

The University of the State of New York
REGENTS COMPETENCY TEST

SCIENCE

Wednesday, June 23, 1993 – 9:15 a.m.

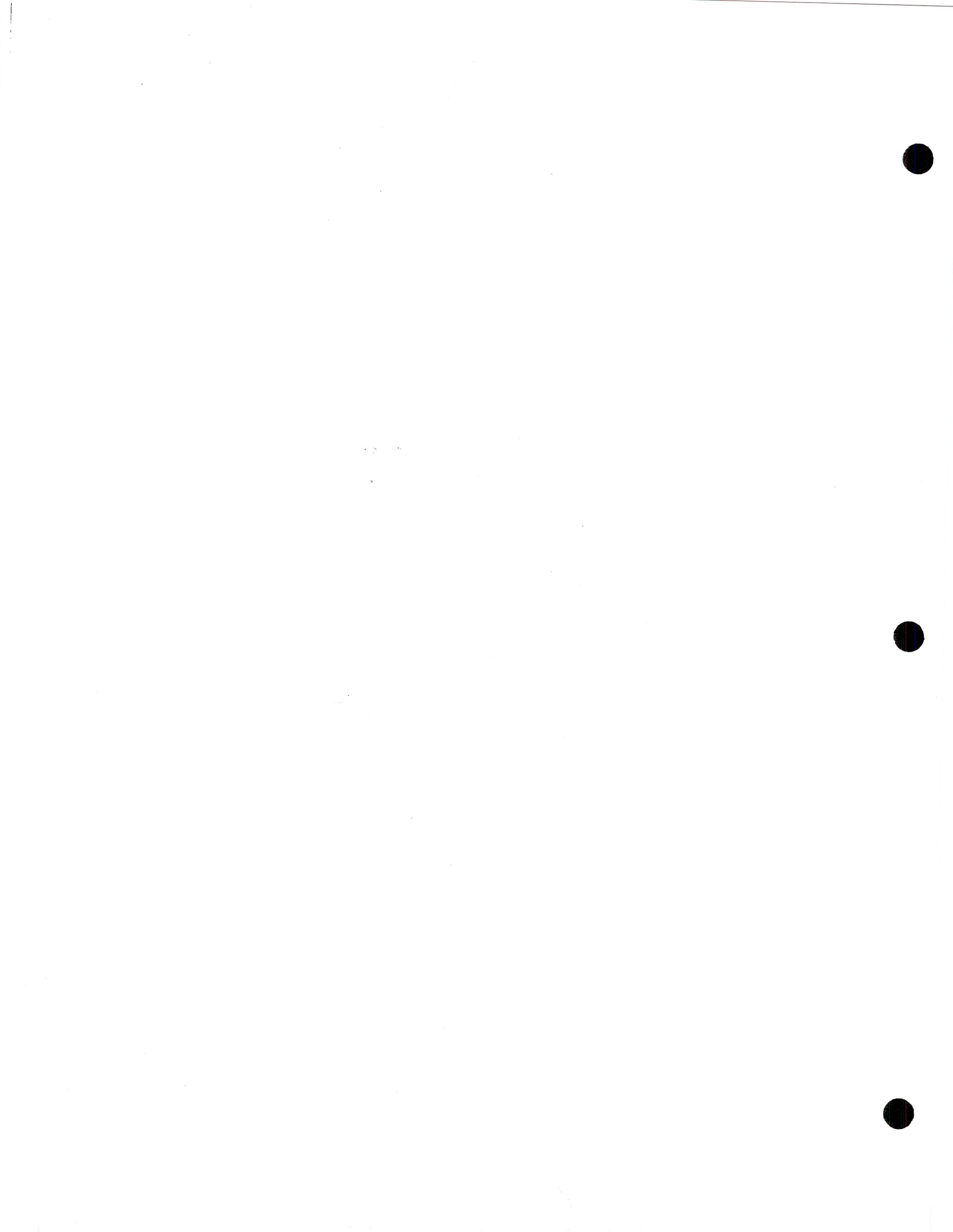
There are 70 questions on this test of basic science concepts and skills. Your answers for questions 1 through 69 must be recorded on the separate answer sheet for multiple-choice questions. Use only a black lead pencil on that answer sheet. Your answer for question 70 is to be recorded in the spaces 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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ALBANY, NEW YORK 12234

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DIRECTIONS TO STUDENTS

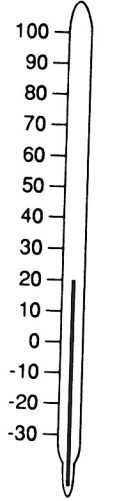
Questions 1 through 69 on this test are multiple-choice questions. Read each question carefully. Decide which of the choices given is the *best* answer, based on science principles. On the separate answer sheet, mark your answer in the row of circles for each question by filling in the circle that has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

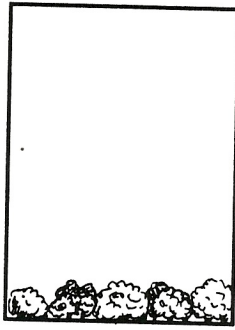
The correct answer is 20°C , which is choice number 2. On your separate answer sheet for the multiple-choice questions, look at the box showing the row of answer circles for the sample question. Since choice number 2 is the correct answer for the sample question, the circle with the number 2 has been 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.

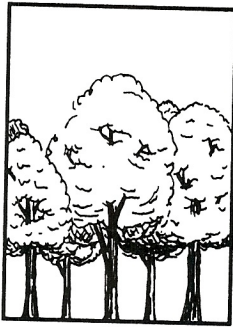
Answer question 70 in the space provided on the last page of this test booklet. Do not make any marks for question 70 on the separate answer sheet. Specific directions for answering this question are given in the test booklet.

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.

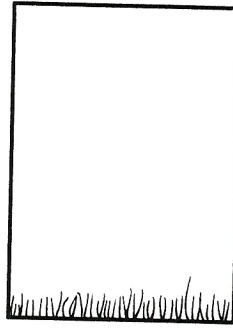
1 The diagrams below show the plant communities present in the same area at different times over a 200-year period.



A



B



C



D

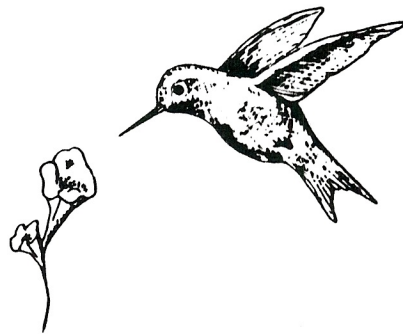
What would be the correct sequence of these plant communities?

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

2 During respiration, most organisms take in oxygen and release

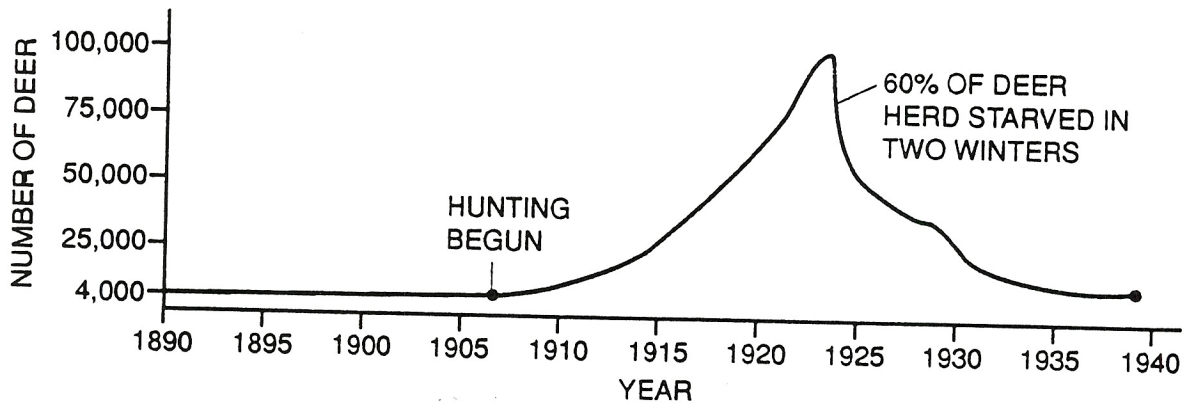
- (1) hydrogen
- (2) chlorine
- (3) helium
- (4) carbon dioxide

3 Which feature of the hummingbird shown below is an adaptation that helps the hummingbird get nectar from flowers?



- (1) forked tail
- (2) small feet
- (3) narrow beak
- (4) keen eyesight

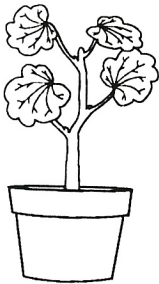
4 President Theodore Roosevelt wanted to increase the number of deer in a national forest. Starting in 1906, hunters were permitted to kill wolves, coyotes, and mountain lions, which eat deer. The graph below shows how the deer population changed after hunting began.



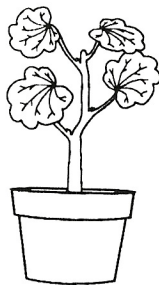
What does the graph show about the results of hunting?

- (1) The actions of people can upset the balance of an ecosystem.
- (2) Natural disasters never upset the balance of an ecosystem.
- (3) Living things can affect nonliving things in the ecosystem.
- (4) Wolves, coyotes, and mountain lions are harmful to this ecosystem.

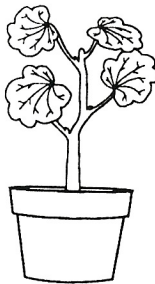
5 The diagrams below show how an experiment was set up to test the effect of a chemical on a certain kind of plant.



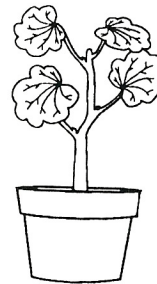
Group A:
no chemical
is added to
30 plants



Group B:
1 gram of the
chemical is added
to 30 plants



Group C:
3 grams of the
chemical is added
to 30 plants

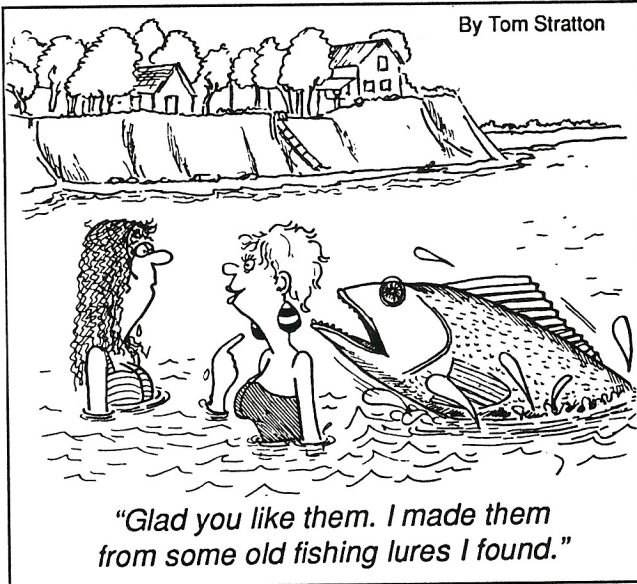


Group D:
5 grams of the
chemical is added
to 30 plants

The control for this experiment is

- (1) group A, only
- (2) groups A and B
- (3) groups C and D
- (4) group D, only

6 The cartoon below shows a characteristic of living things in a humorous way.



Which characteristic of living things does the cartoon show?

- (1) Living things reproduce to insure their survival.
- (2) Living things are independent of each other and their environment.
- (3) Living things respond to stimuli in their environment.
- (4) Living things maintain a balance in the environment.

7 Because carrot plants store starches and sugars in their roots, carrots are a good source of

- (1) water
- (2) carbohydrates
- (3) fats
- (4) proteins

8 A severe storm in a coastal area can reduce the population of seabirds in the next year by

- (1) creating new bonds between species
- (2) reducing the seabirds' natural enemies
- (3) increasing the seabirds' food supply
- (4) destroying the seabirds' nesting sites

9 Which statement applies to all green plants?

- (1) They need oxygen to make food.
- (2) They use light energy to make food.
- (3) They are consumers.
- (4) They are decomposers.

10 Urine, which contains wastes removed from the blood, is formed in the

- (1) small intestine
- (2) large intestine
- (3) kidneys
- (4) liver

11 Which term best completes the statement below?

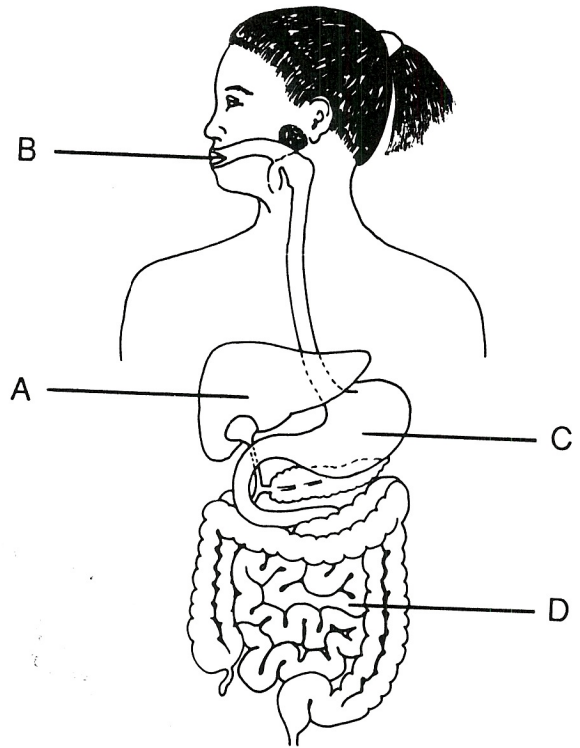
Sperm is to testis as egg is to

- (1) uterus
- (2) penis
- (3) ovary
- (4) mammary gland

12 Muscles are controlled by the

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

13 The diagram below shows the human digestive system.



Digestion begins at point

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

➡ GO RIGHT ON TO THE NEXT PAGE.

14 Emphysema is an illness in which the air sacs in the lungs are damaged. A person with emphysema is often weak and tired because

- (1) oxygen cannot pass easily from blood to muscle cells
- (2) food cannot pass easily from blood to muscle cells
- (3) oxygen cannot pass easily from the lungs to the blood
- (4) food cannot pass easily from the blood to the lungs

15 Which sequence of structures is arranged from simplest to most complex?

- (1) cells → organs → organism → systems → tissues
- (2) cells → tissues → organs → systems → organism
- (3) organism → organs → systems → tissues → cells
- (4) organism → systems → organs → tissues → cells

16 Two organs are considered parts of the same body system if the organs

- (1) are located next to each other
- (2) work together to carry out a life function
- (3) work independently of each other
- (4) are made up of cells

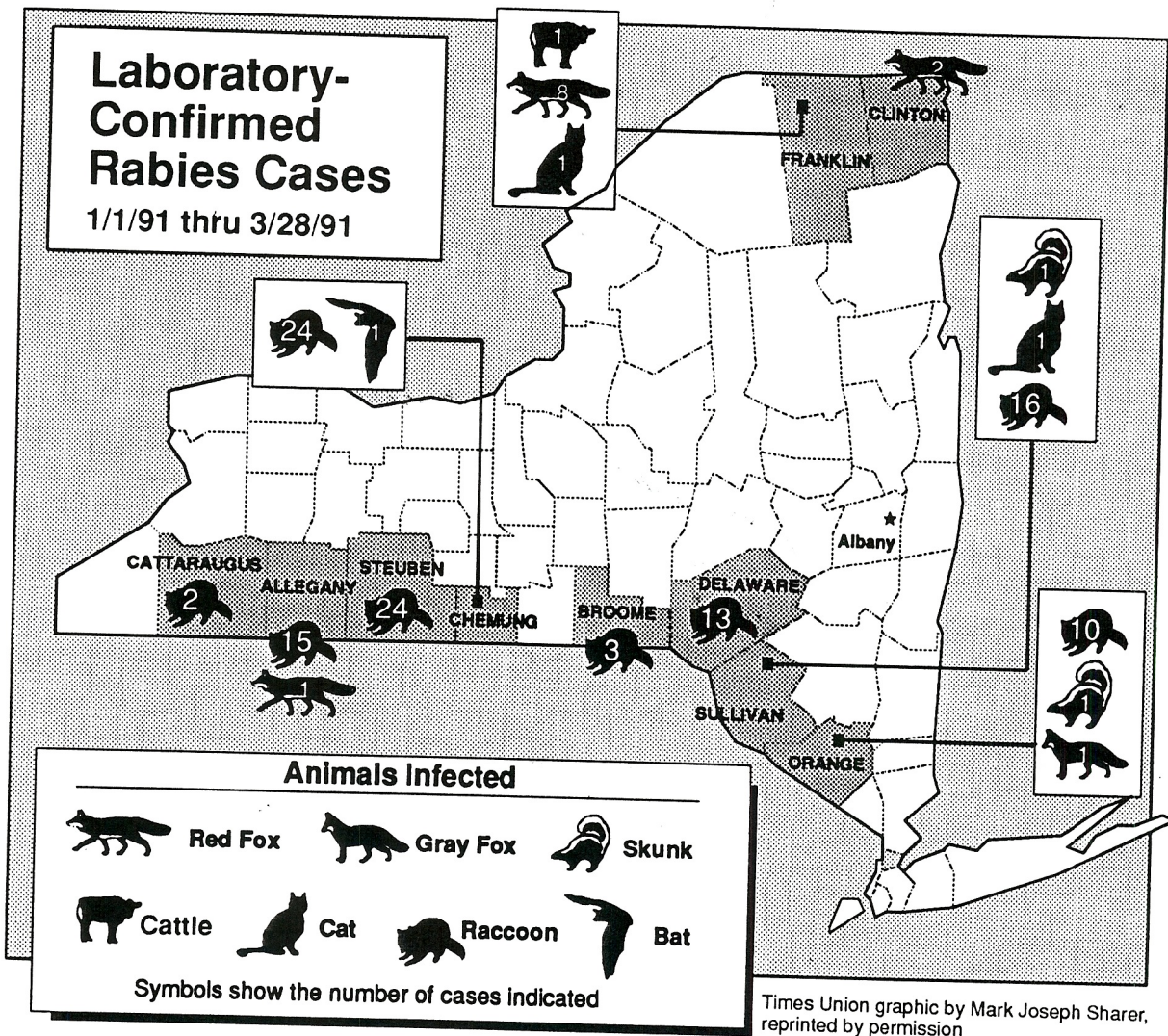
17 Which cells' ability to carry oxygen is blocked when carbon monoxide poisoning occurs?

- (1) red blood cells
- (2) white blood cells
- (3) muscle cells
- (4) nerve cells

18 New skin is made by the process of

- (1) excretion
- (2) circulation
- (3) cell division
- (4) cellular respiration

Base your answers to questions 19 and 20 on the diagram below. The diagram shows the number of laboratory-confirmed rabies cases in various kinds of animals throughout New York State in early 1991.



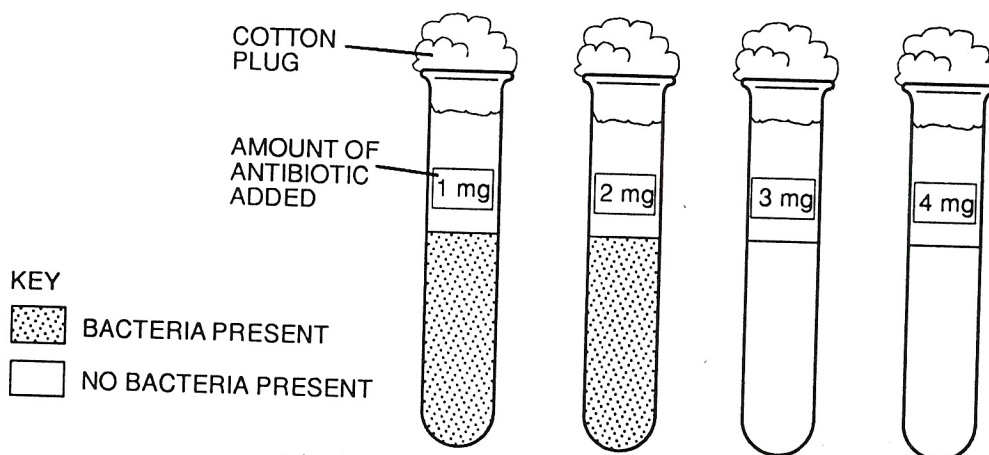
19 In which kind of animal did the largest number of rabies cases occur?

- (1) cat
- (2) raccoon
- (3) red fox
- (4) skunk

20 In which county was the rabies virus found in a bat?

- (1) Allegany
- (2) Broome
- (3) Chemung
- (4) Orange

21 Different amounts of antibiotics were added to identical tubes of bacteria in nutrient broth. One set of results is shown below. The labels show how much antibiotic was added.



If another tube had been treated with 6 milligrams of the antibiotic, its bacterial population would most likely have been

- (1) zero
- (2) one-fourth of the original population, only
- (3) half of the original population, only
- (4) the same as the original population

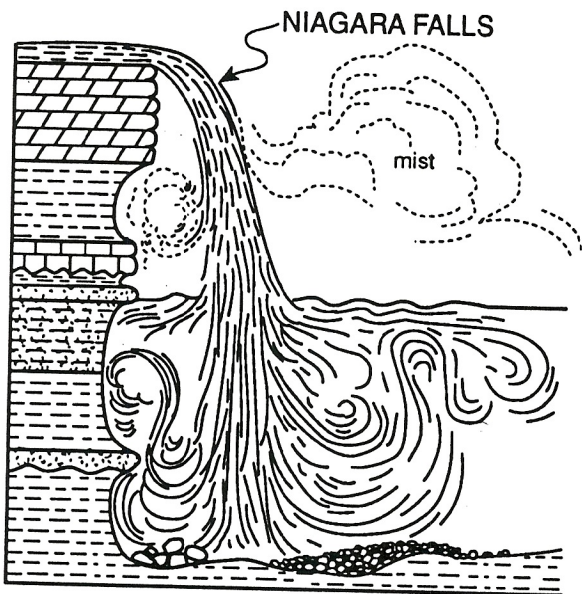
22 The table below gives data for four minerals.

<i>Mineral</i>	<i>Hardness</i>	<i>Density</i>
Gypsum	2.0	2.3
Galena	2.5	7.5
Feldspar	6.0	2.5
Corundum	9.0	4.0

Which statement is best supported by the data given for the four minerals in the table?

- (1) Corundum is the most dense mineral.
- (2) Gypsum is the least dense mineral and also the least hard.
- (3) Galena is the most dense mineral and also the hardest.
- (4) Corundum and feldspar have the same density.

23 The diagram below shows the shape of the cliff behind Niagara Falls.



The cliff has this shape because of the forces of

- (1) winds and glaciers
- (2) floods and earthquakes
- (3) faulting and folding
- (4) weathering and erosion

Note that question 24 has only three choices.

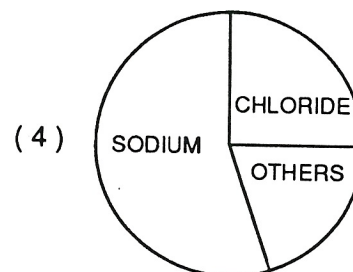
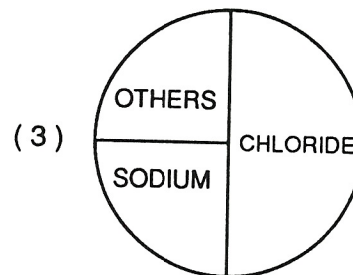
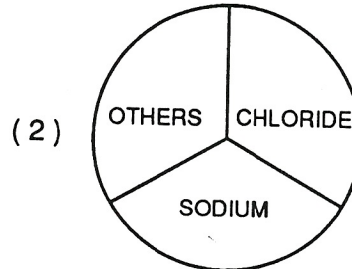
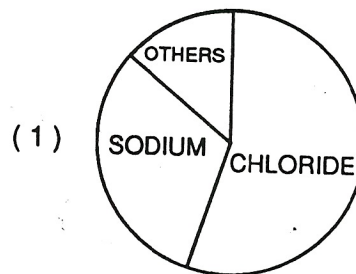
24 Earth's surface features are continually changing. These changes include

- (1) wearing away the surface, only
- (2) building up the surface, only
- (3) both wearing away and building up the surface

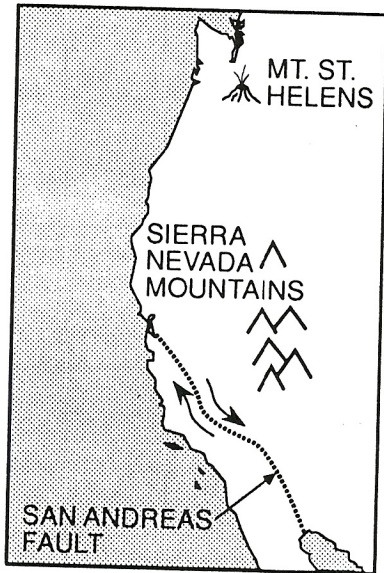
25 The table below shows the percent of various chemical salt ions in the total salt-ion content of ocean water.

Salt Ion	Percent of Total Salt-Ion Content in Ocean Water
Chloride	55
Sodium	31
Others	14

Which graph best represents the information in the table?



26 The diagram below shows geological features found near the west coast of the United States.



These geological features are mostly the result of the

- (1) strength of ocean currents
- (2) movement of Earth's crustal plates
- (3) climate of the area
- (4) decrease in altitude

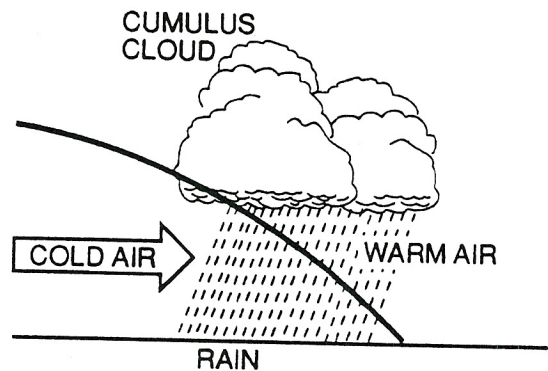
27 The most useful information about the development of past life-forms and climates can be obtained by studying

- (1) molten igneous rock
- (2) weathered rock pieces
- (3) the shape of mineral crystals
- (4) fossils in rocks

28 If a series of sedimentary rock layers has *not* been disturbed by folding or faulting, the bottom rock layer always

- (1) contains fossils
- (2) contains the most minerals
- (3) is the oldest layer
- (4) is the thickest layer

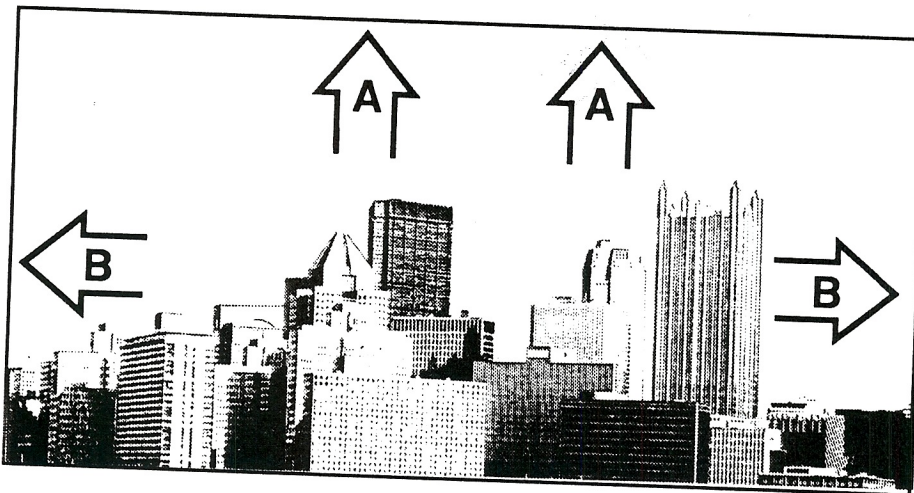
29 The diagram below shows a side view of a cold air mass pushing under a mass of warm air.



The boundary between the cold air and warm air is called a

- (1) front
- (2) high-pressure system
- (3) low-pressure system
- (4) storm system

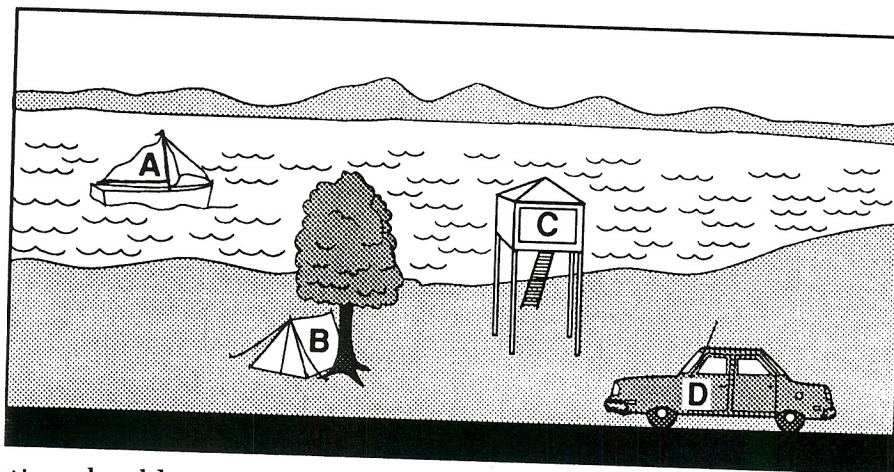
30 The diagram below shows a city on a sunny summer afternoon.



The air in the city is being

- (1) heated and will move in the direction indicated by the arrows labeled A
- (2) heated and will move in the directions indicated by the arrows labeled B
- (3) cooled and will move in the direction indicated by the arrows labeled A
- (4) cooled and will move in the directions indicated by the arrows labeled B

31 The diagram below shows a beach area where people are camping. A thunder and lightning storm warning is announced.

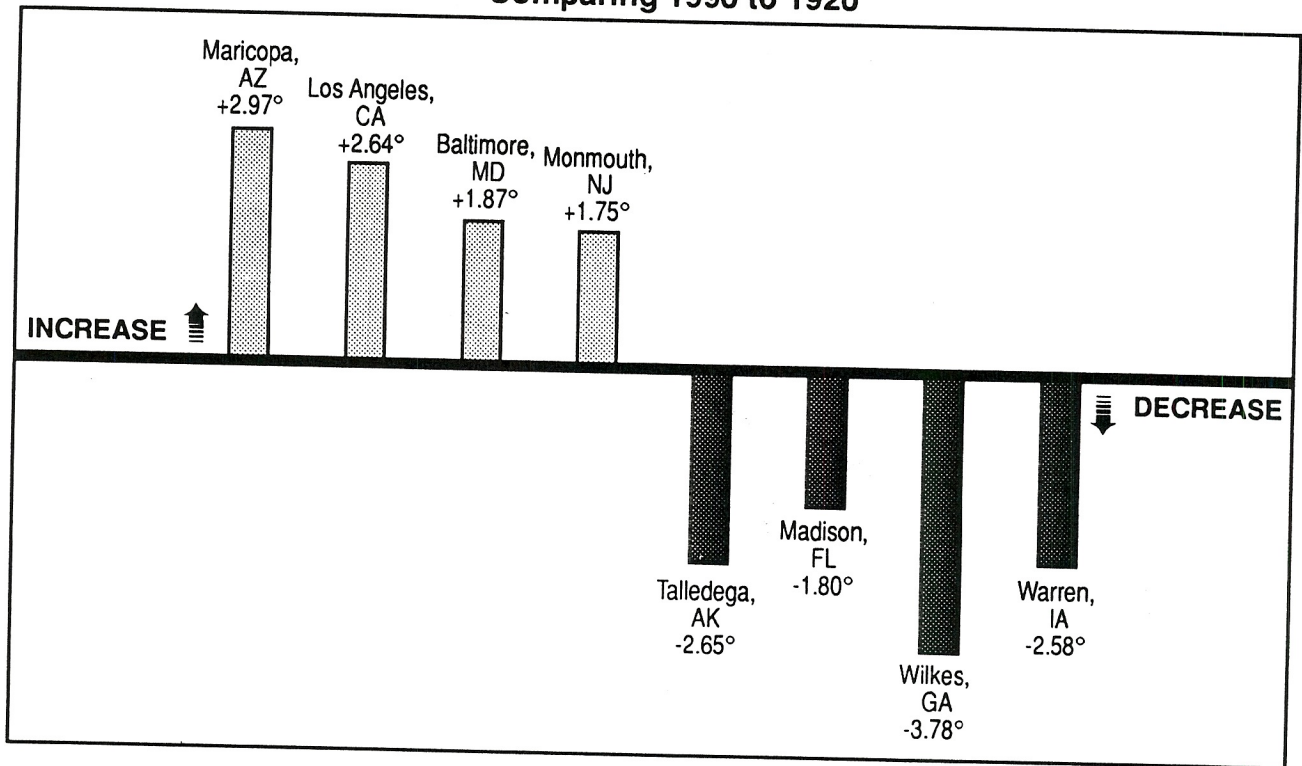


In which location should a person seek safe shelter before the thunderstorm reaches the beach?

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

Base your answers to questions 32 and 33 on the graph below. The yearly average temperature of counties in the United States for the years 1920 and 1990 was compared, and the graph shows the counties that had the greatest temperature difference.

**Differences in the Yearly Average Temperature (°F)
Comparing 1990 to 1920**



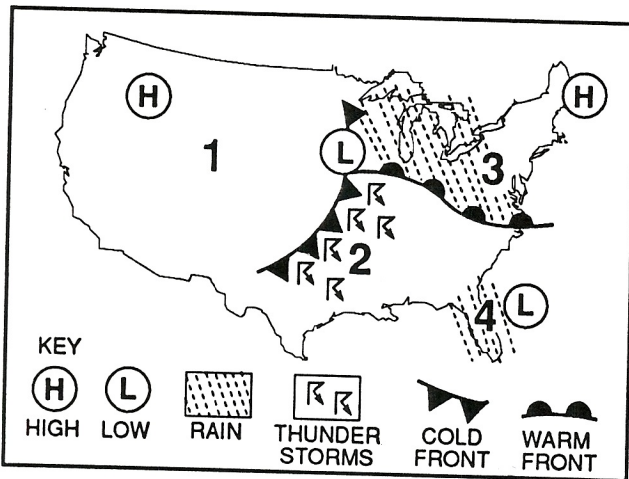
32 Which county had the greatest difference in temperature?

- (1) Maricopa, AZ
- (2) Monmouth, NJ
- (3) Talledega, AK
- (4) Wilkes, GA

33 Comparing 1990 to 1920, what was the difference in temperature of Baltimore, Maryland?

- (1) It was 1.80°F less.
- (2) It was 2.58°F less.
- (3) It was 1.87°F more.
- (4) It was 2.64°F more.

34 At which location on the weather map below is the weather most likely fair?



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

35 An air mass that forms over the Atlantic Ocean near Florida will be

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

36 Which device has improved weather forecasting in recent years?

- (1) electron microscope
- (2) atomic reactor
- (3) satellite
- (4) television

37 At which location would a person *not* observe a period of daylight and a period of darkness every day of the year?

- (1) at the Equator
- (2) at the North Pole
- (3) in New York State
- (4) in Africa

38 What would result from an increase in the speed of Earth's rotation?

- (1) A day would be longer.
- (2) A day would be shorter.
- (3) A year would be longer.
- (4) A year would be shorter.

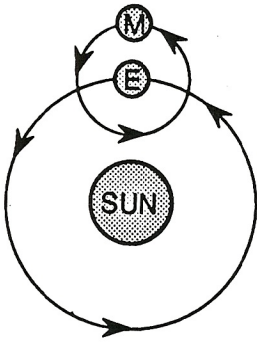
39 The path of Earth around the Sun is defined as Earth's

- (1) orbit
- (2) tilt
- (3) axis
- (4) spin

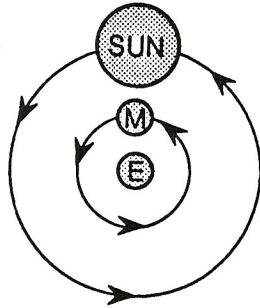
40 New York State has cold weather during the winter because the

- (1) Northern Hemisphere has fewer oceans
- (2) Northern Hemisphere is tilted away from the Sun
- (3) Sun gives off less energy during the winter
- (4) Sun is farther from Earth during the winter

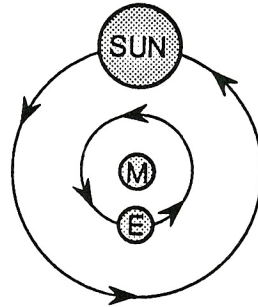
41 Which model correctly shows the movement of the Earth (E) and the Moon (M) in relation to the Sun?



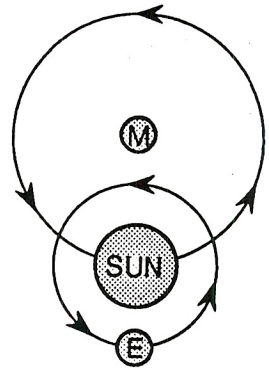
(1)



(2)



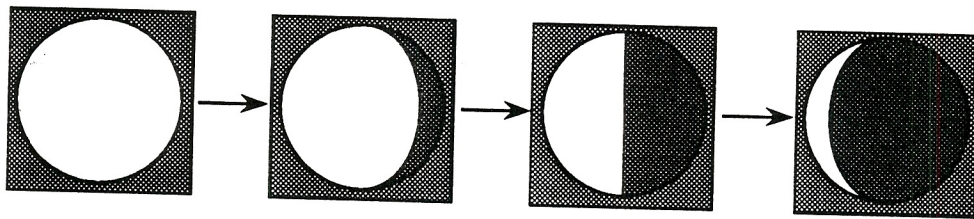
(3)



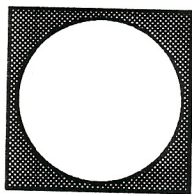
(4)

(NOT DRAWN TO SCALE)

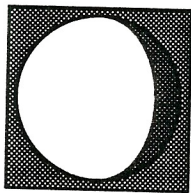
42 The diagram below shows the phases of the Moon as seen from Earth.



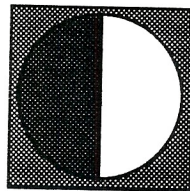
Which phase of the Moon will be observed next?



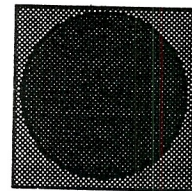
(1)



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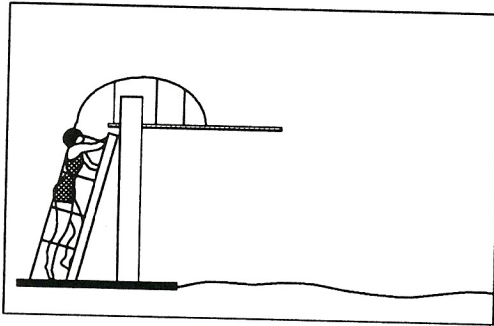
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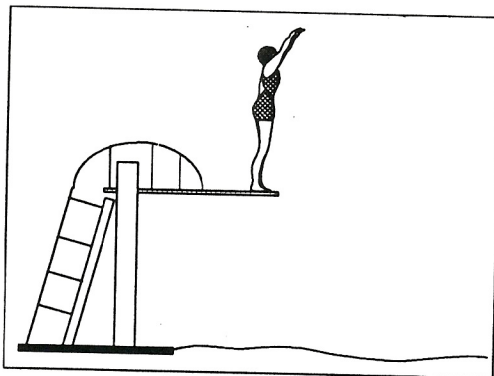
(4)

43 Which picture shows the change from potential energy of gravity to kinetic energy?

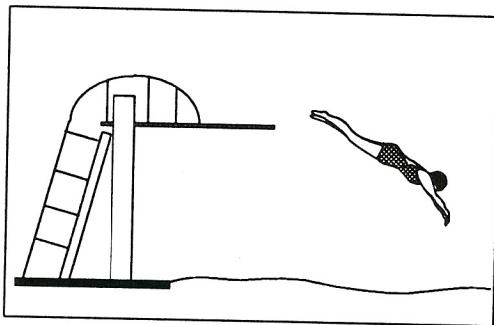
(1)



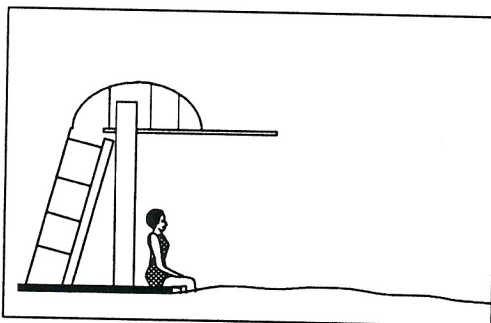
(2)



(3)



(4)



44 The diagram below shows a can of juice being opened.



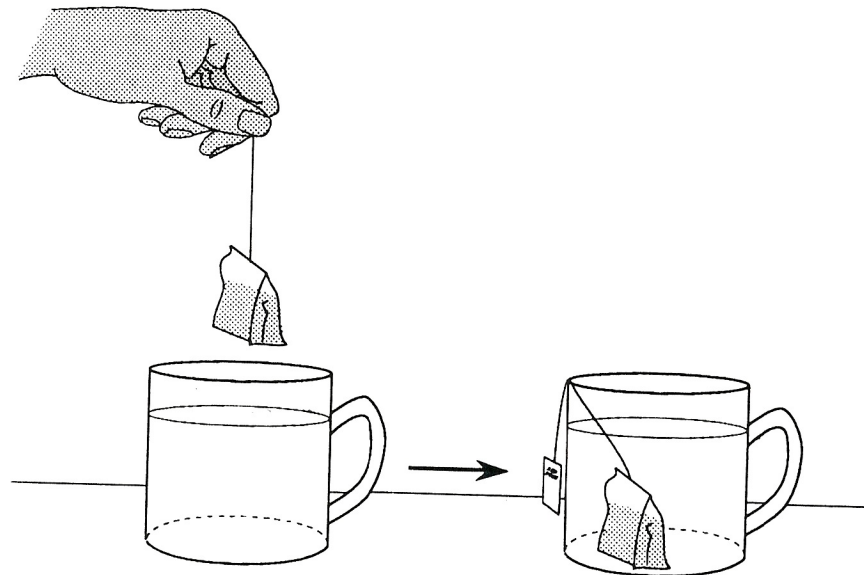
Which simple machine is shown?

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

45 An object is being observed through a microscope. What is the function of the lens?

- (1) It makes the object appear larger.
- (2) It reflects light onto the object.
- (3) It holds the object still.
- (4) It preserves the object.

46 As shown in the diagram below, a teabag at room temperature was dropped into a cup of hot water.



After several seconds, which temperature change had occurred?

- (1) The teabag became warmer and the water became cooler.
- (2) The teabag became cooler and the water became warmer.
- (3) The teabag and the water both became warmer.
- (4) The teabag and the water remained at the same temperature.

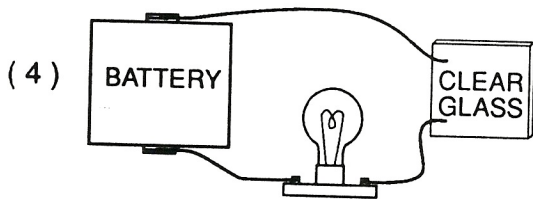
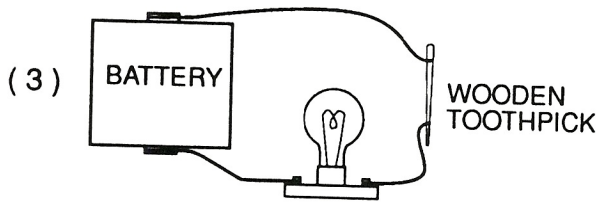
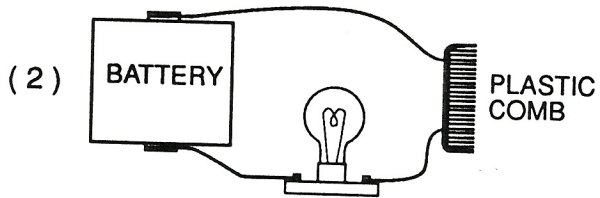
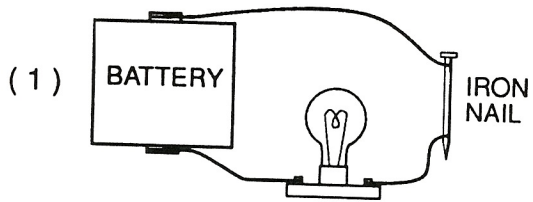
47 In summer, wires strung between telephone poles sag. Wires must sag in summer so that they can

- (1) flap when the wind blows
- (2) drain off any rain
- (3) contract in cold weather without snapping
- (4) expand in cold weather

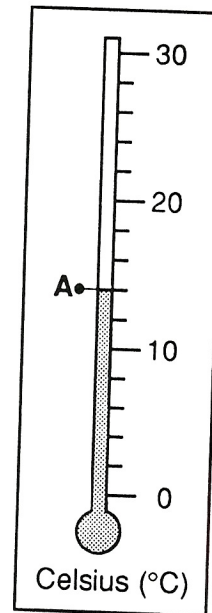
48 For some races during an outdoor track meet, timers start their watches when they see the smoke from the starter's gun, rather than when they hear the sound of the gun, because the

- (1) speed of sound is faster than the speed of light
- (2) speed of sound is slower than the speed of light
- (3) timers can see better than they can hear
- (4) timers can hear better than they can see

49 Which light bulb will light?



50 What temperature is shown at point A on the thermometer below?

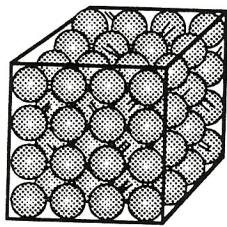


- (1) 11°C
- (2) 12°C
- (3) 14°C
- (4) 15°C

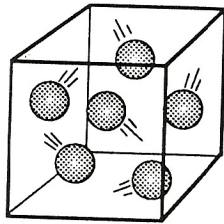
51 Which piece of laboratory equipment is used to prevent accidents?

- (1) eyewash bottle
- (2) eye goggles
- (3) a first-aid kit
- (4) a fire extinguisher

52 The diagrams below illustrate the relative closeness of particles in a solid and a gas.

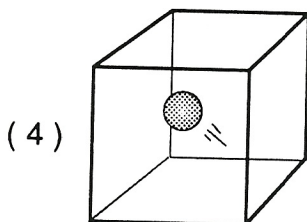
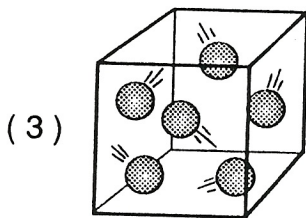
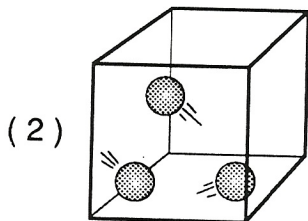
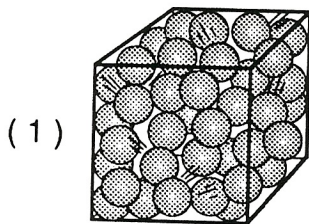


SOLID



GAS

Which diagram best illustrates the relative closeness of particles in a liquid?



53 Which is an example of a physical change?

- (1) souring of milk
- (2) gasoline burning in a car's engine
- (3) rusting of an iron fence
- (4) an ice cube melting on a table

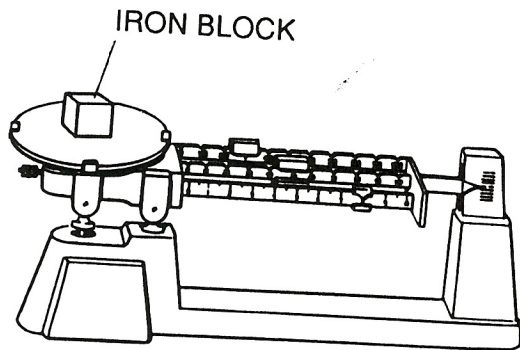
54 Many chemicals are considered toxic. This means that they are

- (1) flammable
- (2) explosive
- (3) poisonous
- (4) radioactive

55 Which statement describes a characteristic common to rocks, water, plants, and humans?

- (1) They are all living things.
- (2) They are all made of chemicals.
- (3) They all make their own food.
- (4) They all reproduce.

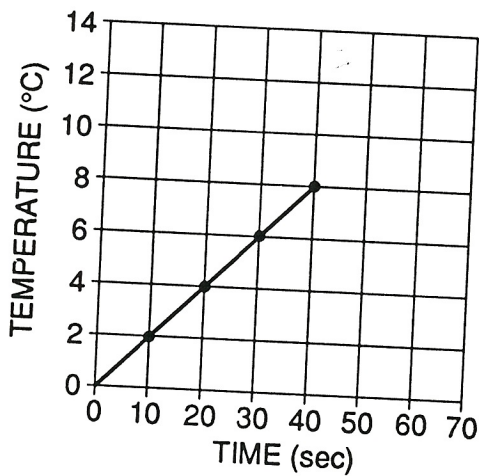
56 The picture below shows a laboratory balance.



What property of the iron block is being measured?

- (1) volume
- (2) mass
- (3) hardness
- (4) melting point

57 A student measured and graphed the temperature of a small amount of water as it was being heated.



If the temperature of the water continued to rise at the same rate, what would be the temperature of the water after being heated for 1 minute?

- (1) 8°C
- (2) 10°C
- (3) 12°C
- (4) 14°C

58 Baking soda bubbles rapidly when mixed with vinegar. The bubbling action will speed up if a beaker of the mixture is placed in

- (1) ice
- (2) water at room temperature
- (3) cold water
- (4) hot water

59 Which resource is considered renewable?

- (1) water
- (2) uranium
- (3) oil
- (4) coal

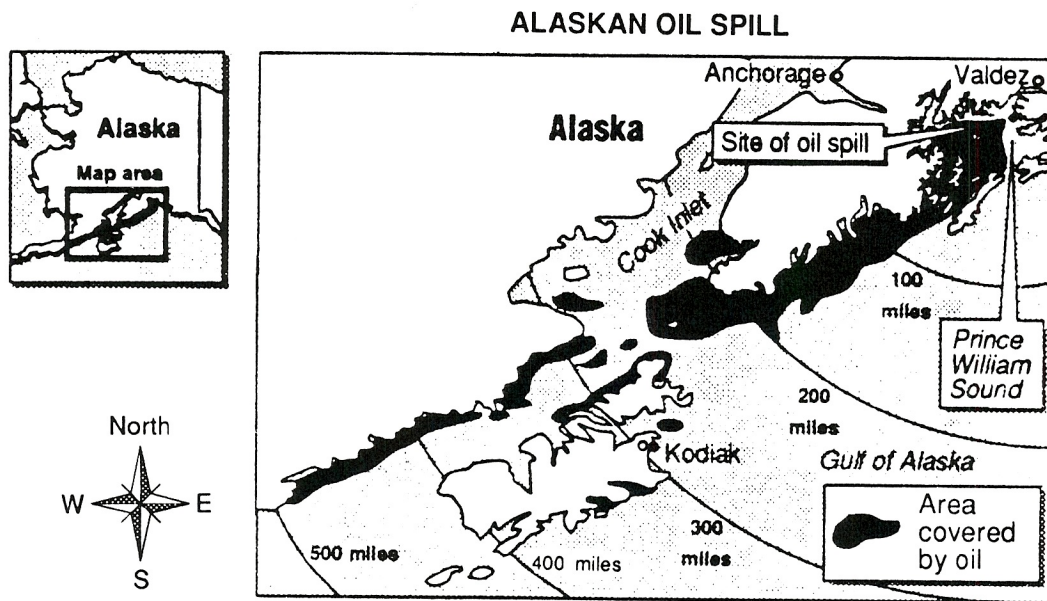
60 Electricity can be produced directly from the Sun's energy by using

- (1) dams
- (2) windmills
- (3) nuclear power plants
- (4) panels of solar cells

61 The watt is a unit used to compare the

- (1) amount of energy in foods
- (2) rate at which automobiles use fuel
- (3) rate at which electrical devices use energy
- (4) weight of objects

62 The map below shows the extent of an oil spill along the coast of Alaska.



The maximum distance that the oil spread from the spill site is closest to

- (1) 200 miles
- (2) 300 miles
- (3) 400 miles
- (4) 500 miles

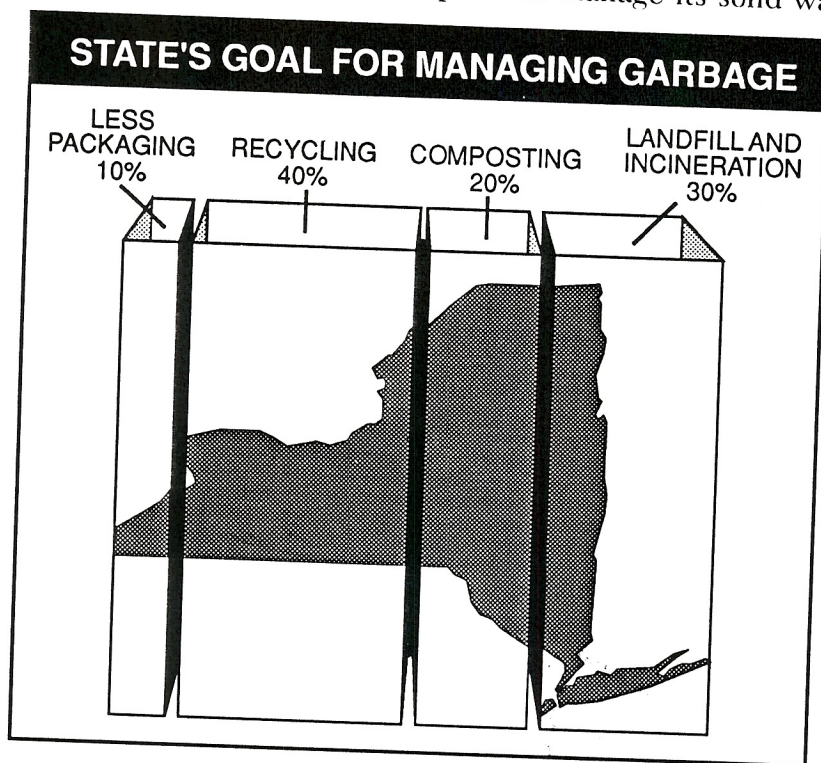
63 Fossil fuel use in the United States can be reduced by using

- (1) natural gas to heat homes
- (2) plastics to build automobiles
- (3) oil to fuel power plants
- (4) wind power to generate electricity

64 Improvements in technological products and processes have most often resulted in

- (1) few changes in people's lifestyles
- (2) no change in how long most people live
- (3) greater numbers and types of items available to consumers
- (4) solutions to all of society's problems

65 The graph below shows how New York State plans to manage its solid waste.



Recycling and composting will make up what percentage of solid waste treatment?

- (1) 10%
- (2) 20%
- (3) 40%
- (4) 60%

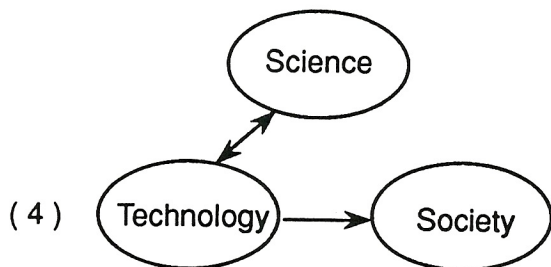
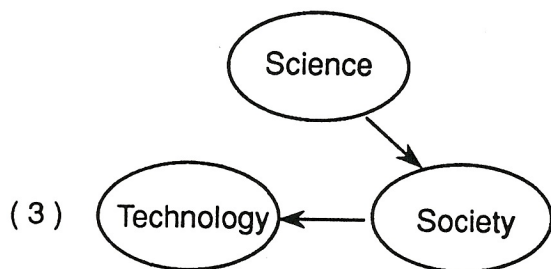
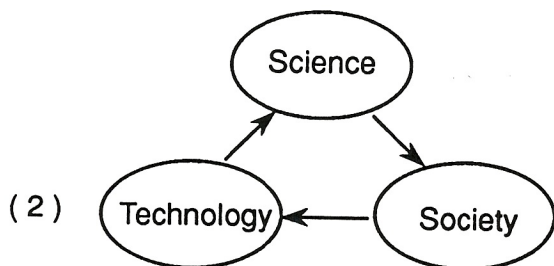
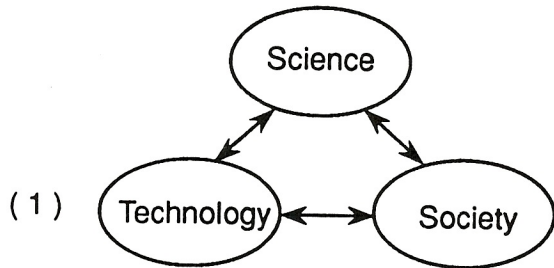
66 The table below shows the advantages and disadvantages of burning coal as a fuel.

<i>Fuel</i>	<i>Advantages</i>	<i>Disadvantages</i>
coal	<ul style="list-style-type: none"> • inexpensive • plentiful • provides jobs 	<ul style="list-style-type: none"> • causes black lung disease • contributes to acid rain • contributes to air pollution

In this table, the advantages of using coal as a fuel are based on

- (1) health effects
- (2) environmental issues
- (3) scientific properties
- (4) economic issues

67 Which diagram best shows the interactions between science, society, and technology?



68 Years ago, asbestos was used as insulation in buildings because it does not burn. Today, asbestos has been shown to be harmful to our health. In some cases, asbestos is being removed from buildings because

- (1) asbestos is now valuable as a gem mineral
- (2) long-term health risks of asbestos outweigh its value as insulation
- (3) the insulating ability of asbestos has been used up
- (4) other materials are better insulators and cost less than asbestos

69 Humans and computers can work together as a system. In this system, humans provide the

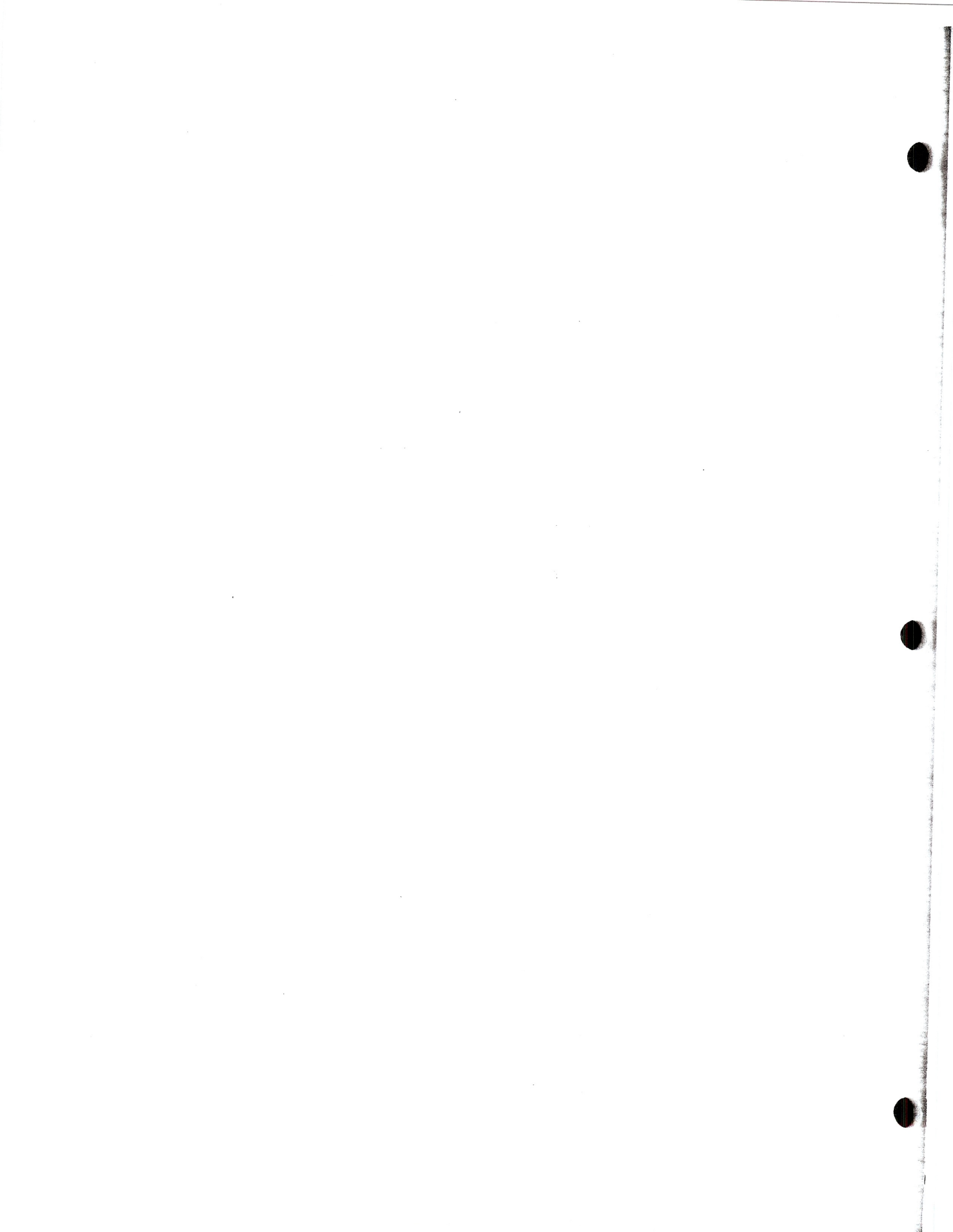
- (1) input
- (2) processing
- (3) output
- (4) feedback

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 table below shows the weight of a lion at various ages from birth to 36 months.

<i>Age</i> (months)	<i>Weight</i> (kg)
0	5
2	6
4	23
6	44
12	69
24	99
36	120

Use the information given in the data table to construct a line graph on the grid provided on the answer sheet. Mark the location of each point with an X and connect the points with a line.



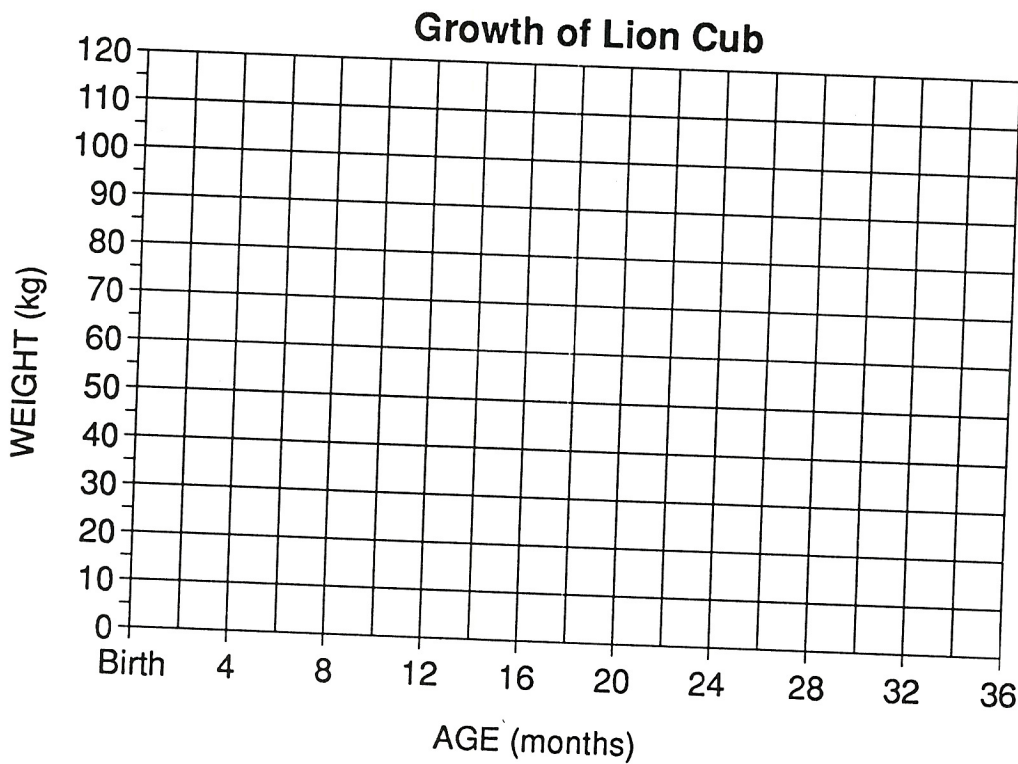
Student _____ Grade _____ Date of Birth _____ Sex: Male Female
 School _____ City or P.O. _____
 Teacher _____ Today's Date _____

REGENTS COMPETENCY TEST

SCIENCE

Wednesday, June 23, 1993 – 9:15 a.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 sheet.