

Matter (Unitmatter)

Name: _____

Date: _____

1. What is the smallest particle of the element gold (Au) that can still be classified as gold?

- A. atom
- B. molecule
- C. neutron
- D. proton

This online assessment item contains material that has been released to the public by the Massachusetts Department of Education.

2. Which statement about the molecules in ice and the molecules in liquid water is correct?

- A. The molecules in ice have more energy than the molecules in liquid water.
 - B. The molecules in ice contain different atoms than the molecules in liquid water.
 - C. The molecules in ice have more electric charge than the molecules in liquid water.
 - D. The molecules in ice are less free to move than the molecules in liquid water.
-

3. Which formulas represent compounds?

- A. O_2 , H_2O_2
 - B. CO_2 , H_2O
 - C. H_2 , CO_2
 - D. H_2 , O_2
-

4. Which statement is correct concerning the mass of a ball of clay?

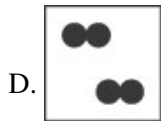
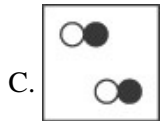
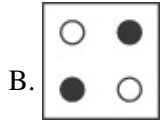
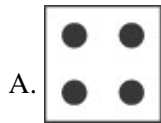
- A. The mass changes as the altitude of the ball of clay changes.
 - B. The mass changes as the shape of the ball of clay changes.
 - C. The mass of the ball of clay is unchanged by altitude or shape.
 - D. The mass is doubled when the ball of clay is divided into two equal pieces.
-

5. Mary wants to find the density of a small stone. Which tools will she need?

- A. a meterstick and a thermometer
 - B. a thermometer and a balance
 - C. a balance and a graduated cylinder
 - D. a graduated cylinder and a meterstick
-

Matter (Unitmatter)

6. If different kinds of atoms are represented by different colored dots, which picture below represents a mixture?



7. Which of the following is a compound?

- A. oxygen
- B. water
- C. nitrogen
- D. air

8. Which symbol represents carbon?

- A. Ca
- B. N
- C. K
- D. C

9. Evidence of a chemical change would be a

- A. melting popsicle.
- B. spinning top.
- C. spilled bucket of water.
- D. rusting car fender.

10. Moisture that collects on the outside of a cold glass results from the process of

- A. evaporation.
 - B. condensation.
 - C. sublimation.
 - D. vaporization.
-

Matter (Unitmatter)

11. Bill has an unknown liquid. In five different tests the liquid shows the same properties as water. Bill can conclude that the liquid

- A. is definitely water.
 - B. cannot be water.
 - C. is partly water.
 - D. could be water.
-

12. The observation that ice cubes float in a glass of water can be explained by the fact that

- A. most substances have less energy as solids than as liquids.
 - B. most substances are less dense as solids than as liquids.
 - C. ice has less energy than liquid water.
 - D. ice is less dense than liquid water.
-

13. Why does the outside of a glass of iced tea sometimes get moist?

- A. Water molecules from the tea pass through the pores in the glass.
 - B. Water vapor in the air turns to liquid as it condenses on the cold glass.
 - C. Glass attracts water droplets that are floating in the air.
 - D. Melting ice creates more water than the glass can hold.
-

14. A hot air balloon rises because

- A. molecules become lighter when heated.
 - B. molecules move faster and farther apart when heated.
 - C. molecules are less attracted by gravity when heated.
 - D. molecules become charged and repel each other when heated.
-

15. The solid, liquid, and gaseous states of water differ from each other in

- A. the mass of the individual atoms.
 - B. the size of the individual atoms.
 - C. the net electrical charge of the individual molecules.
 - D. the average speed of movement of the individual molecules.
-

16. A different chemical substance is formed when a

- A. piece of cloth is cut.
 - B. cup breaks.
 - C. candle burns.
 - D. piece of chalk breaks.
-

17. A solution in a dish contains 3.0 grams of salt dissolved in 100 grams of water. If 50 grams of the water evaporate, the solution is

- A. a compound.
 - B. a mixture.
 - C. an element.
 - D. a solid.
-

Matter (Unitmatter)

18. Carbon dioxide is

- A. an element.
 - B. a compound.
 - C. a solution.
 - D. a mixture.
-

19. A chemical change combining two elements results in

- A. an atom.
 - B. a compound.
 - C. an element.
 - D. a mixture.
-

20. The molecules in a test tube filled with cold water move more slowly than the molecules in a large tank of warm water. What is responsible for this difference in molecule speed?

- A. pressure
 - B. volume
 - C. weight
 - D. heat
-

21. Lucy noticed that her coin collection had begun to tarnish. Some of the metal in the coins had begun to change color. The formation of tarnish is **most** similar to which of the following changes?

- A. shredding a piece of paper into hundreds of tiny strips
 - B. dropping a dinner plate on the floor
 - C. melting ice cubes in a glass of juice
 - D. burning a piece of paper to ashes in a fireplace
-

22. Which is usually true about metals?

- A. Metals melt at lower temperatures than any other elements.
 - B. Metals always have their atoms arranged into crystals.
 - C. Metals do not combine easily with nonmetals.
 - D. Metals conduct electricity more easily than nonmetals.
-

23. If you saw an ice cube sink after it was placed in what you thought was a glass of water, which question should you probably ask?

- A. What kind of liquid is in the glass?
 - B. Will the ice melt slower or quicker?
 - C. How fast did the ice cube sink?
 - D. How soon would the ice cube start to float?
-

24. John has a mixture of salt, sand, and iron filings. To remove the iron filings from the mixture, John should

- A. run a magnet through the mixture.
 - B. put the mixture in water and stir it.
 - C. throw the mixture into the air and see which material falls first.
 - D. blow on it and keep what does not blow away.
-

Matter (Unitmatter)

25. A magnet will attract which of these objects?

- A. bar of soap
 - B. iron nail
 - C. plastic bottle cap
 - D. glass marble
-

26. Which of the following elements is part of the chemical formula for table salt?

- A. Na
 - B. Si
 - C. S
 - D. O
-

27. When mud and water are combined, the result is

- A. a mixture.
 - B. a compound.
 - C. an element.
 - D. a molecule.
-

28. An unknown element that is malleable, shiny, and conducts electricity would most likely be classified as

- A. an acid.
 - B. a salt.
 - C. a metal.
 - D. an ester.
-

29. What will happen if you mix vinegar and baking soda?

- A. It will explode.
 - B. Nothing will happen.
 - C. It will bubble up rapidly.
 - D. It will turn bright red.
-

30. What will happen to the metallic liquid in a thermometer if the thermometer is placed in very hot water?

- A. It will go up.
 - B. It will go down.
 - C. It will disappear.
 - D. It will not change.
-

31. What will happen to the metallic liquid in a thermometer if it is placed in very cold water?

- A. The metallic liquid will go up.
 - B. The metallic liquid will go down.
 - C. The metallic liquid will disappear.
 - D. The metallic liquid will not change.
-

Matter (Unitmatter)

32. Oxygen naturally occurs in which physical state?

- A. solid
 - B. liquid
 - C. gas
 - D. plasma
-

33. All metallic elements are

- A. powdery solids.
 - B. good thermal insulators.
 - C. good conductors of electricity.
 - D. easily melted into liquids.
-

34. Which of the following is an element?

- A. air
 - B. salt
 - C. water
 - D. oxygen
-

35. Which is a metric unit for density?

- A. g/cm
 - B. cm/g₃
 - C. g/cm³
 - D. cm³/g
-

36. When a gas forms a liquid, which process is taking place?

- A. freezing
 - B. condensation
 - C. boiling
 - D. evaporation
-

37. Which unit correctly describes density?

- A. pounds/square inch
 - B. kilograms/square meter
 - C. milligrams/square centimeter
 - D. grams/milliliter
-

38. The element beryllium (Be, atomic number 4 and atomic mass 9) is right above magnesium (Mg, atomic number 12 and atomic mass 24) in the periodic table. How many more electrons does magnesium have than beryllium?

- A. 5
 - B. 7
 - C. 8
 - D. 15
-

Matter (Unitmatter)

39. Which is an example of a chemical change?

- A. ice melting
 - B. salt crystals being ground to powder
 - C. water evaporating
 - D. wood burning
-

40. Use the table below to answer this question.

Substance	Melting Point (°C)
beeswax	62
gold	1,063
lead	327
oxygen	-218

Based on the melting points shown in the table, which material would still be a solid at 400°C?

- A. beeswax
 - B. gold
 - C. lead
 - D. oxygen
-

41. Which action would result in a chemical change?

- A. crumpling several sheets of paper
 - B. pounding a nail into a piece of wood
 - C. peeling and slicing a carrot
 - D. making blueberry muffins
-

42. The amount of matter in an object is called its

- A. weight.
 - B. gravity.
 - C. mass.
 - D. force.
-

Matter (Unitmatter)

43. Which elements are represented by the symbols in the formula NaCl?

- A. sodium, chlorine
 - B. sodium, oxygen, hydrogen
 - C. hydrogen, chlorine
 - D. chlorine, oxygen
-

44. A chemical change for a piece of metal would be

- A. being bent in half.
 - B. getting cut into two pieces.
 - C. being painted.
 - D. getting rusty.
-

45. Which symbolizes a molecule of a compound?

- A. He
 - B. Be
 - C. N₂
 - D. NaCl
-

46. Putting sand and salt together makes

- A. a compound.
 - B. an element.
 - C. a mixture.
 - D. a solution.
-

47. Plastic, wood, and iron are all made up of

- A. cells.
 - B. atoms.
 - C. carbon.
 - D. plants.
-

48. Water is

- A. a compound.
 - B. an element.
 - C. a solution.
 - D. a mixture.
-

Matter (Unitmatter)

49. Use the table below to answer this question.

1981 Pennies		1985 Pennies	
Mass (g)	Volume (cm ³)	Mass (g)	Volume (cm ³)
3.5	0.9	2.5	0.9

In 1982, the composition of US pennies was changed. According to the information in the table, 1985 pennies

- A. are more dense than 1981 pennies.
 - B. are less dense than 1981 pennies.
 - C. are equal in density to 1981 pennies.
 - D. cannot be compared to 1981 pennies.
-

50. On the periodic table, nitrogen is represented by N (atomic number 7). N is a chemical

- A. equation.
 - B. period.
 - C. symbol.
 - D. group (family).
-

51. All of the substances on the periodic table are classified as elements because they

- A. are pure substances.
 - B. are composed of atoms.
 - C. cannot be broken down into other substances.
 - D. cannot be dissolved in water or other liquids.
-

52. A difference between physical change and chemical change is that

- A. chemical change involves energy while physical change does not.
 - B. physical change involves energy while chemical change does not.
 - C. different kinds of molecules are present after a physical change but not after a chemical change.
 - D. different kinds of molecules are present after a chemical change but not after a physical change.
-

53. The chemical symbol Al represents which metal on the periodic table?

- A. arsenic
 - B. antimony
 - C. aurum
 - D. aluminum
-

54. Each element in the periodic table is assigned an atomic number. This number is the same as

- A. the number of electrons in the atom's nucleus.
 - B. the number of protons in the atom's nucleus.
 - C. the number of neutrons in the atom's nucleus.
 - D. the number of protons and neutrons in the atom's nucleus.
-

Matter (Unitmatter)

55. Which is the correct symbol for the element sodium?

- A. S
 - B. AI
 - C. Cl
 - D. Na
-

56. Which statement is usually true about the electrical properties of metals?

- A. Metals have high electrical resistance.
 - B. Lightweight metals are the best conductors.
 - C. Metals and plastics are both good insulators.
 - D. Metals are good electrical conductors.
-

57. Salt (NaCl) is a common substance. Salt is which of these?

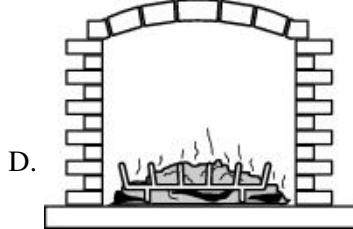
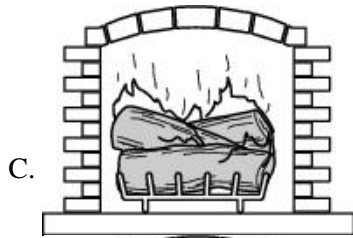
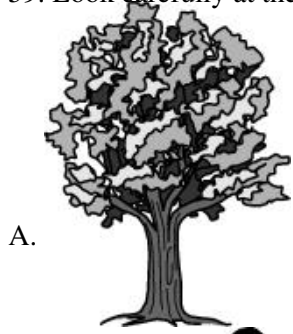
- A. atom
 - B. element
 - C. compound
 - D. mixture
-

58. Students poured equal amounts of different liquids to see how the liquids became layered. The denser liquids layered at the bottom. The lighter liquids layered at the top. Which tool should the students use in this experiment?

- A. a balance scale
 - B. a thermometer
 - C. a magnet
 - D. a graduated cylinder
-

Matter (Unitmatter)

59. Look carefully at the pictures below. Which picture shows only a physical change in the wood?



Matter (Unitmatter)

60. Tom places four objects in a tank of water. He makes the following observations.

- A cork floats.
- A rock sinks.
- A soda can floats.
- A piece of chalk sinks.

Which statement is correct based on Tom's observations?

- A. The rock and the chalk have a density greater than water.
 - B. The rock and the chalk have a density less than water.
 - C. The cork and the can of soda have a density equal to water.
 - D. The cork and the can of soda have a density greater than water.
-

61.

Silver is a white metal that is an excellent conductor of heat and electricity. The density of silver is 10.49 g/cm^3 . Silver does not react with water but does react with nitric acid. Silver tarnishes when exposed to air.

A physical property of silver is

- A. Silver reacts with nitric acid.
 - B. Silver does not react with water.
 - C. The density of silver is 10.49 g/cm^3 .
 - D. Silver tarnishes when exposed to air.
-

62.

During science lab, some students added small pieces of magnesium (Mg) to hydrochloric acid (HCl). They noticed that bubbles formed, the test tube got hot, and the magnesium disappeared.

Which of the following is a sign that a chemical reaction has taken place in **this** experiment?

- A. odor
 - B. formation of a gas
 - C. decrease in temperature
 - D. formation of a precipitate
-

Matter (Unitmatter)

63.

Silver is a white metal that is an excellent conductor of heat and electricity. Silver tarnishes when exposed to air and light. The density of silver is 10.49 g/cm^3 . The melting point is 962°C and the boiling point is 2000°C .

A chemical property of silver is

- A. Silver tarnishes.
 - B. Silver is an excellent conductor.
 - C. The density of silver is 10.49 g/cm^3 .
 - D. The boiling point of silver is 2000°C .
-

64.

In general, metals are solid at room temperature, malleable, ductile, good conductors of heat and electricity, and react in acids to produce hydrogen gas. Which of the properties mentioned is a chemical property?

- A. ductile
 - B. malleable
 - C. good conductors
 - D. reacts with acids
-

65.

What do these substances have in common?

air
helium gas
salt water
copper wire

- A. They are compounds.
 - B. They are pure substances.
 - C. They are composed of atoms.
 - D. They are composed of molecules.
-

66.

Two or more atoms, joined covalently, that act as a unit, are called a(n)

- A. ion.
 - B. atom.
 - C. mixture.
 - D. molecule.
-

Matter (Unitmatter)

67.

Which of the following particles combine to form molecules?

- A. atoms
 - B. protons
 - C. electrons
 - D. compounds
-

68.

Compare and contrast mixtures and compounds. Which statement is true about mixtures and compounds?

- A. Both mixtures and compounds are the same throughout.
 - B. Mixtures and compounds are made of two or more elements in a definite proportion.
 - C. Mixtures must be separated by chemical methods and compounds by physical methods.
 - D. Mixtures contain two or more elements physically combined and compounds contain two or more elements chemically combined.
-

69.

Based on the following characteristics, classify the state of matter.

high energy
found in stars
consists of freely moving charged particles

- A. gas
 - B. solid
 - C. plasma
 - D. liquid
-

70.

A group of students were asked to identify three white powders. The students used physical and chemical properties to identify the powders. They computed the density of each powder. They checked to see if any dissolved in water. One of the powders did not dissolve in water and they thought it was cornstarch. They knew that cornstarch felt slippery and reacted with iodine. The students put a few drops of iodine on each white powder. One powder turned black; it was definitely cornstarch. Another powder, baking soda reacted with vinegar. It fizzed and the test tube got hot.

During the experiment, which of these provided evidence of a physical property of one of the white powders?

- A. vinegar fizzed
 - B. test tube got hot
 - C. cornstarch turned black
 - D. cornstarch felt slippery
-

71.

A group of students were asked to identify three white powders. The students used physical and chemical properties to identify the powders. They computed the density of each powder. They checked to see if any dissolved in water. One of the powders did not dissolve in water and they thought it was cornstarch. They knew that cornstarch felt slippery and reacted with iodine. The students put a few drops of iodine on each white powder. One powder turned black; it was definitely cornstarch. Another powder, baking soda reacted with vinegar. It fizzed and the test tube got hot.

Which of these is an observed chemical property?

- A. color of powders
 - B. density of powders
 - C. powder dissolves in water
 - D. powder reacts with vinegar
-

72.

As you move across the periodic table from right to left within a period, the elements

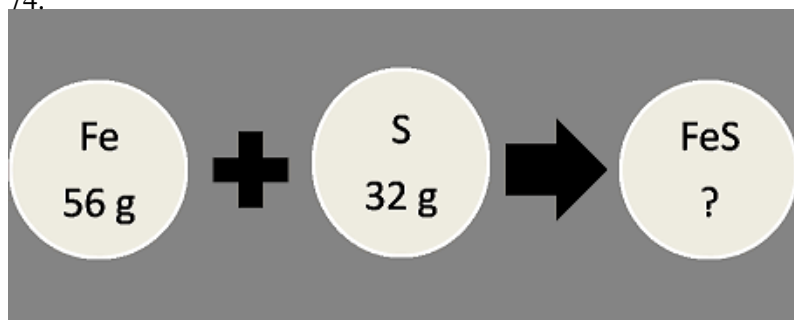
- A. become less stable.
 - B. become more reactive.
 - C. change from gases to solids.
 - D. change from metals to nonmetals.
-

73.

Copper (Cu) is a transition metal found in the 11th column of the periodic table. What statement is true about copper and the two other elements in that column?

- A. All three elements are nonreactive.
 - B. All three elements are in the same period.
 - C. All three elements have the same number of protons.
 - D. All three elements have similar chemical properties.
-

74.



Using the Law of Conservation of Matter, determine the number of grams of iron sulfide (FeS) that will be produced in this reaction.

- A. 24 grams
 - B. 32 grams
 - C. 56 grams
 - D. 88 grams
-

Matter (Unitmatter)

75.

During a science lab investigating chemical reactions, Mrs. Gray's students placed an antacid tablet in a zip lock bag. They recorded the mass of the tablet, 25 grams, and the bag, 60 grams. Then they carefully added 50 grams of water and quickly sealed the bag. The tablet began to fizz and soon disappeared. The bag was filled with gas. If the total mass of the bag + tablet + water was 135 grams before the reaction, what was the total mass of the bag + liquid + gas after the reaction was completed?

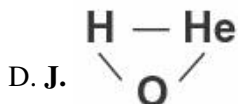
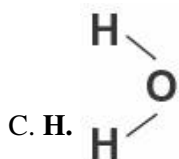
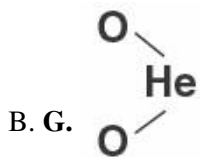
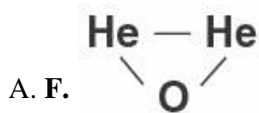
- A. 60 grams
 - B. 75 grams
 - C. 135 grams
 - D. 270 grams
-

76.

During a science lab investigating chemical reactions, Mrs. Gray's students placed an antacid tablet in a zip lock bag. They recorded the mass of the tablet, 25 grams, and the bag, 60 grams. Then they carefully added 50 grams of water and quickly sealed the bag. The tablet began to fizz and soon disappeared. The bag was filled with gas. If the mass of the liquid after the reaction is completed is still 50 grams, how much gas is produced?

- A. 25 grams
 - B. 50 grams
 - C. 60 grams
 - D. 95 grams
-

77. Which picture illustrates the structure of a molecule of water?



Matter (Unitmatter)

78. Which of these is best classified as a mixture?

- A. Carbon dioxide
- B. Water
- C. Soil
- D. Iron

*Permission has been granted for reproduction by the Virginia Department of Education
© Virginia Department of Education*

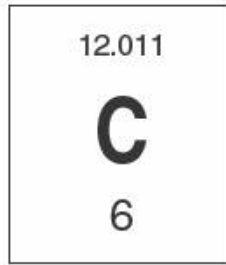
79. According to the chart, on which planet would a ball fall the fastest?

Planet	Earth	Jupiter	Neptune	Saturn
Acceleration due to Gravity (m/s ²)	10	26	14	12

- A. Earth
- B. Jupiter
- C. Neptune
- D. Saturn

*Permission has been granted for reproduction by the Virginia Department of Education
© Virginia Department of Education*

80.



The diagram above shows a block from the periodic table. The number six represents the —

- A. atomic mass of the element carbon
- B. atomic number of the element carbon
- C. number of neutrons in the element carbon
- D. number of valence electrons in the element carbon

*Permission has been granted for reproduction by the Virginia Department of Education
© Virginia Department of Education*