

Longitudinal
Study of
American
Youth

**SEVENTH GRADE
SCIENCE**

Public Opinion Laboratory
Northern Illinois University
DeKalb, Illinois
Fall 1987

INTRODUCTION

This booklet contains questions about science for you to answer. You will be able to answer some of the questions quickly and others will require more thought. Please do not feel discouraged if you are not absolutely sure of an answer. Some questions will ask about things you have covered in class, but others will not. Please do your best to answer each question. If you are not sure of the answer, read the question again, and make your best guess.

MARKING YOUR ANSWERS

Each question is followed by a set of possible answers labeled A, B, C, etc. Read each question carefully, then choose the *one* answer you think is the best, and darken in the letter on your *Answer Sheet* next to the number for that question. Be sure to mark only *one* letter for each question. Do not skip any questions.

The following is an example of a question. Look at the top of your *Answer Sheet* to check your answer.

Example: An apple is a :

- (A) mineral (C) fruit
(B) animal (D) vegetable

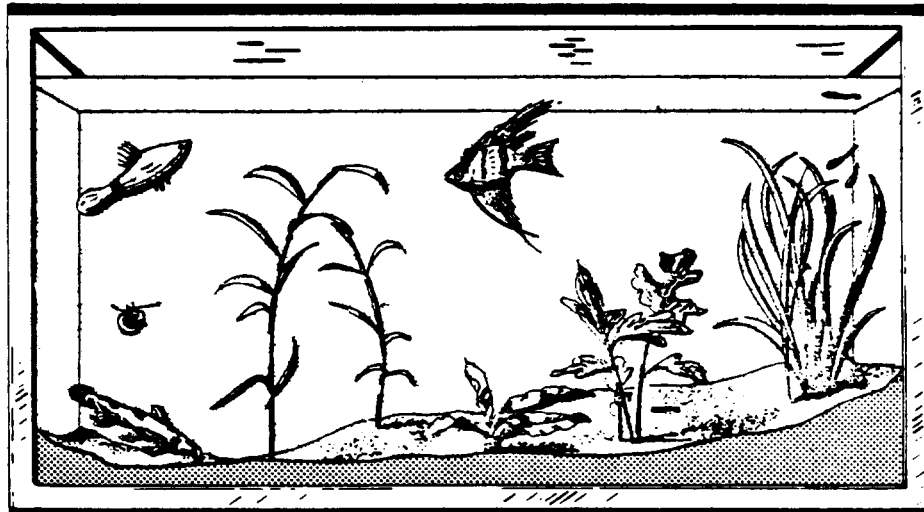
The correct answer is (C). This answer has been blackened in on your *Answer Sheet*, just as you are to do for each question.

Do not make any stray marks on your *Answer Sheet*. Do all of your calculations on the Question Booklet, and use the *Answer Sheet* only to record your answers.

If you have any questions while taking this test, raise your hand, and the person giving the test will come to your seat to help you.

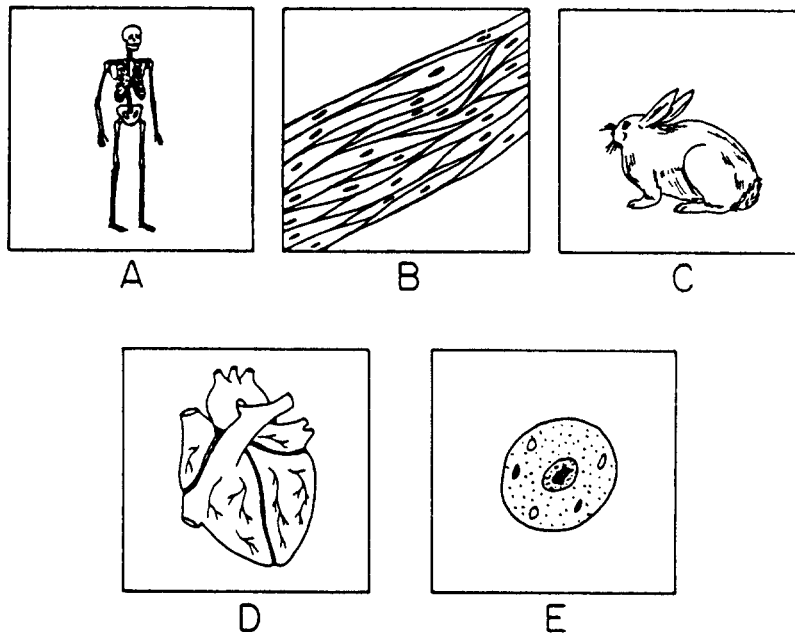
1. Can you see a single atom with an ordinary microscope?
(A) Yes
(B) No
N404803
2. Which of the following animals does NOT lay eggs?
(A) Ostrich
(B) Frog
(C) Mouse
(D) Turtle
N412101
3. Two astronauts walking on the moon are trying to communicate with each other. Which one of the following ways of communicating will *not* work for them?
(A) Ringing a bell
(B) Flashing a light
(C) Using a radio
(D) Waving
N406901
4. As a spaceship approaches the Earth, it begins to get hot and glow. Which of the following best explains why this happens?
(A) The increasing force of gravity causes the spaceship to become hot.
(B) Friction heats the spaceship as it passes through the Earth's atmosphere.
(C) Sunlight reflected from the spaceship's surface heats it.
(D) Electricity in the air heats up the spaceship.
N413101

Some water plants, fish, snails, and other water animals were placed in a sealed aquarium as shown in the picture below.



5. No food, water or air was added to the aquarium for three months. The water level remained the same and the plants, fish, snails, and other water animals continued to live and thrive. What did this prove?
(A) Fish do not require oxygen.
(B) Water plants do not require oxygen.
(C) Snails do not require oxygen.
(D) It did not prove any of these things.
N404601
6. Lasers are used for many purposes. However, a laser would probably NOT be used for which of the following?
(A) Home heating
(B) Eye surgery
(C) Welding
(D) Entertainment
N432101

Look at the pictures below, then answer the question.



7. Which one of the following best shows the order of these pictures from *simplest* to *most complex*?

(A) A B C D E

(D) C A B D E

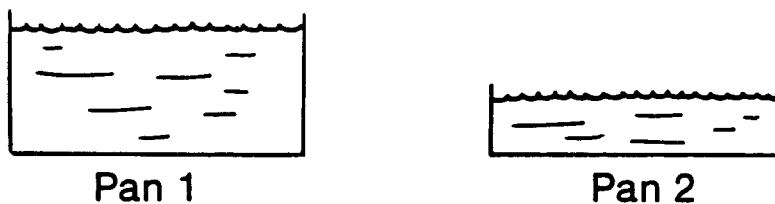
(B) E B D A C

(E) A C E D B

(C) E A D B C

N405801

► **Questions 8-10.** Two flames of the same size were used to heat the two pans of water shown below. Both pans were heated until they reached 90 degrees Celsius.



8. In which pan did the temperature reach 90 degrees first?

(A) Pan 1

(B) Pan 2

(C) Both at the same time

N404901

9. To which pan was the most heat added?

(A) Pan 1

(B) Pan 2

(C) Same amount was added to both

N404902

10. Which pan cooled down the fastest when the flame was turned off?

- (A) Pan 1
- (B) Pan 2
- (C) Both at the same time

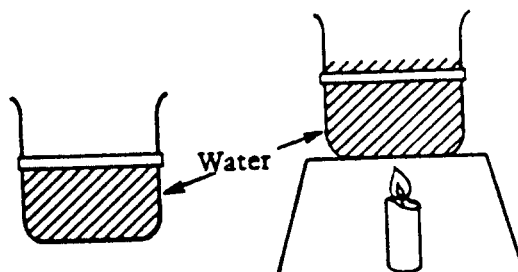
N404903

11. Young caribou (reindeer) are the main source of food for the tundra wolf. The caribou gives birth to its young in the Barren Land north of the Arctic Circle. One year, a severe snow storm struck the Barren Land and killed many of the young caribou.

Which one of the following statements best describes what probably occurred the *next year*?

- (A) There were fewer wolves.
- (B) The caribou moved south to have their young.
- (C) More male caribou were born than females.
- (D) The caribou became extinct.

N405701



12. A rubber band is put around a beaker to mark the level of water in the beaker. The beaker is then placed above a burning candle. After a few minutes the level of water is above the rubber band. What best explains this?

- (A) The water molecules have become bigger.
- (B) The average space between the water molecules has increased.
- (C) Water molecules from the air have condensed into the beaker.
- (D) Many of the water molecules have split, making new gases.

N436107

13. Which of the following is NOT an accurate statement with regard to the drinking of alcoholic beverages?

- (A) Alcohol is a major source of energy for the body.
- (B) Alcohol slows down sensory perception and reflexes.
- (C) Alcoholics are people who are addicted to alcohol.
- (D) Excessive use of alcohol can cause liver disease.

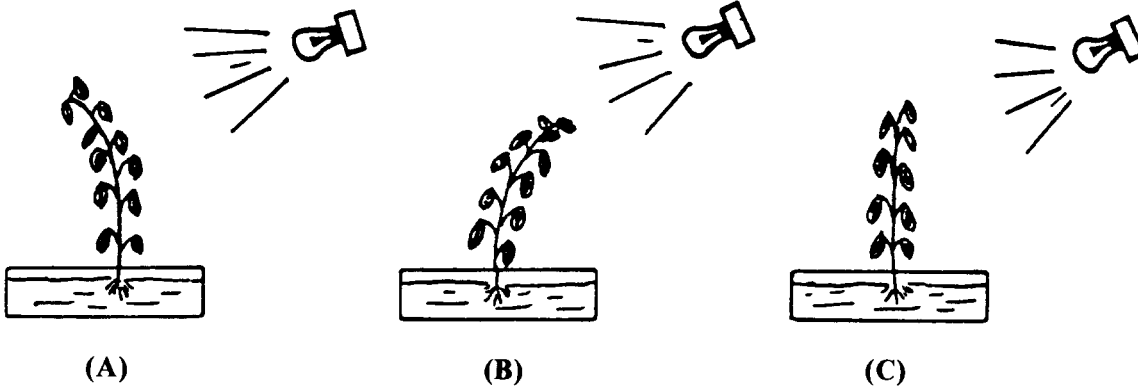
N419201

14. The ores of many metals are sulfides of the metals. In the refining process these ores are "roasted," that is, the sulfur is combined with oxygen, liberating the metal or its oxide (e.g., $\text{CuS} + \text{O}_2 \rightarrow \text{Cu} + \text{SO}_2$). This process is most likely to result in which of the following?

- (A) Acid rain
- (B) Aging of lakes
- (C) Depletion of the ozone layer
- (D) Lead poisoning

N429701

15. A teacher left a plant in a dark classroom during the school's ten day spring break. She placed a light near the plant, and she watered the plant well. When students returned to school after spring break, what do you think the plant looked like?



N401201

16. A teaspoon of salt is dissolved in a quart of water. Which *one* of the following is true?

- (A) The salt can be separated out by filtering the solution through a fine cloth.
 (B) The salt grains can be seen in the solution with a microscope.
 (C) The salt will eventually settle out.
 (D) The salt can be separated out by boiling off the water.

N405301

17. Why can astronauts wearing space suits jump much higher on the Moon than on the Earth?

- (A) The pull of gravity on the Moon is much less than it is on the Earth.
 (B) There is no air on the Moon.
 (C) Their spacesuits help them to jump farther.
 (D) The Moon has less magnetism than the Earth has.

N413001

18. Which of the following statements correctly describes one of the connections between science and technology today?

- (A) Technological progress requires little input from science.
 (B) Technology involves the practical applications of scientific knowledge.
 (C) Workers in science use the laws and principles discovered by workers in technology.
 (D) Technology is the part of science that deals with mechanical problems.

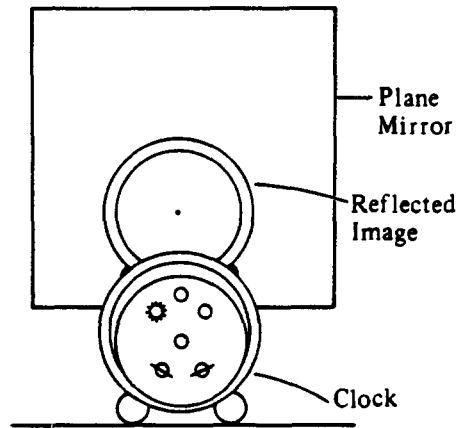
N425201

19. Why are environmental-protection groups often opposed to the burning of coal to produce electricity?

- (A) Power plants using coal require a great deal of space.
 (B) Coal is in limited supply.
 (C) The burning of coal releases pollutants into the air.
 (D) Coal is more expensive to burn than wood.

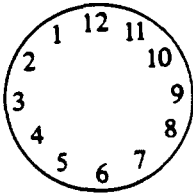
N435201

20. What happens to the sulfur dioxide released by a factory's smokestacks?
- (A) The sulfur dioxide stays in the air forever.
 - (B) The sulfur dioxide immediately falls to earth as dust.
 - (C) The sulfur dioxide eventually falls to earth as acid rain.
 - (D) The sulfur dioxide escapes from the atmosphere into space. N405501
21. What is the most important advantage resulting from the orbiting space telescope?
- (A) It is closer to the stars than are telescopes on the Earth's surface.
 - (B) It can remain stationary in space, thus focusing on a single object for a longer time.
 - (C) It is not affected by distortions caused when light passes through the Earth's atmosphere.
 - (D) It remains at a more constant temperature because of its position in space. N417401
- **Questions 22-27.** Can each of the following statements be used to describe weather?
22. The wind speed is 15 miles per hour. (A) Yes (B) No N406801
23. Sunrise occurred at 7:45 A.M. (A) Yes (B) No N406802
24. The rainfall yesterday was 2 inches. (A) Yes (B) No N406803
25. The air is very dry today. (A) Yes (B) No N406804
26. Today is the first day of spring. (A) Yes (B) No N406805
27. The average yearly temperature is 15 degrees Celsius. (A) Yes (B) No N406806
-
28. To which of the following animals is the wolf most closely related?
- (A) Buffalo (D) Rabbit
 - (B) Deer (E) Sheep
 - (C) Dog N404501
29. Animal bones, seashells, and a certain mineral, all found in shallow ocean water, combine to form the rock limestone. Limestone is found in the state of Ohio. What would this information lead scientists to conclude about Ohio?
- (A) Ohio is a good area for geologists.
 - (B) An unusual number of animals died in Ohio in the past.
 - (C) Part of Ohio was probably once covered by an ocean.
 - (D) Many fish live in Ohio. N416401
30. If a stone is a diamond, it can scratch glass. Stone B can scratch glass. Which of the following statements about stone B is true?
- (A) It is a diamond.
 - (B) It is not a diamond.
 - (C) There isn't enough information to tell whether or not it is a diamond. N413301

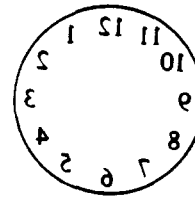


31. A clock is placed in front of an ordinary mirror, as shown above. How would the numbers on the face of the clock appear in the mirror?

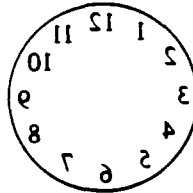
(A)



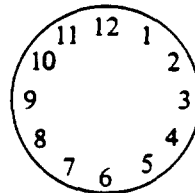
(C)



(B)



(D)



N412701

32. Due to the expansion of our universe, the wavelengths of the light from the most distant stars are shifted to longer wavelengths. A combination of which two of the following instruments could be used to measure this property of the distant stars?

- I. Telescope
- II. Microscope
- III. Spectrometer
- IV. Thermometer

(A) I and II

(C) II and III

(B) I and III

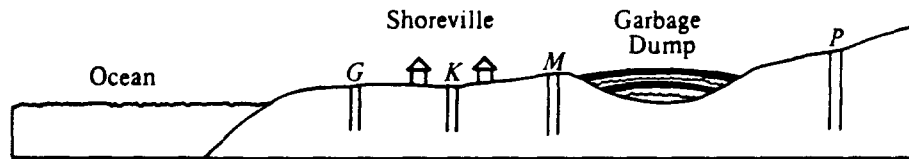
(D) III and IV

N418001

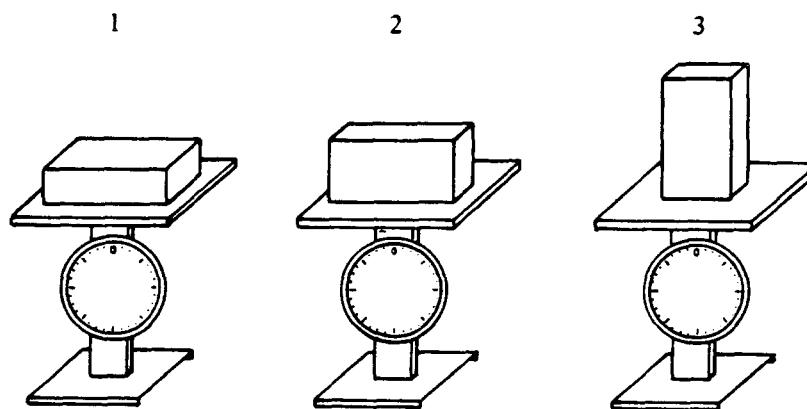
33. A weather report will often have statements like "There is a 20% chance of rain tomorrow." What is meant by this forecast?

- (A) In the past, when conditions were similar, it rained the next day about 20% of the time.
- (B) It will rain 20% of the time during the day.
- (C) If it rains tomorrow, we are likely to have about 20/100 inches of rain.
- (D) Weathermen are right about 20% of the time in making such forecasts.
- (E) It will rain over 20% of a given region, for example, a city or a county.

N409501

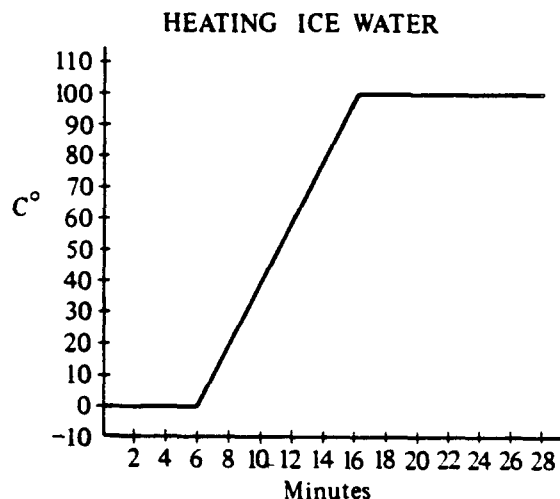


34. The city of Shoreville is considering drilling a well as a source of drinking water at locations *G*, *K*, *M*, or *P*, shown above. Which of the well sites would be the best choice for the benefit of the community?
- (A) Location *P*, because there is less chance of contamination and therefore it would be safer.
 (B) Location *K*, because it is closer to Shoreville and therefore waterlines would be cheaper to construct.
 (C) Location *G*, because there would be more water and it would serve more people.
 (D) Location *M*, because buying the land would be easier and less expensive.
- N417901
35. The Pacific Ocean is surrounded by a large belt of mountain ranges and volcanoes. Which natural events are most closely associated with these landforms?
- (A) Hurricanes
 (B) Tornadoes
 (C) Sandstorms
 (D) Earthquakes
- N420401

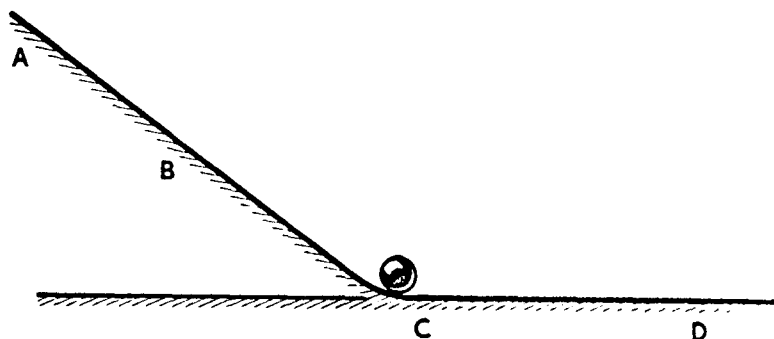


36. A brick can be set on a scale in three different positions, as shown above. In which position will the brick weigh the most?
- (A) 1
 (B) 2
 (C) 3
 (D) The brick will weigh the same in all three positions.
- N434401
37. Recently, some forests were cleared in the Himalayan Mountains. What could have happened as a result of this clearing?
- (A) Colder weather in the hills
 (B) Less rain on the plains below
 (C) Floods on the plains below
 (D) Snow in the mountains
 (E) Warmer weather in the hills
- N407701
38. Which of the following is NOT an example of a chemical change?
- (A) A log burning
 (B) A nail rusting
 (C) An ice cube melting
 (D) An apple rotting
- N420201

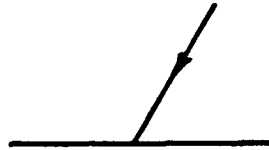
- **Questions 39-40.** A beaker containing crushed ice and water is heated. The temperature of the beaker's contents is recorded every 30 seconds. A graph of the data appears below.



- 39.** Approximately when does active boiling of the contents of the beaker occur?
- (A) From the beginning of the process
 (B) Between 2 and 6 minutes after the heating begins
 (C) Between 6 and 16 minutes after the heating begins
 (D) After approximately 16 minutes of heating
- N418701
- 40.** In the graph the temperature remains constant from 0 to 6 minutes and again after 16 minutes. During these two time periods, the heat energy was used to do which of the following?
- (A) To heat the sides of the beaker
 (B) To remove air molecules from the water
 (C) To expand the distance between the molecules of water
 (D) To change the state of matter in the beaker
- N418702

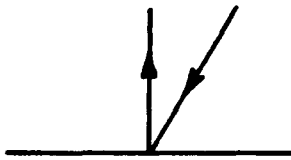


- 41.** A ball rolls down a wooden ramp from A to C and onto a level wooden surface. Which one of the following statements about the speed of the ball at C is sure to be true?
- (A) The speed at C is faster than it will be at D.
 (B) The speed at C is the same as it was at B.
 (C) The speed at C is the same as it will be at D.
 (D) The speed at C is slower than at B.
- N406701

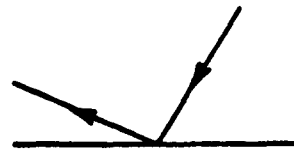


42. A ray of light shines on a mirror at the angle shown above. Which diagram shows what will happen to the light after it strikes the mirror.

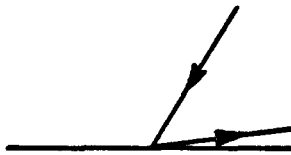
(A)



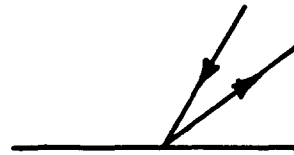
(D)



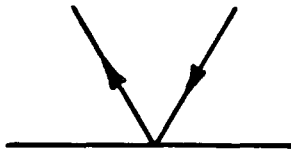
(B)



(E)



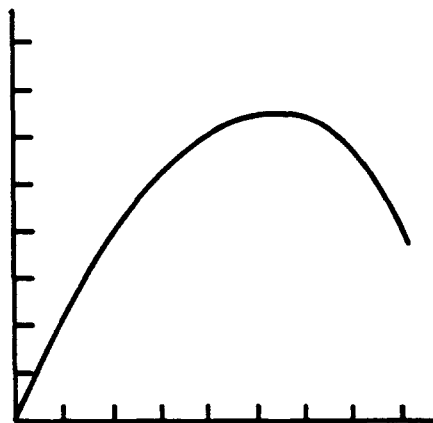
(C)



N407201

43. Which one of the following is the best conclusion you can make from this graph?

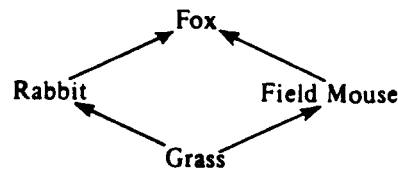
BUSHEL'S OF
CORN PER ACRE



INCHES OF RAINFALL

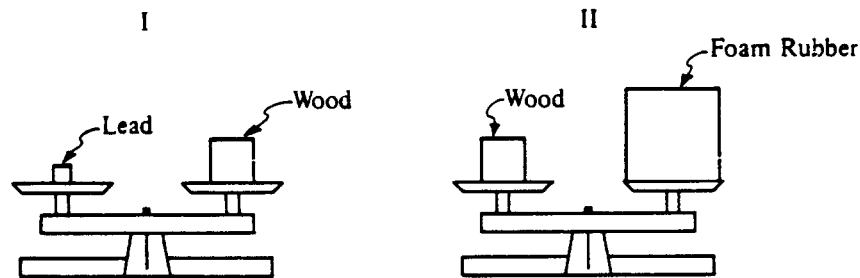
- (A) The more rain there is, the better the corn will grow.
- (B) Corn needs rain to grow, but too much rain is harmful.
- (C) Different kinds of corn need different amounts of rain to grow best.
- (D) Corn can grow well even if there is no rain.

N408801



44. With respect to the field mouse in the food web above, what is the fox considered?
- (A) A predator
(B) A prey
(C) A producer
(D) A decomposer

N418401



45. In Picture I, a piece of lead and a piece of wood are balanced on a scale, and in Picture II the same piece of wood is balanced with a piece of foam rubber. Which of the materials is most dense and which is least dense?
- | Most
Dense | Least
Dense |
|-----------------|----------------|
| (A) Wood | Lead |
| (B) Lead | Foam rubber |
| (C) Foam rubber | Lead |
| (D) Wood | Foam rubber |

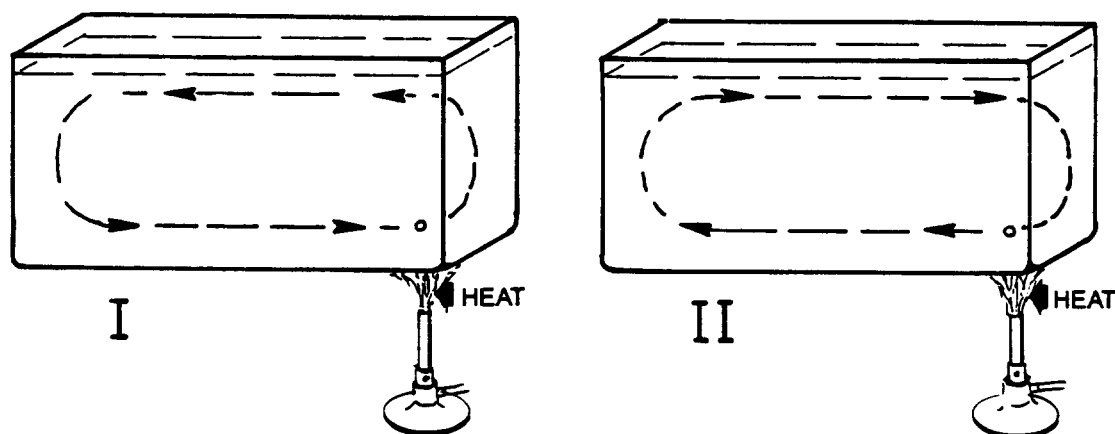
N434901

46. Which of the following best explains why logs can be floated down a river?
- (A) Wood has a lower mean density than water and so will remain only partly submerged in the water.
(B) The buoyant force of the water on the logs is less than the weight of the logs.
(C) River water has a greater density than pure water because river water contains many dissolved minerals.
(D) Logs are not porous and so they cannot absorb any water.

N422301

47. A paper manufacturing company in your area produces large amounts of sulfuric acid as a waste by-product. In spite of efforts to carefully dispose of the waste, some of the acid continually escapes recovery and pollutes a nearby river, affecting wildlife and recreation. The company employs many area residents. Which of the following solutions to help stop the pollution would be preferred by the community?
- (A) Moving the company to a more isolated area and giving the workers the option to move
(B) Adding a substance to the escaping acid to neutralize it
(C) Adding an acid with a higher pH to the escaping acid
(D) Storing the escaping acid in large holding tanks and then taking it to an industrial waste landfill

N429601



48. Imagine a tiny particle of water in a tank being heated as shown. The particle would probably be moving
- (A) as shown in figure I.
 - (B) as shown in figure II.
 - (C) sometimes as shown in figure I and sometimes as shown in figure II.
 - (D) very little or not at all.

N407601

► **Questions 49-52.** Scientific discoveries in one area can often be applied to other areas. Is each of the following an example of this process?

49. Solid state research for small computers was applied in developing better television sets. (A) Yes (B) No
N407401
50. Research for space exploration was applied in developing many new types of medical equipment, such as heart pacemakers. (A) Yes (B) No
N407402
51. Research in developing plastics was applied in developing synthetic blood vessel replacements. (A) Yes (B) No
N407403
52. Laser research was applied in developing a superior method of eye surgery. (A) Yes (B) No
N407404

53. Concern has been expressed about the greenhouse effect of carbon dioxide, CO_2 , on the Earth's atmosphere. The CO_2 allows sunlight to penetrate to the surface but blocks long-wave infrared radiation from escaping to space. If we continue to burn fuels at an increasing rate, all of the following are likely to occur EXCEPT:
- (A) Atmospheric CO_2 will increase.
 - (B) Less heat will be trapped in the atmosphere.
 - (C) Sea levels will rise.
 - (D) The antarctic ice sheet will become smaller.

N437101

54. At the present time, where does most of the energy used in this country come from?
- (A) Nuclear reactors
 - (B) Hot springs
 - (C) Falling water
 - (D) Solar batteries
 - (E) Burning of fuels

N406501

55. The burning of fossil fuels has increased the carbon dioxide content of the atmosphere. What is the most immediate effect that this increasing amount of carbon dioxide is likely to have on our planet?
- (A) A warmer climate
 (B) A cooler climate
 (C) Decreased relative humidity
 (D) Increased relative humidity

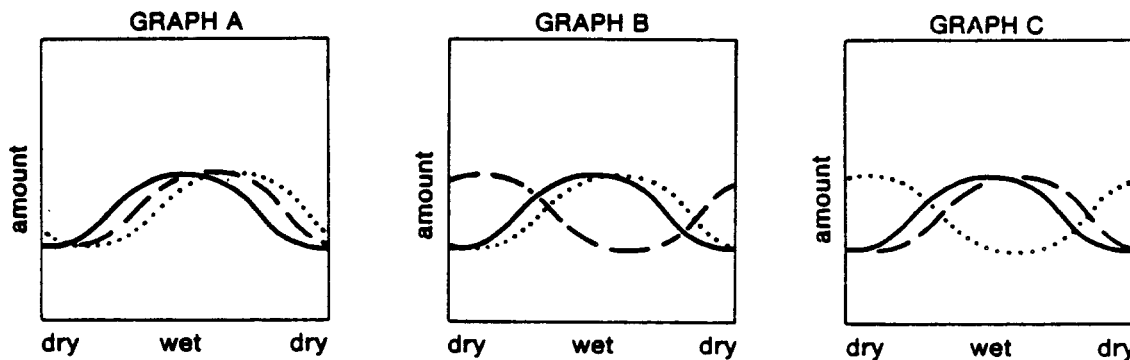
N428401



56. When the Moon, the Earth, and the Sun are in the same line, as shown above, which of the following could occur?
- (A) An eclipse of the Sun could occur.
 (B) An eclipse of the Moon could occur.
 (C) The Moon could be pulled out of its orbit toward the Sun.
 (D) The spin of the Earth could be speeded up.

N414401

57. There are some places in the world where rainfall is seasonal. Several months of rain are followed by a long dry period. In these places, some plants are found only in the rainy season, while others are found only in the dry season. Which one of the graphs below best shows the relationship between the rainfall and the two kinds of plants?



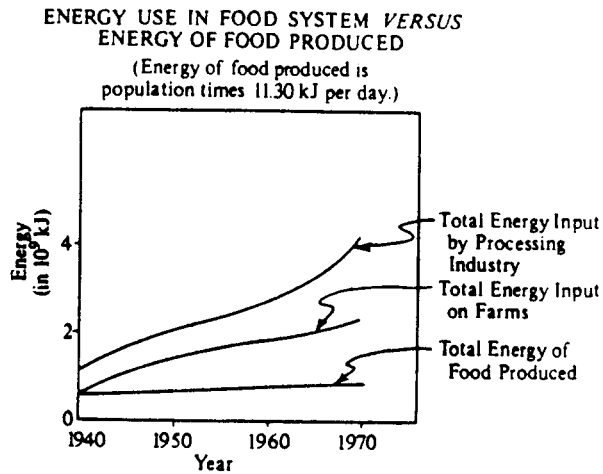
Key: ————— Rainfall
 - - - - - Plants found only in the rainy season
 Plants found only in the dry season

- (A) Graph I
 (B) Graph II
 (C) Graph III

N409601

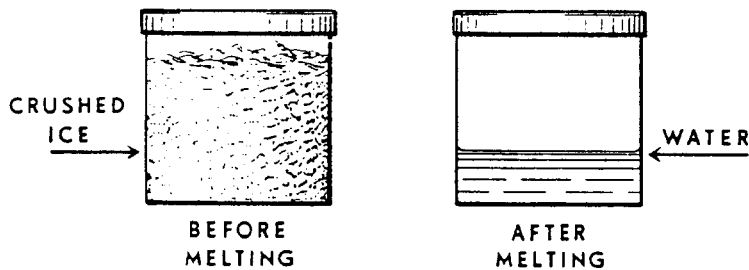
58. The fact that much of the world's oil supply is found under desert areas should lead one to conclude which of the following about what that land once was?
- (A) It was radioactive.
 (B) It was rich in vegetation.
 (C) It was very mountainous.
 (D) It was mined for minerals.

N417701

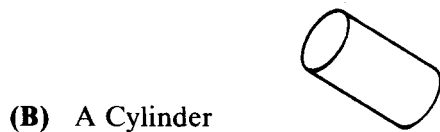
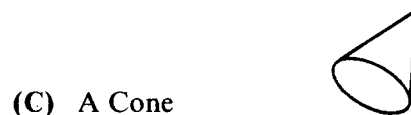
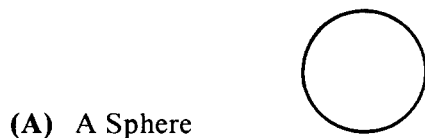


59. According to the graph above, when and where did the largest increase in the amount of energy used for the production of food occur?
- (A) In the processing industry between 1940 and 1950 (C) On the farms between 1940 and 1950
- (B) In the processing industry between 1960 and 1970 (D) On the farms between 1960 and 1970
- N436001

The can below was filled with crushed ice, sealed, and weighed. The ice was melted by slowly warming the can and its contents. No water vapor escaped and no air entered the can.

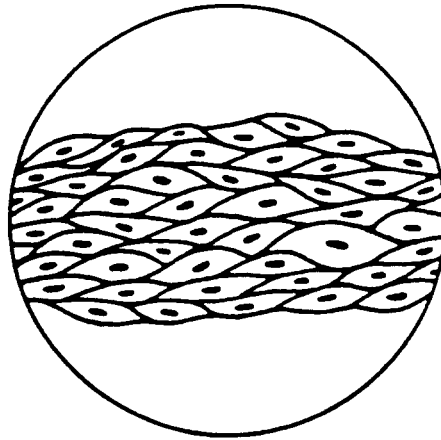


60. The can was then weighed again. Which one of the following results would you expect to find?
- (A) The weight was the same.
 (B) The weight was more.
 (C) The weight was less.
- N405101
61. The shape of the Earth's shadow during an eclipse of the Moon indicates that the shape of the Earth CANNOT be which of the following?



62. Ten plants were placed in sandy soil and ten others were placed in clay soil. Both groups of plants were kept at room temperature, given the same amount of water, and placed in a sunny room. This experiment tests the effect of
- (A) sunlight on plant growth
(B) temperature on plant growth
(C) different soils on plant growth
(D) water on plant growth
- N413401
63. Every year for seventy-eight years it has snowed on a mountain top on January 12. Next year on January 12,
- (A) it will snow for sure.
(B) the chances are very good that it will snow.
(C) the chances are 50-50 that it will snow.
(D) the chances are poor that it will snow on January 12 seventy-nine years in a row.
(E) it will not snow because the odds are against snowing seventy-nine years in a row on January 12.
- N409001
64. The volume of water put into a tank is equal to the rate of flow multiplied by the time it flows. An equation that shows this relationship is
- (A) volume = rate \times time.
(B) rate = volume \times time.
(C) time = rate \times volume.
(D) time = rate/volume.
(E) volume = time/rate.
- N409301

A group of cells looks like this under a microscope.



65. These cells all work together to do the same thing. A group of cells like this is called
- (A) a tissue.
(B) an organism.
(C) an organ.
(D) a system.
- N405001

WHEN YOU HAVE FINISHED

Please check to make sure you have marked *one* answer for each question. When you have checked your answers place your *Answer Sheet* inside the front cover of the test booklet. All of the booklets will be collected at the same time after everyone is finished. Please sit quietly while others are completing their work.

LONGITUDINAL STUDY OF AMERICAN YOUTH
7TH GRADE SCIENCE TEST
FALL 1987

Student's Name _____ EXAMPLE: A B ● D	CORRECT MARK A B C ● E INCORRECT MARKS A B C D E	<ul style="list-style-type: none"> • Use black lead No. 2 pencil. • Make heavy marks the full length of the boxes. • Make only one mark per question. • Erase cleanly any unintended marks.
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PAGE 1

- 1 A B
- 2 A B C D
- 3 A B C D
- 4 A B C D
- 5 A B C D
- 6 A B C D

PAGE 5

- 20 A B C D
- 21 A B C D
- 22 A B
- 23 A B
- 24 A B
- 25 A B
- 26 A B
- 27 A B
- 28 A B C D E
- 29 A B C D
- 30 A B C

PAGE 9

- 42 A B C D E
- 43 A B C D

PAGE 12

- 55 A B C D
- 56 A B C D
- 57 A B C
- 58 A B C D

PAGE 2

- 7 A B C D E
- 8 A B C
- 9 A B C

PAGE 10

- 44 A B C D
- 45 A B C D
- 46 A B C D
- 47 A B C D

PAGE 13

- 59 A B C D
- 60 A B C
- 61 A B C D

PAGE 3

- 10 A B C
- 11 A B C D
- 12 A B C D
- 13 A B C D
- 14 A B C D

PAGE 6

- 31 A B C D
- 32 A B C D
- 33 A B C D E

PAGE 11

- 48 A B C D
- 49 A B
- 50 A B
- 51 A B
- 52 A B
- 53 A B C D
- 54 A B C D E

PAGE 14

- 62 A B C D
- 63 A B C D E
- 64 A B C D E
- 65 A B C D

PAGE 4

- 15 A B C
- 16 A B C D
- 17 A B C D
- 18 A B C D
- 19 A B C D

PAGE 7

- 34 A B C D
- 35 A B C D
- 36 A B C D
- 37 A B C D E
- 38 A B C D

PAGE 8

- 39 A B C D
- 40 A B C D
- 41 A B C D

FOR LSAY USE ONLY					
0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9