

THE UNIVERSITY OF THE STATE OF NEW YORK

# GRADE 8

## INTERMEDIATE-LEVEL TEST SCIENCE

### WRITTEN TEST

JUNE 2003

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 25 open-ended questions. Write your answers to Part II in the space provided in this test booklet.

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

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.**



## 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 correct 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.

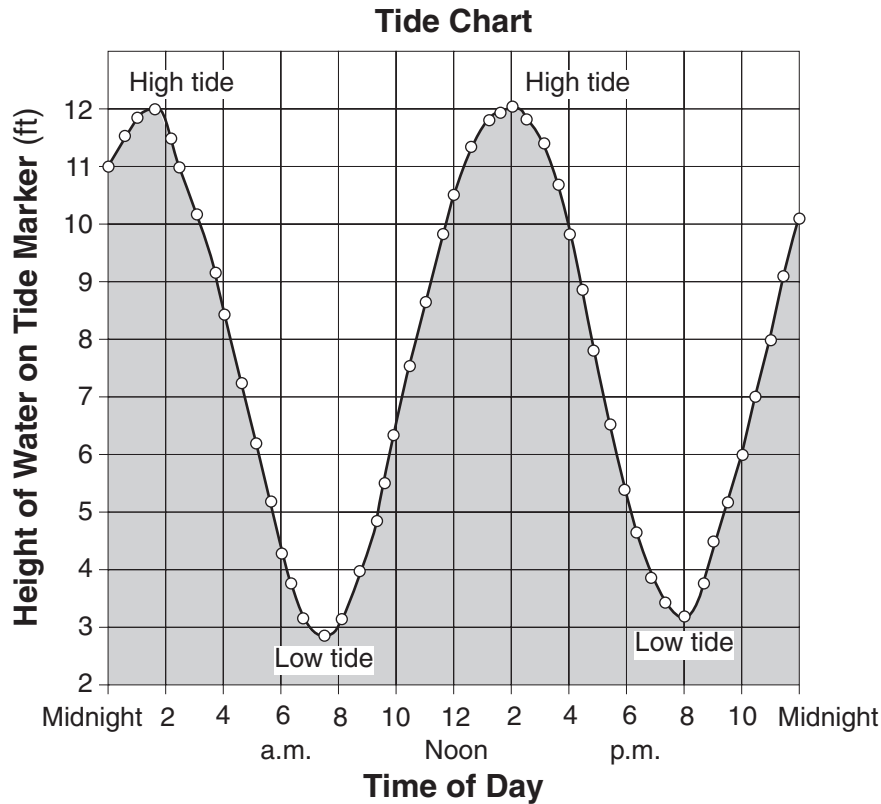
You may use a calculator if needed.

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.

## Part I

1 The graph below shows the water levels that result from tidal action over a 24-hour period.



What was the approximate height of the water on the tide marker at 6 p.m.?

- |            |             |
|------------|-------------|
| (1) 4.3 ft | (3) 8.5 ft  |
| (2) 5.4 ft | (4) 11.2 ft |
- 

2 Approximately how long does it take to cycle from one new Moon to the next new Moon?

- |            |             |
|------------|-------------|
| (1) a day  | (3) a month |
| (2) a week | (4) a year  |

3 If shell fragments are found in a rock sample, it is most likely that the rock formed

- (1) on a mountain slope
- (2) on a glacier
- (3) from magma
- (4) in shallow water

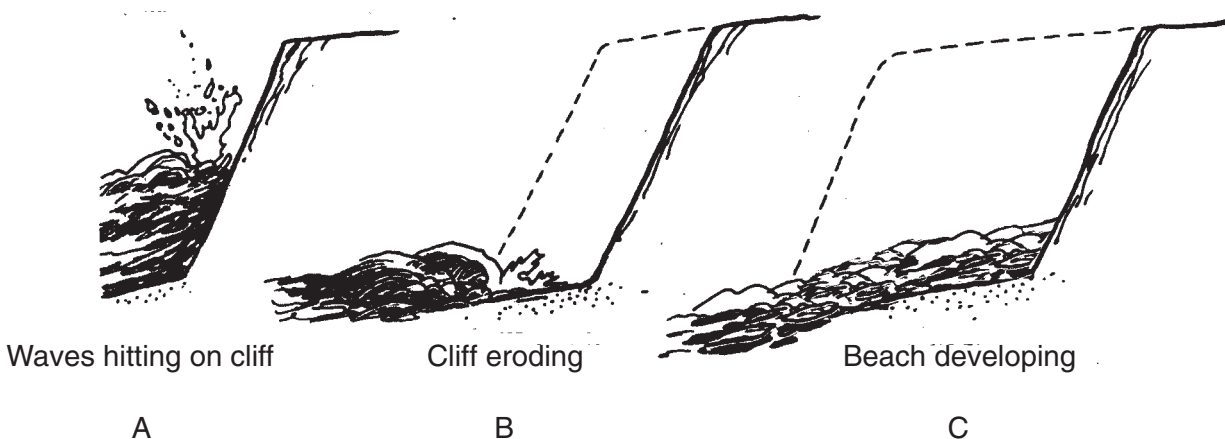
4 The thin layer of water that covers most of Earth's surface is called the

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

5 Which term refers to the atmospheric conditions that prevail from season to season and year to year at a certain location?

- |             |                 |
|-------------|-----------------|
| (1) weather | (3) equilibrium |
| (2) climate | (4) ecosystem   |

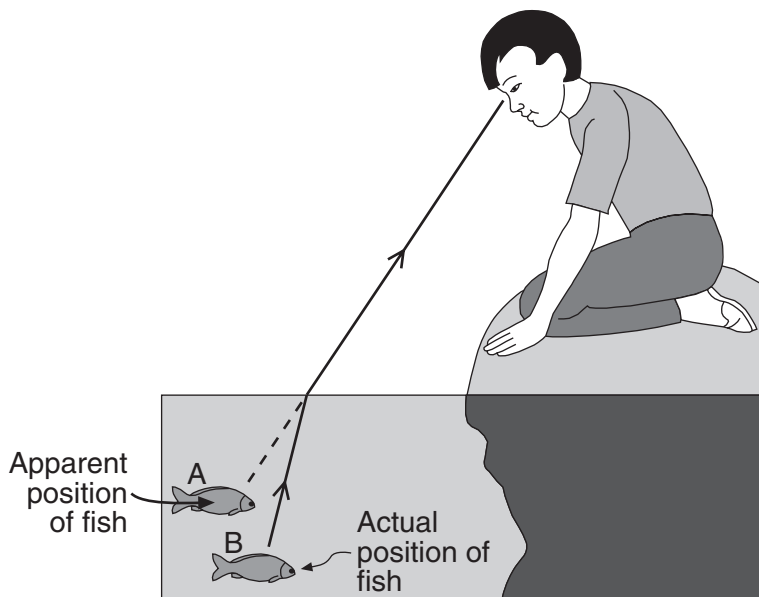
6 The diagram below shows three stages in the formation of a beach.



Which process is mostly responsible for the breaking down of the rock cliff into sand-sized sediment?

- (1) weathering
- (2) faulting
- (3) folding
- (4) precipitation

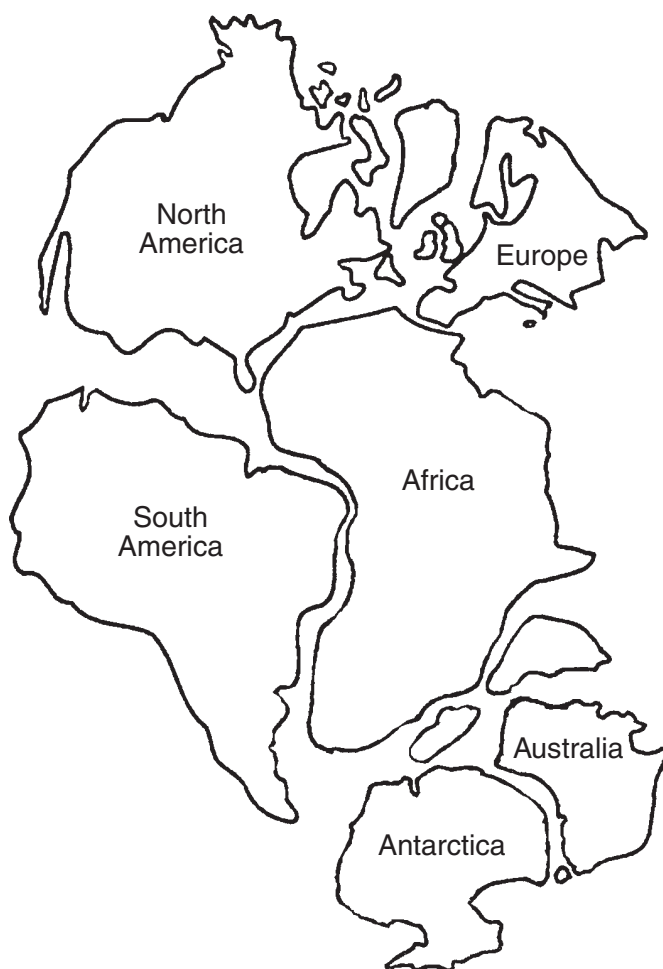
7 The diagram below shows a boy observing a fish located at position B below the surface of the water. The boy sees the fish at position A.



The apparent position of the fish is different from the actual position of the fish. What has happened to the light passing through the water to cause this difference?

- (1) reflection
- (2) absorption
- (3) compression
- (4) refraction

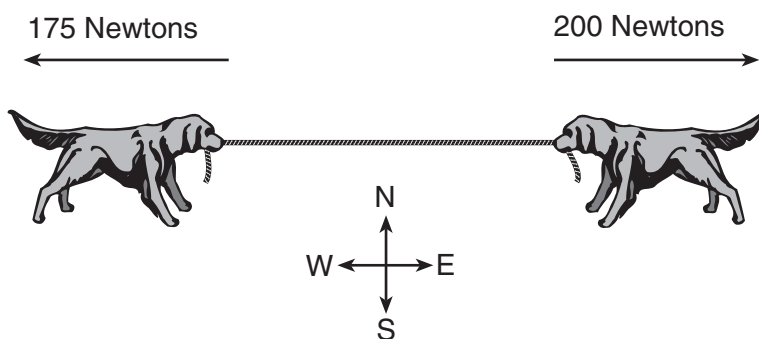
8 The map below shows the probable location of some of the continents at one time in the past.



What feature of the continents best suggests that they were once joined?

- (1) Some continents fit together like puzzle parts.
- (2) Some continents are the same size.
- (3) All continents have mountain ranges.
- (4) All continents contain the same crustal composition.

9 The diagram below shows two dogs pulling on a rope with constant but *unequal* forces.



In which compass direction will both dogs most likely move?

- (1) east
- (2) west
- (3) north
- (4) south

Base your answers to questions 10 and 11 on the map below and on your knowledge of science. The map shows the origin of a maritime tropical air mass. The arrow shows the general track of this air mass. New York State is labeled NY.



**10** Which temperature and moisture conditions are associated with this air mass?

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

**11** Which factor has the greatest influence on the direction of the air-mass track?

- (1) upper air currents
- (2) ocean currents
- (3) sea breezes
- (4) mountain barriers





**12** A common characteristic of sound waves is that they

- (1) are created by vibrations
- (2) travel in straight lines toward the source
- (3) travel fastest through empty space
- (4) move at the speed of light

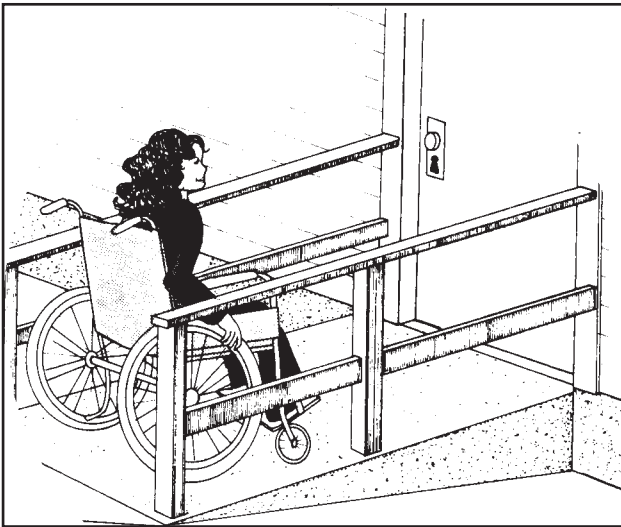
**13** Energy from the Sun reaches Earth mainly by the process of

- (1) conduction
- (2) convection
- (3) reflection
- (4) radiation

**14** Magnets *A* and *B* are of equal magnetic strength. In which position will magnets *A* and *B* have the greatest attractive force toward each other?

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

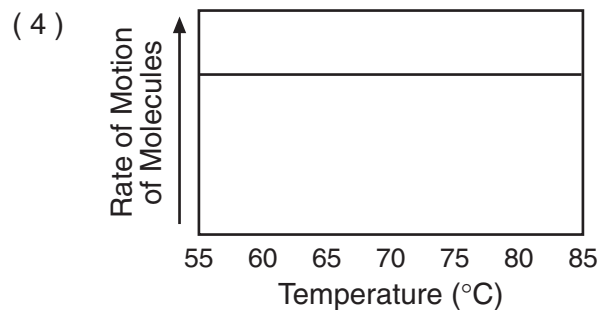
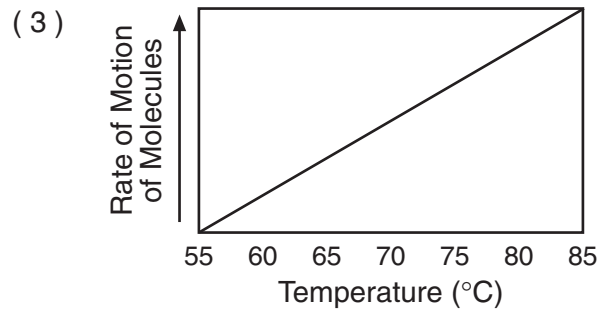
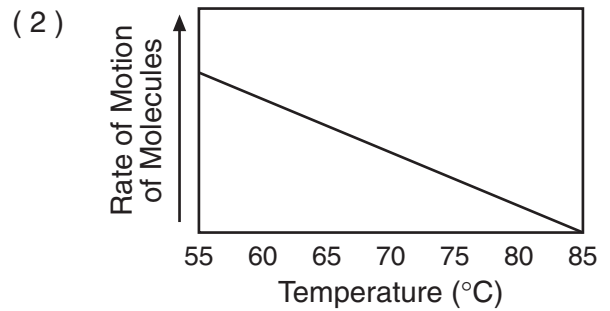
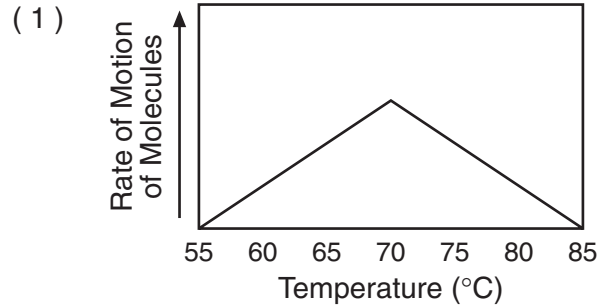
**15** The illustration below shows a student approaching the door to a building.



Which two simple machines are being used to enable the student to reach the door?

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

**16** Which graph correctly shows the effect of heat energy on the motion of molecules of matter?

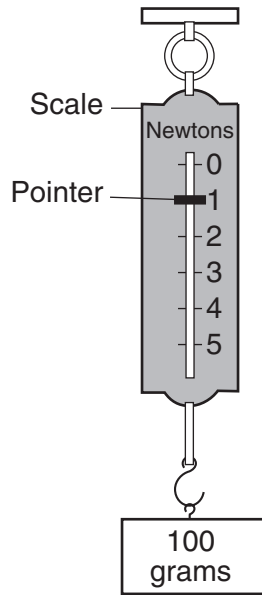


**17** The tiny particles that make up all matter are called

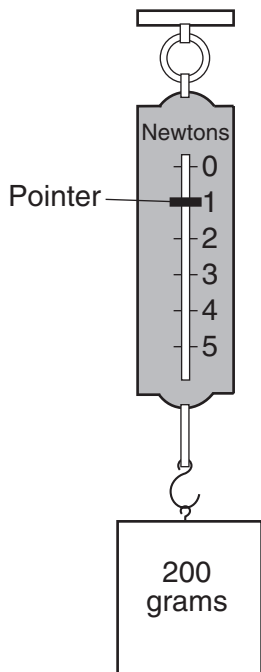
- (1) genes (3) minerals  
 (2) atoms (4) cells



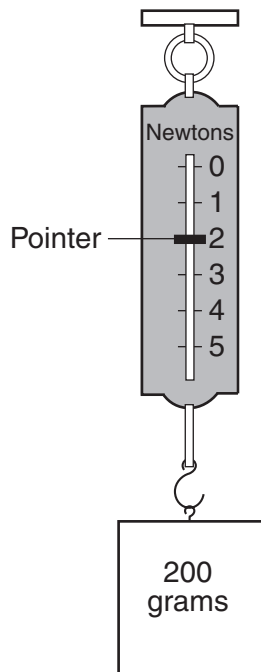
18 The diagram below shows a spring scale being used to weigh a 100-gram mass.



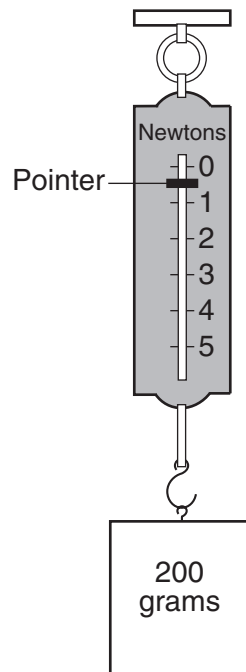
Which diagram best represents the correct reading for the same spring scale being used to weigh a 200-gram mass?



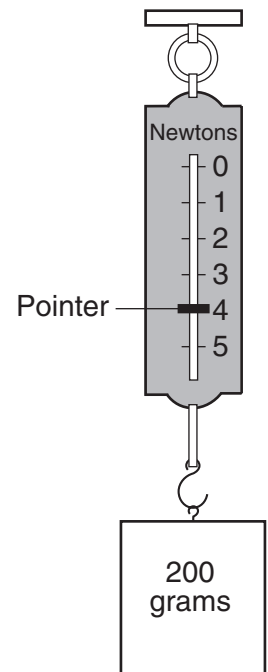
(1)



(2)

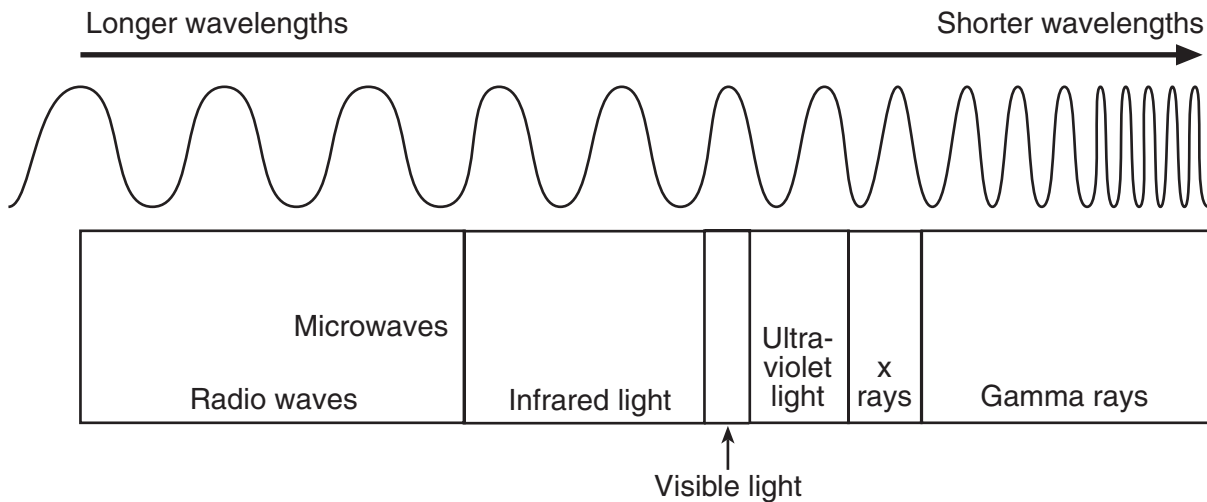


(3)



(4)

19 The diagram below shows the relative wavelengths for several types of electromagnetic energy.



Which type of electromagnetic energy has a shorter wavelength than ultraviolet waves?

- (1) visible light
- (2) microwaves
- (3) x rays
- (4) infrared light

20 Plastic is used to cover the copper wires in the power cords of appliances because plastic differs from copper in

- (1) density
- (2) hardness
- (3) phase at room temperature
- (4) electrical conductivity

21 Which energy source is considered a *nonrenewable* resource?

- (1) solar
- (2) wind
- (3) moving water
- (4) fossil fuel

22 A television set changes electrical energy to sound and light energy. In this process, some energy is

- (1) created
- (2) destroyed
- (3) changed to matter
- (4) changed to heat

23 To provide energy for the work that cells do, all cells need

- (1) chloroplasts
- (2) nutrients
- (3) atmospheric nitrogen
- (4) carbon dioxide

24 Cells are to tissues as tissues are to

- (1) microbes
- (2) organs
- (3) systems
- (4) bacteria

25 Which group is made up of organisms that are all members of the same kingdom?

- (1) cat, frog, and mushroom
- (2) mold, bacteria, and apple tree
- (3) grass, worm, and shark
- (4) fern, rose bush, and corn plant

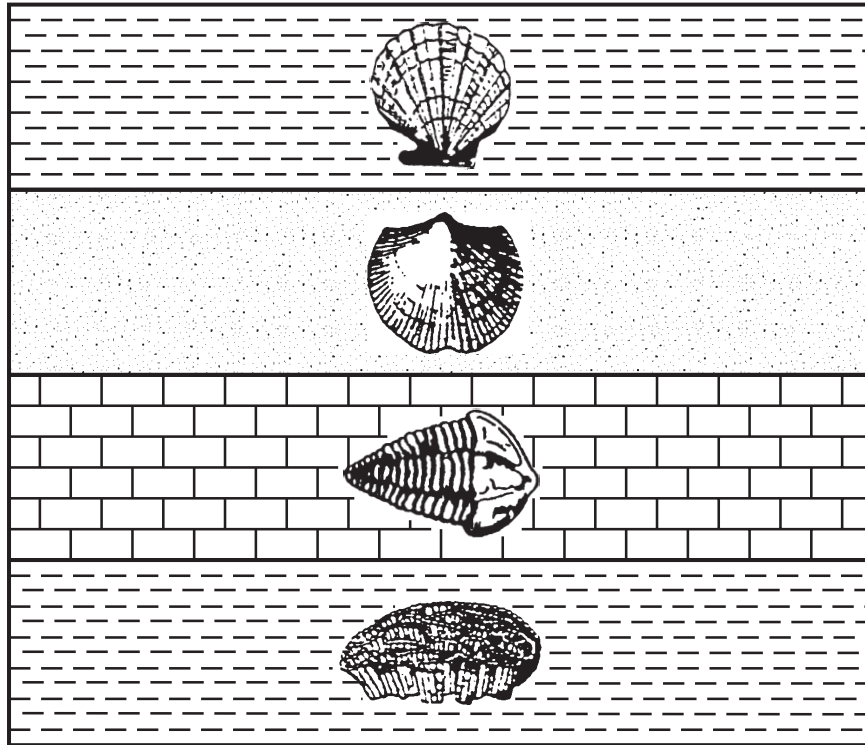
26 When a person breathes, the lungs absorb oxygen, which is used by cells to carry out the process of

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

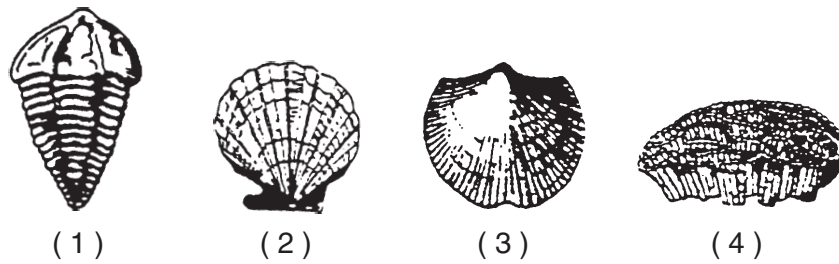
27 Running is an activity that causes the cells in the muscular system to use oxygen at a faster rate. Which system responds by delivering more oxygen to these cells?

- (1) digestive
- (2) nervous
- (3) circulatory
- (4) endocrine

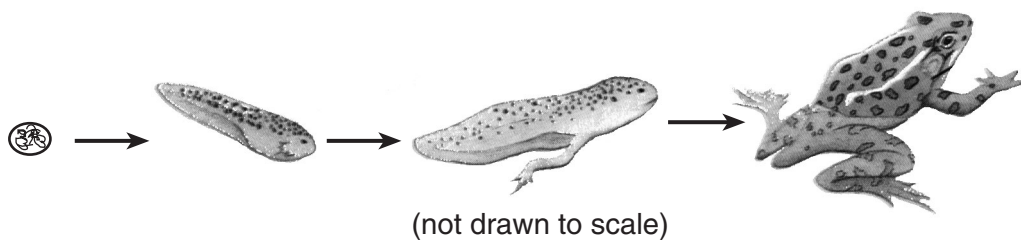
28 The cross section below shows sedimentary rock layers containing fossils.



Assuming that these rock layers have not been overturned, which fossil is in the layer that was formed most recently?



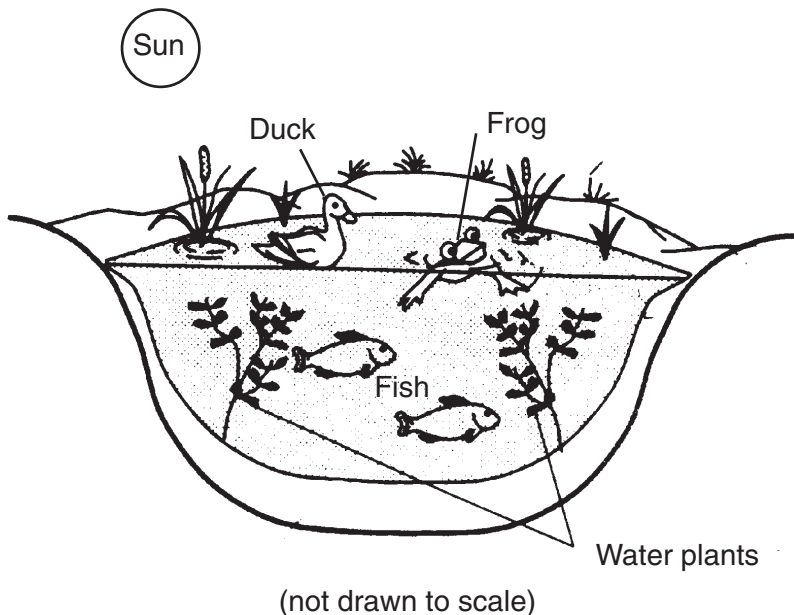
29 The diagram below shows how a frog develops. A fertilized egg hatches into a tadpole with gills. The tadpole develops legs and lungs and becomes an adult frog.



What is the term for this series of changes during the life cycle of the frog?

- (1) fertilization
- (2) reproduction
- (3) mutation
- (4) metamorphosis

Base your answers to questions 30 and 31 on the diagram below and on your knowledge of science. The diagram represents a pond community containing a variety of plants and animals.



**30** Why are the fish able to survive in the pond?

- (1) The fish use carbon dioxide produced by the plants.
- (2) The fish use oxygen produced by the plants.
- (3) The plants use oxygen produced by the fish.
- (4) The plants use chlorophyll produced by the fish.

**31** The main source of energy for this pond community is the

- |            |                |
|------------|----------------|
| (1) plants | (3) pond water |
| (2) Sun    | (4) animals    |

**32** A new variety of tomato is better tasting and can be stored longer than other tomato varieties. This new tomato is produced by placing additional gene segments into the cells of the tomato plant. This process is known as

- (1) genetic engineering
- (2) selective breeding
- (3) natural selection
- (4) sexual reproduction

**33** Which human body systems are directly involved in reflex actions, such as knee jerk, blinking, and jumping when startled?

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

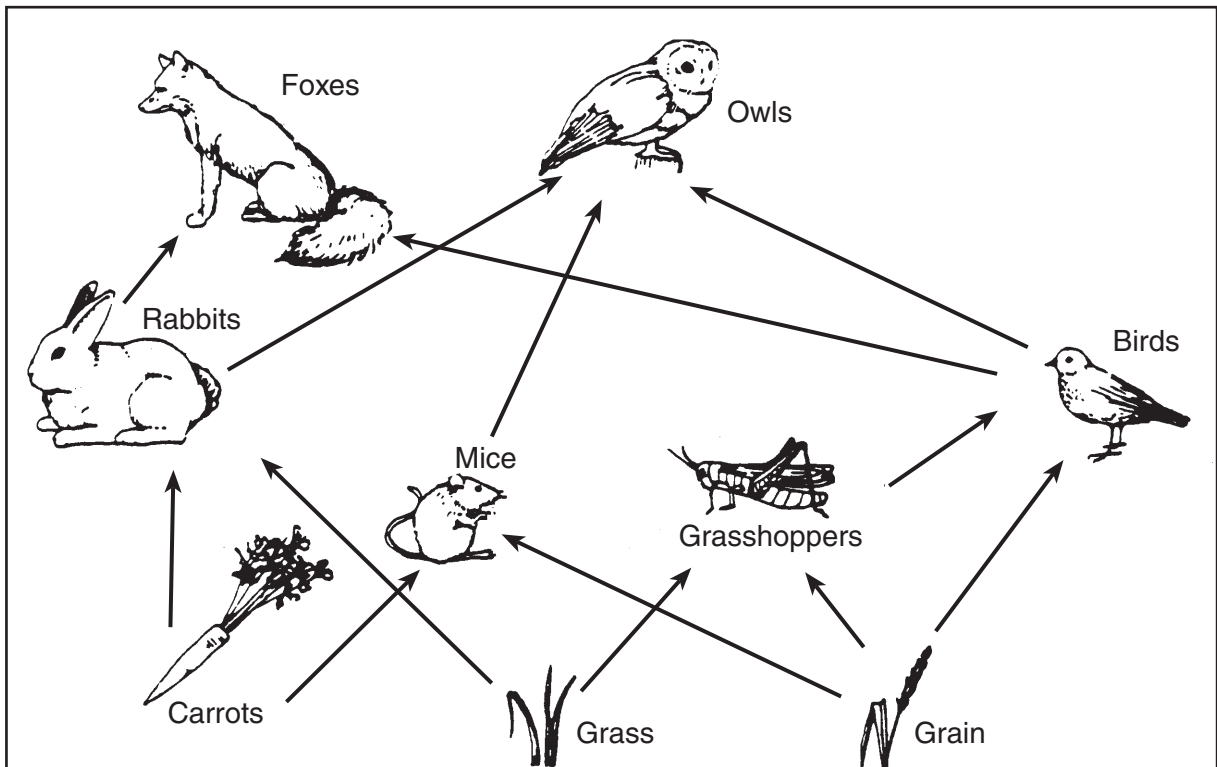
**34** In a one-celled organism, cell division is responsible for

- (1) growth and maintenance
- (2) sexual reproduction
- (3) asexual reproduction
- (4) production of sex cells

**35** In which human body system are hormones produced?

- |                 |               |
|-----------------|---------------|
| (1) respiratory | (3) nervous   |
| (2) endocrine   | (4) digestive |

Base your answers to questions 36 through 38 on the food web below and your knowledge of science.



( not drawn to scale )

**36** What is the role of the foxes in this food web?

- (1) carnivore
- (2) decomposer
- (3) herbivore
- (4) producer

**37** Which organisms in this food web are omnivores?

- (1) birds
- (2) carrots
- (3) grasshoppers
- (4) rabbits

**38** Which statement would be true if the owl population disappeared?

- (1) The mouse population would increase.
- (2) The carrot population would increase.
- (3) The fox population would decrease.
- (4) The rabbit population would decrease.

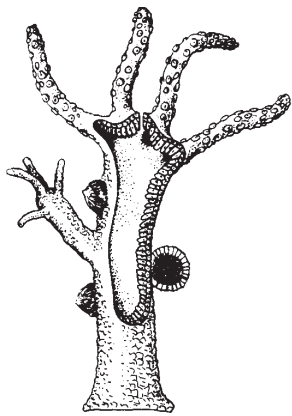
**39** A new yeast cell is sometimes produced from a single parent by a process called budding. The process of budding is best described as

- (1) sexual reproduction, with genetically identical offspring
- (2) sexual reproduction, with genetically different offspring
- (3) asexual reproduction, with genetically identical offspring
- (4) asexual reproduction, with genetically different offspring

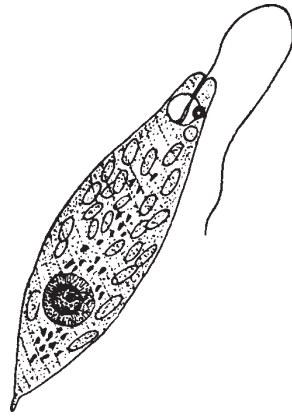
**40** When do organs begin to develop in humans?

- (1) in the sperm cell before fertilization
- (2) before fertilization and after birth
- (3) in the egg cell after fertilization
- (4) after fertilization and before birth

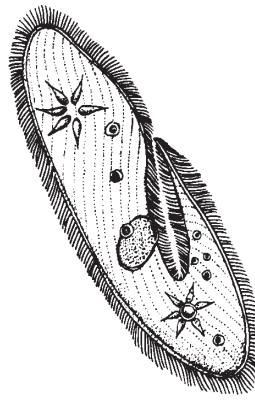
41 Which illustration is an example of a multicellular organism?



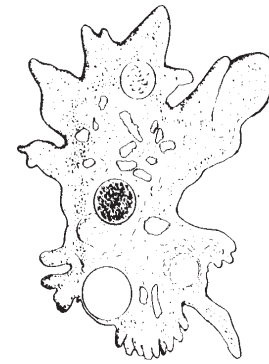
Hydra



Euglena



Paramecium



Amoeba

- (1) hydra
- (2) euglena

- (3) paramecium
- (4) amoeba

42 The vast variety of different traits found in humans results from

- (1) intensive training and education
- (2) sexual reproduction and mutations
- (3) exercise and conditioning
- (4) birth defects and recessive genes

43 Which body system is responsible for the elimination of liquid and gaseous wastes?

- (1) nervous
- (2) skeletal
- (3) excretory
- (4) digestive

44 Which factor has the *least* effect on a person's metabolism?

- (1) exercise
- (2) hormones
- (3) intelligence
- (4) diet

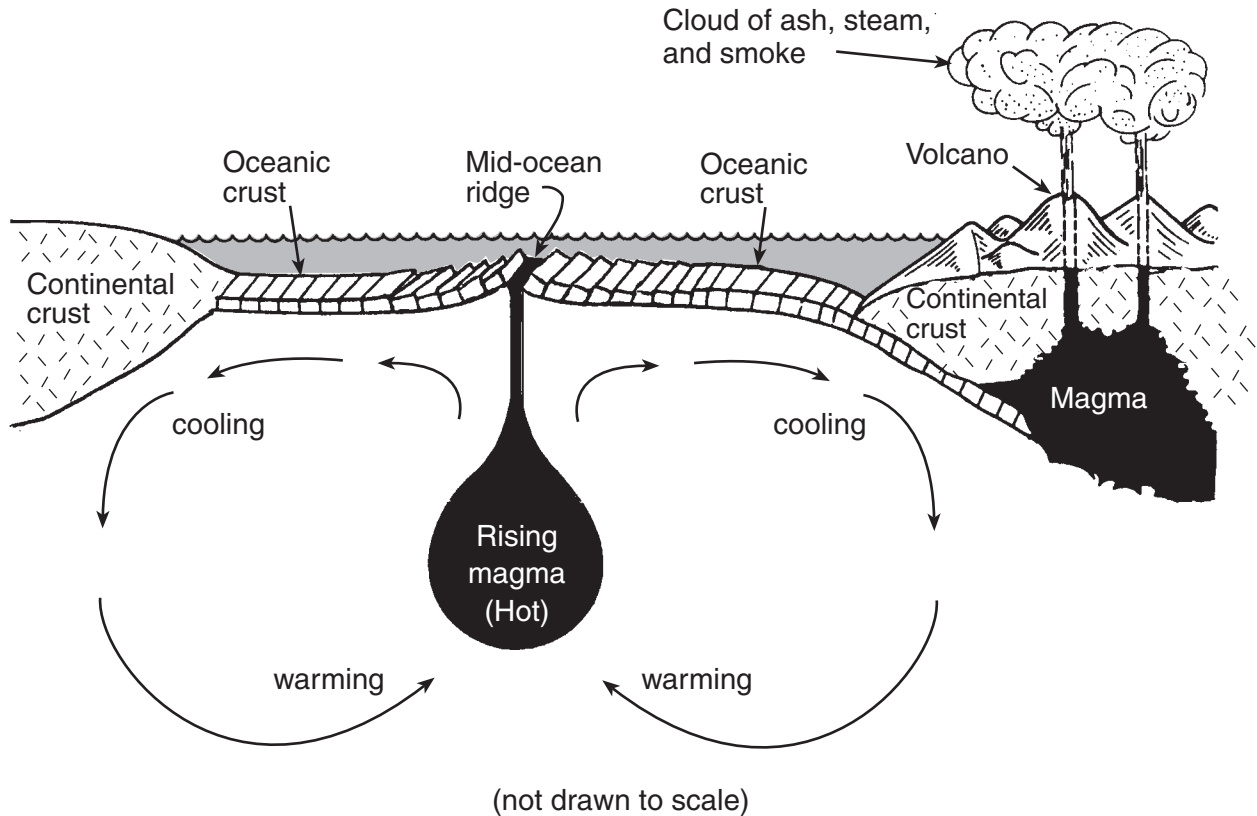
45 Which of the four terms below includes the other three terms?

- (1) community
- (2) ecosystem
- (3) population
- (4) individual

## Part II

*Directions (46–70):* Record your answers in the spaces provided in this test booklet.

Base your answers to questions 46 through 48 on the cross section below and on your knowledge of science. The cross section shows the heat flow and movement of some material within Earth, causing sections of Earth's crust (plates) to move.



**46** How does the temperature of Earth's crust compare to the temperature of Earth's interior? [1]

---

**47** Name *two* geologic features or events that might result from the movement of crustal plates. [2]

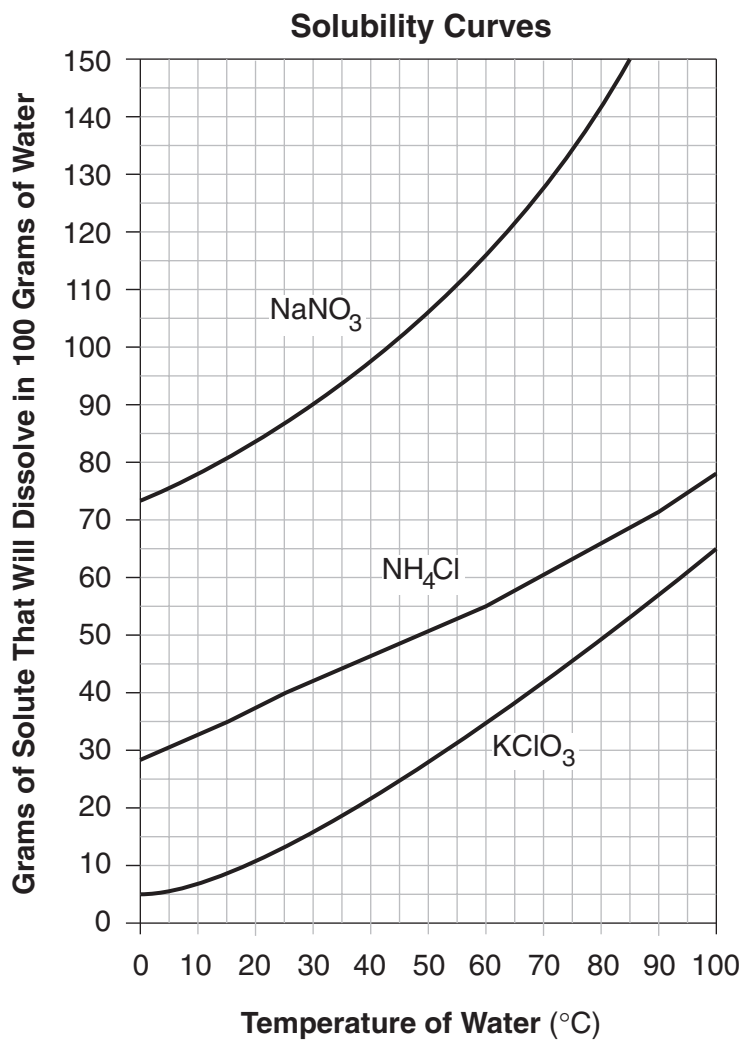
(1) \_\_\_\_\_

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

**48** How does the thickness of Earth's oceanic crust compare to the thickness of the continental crust? [1]

---

Base your answers to questions 49 and 50 on the graph below and data table on page 17. The graph shows the amounts of three solid solutes that will dissolve in 100 grams of water at various temperatures.



49 Using the graphed data, describe the relationship between the temperature of the water and the amount of solute that will dissolve. [1]

---

---



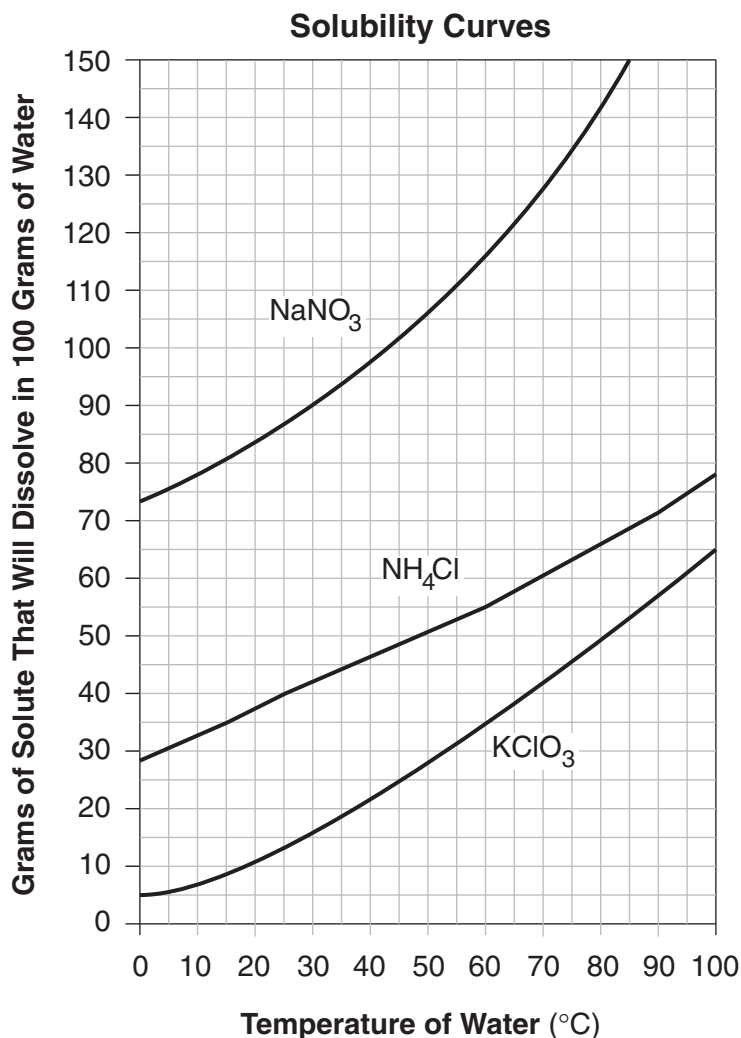
50 The data table shows the solubility of a fourth solid solute, KBr, in 100 grams of water at various temperatures.

**Solubility of KBr**

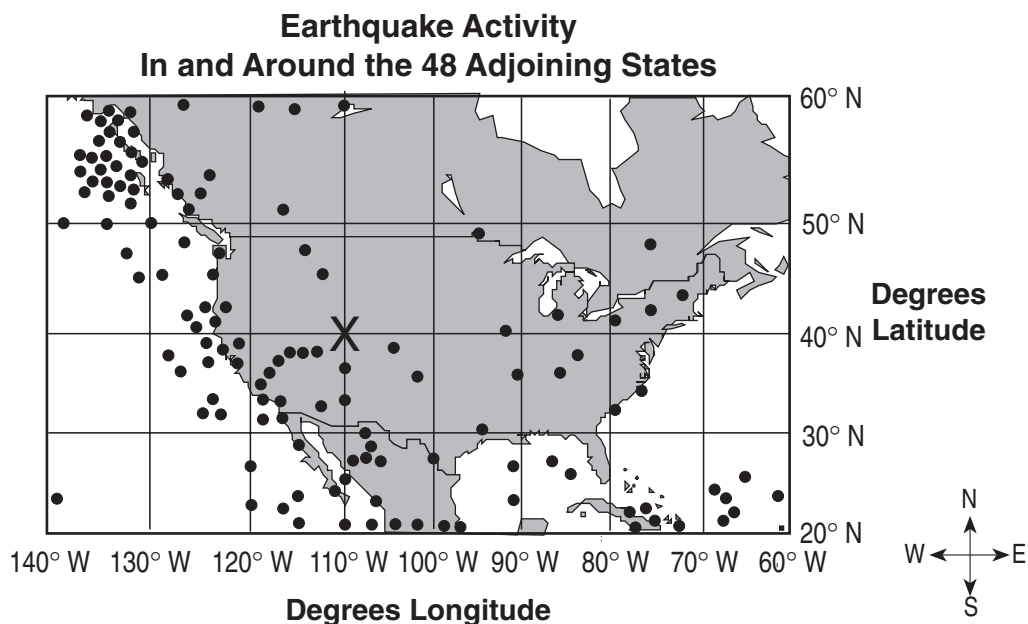
Temperature of Water (°C)	Grams of KBr Solute That Will Dissolve in 100 Grams of Water
0	53
20	65
40	76
60	88
80	95
100	104

Using the data in the table, construct a line graph on the grid below to illustrate the solubility of KBr. Follow the directions below.

- a Use an **X** to plot the location of each point on the data table. [1]
- b Connect the **Xs** with a line. [1]
- c Label this line KBr. [1]



Base your answers to questions 51 through 53 on the map below and on your knowledge of science. The map shows earthquake activity in and around the United States. Earthquake activity is indicated by dots.



51 State *one* reason that there are more earthquakes in the western section of the area shown on the map. [1]

---



---

52 According to the map, what is the latitude and longitude of the location at letter X? [Your answer must include a value, unit, and direction for each.] [2]

Latitude: \_\_\_\_\_

Longitude: \_\_\_\_\_

53 List *two* actions that residents of the west coast might include in an earthquake emergency preparedness plan. [2]

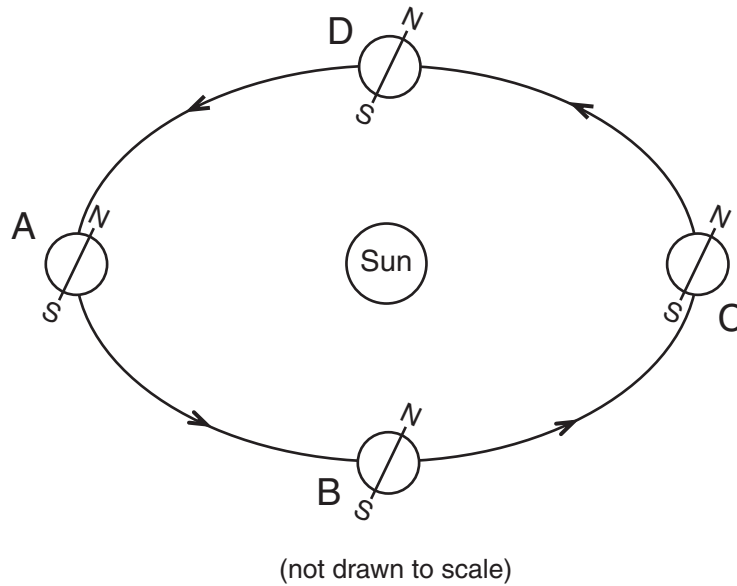
(1) \_\_\_\_\_

---

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

---

Base your answers to questions 54 through 56 on the diagram below. The diagram shows Earth's revolution around the Sun as viewed from space. Positions A, B, C, and D represent the beginning of each season on Earth.



54 State *one* reason that Earth has seasons. [1]

---

55 If Earth were at position *D*, how much time would it take to return to position *D*? [1]

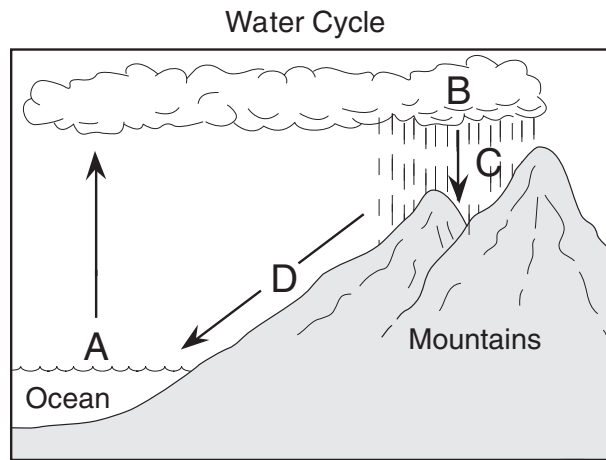
---

56 Which season begins in the Northern Hemisphere when Earth is at position *A*? [1]

---

---

57 The diagram below uses letters A, B, C, and D to represent processes occurring in a water cycle.



In the chart below, identify the process that is occurring at each letter in the diagram. Select the process from the list below. [2]

*Processes*  
 condensation  
 evaporation  
 precipitation  
 runoff

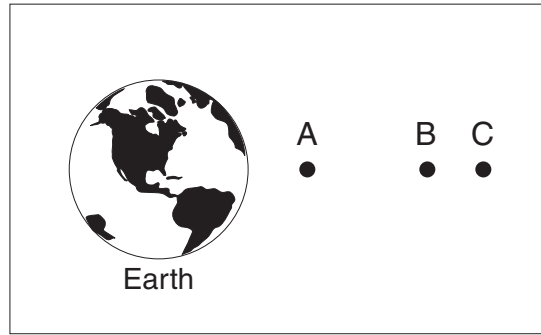
Letter	Process That Is Occurring
A	
B	
C	
D	

58 A student is given a mixture of salt, sand, and iron filings. Explain *two* laboratory methods that the student could use to physically separate some of these substances. [2]

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

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

59 In the diagram below, the letters *A*, *B*, and *C* represent three identical satellites and their relative distances from Earth as seen from space.



(not drawn to scale)

*a* Which satellite would experience the strongest pull of Earth's gravity? [1] \_\_\_\_\_

*b* State a scientific principle that explains your answer in part *a*. [1]

---



---

*c* Predict what might happen to satellite *B* if the forces acting on it become unbalanced. [1]

---



---

60 The Punnet square below represents the result of the cross between two tall pea plants. All of the resulting offspring were tall.

	T	t
T	TT	Tt
T	TT	Tt

Key: T = tall height (dominant)  
t = short height (recessive)

Identify *two* offspring from the Punnet square that could produce short pea plants if they were crossed. Explain your answer. [2]

Offspring: \_\_\_\_\_ x \_\_\_\_\_

Explanation: \_\_\_\_\_

---

61 The table below provides some information about common plant cell structures and their functions. In the table, there are three blank spaces. Fill in the three blank spaces by writing the name of the plant cell structure that performs the function described. [3]

**Plant Cell Structures and Their Functions**

<b>Plant Cell Structure</b>	<b>Function</b>
Cell membrane	Allows substances to enter and leave the cell
	Directs the cell's activities including reproduction
	Captures energy from sunlight to make food
	Protects and supports the cells
Cytoplasm	Allows the movement of materials around the cell and supports other cell structures
Vacuole	Stores food, water, and waste

---

Base your answers to questions 62 and 63 on the information below and on your knowledge of science.

A company built a paper plant on 90 acres of land in a local community. The company employs 800 people and uses local timber to make the paper.

62 *a* Describe a situation that might harm the environment as the company operates its paper plant. [1]

---

*b* Describe a way that the company might prevent this damage to the environment in the future. [1]

---

63 What is the term given to the substances produced by the paper industry that are harmful to organisms? [1]

---

---

**64** In 1990, there was just one farmhouse on a square kilometer of land. The land was sold to a developer who planned to build a total of 20 houses. While some of the houses were being built, a scientist collected the data in the table below.

<b>Year</b>	<b>Number of Rabbits per km<sup>2</sup></b>	<b>Number of Houses per km<sup>2</sup></b>
1990	75	1
1991	72	2
1992	64	3
1993	60	5
1994	56	8
1995	51	10
1996	46	12
1997	35	13
1998	29	15
1999	21	16

*a* The last four houses were built in the year 2000. Based on the data in the table, predict what happened to the number of rabbits in the year 2000. [1]

---

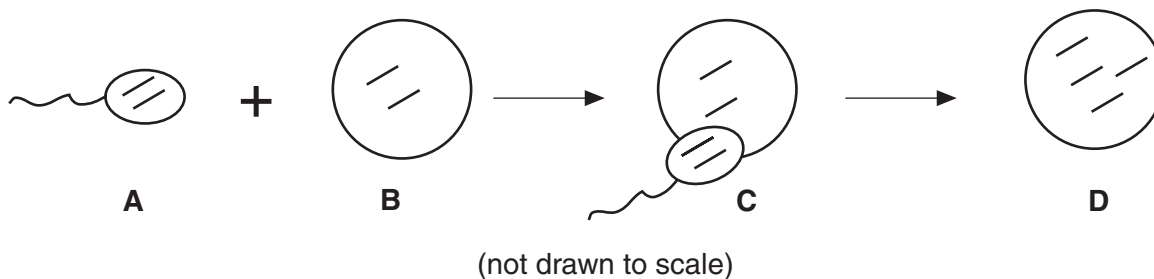
*b* Explain how you arrived at this prediction. [1]

---

---

---

Base your answers to questions 65 through 67 on the diagram below and on your knowledge of science. The diagram shows a model of sexual reproduction. The lines in each cell represent genetic material (chromosomes).



65 Which letter in the diagram represents a female sex cell? [1] \_\_\_\_\_

66 Which process is occurring at C? [1] \_\_\_\_\_

67 What evidence in the diagram shows that sexual reproduction occurred? [1]

---



---



---

Base your answers to questions 68 and 69 on the chart below and on your knowledge of science. Each food in the chart is a particularly good source of the nutrient listed.

Nutrient	Food Source
protein	fish
carbohydrate	orange juice
fat	olive oil

68 Which nutrient listed in the chart is primarily responsible for growth and repair in the human body? [1]

---

69 Which food source listed in the chart would provide a quick source of energy for the cells of the body? [1]

---

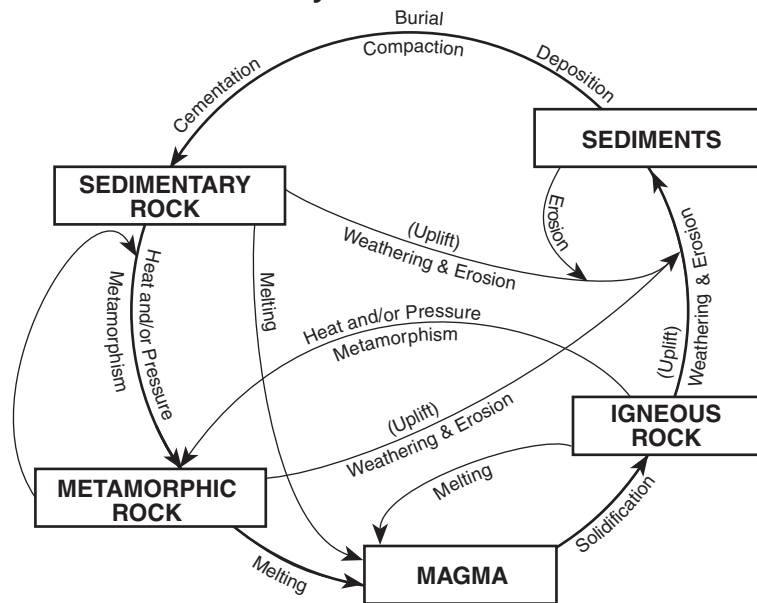


---



70 The diagram below shows the rock cycle in Earth's crust. Use this rock cycle diagram to fill in the rock types and method of formation that have been left blank in the chart below. [3]

### Rock Cycle in Earth's Crust



Rock Type	Method of Formation
	melting and solidification
	deposition, compaction, and cementation
Metamorphic	





**For Teacher Use Only**  
**Part II Credits**

<b>Question</b>	<b>Maximum Credit</b>	<b>Credit Allowed</b>
46	1	
47	2	
48	1	
49	1	
50	3	
51	1	
52	2	
53	2	
54	1	
55	1	
56	1	
57	2	
58	2	
59	3	
60	2	
61	3	
62	2	
63	1	
64	2	
65	1	
66	1	
67	1	
68	1	
69	1	
70	3	
<b>Total</b>	<b>41</b>	