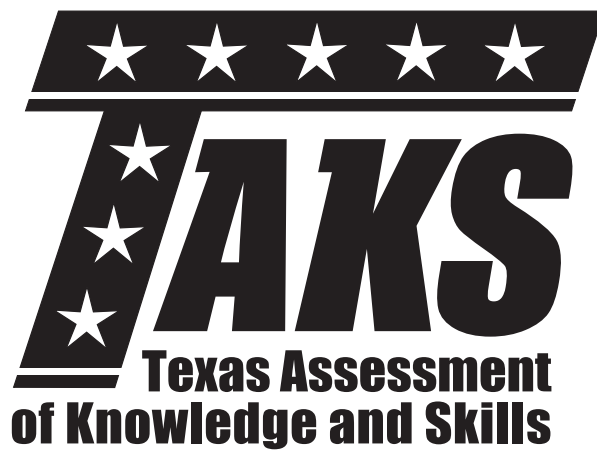


STUDENT NAME _____



**GRADE 8
SCIENCE**

SCIENCE

FORMULA CHART

Work = force \times distance

$$W = Fd$$

Speed = $\frac{\text{distance}}{\text{time}}$

$$s = \frac{d}{t}$$

Force = mass \times acceleration

$$F = ma$$

Weight = mass \times acceleration due to gravity

$$\text{Weight} = mg$$

Density = $\frac{\text{mass}}{\text{volume}}$

$$D = \frac{m}{v}$$

Constants/Conversions

$$g = \text{acceleration due to gravity} = 9.8 \frac{\text{m}}{\text{s}^2}$$

$$\text{speed of light} = 3 \times 10^8 \frac{\text{m}}{\text{s}}$$

$$\text{speed of sound} = 343 \frac{\text{m}}{\text{s}} \text{ at sea level and } 20^\circ\text{C}$$

$$1 \text{ cm}^3 = 1 \text{ mL}$$

Metric ruler can be found on the separate formula chart.

Periodic Table of the Elements

Atomic number — 14
 Symbol — **Si**
 Atomic mass — 28.086
 Silicon — Name

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	H 1.008 Hydrogen																	He 4.0026 Helium
2	Li 6.941 Lithium	Be 9.012 Beryllium															F 18.998 Fluorine	Ne 20.179 Neon
3	Na 22.990 Sodium	Mg 24.305 Magnesium											Al 26.982 Aluminum	Si 28.086 Silicon	P 30.974 Phosphorus	S 32.066 Sulfur	Cl 35.453 Chlorine	Ar 39.948 Argon
4	K 39.098 Potassium	Ca 40.08 Calcium	Sc 44.956 Scandium	Ti 47.88 Titanium	V 50.942 Vanadium	Cr 51.996 Chromium	Mn 54.938 Manganese	Fe 55.847 Iron	Co 58.933 Cobalt	Ni 58.69 Nickel	Cu 63.546 Copper	Zn 65.39 Zinc	Ga 69.72 Gallium	Ge 72.61 Germanium	As 74.922 Arsenic	Se 78.96 Selenium	Br 79.904 Bromine	Kr 83.80 Krypton
5	Rb 85.468 Rubidium	Sr 87.62 Strontium	Y 88.906 Yttrium	Zr 91.224 Zirconium	Nb 92.906 Niobium	Mo 95.94 Molybdenum	Tc (98) Technetium	Ru 101.07 Ruthenium	Rh 102.906 Rhodium	Pd 106.42 Palladium	Ag 107.868 Silver	Cd 112.41 Cadmium	In 114.82 Indium	Sn 118.71 Tin	Sb 121.763 Antimony	Te 127.60 Tellurium	I 126.904 Iodine	Xe 131.29 Xenon
6	Cs 132.905 Cesium	Ba 137.33 Barium	La 138.906 Lanthanum	Hf 178.49 Hafnium	Ta 180.948 Tantalum	W 183.84 Tungsten	Re 186.207 Rhenium	Os 190.23 Osmium	Ir 192.22 Iridium	Pt 195.08 Platinum	Au 196.967 Gold	Hg 200.59 Mercury	Pb 207.2 Lead	Bi 208.980 Bismuth	Po (209) Polonium	At (210) Astatine	Rn (222) Radon	
7	Fr (223) Francium	Ra 226.025 Radium	Ac 227.028 Actinium	Rf (261) Rutherfordium	Db (262) Dubnium	Sg (263) Seaborgium	Bh (262) Bohrium	Hs (265) Hassium	Mt (266) Meitnerium	110 (269) Darmstadtium	109 (266) Tennessine	108 (265) Livermorium	107 (262) Tennessine	106 (263) Livermorium	105 (262) Livermorium	104 (261) Livermorium	103 (260) Livermorium	102 (259) Livermorium

Mass numbers in parentheses are those of the most stable or most common isotope.

58	Ce 140.12 Cerium	59	Pr 140.908 Praseodymium	60	Nd 144.24 Neodymium	61	Pm (145) Promethium	62	Sm 150.36 Samarium	63	Eu 151.97 Europium	64	Gd 157.25 Gadolinium	65	Tb 158.925 Terbium	66	Dy 162.50 Dysprosium	67	Ho 164.930 Holmium	68	Er 167.26 Erbium	69	Tm 168.934 Thulium	70	Yb 173.04 Ytterbium	71	Lu 174.967 Lutetium
90	Th 232.038 Thorium	91	Pa 231.036 Protactinium	92	U 238.029 Uranium	93	Np 237.048 Neptunium	94	Pu (244) Plutonium	95	Am (243) Americium	96	Cm (247) Curium	97	Bk (247) Berkelium	98	Cf (251) Californium	99	Es (252) Einsteinium	100	Fm (257) Fermium	101	Md (258) Mendelevium	102	No (259) Nobelium	103	Lr (262) Lawrencium

Lanthanide Series

Actinide Series

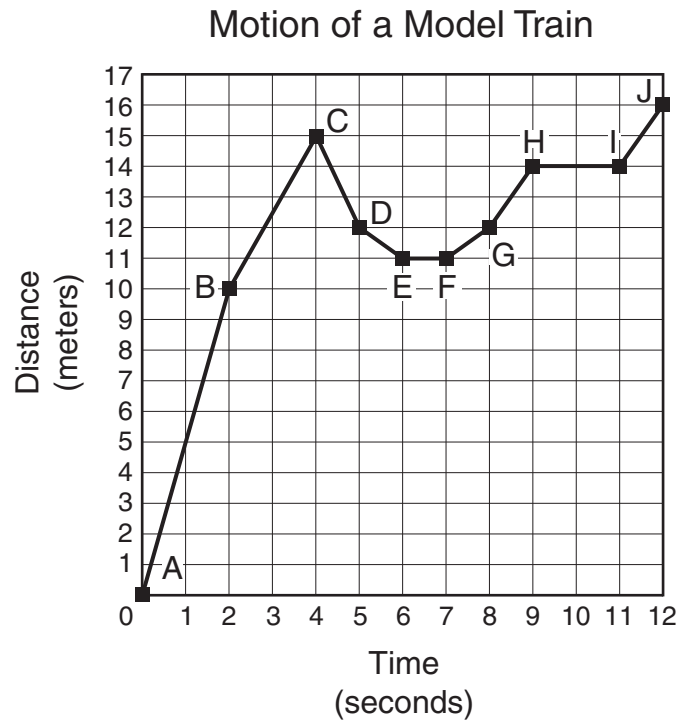
DIRECTIONS

Read each question and choose the best answer. Then fill in the correct answer on your answer document.

SAMPLE A

Which of the following would be best to use to measure the mass of a mineral sample?

- A Meterstick
- B Graduated cylinder
- C Balance
- D Hand lens



The graph above shows the motion of a model train. What was the average speed of the train in meters/second between points B and C? Record and bubble in your answer to the nearest tenth on the answer document.



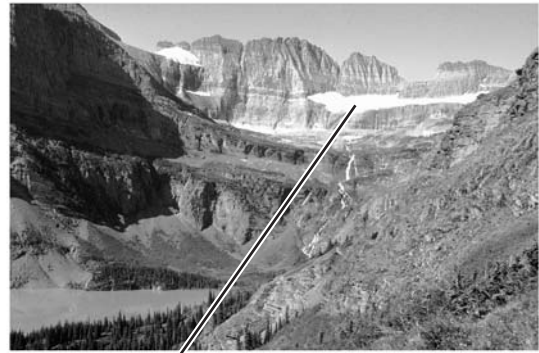
- 1 A student finishes an experiment and is left with three empty beakers that held liquids during the experiment. The best lab practice is to —
- A leave the beakers exactly as they are for the next student
 - B turn the beakers upside down to drain in the sink
 - C wash the beakers and air-dry them on a rack
 - D take the beakers directly to a rack to dry

1910



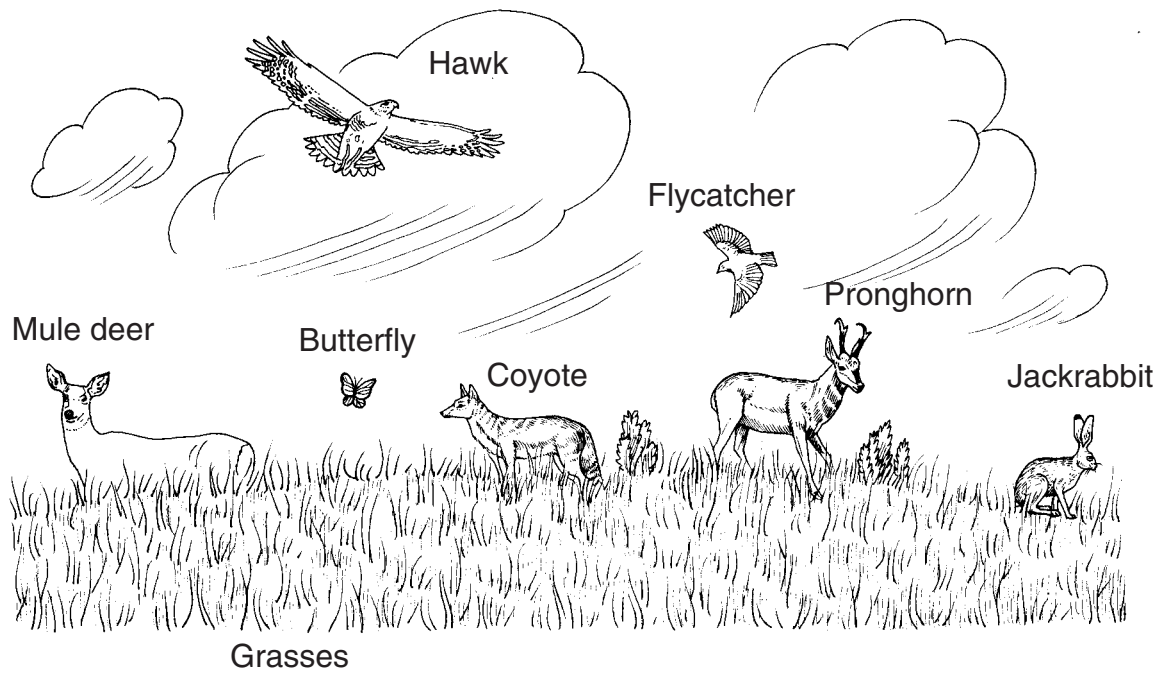
Grinnell
Glacier

1997



Grinnell
Glacier

- 2 The photographs above show how a change in climate is affecting the size of Grinnell Glacier in Glacier National Park. Which of the following best explains the change in the glacier between 1910 and 1997?
- F Higher average temperatures
 - G Higher frequency of earthquakes
 - H Higher total precipitation
 - J Higher rates of wind erosion



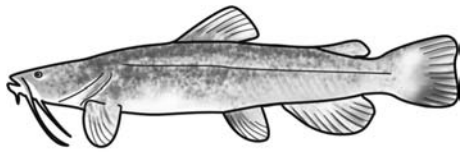
3 A grassland community is pictured above. Grasses are considered —

- A secondary consumers
- B primary consumers
- C decomposers
- D producers

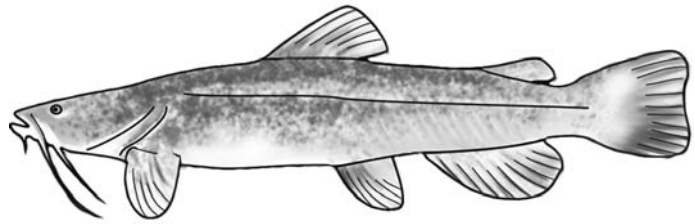
- 4 Which of the following processes helps the body maintain chemical balance?
- F Tears washing away dust from the eyes
 - G Rib bones protecting internal organs
 - H Hair growing faster in winter months
 - J Cells using sugar in the blood

- 5 Heavy rains in an aquifer's recharge zone cause rivers and streams to flood. How will this most likely affect the aquifer?
- A The total water volume will increase.
 - B The outflow from natural springs will decrease.
 - C The water level in the aquifer will decrease.
 - D The rate of water use by humans will increase.

- 6 Which of the following best represents stored potential energy?
- F Air leaking from a flat tire
 - G Stress built up in a rock fault
 - H Heat given off by a forest fire
 - J Water flowing through a hose



Catfish 1

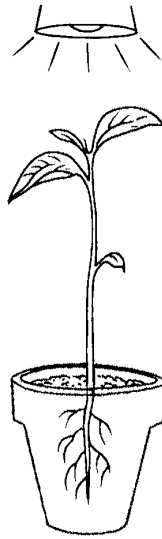


Catfish 2

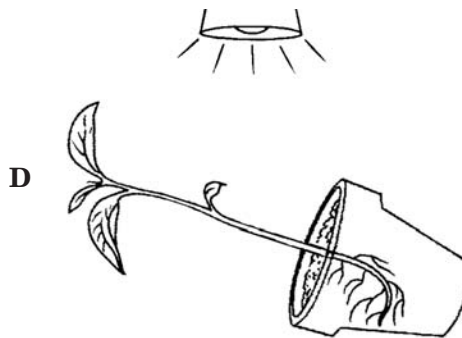
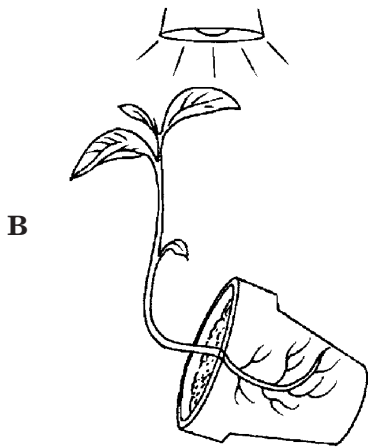
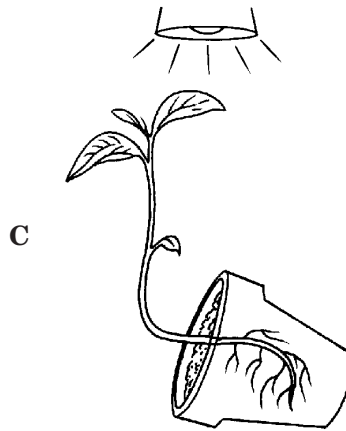
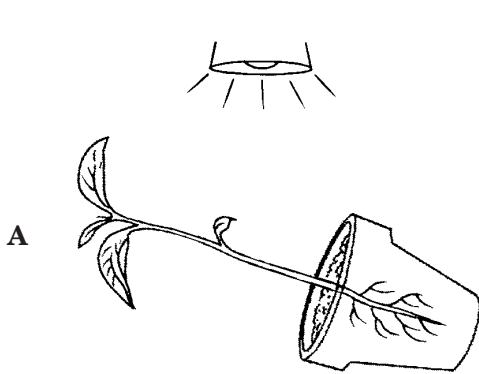
Scale
1 cm = 4 cm

- 7 The scale drawings above show two catfish collected from a river. What is the difference in the actual body lengths of these catfish?
- A 3 cm
 - B 9 cm
 - C 12 cm
 - D 24 cm

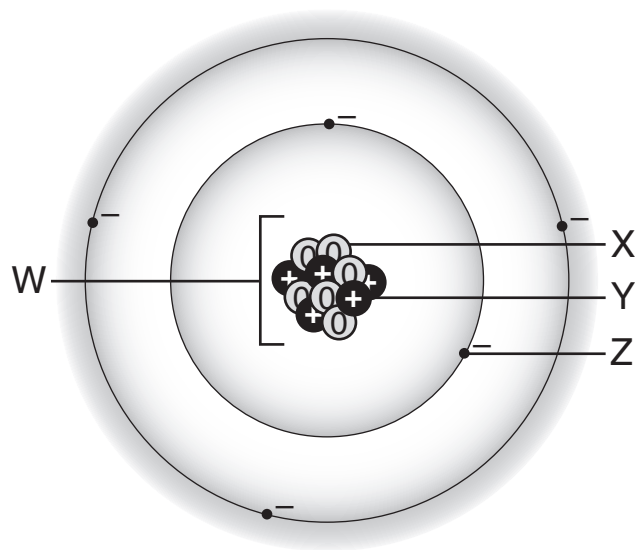
- 8 Which of these is an example of a chemical reaction?
- F A pot of water boiling
 - G An iron nail rusting
 - H Corn being ground
 - J Sugar dissolving in tea



9 Which of the following shows how the plant above would grow if the pot were knocked on its side and left for several weeks?

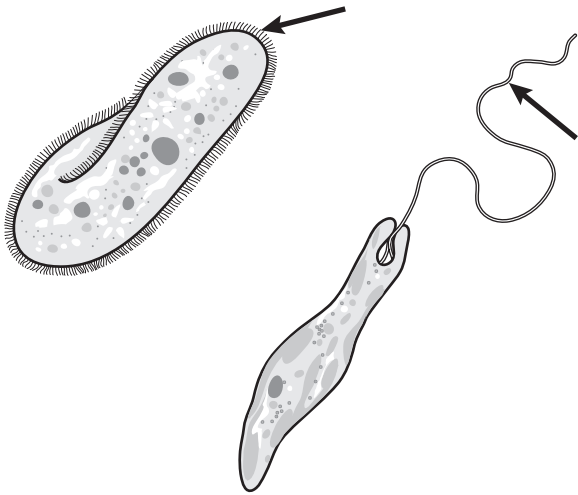


Boron Atom



10 Which letter in this model of a boron atom represents a neutron?

- F W
- G X
- H Y
- J Z

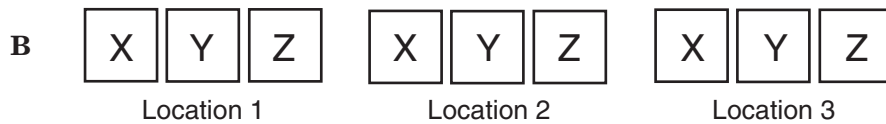
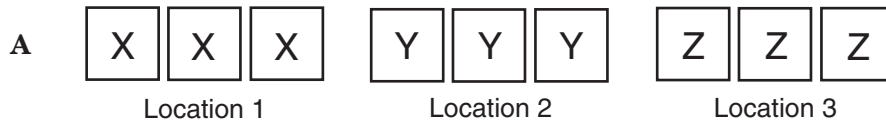


- 11 The single-celled organisms shown above live in water. What is the main function of the structures identified by the arrows?
- A Absorbing water
 - B Removing wastes
 - C Helping with motion
 - D Getting food

12 The transfer of carbon that results from burning fossil fuels will most likely affect Earth in the future by —

- F raising the average global temperature
- G reducing evaporation rates of ocean water
- H decreasing the total mass of plant life
- J making air transparent to ultraviolet light

- 13 An experiment is being done to determine how light affects the growth of three different types of pea plants. Peas of each type are planted in several cups, and the cups are labeled X, Y, or Z to show the type of pea planted in each. Some cups are set in each of three locations to receive different amounts of light. Which of the following best shows how the plants should be arranged for the experiment?

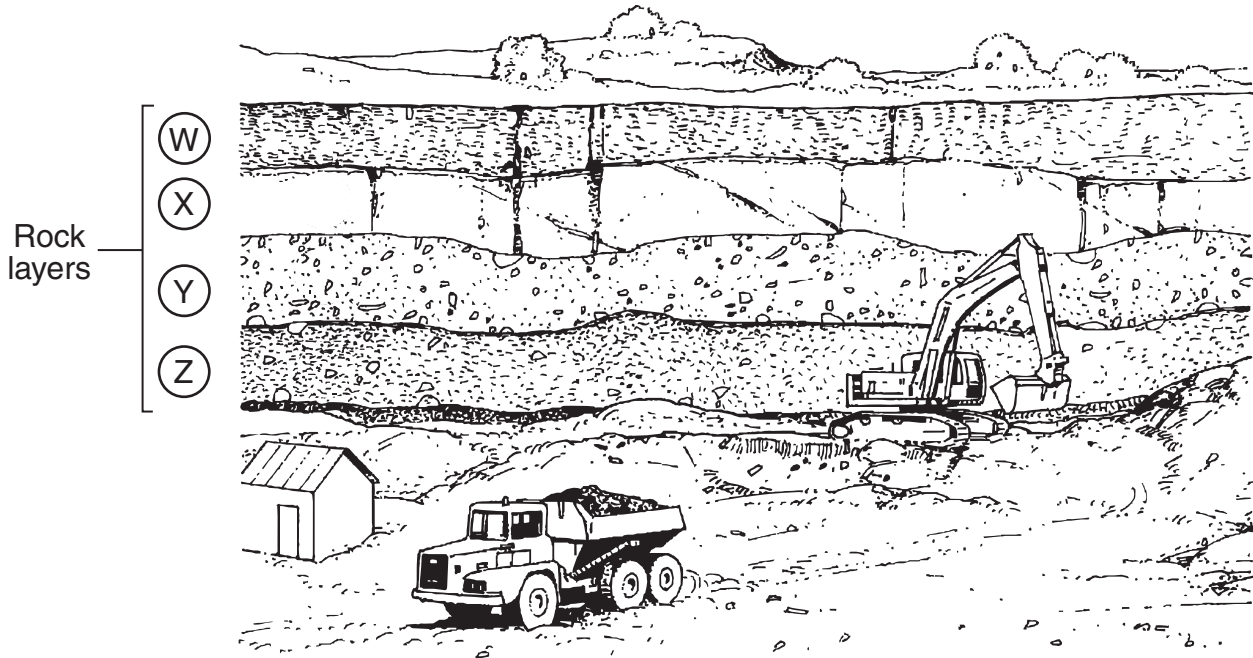


- 14 Which set of equipment would be used to measure the boiling point of a liquid?
- F Balance, thermometer, and stopwatch
 - G Test tube, hot plate, and balance
 - H Stopwatch, test tube, and microscope
 - J Beaker, hot plate, and thermometer

Use the information below and your knowledge of science to answer questions 15–18.

Cross Section of Rock Layers

A quarry is an open pit from which rock can be obtained by digging, cutting, or blasting. The quarry shown below cuts through several layers of sedimentary limestone rock, labeled W through Z. Some of the rock from the quarry is crushed to make gravel of various sizes. The rock and gravel are used in the construction of buildings and roads. Large diesel machines and trucks remove the rock and gravel and transport it to construction sites.



- 15** Before the quarry was dug, the land contained more vegetation. What impact has this change most likely had on the local ecosystem?
- A** Larger predator populations
 - B** A lower number of producers
 - C** A greater number of herbivores
 - D** A smaller amount of available carbon dioxide

Mohs Scale of Mineral Hardness

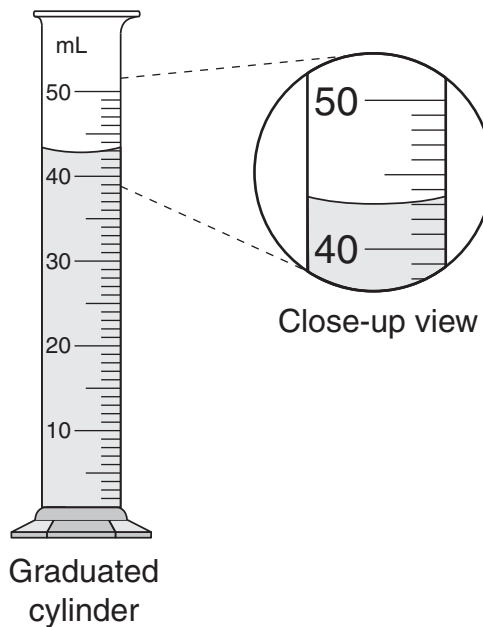
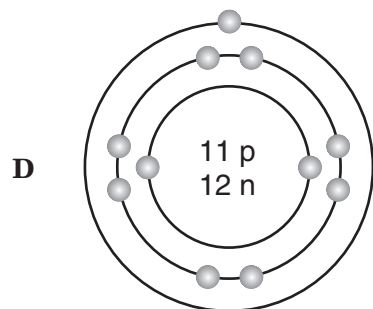
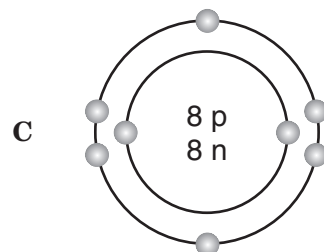
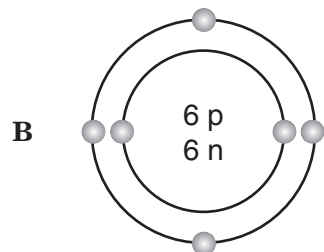
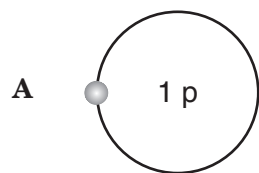
Hardness	Mineral
1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Orthoclase
7	Quartz
8	Topaz
9	Corundum
10	Diamond

- 16** Both gypsum and limestone are found in the quarry. Limestone has about the same hardness as calcite. A mineral's hardness can be determined from how easily it is scratched by another mineral. In a hardness test, what result will show the difference between gypsum and limestone?
- F** Fluorite scratches limestone and gypsum.
 - G** Gypsum scratches talc.
 - H** Limestone scratches talc.
 - J** Calcite scratches gypsum.

- 17** At the quarry, soil was removed to get to the rock layers underneath. Which part of the environment was probably least affected by this soil being removed?
- A** Air
 - B** Groundwater
 - C** Runoff water
 - D** Plants

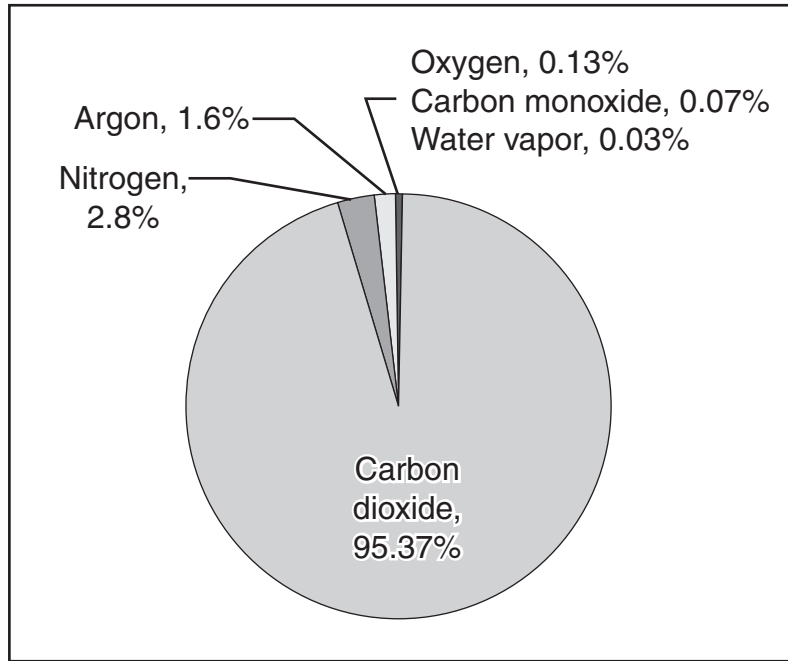
- 18** Diesel fuel is used in the engines of the machines and trucks at the quarry. Which of these is the main energy transformation as the fuel is used by the engines?
- F** Electrical energy is converted to heat energy.
 - G** Heat energy is converted to potential energy.
 - H** Electrical energy is converted to kinetic energy.
 - J** Chemical energy is converted to kinetic energy.

19 According to the periodic table, which of the following best represents a carbon atom?

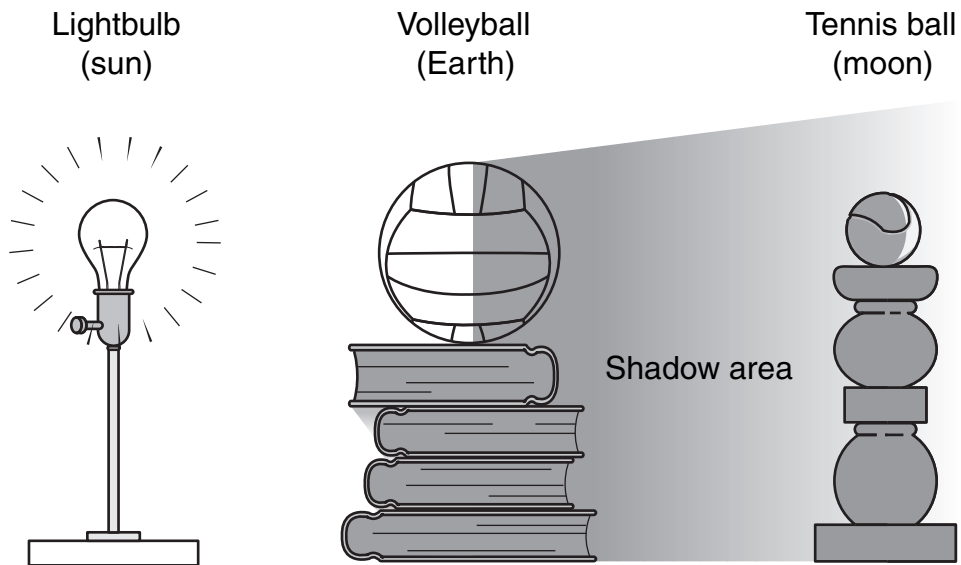


20 What is the volume of the liquid in the graduated cylinder? Record and bubble in your answer to the nearest milliliter on the answer document.

Composition of Martian Atmosphere



- 21** Some data about the atmosphere of Mars are shown above. What conclusion can be made about the ability of humans to breathe Martian air?
- A** Life support will be needed because the percentage of oxygen is too low.
 - B** It will be impossible to breathe because the percentage of nitrogen is too low.
 - C** Oxygen and nitrogen will make it possible for photosynthesis to produce food.
 - D** Humans will be able to breathe the air because oxygen is present.

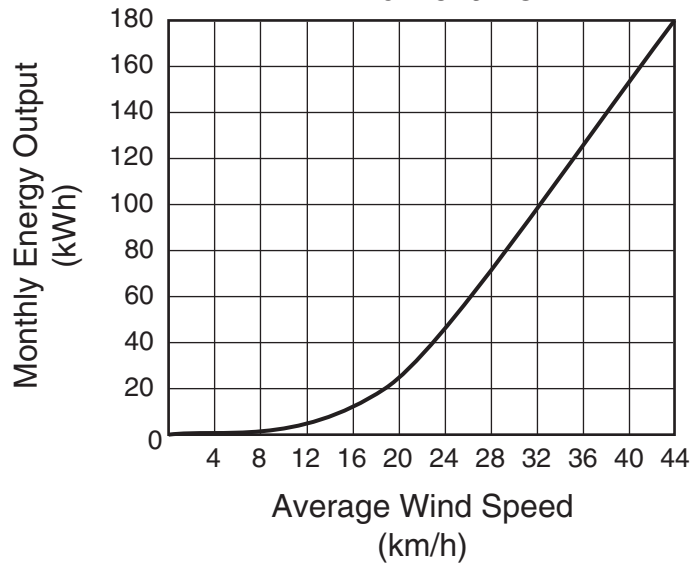


- 22** The model above is set up to show how a lunar eclipse occurs. What is the greatest limitation of this model?
- F** The lightbulb is standing straight up instead of tilted on an axis.
 - G** Comparative sizes and distances are inaccurate.
 - H** The shadow is being cast in the wrong direction.
 - J** The heat released is much less than that released by the sun.

Wind Turbine

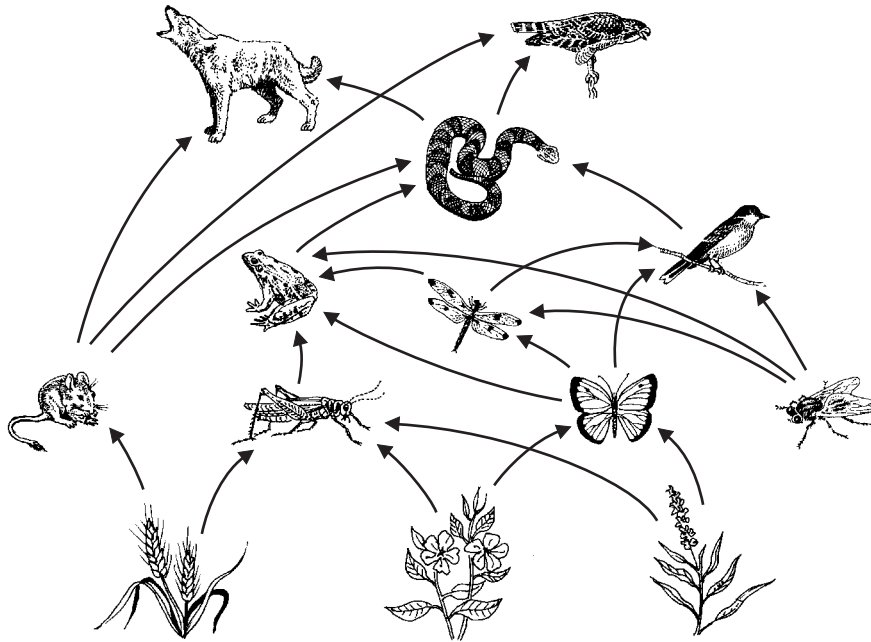


Energy Output from Wind Turbine



- 23** An engineer measured how much energy a new type of wind turbine generated in locations with different wind speeds. A graph of the results is shown above. What is the best inference about operating the wind turbine at a location with wind speeds ranging from 0 to 8 km/h?
- A** The turbine can reduce a household's electricity bill.
 - B** The air is too dense to turn the rotor blades of the turbine.
 - C** The wind moves too slowly to generate enough energy.
 - D** Air pollution can be eliminated by using the turbine.

- 24** A woman running in a marathon requires a constant supply of oxygen to her muscles. Which cells carry oxygen to muscle tissue?
- F** Artery cells
 - G** Red blood cells
 - H** Nerve cells
 - J** Lung cells

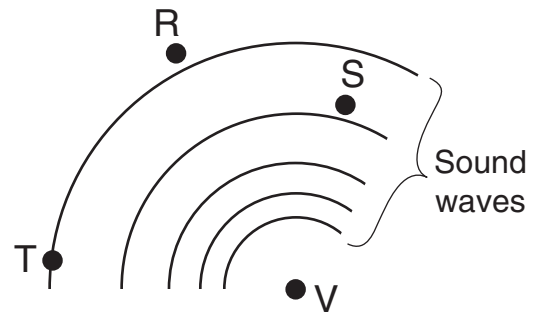


25 In the food web above, which of the following organisms feeds on the largest variety of different producers?



26 Evidence suggests that dinosaurs became extinct when a large meteorite struck in the area of the Yucatán Peninsula. Scientists hypothesize that this enormous impact killed all the dinosaurs, even those on the other side of Earth, because the —

- F** debris thrown into the atmosphere blocked sunlight
- G** heat flash from the impact immediately vaporized all life-forms
- H** impact blasted the atmosphere surrounding Earth into space
- J** intense heat completely boiled away the oceans



27 In the diagram above, at which point are the sound waves being generated?

- A** R
- B** S
- C** T
- D** V

Before



After



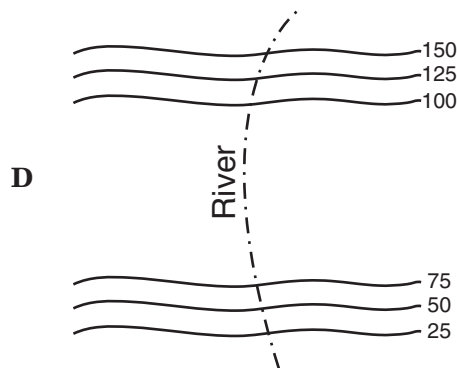
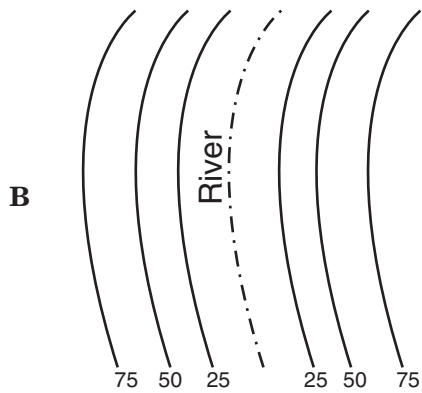
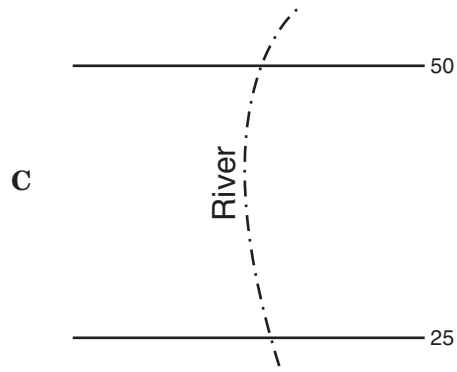
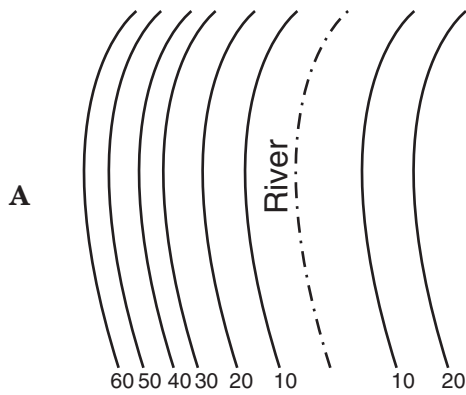
© AP Photo/Jim Cole (both photos)

- 28 In spring 2003 a natural rock outcropping in New Hampshire called the Old Man of the Mountain collapsed. Which of the following most likely loosened the rock and caused it to fall?
- F Heat turning sedimentary rock into metamorphic rock
 - G Water freezing and thawing inside cracks in the rock
 - H Volcanic activity producing pressure at the rock's base
 - J Oxygen reacting with iron on the surface of the rock



© Paul Almasy/COFIBIS

29 Which of the following is the most reasonable topographic map of the area shown in the picture?



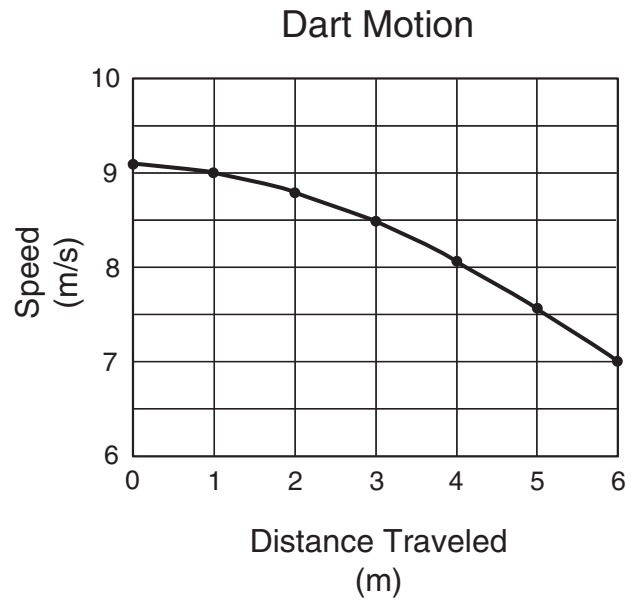
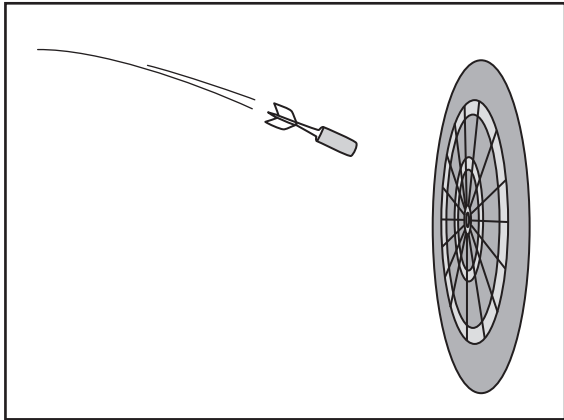
30 For rabbits, having long hair is an advantage over having short hair in environments with —

F high levels of rain

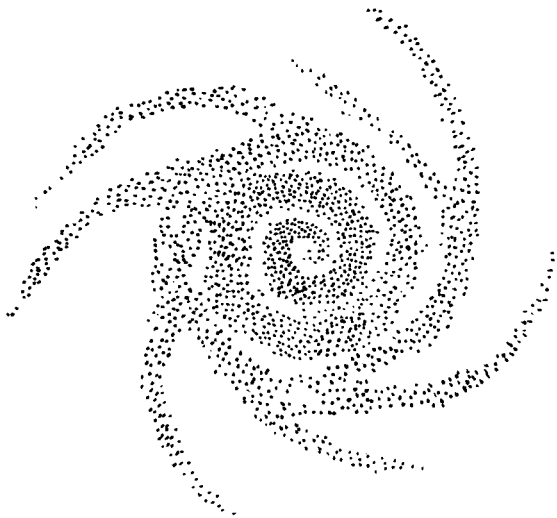
G a large number of competitors

H low temperatures

J few predators



- 31 A foam dart is thrown toward a dartboard. The graph represents its motion. At about what speed is the dart traveling when it hits the dartboard, 7 meters from the starting point?
- A 6.3 m/s
 - B 6.9 m/s
 - C 7.2 m/s
 - D 7.4 m/s



32 The picture shows sand used to make a model of a galaxy. In the model, each grain of sand best represents —

- F** a comet
- G** a black hole
- H** an asteroid
- J** a star

Element	Number of Protons
T	7
Q	15
X	12
Z	17

33 The table above shows the number of protons in an atom of four different elements. According to the periodic table, which of these elements is a metal?

- A** T
- B** Q
- C** X
- D** Z

34 The United States consumed about 19 million barrels of petroleum per day in 2000. This rate continues to increase. It is important to develop alternative sources of energy because petroleum —

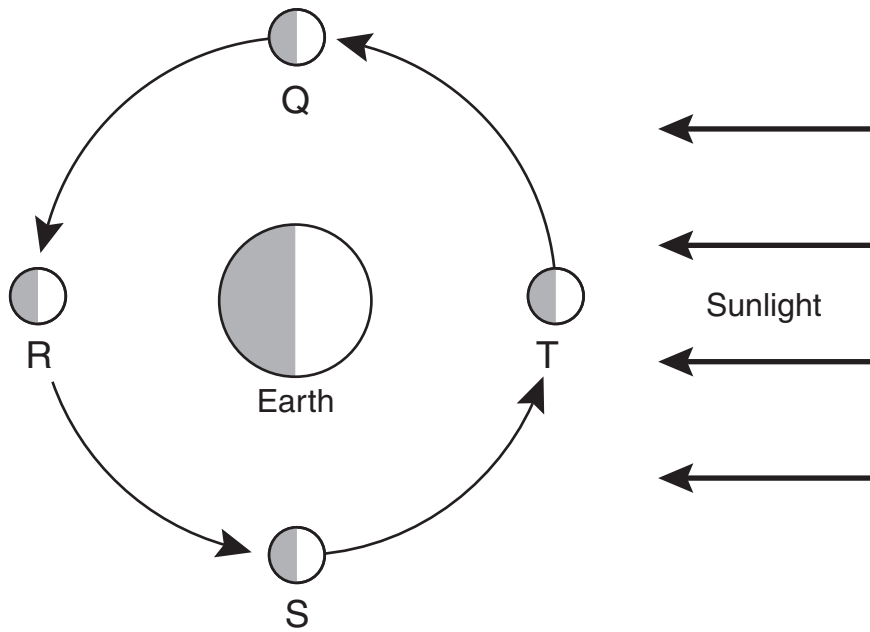
- F** will eventually use up all the oxygen needed for human survival
- G** is being spilled into the ocean faster than it is being used
- H** fails to store solar energy and contains limited chemical energy
- J** is a limited source of energy that is almost impossible to renew

Boiling Points of Some Compounds

Chemical Formula	Boiling Point (°C)	Temperature Increase (°C)
CH ₄	-162	—
C ₂ H ₆	-89	73
C ₃ H ₈	-42	47
C ₄ H ₁₀	-1	41
C ₅ H ₁₂	36	37
C ₆ H ₁₄	69	33

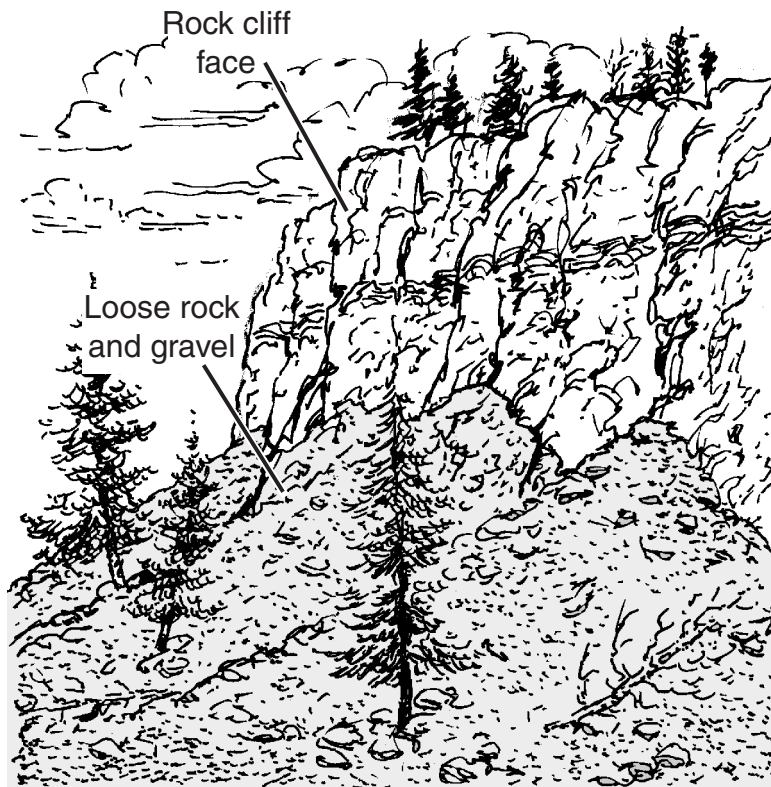
- 35** The table above shows that the more carbon atoms a compound has, the higher the compound's boiling point. Based on the data in the table, a reasonable estimate of the boiling point of the next compound, C₇H₁₆, is —
- A** 70°C
 - B** 99°C
 - C** 120°C
 - D** 142°C

-
- 36** Which of the following is least affected by seasonal environmental conditions?
- F** The pattern in a tiger's fur
 - G** The dropping of tree leaves
 - H** The sprouting of acorns
 - J** The migration of gray whales

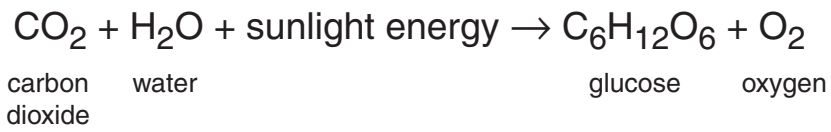


37 The diagram shows the orbit of the moon around Earth. Between which two points will the moon appear to change from a new moon to a quarter moon?

- A** Q and R
- B** R and S
- C** S and T
- D** T and Q

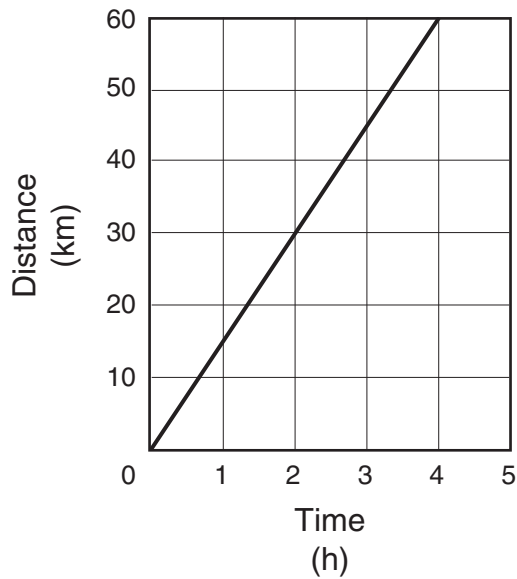


- 38 In the picture above, the rocks at the bases of the trees were separated from the cliff face by water freezing and thawing. Which process best describes the breaking of the rock?
- F Soil erosion
 - G Mountain building
 - H Chemical weathering
 - J Physical weathering



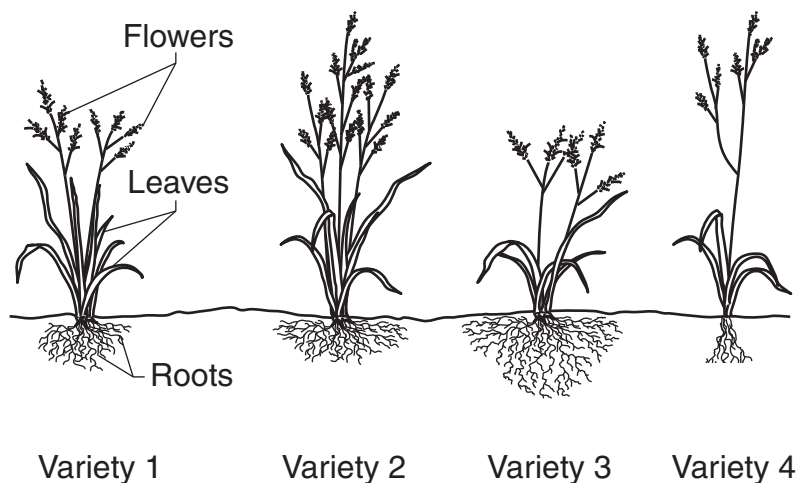
39 Which molecule in the equation represents food energy made by plants?

- A Carbon dioxide
- B Water
- C Glucose
- D Oxygen



40 The graph shows the movement of a car over time. What is the car's average speed?

- F 10 kilometers per hour
- G 15 kilometers per hour
- H 30 kilometers per hour
- J 60 kilometers per hour



- 41 The picture above shows four varieties of the same species of grass that grow in a prairie ecosystem. Which variety has the best chance of surviving a long period of dry weather?
- A Variety 1
 - B Variety 2
 - C Variety 3
 - D Variety 4

- 42 One of the reactions involved in obtaining pure copper (Cu) from copper-containing rock is

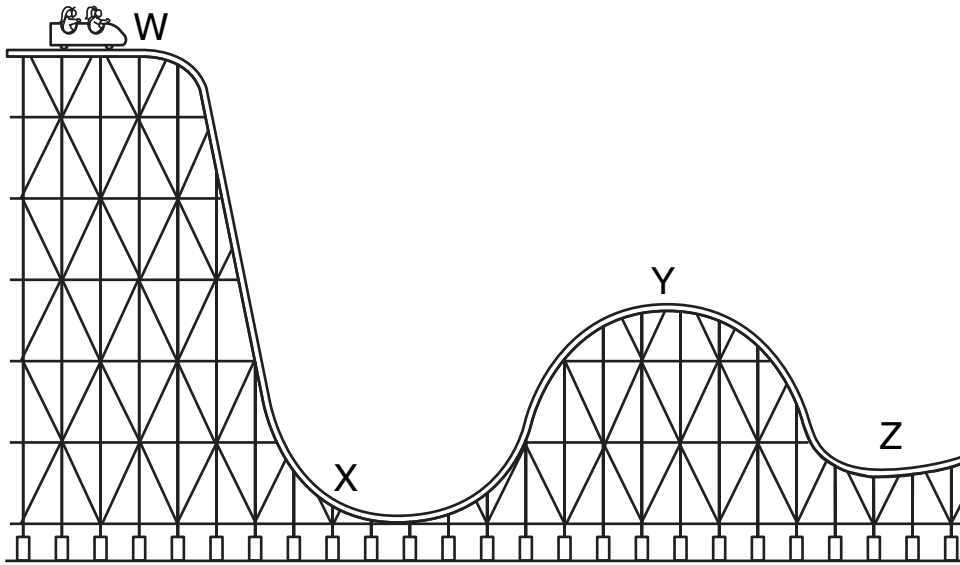


Which of the following best describes the reaction?

- F Copper atoms are used to produce more copper atoms.
- G Elements are rearranged into new substances.
- H Atoms of other elements are turned into copper atoms.
- J Compounds change phase from liquid to gas.

- 43 Which of the following most promotes chemical weathering in limestone?

- A Freezing water
- B Blowing wind
- C Running water
- D Growing roots



44 At which point on the roller coaster will the car have the greatest amount of kinetic energy?

- F W
- G X
- H Y
- J Z

	G	g
g		
g		

G = glossy leaves (dominant trait)
g = nonglossy leaves (recessive trait)

- 45 Glossy leaves are smooth and shiny. What percent of offspring from the cross shown above will have glossy leaves?
- A 0%
B 25%
C 50%
D 100%
- 46 Which energy transformation occurs when a match is lit?
- F Chemical energy to heat energy
G Heat energy to potential energy
H Electrical energy to heat energy
J Kinetic energy to potential energy

Guaranteed effective

100% pure
Acetone

Professional-strength
nail polish remover

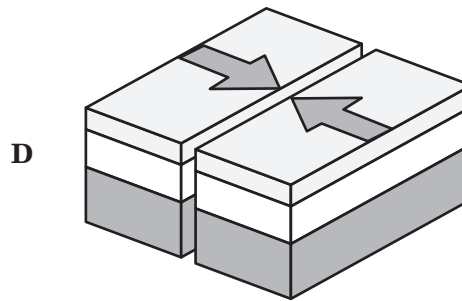
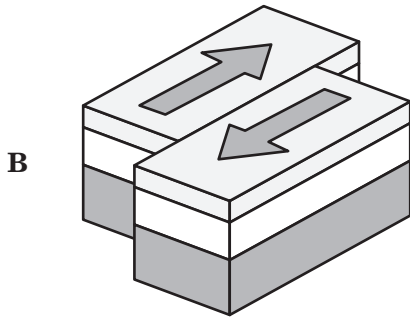
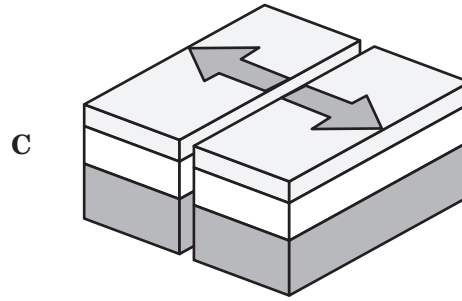
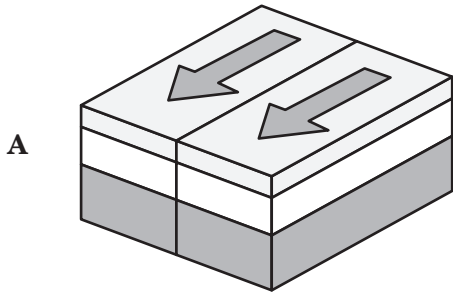
- Removes artificial nails
- Removes polish from natural nails FAST!
- Great for hard-to-remove glitter and glue

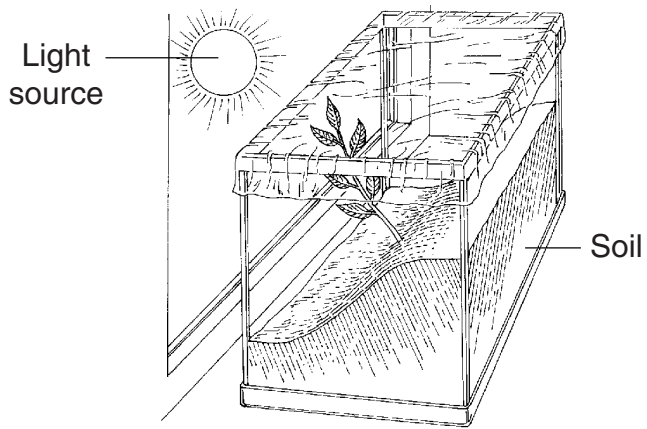
INGREDIENTS: Acetone, denatonium benzoate, fragrance

WARNING: Flammable liquid

- 47 A cosmetics company markets bottles of nail polish remover with the label shown above. A consumer group concluded that the claim that the acetone is 100% pure is false. What is the most likely reason the consumer group reached this conclusion?
- A The acetone has probably dissolved some of the bottle.
B The group has found that other claims by the company are false.
C There are ingredients other than acetone in the nail polish remover.
D Pure acetone is a flammable liquid, as stated on the label.
- 48 During primary ecological succession, the initial formation of soil helps establish —
- F grasses
G mushrooms
H shrubs
J trees

49 Which diagram best represents the type of plate movement that results in mountain building?





Conclusion: This species of plant grows straight toward light.

50 The picture shows the results of an experiment to investigate the effect of light on plant growth. The conclusion is weakened by the —

- F slope of the soil
- G color of the light source
- H flow of air into and out of the room
- J length of time for the experiment

BE SURE YOU HAVE RECORDED ALL OF YOUR ANSWERS
ON THE ANSWER DOCUMENT.

