

REGENTS COMPETENCY TEST

SCIENCE

Wednesday, January 25, 1995 — 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 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.

Copyright 1995
THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
ALBANY, NEW YORK 12234

No part of this test may be reproduced and/or transmitted by any means without written permission.

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

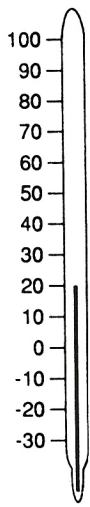
What temperature reading is shown on the thermometer?

(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.

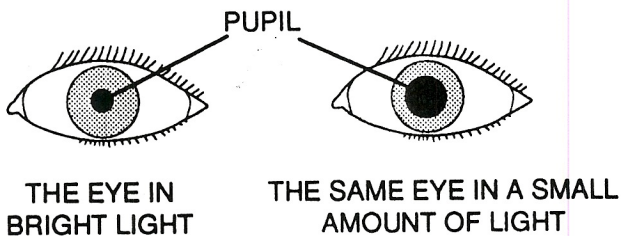
1 As they grow, green plants take minerals from the soil. When the plants die, they may decompose and return minerals to the soil. This information shows that plants

- (1) are producers
- (2) are consumers
- (3) exchange materials with the environment
- (4) require energy and food to live

3 The snowshoe rabbit turns brown in the summer and white in the winter. This color change is an example of how

- (1) living things are adapted for survival
- (2) natural balance may be disturbed
- (3) microorganisms are beneficial to the environment
- (4) some living things remain dormant during winter

2 The diagram below shows how the size of the pupil changes as the amount of light is reduced.



This change in the eye is best described as a

- (1) conditioned response
- (2) response to a stimulus
- (3) voluntary action
- (4) learned behavior

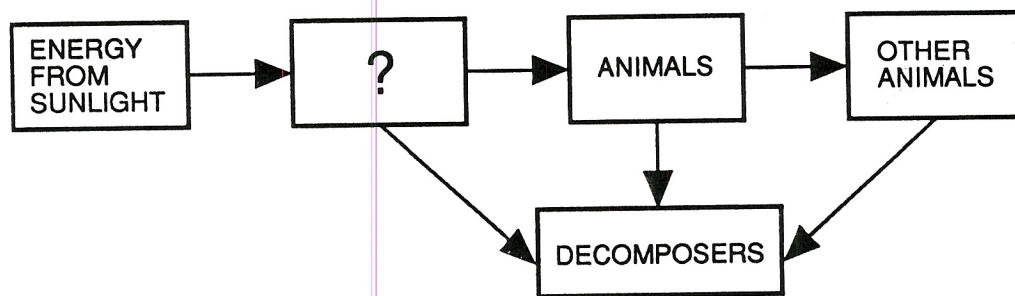
4 Which organisms are producers?

- (1) fungi
- (2) raccoons
- (3) grasshoppers
- (4) corn plants

5 What would be the most immediate result if the number of deer in a natural community increased significantly?

- (1) The deer would stop reproducing.
- (2) The natural community would remain balanced.
- (3) The deer would have more difficulty getting enough food.
- (4) More grasses would grow to feed the deer.

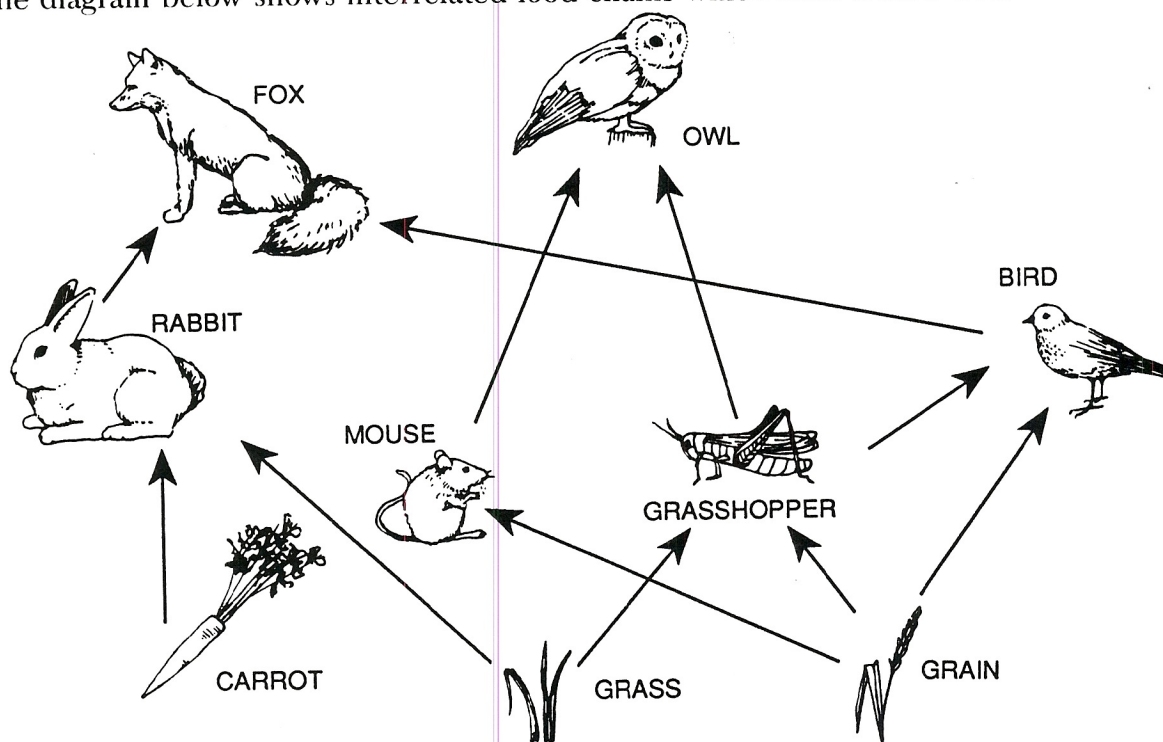
6 The model below shows energy movement through an ecosystem.



Which form of living thing best completes the model?

- (1) consumers
- (2) bacteria
- (3) fungi
- (4) green plants

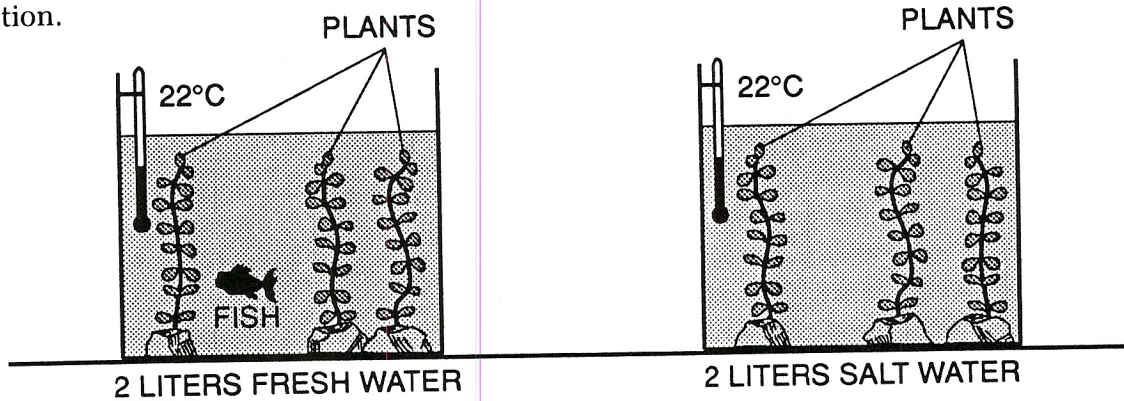
7 The diagram below shows interrelated food chains which form a food web.



How many consumers are shown in the food web?

- (1) 1
- (2) 6
- (3) 3
- (4) 9

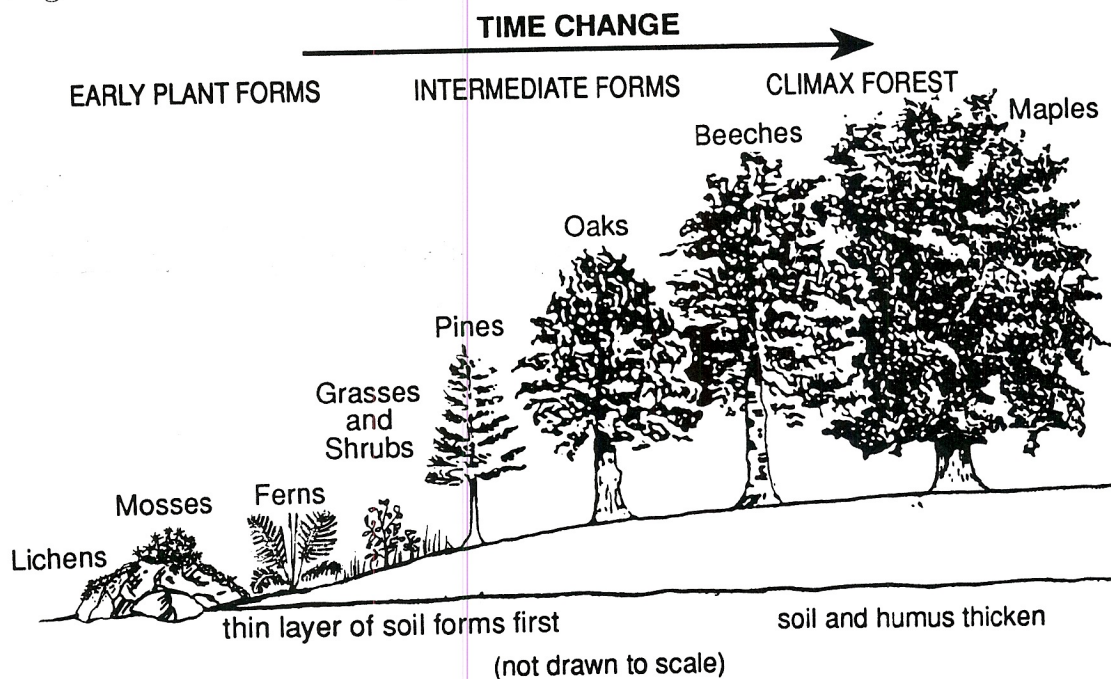
- 8 A student wants to find out if a kind of plant can survive in both fresh water and salt water. The student sets up the activity shown below to investigate this question.



What mistake was made in setting up this investigation?

- (1) Both tanks are at 22° Celsius.
- (2) Both tanks contain 2 liters of water.
- (3) Only one tank has a fish in it.
- (4) Some plants are in fresh water and some plants are in salt water.

- 9 The diagram below shows development of a mature forest.



According to the diagram, lichens and mosses living on bare rock will first be replaced by

- (1) beeches and maples
- (2) pines and beeches
- (3) shrubs and pines
- (4) ferns and grasses

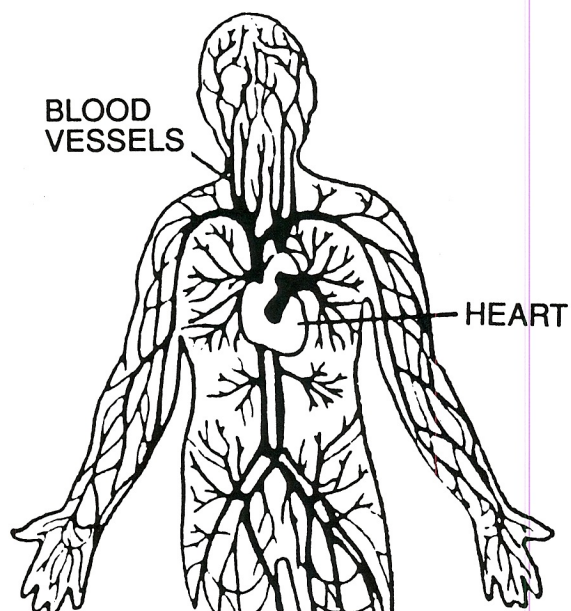
10 Which human activity most seriously disturbs the balance of an ecosystem?

- (1) clearing land for new construction
- (2) protecting endangered species
- (3) studying the relationships between animal populations
- (4) creating new laws to protect wetland communities

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

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

11 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

13 Which term best completes the statement below?

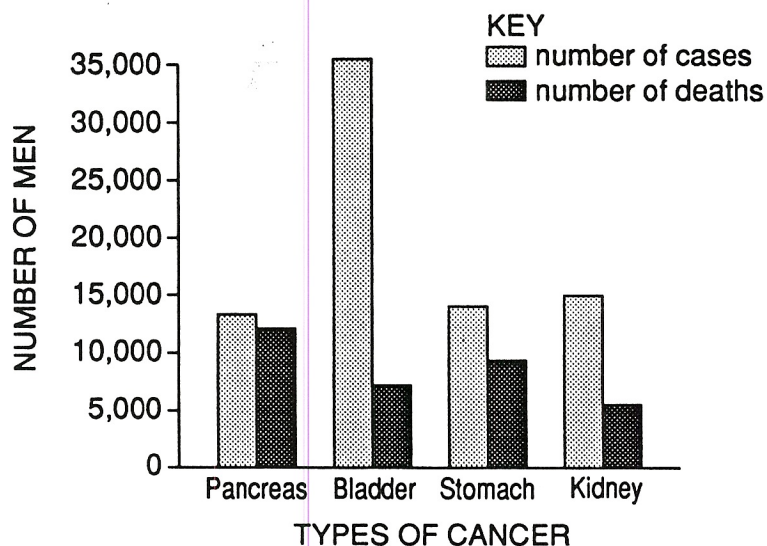
Female is to ovaries as male is to

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

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

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

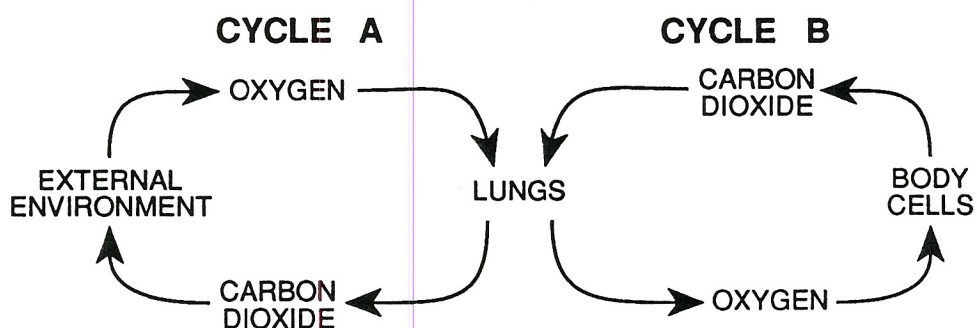
- 15 The graph below shows the number of cases of some kinds of cancer in men and the number of deaths from that type of cancer.



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

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

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



The arrows of cycle B represent

- (1) blood
- (2) muscle
- (3) bone
- (4) glands

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

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

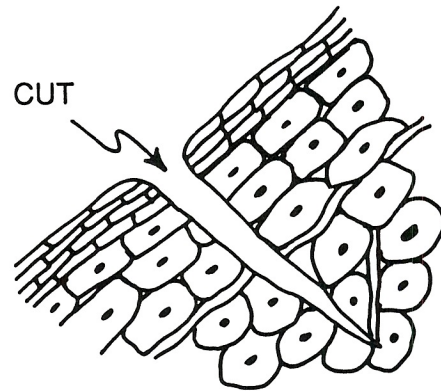
18 Certain microorganisms live on the roots of plants and provide nutrients for those plants. This situation shows how microorganisms can be

- (1) harmful to the environment
- (2) controlled with chemicals
- (3) beneficial to other organisms
- (4) nonrenewable resources

19 The simplest structure that is able to respond to stimuli and carry on respiration is

- (1) a cell
- (2) a tissue
- (3) an organ
- (4) a system

20 The diagram below shows a magnified portion of human skin that has been cut.




What process is responsible for repairing the damage to the skin?

- (1) liquid blood sterilizing the wound
- (2) cell division creating new cells
- (3) fat cells being deposited in the wound
- (4) the liver sending new skin cells to the wound

21 Many infectious diseases are caused by

- (1) heredity
- (2) microorganisms
- (3) deficiencies in diet
- (4) cold temperatures

- 22 The chart below shows Moh's scale of hardness for minerals.

Moh's Scale of Hardness	
<p>SOFTEST MINERAL</p>  <p>HARDEST MINERAL</p>	Talc
	Gypsum
	Calcite
	Fluorite
	Apatite
	Orthoclase
	Quartz
	Topaz
	Corundum
	Diamond

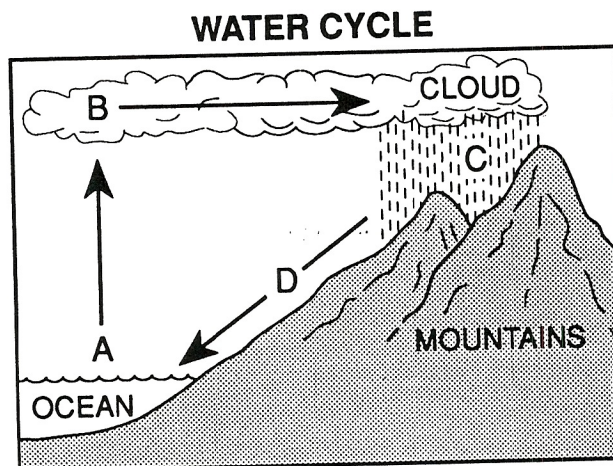
According to the chart, which minerals can be scratched by calcite?

- (1) gypsum and fluorite
- (2) apatite and orthoclase
- (3) talc and gypsum
- (4) corundum and diamond

- 23 As weathering and erosion processes have acted on the Appalachian Mountains over a long period of time, the mountains have become

- (1) covered with fossils
- (2) active volcanoes
- (3) higher, steeper mountains
- (4) lower mountains

- 24 The diagram below shows processes that are part of the water cycle.



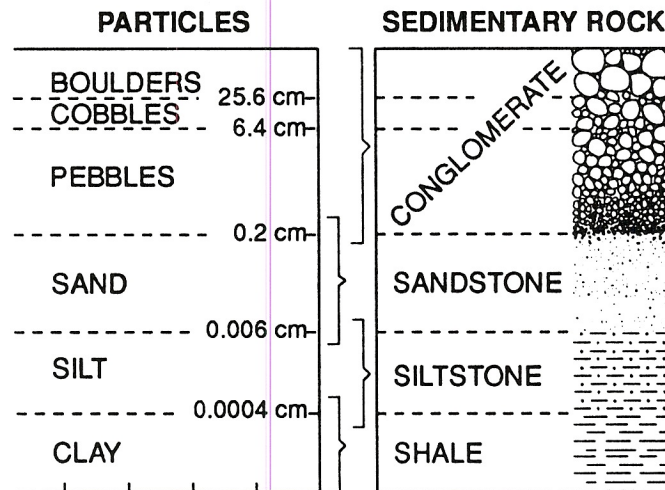
Which processes are most directly affected by the force of gravitational attraction?

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

- 25 The weathering of bedrock produces

- (1) rock fragments and soil particles
- (2) snow and glaciers
- (3) erupting volcanoes and lava flows
- (4) clouds and rain

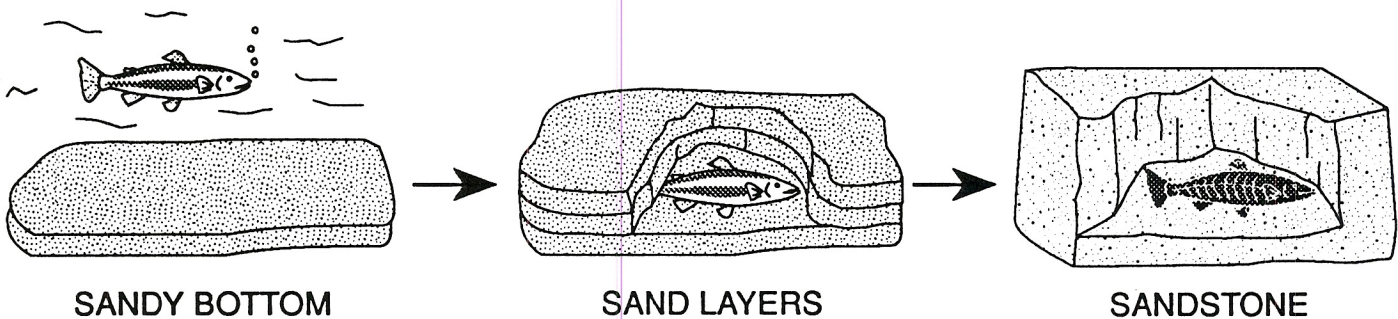
- 26 The diagram below shows four types of sedimentary rocks and the size of the particles from which they are made.



Which type of sedimentary rock could be made from particles averaging 10 centimeters in size?

- (1) conglomerate
- (2) sandstone
- (3) siltstone
- (4) shale

- 27 The diagram below represents a process that occurs over a long period of time.



Which process is represented in this diagram?

- (1) condensation
- (2) fossilization
- (3) photosynthesis
- (4) reproduction

28 Which event results in the formation of new rock?

- (1) a volcanic lava flow
- (2) a violent earthquake
- (3) a landslide
- (4) a landfill closing

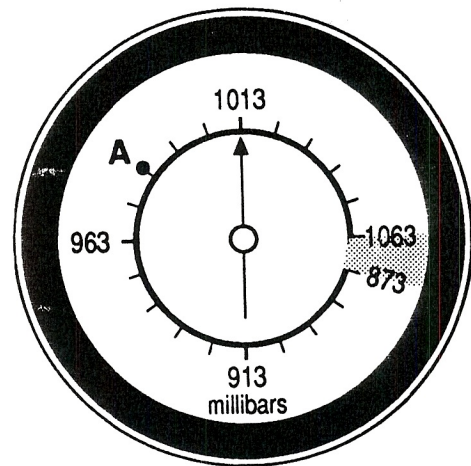
29 Earth's weather is determined mostly by

- (1) air masses
- (2) meteors
- (3) tides
- (4) longitude

30 Winds are caused by differences in

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

31 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

32 An air mass located over the ocean near the state of Florida is likely to be

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

- 33 The windchill chart below shows how cold the air would feel at different temperatures and wind speeds.

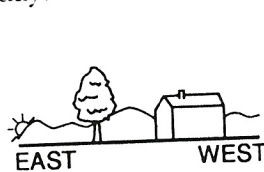
Windchill

		Air Temperature (°F)											
		35	30	25	20	15	10	5	0	-5	-10	-15	-20
Wind Speed (miles per hour)	4	35	30	25	20	15	10	5	0	-5	-10	-15	-20
	5	32	27	22	16	11	6	0	-5	-10	-15	-21	-26
	10	22	18	10	3	-3	-9	-15	-22	-27	-34	-40	-46
	15	16	9	2	-5	-11	-18	-25	-31	-38	-45	-51	-58
	20	12	4	-3	-10	-17	-24	-31	-39	-46	-53	-60	-67
	25	8	1	-7	-15	-22	-29	-36	-44	-51	-59	-66	-74
	30	6	-2	-10	-18	-25	-33	-41	-49	-56	-64	-71	-79
	35	4	-4	-12	-20	-27	-35	-43	-52	-58	-67	-74	-82
	40	3	-5	-13	-21	-29	-37	-45	-53	-60	-69	-76	-84
	45	2	-6	-14	-22	-30	-38	-46	-54	-62	-70	-78	-85

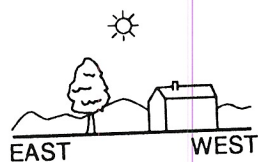
If the actual air temperature is 30°F and the wind speed is 20 mph, the windchill is

- (1) 10°F
- (2) -2°F
- (3) 30°F
- (4) 4°F

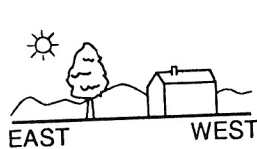
- 34 In which order should the diagrams below be placed to show the position of the Sun as it appears to move across the sky in the Northern Hemisphere during one day?



A



B



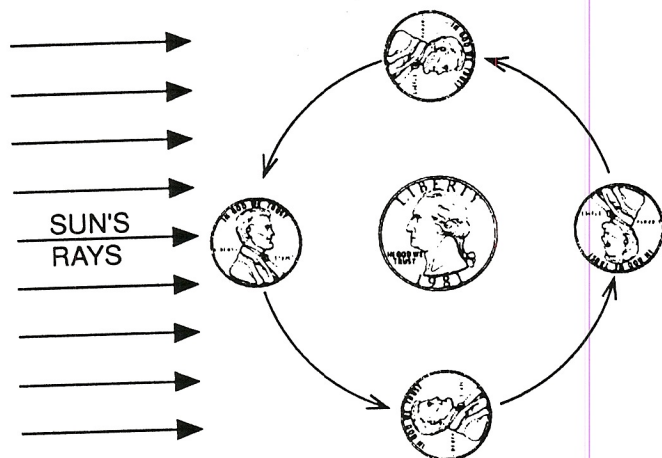
C



D

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

- 35 The diagram below shows coins that a teacher places on a tabletop to model the Moon orbiting Earth.



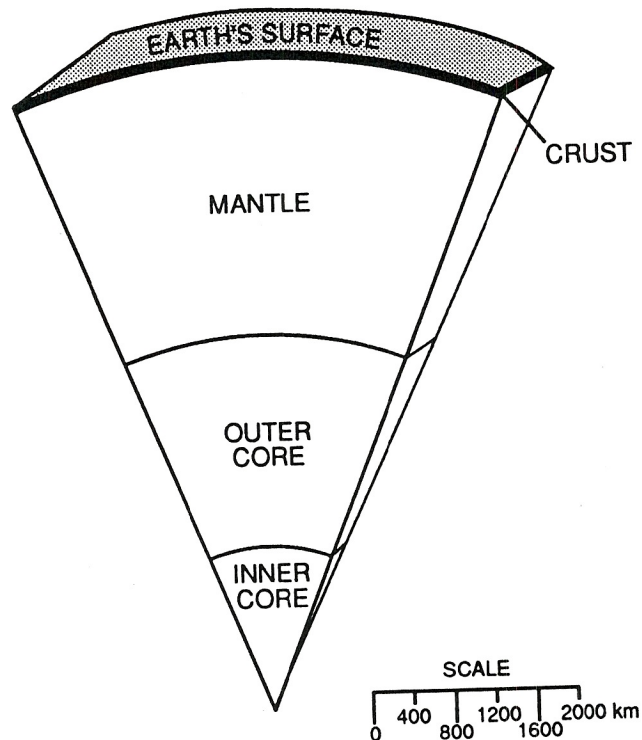
What feature of the Moon is best demonstrated by this coin model?

- (1) The same side of the Moon always faces Earth.
- (2) The distance from the Moon to Earth changes.
- (3) The distance between the Moon and the Sun remains the same.
- (4) The same side of the Moon is always lit by sunlight.

- 36 Tides on Earth are caused by the Moon's and Sun's

- (1) magnetic field
- (2) gravitational attraction
- (3) radiant energy
- (4) nuclear fusion

- 37 The diagram below shows a cross-sectional view of Earth's layers, with a scale for distance.



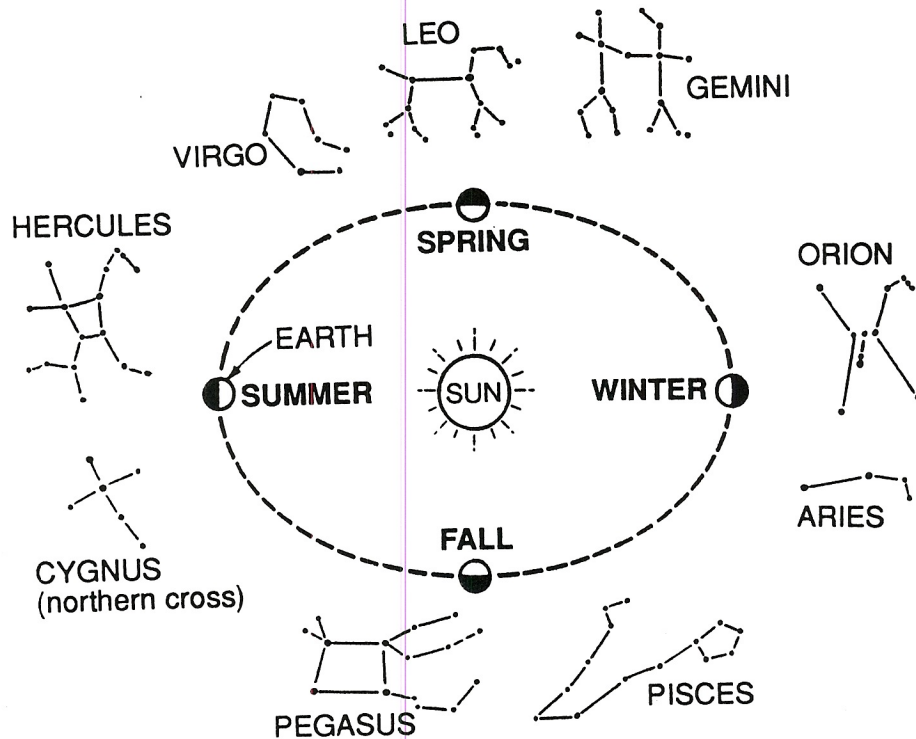
Which layer of Earth is thickest?

- (1) inner core
- (2) outer core
- (3) mantle
- (4) crust

- 38 Which object in the solar system is the largest?

- (1) Earth
- (2) a meteor
- (3) the Moon
- (4) the Sun

- 39 The diagram below shows Earth, the Sun, and star constellations that are visible from Earth's Northern Hemisphere during different seasons of the year.



During which season is the constellation Leo *not* visible from Earth's Northern Hemisphere?

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

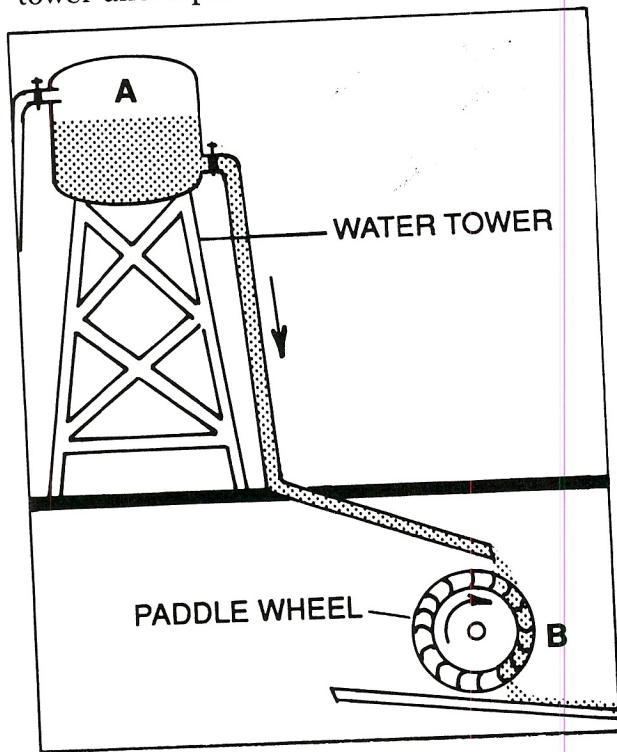
40 Day and night are caused by Earth's

- (1) tilt
- (2) shape
- (3) rotation
- (4) seasons

41 When a piece of wood is sanded, the wood feels hot. The wood's temperature rises because

- (1) heat stored in the wood is released
- (2) friction produces heat
- (3) wood is a good conductor
- (4) sandpaper is a good insulator

- 42 The diagram below shows a water tower and a paddle wheel.



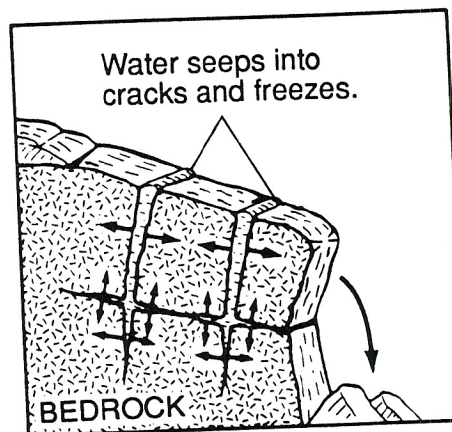
What change in the energy of the water takes place as the water flows from A to B?

- (1) Potential energy at A is changed to kinetic energy at B.
- (2) Kinetic energy at A is changed to potential energy at B.
- (3) Potential energy at B is changed to kinetic energy at A.
- (4) Kinetic energy at B is changed to potential energy at A.

- 43 The efficiency of a machine can be improved most by

- (1) decreasing the size of the machine
- (2) adding more electrical parts to the machine
- (3) using the machine more often
- (4) oiling the machine's moving parts

- 44 In the diagram below, water is freezing in the cracks of a section of bedrock.



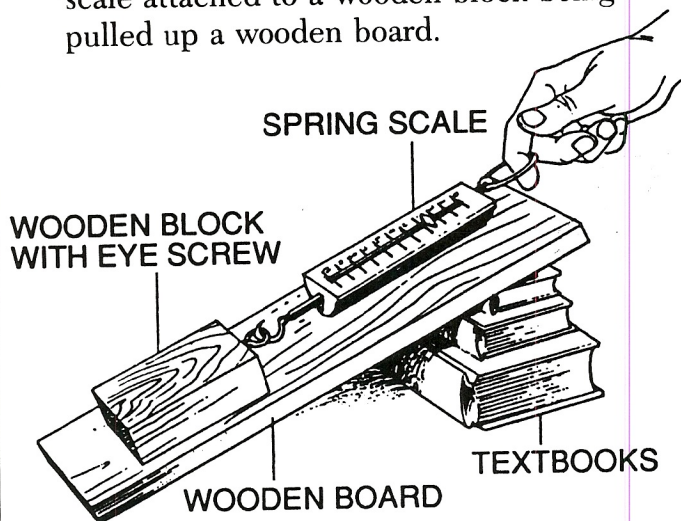
Why is the bedrock undergoing change as shown by the arrows?

- (1) Water is expanding as it freezes and splits the bedrock.
- (2) Water is absorbing heat from the bedrock as it freezes, causing the bedrock to split.
- (3) Water is holding the rock pieces together like a glue.
- (4) Bedrock is changing into water as gravity pulls down on it.

- 45 Electricity flows most easily through

- (1) rubber
- (2) plastic
- (3) metal
- (4) wood

- 46 The diagram below shows a spring scale attached to a wooden block being pulled up a wooden board.



What is being measured by the spring scale in the diagram?

- (1) force
- (2) angle of incline
- (3) volume
- (4) temperature

- 47 A weather observer recorded the length of time between lightning flashes and the arrival time of the sound of thunder.

Lightning Flashes	Time Before Sound of Thunder
1st	18.0 seconds
2nd	16.5 seconds
3rd	5.2 seconds
4th	7.0 seconds

Which lightning flash occurred closest to the weather observer's position?

- (1) 1st
- (2) 2nd
- (3) 3rd
- (4) 4th

- 48 The chart below shows the reflecting ability of paper of different colors.

REFLECTING ABILITY OF PAPER

Color of Paper	Percentage of Light Reflected
white	85%
ivory	67%
bright yellow	50–70%
dark red	14%
dark green	9%
dark blue	8%
flat black	2–4%

What color paper most closely matches the reflecting ability of a mirror?

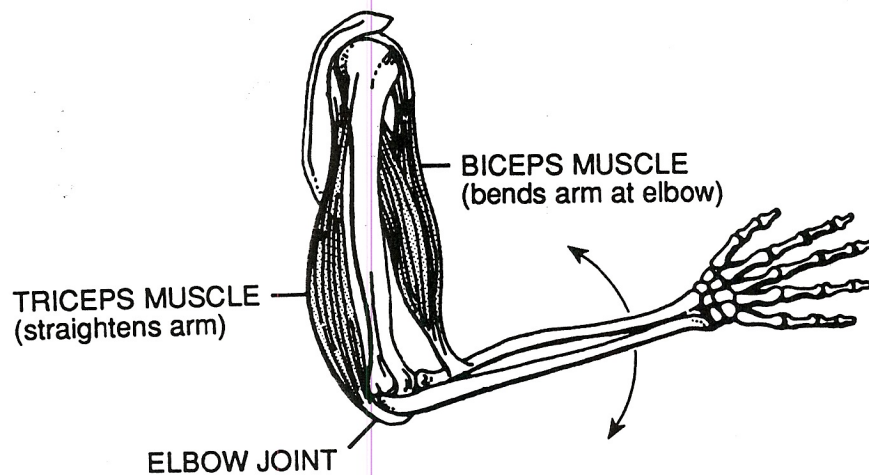
- (1) flat black
- (2) bright yellow
- (3) dark red
- (4) white

- 49 Which would be the best title for the list of terms in the box below?

chemical	light
electrical	nuclear
mechanical	heat
sound	

- (1) Electromagnetic Waves
- (2) Forms of Energy
- (3) Energy and Technology
- (4) Energy and Matter

50 The diagram below shows some structures of the human arm.

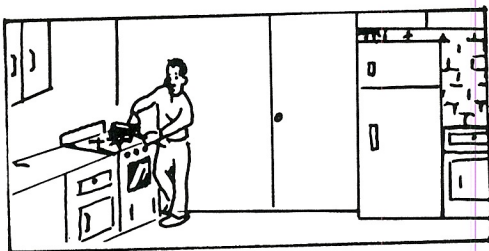


When an arm bends at the elbow, the arm operates most like which simple machine?

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

51 In which situation would a person most likely be exposed to the most electromagnetic waves?

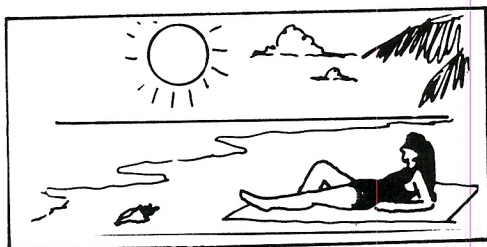
(1)



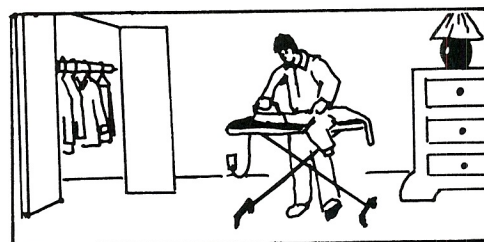
(3)



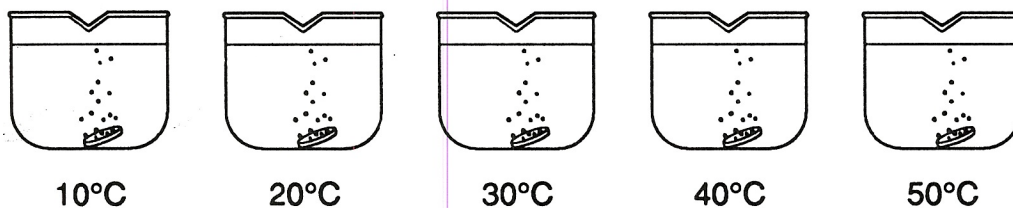
(2)



(4)



- 52 In the investigation represented below, 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.

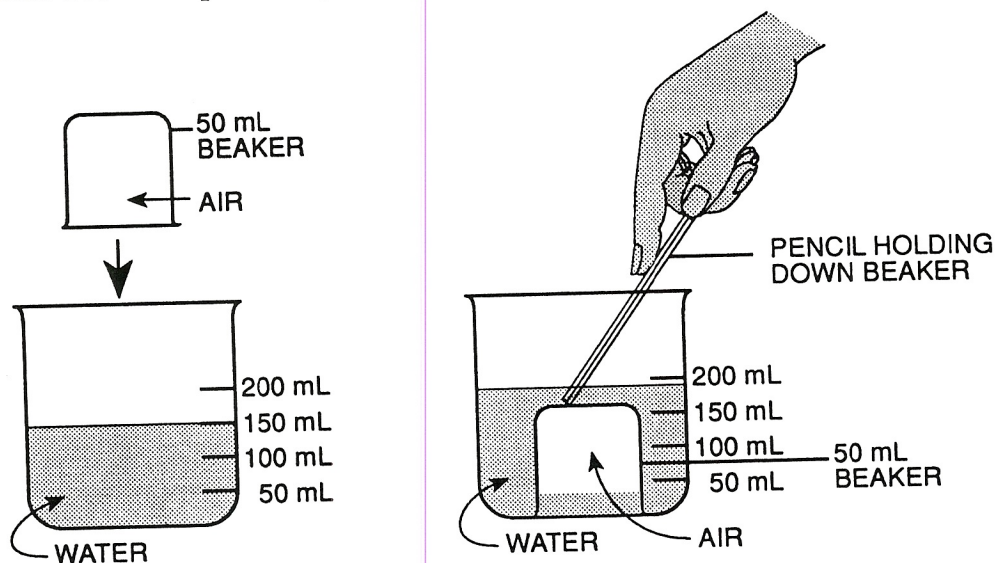


Temperature of Water (°C)	Time to Dissolve (sec)
10	60
20	50
30	42
40	36
50	30

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

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

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



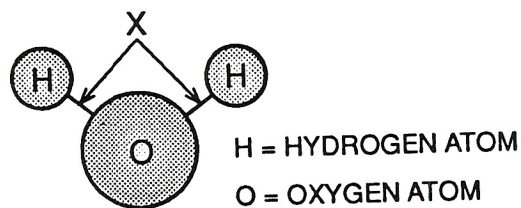
The demonstration suggests that air

- (1) takes up space
- (2) weighs more than water
- (3) is a liquid
- (4) reacts chemically with water

- 54 A student noticed that drops of water appeared on a cold window when she breathed against it. She had just observed

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

- 55 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

- 56 The chart below shows various characteristics of four substances at room temperature.

Characteristic	Substance			
	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 ³

Which statement about these substances 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.

- 57 Which activities would be an example of 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) mowing the lawn and putting the clippings in a trash bag
- (4) putting gas in the car and paying for the gas

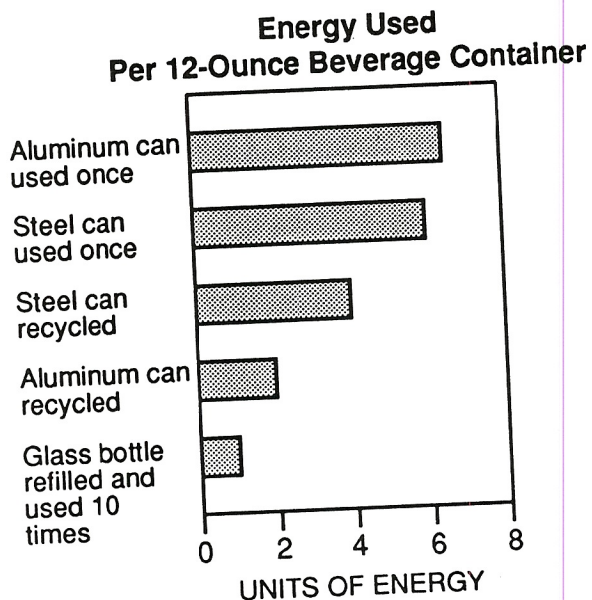
- 58 The picture below shows a hand movement called wafting.



This laboratory safety procedure is used because some chemicals

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

- 59 The graph below compares the amount of energy used to produce different types of standard-size beverage containers.



Which type of container should a soft drink company use to conserve the most energy?

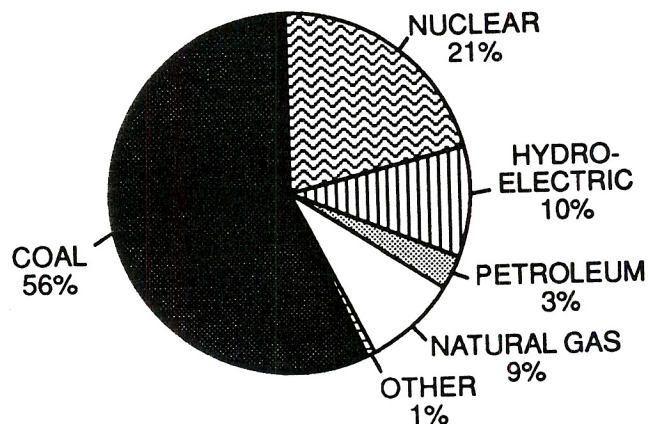
- (1) glass bottles (refillable)
- (2) aluminum cans (recycled)
- (3) aluminum cans (used once)
- (4) steel cans (recycled)

- 60 Which energy resource is a fossil fuel?

- (1) wind
- (2) petroleum
- (3) sunlight
- (4) battery

- 61 The graph below shows the different energy resources used to produce electricity in the United States.

Energy Resources Used to Produce Electricity in the United States



Which of these energy resources produces the *least* electricity?

- (1) natural gas
- (2) nuclear
- (3) coal
- (4) petroleum

- 62 Air currents can be changed into electrical energy by a

- (1) solar cell
- (2) weather vane
- (3) windmill
- (4) propeller on an airplane

- 63 Four electrical appliances and the electrical power they use are listed below.

Appliance	Power (watts)
Dishwasher	2,300
Hair dryer	1,000
Radio	100
Television	300

If each appliance were used for the same period of time, which one would require the most energy?

- (1) dishwasher
- (2) hair dryer
- (3) radio
- (4) television

- 64 Fire-resistant material that was first developed for astronauts' spacesuits is now used to protect firefighters. This information is an example of how a product of technology

- (1) has no real value except for research
- (2) may be adapted to meet other human needs
- (3) creates new problems
- (4) solves only one specific problem

- 65 Which statement is true of all technological devices?

- (1) They use recyclable material.
- (2) They are developed for people with disabilities.
- (3) They have some effect on the environment.
- (4) They eliminate more jobs than they create.

- 66 Which activity is a better example of science than of technology?

- (1) developing a longer lasting light bulb
- (2) baking a cake using cholesterol-free ingredients
- (3) designing a faster train
- (4) examining Mars for signs of life

- 67 Disposable diapers are easy to use because they do not require washing. However, since they are thrown away, the diapers take up space in landfills. According to this information, the use of disposable diapers

- (1) has not affected society in any way
- (2) will be stopped because of its effect on the environment
- (3) will always continue regardless of its disadvantages
- (4) has both benefits and burdens for people and the environment

- 68 The table below lists some advantages and disadvantages of four sources of energy. One energy source has its advantage and disadvantage listed in the wrong columns.

Source of Energy	Advantage	Disadvantage
Fossil fuels	inexpensive	air pollution
Nuclear fuels	no air pollution	dangerous nuclear waste material
Sunlight	solar cells are expensive	renewable energy source
Wind	renewable energy source	cannot be used in all locations

Which energy source has its advantage and disadvantage listed in the wrong columns?

- (1) fossil fuels
- (2) nuclear fuels
- (3) sunlight
- (4) wind

- 69 What does the information in the box below show about technology?

The ozone layer in Earth's atmosphere protects Earth from harmful ultraviolet radiation. The use of certain chemicals in air conditioners and refrigerators has caused serious destruction of the ozone layer.

- (1) Technology always solves problems.
- (2) Technology can capture the Sun's energy.
- (3) Technology can benefit the environment.
- (4) Technology can have a global impact.

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 growth of a fish over a period of time in a classroom aquarium.

Month	Length (cm)
September	4.0
October	6.0
November	7.0
December	8.0
January	10.0
February	11.0

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.

Tear Here

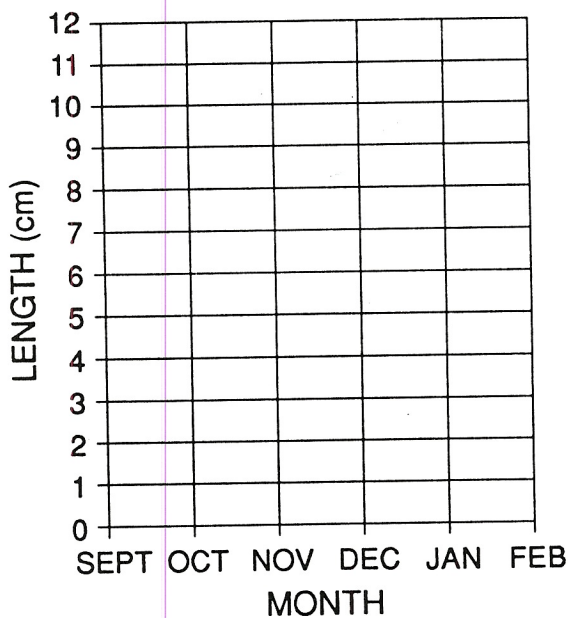
Student _____ Grade _____ Date of Birth _____ Sex: ☐ Male ☐ Female
City _____
School _____ or P.O. _____
Teacher _____ Today's Date _____

REGENTS COMPETENCY TEST

SCIENCE

Wednesday, January 25, 1995 – 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 sheet.