

Pre-Test : Chemical Bonding

Directions: Circle the letter to indicate whether the following statements are either true ("T") or false ("F").

1. Chemical bonding is the process of atoms combining to form new substances. T F
2. In the nucleus are two types of subatomic particles called electrons and ions. T F
3. Electrons are negatively charged particles which orbit the nucleus. T F
4. A neutral charge occurs when the number of electrons equal the number of protons. T F
5. Electrons hold random positions orbiting the nucleus. T F
6. Valence electrons are in the innermost energy level. T F
7. Matter in its lowest energy state tends to be more stable. T F
8. Atoms with a positive or negative charge are called ions. T F
9. Atoms with more valence electrons tend to have low ionization energies. T F
10. One property common to metals with metallic bonds is malleability. T F

Video Quiz

Directions: Fill in the blank with the correct word from the list at the bottom of the page. Not all words from the list will be used.

1. A chemical bond is an attractive _____ that holds atoms together.
2. Chemical bonding is the process of atoms combining to form new _____.
3. Matter tends to exist in its _____ energy state.
4. An _____ bond is a bond in which one atom donates electrons to another atom.
5. When the number of protons equals the number of electrons an atom has a _____ charge.
6. Ions are atoms with a positive or negative _____.
7. _____ is the process of removing electrons from atoms to form ions.
8. Electron _____ is the tendency of an atom to gain electrons when forming bonds.
9. A bond in which atoms share electrons is called a _____ bond.
10. In a _____ bond many electrons are shared by many atoms.

affinity
charge
covalent
crystal lattice
force
ionic
ionization
lowest
malleability
metallic
neutral
nucleus
protons
substances

Discussion Questions

Directions: Answer the following questions in the spaces provided (use the back of the sheet if necessary) or as a group.

1. Describe the process of chemical bonding in general terms.
2. Describe the structure of the atom and the position of protons, neutrons, and electrons.
3. Describe how energy levels fill up with electrons, and the importance of valence electrons in forming chemical bonds between atoms.
4. Describe the nature of ionic bonds, and provide an example of an ionic bond.
5. Describe the nature of covalent bonds, and provide an example of a covalent bond.
6. Describe what is illustrated in electron-dot diagrams.
7. Describe the nature of metallic bonds, and provide an example of a metallic bond

Word Search

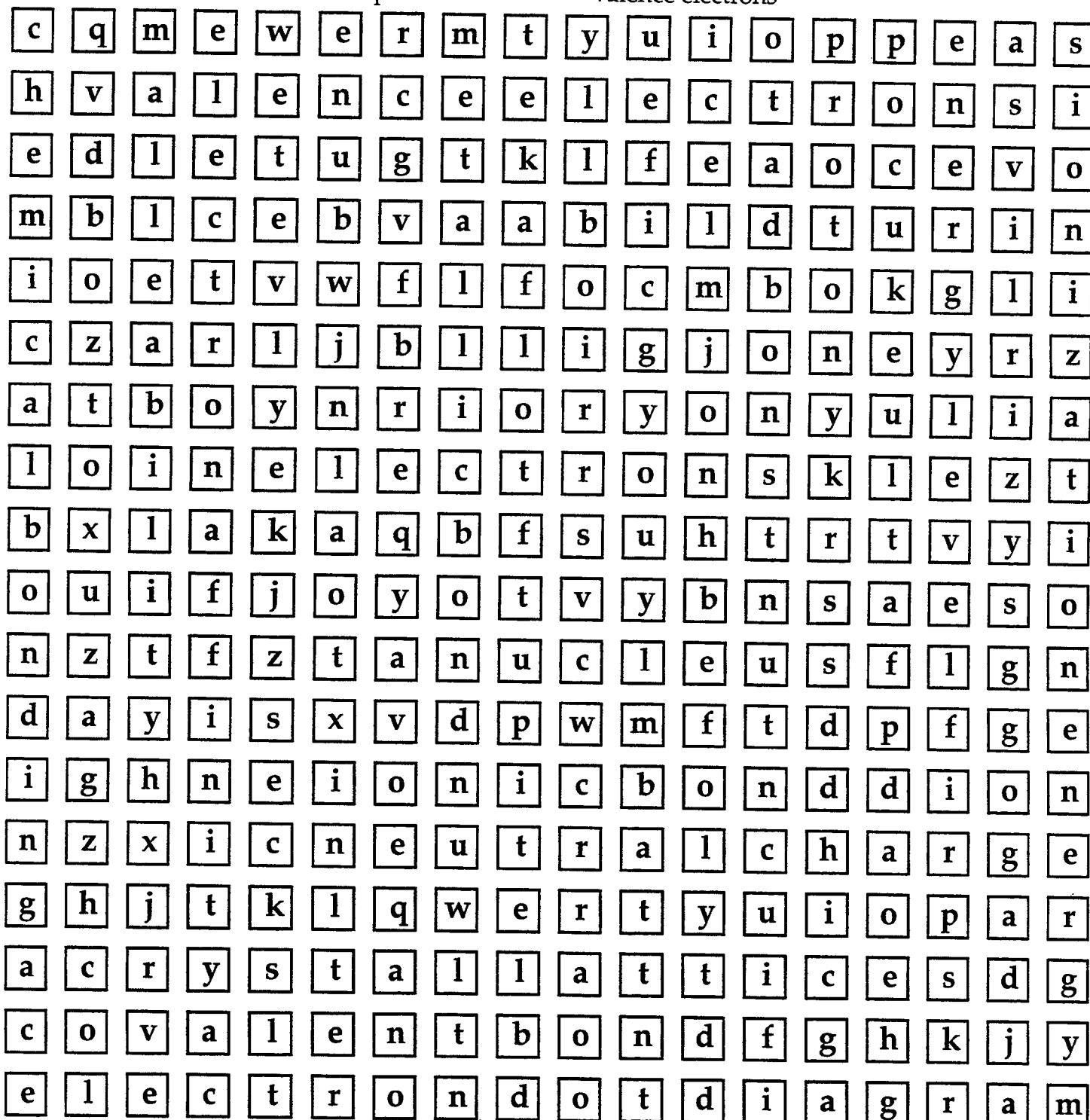
Directions: Find and circle the following vocabulary words in the puzzle. After completing the puzzle, write the definition of each word on the back of the page.

chemical bonding
electron dot diagram
ionization energy
nucleus

covalent bond
electrons
metallic bond
protons

crystal lattice
energy level
malleability
valence electrons

electron affinity
ionic bond
neutral charge



Internet Lesson

Directions: Locate this web site, read through the text and graphics and answer the following questions.

<http://www.nyu.edu/pages/mathol/textbook/bonding.html>

1. What atoms make up a water molecule?
2. What gives molecules different properties?
3. What is a covalent bond?

Click "Lewis Dot Structure"

4. What is a Lewis Dot Structure?

Click the "Back" button

5. Table salt is made up of what two elements?
6. When sodium and chlorine combine what happens to the electrons?
7. How do hydrogen bonds form?

Experiment!

Classifying Bonds

Objective

In this exercise, you will identify some common compounds, identify the type of bonds in the compound, create a Bohr model of the elements in the compound, and describe how the elements combine to form a compound.

Materials

Periodic Table
paper
pencil
chemistry resource book, textbook, or encyclopedia
aluminum can
salt
water

Procedure

Complete the chart below with the following information:

1. For each of the three substances provided (aluminum, salt, and water), state its chemical formula.
2. Next, determine which chemical bond binds the atoms together. Is it covalent, ionic, or metallic bond?
3. For each substance provided, draw a Bohr model for the elements in the compound.
4. Describe how the atoms create bonds and what happens with the valence electrons.

	Chemical Formula	Type of Bond	Bohr Model of Elements	Bonding Process
Aluminum				
Salt				
Water				

Conclusion:

Take some time to select some common objects in the classroom or your home that have a relatively simple chemical formula. Figure out the type of bonds that hold the atoms together, and then describe how the bonds form. You may need to use some books for assistance in figuring out the chemical formulas and the type of bonds involved.

Post - Test : Chemical Bonding

Directions: Answer the questions as indicated. Each question is worth five points.

Fill in the blank with the correct word.

1. A chemical _____ is an attractive bond that holds atoms together.
2. The overall charge of the nucleus is _____.
3. Electrons carry a _____ charge.
4. If the number of protons equals the number of electrons, the overall charge of the atom is _____.
5. The second energy level can hold as many as _____ electrons
6. _____ is the process of removing electrons to form ions.
7. Chlorine has a high electron _____ because it attracts electrons easily.
8. In a _____ bond, atoms share electrons.
9. In an electron-dot diagram, just the _____ electrons are illustrated.
10. In metallic bonds, many electrons are _____ by many atoms.

Circle "T" if the statement is true, or "F" if it is false.

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| 11. Chemical bonding is the process of atoms combining to form new substances. | T F |
| 12. The third energy level can hold as many as 14 electrons. | T F |
| 13. Valence electrons are important in determining how atoms bond with each other. | T F |
| 14. A grain of salt has a very irregular pattern. | T F |
| 15. Malleability is the ability of metals to remain rigid. | T F |

Post - Test : Chemical Bonding

Circle the correct answer.

16. When the outermost energy level of an atom is full it tends to be _____.
- a.) stable
 - b.) reactive
 - c.) volatile
 - d.) radioactive
17. Calcium, an element with 20 electrons, has _____ valence electrons.
- a) 4
 - b) 6
 - c) 10
 - d) 12
18. The energy needed for the removal of electrons is called _____ energy.
- a) activation
 - b) ionic
 - c) nuclear
 - d) removal
19. An atom that has a positive or negative charge is referred to as an _____.
- a.) electron
 - b.) proton
 - c.) ion
 - d.) electrode
20. A crystal _____ is a three-dimensional pattern of ions that repeats itself.
- a.) lattice
 - b.) figure
 - c.) hexagon
 - d.) cube