

Directions: Use the provided websites as resources to conduct research on chemical bonding. You may explore the activity-related websites **ONLY**. You must write and answer each question on your own paper.

Website 1: http://www.visionlearning.com/library/module_viewer.php?mid=55

A) "Module"

- Approximately how many elements are represented on the periodic table? 118
- What accounts for the fact that there are far more substances than are listed on the periodic table?
There are far more substances because these elements can combine and react to form new substances.
- "Formed when two or more atoms chemically bond together, the resulting compound is unique both chemically and physically from its parent atoms.
- What compound forms during the reaction between elemental sodium and elemental chlorine?
Name: sodium chloride Formula: NaCl
- List five facts related to G. N. Lewis.
proposed chemical bonds are formed b/w atoms b/c electrons interact w/
 - each other
 - elements are stable when they have 8 valence electrons
 - atoms with fewer than eight electrons bond together to fill valence shells
 - suggested electrons occupy cube shaped orbitals
 - he is an American Chemist
- Explain the behavior of electrons in ionic bonding.
electrons are transferred from one atom to another.
- In the process of either gaining or losing negatively charged electrons, the reacting atoms form ions.
- In the reaction between sodium and chlorine, which atom loses an electron? Which atom gains the electron? Na loses e⁻, Cl gains e⁻
- After transferring the electron, which ion is negatively charged? Why is the ion negatively charged?
Write the symbol for the negative ion: the anion is negatively charged because it gains an electron.
- After transferring the electron, which ion is positively charged? Why is the ion positively charged?
Write the symbol for the positive ion: the cation ion is positively charged because it loses electrons
- How does the sodium atom contrast to the sodium ion? (charge, size)
When the sodium loses the electron it becomes smaller in size and its charge becomes positive.
- How does the chlorine atom contrast to the chlorine ion? (charge, size)
the chlorine atom becomes negative and grows in size as it gains the electron from the sodium atom.

13. List six features that are common to ionic compounds.

1. ionic compounds are a bond between nonmetals and metals
2. the metal comes first and then the nonmetal when naming
3. dissolves easily in water and other polar solvents
4. in solutions, ionic compounds easily conduct electricity
5. they tend to form crystalline solids with high melting points
6. ionic compounds are solids because of intermolecular forces

14. Summarize the explanation for the reason why ionic compounds are solids.

Ionic compounds are solids because the intermolecular forces in between the solids. The opposite charges of the atoms in the compound cause the atoms to attract and be arranged in an alternating form.

15. What physical property results from ionic compounds forming crystals?

Ionic compounds form high melting points when they are in a crystalline structure.

16. Explain the behavior of electrons in covalent bonding.

The electrons are shared between atoms.

17. What causes covalent bonding to occur rather than ionic bonding?

Covalent bonding occurs because atoms have similar tendencies for electrons. Because both atoms want to gain electrons, they share electrons to attempt to fill their valence shells.

18. Among what type of elements does covalent bonding tend to occur? nonmetals

19. Explain one difference between ionic compounds and covalent molecules.

Ionic compounds occur between nonmetals and metals, covalent bonds occur between nonmetals.

20. Which type of bonding is greater: ionic or covalent? Why?

Ionic is a greater bond because full charges are formed in order to attract the atoms together to form a strong bond.

21. How many electrons are necessary to form a single bond? 2

22. How many electrons are present in a double bond? 4 Triple bond? 6

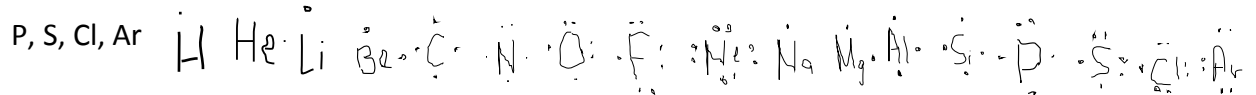
23. What purpose do Lewis dot structures serve?

The Lewis dot structures represent the formation of the valence electrons in an atom.

24. How are Lewis structures written? Explain.

The structures are written with the element symbols in the middle with dots surrounding it in a clockwise manner.

25. On the back of the last page, draw the Lewis structures for: H, He, Li, Be, C, N, O, F, Ne, Na, Mg, Al, Si,



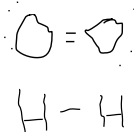
26. Regarding covalent bond, what do "polar" and "non-polar" mean?

Polar bonding is when electrons are unequally shared between atoms. Nonpolar bonding is when electrons are shared equally between atoms.

27. List two examples of non-polar covalent molecules. Draw their Lewis structures.

O₂

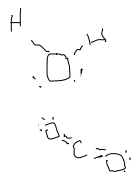
H₂



28. List two examples of polar covalent molecules. Draw their Lewis structures.

H₂O

CO₂



29. In your own words, define "dipole."

Dipole is when atoms in a molecular compound have a partial charge due to unequal sharing of electrons.

30. In a polar covalent molecule, the region containing more electrons has a partial negative charge.

However, the other pole of the molecule, which has fewer electrons, has a partial positivw charge.

B) "Questions & Quizzes"

1. Click on "Chemical Bonding Quiz."
2. Take the quiz.
3. Record your score here: 13/13

Website 2: <http://www.ewart.org.uk/science/structures/str14.htm>

1. Ionic bonding occurs when atoms gain or lose electrons. Most atoms want 8 electrons in their outside shells, but a hydrogen atom wants only 2 electrons. Carbon is an atom with a total of 6 electrons. This means that it has 4 electrons in its outside shell.
2. "Answer these questions"
 - a. Select the best answer for numbers 1-10
 - b. Record your score here: 10/10