

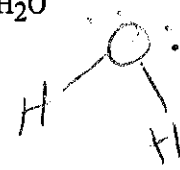
Name

Key

Unit 5: Bonding

I Can Statements

<p>___ 1. I can state the three types of chemical bonds.</p>	<p>The three types of chemical bonds are: <u>ionic</u>, <u>covalent</u>, and <u>metallic</u>.</p>
<p>___ 2. I can state the number of valence electrons that an atom attains to be most stable.</p>	<p>Atoms are most stable when they have <u>8</u> valence electrons.</p>
<p>___ 3. I can state the two types of compounds.</p>	<p>The two types of compounds are <u>ionic</u> and <u>covalent</u>.</p>
<p>___ 4. I can define ionic bond, covalent bond, and metallic bond in terms of the types of elements (metals, nonmetals) from which they are formed.</p>	<p>Definition: ionic bond Bond B/W metal + Non M. w/ transfer of e^- covalent bond NM + NM w/ shared e^- metallic bond metal + metal Bond w/ flowing e^-</p>
<p>___ 5. I can define ionic and covalent bonds based on what happens to the valence electrons.</p>	<p>Definition: In an <u>ionic bond</u>, the valence electrons of the transfered <u>metal</u> are <u>transferred</u> to the <u>nonmetal</u> so that each atom attains a stable octet (like noble gases). In a <u>covalent bond</u>, the valence electrons of the two <u>non metals</u> are <u>shared</u> so that each atom attains a stable octet (like noble gases).</p>
<p>___ 6. I can explain TICS as it relates to chemical bonding.</p>	<p>TICS stands for <u>transfer ionic, covalent, shared</u> It helps me remember what happens to the electrons in each type of bond.</p>
<p>___ 7. In terms of valence electrons, I can find similarities and differences between the bonding in several substances.</p>	<p>Explain, in terms of valence electrons, why the bonding in methane (CH_4) is similar to the bonding in water (H_2O) <u>Both are covalent. shared e^-</u> Explain, in terms of valence electrons, why the bonding in HCl is different than that bonding in NaCl. <u>HCl is covalent, nacl is ionic</u></p>

<p>___ 8. I can draw a Lewis dot diagram to represent an ionic compound.</p>	<p>Draw Lewis dot diagrams for the following ionic compounds.</p> <p>LiBr CaCl₂</p> <p>$[Li]^+ [Br]^-$ $[Ca]^{2+} 2 [Cl]^-$</p>
<p>___ 9. I can draw a Lewis dot diagram to represent a molecular (covalently bonded) compound.</p>	<p>Draw Lewis dot diagrams for the following molecular substances.</p> <p>H₂O CO₂</p> <p> $O=C=O$ with four lone pairs on each O</p> <p>I₂ CH₄</p> <p>$I-I$ with three lone pairs on each I $H-C-H$ with three H atoms and one lone pair on C or $H:C:H$ with three H atoms and one lone pair on C</p>
<p>___ 10. I can state the number of electrons that are shared in single and multiple covalent bonds.</p>	<p>In a single covalent bond, <u>2</u> electrons are shared.</p> <p>In a double covalent bond, <u>4</u> electrons are shared.</p> <p>In a triple covalent bond, <u>6</u> electrons are shared.</p>
<p>___ 12. I can state the type of bonding that occurs in the polyatomic ions (Reference Table E) and explain why they have that type of bonding.</p>	<p>Polyatomic ions have <u>covalent</u> bonding because <u>electrons are shared</u>.</p>
<p>___ 13. Given the chemical formula for a compound, I can determine the type(s) of bonding in the compound.</p>	<p>State the type(s) of bonding in the following compounds:</p> <p>NaCl <u>I</u> CO <u>C</u></p> <p>Hg <u>M</u> Na₃PO₄ <u>I & C</u></p>
<p>___ 14. I can explain and apply the meaning of BARF as it applies to chemical bonding.</p>	<p>BARF stands for <u>Break absorb, Release form</u></p> <p>This means that when a bond is FORMED, energy is <u>released</u> and when a bond is BROKEN, energy is <u>absorbed</u>.</p> <p>Given the balanced equation:</p> <p style="text-align: center;">N + N ----> N₂</p> <p style="text-align: right; font-size: 2em;"><u>Formed!</u></p>

	<p>Which statement describes the process represented by this equation?</p> <p>A) A bond is formed as energy is absorbed.</p> <p>B) A bond is formed as energy is released.</p> <p>C) A bond is broken as energy is absorbed.</p> <p>D) A bond is broken as energy is released.</p> <p style="text-align: right;">Barf ↑</p>
<p>15. I can explain the difference between a polar covalent bond and a nonpolar covalent bond in terms of the types of nonmetals involved.</p>	<p>Polar covalent bonds are formed when <u>two</u> nonmetals share electrons unevenly.</p> <p>Nonpolar covalent bonds form when <u>two</u> nonmetals share electrons evenly.</p>
<p>16. I can explain how to determine the degree of polarity of a covalent bond.</p>	<p>The degree of polarity of a covalent bond is determined by the <u>electronegativity difference</u> between the elements.</p>
<p>26. I can explain why one covalent bond is more or less polar than another covalent bond, based on electronegativity difference.</p>	<p>Explain, in terms of electronegativity difference, why the bond between carbon and oxygen in a carbon dioxide molecule is less polar than the bond between hydrogen and oxygen in a water molecule.</p> <p>There is a greater eneg difference in H-O Bond making it more polar</p>
<p>28. I can state, in order, the three questions that are asked to determine if a MOLECULE is polar or nonpolar.</p>	<p>When determining if a MOLECULE is polar or non-polar, the first question to ask is <u>"Are there polar Bonds?"</u></p> <p>When determining if a MOLECULE is polar or non-polar, the second question to ask is <u>What shape is it?</u></p> <p>When determining if a MOLECULE is polar or non-polar, the third question to ask is <u>is there symmetry?</u></p>
<p>29. I can explain and apply the meaning of SNAP as it applies to determining molecule polarity.</p>	<p>SNAP means <u>Symmetrical Nonpolar</u> <u>Asymmetrical Polar</u></p> <p>Why is a molecule of CH₄ nonpolar even though the bonds between the carbon and hydrogen are polar?</p> <p>Symmetry</p>

A) The shape of the CH₄ molecule is symmetrical.
 B) The shape of the CH₄ molecule is asymmetrical.
 C) The CH₄ molecule has an excess of electrons.
 D) The CH₄ molecule has a deficiency of electrons.

Explain, in terms of charge distribution, why a molecule of water (H₂O) is polar.
Concentration of negative charge on O

30. I can determine if a molecular is polar or nonpolar.

Determine which molecules are polar and which are nonpolar. Justify your answer.

H ₂ O	CO ₂
<i>Polar</i>	<i>NP</i>
I ₂	CH ₄
<i>NP</i>	<i>NP</i>

32. I can define intermolecular forces and give examples of each.

Definition:
 Intermolecular forces : *Forces of attraction B/w molecules.*

Examples: *Dipole Dipole / London Disp.*

34. I can list the intermolecular forces from STRONGEST to WEAKEST.

Strongest *Hydrogen* > *Dipole* > *Vanderwaal* Weakest

36. I can state the relationship between polarity and IMF strength.

As the polarity of the molecule ↑, the strength of the IMF ↑.

38. Given the physical state of some substances, I can compare the relative strength of the IMF.

At STP, iodine (I₂) is a crystal and fluorine (F₂) is a gas. Compare the strength of the IMF in a sample of I₂ at STP to the strength of the IMF in a sample of F₂ at STP.
I must have stronger IMF B/c it is more difficult to change phase.

<p>___ 39. Given the boiling points (or freezing points) of some substances, I can compare the relative strength of the IMF.</p>	<p>At STP, CF_4 boils at -127.8°C and NH_3 boils at -33.3°C. Which substance has stronger IMF? Justify your answer.</p> <p>The Lower the Bp the weaker the IMF CF_4 must be weaker!</p>
<p>___ 40. I can explain and apply the meaning of "Hydrogen bonding is FON".</p>	<p>"Hydrogen bonding is FON" means <u>hydrogen</u></p> <p><u>bonds occur B/w H-F, H-O, H-N</u></p> <p>Which compound has hydrogen bonding between its molecules?</p> <p>A) CH_4 B) CaH_2 C) KNO_3 D) H_2O</p>

