

### Ch9/ PowerPoint Study-1 Bonding - Lewis Structures Name:

Answer these questions as you are watching the videos. They are due in class.

These questions are not just for you to answer but also to prepare you for the exam.

Make sure you understand what you are writing and not just copy from the text book. Show all work.

- 1) Identify the following elements as metals or nonmetals and write their Lewis structures in the row below.

Element	Li	F	S	Ca	N
Metal or Non metal					
Lewis Structure					

- 2) Write the Lewis structures of the following ions.

$\text{Li}^+$	$\text{S}^{2-}$	$\text{Ca}^{2+}$	$\text{N}^{3-}$	$\text{F}^-$

Use the strategies given below for writing Lewis structures.

- First determine if you are writing Lewis structure for ionic or covalent compound. If ionic, i.e. metal and nonmetal, then see how to draw the Lewis structure from the power point. For covalent (all nonmetals), see steps 2 onwards.
  - Identify the central atom in the covalent compound – this is usually the left one in the compound or left in the periodic table.
  - Write the atom and write all the valence electrons around it.
  - Place all the other atoms surrounding the central atom. These are also called the terminal atoms.
  - Write all the valence electrons on the terminal atoms.
  - See how many electrons need to be shared for the terminal atoms with the central atom to give the terminal atom an octet (or duet in case of H).
- 3) From the elements in question 1, pick the element pairs that will form ionic and the ones that will form covalent bonds (table continued on the next page) ; write the compound formed and the Lewis structure.

Ionic Bond Pairs		Lewis Structure	
Pair: Select a metal and nonmetal	Compound formed		

Covalent Bond Pairs		Lewis Structure	
Pair	Compound formed		
N and F	NF <sub>3</sub>		
F and S	SF <sub>2</sub>		

- 4) For the following compounds, count the total number of electrons on the central atom and write which octet rule is being violated: incomplete shell, expanded shell, or unpaired electron. If no rule is violated, then write so.

Strategy: a) Count the number of bonds and multiply by 2, b) add any lone pair electrons left on the atom. Use the total number of electrons to find the violations.

$  \begin{array}{c}  \text{H} \\    \\  \text{H}-\text{P}-\text{H} \\    \\  \text{H}  \end{array}  $	
$  \begin{array}{c}  \text{Cl} \\    \\  \text{Cl}-\text{B}-\text{Cl}  \end{array}  $	
$  \text{HO}-\overset{\cdot\cdot}{\text{N}}=\text{O}  $	