

Elements and the Periodic Table Study Guide

Write the letter of the correct answer on the line at the left.

- C 1. The basic particle from which all elements are made is called a(n)
a.) crystal. b.) molecule. c.) atom. d.) chemical bond.
- A 2. Which of the following is an example of an element?
a.) copper b.) rust c.) salt d.) water
- C 3. The _____ group has 6 valence electrons.
a) alkali metals b) group 17 c) group 16 d) group 6
- B 4. How many energy levels does lithium have?
a) 1 b) 2 c) 3 d) 4

Oct 4-12:20 PM

Fill in the blank to complete each statement.

1. Mendeleev constructed the first periodic table.
2. In the modern periodic table, the elements are arranged in order of increasing atomic #.
3. The atomic number of an element equals the number of protons in an atom of that element.
4. A chemical symbol is a representation of an element usually consisting of one or two letters.
5. The periodic table is organized in horizontal rows called periods
6. and vertical columns called groups or families

Oct 4-12:20 PM

If the statement is true write true. If the statement is false, change the underlined word or words to make the statement true.

- metals 1. The majority of elements in the periodic table are nonmetals.
- true 2. The reactivity of metals tends to increase as you move from left to right across the periodic table.
- true 3. Zinc, iron, nickel, and copper are examples of transition metals.
- alkali metals 4. The elements of Group 1 of the periodic table are called the lanthanides.
- true 5. Most metals are good conductors of electric current and heat.

Fill in the blank to complete each statement.

1. Nonmetals have properties that are the opposite of metals.
2. Atoms of nonmetals usually lose or gain electrons when they react with other atoms.
3. A substance that can conduct electric current under some conditions but not under other conditions is called a metalloids
Semi-conductors

Oct 4-12:20 PM

Multiple Choice: Read the question and all possible answers. Write the letter of the choice you select on the line in front of the question number.

- D 1. Glass breaking is an example of a:
a. Chemical property b. Physical Property c. Chemical Change d. Physical Change
- C 2. Metal oxidizing (tarnishing, rusting) is an example of a:
a. Chemical property b. Physical Property c. Chemical Change d. Physical Change
- D 3. When describing an object, which of the following is a chemical property?
a. size b. shape c. texture d. flammability
- B 4. A scientist places 10 mL of water in a test tube and heats the liquid over a Bunsen burner for 2 minutes. The liquid boils and escapes as steam. This experiment is a good example of
b. physical change involving phase changes c. chemical change involving chemical reactions
a. chemical change involving phase changes d. physical change involving chemical reactions

Oct 4-12:20 PM

A cube of sugar has the following properties. Mark each property as a (C)chemical or (P)physical property.

P 5. Mass = 2 grams *e*

IP 8. Composed of small, white crystals

P 6. Density = 8 g/cm^3 *I*

C 9. Bubbles and fizzes when heated

C 7. Burns when heated

Oct 4-12:20 PM

1. List the components of Dalton's Atomic Theory.

1. All matter made of atoms

2. Based upon Dalton's Atomic Theory, explain why $\text{Mg}_{1.5}\text{Cl}_3$ is not a valid formula.

atoms can't be divided (cont. @ bottom)

3. In the symbol, ${}_{11}^{23}\text{Na}$, explain what 11, 23, and Na represent.

23 Atomic mass 11 - atomic #

4. Explain why ${}^{14}\text{C}$ and ${}^{12}\text{C}$ are isotopes.

They have diff. # of neutrons

3. Atoms of the same element are identical

4. Atoms of diff. elements are different

5. Atoms exist in whole # ratios.

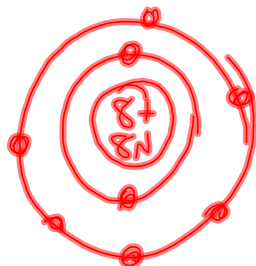
6. In reactions atoms are separated, combined & rearranged.

1

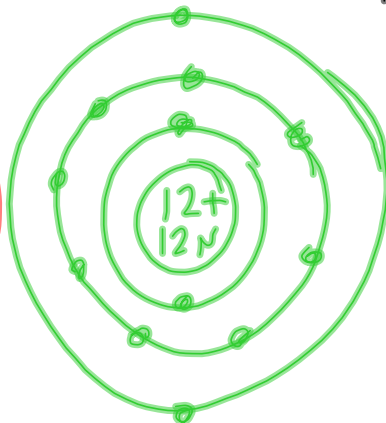
Oct 4-12:21 PM

5. Draw a Lewis Structure and a Bohr Model for the following:

a) Oxygen



b) Magnesium



c) Xenon



d) Bromine



Oct 4-1:09 PM

Isotopes

- The number of neutrons in any specific type of atom can vary. Atoms of the same element with different numbers of neutrons are called isotopes.
- Isotopes are distinguished from each other by including the mass number with the name or symbol.

Name	Symbol	Atomic #	Mass #	# Protons	# Neutrons	# Electrons
Uranium	^{235}U	92	235	92	143	92
Uranium	^{238}U	92	238	92	146	92
Carbon-12	^{12}C	6	12	6	6	6
Carbon-13	^{13}C	6	13	6	7	6

Ions

- As we have seen, in a neutral atom, the number of protons and the number of electrons is equal.
- Atoms can gain or lose electrons to become ions. Ions are charged atoms resulting from the difference in number of positive protons and negative electrons.
- A cation is a positive ion. A cation results when an atom loses electrons. # Protons > # Electrons
- An anion is a negative ion. An anion results when an atom gains electrons. # Electrons > # Protons
- Ions are distinguished from atoms by including the ion charge as a superscript in the symbol.

Name	Symbol	Atomic #	Mass #	# Protons	# Neutrons	# Electrons	Cation or Anion?
Aluminum	Al^{3+}	13	27	13	14	10	cation
Iron ion	Fe^{2+}	26	56	26	30	24	cation
Phosphorus	P^{-3}	15	30	15	15	18	anion
fluorine	F^{-1}	9	19	9	10	10	anion

Oct 4-12:21 PM