

REGENTS COMPETENCY TEST

SCIENCE

Tuesday, January 28, 1997 — 1:15 p.m.

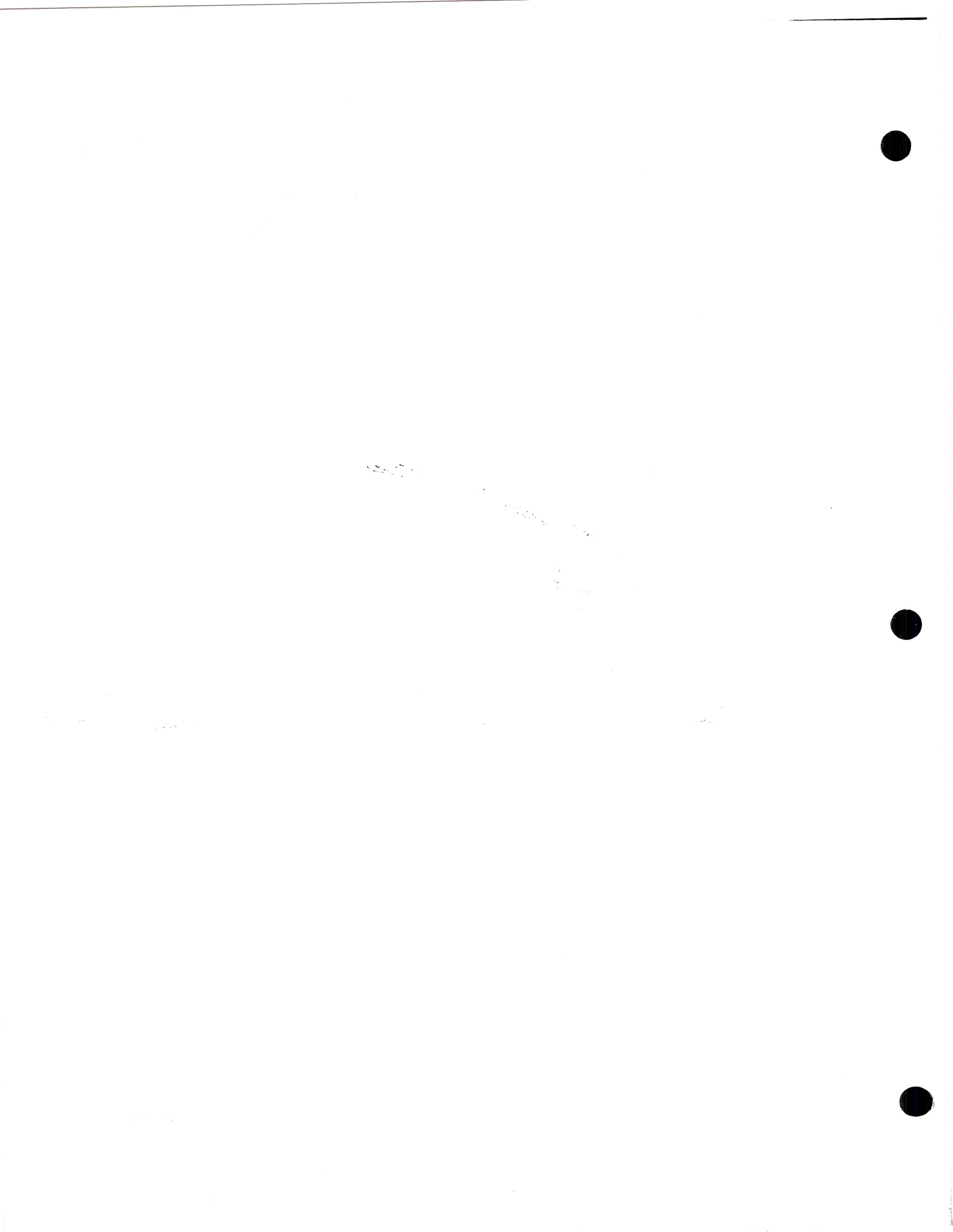
There are 70 questions on this test of basic science concepts and skills. Your answers for questions 1 through 69 must be recorded on the separate answer sheet for multiple-choice questions. Use only a No. 2 pencil on that answer sheet. Your answer for question 70 is to be recorded in the spaces provided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

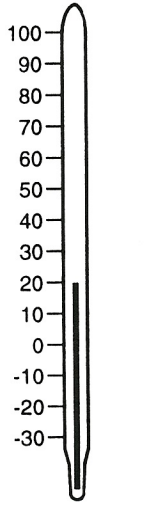
Questions 1 through 69 on this test are multiple-choice questions. Read each question carefully. Decide which of the choices given is the *best* answer, based on science principles. On the separate answer sheet, mark your answer in the row of circles for each question by filling in the circle that has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

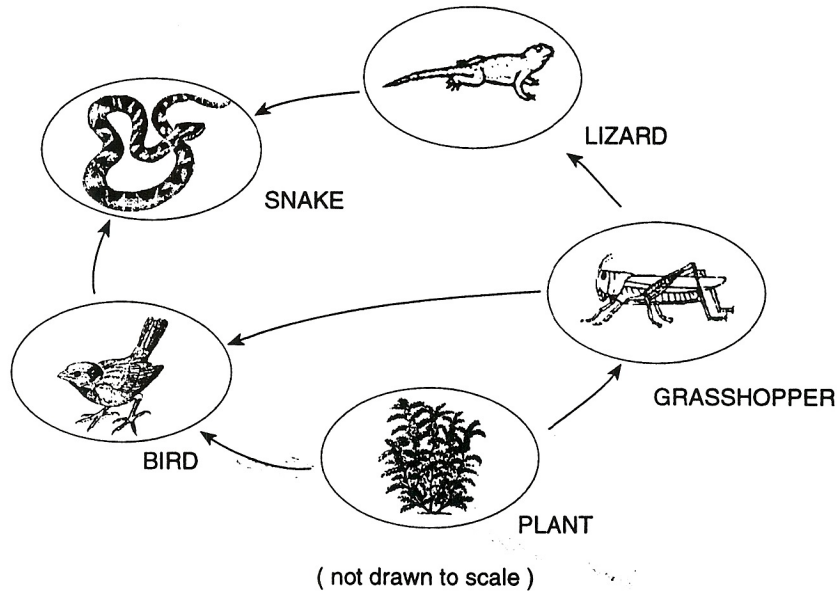
Answer questions 1 through 69 on this test in the same way. Mark only one answer for each question. If you want to change an answer, be sure to erase your first mark completely. Then mark the answer you want. You may use scrap paper and the blank spaces of this test booklet to work out the answers to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

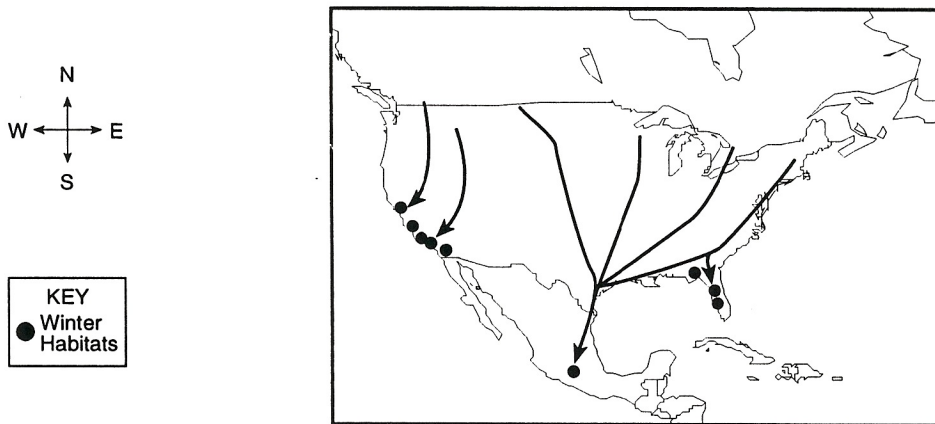
1 The diagram below shows a food web.



If the number of lizards greatly increased, the number of grasshoppers would most likely

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

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



What behavior of the monarch butterfly is shown by the routes indicated in the map?

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

3 One difference between living things and nonliving things is that only living things have

- (1) mass
- (2) volume
- (3) a variety of temperatures
- (4) the ability to reproduce

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

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

4 Tomato seedlings in pots are grown indoors next to a window. What will 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 only on the parts of the tomato seedlings facing away from the window.
- (4) The tomato seedlings will grow toward the window.

7 New bacteria come from

- (1) living bacteria
- (2) dead organisms
- (3) spoiled food
- (4) dirty water

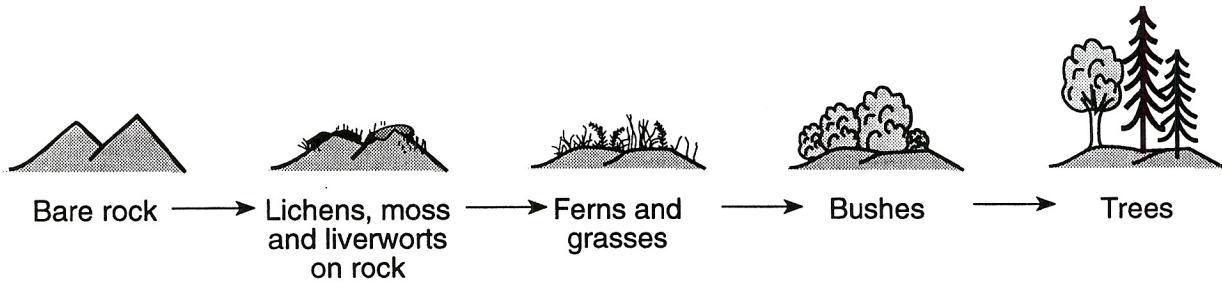
5 The oxygen in the atmosphere comes mainly from

- (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

8 Which organisms require water in order to survive?

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

9 A volcano erupts and creates a new island. A likely change in natural communities over time at a location on the island is shown below.

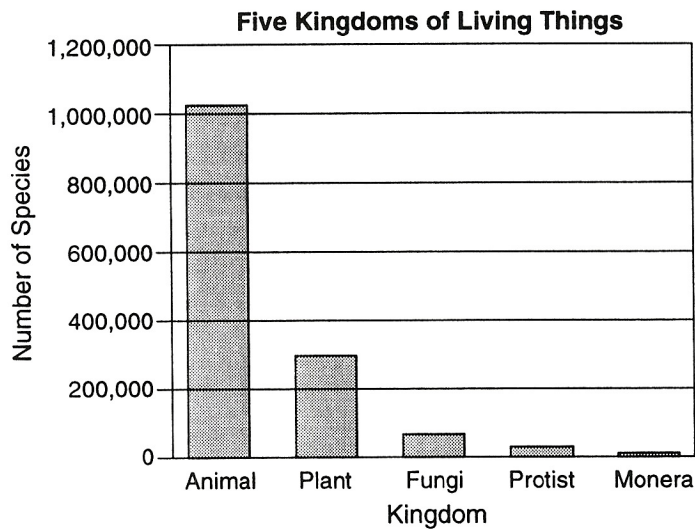


(Not drawn to scale)

Which statement best explains why trees do *not* start to grow on the island right after it is formed?

- (1) The climate is too hot for tree growth.
- (2) The tree roots are unprotected due to the presence of thin 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.

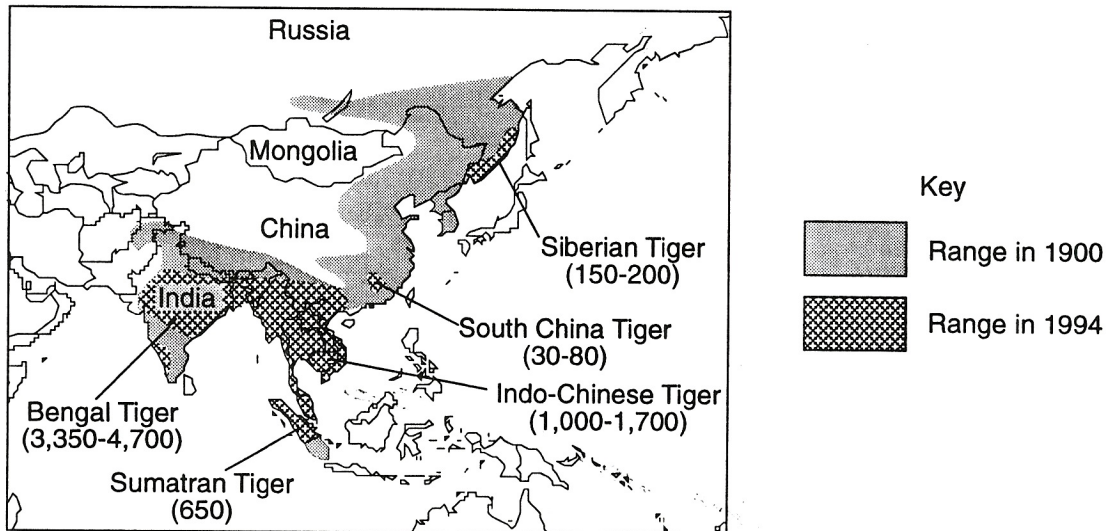


Which kingdom contains about one-half as many species as the fungi kingdom?

- (1) animal
- (2) plant
- (3) protist
- (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



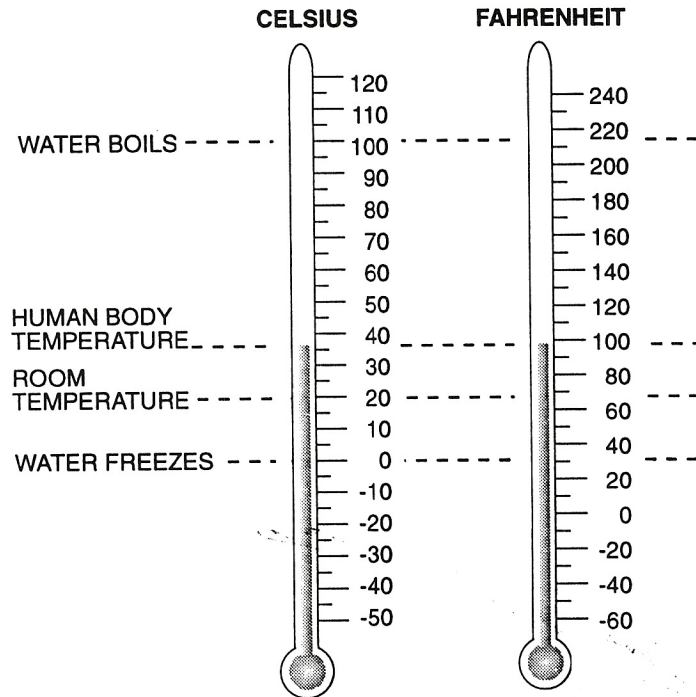
Source: International Union for the Conservation of Nature (adapted)

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

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

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12 According to the temperature scales shown below, what is the approximate temperature of the human body?



- (1) 89°F
- (2) 110°F
- (3) 98°C
- (4) 37°C

13 A researcher studied 2,000 adult males in their 20's to determine their general health. The results are shown in the data table below.

FITNESS CATEGORIES OF SELECTED ADULT MALES

Fitness Category	Average Blood Pressure	Average Body Weight (kg)	Average Daily Calorie Intake	Average Cholesterol (mg)	Average Exercise (minutes per week)
A	127/84	86	3,500	239	45
B	125/83	83	2,700	229	61-120
C	121/80	76	2,950	217	240

Based on the table, men in category C take in more Calories but weigh less than those in category B. This is best explained by differences in their

- (1) age
- (2) blood pressure
- (3) amount of exercise
- (4) cholesterol level

14 Which human structure is moved by involuntary muscles?

- (1) heart
- (2) arm
- (3) leg
- (4) jaw

15 Human growth, sexual development, and energy production are controlled by hormones from the

- (1) excretory system
- (2) endocrine system
- (3) nervous system
- (4) respiratory system

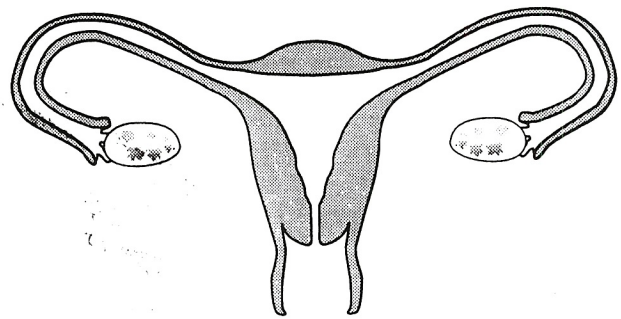
16 Emphysema is a disease that decreases the ability of the lungs to exchange materials with the circulatory system. One result of this condition is a decrease in the amount of

- (1) hormones in the blood
- (2) water in the blood
- (3) food in the blood
- (4) oxygen in the blood


17 Which is a function of the kidneys, skin, and lungs?

- (1) preparing food for use by cells
- (2) providing for the formation of offspring
- (3) coordinating and controlling body activity
- (4) removing wastes from the body

18 Which body system is represented by the organs in the diagram below?

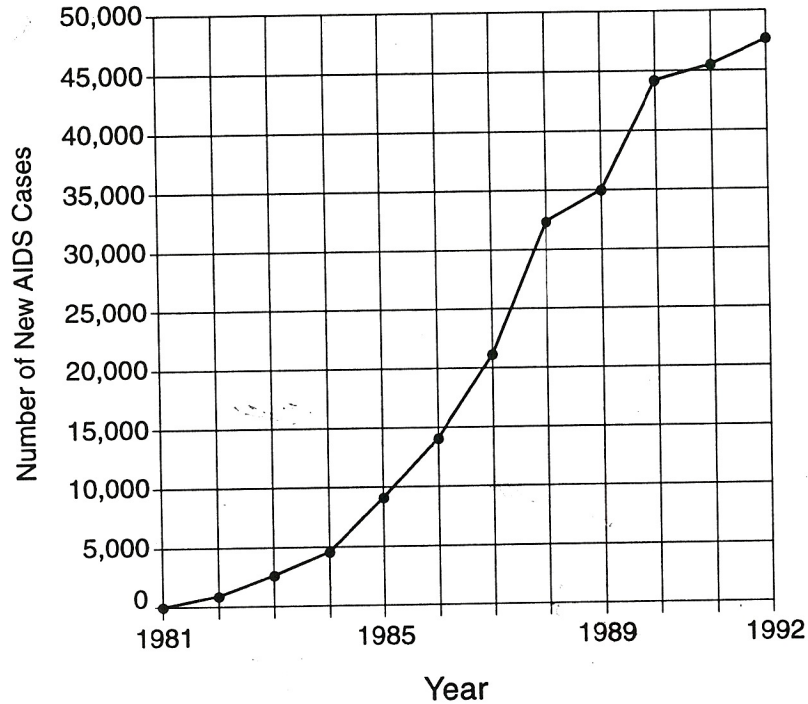


- (1) female reproductive system
- (2) male endocrine system
- (3) female digestive system
- (4) male excretory system

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19 The graph below shows the number of new AIDS cases reported in the United States each year from 1981 to 1992.

Number of New AIDS Cases in U.S.



Based on the information in the graph, the number of new AIDS cases reported each year in the United States

- (1) will start to decrease by the year 2000
- (2) doubled between 1989 and 1992
- (3) had the greatest increase between 1987 and 1988
- (4) increased until 1990 and then decreased

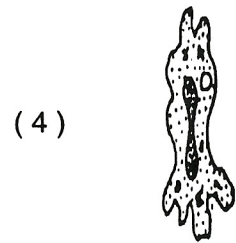
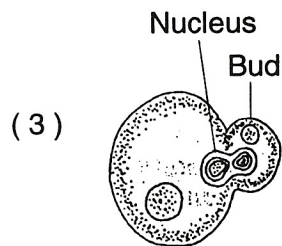
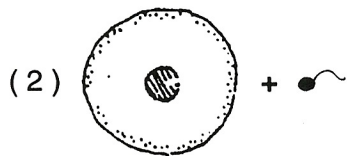
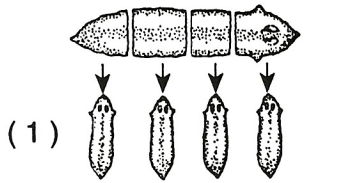
20 The presence of microorganisms in a patient's urine would cause a doctor to suspect that the patient has

- (1) an allergy to penicillin
- (2) a hormone imbalance
- (3) a sleeping disorder
- (4) an infectious disease

21 Some bacteria in the stomach of a cow turn hay into nutrients. This statement suggests that

- (1) hay causes illness in cows
- (2) cows should be vaccinated against stomach disease
- (3) bacteria can be beneficial to cows
- (4) humans should avoid drinking milk from cows with stomach bacteria

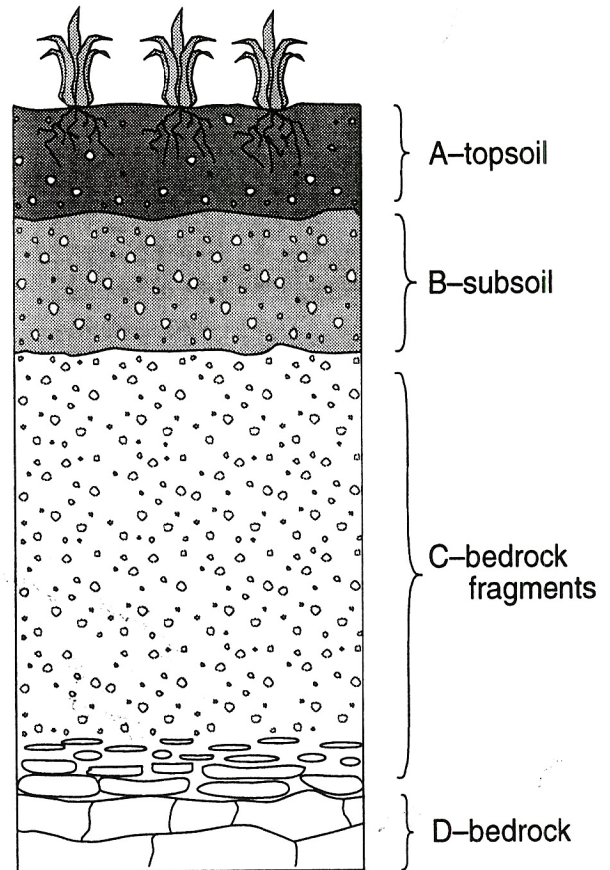
22 Which diagram represents the type of reproduction that allows the greatest possibility for variation in succeeding generations?



23 The Appalachian Mountains are much lower in elevation today than they were millions of years ago. This change in elevation is due to

- (1) deposition
- (2) earthquakes
- (3) meteor impacts
- (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) volcanic eruption
- (3) folding
- (4) digestion by decomposers

25 All rocks are composed of

- (1) organic remains
- (2) minerals
- (3) meteors
- (4) fossils

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

SOME PHYSICAL PROPERTIES OF FOUR MINERALS

Mineral Name	Cleavage/Fracture	Color	Streak	Luster
biotite mica	cleavage, 1 direction	dark brown to black	light tan	glassy
calcite	cleavage, 3 directions, not at 90° to each other	white, clear, pink, blue, yellow	white	glassy
fluorite	cleavage, 4 directions, at 90°	colorless, purple, blue, green, yellow, brown	white	glassy
galena	cleavage, 3 directions, at 90°, often bent	silver or lead gray	gray to black	metallic

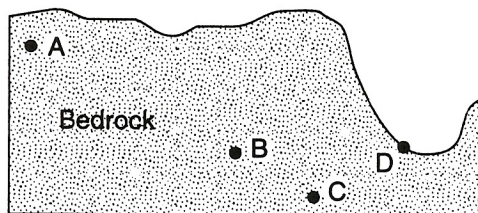
Which mineral can have a glassy luster, a white streak, a blue color, and cleavage in three directions?

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

27 Earthquakes and volcanoes provide evidence of

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

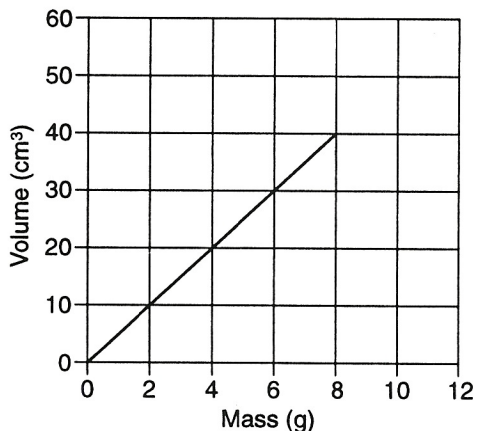
28 The diagram below shows a cross section of a portion of Earth's crust.



At which location is the bedrock most affected by erosion?

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

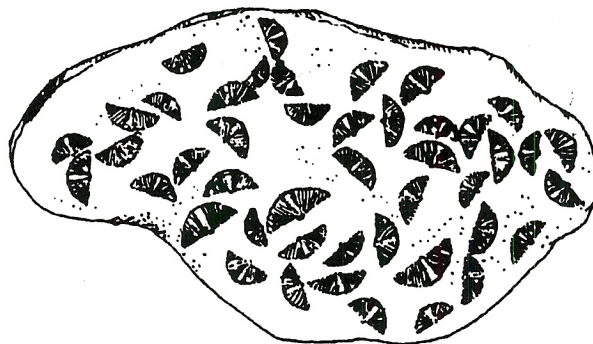
29 The graph below shows the relationship between mass and volume for a material.



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

30 The diagram below shows fossils found in sedimentary rocks.



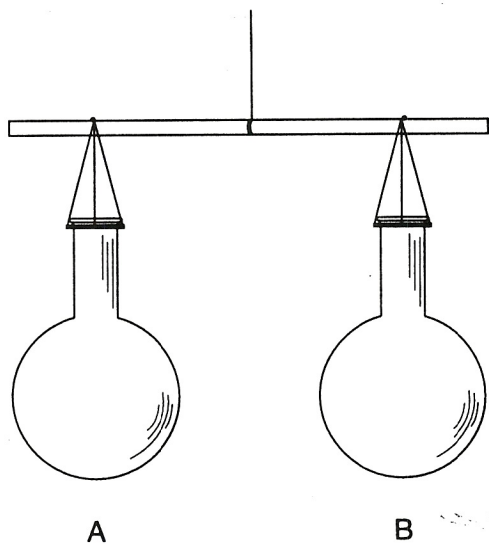
The study of fossils like these has allowed scientists to

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

31 An air mass from Canada and an air mass from the Gulf of Mexico can both travel across New York State. Compared to the air mass from Canada, the air mass from the Gulf of Mexico will generally be

- (1) colder
- (2) warmer
- (3) lower in humidity
- (4) higher in air pressure

32 The diagram below shows two open flasks hung so they are in perfect balance.



What happens as flask A is heated?

- (1) Flask A will rise and flask B will sink.
- (2) Flask B will rise and flask A will sink.
- (3) The entire setup will spin rapidly.
- (4) The flasks will remain in balance.

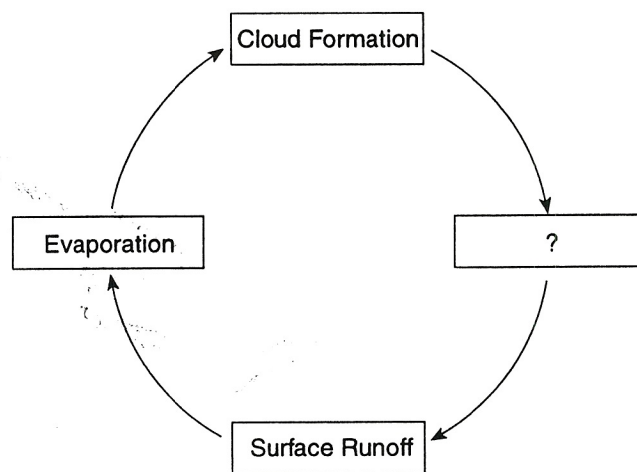
33 Which forecast would alert people to prepare for hazardous weather?

- (1) The high temperature tomorrow may reach 75°F.
- (2) Hurricane Emily is expected to reach this area tomorrow.
- (3) The outlook for tomorrow is cloudy with a chance of rain.
- (4) A high-pressure system is approaching this area.

34 Air pollution resulting from a natural event could be smoke from a

- (1) diesel truck
- (2) coal-burning plant
- (3) trash-burning incinerator
- (4) forest fire caused by lightning

35 The diagram below represents part of the water cycle.



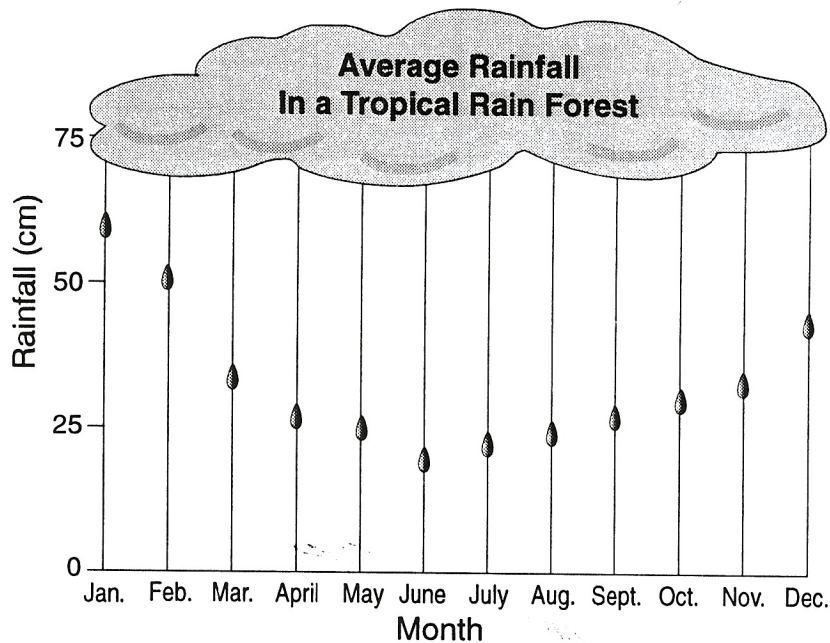
Which label should be put in the box with the question mark to complete the diagram?

- (1) Condensation
- (2) Precipitation
- (3) Melting
- (4) Freezing

36 Which weather event is most likely to occur in New York State during January?

- (1) tornado
- (2) thunderstorm
- (3) snowstorm
- (4) hurricane

37 The graph below shows the average monthly rainfall in a tropical rain forest.



Based on the information provided in the graph, which statement below is correct?

- (1) More rain fell in April than in December.
- (2) The amount of rainfall in February and July is almost the same.
- (3) June is the driest month of the year.
- (4) December is the wettest month of the year.

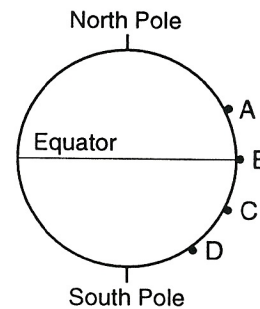
38 The apparent motion of the Moon rising in the east and setting in the west is caused by

- (1) Earth's rotation
- (2) Earth's revolution
- (3) the Moon's rotation
- (4) the Moon's revolution

39 What is the total amount of time required for Earth to make one revolution around the Sun?

- (1) an Earth day of about 24 hours
- (2) a lunar month of about 29 days
- (3) an Earth season of about 3 months
- (4) an Earth year of about 365 days

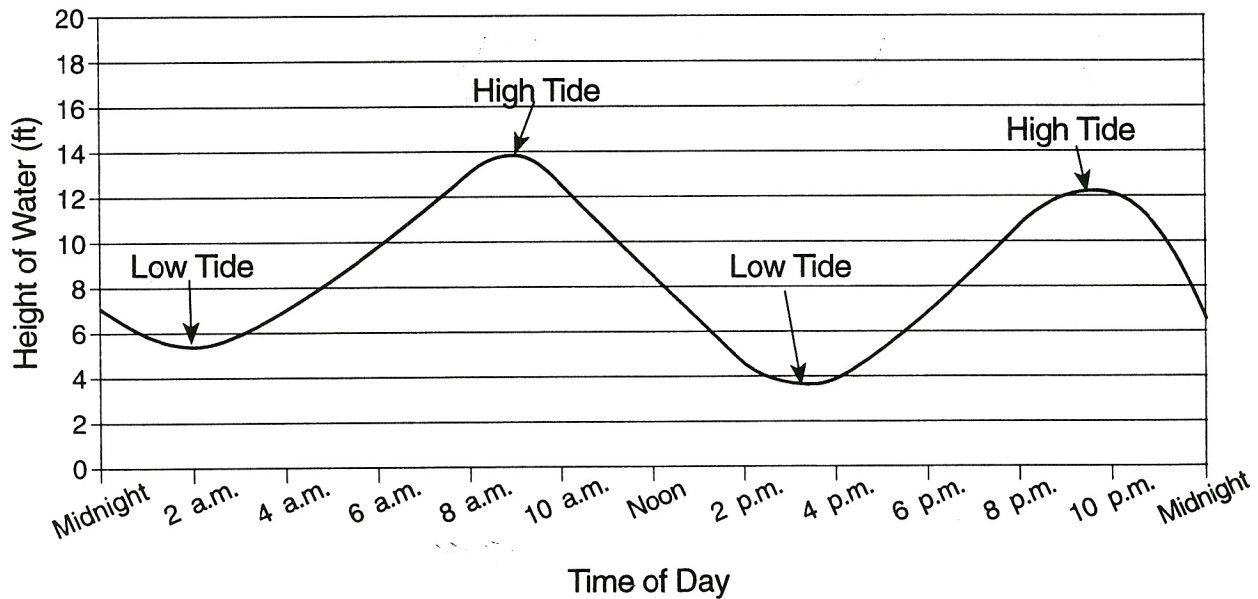
40 In the diagram below, the letters represent locations on Earth's surface.



On the first day of spring, the Sun's rays would be most direct at location

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

41 The graph below shows tide data for one day.



The greatest difference in height between high and low tides shown on the graph is approximately

- (1) 4 ft
- (2) 7 ft
- (3) 10 ft
- (4) 14 ft

42 The data table below compares features of Mars and Earth.

Feature	Mars	Earth
Land area	143 million km ²	148 million km ²
Percentages of atmospheric gases	CO ₂ (95%), N ₂ (2%), O ₂ (0.1%)	CO ₂ (0.03%), N ₂ (78%), O ₂ (21%)
Rotation period	24 h 37 min 23 sec	23 h 56 min 4 sec
Land surface	Solid rocky surface	Solid rocky surface

Which feature listed in the table differs most for Earth and Mars?

- (1) land area
- (2) percentages of atmospheric gases
- (3) rotation period
- (4) land surface

43 The major bodies that revolve in orbits around the Sun are called

- (1) stars
- (2) meteors
- (3) moons
- (4) planets

44 Radio waves, microwaves, and x rays are examples of

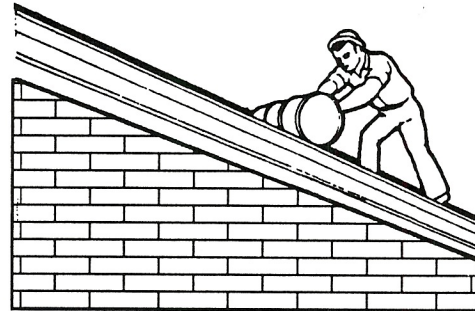
- (1) electromagnetic energy
- (2) heat energy
- (3) sound energy
- (4) nuclear energy

45 Why is it unsafe to place a glass bottle of soda in the freezer to cool?

- (1) Freezing the metal cap may cause it to expand and pop off.
- (2) Freezing the water in the soda may cause it to expand and burst the bottle.
- (3) Freezing the carbon dioxide in the bottle may cause it to explode.
- (4) Drinking ice-cold soda may cause a person's intestines to freeze.

Note that question 46 has only three choices.

46 The diagram below shows a worker rolling a barrel up a roof.



The potential energy of the barrel is

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

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

SPEED OF SOUND THROUGH DIFFERENT MATERIALS

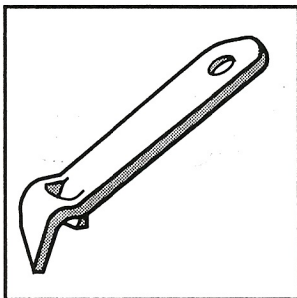
Material	Speed (m/sec)
air	332
water	1554
wood	3828
iron	5103
stone	5971

About how far will sound move through iron in 1 second?

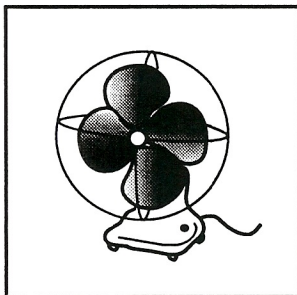
- (1) 300 m
- (2) 1500 m
- (3) 5000 m
- (4) 6000 m

48 Which object is a lever?

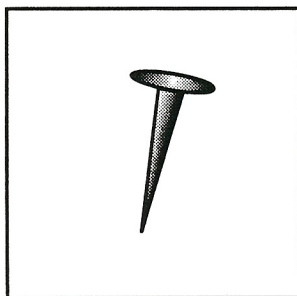
(1)



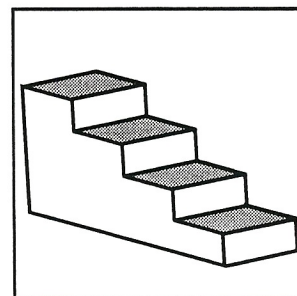
(2)



(3)



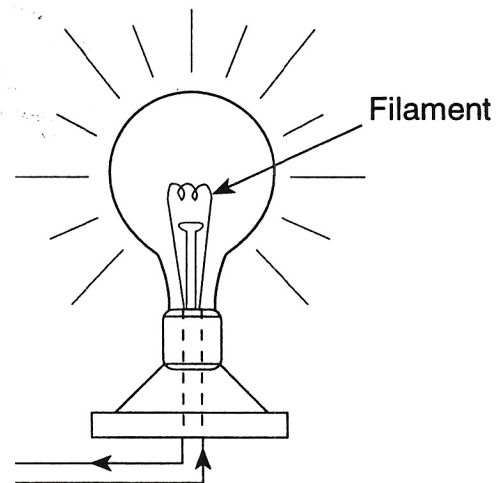
(4)



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

- (1) fan
- (2) steam iron
- (3) match
- (4) television

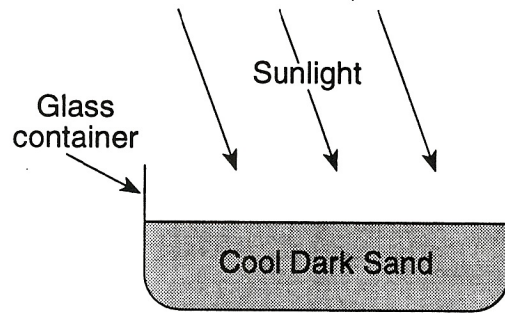
50 The diagram below shows a light bulb. Electrical energy flows from the power cord through the filament in the bulb, then back through the power cord. The electricity flowing through the filament causes the filament to heat up and produce light.



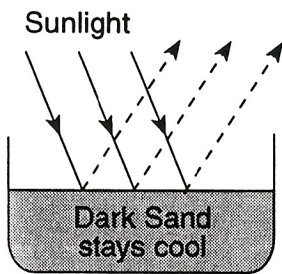
If the filament is broken, why is the bulb no longer able to light?

- (1) When the flow of electricity reaches the break, it turns around and goes out through the power cord.
- (2) The light bulb no longer contains a complete circuit for the flow of electricity.
- (3) The broken filament was the source of electrical energy.
- (4) The broken filament is an insulator.

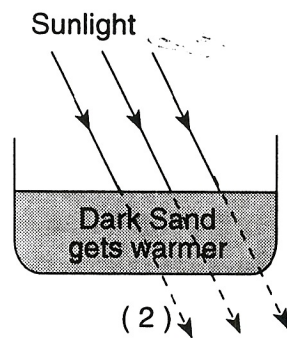
51 The diagram below shows sunlight and a glass container of cool dark sand.



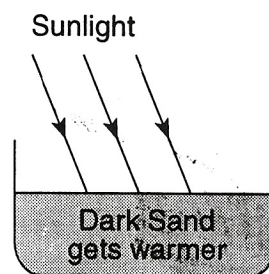
Which diagram best illustrates what happens to most of the sunlight when it reaches the dark sand?



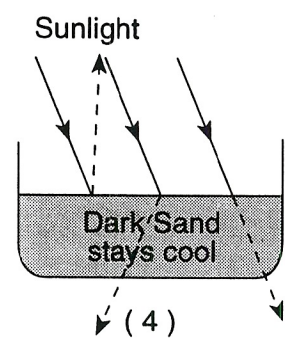
(1)



(2)



(3)



(4)

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

- (1) eating foods that have been heated
- (2) wearing a hat and gloves
- (3) taking a hot shower
- (4) exercising

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

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

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

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

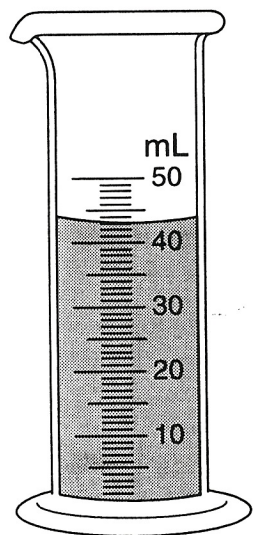
55 Which activity most likely involves a chemical change?

- (1) baking bread
- (2) boiling water
- (3) cutting a pie
- (4) freezing a cake

56 The safest way to smell an unknown substance is to

- (1) smell deeply with your nose directly over the substance
- (2) use a waving motion with your hand over the substance to bring the vapor toward your nose and then smell
- (3) let the vapor collect in a sealed, unventilated room and then enter the room and smell it
- (4) dip your finger into the substance and then smell your finger

57 The diagram below shows a graduated cylinder.



The volume of the liquid in the graduated cylinder is closest to

- (1) 42 mL
- (2) 43 mL
- (3) 45 mL
- (4) 57 mL

58 The diagram below represents oxygen combining with carbon to form carbon dioxide.



The lines on the diagram labeled A represent

- (1) light waves
- (2) sound waves
- (3) chemical elements
- (4) chemical bonds

59 The warning label below appears on the side of a can of spray paint.

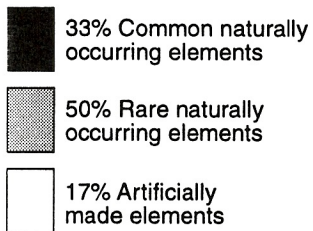
KEEP OUT OF REACH OF CHILDREN
Danger: Contents under pressure.
Do not puncture or incinerate.
Harmful if swallowed. Avoid breathing vapors. Use in a well-ventilated area.

What does the information on the label indicate about the can of spray paint?

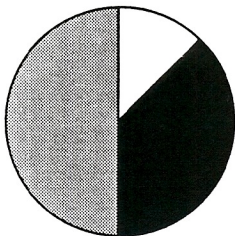
- (1) It should be used in a tightly sealed room.
- (2) It releases vapors that are harmful to children but not adults.
- (3) It could explode when heated.
- (4) It should be crushed before it is thrown away.

60 The circle graph key below shows the percentages of different types of elements.

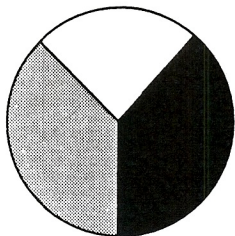
Circle graph key



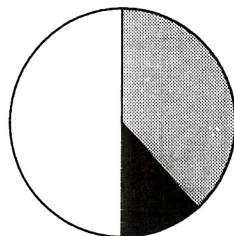
Which graph best represents the information contained in the key?



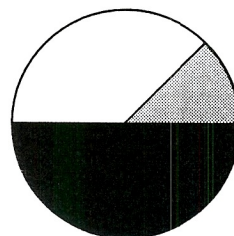
(1)



(2)

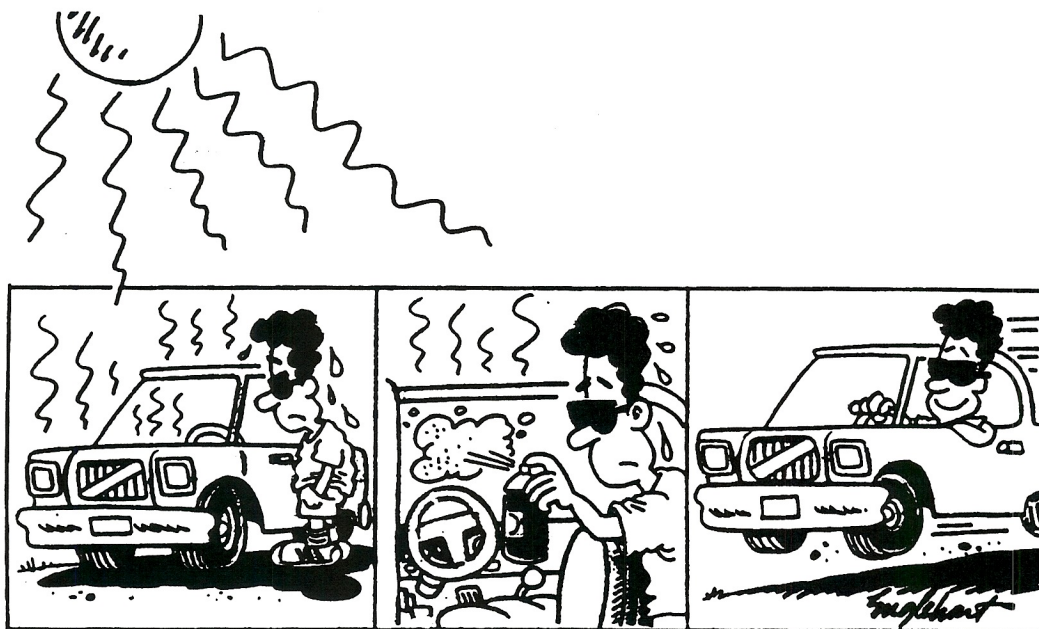


(3)



(4)

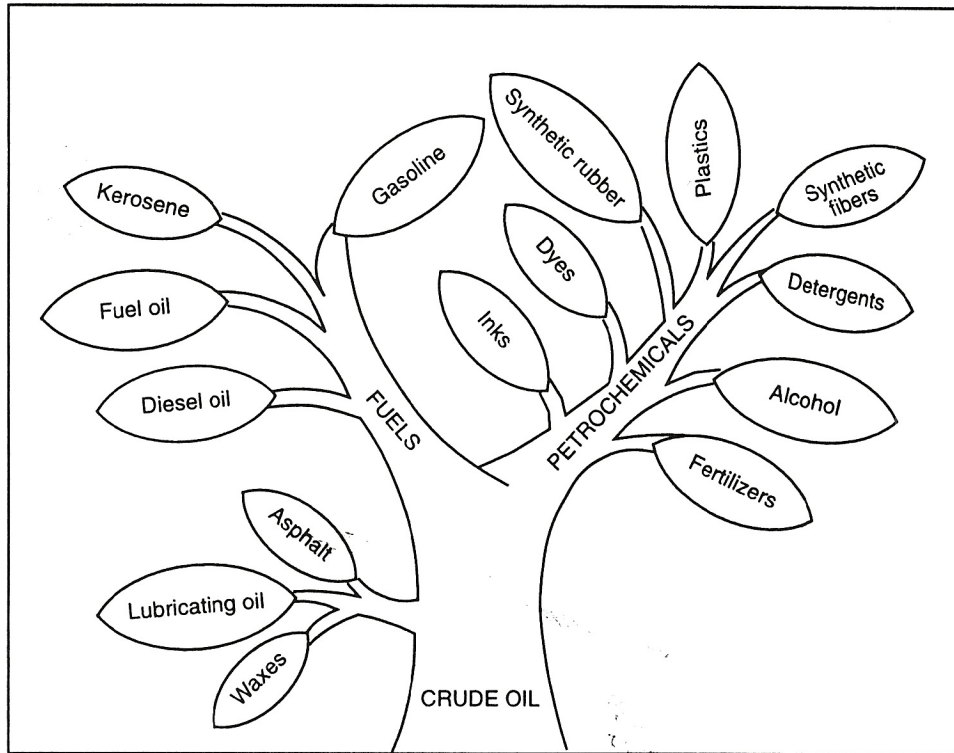
61 The cartoon below shows a person cooling down the interior of a hot car by spraying the inside with water and waiting while the water quickly evaporates.



The method of cooling shown in the cartoon works because heat energy is generally

- (1) absorbed when a solid becomes a liquid
- (2) released when a liquid becomes a solid
- (3) absorbed when a liquid becomes a gas
- (4) released when a gas becomes a liquid

62 Which statement is true of the products shown in the diagram below?



- (1) All are fuels.
- (2) All are found in nature.
- (3) All are products of crude oil.
- (4) All are formed over millions of years.

63 The table below shows the power ratings of four appliances.

Appliance	Power (watts)
Hair Dryer	1000
Microwave Oven	700
Light Bulb	150
Radio	100

Which appliance would use the *least* amount of electrical energy in 1 minute?

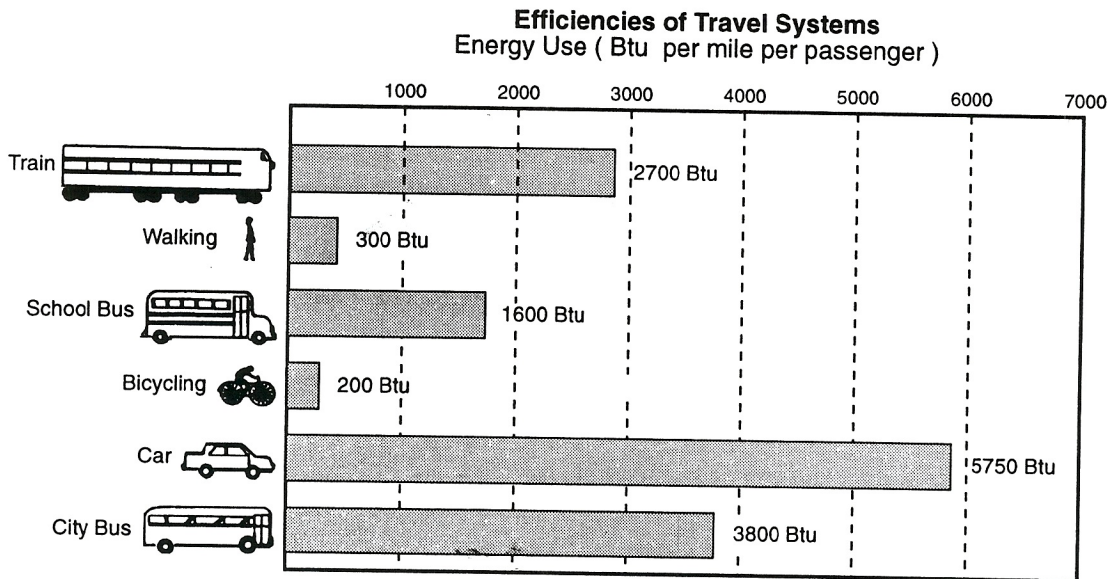
- (1) hair dryer
- (2) microwave oven
- (3) light bulb
- (4) radio

Note that question 64 has only three choices.

64 Over the past 50 years, the worldwide consumption of energy to meet human needs has

- (1) decreased
- (2) increased
- (3) remained the same

65 The chart below shows the energy use per mile of different forms of travel systems.



Which form of travel is the most energy efficient?

- (1) walking
- (2) bicycling
- (3) car
- (4) city bus

66 Which activity is an example of technology?

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

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

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

68 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) always benefits people
- (2) is always dangerous
- (3) may prevent diseases
- (4) may sometimes be harmful

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 with this hormone and pay a higher price for milk produced without it.

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

- (1) Research has proven that it is unsafe for human consumption.
- (2) They believe higher priced products usually are better quality.
- (3) They believe consuming the milk may have some unknown negative results.
- (4) The FDA warned consumers not to drink it.

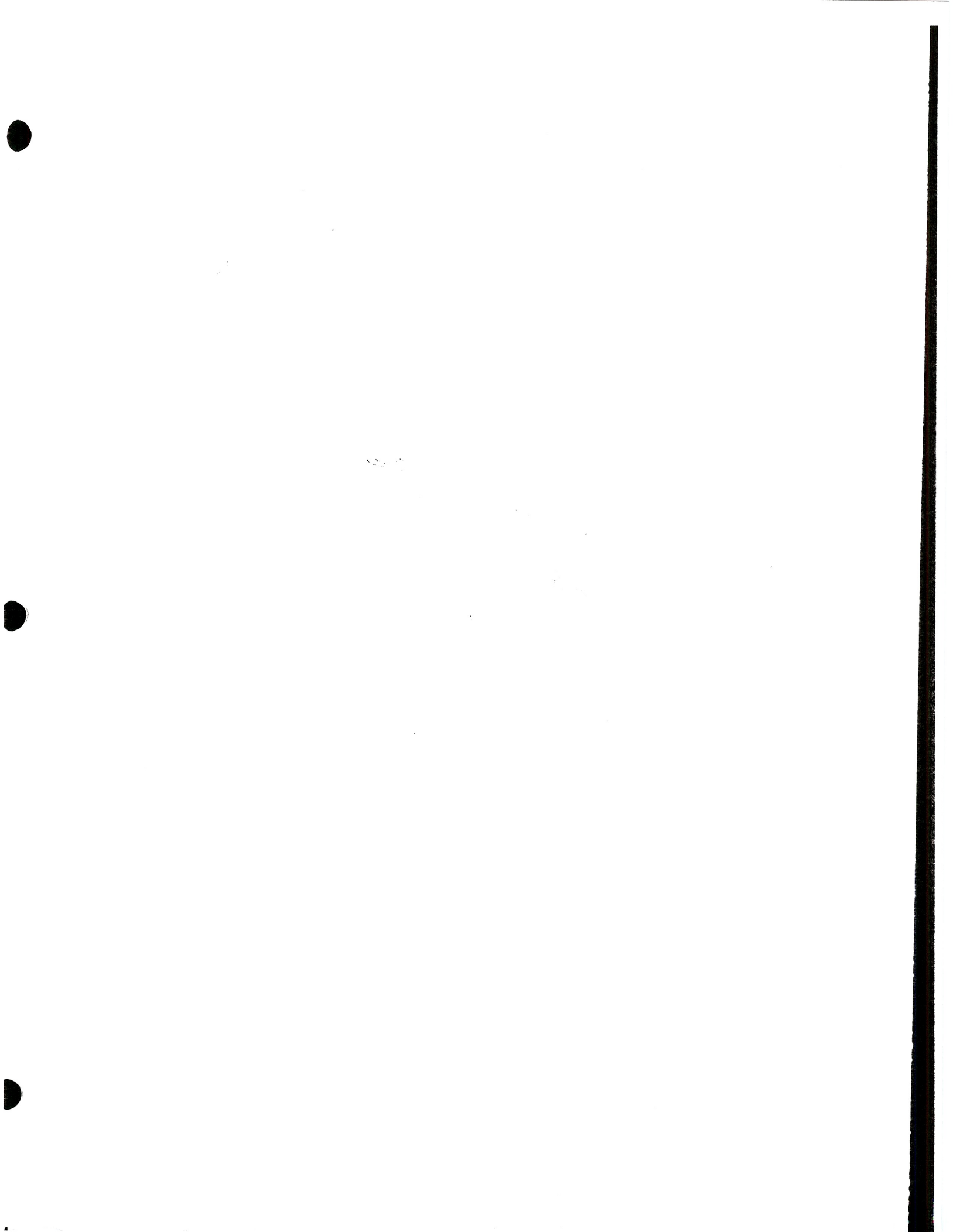
Directions (70): Record your answer to question 70 in the space provided on the last page of this test booklet. Turn to the last page and fold it along the dotted line. Then tear it off slowly and carefully. Write your name and the other information requested in the spaces at the top of the page.

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

ANIMAL SPEEDS

Animal	Maximum Speed (mi/h)
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 graph provided on the answer sheet.





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

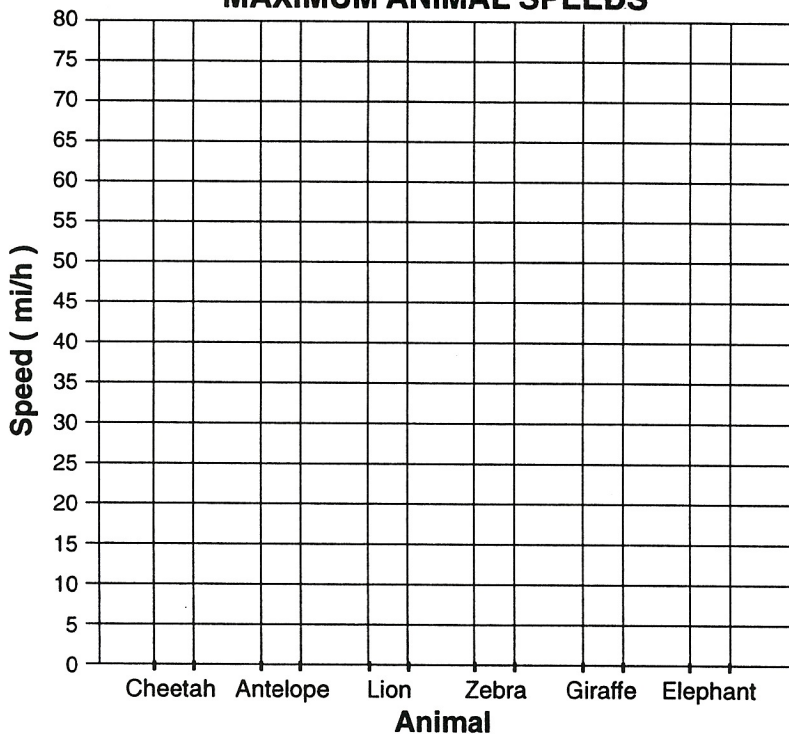
REGENTS COMPETENCY TEST

SCIENCE

Tuesday, January 28, 1997 — 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.

MAXIMUM ANIMAL SPEEDS



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.