

Tennessee Comprehensive Assessment Program

TCAP

Science | Grade 8
Practice Test

Student Name

Teacher Name



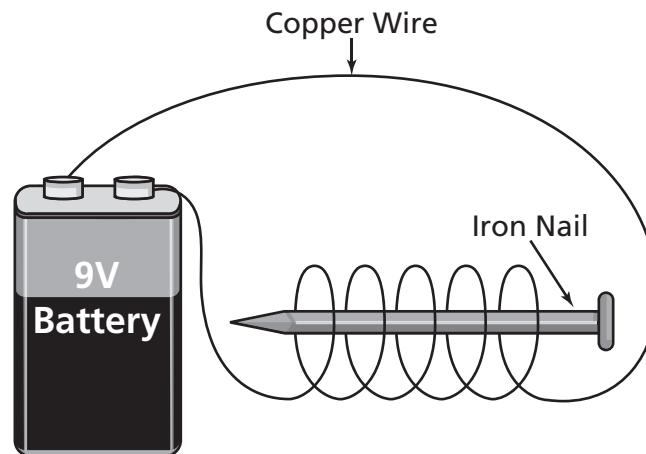
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1 A student observes actions that occurred in four different eggs. Which action describes only a chemical change?

- A** a cut up egg
- B** a stirred egg
- C** a rotting egg
- D** a dropped egg

2 The parts of an electromagnet are shown below.

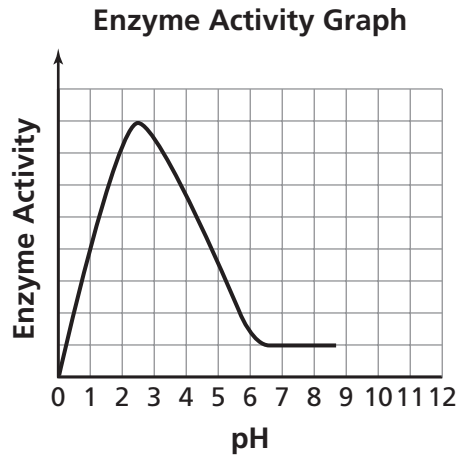


The strength of the magnet will be increased by

- F** using more nails.
- G** adding a switch.
- H** making more loops with the wire.
- J** placing the battery closer to the nail.

Go On ►

3 The activity of an enzyme at different pH levels is shown in the graph.



Which table best represents the data in the graph?

Enzyme Activity

A

Activity Level	pH Level
Highest	Strong acid, 2.5
Lowest	Weak acid, 6.4

Enzyme Activity

C

Activity Level	pH Level
Highest	Strong acid, 2.0
Lowest	Weak acid, 6.0

Enzyme Activity

B

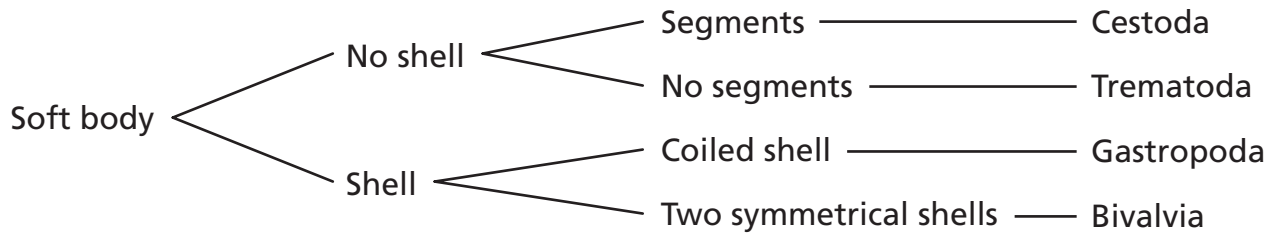
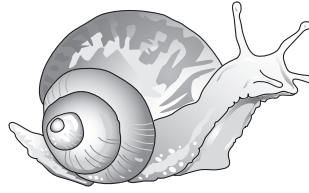
Activity Level	pH Level
Highest	Strong acid, 1.0
Lowest	Weak acid, 5.0

Enzyme Activity

D

Activity Level	pH Level
Highest	Strong acid, 3.5
Lowest	Weak acid, 6.9

4 A classification key for an organism is shown below.



To what class does the organism belong?

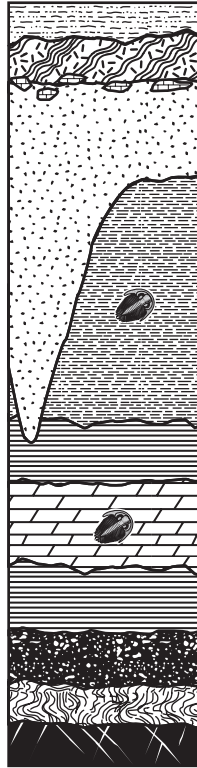
- F** Cestoda
- G** Gastropoda
- H** Trematoda
- J** Bivalvia

5 The clearing of rain forests for agricultural use has led to a decrease in biodiversity in many areas. One potential consequence of deforestation is

- A** an increase in the amount of atmospheric oxygen.
- B** the loss of plants with potential medicinal uses.
- C** a decrease in soil erosion.
- D** improved habitat for wildlife.

Go On ►

- 6** Two fossils that appear to be from the same type of organism are found in two different layers of rock. The layers of rock are shown below.



Which can be determined from the location of the fossils?

- F** the prey of the organisms
- G** the predators of the organism
- H** the cause of death for each organism
- J** the relative age of each organism

- 7** The table shows the percentage of individuals in a population of insects that is resistant to certain types of insecticides.

Insecticide Resistant Insect Populations

Population	Insecticide 1	Insecticide 2	Insecticide 3
1	12.8%	48.5%	1.8%
2	52.5%	2%	9.3%
3	28.6%	9.2%	34.8%
4	0%	0%	10.1%
5	2.8%	66.6%	3.5%
6	3.6%	78.5%	48.2%

Which two populations would be most affected by a widespread use of Insecticide 2 ?

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

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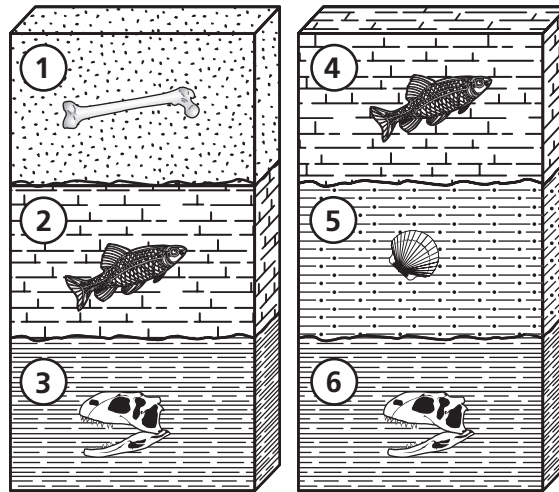
8 A student applies heat to a solid substance. Which indicates that a chemical change occurred?

- F** The substance becomes a liquid but solidifies when cooled.
- G** The substance changes color and stays that color when cooled.
- H** The substance goes from liquid to gas very quickly.
- J** The substance expands but stays the same color.

9 Which option contains only compounds?

- A** H_2O , H_2O_2 , H_3O , CO_2
- B** Na, NaCl, Pb, $\text{C}_6\text{H}_{12}\text{O}_6$
- C** NH_3 , KNO_3 , Hg, Ne
- D** Au, Ni, Cu, Fe

10 Compare the fossil layers shown below.



Which organisms are most likely to be the same approximate age?

- F** 1 and 3
- G** 3 and 5
- H** 2 and 4
- J** 5 and 6

11 The Arctic environment has temperatures that range between -22°C and 6°C with snow covering some of the area. Which adaptation would most likely help a population of organisms survive this environment?

- A** long necks and tall legs
- B** large shell and leathery skin
- C** light colored fur and layers of blubber
- D** brightly colored feathers and webbed feet

Go On ►

12

The table below shows the average rainfall amounts and number of grazing animals in an area over a 30-year period.

Rainfall Data

	Millimeters of Rain	Number of Grazing Animals
1975	780	1500
1980	525	2000
1985	600	1500
1990	575	2500
1995	300	1500
2000	850	1000
2005	300	1500

Which is the best conclusion based on the data?

- F** The number of grazing animals increases approximately every 5 years.
- G** The number of grazing animals supported by rainfall cannot exceed 2000.
- H** The number of grazing animals is not affected by the amount of rainfall.
- J** The number of grazing animals increases after years of increased rainfall.

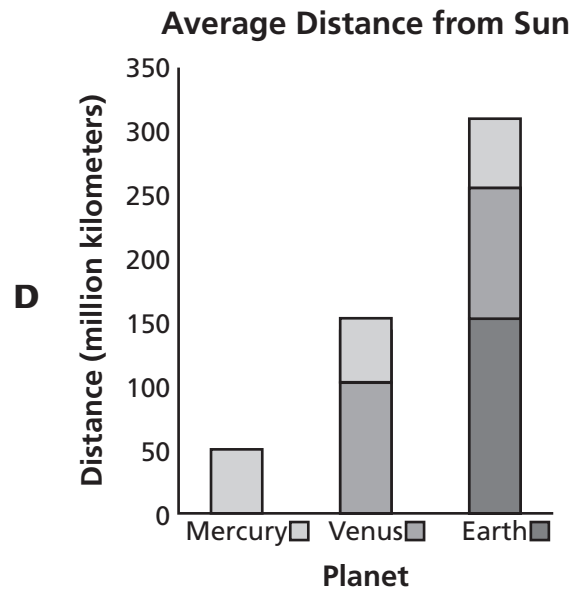
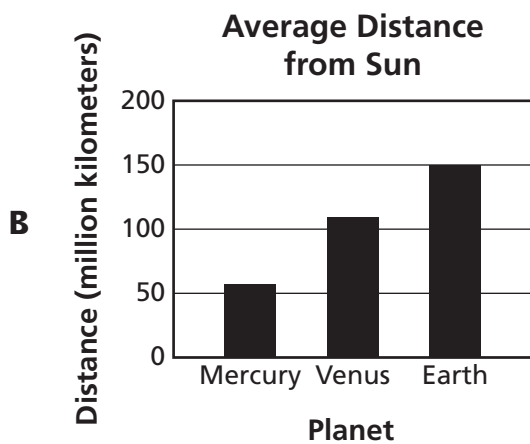
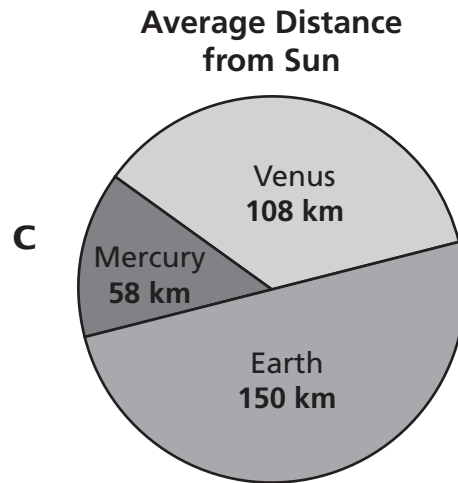
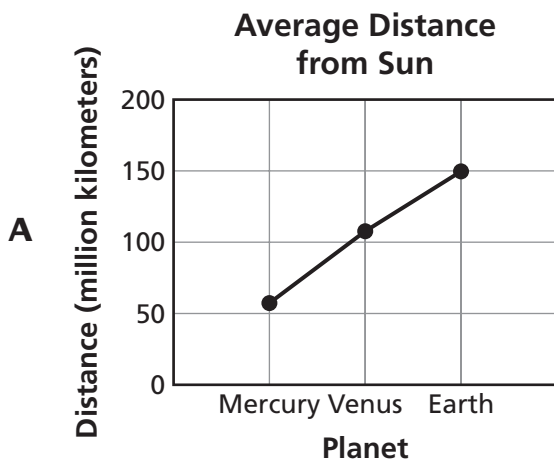
13

The table shows the average distance from the sun to the planets Mercury, Venus, and Earth.

Average Distance from Sun

Planet	Millions of Kilometers (km)
Mercury	58
Venus	108
Earth	150

Which graph best compares the distances from the sun for these three planets?

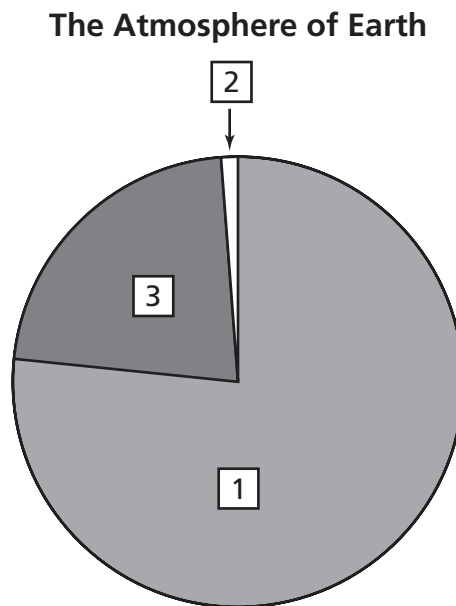


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14 An engineering company is testing a new weather-forecasting program. Which procedure would best verify that the program is making accurate predictions?

- F** comparing the predictions of the program to the actual weather
- G** comparing the predictions of the program to other predictions
- H** using the program to verify events not related to weather
- J** using the program to verify past weather-related events

15 The following graph represents the percentages of gases that make up the atmosphere of Earth.



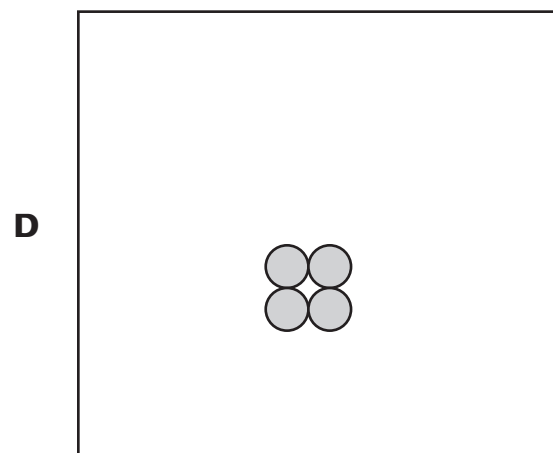
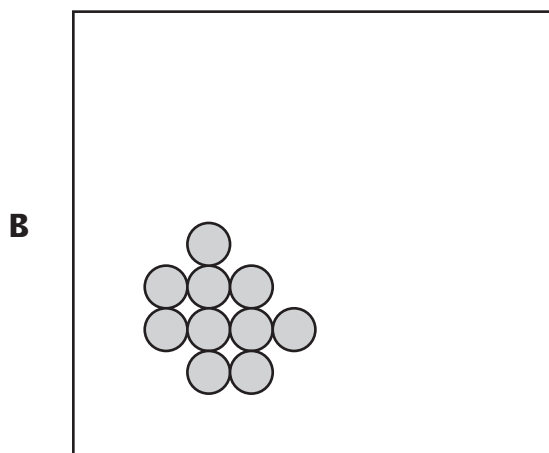
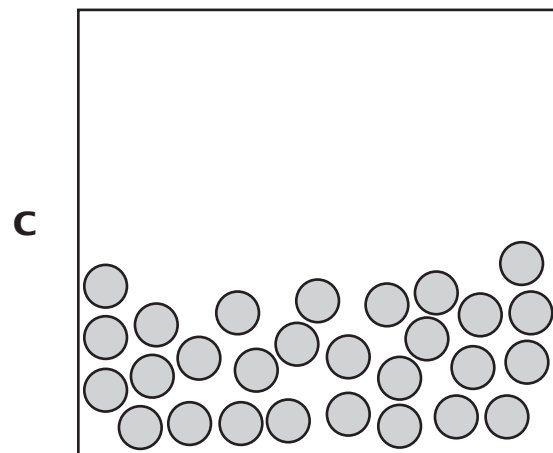
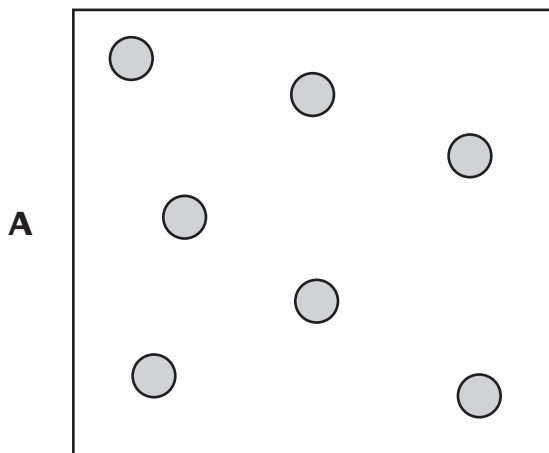
Which gas is represented in the portion labeled 1 on the graph?

- A** argon
- B** hydrogen
- C** nitrogen
- D** oxygen

16 A company is designing a dam with a floodgate to keep houses safe during the rainy season. The company is reviewing several possible designs that have worked in the past and is trying to develop a plan for implementing one design. Which is the next step in this process?

- F** pick several dams to use in a consumer survey
- G** test each dam model during a different flood season
- H** analyze the dam designs and pick one based on local needs
- J** redesign the past dams based on what the company feels will work best

17 Which diagram best shows the type of particle arrangement associated with a gas?





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18 The equation for density is shown below.

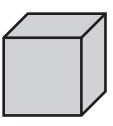
$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$
$$D = \frac{m}{V}$$

Which block has the greatest density?

F 
Mass = 9 grams
Volume = 9 cubic centimeters

H 
Mass = 11 grams
Volume = 4 cubic centimeters

G 
Mass = 10 grams
Volume = 12 cubic centimeters

J 
Mass = 12 grams
Volume = 15 cubic centimeters

19 Which statement best describes the difference between a mixture and a compound?

- A** Compounds are pure elements.
- B** Compounds contain elements bonded together.
- C** Compounds can be easily separated into distinct parts.
- D** Compounds have multiple boiling points.

- 20** A student is trying to determine the density of a cube using the formula shown below.

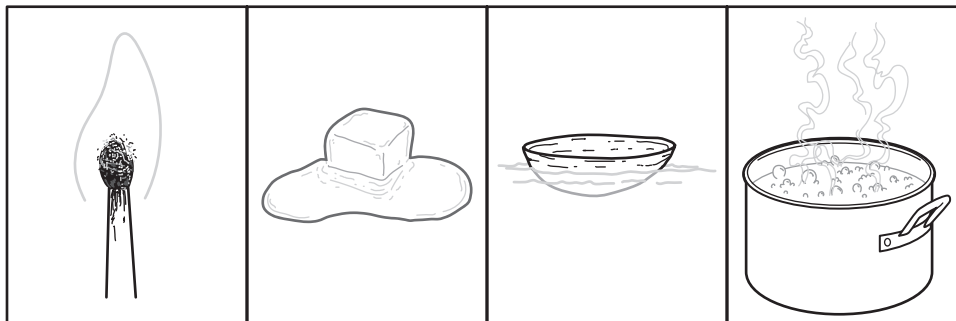
$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$
$$D = \frac{m}{V}$$

What is the density of the cube if it has a mass of 2 grams and a volume of 1 cubic centimeter?

- F** 3.0 grams/cubic centimeter
 - G** 2.0 grams/cubic centimeter
 - H** 1.0 gram/cubic centimeter
 - J** 0.5 gram/cubic centimeter
- 21** The main biofuel on the market today is ethanol, a fuel made from corn. Which type of bioengineered product is ethanol?
- A** adaptive
 - B** assistive
 - C** resistant
 - D** manipulated

Go On ►

22 Four changes are shown below.



Which of these represents a chemical change?

- F** A match is lit, creating a yellow-orange flame.
- G** A small piece of ice melts, changing from a solid to a liquid.
- H** A ball of clay sinks in water, and floats when reshaped.
- J** A pot of water is heated to boiling, and evaporation occurs.

25

The procedure below is designed to test how water temperature affects the rate at which sugar dissolves.

- Measure 150 milliliters of water into each beaker.
- Heat water to three different temperatures.
- Put 5 grams of sugar into each of the beakers at the same time.
- Stir and record the time it takes for the sugar to completely dissolve.

Which additional step will most improve the investigation?

- A** Use 200 milliliters of water in each beaker.
- B** Record the initial and final temperatures of the water.
- C** Stir at different rates for each beaker.
- D** Record the times when sugar is half dissolved.

26

The table below shows researchers' data from an investigation designed to determine which sponge shape absorbs the greatest volume of water.

Sponge Table

Sponge Shape	Mass of Wet Sponge
Round	5.50 grams
Square	5.70 grams
Irregular	6.00 grams
Oval	5.53 grams

Based on the data, the researchers stated that the irregular-shaped sponge absorbed the greatest volume of water. Researchers plan to market the irregular-shaped sponge as “super absorbent.” What is wrong with the researchers' interpretation of the data?

- F** The researchers should have tested the sponges in different types of liquids.
- G** The researchers should have tested more types of sponges.
- H** The researchers did not record the dry mass or volume of each sponge.
- J** The researchers did not freeze each sponge before massing it.

Go On ►

27 An iron block had an initial mass of 100 grams. As the block rusted, its mass increased. Which best explains why the mass increased?

- A** Oxygen combines with iron when rust is formed.
- B** Rust grows as it absorbs energy from the block.
- C** Water is absorbed as rust forms on the iron block.
- D** Rust releases heat and makes the iron expand.

28 Which procedure best represents the law of conservation of mass?

- F** evaporating salt water leaves 5 grams of salt
- G** burning 2 kilograms of wood leaves 0.4 kilogram of ash
- H** using filter paper to separate 2 grams of solid from 10 grams of water
- J** combining 2 grams of copper and 4 grams of sulfur to produce 6 grams of copper sulfate

29 An unknown substance will be classified as an acid if the substance

- A** has a pH of 3.0.
- B** is slippery to the touch.
- C** turns red litmus paper blue.
- D** releases hydroxide ions in water.

30 Which is best used with a bar magnet to produce an electric current?

- F** metal coins
- G** silver pins
- H** paper clips
- J** wire coil

31 A student is to determine how much salt will dissolve in 50 milliliters of water. Which tool is best for measuring the volume of water to be used?

- A 100-milliliter graduated cylinder
- B thermometer
- C spring scale
- D 25-milliliter beaker

32 The equation below represents a chemical reaction that releases energy.

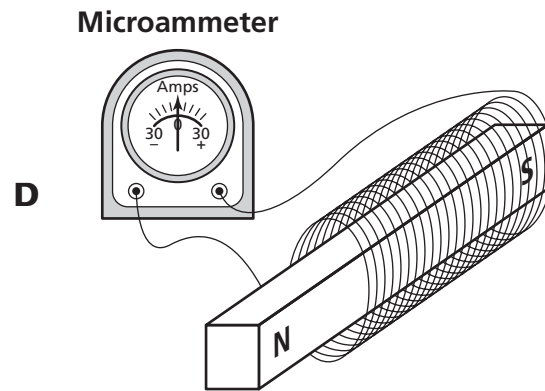
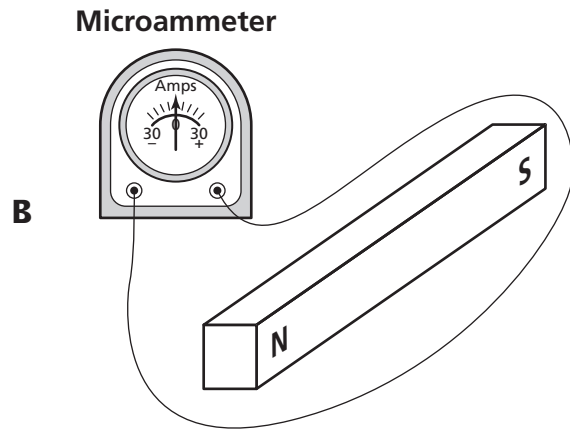
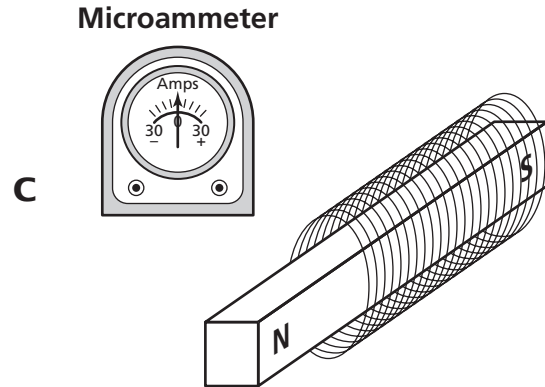
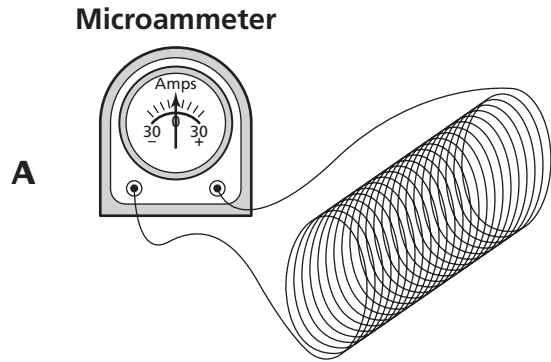


Which part of the equation is a reactant?

- F 2NaOH
- G H_2
- H $2\text{H}_2\text{O}$
- J energy

Go On ►

33 Which diagram shows an apparatus that is correctly set up to produce and measure electricity?



34 The construction of an electromagnet would be best completed by introducing a current into loops of wire wrapped around

- F** a sandstone rock.
- G** a glass square.
- H** a plastic rod.
- J** an iron nail.

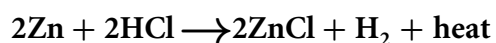
35

A factory is producing a new machine designed to reduce the amount of air pollution in houses. The machine was produced and sold to the public. After several months, reports show the machine is not working correctly. Which of these most likely caused this outcome?

- A** The proper cost analysis was not performed.
- B** The prototype was not tested before use by the public.
- C** The designers did not test other types of machines.
- D** The manufacturing of the machine was done over several months.

Part 2

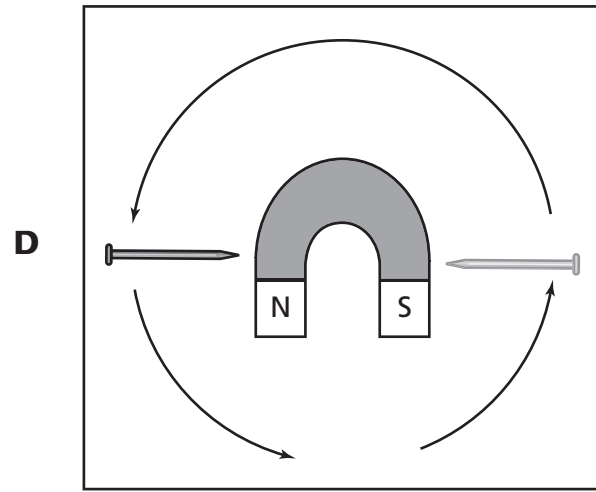
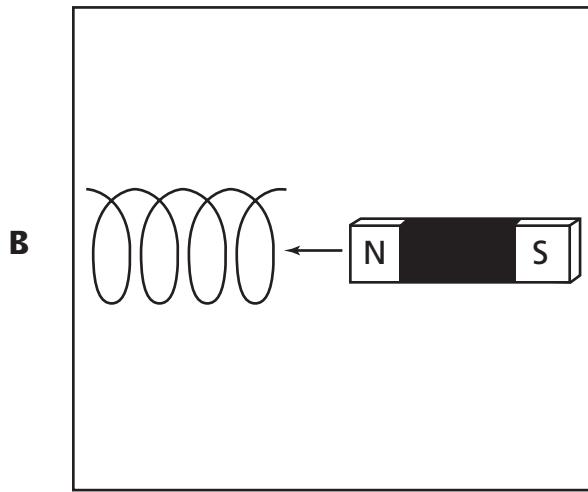
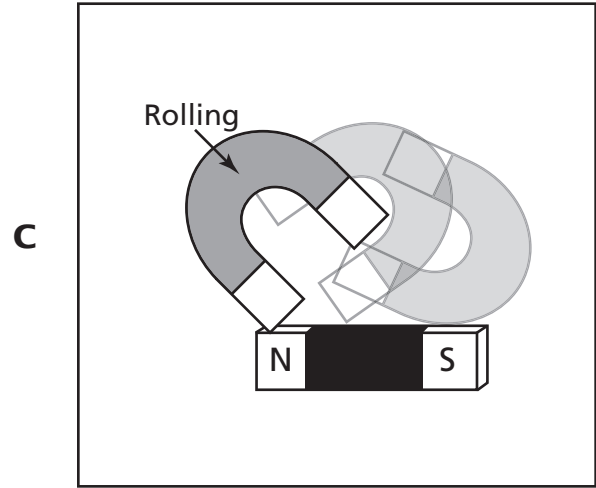
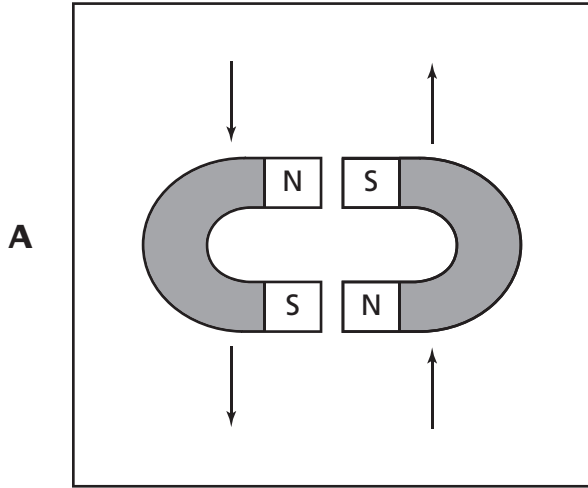
- 36** A chemical equation is shown below.



The element zinc (Zn) can best be described as a

- F** compound.
 - G** mixture.
 - H** gas.
 - J** reactant.
- 37** In order to prolong the shelf life of fruits and vegetables, companies expose some types of fruits and vegetables to X-rays in order to kill bacteria. Which best describes irradiated fruits and vegetables?
- A** adaptive products
 - B** assistive products
 - C** synthetic products
 - D** natural products
- 38** A student asks why the ashes from a fire have a much lower mass than the wood that was burned. Which is the correct answer to the student's question?
- F** Atoms in the wood are destroyed.
 - G** Gases are released into the air.
 - H** Water inside the wood solidifies.
 - J** Heat causes molecules to lose density.

39 Which diagram represents a magnet creating an electric current?



Go On ►

- 40** The sun is much larger than the moon. Which of these best explains why the moon, despite its smaller size, has a greater effect on ocean tides than the sun does?
- F** The moon is much closer to Earth.
 - G** The moon produces less light than the sun.
 - H** The moon and Earth have the same composition.
 - J** The moon has a lower surface temperature.
- 41** Which two items are best to use to determine the combined volume of three small rocks?
- A** electric scale and ruler
 - B** graduated cylinder and water
 - C** hot plate and beaker
 - D** meter stick and eye dropper
- 42** Which properties most likely indicate that a substance is a base?
- F** releases hydrogen gas and reacts with metals
 - G** turns red litmus blue and conducts an electric current
 - H** turns blue litmus red and conducts an electric current
 - J** has a pH below seven and corrodes a nail
- 43** Wire coils spinning between two magnets will produce
- A** cold.
 - B** electricity.
 - C** steam.
 - D** chemicals.

44 A scientist wants to study what happens when carbon dioxide (CO_2) reacts with hydrogen (H_2). The scientist discovers that this reaction produces methane (CH_4) and water (H_2O). Which equation correctly represents this reaction?

- F** $\text{CO}_2 + \text{H}_2 \rightarrow \text{CH}_4 + \text{H}_2\text{O}$
- G** $\text{CO}_2 + 4\text{H}_2 \rightarrow \text{CH}_4 + \text{H}_2\text{O}$
- H** $\text{CO}_2 + \text{H}_2 \rightarrow \text{CH}_4 + 2\text{H}_2\text{O}$
- J** $\text{CO}_2 + 4\text{H}_2 \rightarrow \text{CH}_4 + 2\text{H}_2\text{O}$

45 The table provides information about different worms.

Worm Characteristics

Type of Worm	Segmented	Bilateral Symmetry	Sexual Reproduction	Body Cavity	Example
Segmented worms	Yes	Yes	Yes	Yes	Earthworms and leeches
Flatworms	No	Yes	Yes	No	Planaria and tapeworms
Roundworms	No	Yes	Yes	Modified	Hookworms and <i>Ascaris</i>

Which is an example of a nonsegmented worm with no body cavity?

- A** Earthworms
- B** leeches
- C** *Ascaris*
- D** tapeworms

Go On ►

46 A chart listing the density of four metals is shown below.

Metal Densities Chart

Metal	Density (grams/cm ³)
Aluminum	2.70
Iron	7.87
Nickel	8.91
Silver	10.49

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$
$$D = \frac{m}{v}$$

A student determines that a metal has a mass of 810.0 grams and a volume of 90.0 cubic centimeters. Using the formula above, this unknown metal is most likely

- F** aluminum.
- G** iron.
- H** nickel.
- J** silver.

47 A student recorded the speed of several blue cars versus several red cars over the course of 1 day. The average speed of red cars was 70 mph, while the average speed of blue cars was 68 mph. The student concludes that red paint makes cars go faster. Which statement identifies an error in the student's conclusion?

- A** The conclusion was made based on two types of cars.
- B** The observation was made on several highways.
- C** The observation shows information for several times of day.
- D** The conclusion claims that there is a cause and effect without evidence.

- 48** A student coils a copper wire around a bar magnet. Which action will cause the device to generate electricity?
- F** The student connects the copper wire to a light bulb.
 - G** The student insulates the copper wire with plastic.
 - H** The student uses a horseshoe magnet instead of a bar magnet.
 - J** The student moves the bar magnet through the copper wire coils.

49 Which keeps Earth in its orbit?

- A** the rotation of Earth
- B** the gravity of the sun
- C** the revolution of the moon
- D** the gravity of the moon

50 A nuclear power plant has recently been built to generate electricity for a town located near several small lakes. Which is not a benefit of this nuclear power plant being built?

- F** The cost of the electricity will decrease.
- G** The loss of habitat for local wildlife.
- H** The heating of homes will be easier.
- J** The nuclear power plant will provide jobs.

Go On ►

51 A student wants to test how the concentration of phosphorus in a fertilizer affects plant growth. In designing this experiment the independent variable would most likely be the

- A** amount of phosphorus used per plant.
- B** height each plant grows after given fertilizer.
- C** type of each plant used.
- D** type of phosphorus used.

52 A student designs an experiment to test the acidity of the water in several ponds near an industrial area. Which tool would best help a student obtain accurate data?

- F** oxygen probe
- G** metric ruler
- H** pH indicator
- J** heat sensor

53 A student observes a tree with small needle-like leaves that stay green year round. Which conclusion can the student draw from the shape of the leaves?

- A** The leaves of the tree do not perform photosynthesis.
- B** The leaves of the tree have an illness that stunts their growth.
- C** The leaves of the tree are nonfunctional.
- D** The leaves of the tree are intended to reduce water loss.

54 A student investigated how the mass of a plastic disk affected its motion. The student pushed five similar plastic disks, each with a different mass, across a wooden floor. The student recorded the distance each disk traveled. The investigation was repeated five times. The student concluded there was no relationship between mass and distance traveled. Which of these best describes an error in the investigation?

- F** The student performed too few trials.
- G** The student should have used disks that were the same mass.
- H** The student should have pushed the disks across different surfaces.
- J** The student failed to control the amount of force applied.

55 Which statement best describes what the planet Saturn, a lizard, and a steaming kettle have in common?

- A** All are made of atoms.
- B** All are multicellular organisms.
- C** All are at the same internal temperature.
- D** All produce their own energy without help.

56 A student observes that a gas is formed when chemical Y is added to chemical Z in the lab. The student's observation of a new product being formed is the common outcome of all

- F** physical changes.
- G** chemical changes.
- H** mass changes.
- J** phase changes.

Go On ►

57 Which substance is classified as an element?

- A** NaCl
- B** CO
- C** H₂O
- D** Li

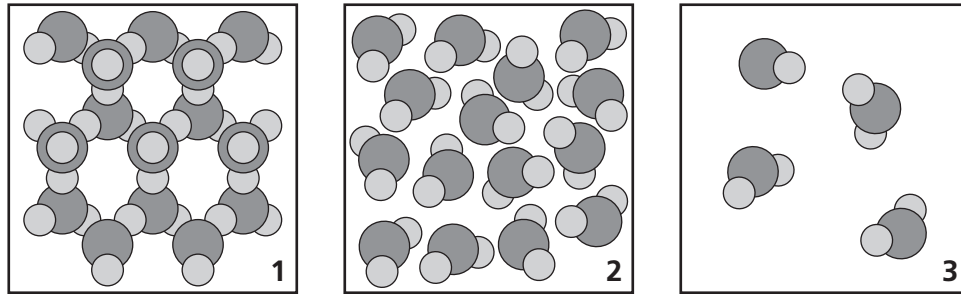
58 A combination of salt and sugar grains is best classified as a mixture because

- F** the grains taste different from one another.
- G** both the salt and sugar grains are in the same state of matter.
- H** no new chemical bonds are formed between the salt and sugar grains.
- J** a new product is formed when the salt and sugar grains are combined.

59 Which elements make up most of the atmosphere of Earth?

- A** oxygen and nitrogen
- B** nitrogen and helium
- C** water vapor and helium
- D** oxygen and water vapor

60 Diagrams of molecular arrangements are shown below.



The molecular arrangement of a solid is best represented in

- F** diagram 3.
- G** diagram 1.
- H** diagrams 1 and 2.
- J** diagrams 2 and 3.

61 A 5-gram sample of water occupies 5 milliliters of space in a beaker.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$
$$D = \frac{m}{V}$$

Using the above formula, what is the density of the water sample?

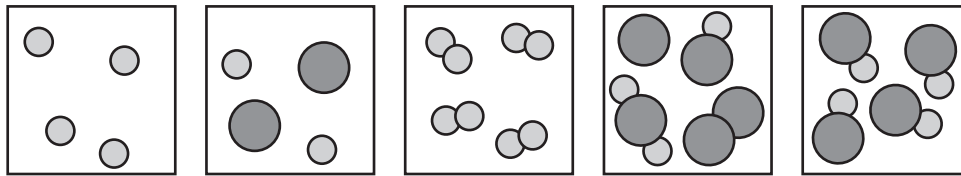
- A** 1 gram/milliliter
- B** 5 grams/milliliter
- C** 10 grams/milliliter
- D** 25 grams/milliliter

Go On ►

62 Which statement best describes a physical change?

- F** A process separates water into hydrogen gas and oxygen gas.
- G** An iron nail exposed to the atmosphere forms rust.
- H** Burning carbon releases the gas carbon dioxide.
- J** Salt added to a cup of water makes salt water.

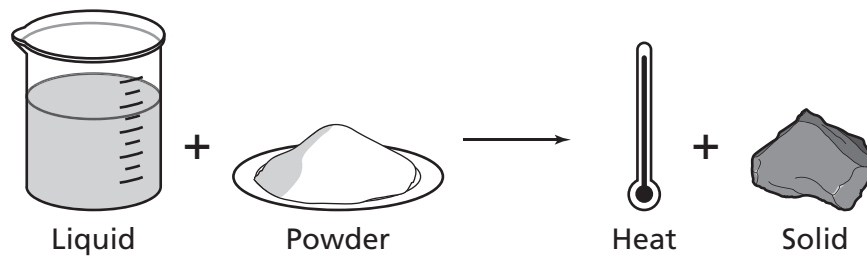
63 Five diagrams of atomic arrangements are shown below.



Which of these best describes all five diagrams?

- A** All are compounds made of atoms.
- B** All have three types of atoms.
- C** All are composed of atoms.
- D** All have the same atomic symbol.

- 64** A student performed a classroom investigation by mixing a purple liquid and a white powder. Diagrams of the setup and the resulting blue solid are shown below.

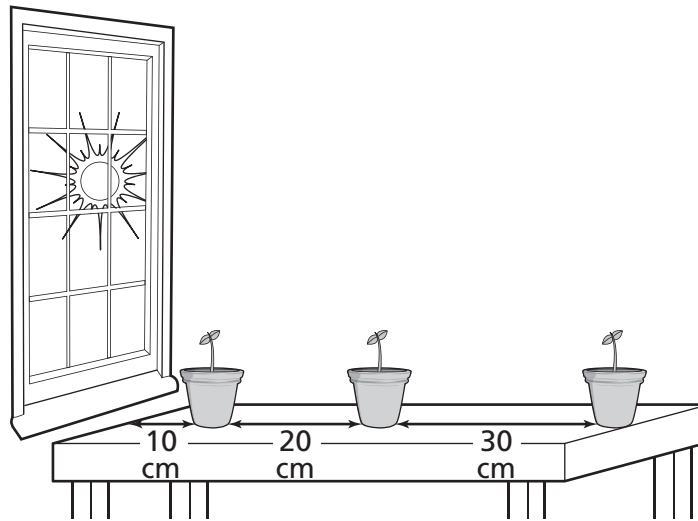


The student could best classify this reaction as a

- F** physical change.
- G** weight change.
- H** mass change.
- J** chemical change.

Go On ►

- 65** The picture below illustrates an experiment designed to test plant growth using potted green bean sprouts placed in front of a window.



Which of these is the independent variable in this experimental design?

- A** different species of plants
- B** different types of light sources
- C** the height of each plant's ceramic pot
- D** the distance of the plants from the light source

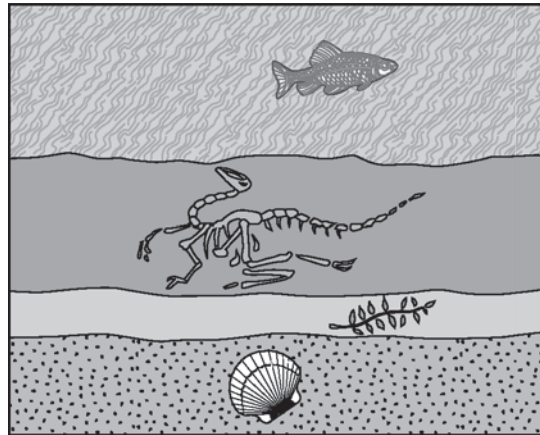
- 66** Which of these occurs during all chemical changes?

- F** new elements are formed
- G** temperature increases
- H** new bonds form between atoms
- J** phase changes from solid to liquid

67 Which statement describes a possible consequence if biodiversity were to decrease in the Arctic due to the extinction of polar bears?

- A** changes in the food web, leading to a loss of food resources for native people
- B** an increase in the number of producers after a herbivore population boom
- C** a decrease in the number of herbivores due to natural predators being gone
- D** disturbances in weather patterns, leading to a higher average water temperature

68 A cross section of rock layers is shown below.



Which fossil is found in the oldest layer?

- F** dinosaur
- G** fish
- H** shell
- J** leaf

Go On ►

69 The table below lists properties of four different pure samples.

Table of Solution Properties

Sample	Color of Blue Litmus Paper After Dipped in Solution	pH	Does Sample Conduct Electricity?
1	Red	5.2	Yes
2	Purple	7.0	No
3	Blue	9.8	Yes
4	Red	4.3	Yes

Based on the table, which sample is a base?

- A** Sample 1
- B** Sample 2
- C** Sample 3
- D** Sample 4

Name: _____

1. (A) (B) (C) (D)

2. (F) (G) (H) (J)

3. (A) (B) (C) (D)

4. (F) (G) (H) (J)

5. (A) (B) (C) (D)

6. (F) (G) (H) (J)

7. (A) (B) (C) (D)

8. (F) (G) (H) (J)

9. (A) (B) (C) (D)

10. (F) (G) (H) (J)

11. (A) (B) (C) (D)

12. (F) (G) (H) (J)

13. (A) (B) (C) (D)

14. (F) (G) (H) (J)

15. (A) (B) (C) (D)

16. (F) (G) (H) (J)

17. (A) (B) (C) (D)

18. (F) (G) (H) (J)

19. (A) (B) (C) (D)

20. (F) (G) (H) (J)

21. (A) (B) (C) (D)

22. (F) (G) (H) (J)

23. (A) (B) (C) (D)

24. (F) (G) (H) (J)

25. (A) (B) (C) (D)

26. (F) (G) (H) (J)

- 27. (A) (B) (C) (D)
- 28. (F) (G) (H) (J)
- 29. (A) (B) (C) (D)
- 30. (F) (G) (H) (J)
- 31. (A) (B) (C) (D)
- 32. (F) (G) (H) (J)
- 33. (A) (B) (C) (D)
- 34. (F) (G) (H) (J)
- 35. (A) (B) (C) (D)
- 36. (F) (G) (H) (J)
- 37. (A) (B) (C) (D)
- 38. (F) (G) (H) (J)
- 39. (A) (B) (C) (D)
- 40. (F) (G) (H) (J)
- 41. (A) (B) (C) (D)
- 42. (F) (G) (H) (J)
- 43. (A) (B) (C) (D)
- 44. (F) (G) (H) (J)
- 45. (A) (B) (C) (D)
- 46. (F) (G) (H) (J)
- 47. (A) (B) (C) (D)
- 48. (F) (G) (H) (J)
- 49. (A) (B) (C) (D)
- 50. (F) (G) (H) (J)
- 51. (A) (B) (C) (D)
- 52. (F) (G) (H) (J)
- 53. (A) (B) (C) (D)

-
54. (F) (G) (H) (J)
55. (A) (B) (C) (D)
56. (F) (G) (H) (J)
57. (A) (B) (C) (D)
58. (F) (G) (H) (J)
59. (A) (B) (C) (D)
60. (F) (G) (H) (J)
61. (A) (B) (C) (D)
62. (F) (G) (H) (J)
63. (A) (B) (C) (D)
64. (F) (G) (H) (J)
65. (A) (B) (C) (D)
66. (F) (G) (H) (J)
67. (A) (B) (C) (D)
68. (F) (G) (H) (J)
69. (A) (B) (C) (D)

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Science Answer Key

1	C
2	H
3	A
4	G
5	B
6	J
7	A
8	G
9	A
10	H
11	C
12	J
13	B
14	F
15	C
16	H
17	A
18	H

19	B
20	G
21	A
22	F
23	C
24	H
25	B
26	H
27	A
28	J
29	A
30	J
31	A
32	H
33	D
34	J
35	B
36	J

37	A
38	G
39	B
40	F
41	B
42	G
43	B
44	J
45	D
46	H
47	D
48	J
49	B
50	G
51	A
52	H
53	D
54	J

55	A
56	G
57	D
58	H
59	A
60	G
61	A
62	J
63	C
64	J
65	D
66	H
67	A
68	H
69	C