explain why a sample of magnetite will scratch a sample of galena. [1]

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Base your answers to questions 53 and 54 on the food web below and on your knowledge of science.



53 Which organism labeled in this food web provides energy, either directly or indirectly, to all of the other organisms? [1]

\_\_\_\_\_

54 Explain why the amount of food available to the slug population might increase if the aphid population *decreased*. [1]

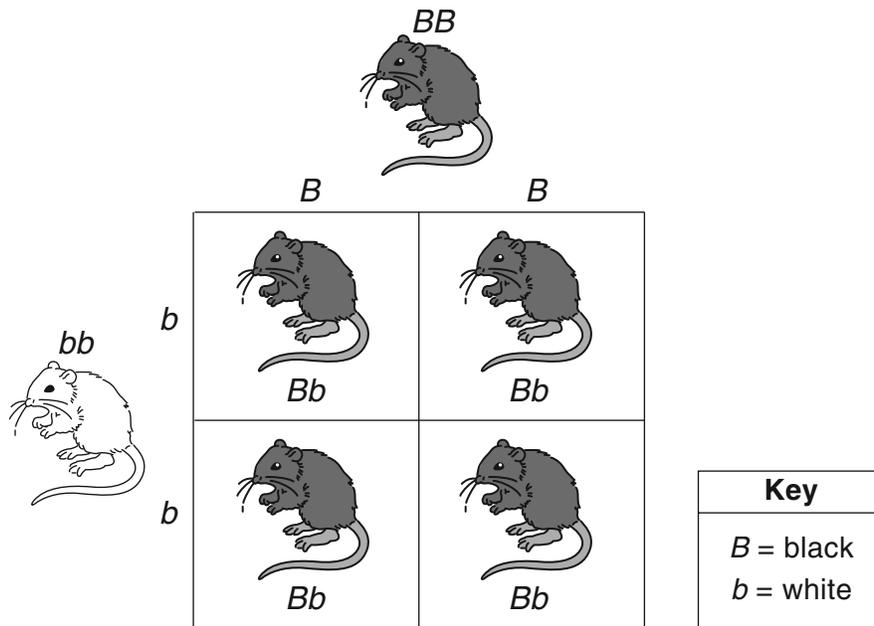
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

55 Use the terms below to complete the sequence of the levels of organization in a multicellular organism. [1]

- organs
- organ systems
- tissues

cells → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → organism

Base your answers to questions 56 and 57 on the Punnett square below and on your knowledge of science. The Punnett square shows a cross between a mouse with black fur whose genetic makeup was  $BB$ , and a mouse with white fur whose genetic makeup was  $bb$ .



56 Explain why all of the offspring have black fur, even though each of them has a gene for white fur. [1]

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57 A second cross was done using a different pair of mice. One parent was a mouse with white fur ( $bb$ ). The other parent was a mouse with black fur. Some of the offspring produced from this cross had white fur. What genetic makeup did this parent with black fur have in order to produce some offspring with white fur? [1]

Genetic makeup: \_\_\_\_\_

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58 The chart below shows the major function of three different human organ systems. For *each* major function listed, identify the human organ system that performs the function. [2]

Major Function	Human Organ System
moves substances to and from all cells of the body	_____ system
creates sex cells and offspring	_____ system
breaks down food	_____ system

59 The data table below shows five hamster species and the number of chromosomes found in their body cells.

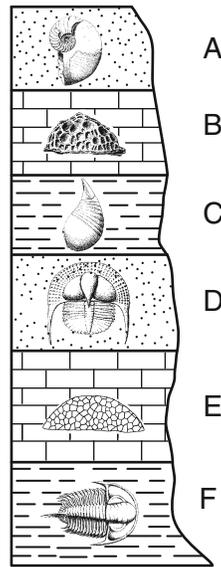
**Number of Chromosomes in the Body Cells of Five Hamster Species**

Hamster Species	Number of Chromosomes
Syrian hamster	44
dwarf Campbell's Russian hamster	28
dwarf winter white Russian hamster	28
Chinese hamster	22
Roborovski hamster	34

These species all reproduce sexually. How many chromosomes would be in a sex cell of a Syrian hamster? [1]

\_\_\_\_\_ **chromosomes**

Base your answers to questions 60 and 61 on the diagram below and on your knowledge of science. The diagram represents a cross section of several layers of sedimentary rock that have *not* been overturned. Each layer contains fossils.



60 Explain why the fossils in rock layer A are more likely to resemble life-forms that exist today. [1]

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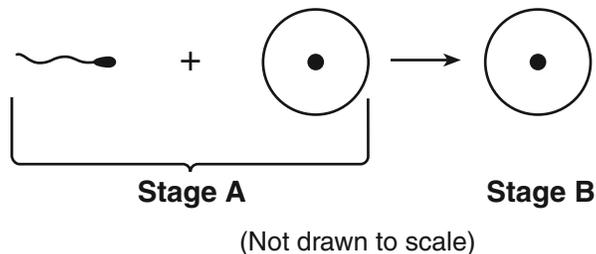
61 State *one* conclusion that many scientists have made about Earth's past by studying fossils. [1]

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Base your answers to questions 62 and 63 on the diagram below and on your knowledge of science. The diagram represents a model of sexual reproduction in humans. Two stages are labeled A and B.



62 Identify each of the *two* cells represented at stage A. [1]

 \_\_\_\_\_

 \_\_\_\_\_

63 Describe *one* difference between sexual reproduction and asexual reproduction. [1]

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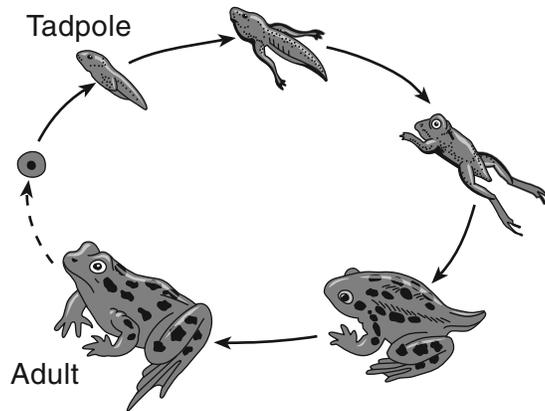
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64 Producers, consumers, and decomposers are three types of organisms that obtain nutrients in different ways. In the chart below, identify *each* organism as a producer, consumer, or decomposer based on its source of nutrients. [1]

Organism	Source of Nutrients	Type of Organism
mushroom	breaks down dead tree roots	
algae	makes its own food	
cow	eats plants	

Base your answers to questions 65 and 66 on the information and diagram below and on your knowledge of science. The diagram represents the life cycle of a frog.

Frogs live most of their lives in and around water. During the tadpole stage, they live entirely underwater and get oxygen through their gills. As adults, frogs can live on land and breathe air.



(Not drawn to scale)

65 Identify *one* structural change to this organism's body that occurs during its life cycle. [1]

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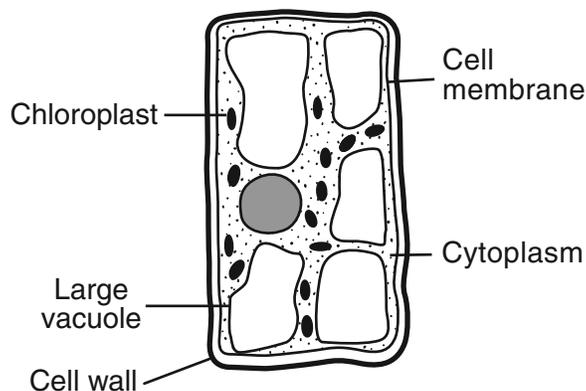
66 An environmental change causes a *decrease* in the amount of oxygen that is dissolved in the pond water. Explain why this change would have a greater effect on the frog during the tadpole stage than during the adult stage. [1]

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Base your answers to questions 67 and 68 on the diagram below and on your knowledge of science. The diagram represents an enlarged view of a plant cell. Several cell structures have been labeled.



67 Identify *two* labeled structures that identify this cell as a plant cell rather than an animal cell. [1]

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

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

68 Identify *one* other structure that could be found in this plant cell that is *not* labeled in the diagram. [1]

\_\_\_\_\_

\_\_\_\_\_

Base your answers to questions 69 and 70 on the information below and on your knowledge of science.

A student performed an experiment in which 10 mL of a strong acid was placed on a sample of limestone. Bubbles formed where the acid touched the limestone. After 20 minutes, the bubbling stopped and the surface of the limestone appeared unchanged.

69 Identify *one* observation that shows a chemical reaction occurred between the acid and the limestone. [1]

\_\_\_\_\_

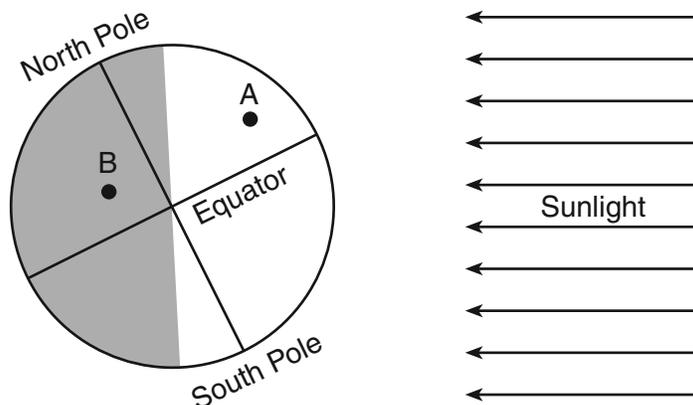
70 Explain why limestone buildings are weathered by acid rain even though the limestone sample in this experiment did *not* appear to be changed by the strong acid. [1]

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

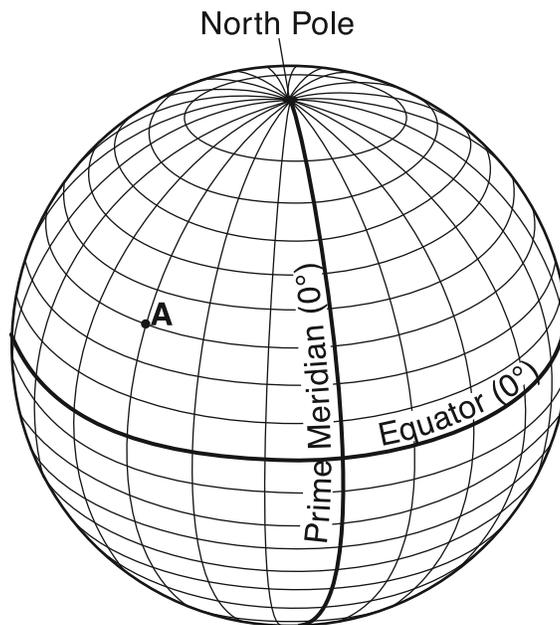
- 71 The diagram below represents one position of Earth in its orbit. Points *A* and *B* represent locations on Earth's surface. Location *A* is experiencing daylight while location *B* is experiencing darkness.



What Earth motion will bring location *B* into daylight in the next few hours? [1]

\_\_\_\_\_

- 72 The model below shows latitude and longitude lines on Earth. Point *A* represents a location on Earth. The latitude lines shown are spaced  $10^\circ$  apart and the longitude lines are spaced  $15^\circ$  apart.



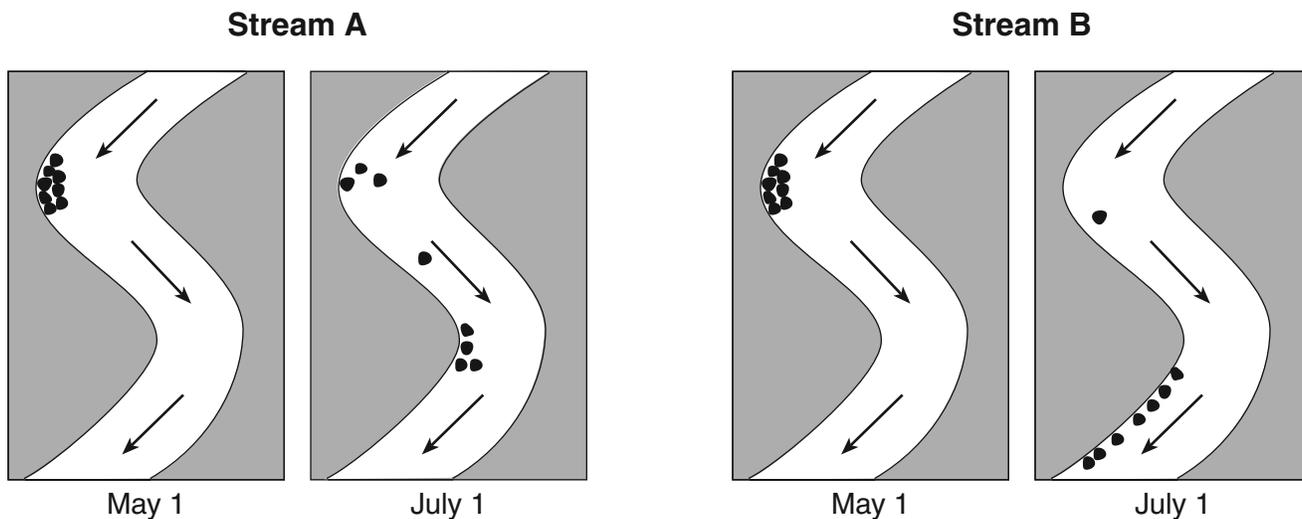
Determine the latitude and longitude of location *A*. [1]

Latitude: \_\_\_\_\_  $^\circ$  N

Longitude: \_\_\_\_\_  $^\circ$  W

Base your answers to questions 73 and 74 on the four maps below and on your knowledge of science. The maps shows two streams, A and B, on two different dates. The arrows represent the direction of the streams' flow.

Students studying erosion painted several rocks of similar size, shape, and density. On May 1, they put half of the rocks in stream A and half of the rocks in stream B. On July 1, the students recorded the locations of the painted rocks in each stream. The results are shown in the diagram below.



73 Explain how this experiment demonstrated erosion. [1]

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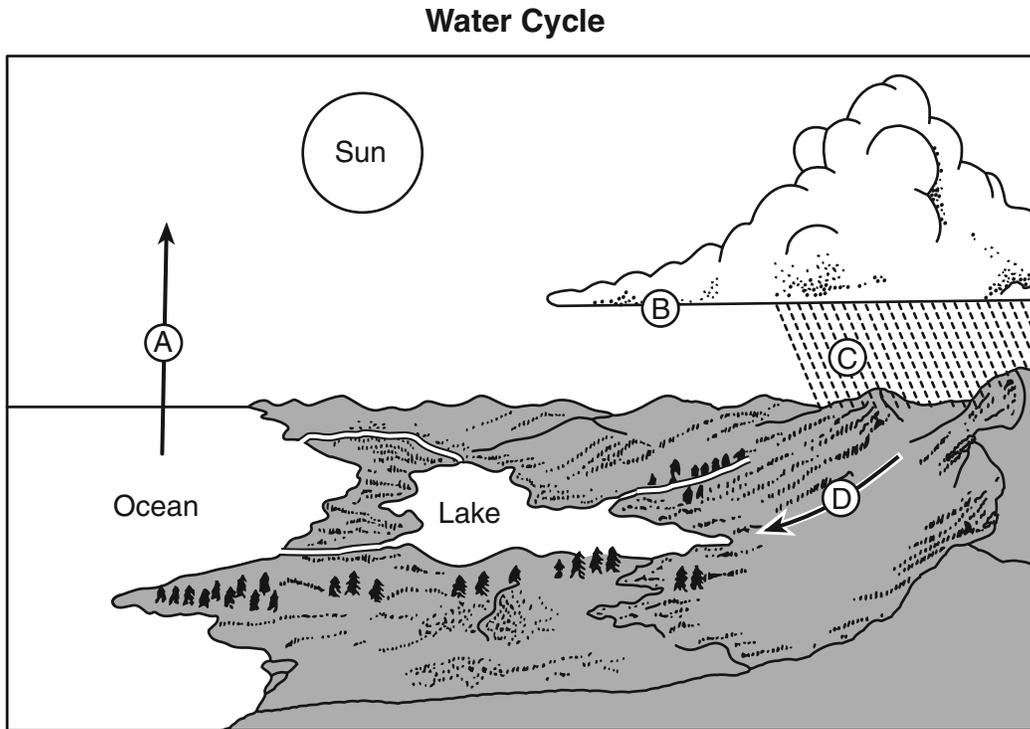
74 State *one* possible reason why more rocks moved farther downstream in stream B than in stream A. [1]

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75 The diagram below shows part of the water cycle. Some processes in the water cycle are represented by A, B, C, and D.



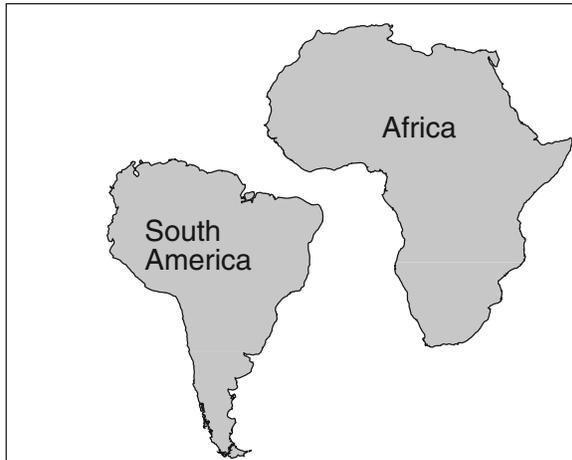
Complete the chart below by identifying the water cycle process represented by *each* letter in the diagram. [2]

**Water Cycle**

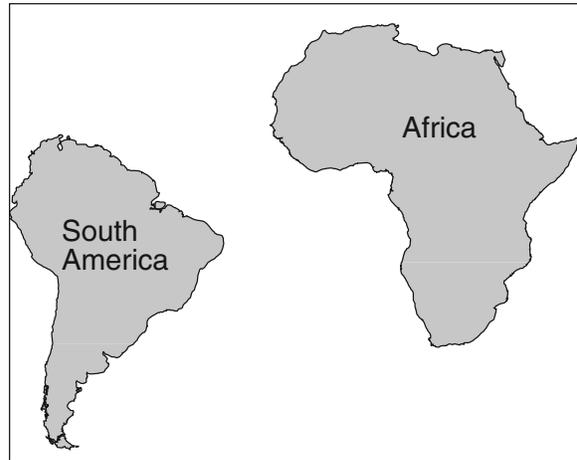
Letter	Process
A	
B	
C	
D	

Base your answers to questions 76 and 77 on the maps below and on your knowledge of science. The maps show the change in the positions of South America and Africa over the last 65 million years.

**Location of South America and Africa  
65 Million Years Ago**



**Location of South America and Africa  
Today**



76 Describe the process that most likely caused the change in the positions of South America and Africa over the last 65 million years. [1]

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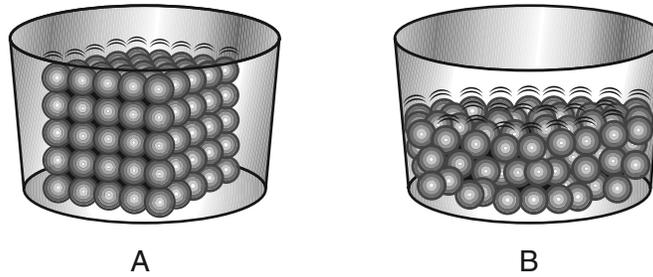
77 State *one* piece of evidence to support the theory that South America and Africa were once connected. [1]

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78 Diagrams *A* and *B* show models of how the molecules of the same substance are arranged in two different phases of matter.



(Not drawn to scale)

Which phases of matter are represented by diagrams *A* and *B*? [1]

Diagram *A*: \_\_\_\_\_ Diagram *B*: \_\_\_\_\_

79 When a balloon is rubbed on a wool sweater, the balloon builds up a negative electrical charge. When a glass rod is rubbed on silk, the rod builds up a positive electrical charge. Explain why the charged balloon will be attracted to the charged glass rod. [1]

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80 The diagram below shows a portion of the Periodic Table of the Elements.

### Portion of the Periodic Table of the Elements

KEY

28	—	approximate atomic mass
Si	—	symbol
Silicon	—	name
14	—	atomic number

Groups

18
4
He
Helium
2

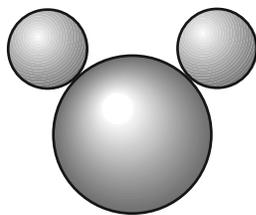
13	14	15	16	17	18
11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
27 Al Aluminum 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35 Cl Chlorine 17	40 Ar Argon 18
70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
81 Tl Thallium 204.4	82 Pb Lead 207.2	83 Bi Bismuth 209.0	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)

Identify *one* element that has chemical properties similar to the chemical properties of fluorine. [1]

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- 81 The diagram below shows the arrangement of atoms and the chemical composition of a water molecule. The table shows common elements and their chemical symbols.

**Water Molecule (H<sub>2</sub>O)**



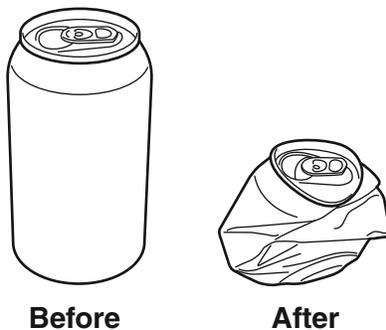
**Table of Common Elements**

Element	Chemical Symbol
helium	He
calcium	Ca
oxygen	O
carbon	C
chlorine	Cl
hydrogen	H
sulfur	S

What *two* elements make up the water molecule? [1]

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

Base your answers to questions 82 and 83 on the diagram below and on your knowledge of science. The diagram shows an aluminum can before and after it was crushed.



82 Explain why crushing the aluminum can is an example of a physical change and *not* a chemical change. [1]

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83 Making cans from newly mined aluminum ore uses a large amount of energy. Therefore, old aluminum cans are often recycled to make new ones. State *one* positive effect recycling aluminum has on the environment. [1]

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# GRADE 8 INTERMEDIATE-LEVEL SCIENCE

## For Teacher Use Only

### Part II Credits

Question	Maximum Credit	Credit Allowed
46	1	
47	1	
48	1	
49	1	
50	1	
51	1	
52	1	
53	1	
54	1	
55	1	
56	1	
57	1	
58	2	
59	1	
60	1	
61	1	
62	1	
63	1	
64	1	
65	1	
66	1	
67	1	
68	1	
69	1	
70	1	
71	1	
72	1	
73	1	
74	1	
75	2	
76	1	
77	1	
78	1	
79	1	
80	1	
81	1	
82	1	
83	1	
<b>Total</b>	<b>40</b>	

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