

REGENTS COMPETENCY TEST

SCIENCE

Monday, June 21, 2004 — 1:15 p.m.

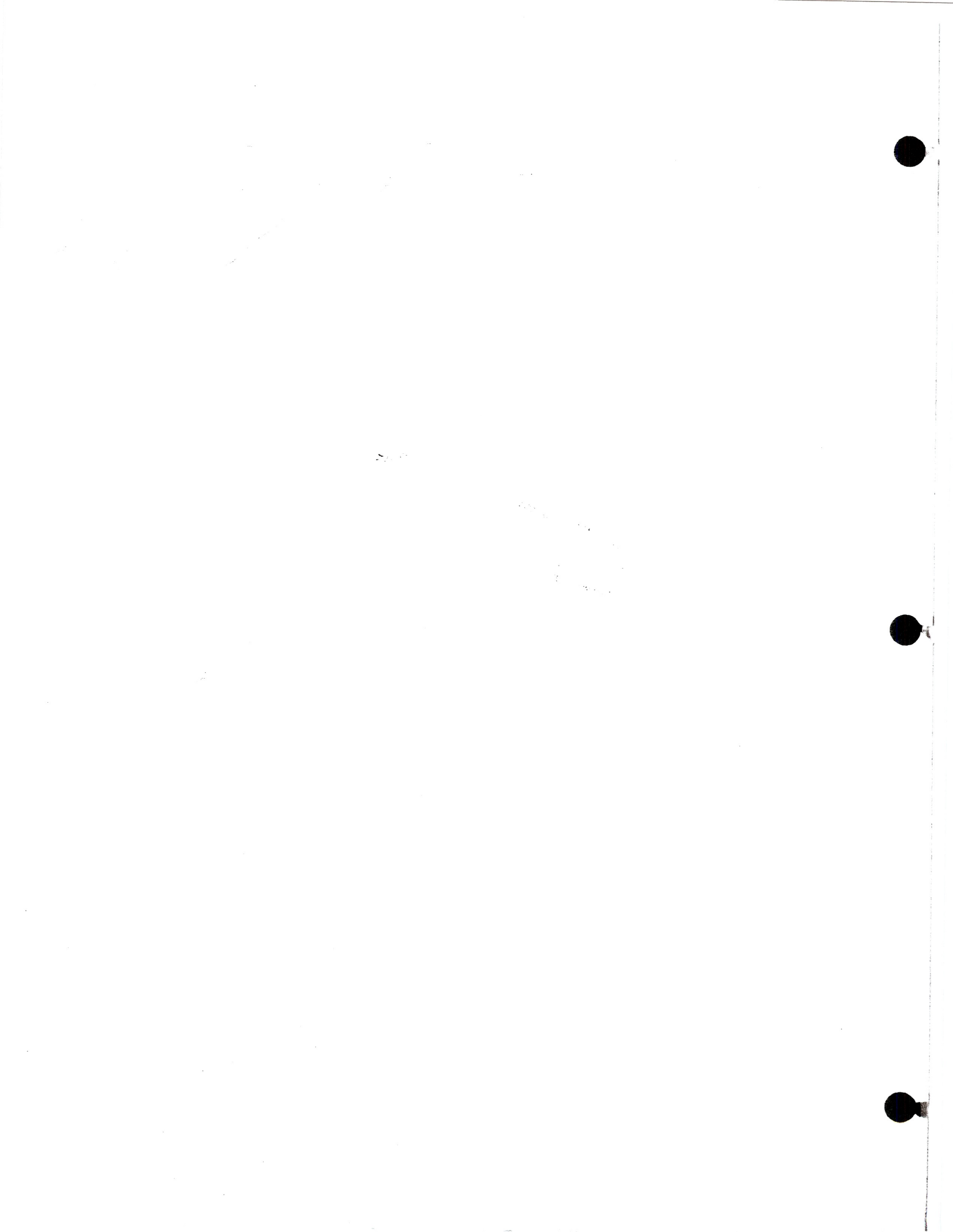
There are 70 questions on this test of basic science concepts and skills. Your answers for questions 1 through 69 must be recorded on the separate answer sheet for multiple-choice questions. Use only a No. 2 pencil on that answer sheet. Your answer for question 70 is to be recorded in the spaces provided on the last page of this test booklet.

When you have completed the test, you must sign the declaration which states that you did not see any of the questions or answers before taking this test and that you have neither given nor received help in answering any of the questions during the test. Your answer papers cannot be accepted if you fail to sign this declaration.

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO.

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DIRECTIONS TO STUDENTS

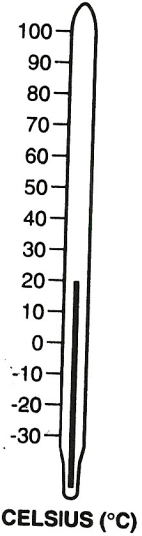
Questions 1 through 69 on this test are multiple-choice questions. Read each question carefully. Decide which of the choices given is the *best* answer, based on science principles. On the separate answer sheet, mark your answer in the row of circles for each question by filling in the circle that has the same number as the answer you have chosen.

Read the sample question below.

Sample Question

What temperature reading is shown on the thermometer?

(1) -30°C
(2) 20°C
(3) 70°C
(4) 100°C



CELSIUS ($^{\circ}\text{C}$)

The correct answer is 20°C , which is choice number **2**. On your separate answer sheet for the multiple-choice questions, 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.

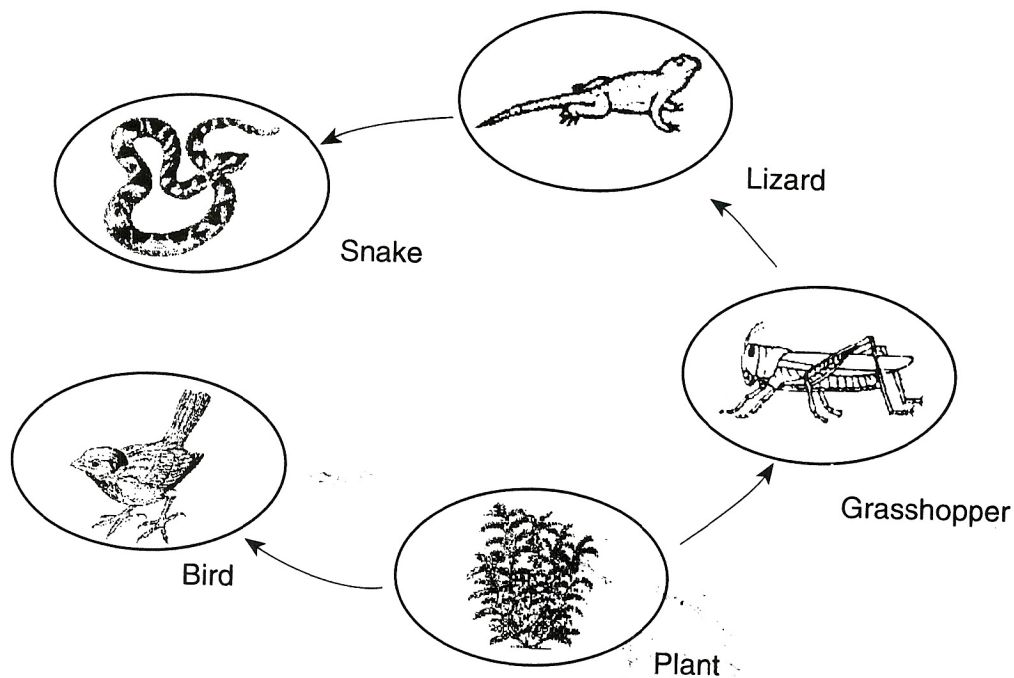
Answer questions 1 through 69 on this test in the same way. Mark only one answer for each question. If you want to change an answer, be sure to erase your first mark completely. Then mark the answer you want. You may use scrap paper and the blank spaces of this test booklet to work out the answers to the questions, but be sure to mark all your answers for questions 1 through 69 on the separate answer sheet.

Answer question 70 in the space provided on the last page of this test booklet. Do not make any marks for question 70 on the separate answer sheet. Specific directions for answering this question are given in the test booklet.

When you are told to start working, turn the page and begin with question 1. Work carefully and answer all the questions. Your score will be the number of questions you answer correctly.

Note that question 1 has only three choices.

1 The diagram below shows a partial food web.



(Not drawn to scale)

If the number of lizards in this food web greatly increased, then the number of grasshoppers would most likely

- (1) decrease
- (2) increase
- (3) remain unchanged

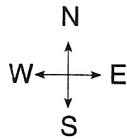
2 One difference between living things and nonliving things is that only living things

- (1) have mass
- (2) occupy space
- (3) can have a variety of temperatures
- (4) have the ability to reproduce

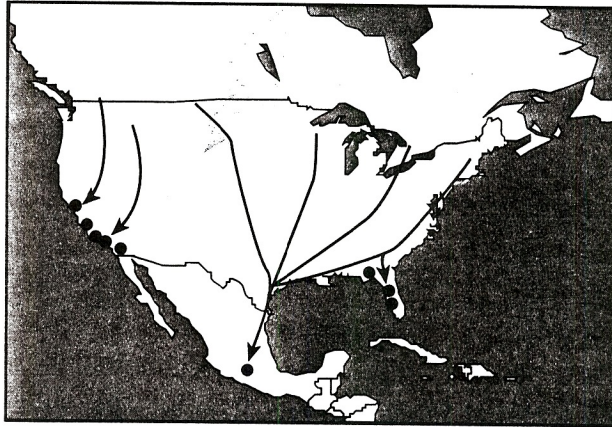
3 Tomato seedlings in pots are grown indoors on a sunny windowsill. What will most likely happen if the pots are never turned around?

- (1) The leaves on the side facing the window will die.
- (2) The tomato seedlings will grow weak roots.
- (3) Moisture will collect on the leaves facing away from the window.
- (4) The tomato seedlings will grow toward the window.

4 The arrows on the map of North America below show the main routes traveled by monarch butterflies each fall.



KEY
● Winter habitats



What behavior of the monarch butterfly is shown by the travel routes on the map?

- (1) migration
- (2) reproduction
- (3) hibernation
- (4) dormancy

5 The oxygen in the atmosphere comes mainly from

- (1) the physical breakdown of water molecules in the oceans
- (2) the chemical breakdown of soil minerals
- (3) green plants carrying on photosynthesis
- (4) the process of cellular respiration

7 New bacteria are produced directly from

- (1) living bacteria
- (2) decaying matter
- (3) spoiled food
- (4) dirty water

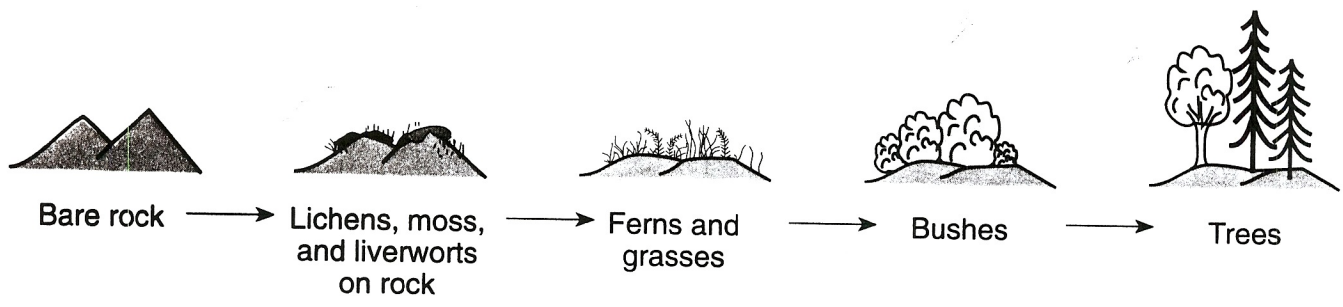
6 The fur of snowshoe rabbits changes color from brown to white during the winter. This change best shows the rabbits' ability to

- (1) maintain body heat
- (2) adapt to their environment
- (3) reproduce in large numbers
- (4) obtain energy directly from the Sun

8 Which organisms require water in order to survive?

- (1) producers, only
- (2) consumers, only
- (3) decomposers, only
- (4) producers, consumers, and decomposers

9 The sequence of diagrams below shows a likely change in a natural community over time.

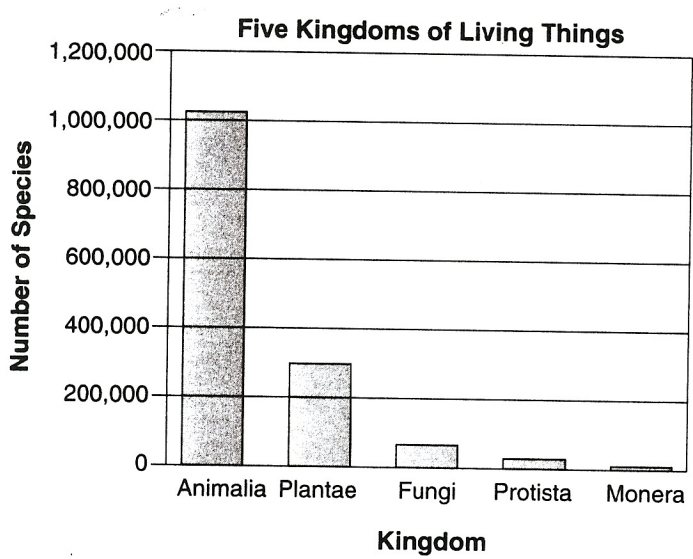


(Not drawn to scale)

Which statement best explains the lack of trees at the beginning of the sequence?

- (1) The climate is too hot for tree growth.
- (2) The tree roots are unprotected due to the presence of thinly scattered grass.
- (3) There is too little soil to support tree growth.
- (4) There is too little rainfall to support tree growth.

10 The graph below shows the number of species in each of five kingdoms of living things.

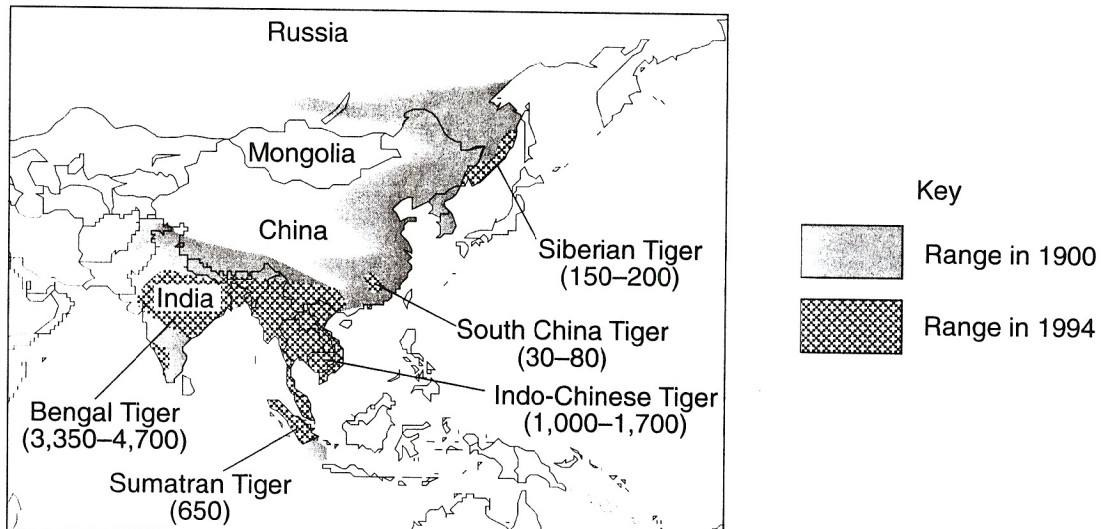


Which kingdom contains about one-half as many species as the Fungi kingdom?

- (1) Animalia
- (2) Plantae
- (3) Protista
- (4) Monera

11 The map below shows the shrinking ranges and the present number of animals for different tiger species in one part of the world from 1900 to 1994.

The Tiger's Shrinking Range



Source: International Union for the Conservation of Nature (adapted)

In this area of the world, which type of tiger is probably in the most danger of completely disappearing (becoming extinct)?

- (1) Siberian tiger
- (2) South China tiger
- (3) Bengal tiger
- (4) Sumatran tiger

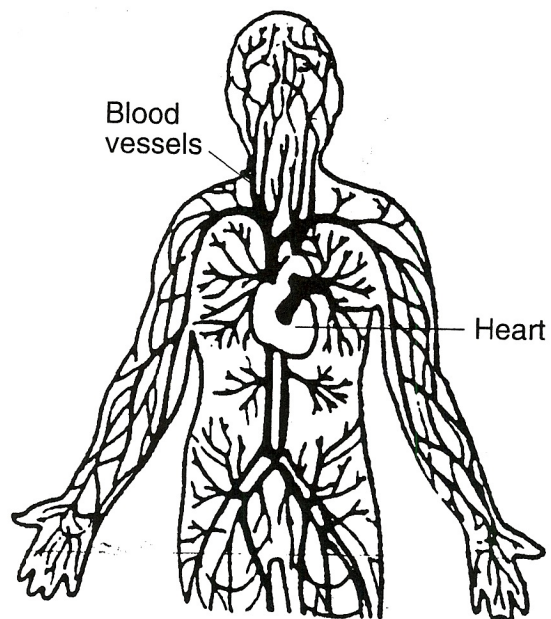
12 Which human body system includes the brain and spinal cord?

- (1) endocrine
- (2) nervous
- (3) respiratory
- (4) reproductive

13 Male sex cells are produced by the

- (1) penis
- (2) ovaries
- (3) testes
- (4) sperm ducts

14 What is the major function of the body system shown in the diagram below?



- (1) breakdown of food
- (2) movement of limbs
- (3) secretion of hormones
- (4) transportation of materials

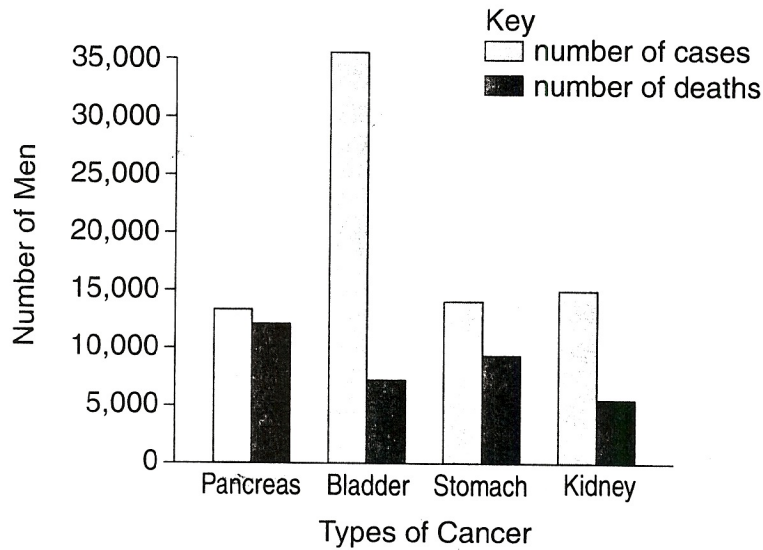
15 An organ that helps control the water balance of the body and eliminates waste from blood is the

- (1) pancreas
- (2) stomach
- (3) heart
- (4) kidney

16 In humans, undigested material is moved through the large intestine by the action of

- (1) muscle tissue
- (2) bone tissue
- (3) blood
- (4) cartilage

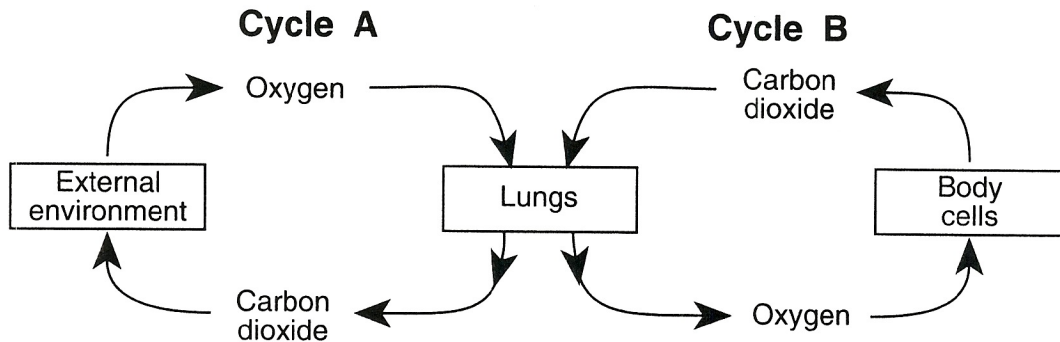
17 The graph below shows the number of cases of some types of cancer in men and the number of deaths from that type of cancer.



Based on the information in the graph, cancer in which organ caused the most deaths?

- (1) bladder
- (2) pancreas
- (3) stomach
- (4) kidney

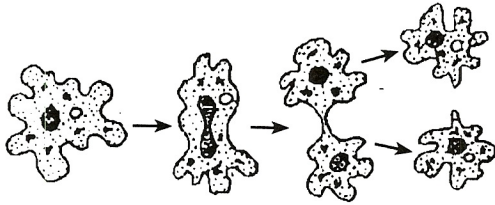
18 The diagram below shows a relationship between a system of the human body and the environment.



The arrows of cycle B represent

- (1) blood flow
- (2) muscle contraction
- (3) bone growth
- (4) hormone secretion

19 The diagram below shows a life process of a single-celled organism.



Which life process is shown?

- (1) reproduction
- (2) growth
- (3) locomotion
- (4) excretion

20 Infectious diseases are caused by

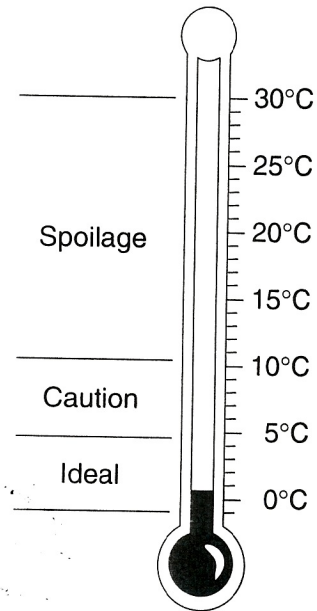
- (1) nutrients
- (2) microorganisms
- (3) allergies
- (4) minerals

21 Pasteurization is most important in the production of

- (1) communication devices
- (2) nuclear energy
- (3) solar cells
- (4) processed foods

22 The diagram below provides information about storing milk at different temperatures.

Milk Storage Temperature



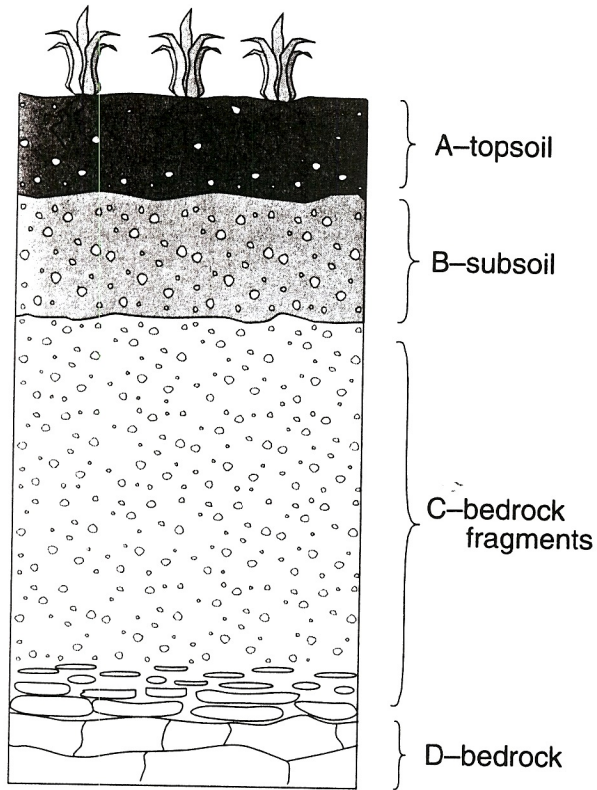
Based on the diagram, which temperature is best for storing milk?

- (1) 20°C
- (2) 8°C
- (3) 3°C
- (4) 6°C

23 The Adirondack Mountains are much lower in elevation today than they were millions of years ago. This change in elevation was caused primarily by

- (1) earthquakes
- (2) meteor impacts
- (3) deposition
- (4) erosion

24 The diagram below shows a cross section of soil layers down to bedrock.



Which process caused the bedrock in layer *D* to break up into fragments?

- (1) weathering
- (2) folding
- (3) volcanic eruption
- (4) digestion by decomposers

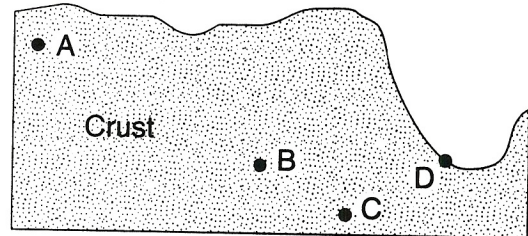
25 All rocks are composed of

- (1) organic remains
- (2) meteor fragments
- (3) minerals
- (4) fossils

26 Earthquakes and volcanoes provide evidence of

- (1) weathering and erosion
- (2) air-mass movement
- (3) crustal plate movement
- (4) fossil fuel formation

27 The diagram below shows a cross section of a portion of Earth's crust.



At which location is the crust most affected by erosion?

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

28 The data table below lists some physical properties of four minerals.

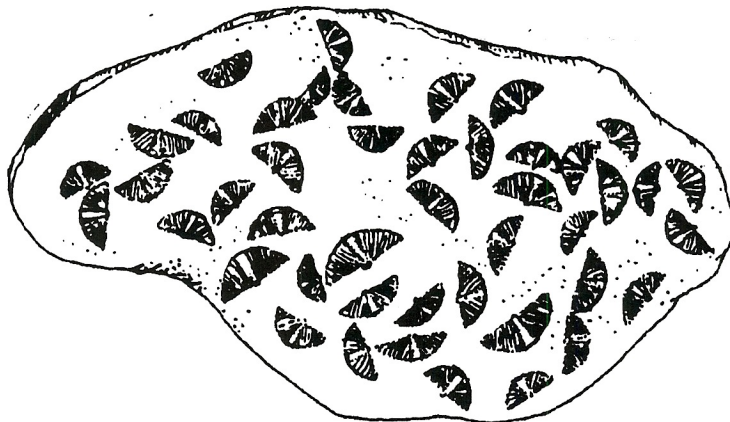
SOME PHYSICAL PROPERTIES OF FOUR MINERALS

Mineral Name	Cleavage/Fracture	Color	Streak	Luster
biotite mica	cleavage in 1 direction	dark brown to black	light tan	glassy
calcite	cleavage in 3 directions	white, clear, pink, blue, yellow	white	glassy
fluorite	cleavage in 4 directions	colorless, purple, blue, green, yellow, brown	white	glassy
galena	cleavage in 3 directions	silver or lead gray	gray to black	metallic

Which mineral can have a glassy luster, a white streak, a blue color, and cleavage in three directions?

- (1) biotite mica
- (2) calcite
- (3) fluorite
- (4) galena

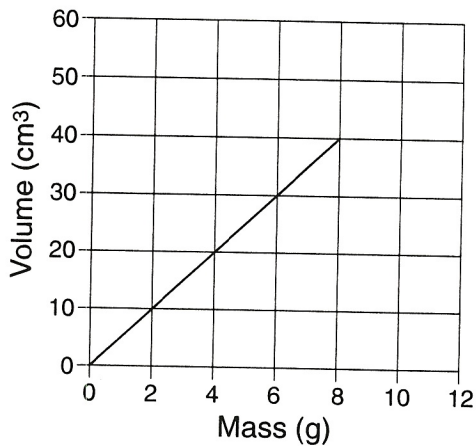
29 The diagram below shows fossils found in sedimentary rocks.



The study of fossils like these has allowed scientists to

- (1) describe past environments and the development of life over time
- (2) study present ocean temperatures and ocean depths
- (3) predict future erosion and weathering rates
- (4) analyze the composition of sedimentary rocks and minerals

30 The graph below shows the relationship between mass and volume for a material.



What would be the volume of a piece of this material with a mass of 10 grams?

- (1) 30 cm³
- (2) 40 cm³
- (3) 50 cm³
- (4) 60 cm³

31 A change in weather conditions is caused mainly by

- (1) the movement of air masses
- (2) the impact of meteors
- (3) the rise and fall of ocean tides
- (4) a location's longitude

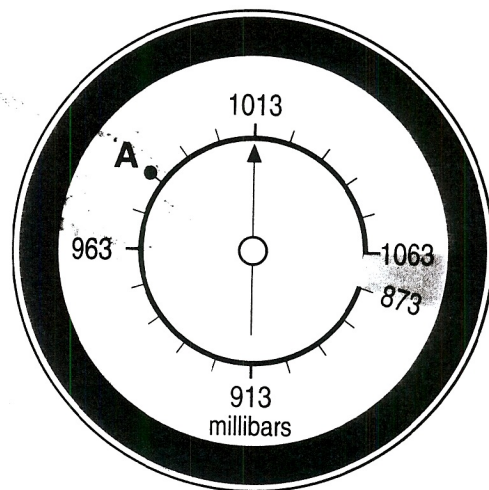
32 Winds are caused by differences in

- (1) types of precipitation
- (2) dewpoints
- (3) air pressures
- (4) cloud types

33 An air mass located over the ocean near the state of Florida is most likely

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

34 A barometer reading of 1013 millibars of air pressure is shown below.



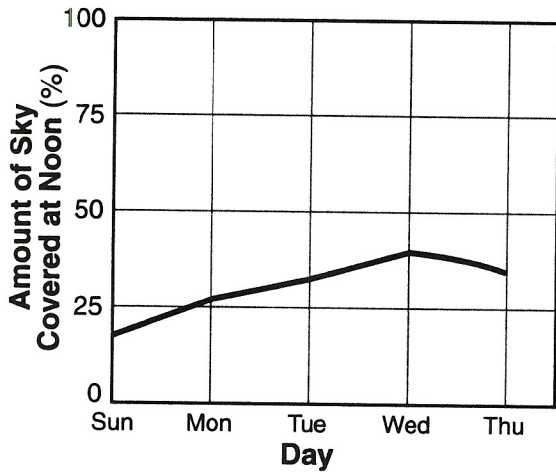
If the arrow on the barometer moves to point A, the air-pressure reading will be

- (1) 965 millibars
- (2) 973 millibars
- (3) 983 millibars
- (4) 1010 millibars

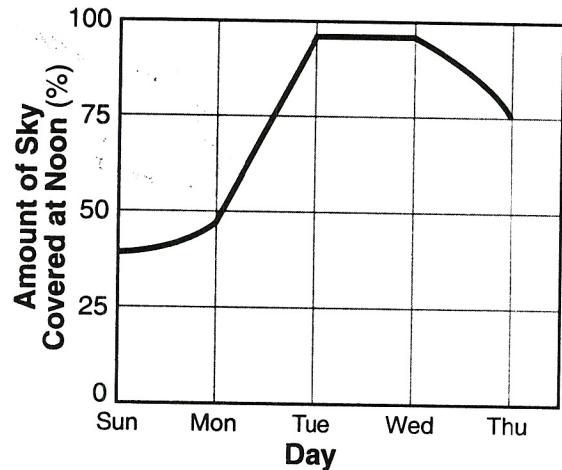
35 The table below shows weather data recorded at noon for 5 consecutive days in January.

Day	Temperature (°F)	Humidity (%)	Wind Speed (mph)	Amount of Sky Covered with Clouds (%)
Sunday	21	38	10	0
Monday	26	47	10	25
Tuesday	30	97	25	90
Wednesday	38	98	30	90
Thursday	36	75	15	75

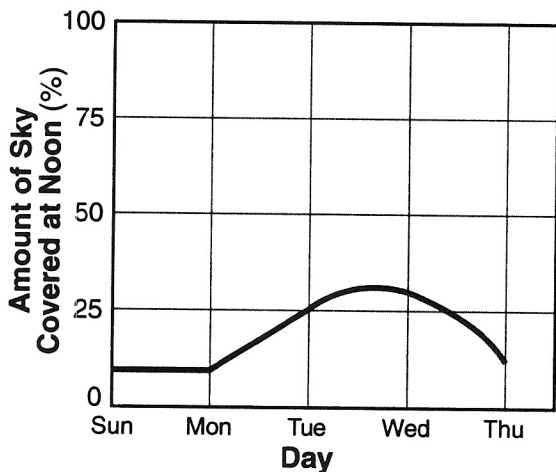
Which graph correctly shows the change in the amount of sky covered with clouds from Sunday through Thursday?



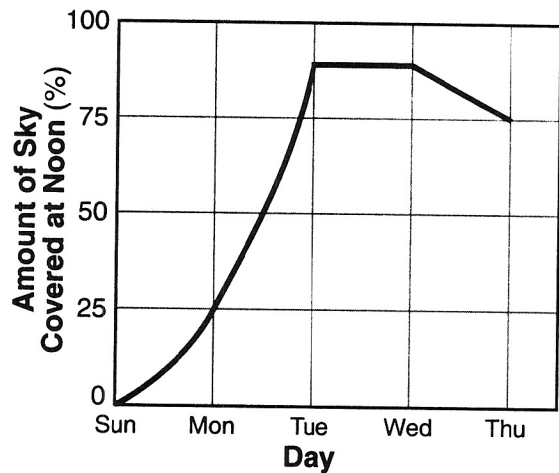
(1)



(3)

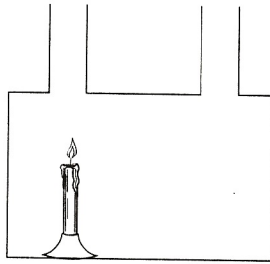


(2)

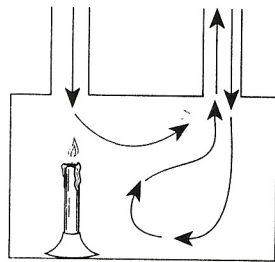


(4)

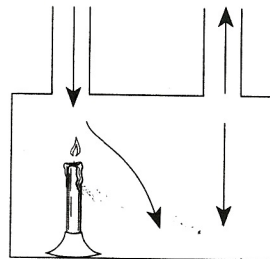
36 The diagram below shows a candle in a box which is sealed except for the two openings shown.



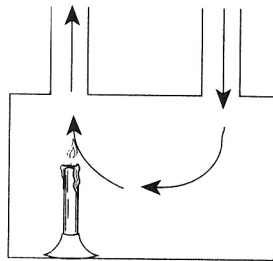
Which diagram best represents the movement of air in the box?



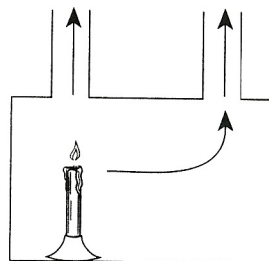
(1)



(3)

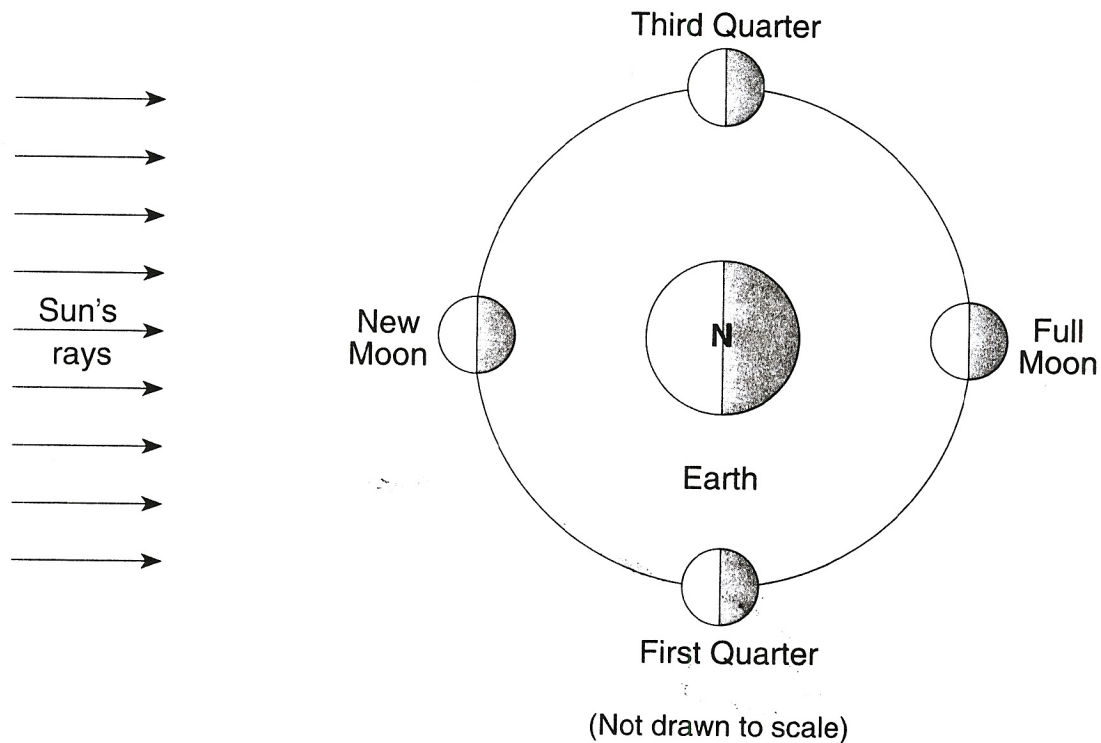


(2)



(4)

37 The diagram below shows four positions of the Moon in orbit around Earth as seen from space. The North Pole is labeled N.



Why is the Moon *not* visible from Earth at the New Moon phase?

- (1) The Moon is making too little light energy.
- (2) The Sun is making too little light energy for the Moon to reflect.
- (3) The lighted portion of Earth is facing away from the Moon.
- (4) The lighted portion of the Moon is facing away from Earth.

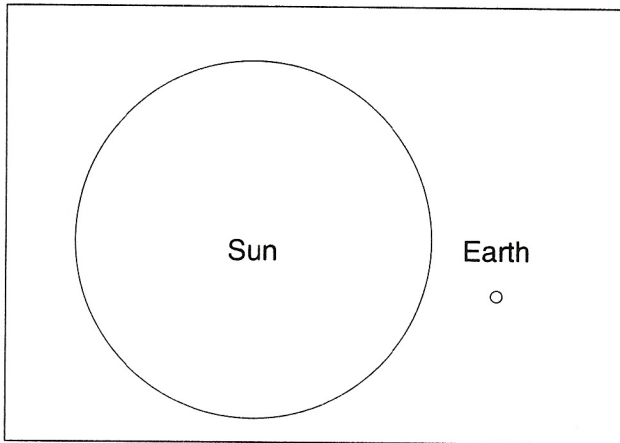
38 How long does Earth take to complete one revolution around the Sun?

- (1) 1 year
- (2) 1 month
- (3) 1 day
- (4) 1 hour

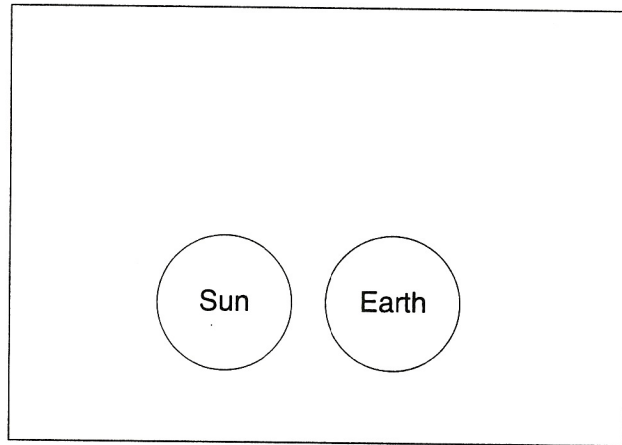
39 What causes the changing seasons in New York State?

- (1) the change in Earth's distance from the Sun
- (2) Earth's tilted axis and Earth's revolution
- (3) the Moon's tilted axis and changing phases
- (4) different amounts of energy produced by the Sun

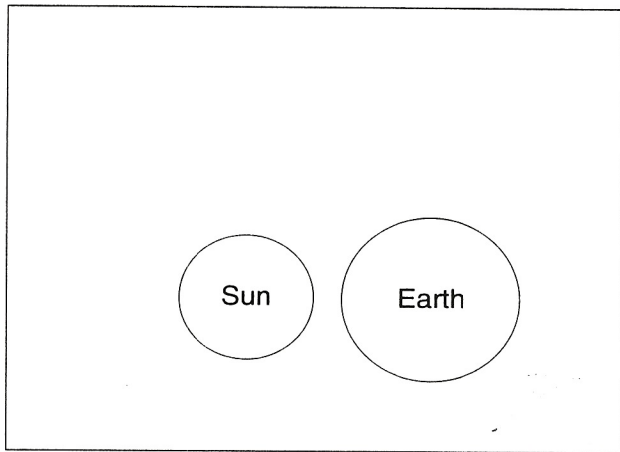
40 Which diagram most accurately compares the size of the Sun to the size of Earth?



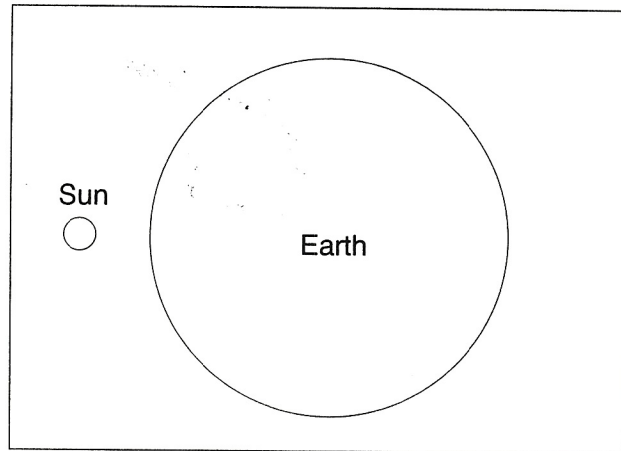
(1)



(3)

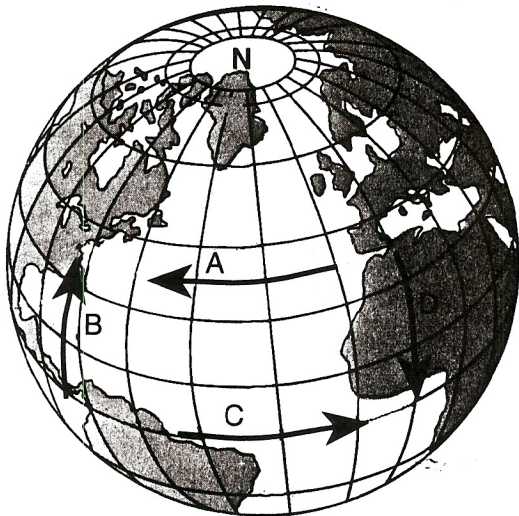


(2)



(4)

41 The diagram below shows a model of Earth. The North Pole is labeled *N*.



Which arrow shows the direction of Earth's rotation?

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

42 A glowing rock fragment traveling through Earth's atmosphere is called a

- (1) star
- (2) planet
- (3) moon
- (4) meteor

43 Radio waves, microwaves, and x rays are types of

- (1) electromagnetic energy
- (2) heat energy
- (3) sound energy
- (4) nuclear energy

44 Why is it unsafe to leave a sealed glass bottle of iced tea in the freezer?

- (1) Freezing the cap may cause it to expand and fly off.
- (2) Freezing the water in the iced tea may cause it to expand and burst the bottle.
- (3) Drinking the cold iced tea may affect respiration.
- (4) Drinking an ice-cold beverage may cause a person's intestines to freeze.

Note that question 45 has only three choices.

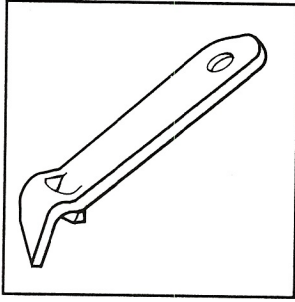
45 The diagram below shows a worker rolling a barrel up an inclined roof.



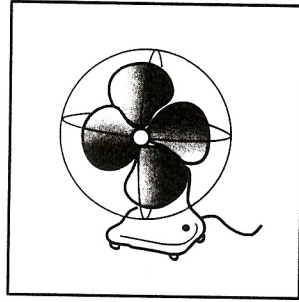
The potential energy of the barrel is

- (1) decreasing
- (2) increasing
- (3) not changing

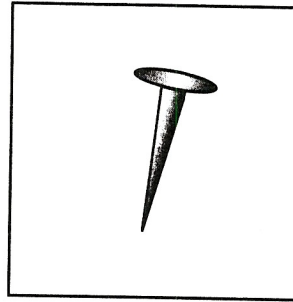
46 Which object drawn below best represents the principle of the lever?



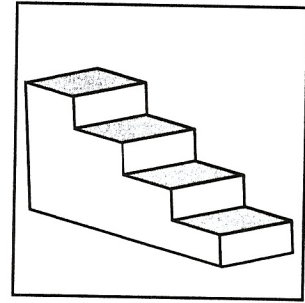
(1)



(2)



(3)

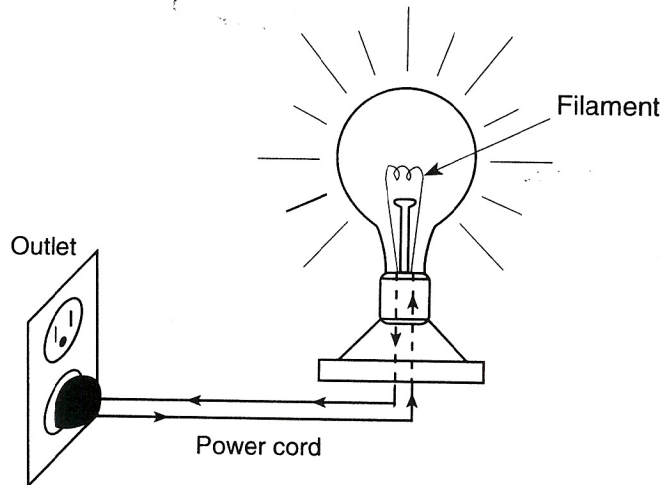


(4)

47 In which device is electrical energy converted to light and sound energy?

- (1) battery recharger
- (2) steam iron
- (3) match
- (4) television

49 The diagram below shows a lightbulb. Electrical energy flows from the electrical outlet through the power cord, through the filament in the bulb, then back through the power cord. The electricity flowing through the filament causes the filament to heat up and produce light.



48 The chart below shows the speed of a sound as it travels through different materials.

Material	Speed (m/sec)
air	332
water	1,554
wood	3,828
iron	5,103
stone	5,971

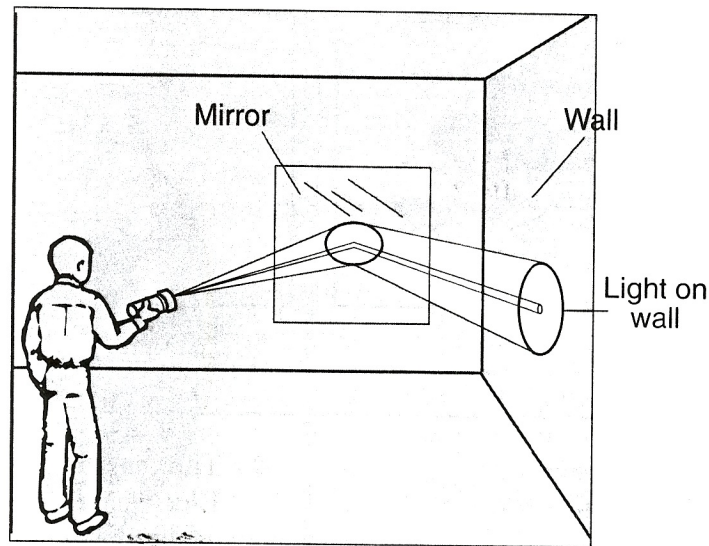
Approximately how far can sound travel through iron in 1 second?

- (1) 300 m
- (2) 1,500 m
- (3) 5,000 m
- (4) 6,000 m

If the filament is broken, why is the bulb no longer able to light?

- (1) When the flow of electricity reaches the broken filament, it reverses direction.
- (2) There is no longer a complete circuit for the flow of electricity.
- (3) The filament is the source of electrical energy.
- (4) The filament is an insulator.

50 The picture below shows a person shining a flashlight at a mirror.



The light reaches the wall because of the mirror's ability to

- (1) transmit light
- (2) absorb light
- (3) reflect light
- (4) produce light

51 Which action most directly *decreases* the amount of heat loss from a human body?

- (1) drinking a hot beverage
- (2) wearing a hat and gloves
- (3) taking a hot shower
- (4) exercising

53 Which device is best for preventing fires caused by electrical overloads?

- (1) circuit breaker
- (2) light switch
- (3) smoke detector
- (4) lightning rod

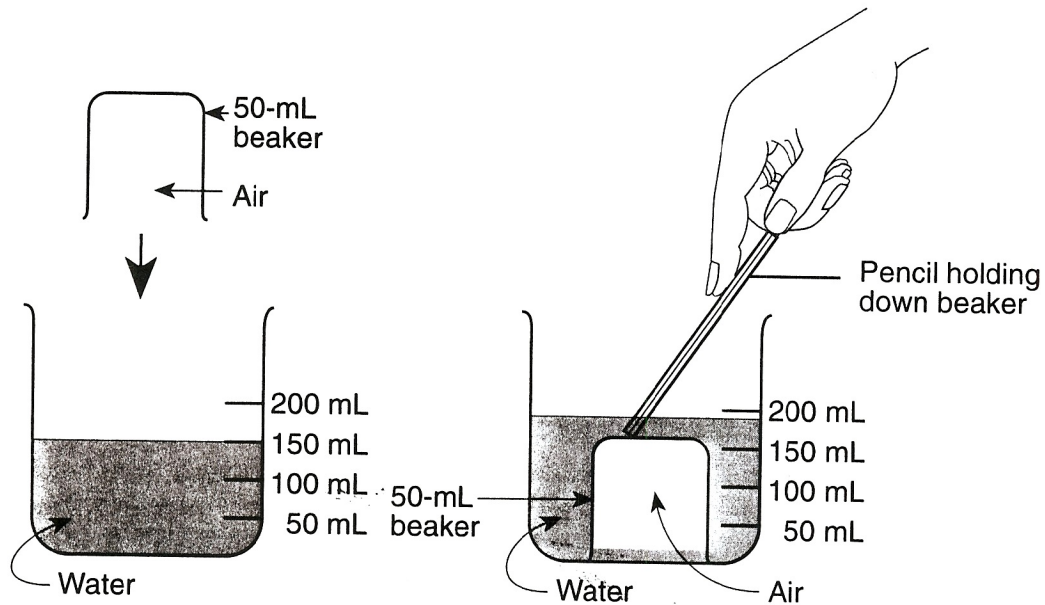
52 Which of these objects is the best conductor of electricity?

- (1) wooden block
- (2) rubber hose
- (3) glass bottle
- (4) silver spoon

54 Which activities show a physical change followed by a chemical change?

- (1) writing on a piece of paper and then crumpling it up
- (2) mixing cake ingredients and then baking the cake
- (3) moving the lawn and then raking the grass clippings
- (4) putting gas in the car and then paying for the gas

55 The demonstration below shows what happens to the water level when a small beaker is placed upside down in a large beaker of water.



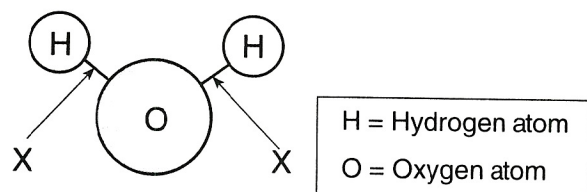
The demonstration suggests that air

- (1) takes up space
- (2) has no mass
- (3) is a hazardous substance
- (4) reacts chemically with water

56 A student noticed that drops of water appeared on a cold window when she breathed against it. What process was she observing?

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

57 The diagram below shows a model of a water molecule.



What do the lines labeled X represent?

- (1) gravitational forces
- (2) light energy
- (3) chemical bonds
- (4) magnetic fields

58 The chart below shows characteristics of the contents of four containers at room temperature.

Characteristic	Container			
	A	B	C	D
Color	clear	clear	clear	clear
Phase	liquid	gas	liquid	liquid
Density	1.0 g/cm ³	0.001 g/cm ³	1.38 g/cm ³	1.06 g/cm ⁶

Which statement about the content of these containers is true?

- (1) A and B are both liquids.
- (2) C and D have the same density.
- (3) A, C, and D are different colors.
- (4) A, B, C, and D are different substances.

59 In an investigation, five identical solid tablets were dissolved in equal amounts of water at different temperatures. The amount of time each tablet took to completely dissolve was recorded, as shown in the data table below.

Temperature of Water (°C)	Time to Dissolve (sec)
10	60
20	50
30	42
40	36
50	30

About how long would it take for one of these tablets to completely dissolve in a similar container of water if the temperature of the water was 25°C?

- (1) 25 sec
- (2) 41 sec
- (3) 46 sec
- (4) 51 sec

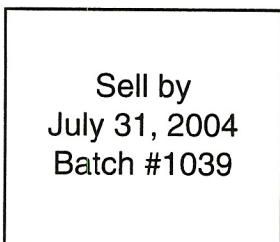
60 The picture below shows a hand movement called wafting.



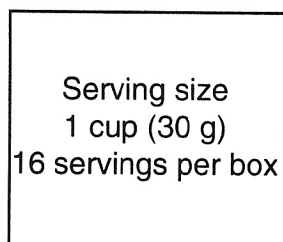
This laboratory safety procedure of wafting is used because some chemicals

- (1) are flammable
- (2) give off irritating vapors
- (3) are radioactive
- (4) stain skin and clothes

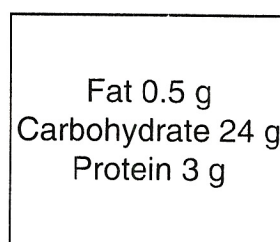
61 Which information from a bran flakes cereal-box label indicates the nutritional value of the cereal?



(1)



(2)

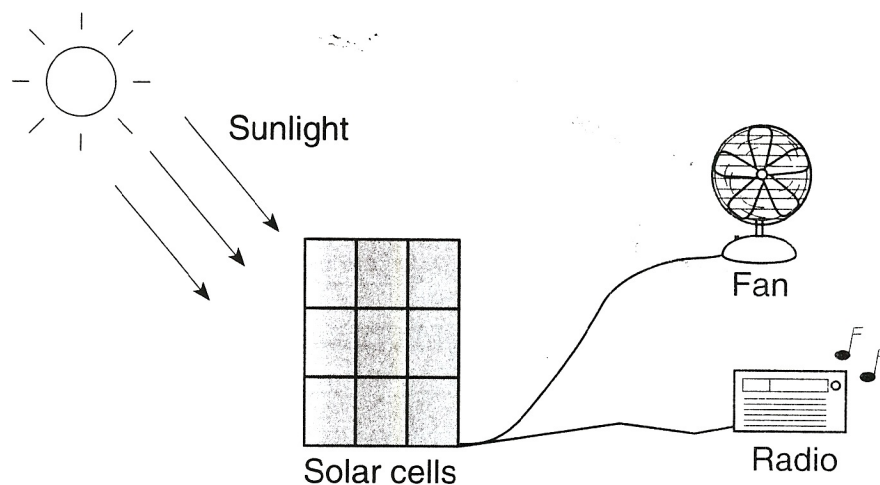


(3)



(4)

62 The diagram below represents solar cells transforming one type of energy into another.



Which energy transformation is taking place in the solar cells?

- (1) Solar energy is being transformed into electrical energy.
- (2) Solar energy is being transformed into magnetic energy.
- (3) Electrical energy is being transformed into solar energy.
- (4) Magnetic energy is being transformed into solar energy.

63 The table below shows the rate of energy use per hour, in watts, for several different electrical appliances.

Appliance	Energy Use Per Hour (watts)
Video recorder	35
Television	50
Air-conditioner	1,500
Clothes dryer	4,860

How many hours would a television have to operate in order to use the same amount of energy that an air-conditioner uses in 1 hour?

- (1) 1 hour
- (2) 20 hours
- (3) 30 hours
- (4) 1,450 hours

64 The burning of coal contributes most directly to the problem of

- (1) air pollution
- (2) water pollution
- (3) shortage of landfills
- (4) nuclear waste

65 Which burden is placed on the environment by the use of automobiles?

- (1) decreased renewable resources
- (2) decreased water pollution
- (3) increased radioactive wastes
- (4) increased air pollution

66 Which activity is an example of technology

- (1) developing robotic arms that can assemble car parts
- (2) developing a theory that explains atom particle behavior
- (3) observing phases of the Moon
- (4) recording daily high and low temperatures

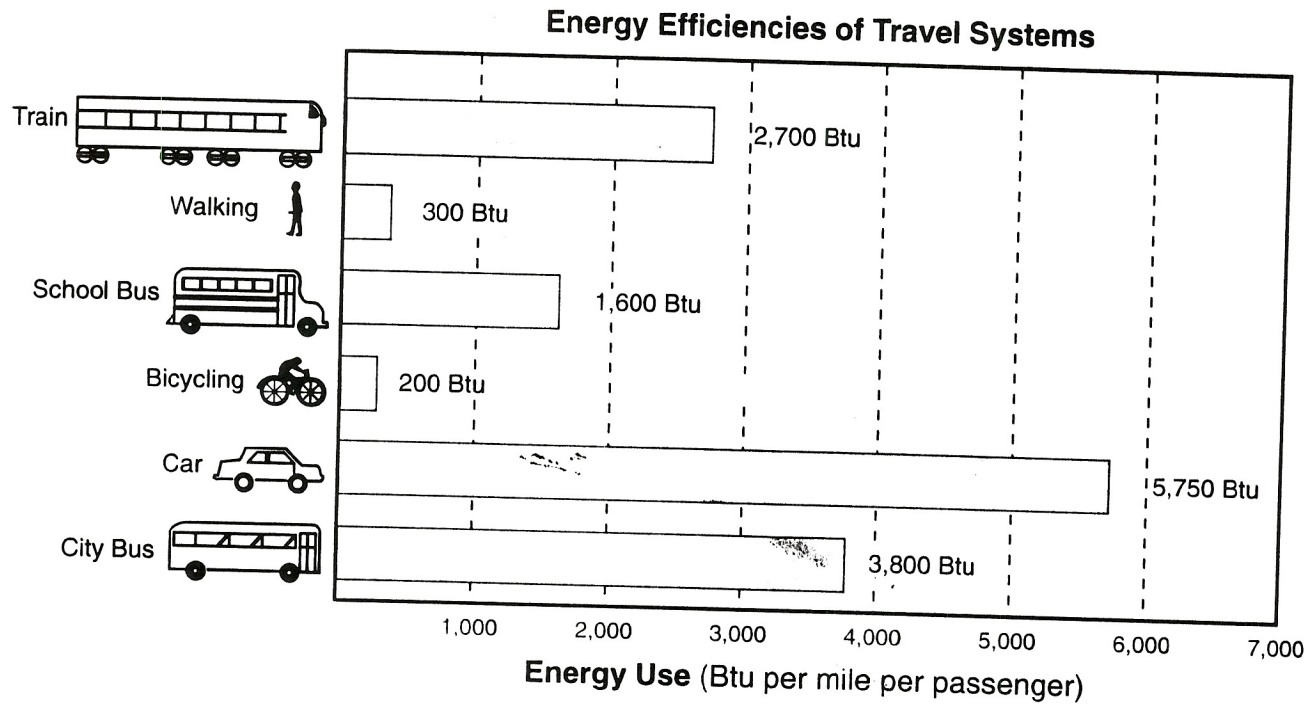
67 The box below contains information about the ozone layer.

Chemicals in some spray cans are thought to produce holes in the ozone layer of Earth's atmosphere. These holes have allowed more ultraviolet rays to reach Earth. Ultraviolet rays can cause skin cancer.

These statements describe ways in which technology

- (1) only benefits people
- (2) provides more jobs
- (3) may prevent diseases
- (4) may be harmful

68 Energy use per passenger per mile is a measure of the energy efficiency of a travel system. The more energy needed to move a passenger one mile, the less efficient the system is. The chart below shows the energy use per mile per passenger of different forms of travel systems.



Which form of travel is the most energy efficient?

- (1) walking
- (2) bicycling
- (3) riding in a car
- (4) riding on a city bus

69 The box below contains information about milk production.

Many dairy farmers are now using a hormone designed to increase milk production in cows. Use of the hormone was recently approved by the Federal Food and Drug Administration (FDA). Some consumers refuse to buy milk produced using this hormone. These consumers want more information about the hormone's effect on humans.

Why do these consumers avoid drinking the milk produced with the use of the hormone?

- (1) The FDA warned consumers not to drink milk produced using this hormone.
- (2) They believe the milk produced using the hormone is easier to use.
- (3) They believe consuming the milk may have some unknown negative results.
- (4) Research has proven that the hormone is safe for cows.

Directions (70): Record your answers to question 70 in the space provided on the last page of this test booklet. Turn to the last page and fold it along the dotted line. Then tear it off slowly and carefully. Write your name and the other information requested in the spaces at the top of the page.

70 The data table below shows the maximum speeds in miles per hour (mph) for different types of animals.

Animal Speeds

Animal	Maximum Speed (mph)
Cheetah	70
Antelope	61
Lion	50
Zebra	40
Giraffe	32
Elephant	25

Use the information in the data table to construct a bar graph on the grid provided on the separate answer sheet.

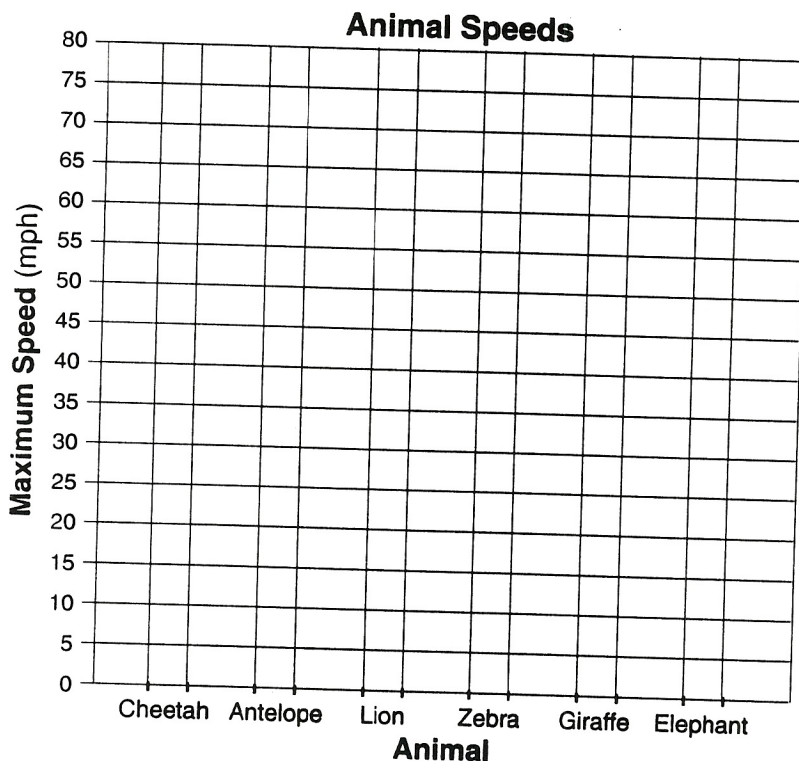
Student _____ Grade _____ Date of Birth _____ Sex Male Female
 School _____ City _____ or P.O. _____
 Teacher _____ Today's Date _____

REGENTS COMPETENCY TEST

SCIENCE

Monday, June 21, 2004 — 1:15 p.m.

Write your answer to question 70 on this answer sheet. Do not make any mark in the space for question 70 on your multiple-choice answer sheet.



When you have completed this part of the examination, be sure to sign the declaration printed on the bottom of your multiple-choice answer sheet. Make sure you hand in this answer sheet along with your multiple-choice answer sheet.