

Longitudinal Study of American Youth

SCIENCE

Form (A)

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

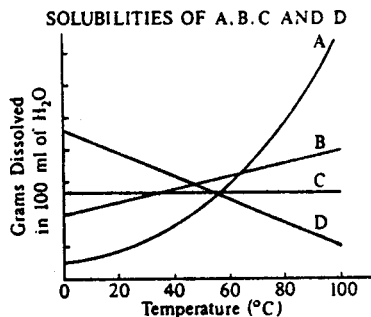
Each question is followed by a set of possible answers labeled A, B, C, etc. Read each question carefully, then choose the *one* answer you think is the best, and darken in the letter on your *Answer Sheet* next to the number for that question. Be sure to mark only *one* letter for each question. Do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

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.

Social Science Research Institute

Northern Illinois University DeKalb, Illinois 60115



1. According to the graph above, which of the chemicals is most soluble in water at 90°C?

- (A) A (B) B (C) C (D) D

N427501

2. Can you see a single atom with the unaided eye?

- (A) Yes (B) No

N404801

3. Can you see a single atom with a magnifying glass?

- (A) Yes (B) No

N404802

4. In which of the following states of matter are the molecules generally most tightly packed?

- (A) Solid (B) Liquid (C) Gas

N419801

5. 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

6. Polaris, the North Star, will appear most directly overhead to an observer at which of the following places in the Northern Hemisphere?

- (A) Near the equator (C) In Seattle
 (B) In Miami (D) Near the North Pole

N420601

7. Our solar system contains all of the following EXCEPT

- (A) Earth.
- (B) Mars.
- (C) the Sun.
- (D) the Moon.
- (E) the North Star.

N406601

8. 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

9. 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

10. 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
- (B) I and III
- (C) II and III
- (D) III and IV

N418001

11. To which of the following animals is the wolf most closely related?

- (A) Buffalo
 (B) Deer
 (C) Dog
 (D) Rabbit
 (E) Sheep

N404501

► Questions 12-13. In two different places in a museum of natural history, you may find the following combinations.

Place 1: Aspen trees, beaver, blue jays and deer

Place 2: Rattlesnakes, alligators and turtles

12. The things in Place 1 are probably grouped together because

- (A) they are found in the same area in nature.
 (B) people enjoy looking at them.
 (C) they were collected at about the same time.
 (D) they were all alive once.

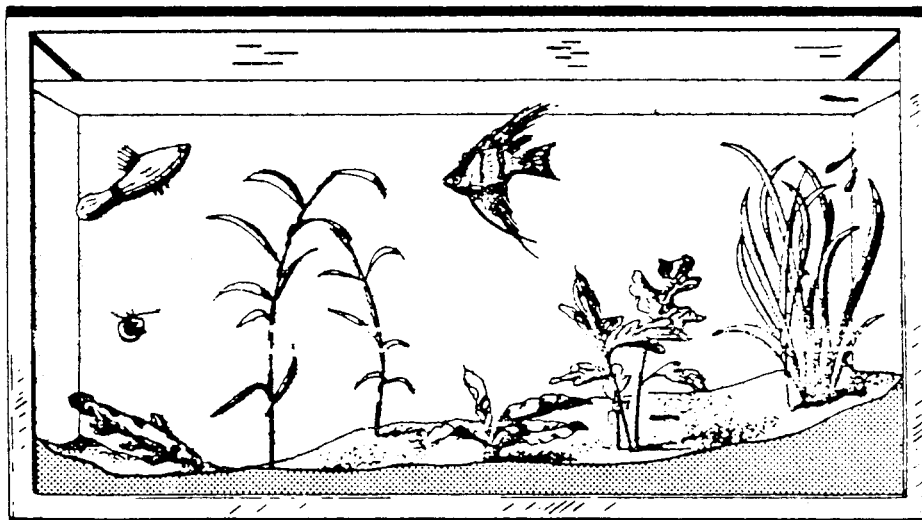
N404701

13. The things in Place 2 are probably grouped together because

- (A) they are found in the same area in nature.
 (B) people enjoy looking at them.
 (C) they have similar characteristics.
 (D) they eat the same kinds of food.

N404702

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



14. 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?

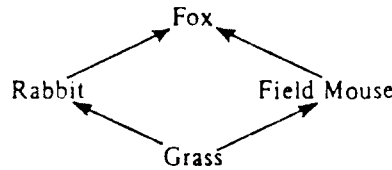
- (A) Fish do not require oxygen.
 (B) Water plants do not require oxygen.
 (C) Snails do not require oxygen.
 (D) It did not prove any of these things.

N404601

15. Which of the following animals does NOT lay eggs?

- (A) Ostrich
- (B) Frog
- (C) Mouse
- (D) Turtle

N412101

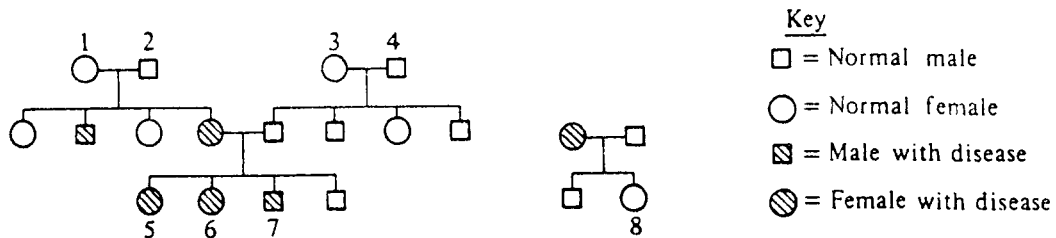


16. With respect to the field mouse in the food web above, what is the fox considered?

- (A) A predator
- (B) A prey
- (C) A producer
- (D) A decomposer

N418401

17. The pedigree chart below shows the occurrence of a hypothetical inherited disease.



If Individual 7 marries Individual 8, what is the chance that any of their children will have the disease?

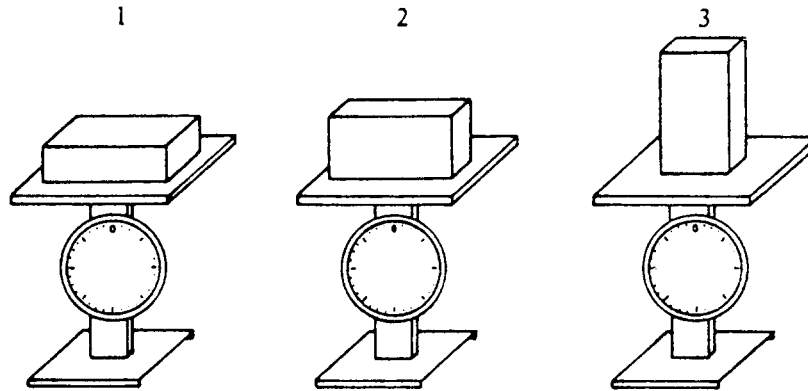
- (A) 0
- (B) 25%
- (C) 50%
- (D) 100%

N430003

18. 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



19. 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

20. If a stone is a diamond, it can scratch glass. Stone A cannot scratch glass. Which of the following statements about stone A 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.

N413201

21. As an experiment, Mary grew some plants in the refrigerator and some plants on the window sill. She watered the ones on the window sill every day. For two days she forgot to water the ones in the refrigerator. The plants on the window sill grew 4 centimeters. The plants in the refrigerator grew 2 centimeters.

Why couldn't Mary say the plants on the window sill grew taller just because they were in a warmer place?

- (A) Because the plants on the window sill got more water than those in the refrigerator
- (B) Because she used the same kinds of plants in each place
- (C) Because she used the same sized pots

N411502

22. Suppose you believe that all blue objects will sink in water. How should you go about testing this idea?

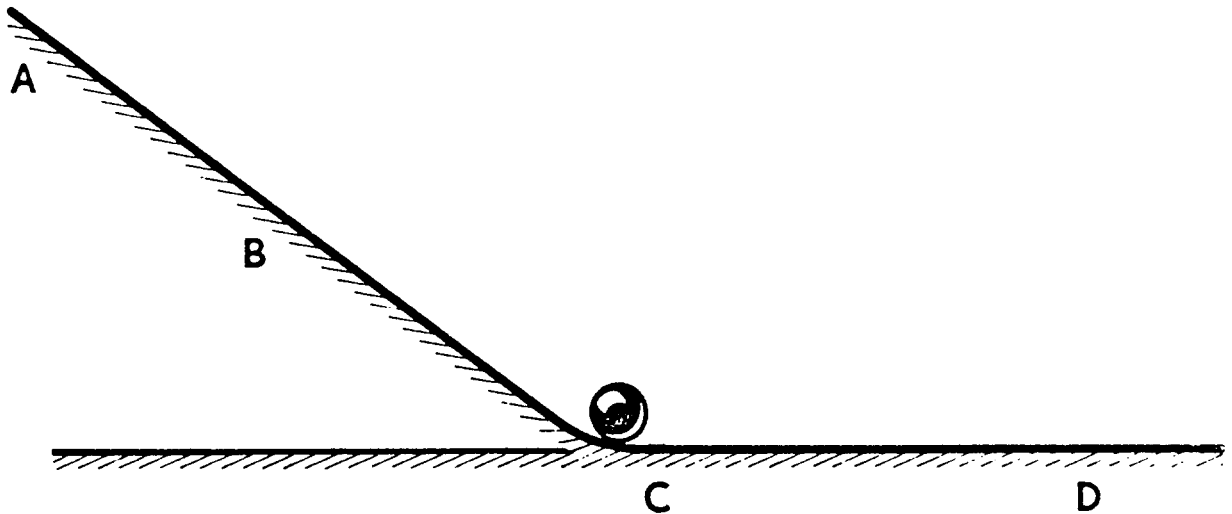
- (A) Look for white objects that float.
- (B) Look for white objects that sink.
- (C) Look for blue objects that sink.
- (D) Look for blue objects that float.

N413701

23. 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



24. 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?

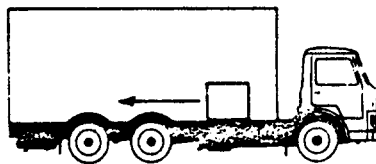
- (A) The speed at C is faster than it will be at D.
(B) The speed at C is the same as it was at B.
(C) The speed at C is the same as it will be at D.
(D) The speed at C is slower than at B.

N406701

25. 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



26. The truck shown above accelerates quickly to the right. If the floor of the trailer is slippery enough so there is little friction, a package inside the truck slides to the back. What does this illustrate?

- (A) Objects at rest remain at rest unless acted on by a force.
(B) Mass can be converted to energy.
(C) All objects have weight.
(D) The total energy of an object always remains the same.

N425001

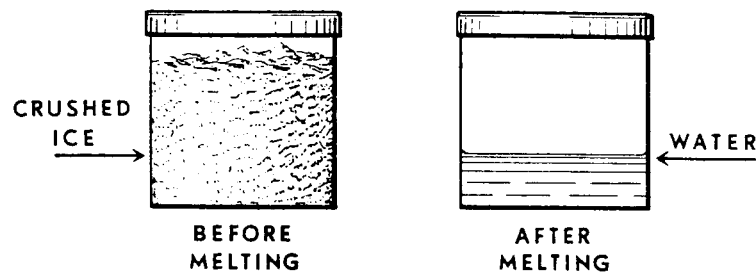
27. Beaker I contains 200 milliliters of water and beaker II contains 400 milliliters of water. Both beakers are initially at 25°C.

If the two beakers are heated at the same constant rate for 2 minutes, how will the temperature of the water in them compare?

- (A) It will be higher in beaker I than in beaker II.
- (B) It will be higher in beaker II than in beaker I.
- (C) It will be the same in both beakers.

N423901

28. 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.



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

29. 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

30. 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

31. 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

32. The shape of the Earth’s shadow during an eclipse of the Moon indicates that the shape of the Earth could be like which of the following?

- (A) A cylinder
- (B) A doughnut
- (C) A pyramid
- (D) A cube

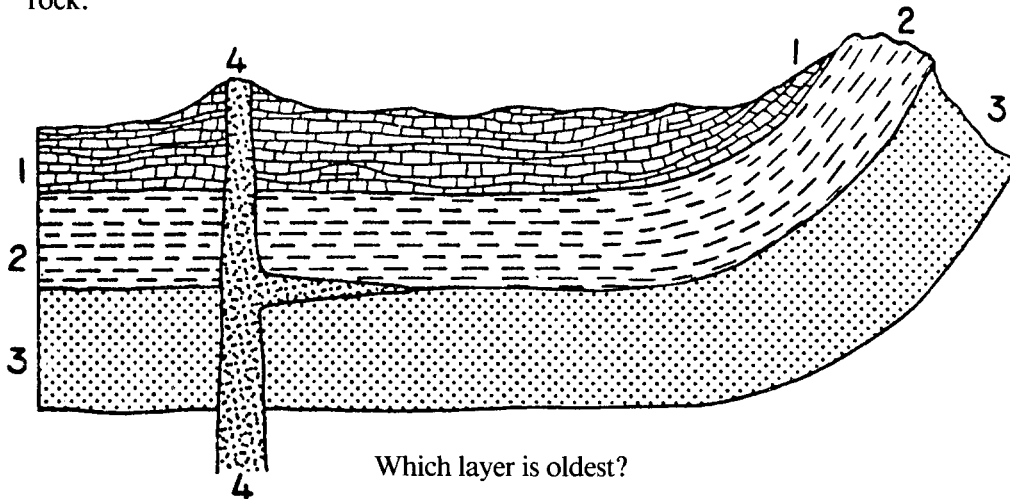
N429201

33. 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

34. This diagram represents a cross-section of one part of the earth’s crust. Layers 1, 2, 3 and 4 are each different kinds of rock.



Which layer is oldest?

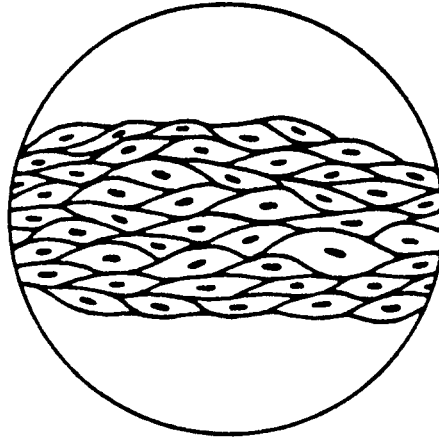
- (A) 1
- (B) 2
- (C) 3
- (D) 4

N407301

35. When the Moon, the Earth, and the Sun are in the same line, as shown below, 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
-
36. 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 (C) Decreased relative humidity
(B) A cooler climate (D) Increased relative humidity N428401
37. 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
38. Concern has been expressed about the greenhouse effect of carbon dioxide, CO₂, on the Earth's atmosphere. The CO₂ 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 CO₂ 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
39. Acid rain is the result of the combination of pollution in the air and precipitation. Environmental action groups are advocating the control of acid rain by what means?
- (A) Prohibiting industrialization wherever crops are grown
(B) Requiring workers to wear protective clothing
(C) Requiring industries to install antipollution filters and other devices
(D) Requiring that new industries locate in areas of low precipitation N424701



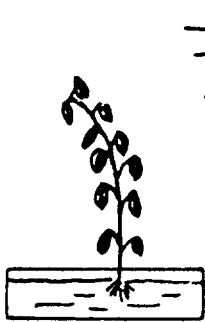
A group of cells looks like this under a microscope.

40. These cells all work together to do the same thing. A group of cells like this is called

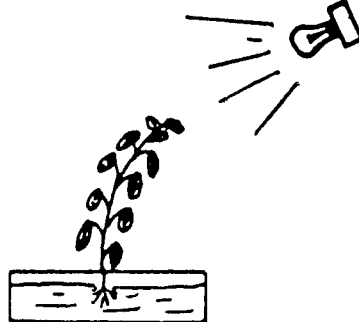
- (A) a tissue. (C) an organ.
 (B) an organism. (D) a system.

N405001

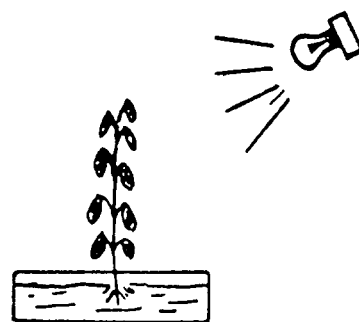
41. A teacher left a plant in a dark classroom during the school's ten day spring break. She placed a light near the plant, and she watered the plant well. When students returned to school after spring break, what do you think the plant looked like?



(A)



(B)



(C)

N401201

42. Which part of the blood carries most of the oxygen to the body?

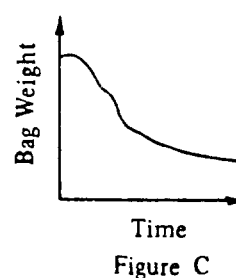
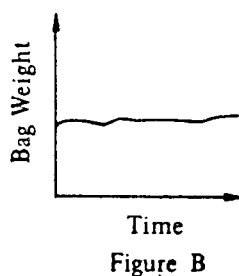
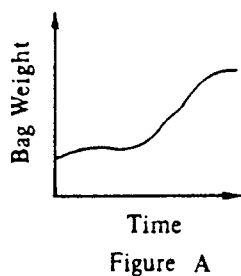
- (A) Plasma (C) Red cells (E) White cells
 (B) Platelets (D) Serum

N405201

43. Half-life is a measure of

- (A) distance. (C) time. (E) color.
 (B) mass. (D) temperature.

N407001



44. The graphs above indicate the gain or loss of weight of a dialysis bag over a period of time. A dialysis bag is made of a semipermeable material. Water moves through the material, but sugar does not.

Which graph represents a state of equilibrium in a dialysis bag?

- (A) Figure A (B) Figure B (C) Figure C

N428102

45. Which of the following best explains why marine algae are most often restricted to the top 100 meters in the ocean?

- (A) They have no roots to anchor them to the ocean floor.
 (B) They are photosynthetic and can live only where there is light.
 (C) The pressure is too great for them to survive below 100 meters.
 (D) The temperature of the top 100 meters of the ocean is ideal for them.

N432901

46. Which of the following best explains why insects or birds that are introduced to a new country often become pests in the new area?

- (A) Their food supply in the new country is unlimited.
 (B) The new country produces beneficial mutations.
 (C) The predators of their former habitat are lacking in the new country.
 (D) Competition among them increases.

N428001

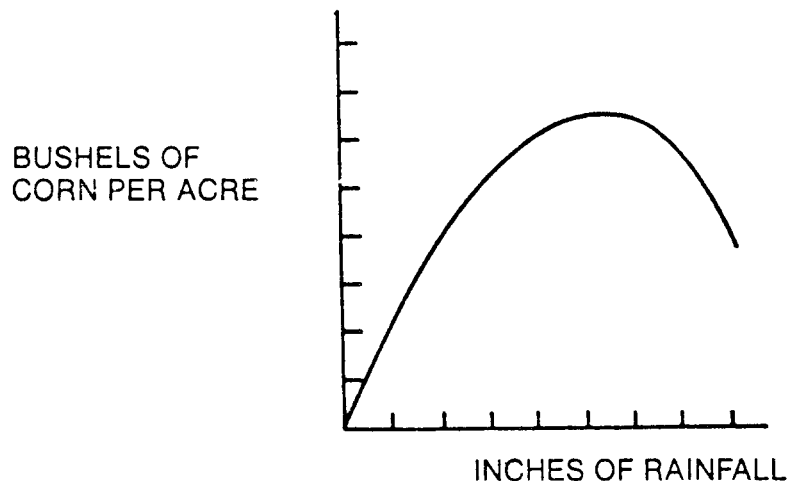
47. One hundred pea seeds were put in Petri dishes and covered with wet paper towels. The dishes were put inside black plastic sacks and carefully divided between two temperature-controlled incubators set to different temperatures.

The experiment was apparently designed to study the effect of which of the following variables on the germination of pea seeds?

- (A) Seed type
(B) Water
(C) Light
(D) Temperature

N431901

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



- (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

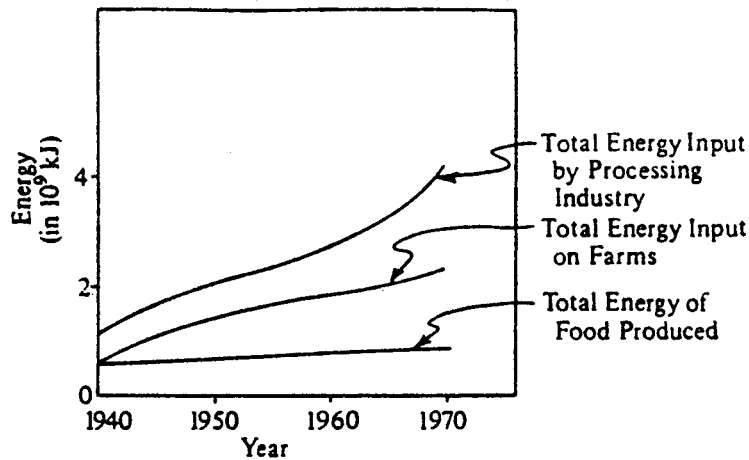
49. Scientists today agree on many ideas about how the natural world works. Which of the following is a scientific attitude toward these ideas?

- (A) Some of the ideas will probably have to change when scientists have more information.
(B) Most ideas will not be changed for a very long time to come.
(C) All of the ideas will have to change to keep up with fast-moving world events.
(D) None of the ideas will be changed because they are scientific ideas.

N435001

**ENERGY USE IN FOOD SYSTEM *VERSUS*
ENERGY OF FOOD PRODUCED**

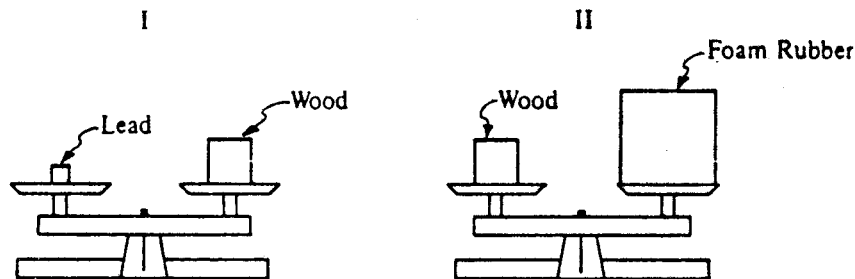
(Energy of food produced is
population times 11.30 kJ per day.)



50. 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
- (B) In the processing industry between 1960 and 1970
- (C) On the farms between 1940 and 1950
- (D) On the farms between 1960 and 1970

N436001



51. 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
- (B) Lead
- (C) Foam rubber
- (D) Wood

- Lead
- Foam rubber
- Lead
- Foam rubber

N434901

52. Which of the following is the best way to induce an electrical current in a coil of wire?

- (A) Heating the coil uniformly
- (B) Surrounding the coil with oil
- (C) Pounding the coil with a hammer
- (D) Rotating the coil in a magnetic field
- (E) Stroking the coil with a piece of cat's fur

N407901

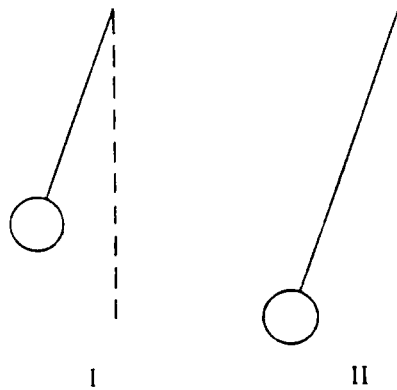
53. A medical researcher wanted to find out what caused a certain disease. She gathered the following information from different places in the world.

	Major Type of Food	Type of Area	Mosquitoes	Disease
Country 1	Fish only	City	Yes	Yes
Country 2	Meat and vegetables	Farmland	No	No
Country 3	Fish and rice	City	No	Yes
Country 4	Fish only	Farmland	Yes	Yes

Which one of the following would be best for the researcher to study more closely in order to find the cause of the disease?

- (A) Major type of food
- (B) Type of area
- (C) Mosquitoes
- (D) Swamps

N411201



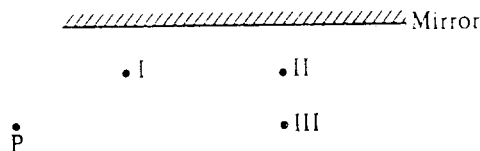
The bobs of two pendulums shown above have the same masses and volumes. The string of pendulum I is 100 centimeters long and the string of pendulum II is 150 centimeters long.

A student holds each bob at its starting angle of 20°, and then releases both bobs simultaneously.

54. How does the period (time for one complete swing) of pendulum I compare with the period of pendulum II?

- (A) The period of pendulum I is greater.
- (B) The periods of pendulums I and II are the same.
- (C) The period of pendulum II is greater.

N424901



55. Objects are placed in front of an ordinary mirror at points I, II, and III as shown in the diagram above. Which of the objects can be seen in the mirror by a person at point P?

- (A) I only
- (B) II only
- (C) II and III only
- (D) I, II, and III

N430601

ABOUT THIS TEST

Please answer the following questions after you have completed this test. Record your answers in the box at the end of the answer sheet.

- A. How much of the material covered on this test has been taught in your classes?
- B. How difficult was this test for you?
- C. How well do you think you did on this test?
- D. How hard did you work to do well on this test?

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
SCIENCE TEST (FORM A)**

	CORRECT MARK A B C ● D	<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.
Student's Name	INCORRECT MARKS X ⊖ φ ⊗ ⊘	
Today's Date		

<p>PAGE 1</p> <p>1 (A) (B) (C) (D)</p> <p>2 (A) (B)</p> <p>3 (A) (B)</p> <p>4 (A) (B) (C)</p> <p>5 (A) (B) (C) (D)</p> <p>6 (A) (B) (C) (D)</p> <p>PAGE 2</p> <p>7 (A) (B) (C) (D) (E)</p> <p>8 (A) (B) (C) (D)</p> <p>9 (A) (B) (C) (D)</p> <p>10 (A) (B) (C) (D)</p> <p>PAGE 3</p> <p>11 (A) (B) (C) (D) (E)</p> <p>12 (A) (B) (C) (D)</p> <p>13 (A) (B) (C) (D)</p> <p>14 (A) (B) (C) (D)</p> <p>PAGE 4</p> <p>15 (A) (B) (C) (D)</p> <p>16 (A) (B) (C) (D)</p> <p>17 (A) (B) (C) (D)</p> <p>18 (A) (B) (C) (D)</p> <p>PAGE 5</p> <p>19 (A) (B) (C) (D)</p> <p>20 (A) (B) (C)</p> <p>21 (A) (B) (C)</p> <p>22 (A) (B) (C) (D)</p> <p>PAGE 6</p> <p>23 (A) (B) (C) (D) (E)</p> <p>24 (A) (B) (C) (D)</p> <p>25 (A) (B) (C) (D)</p> <p>26 (A) (B) (C) (D)</p>	<p>PAGE 7</p> <p>27 (A) (B) (C)</p> <p>28 (A) (B) (C)</p> <p>29 (A) (B) (C) (D)</p> <p>30 (A) (B) (C) (D)</p> <p>PAGE 8</p> <p>31 (A) (B) (C) (D)</p> <p>32 (A) (B) (C) (D)</p> <p>33 (A) (B) (C) (D)</p> <p>34 (A) (B) (C) (D)</p> <p>PAGE 9</p> <p>35 (A) (B) (C) (D)</p> <p>36 (A) (B) (C) (D)</p> <p>37 (A) (B) (C) (D)</p> <p>38 (A) (B) (C) (D)</p> <p>39 (A) (B) (C) (D)</p> <p>PAGE 10</p> <p>40 (A) (B) (C) (D)</p> <p>41 (A) (B) (C)</p> <p>42 (A) (B) (C) (D) (E)</p> <p>PAGE 11</p> <p>43 (A) (B) (C) (D) (E)</p> <p>44 (A) (B) (C)</p> <p>45 (A) (B) (C) (D)</p> <p>46 (A) (B) (C) (D)</p>	<p>PAGE 12</p> <p>47 (A) (B) (C) (D)</p> <p>48 (A) (B) (C) (D)</p> <p>49 (A) (B) (C) (D)</p> <p>PAGE 13</p> <p>50 (A) (B) (C) (D)</p> <p>51 (A) (B) (C) (D)</p> <p>52 (A) (B) (C) (D) (E)</p> <p>PAGE 14</p> <p>53 (A) (B) (C) (D)</p> <p>54 (A) (B) (C)</p> <p>55 (A) (B) (C) (D)</p>
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ABOUT THIS TEST

A. How much of the material on this test has been taught in your classes?

All Almost All Most Some Little

B. How difficult was this test?

Very Difficult Difficult Easy Very Easy

C. How well do you think you did?

Very Well Well Poorly Very Poorly

D. How hard did you work?

Very Hard Pretty Hard Not Very Hard Not Hard At All

FOR LSAY USE ONLY

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