***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”

1. Approximately how many elements are represented on the periodic table? 118 elements

2. What accounts for the fact that there are far more substances than are listed on the periodic table?

The elements can combine to create many more unique substances.

3. “Formed when two or more atoms chemically bond together, the resulting compound is unique

both chemically and physically from its parent atoms

\_.

4. What compound forms during the reaction between elemental sodium and elemental chlorine?

|  |  |  |
| --- | --- | --- |
|  | Name:\_Sodium Chloride |  |
| 5. | List five facts related to G. N. Lewis. |
|  | 1. American chemist | 4. Suggested that atoms share electrons to reach 8 |
|  | 2.Chemical bonds are formed b/w atoms | 5.Propsed Lewis dot structure |
|  | 3. Observed the octet rule |  |
| 6. | Explain the behavior of electrons in ionic bonding. |  |

Formula: NaCl

7. In the process of either losing or gaining negatively charged electrons, the reacting atoms form ions.

8. In the reaction between sodium and chlorine, which atom loses an electron? Which atom gains the electron? Sodium

9. After transferring the electron, which ion is negatively charged? Why is the ion negatively charged?

Write the symbol for the negative ion: Negatively charged Chlorine ion. Cl- gained an e-

10. After transferring the electron, which ion is positively charged? Why is the ion positively charged?

Write the symbol for the positive ion: Sodium is positively charged. Na+ lost an e-

11. How does the sodium atom contrast to the sodium ion? (charge, size)

The sodium is bigger than the ion and is neutral instead positively charged.

12. How does the chlorine atom contrast to the chlorine ion? (charge, size)

The chlorine atom is smaller compared to its larger, negatively charged ion.

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

Conduct electricity

Form crystalline solids

High melting points

Forms between metals and nonmetals

In naming, the metal is always first

Dissolves easily in water and other polar solvents

1. 4.

2. 5.

3. 6.

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

The intermolecular forces in ionic solids arrange the molecules in an alternating fashion.

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

Ionic compounds are all solids that conduct electricity.

16. Explain the behavior of electrons in covalent bonding.

Electrons are shared between atoms in covalent bonds.

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

Covalent bonding occurs when two or more elements share electrons.

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 transfer electrons instead of sharing between atoms like covalent molecules.

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

Ionic bonds are greater as they require a higher ionization energy to break than covalent bonds.

21. How many electrons are necessary to form a single bond? 8

22. How many electrons are present in a double bond? 16 Triple bond? 24

23. What purpose do Lewis dot structures serve?

They are shorthand to represent the valence electrons of an atom.

24. How are Lewis structures written? Explain.

Lewis structures are drawn with the element symbol surrounded by the number of valence electrons it has.

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, P, S, Cl, Ar

26. Regarding covalent bond, what do “polar” and “non-polar” mean? Polar bonds are formed when electrons are unequally shared between two atoms and the non-polar bonds are the opposite.

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

H2 and O2

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

H2O and HCl

29. In your own words, define “dipole.”

The dipole is a partial electrical charge that occurs when there is an unequal sharing of electrons between atoms in a molecule.

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 positive charge.

B) “Questions & Quizzes”

1. Click on “Chemical Bonding Quiz.”

2. Take the quiz.

3. Record your score here: 92% [12/13]

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

1. Ionic bonding occurs when atoms gain or lose \_. Most atoms want electrons in their outside shells, but a hydrogen atom wants only electrons. Carbon is an atom with a total of electrons. This means that it has electrons in its outside shell.

2. “Answer these questions”

a. Select the best answer for numbers 1-10 b. Record your score here: