

THE UNIVERSITY OF THE STATE OF NEW YORK

# GRADE 8

## INTERMEDIATE-LEVEL TEST

## SCIENCE

# WRITTEN TEST

JUNE 2004

Name \_\_\_\_\_

School \_\_\_\_\_

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 33 open-ended questions. Write your answers to Part II 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 OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO.**

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THE STATE EDUCATION DEPARTMENT  
ALBANY, NEW YORK 12234

**NO PART OF THIS TEST MAY BE REPRODUCED AND/OR TRANSMITTED BY ANY MEANS WITHOUT WRITTEN PERMISSION.**



## Part I

### DIRECTIONS

There are 45 questions on Part I of the test. Each question is followed by 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.

## Part I

1 The items listed below were found in a science classroom.

- a heart made of plastic with many of its parts labeled
- clay formed to look like Earth and other planets
- a giant plastic plant cell with removable cell parts

These items are all examples of

- (1) models                      (3) variables  
 (2) experiments              (4) controls

2 Which of the organisms shown below consists of only one cell?



Pine tree



Ameba



Mushroom



Earthworm

(Not drawn to scale)

- (1) pine tree                      (3) mushroom  
 (2) ameba                         (4) earthworm

3 What is the main function of the circulatory system?

- (1) secrete enzymes              (3) produce hormones  
 (2) digest proteins                (4) transport materials

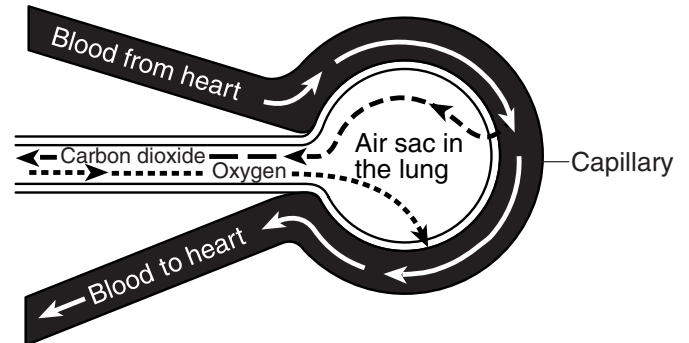
4 Infectious diseases are caused by

- (1) allergies  
 (2) vitamin deficiencies  
 (3) chemical spills  
 (4) microorganisms

5 If a species is no longer able to reproduce, it will

- (1) adapt to its environment  
 (2) become immune to disease  
 (3) become extinct  
 (4) increase its population

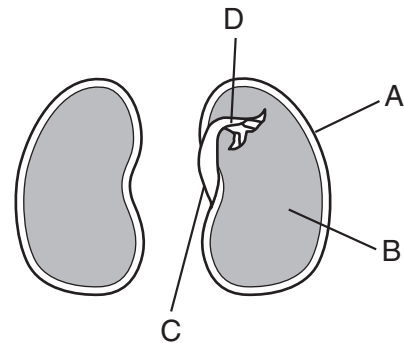
6 The diagram below represents a magnified view of an air sac in the human lung. The white arrows indicate blood flow.



Which two systems are interacting in this diagram?

- (1) skeletal and muscular  
 (2) nervous and endocrine  
 (3) reproductive and digestive  
 (4) respiratory and circulatory

7 The diagram below represents a bean seed that has been cut in half to show its various structures.

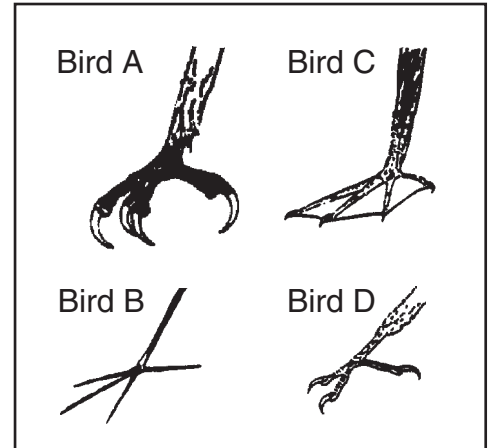


Which letter represents the stored food that the new plant will use for early development?

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

Base your answers to questions 8 and 9 on the drawings of bird feet and the dichotomous key below.

A Key to Identifying Birds		
Couplet	Description	
1a	Toes webbed	go to 2
1b	Toes not webbed	go to 3
2a	Four toes webbed together	cormorant
2b	Three toes webbed together	duck
3a	Claws curved	go to 4
3b	Claws not curved	jacana
4a	Claws large	eagle
4b	Claws small	kingfisher



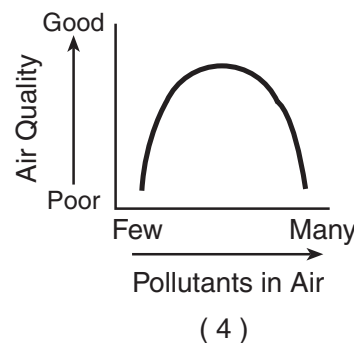
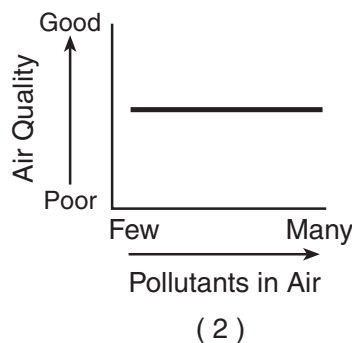
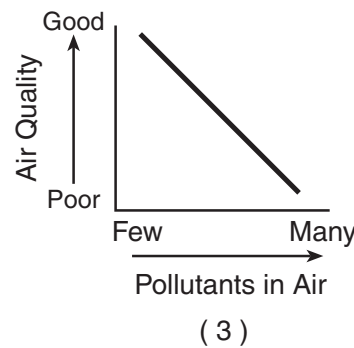
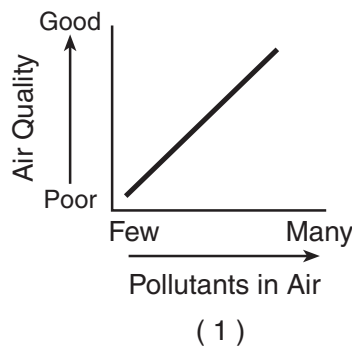
8 Bird B is correctly identified as

- (1) a cormorant
- (2) a duck
- (3) an eagle
- (4) a jacana

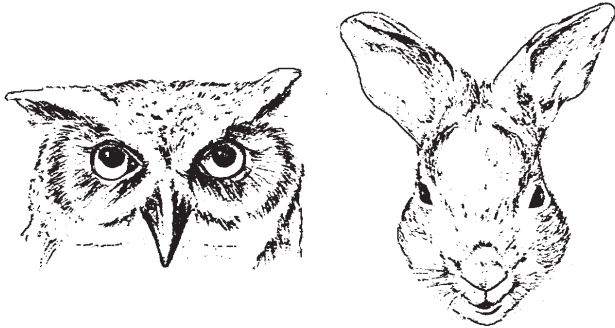
9 What is a common feature of both the eagle and the kingfisher?

- (1) claws large
- (2) claws curved
- (3) three toes webbed together
- (4) four toes webbed together

10 Which graph best represents the relationship between the amount of pollutants in the air and the quality of the air?



- 11 The eyes of the owl and the rabbit shown in the diagram below give each animal a different advantage. The front-facing owl eyes allow the bird to accurately judge distance when swooping in on prey. The side-facing rabbit eyes allow the animal to detect the motion of possible predators.

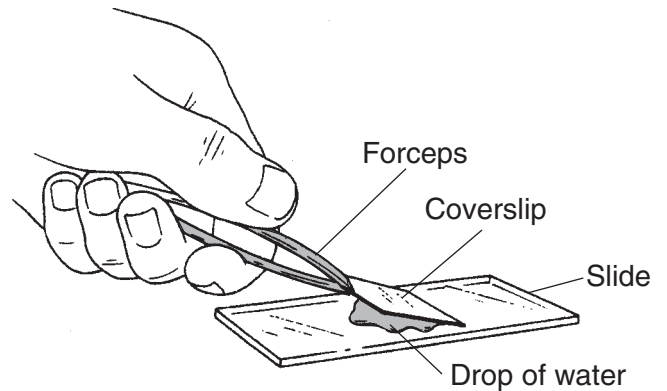


The specialized eye types of these animals are examples of

- (1) disruptions of the natural balance
  - (2) the interdependence of living things
  - (3) adaptations for survival under certain conditions
  - (4) involuntary responses to stimuli
- 12 Which disease is a result of abnormal cell division?
- (1) AIDS
  - (2) cancer
  - (3) chicken pox
  - (4) common cold
- 13 A change in the environment that causes a response is known as a
- (1) stimulus
  - (2) habit
  - (3) reflex
  - (4) source
- 14 The energy obtained from food is measured in units called
- (1) watts
  - (2) Calories
  - (3) degrees
  - (4) pounds

- 15 As the population of small fish in a lake decreases, the population of large fish that depend on the small fish for food will
- (1) reproduce faster
  - (2) begin to produce their own food
  - (3) decrease in number
  - (4) increase in number

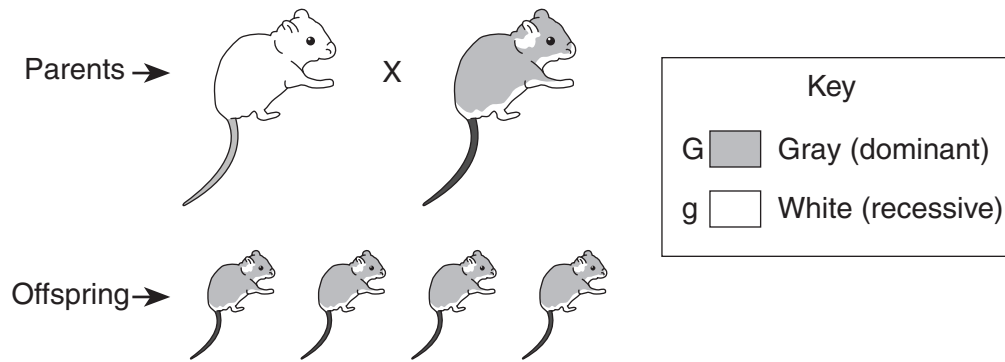
- 16 The diagram below shows a student making a wet-mount slide.



Why should the student make sure the edge of the coverslip touches the drop of water before setting the coverslip onto the slide?

- (1) to increase evaporation
  - (2) to reduce air bubbles
  - (3) to clean the slide
  - (4) to prevent the coverslip from breaking
- 17 Beaver dams can cause floods.
- This statement shows how
- (1) animal growth is affected by environmental conditions
  - (2) animal behavior may affect the environment
  - (3) an animal's health depends on its environment
  - (4) an animal's development depends on its environment

Base your answers to questions 18 and 19 on the diagram below. The diagram shows the offspring of a white mouse and a gray mouse. All of the offspring are gray.



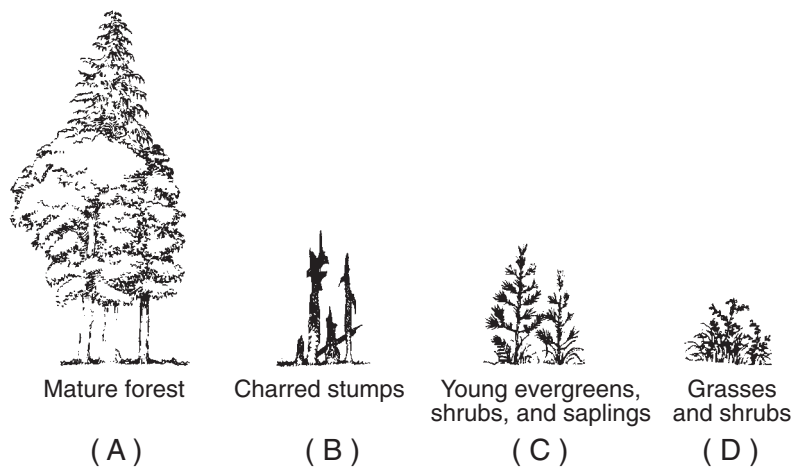
18 Which is a correct gene combination for the parents shown in the diagram?

- (1)  $GG \times GG$
- (2)  $gg \times gg$
- (3)  $gg \times GG$
- (4)  $Gg \times Gg$

19 If two gray ( $Gg$ ) mice mated, what percent of their offspring would have pure white fur?

- (1) 25%
- (2) 50%
- (3) 75%
- (4) 100%

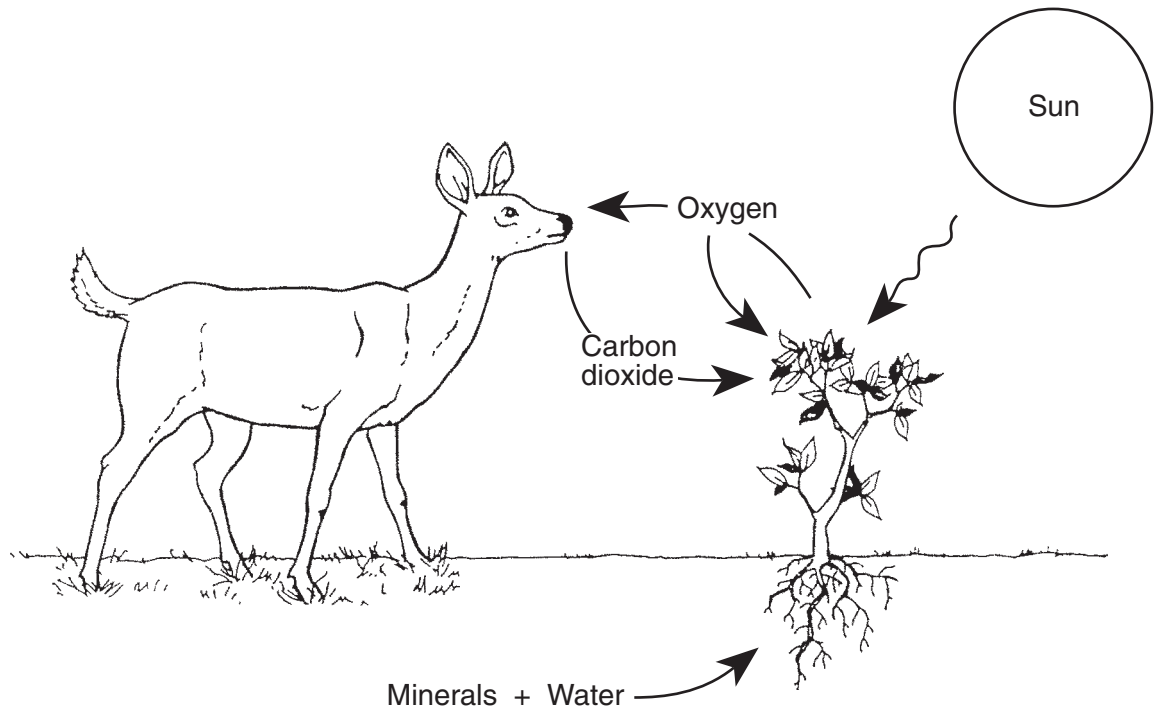
20 The diagrams below show the plant communities present in the same area at different times over a 200-year period following a forest fire.



What is the correct sequence of these plant communities following the forest fire?

- (1)  $B \rightarrow A \rightarrow D \rightarrow C$
- (2)  $B \rightarrow C \rightarrow D \rightarrow A$
- (3)  $B \rightarrow D \rightarrow C \rightarrow A$
- (4)  $B \rightarrow A \rightarrow C \rightarrow D$

Base your answers to questions 21 and 22 on the diagram below and on your knowledge of science. The diagram below shows some relationships within a natural community.



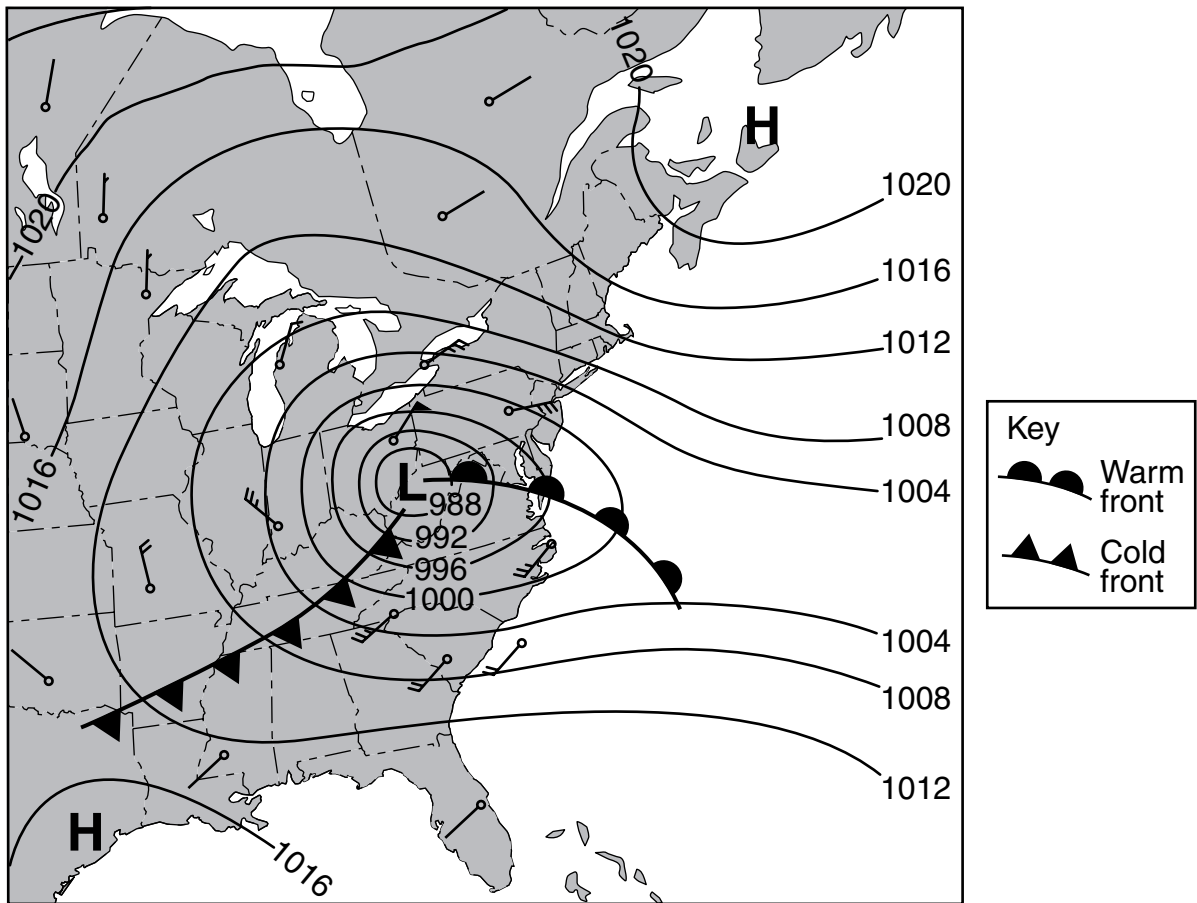
21 Which statement best explains the relationships shown?

- (1) Water changes over time to a nonrenewable resource.
- (2) Living things exchange materials with their environment.
- (3) Minerals recycle the dead materials in the environment.
- (4) Living things produce other living things.

22 Which process produces oxygen that is released into the atmosphere?

- (1) respiration
  - (2) locomotion
  - (3) excretion
  - (4) photosynthesis
-

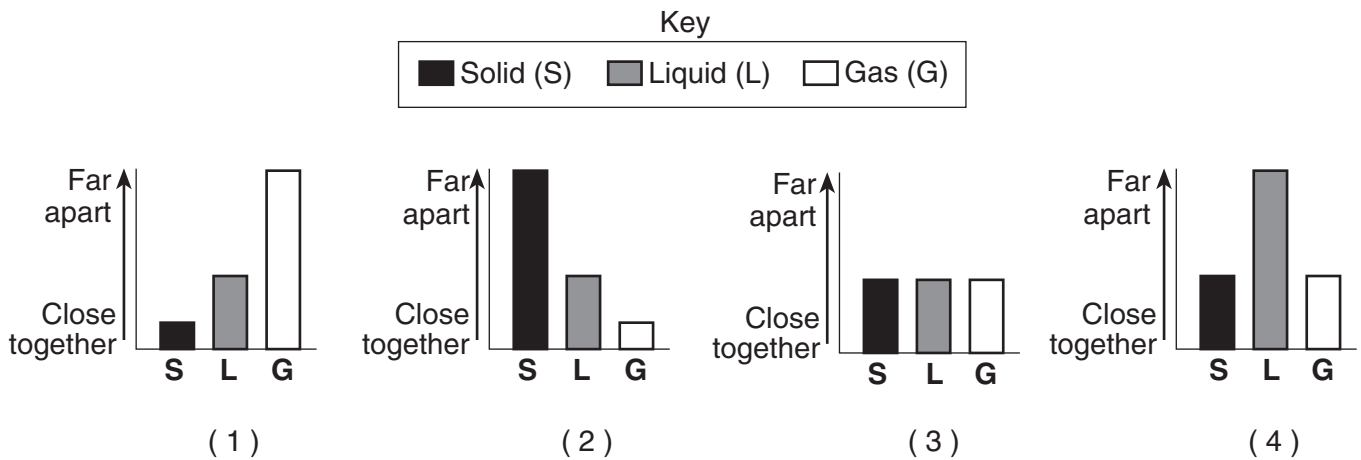
23 The weather map below shows the locations of a warm and a cold front over part of North America.



The numbered lines on the weather map connect locations with the same


- (1) wind direction
- (2) wind speed
- (3) air temperature
- (4) air pressure

24 Which graph best represents the relative distance between the particles of most substances in their solid, liquid, and gas states?



- 25 Which scientific model could be used to predict the properties of an element?
- (1) closed loop system
  - (2) Punnett square
  - (3) Periodic Table
  - (4) water cycle chart

Base your answers to questions 26 through 28 on the chart below, which shows various data collected and predicted for Albany, New York, on March 9, 2001.

Updated: <b>05:51 AM EST on March 09, 2001</b>	
Observed at	Albany, New York
Temperature	<b>34°F</b>
Windchill	<b>26°F</b>
Humidity	<b>81%</b>
Dewpoint	<b>28°F</b>
Wind	<b>SE at 7 mph</b>
Pressure	<b>29.88 in</b>
Conditions	<b>Overcast</b>
Visibility	<b>10 miles</b>
Clouds	<b>Overcast (OVC): 1800 ft</b>
Sunrise	<b>6:17 AM (EST)</b>
Sunset	<b>5:51 PM (EST)</b>
Moon Rise	<b>6:02 PM (EST)</b>
Moon Set	<b>6:37 AM (EST)</b>
<b>Moon Phase</b>	 Mar. 09   Mar. 16   Mar. 25

Source: www.accuweather.com

- 26 The chart shows information about Moon phases, times of sunrise and sunset, and
- (1) climate patterns
  - (2) local weather conditions
  - (3) seasonal changes
  - (4) global warming

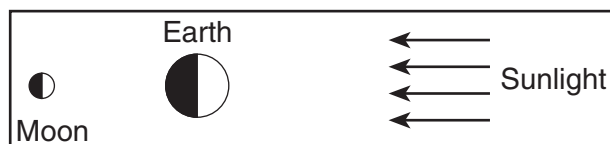
- 27 Which diagram correctly shows the position of the Moon with respect to Earth on March 9, 2001?



(1)



(2)



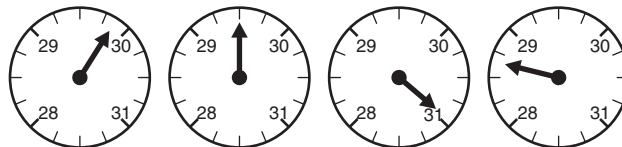
(3)



(4)

(Not drawn to scale)

- 28 Which instrument dial shows a correct air-pressure reading for Albany, New York, for this date and time?



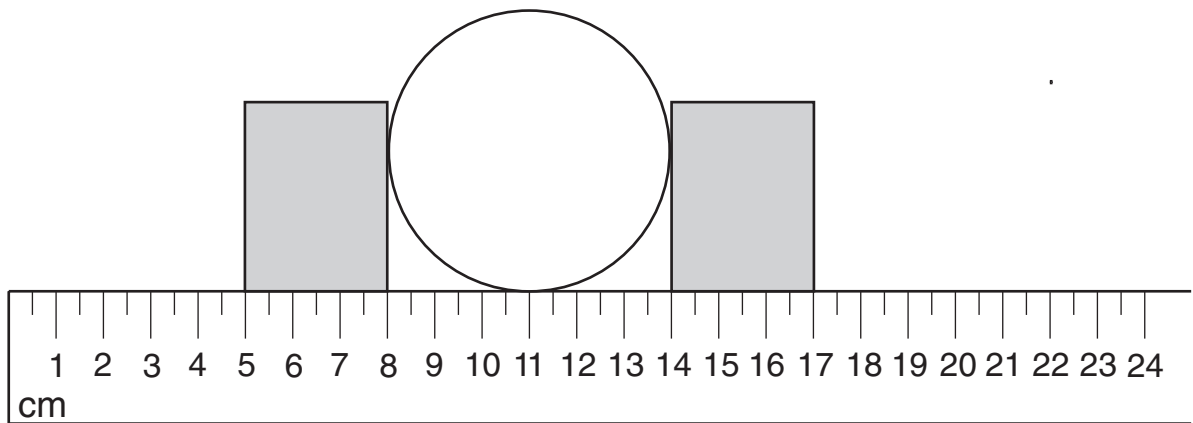
(1)

(2)

(3)

(4)

29 The diagram below shows a ball held in place by two blocks. The diameter (width) of the ball is shown between the two blocks.

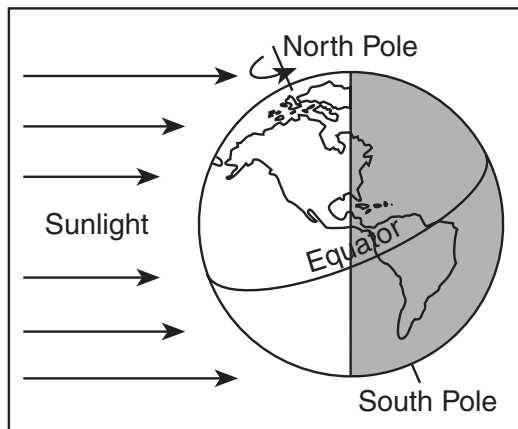


(Not drawn to scale)

What is the diameter of the ball?

- (1) 6.0 cm
- (2) 8.0 cm
- (3) 14.0 cm
- (4) 17.0 cm

30 The diagram below shows Earth as viewed from space.



Which season is occurring in the Northern Hemisphere?

- (1) summer
- (2) autumn
- (3) winter
- (4) spring

31 A chemical property of a mineral is evident if the mineral

- (1) breaks easily when struck with a hammer
- (2) bubbles when acid is placed on it
- (3) is easily scratched by a fingernail
- (4) reflects light from its surface

32 The bold line on the map below shows the San Andreas Fault.

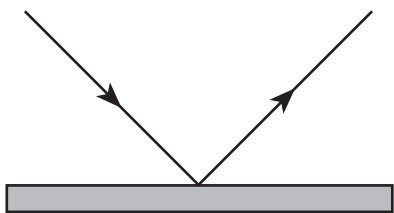


The San Andreas Fault is the result of

- (1) overpopulation
- (2) a large glacier
- (3) weathering and erosion
- (4) crustal plate movement



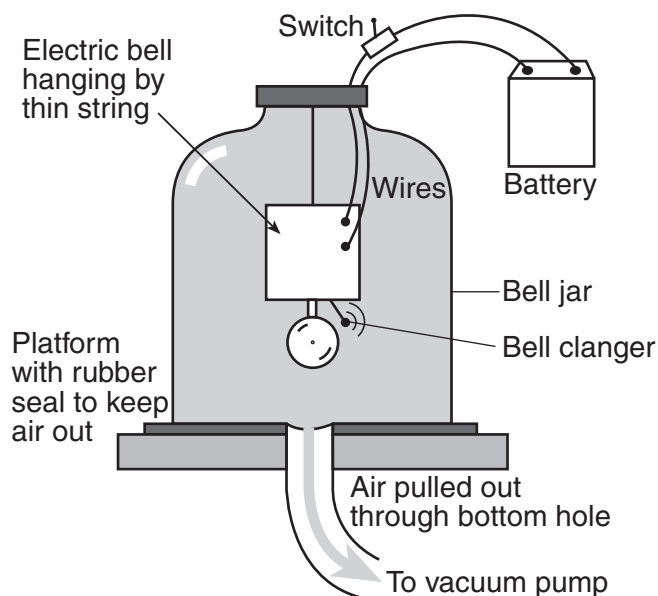
38 The diagram below shows a light ray.



In this diagram, the light ray is being

- (1) transmitted
- (2) absorbed
- (3) reflected
- (4) refracted

39 The picture below shows a ringing bell inside a vacuum jar.



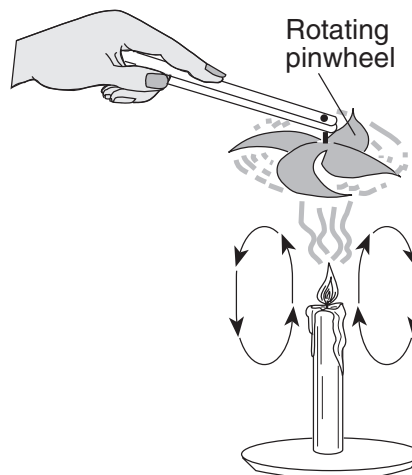
As air is pumped from the vacuum jar, the sound level of the ringing bell will decrease until it can no longer be heard. This happens because air must be present in the jar in order for

- (1) sound to be transferred
- (2) electricity to flow through the wires
- (3) the rubber to seal the jar
- (4) the bell clanger to vibrate

40 Which two factors determine the gravitational attraction between two objects?

- (1) time and temperature
- (2) shape and orbital speed
- (3) color and hardness
- (4) mass and distance apart

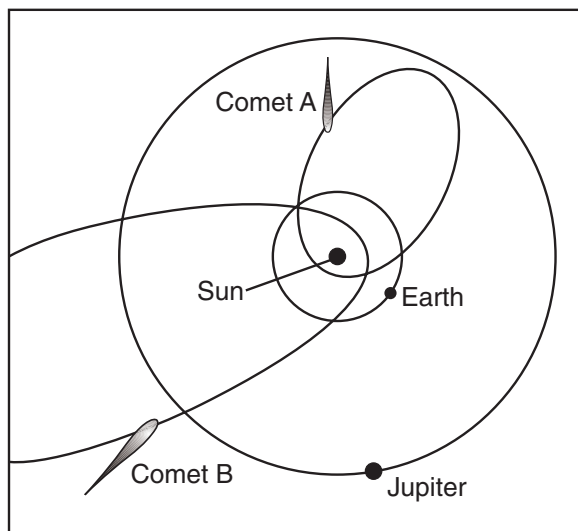
41 The diagram below shows a pinwheel rotating above a lit candle. The arrows indicate the direction of air flow.



Which energy transformation is best shown in this diagram?

- (1) heat to mechanical
- (2) mechanical to light
- (3) sound to heat
- (4) heat to sound

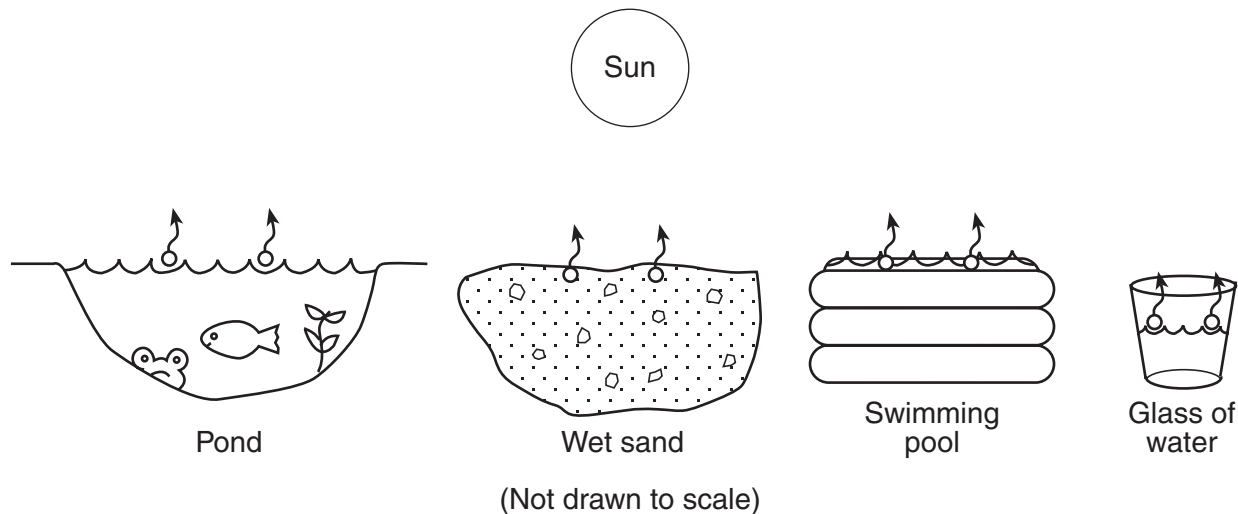
42 The diagram below shows four objects and their orbits around the Sun, as seen from space.



Which statement is true about *all* of the objects shown in the diagram?

- (1) They produce their own light.
- (2) They belong to our solar system.
- (3) They are composed mostly of gases.
- (4) They are the same distance from the Sun.

Base your answers to questions 43 and 44 on the diagrams below and your knowledge of science. The diagrams show liquid water changing to water vapor in four different situations.



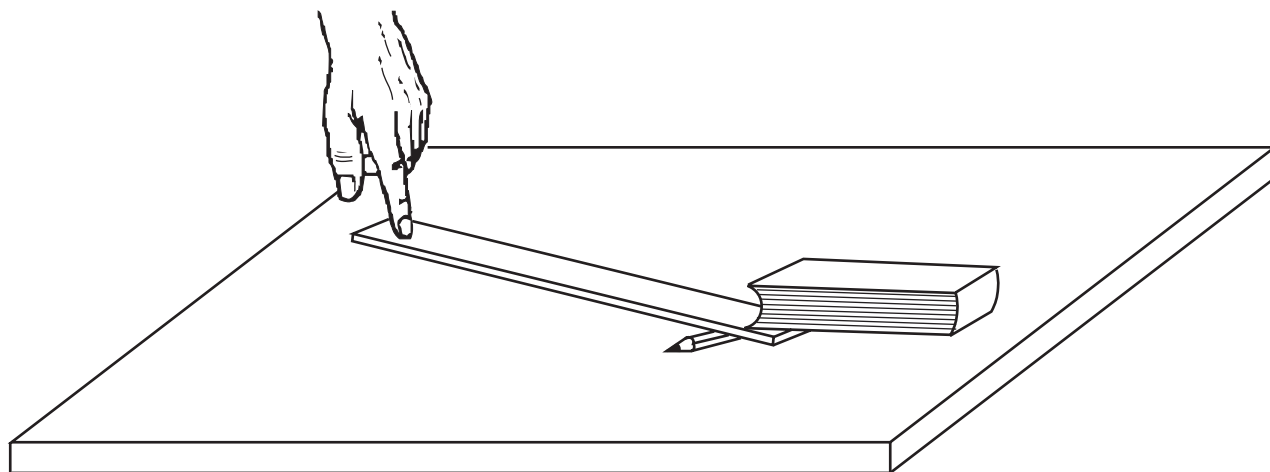
43 Which observation would be evidence that the water is undergoing a phase change?

- (1) Waves form on the top of the pond.
- (2) Water soaks into the wet sand.
- (3) The water splashes out of the swimming pool.
- (4) The water level in the glass of water decreases.

44 How is heat energy transferred within the liquid water in the pond?

- (1) compound formation
  - (2) convection currents
  - (3) chemical reactions
  - (4) nuclear reactions
- 

45 The drawing below shows a person about to lift a book using a ruler and pencil.



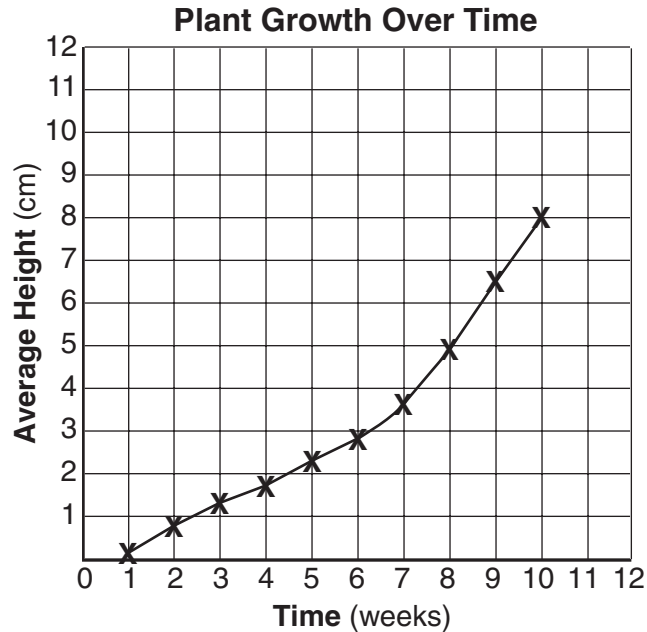
This drawing illustrates an example of which simple machine?

- (1) gear
  - (2) pulley
  - (3) balance
  - (4) lever
-

## Part II

*Directions (46–78):* Record your answers in the spaces provided in this test booklet.

Base your answers to questions 46 and 47 on the graph below. The graph shows the results of an experiment that tested the effect of time on the growth of a plant. A student measured the height of several plants for ten weeks and determined the average height. The results are shown in the graph below.



46 Identify one variable that should be held constant during this experiment. [1]

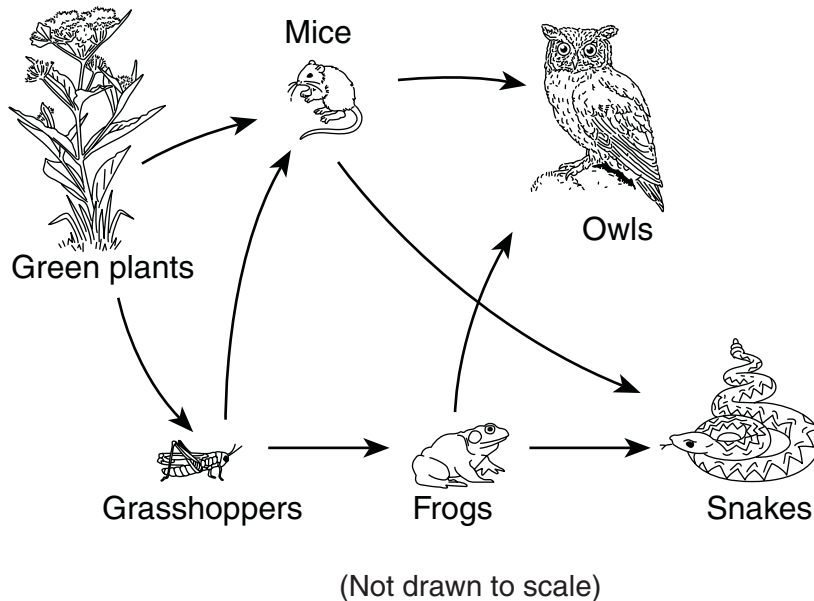
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47 According to the graph, what will the average height of the plants be at week 11 if growth continues at the same rate as in weeks 8 through 10? [1]

\_\_\_\_\_ cm

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Base your answers to questions 48 through 50 on the partial food web below and on your knowledge of science.



48 How are the feeding relationships of the mice different from the feeding relationships of the other organisms in this food web? [1]

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49 Explain this statement: The energy for all the organisms in this food web can be traced back to the Sun. [1]

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50 Give an example of a carnivore, a producer, and an herbivore shown in this food web. [3]

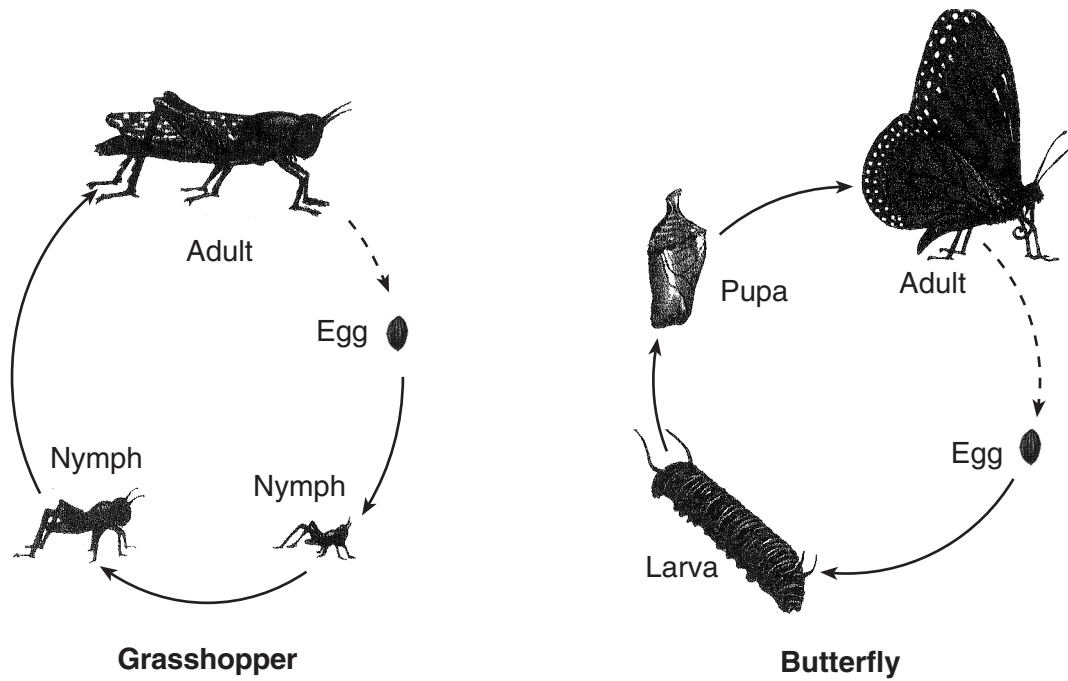
Carnivore: \_\_\_\_\_

Producer: \_\_\_\_\_

Herbivore: \_\_\_\_\_

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51 The diagrams below show the life cycles of a grasshopper and a butterfly.



(Not drawn to scale)

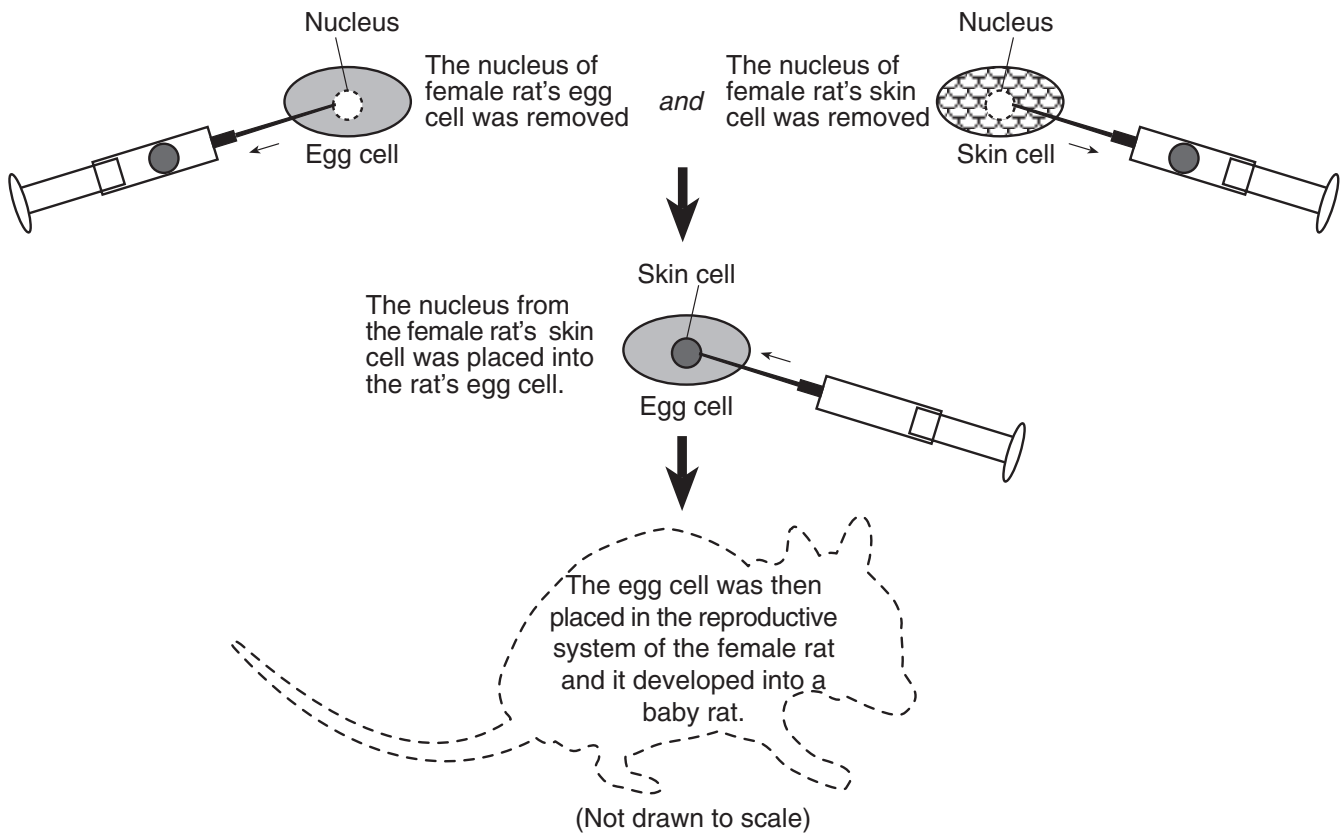
Describe one difference in the pattern of development of the grasshopper and the pattern of development of the butterfly shown in the diagrams. [1]

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Base your answers to questions 52 and 53 on the laboratory procedure described below and on your knowledge of science.



52 Explain why the baby rat was identical to its mother. [1]

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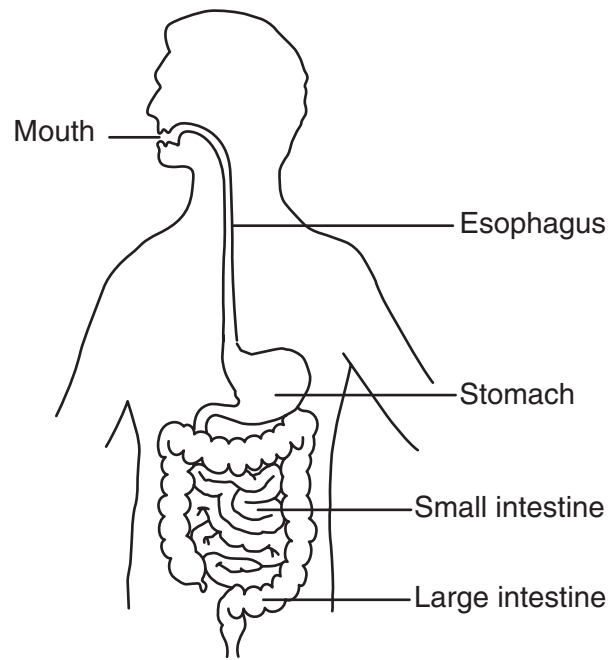
53 A different female laboratory rat gave birth to several babies after being fertilized with sperm. Explain why these babies will *not* be genetically identical to the mother. [1]

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54 The diagram below shows several organs in the human digestive system.

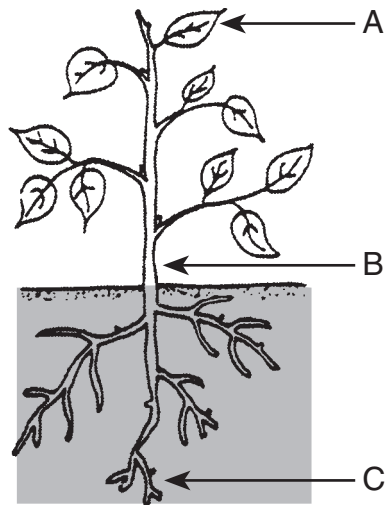


Explain *two* ways that food is changed as it passes through the digestive system. [2]

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

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

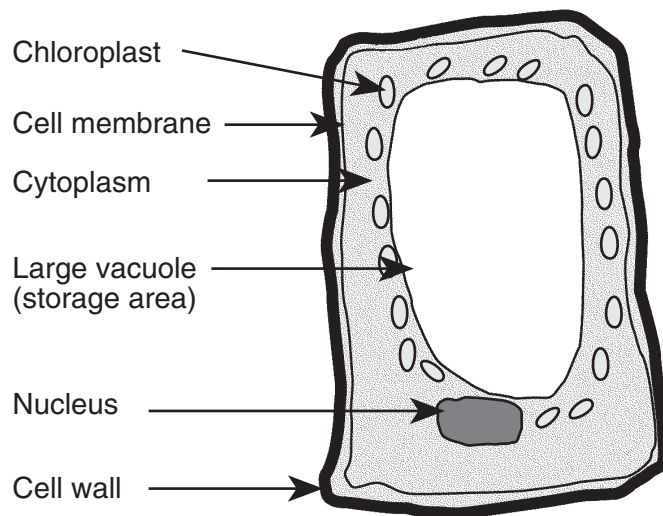
55 The diagram below shows a bean plant.



Complete the chart below by identifying the *three* structures labeled *A*, *B*, and *C*. Identify one function of each structure. [3]

Letter	Plant Structure	Function of Structure
A		
B		
C		

Base your answers to questions 56 and 57 on the diagram below and on your knowledge of science. The diagram shows a cell with some basic cell structures labeled.



56 Identify *two* structures labeled in the diagram, other than the large vacuole, that indicate this cell is a plant cell. [1]

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

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

57 Which hereditary material in the nucleus of the cell is responsible for passing traits on to the next generation? [1]

\_\_\_\_\_

\_\_\_\_\_

Base your answers to questions 58 through 60 on the information below and on your knowledge of science.

Maintaining a constant body temperature, no matter what the temperature of its surroundings, is a condition that needs to be balanced in many organisms. This ability is important to the organism's survival. These organisms have many different body structures and behaviors that help maintain a constant body temperature.

58 Whales have a thick layer of blubber (fat) under their skin. How does this blubber help the whales to maintain a constant body temperature? [1]

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59 Humans sweat when they are in the hot sun. How does sweating help humans to maintain a constant body temperature? [1]

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60 Foxes living in different parts of the world have different-sized ears. The arctic fox, which lives in cold climates, has small ears. The desert fox, which lives in hot climates, has large ears. How does ear size help each of these foxes to maintain a constant body temperature? [1]

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Base your answers to questions 61 through 63 on the information below and on your knowledge of science.

A student determined that shaking a container of sand caused the temperature of the sand to rise.

The student then performed a new experiment to see if shaking a container of pebbles would cause the temperature of the pebbles to rise.

61 Explain why the shaking caused the temperature of the sand to rise. [1]

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62 Write a hypothesis for the new experiment. [1]

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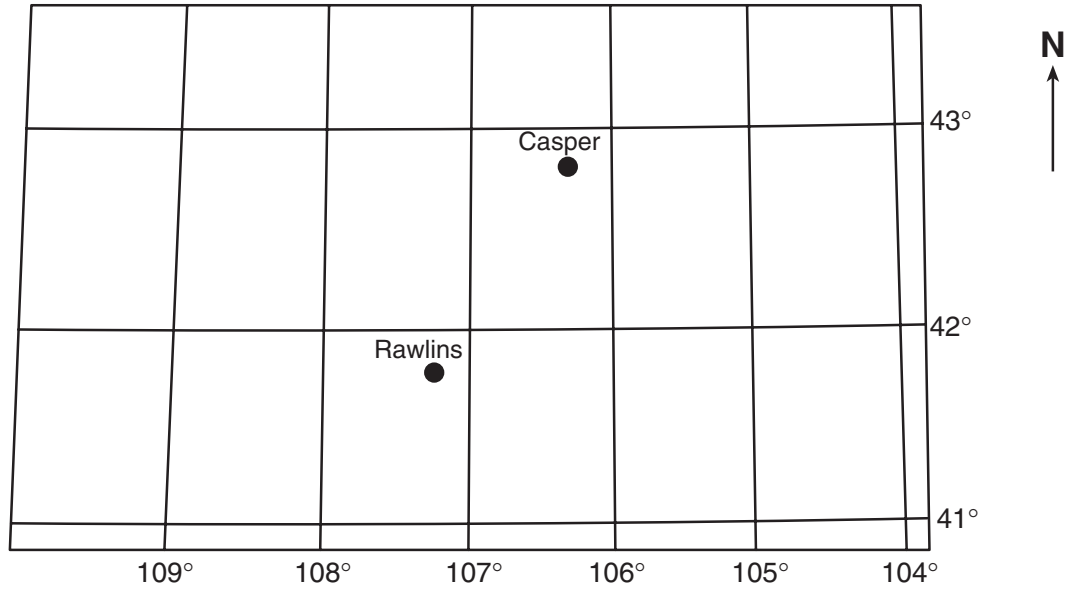
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63 Identify the dependent (responding) variable in the new experiment. [1]

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Base your answers to questions 64 and 65 on the partial map of the State of Wyoming below. The locations of Casper and Rawlins, Wyoming, are shown.



64 Explain why sunrise in Casper, Wyoming, occurs 4 minutes earlier than sunrise in Rawlins, Wyoming. [1]

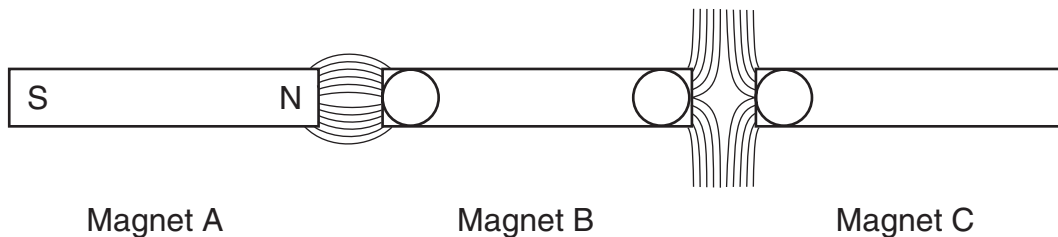
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65 On the map above, place an **X** to represent the location of Medicine Bow, Wyoming, (42° N, 106° W). [1]

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66 The diagram below shows three bar magnets. The south and north poles have been labeled *S* and *N* on magnet A. The lines between each magnet show how iron filings line up when sprinkled around the magnets.



*a* On the magnets shown, place an *S* in each circle that is a south pole and an *N* in each circle that is a north pole. [1]

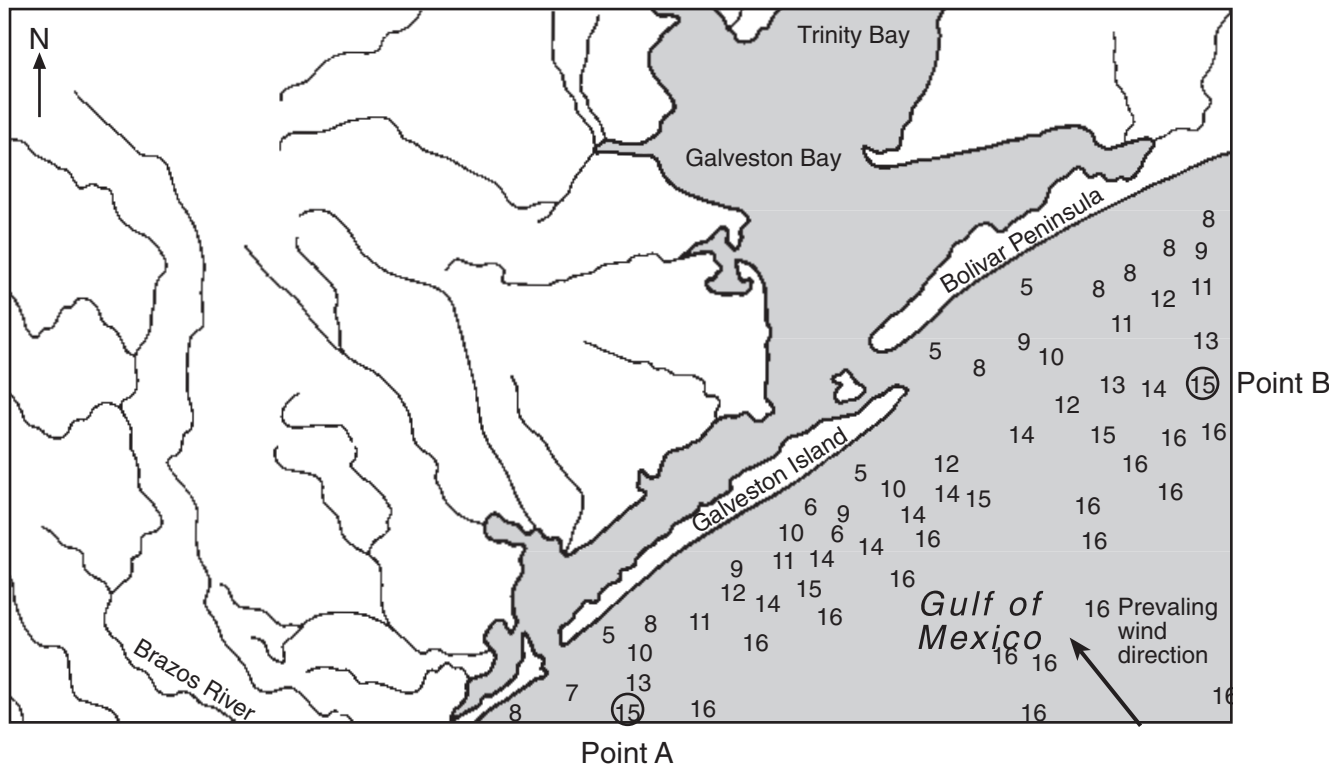
*b* State the scientific reasoning you used to label the poles. [1]

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Base your answers to questions 67 and 68 on the map below, which shows the depth of water, in meters, for a portion of the Gulf of Mexico in the vicinity of Galveston, Texas.



67 An isoline connects points of equal value. On the map, draw the complete 15-meter isoline to show the depth of the Gulf of Mexico shown on the map. Your 15-meter isoline should extend from point A to point B. These points are circled on the map. [1]

68 Explain why the gulf sides of Galveston Island and Bolivar Peninsula have smoother coastlines than their inland coastlines. [1]

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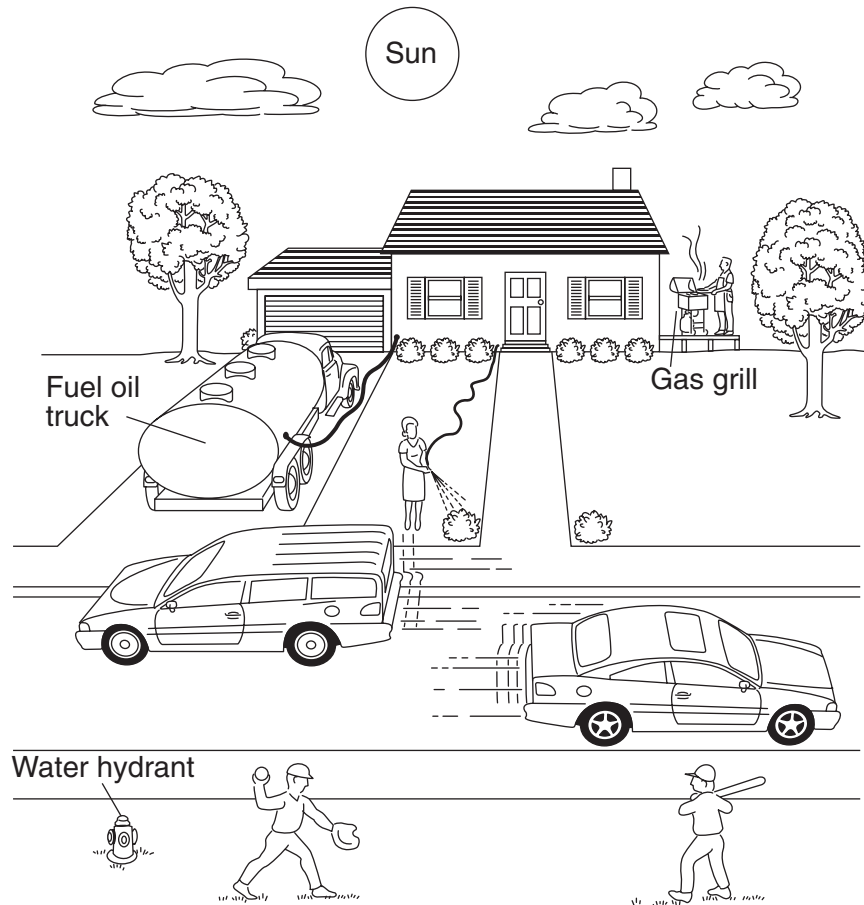


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Base your answers to questions 69 through 72 on the illustration below and on your knowledge of science. The illustration shows a number of activities happening on a sunny day.



69 What is the original source of energy for all these activities? [1]

\_\_\_\_\_

70 Identify one activity in the diagram that requires the use of fossil fuels. [1]

\_\_\_\_\_

71 Identify one renewable resource shown in the diagram. [1]

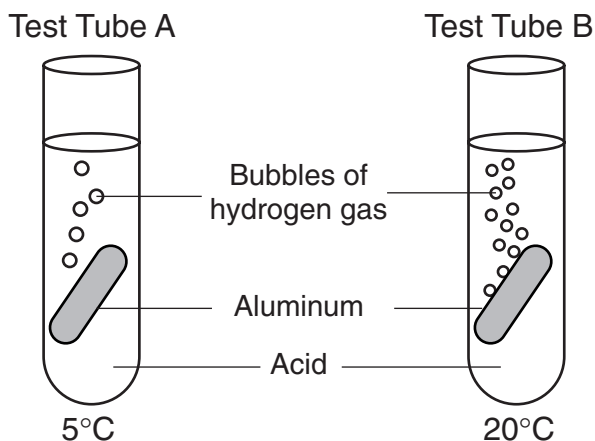
\_\_\_\_\_

72 An energy transformation occurs when one form of energy is changed to another. Fill in the spaces below to describe an energy transformation that occurs as the children play baseball. [1]

\_\_\_\_\_ is changed to \_\_\_\_\_

Base your answers to questions 73 through 75 on information below and on your knowledge of science.

Equal-sized pieces of aluminum were placed in test tubes containing equal volumes of acid, at different temperatures. The temperature of the acid in test tube A is  $5^{\circ}\text{C}$ . The temperature of the acid in test tube B is  $20^{\circ}\text{C}$ .



73 What observation would indicate that a chemical reaction is taking place in the test tubes? [1]

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74 What effect does the temperature of the acid have on the rate at which the reaction progresses? [1]

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75 Identify *two* actions the student could take to increase the reaction rate in the test tubes. [2]

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

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

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Base your answers to questions 76 through 78 on the information below and on your knowledge of science.

A student adds a mixture of oil, sand, and salt to a beaker of water and stirs. The student stops stirring and observes that the salt is no longer visible, the oil floats to the top, and the sand sinks to the bottom of the beaker.

76 Explain why the oil floats after the stirring stops. [1]

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77 Explain why the salt is no longer visible after the stirring stops. [1]

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78 Identify one way to remove the sand from the mixture in the beaker. [1]

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**For Teacher Use Only  
Part II Credits**

<b>Question</b>	<b>Maximum Credit</b>	<b>Credit Allowed</b>
46	1	
47	1	
48	1	
49	1	
50	3	
51	1	
52	1	
53	1	
54	2	
55	3	
56	1	
57	1	
58	1	
59	1	
60	1	
61	1	
62	1	
63	1	
64	1	
65	1	
66	2	
67	1	
68	1	
69	1	
70	1	
71	1	
72	1	
73	1	
74	1	
75	2	
76	1	
77	1	
78	1	
<b>Total</b>	<b>40</b>	