





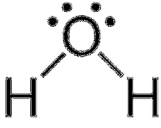
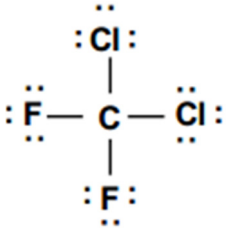
## VSEPR Theory

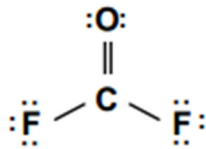
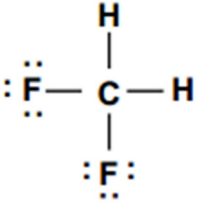
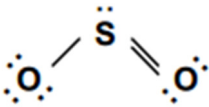
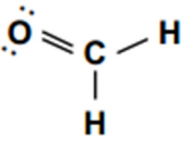
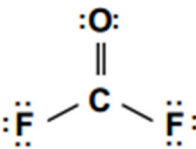
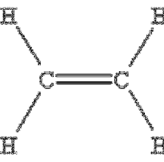
Name MR. SUDBURY KEY Date \_\_\_\_\_

VSEPR Stands for Valence Shell Electron Pair Repulsion. This theory helps predict the shape of molecules based on the elements that bond and where the unshared pairs of electrons are. The four major shapes that we will encounter are linear, bent, trigonal-planar, and tetrahedral. The characteristics of these molecular shapes are listed in Table 6-5 below. Pay special attention to the number of atoms bonded to the central atom.

	Molecular shape	Atoms bonded to central atom	Lone pairs of electrons	Type of molecule	Formula example	Lewis structure
Linear		2	0	AB <sub>2</sub>	BeF <sub>2</sub>	$\text{:}\ddot{\text{F}}\text{--Be--}\ddot{\text{F}}\text{:}$
Bent or angular		2	1	AB <sub>2</sub> E	SnCl <sub>2</sub>	$\text{:}\ddot{\text{Cl}}\text{--}\overset{\cdot\cdot}{\text{Sn}}\text{--}\ddot{\text{Cl}}\text{:}$
Trigonal-planar		3	0	AB <sub>3</sub>	BF <sub>3</sub>	$\begin{array}{c} \text{:}\ddot{\text{F}}\text{:} \\ \diagdown \quad \diagup \\ \text{B} \\ \diagup \quad \diagdown \\ \text{:}\ddot{\text{F}}\text{:} \\ \text{:}\ddot{\text{F}}\text{:} \end{array}$
Tetrahedral		4	0	AB <sub>4</sub>	CH <sub>4</sub>	$\begin{array}{c} \text{H} \\   \\ \text{H--C--H} \\   \\ \text{H} \end{array}$

Draw the Lewis structures for the elements below and predict their molecular shape according to VSEPR theory.

Name	Lewis Structure	Molecular Geometry
1. Water (H <sub>2</sub> O)		Circle one: a) <i>Linear</i> b) <b><i>Bent</i></b> c) <i>Trigonal-Planar</i> d) <i>Tetrahedral</i>
2. CS <sub>2</sub>	$\text{:}\ddot{\text{S}}\text{=C=}\ddot{\text{S}}\text{:}$	Circle one: a) <b><i>Linear</i></b> b) <i>Bent</i> c) <i>Trigonal-Planar</i> d) <i>Tetrahedral</i>
3. CCl <sub>2</sub> F <sub>2</sub>		Circle one: a) <i>Linear</i> b) <i>Bent</i> c) <i>Trigonal-Planar</i> d) <b><i>Tetrahedral</i></b>

4. $\text{COF}_2$		<p>Circle one:</p> <ul style="list-style-type: none"> <li>a) <i>Linear</i></li> <li>b) <i>Bent</i></li> <li>c) <b>Trigonal-Planar</b></li> <li>d) <i>Tetrahedral</i></li> </ul>
5. $\text{CF}_2\text{H}_2$		<p>Circle one:</p> <ul style="list-style-type: none"> <li>a) <i>Linear</i></li> <li>b) <i>Bent</i></li> <li>c) <i>Trigonal-Planar</i></li> <li>d) <b>Tetrahedral</b></li> </ul>
6. $\text{CHN}$	$\text{H} - \text{C} \equiv \text{N}:$	<p>Circle one:</p> <ul style="list-style-type: none"> <li>a) <b>Linear</b></li> <li>b) <i>Bent</i></li> <li>c) <i>Trigonal-Planar</i></li> <li>d) <i>Tetrahedral</i></li> </ul>
7. $\text{SO}_2$		<p>Circle one:</p> <ul style="list-style-type: none"> <li>a) <i>Linear</i></li> <li>b) <b>Bent</b></li> <li>c) <i>Trigonal-Planar</i></li> <li>d) <i>Tetrahedral</i></li> </ul>
8. $\text{CH}_2\text{O}$		<p>Circle one:</p> <ul style="list-style-type: none"> <li>a) <i>Linear</i></li> <li>b) <i>Bent</i></li> <li>c) <b>Trigonal-Planar</b></li> <li>d) <i>Tetrahedral</i></li> </ul>
9. $\text{COF}_2$		<p>Circle one:</p> <ul style="list-style-type: none"> <li>a) <i>Linear</i></li> <li>b) <i>Bent</i></li> <li>c) <b>Trigonal-Planar</b></li> <li>d) <i>Tetrahedral</i></li> </ul>
10. $\text{C}_2\text{H}_4$		<p>Circle one:</p> <ul style="list-style-type: none"> <li>a) <b>Linear</b></li> <li>b) <i>Bent</i></li> <li>c) <i>Trigonal-Planar</i></li> <li>d) <i>Tetrahedral</i></li> </ul>