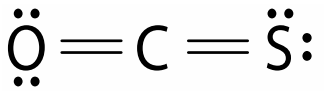
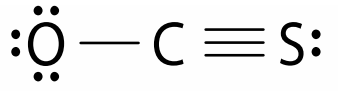
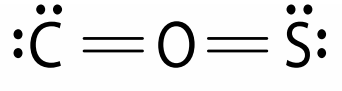
CHEMISTRY 11 AP – FORMAL CHARGE & VSEPR WORKSHEET

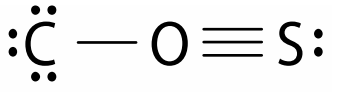
1) Assign formal charges to each atom in each of the following six structures for SCO. Predict which structure is favoured. Which is least likely to form? Explain.

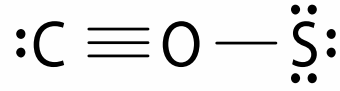
(a) 

(b) 

(c) 

(d) 

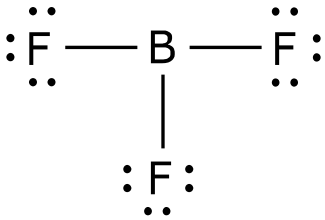
(e) 

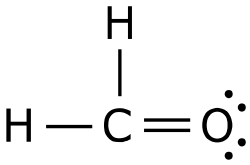
(f) 

2) Draw two structures for SO_3, one with an expanded octet and one without. You do not need to show resonance structures for the non-expanded form. Use formal charges to predict which structure is favoured.

3) Why do non-bonding or lone pair electrons attached to a central atom occupy more space than bonding electron pairs?

4) Consider the following Lewis structures. Would you expect these molecules to have the same shape or a different shape? Explain.

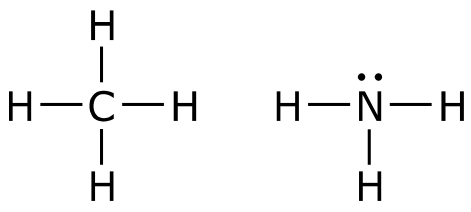




5) For each pair of columns, draw lines to connect the AX_mE_n notation on the left to the correct shape listed on the right. (The first one is done for you.)

AX_mE_n Notation	Molecular Shape	AX_mE_n Notation	Molecular Shape
AX_3	Bent	AX_4E	T-shaped
AX_2E_3	Trigonal bipyramidal	AX_2E	Octahedral
AX_4	Trigonal pyramidal	AX_3E_2	Square pyramidal
AX_3E	Trigonal planar	AX_6	Square planar
AX_2E_2	Tetrahedral	AX_5E	Bent
AX_5	Linear	AX_4E_2	Seesaw

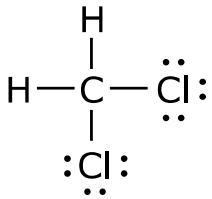
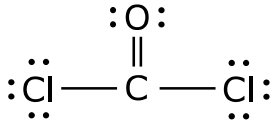
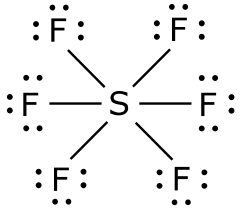
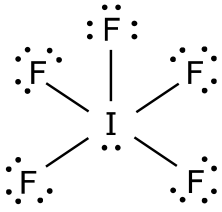
6) Consider the Lewis structures for methane and ammonia. Which molecule will have the smaller X – A – X bond angle and why?



7) Assume that all of the peripheral atoms are the same for each AX_mE_n category listed below and complete the following table. (Note that two different bond angles exist in an AX_5 molecule.)

AX_mE_n Category	AX_2	AX_3	AX_4	AX_5		AX_2E_3	AX_6	AX_4E_2
X – A – X Bond Angle								

8) Complete the following table:

Lewis Structure	AX_mE_n Notation	Shape of Molecule (Name and Diagram)
		
		
		
		

9) Draw Lewis structures for each of the following species and predict the resulting shapes.

(a) AsH_3

(b) I_3^-

(c) NH_2^-

(d) ClO_4^-