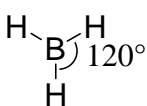
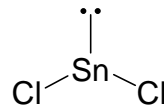
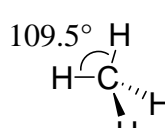
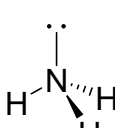
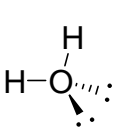




**SN = 3**    Ideal Bond Angle =  $120^\circ$   
 Electron Group Arrangement: trigonal planar








Possible CN's	Lewis Structure <i>e.g.</i>	Shape	Shape Name
<b>CN = 3</b>	$\begin{array}{c} \text{H}-\text{B}-\text{H} \\   \\ \text{H} \end{array}$		trigonal planar
<b>CN = 2</b>	$\begin{array}{c} \text{:}\ddot{\text{Cl}}-\ddot{\text{Sn}}-\ddot{\text{Cl}}\text{:} \\ \text{(large Group 14 can have} \\ \text{less than an octet)} \end{array}$		bent (or angular) (names based on atom locations only)

**SN = 4**    Ideal Bond Angle =  $109.5^\circ$   
 Electron Group Arrangement: tetrahedral

Possible CN's	Lewis Structure <i>e.g.</i>	Shape	Shape Name
<b>CN = 4</b>	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{H} \\   \\ \text{H} \end{array}$		tetrahedral
<b>CN = 3</b>	$\begin{array}{c} \text{H}-\ddot{\text{N}}-\text{H} \\   \\ \text{H} \end{array}$		trigonal pyramidal
<b>CN = 2</b>	$\begin{array}{c} \text{H}-\ddot{\text{O}}-\text{H} \\ \text{or} \\ \text{H}-\ddot{\text{O}}\text{:} \\   \\ \text{H} \end{array}$		bent (or angular) (but how similar is it to $\text{SnCl}_2$ ?)

If for a given atom (1)  $\text{SN} = \text{CN}$  and (2) all substituents are identical, the actual (experimental) bond angles will be the same as the ideal bond angles (by symmetry).

### VSEPR Theory for Hypervalent Compounds

<u>S.N.</u>	<u>C.N.</u>	Shape Names (ideal bond angles)	<u>S.N.</u>	<u>C.N.</u>	Shape Names (ideal bond angles)
5	5	 Trigonal bipyramidal $90^\circ, 120^\circ$	6	6	 Octahedral $90^\circ$
	4	 See-saw $90^\circ, 120^\circ$		5	 Square pyramidal $90^\circ$
	3	 T-shaped $90^\circ$		4	 Square planar $90^\circ$
	2	 Linear $180^\circ$			

Ideal Bond Angles =  $90^\circ, 120^\circ$   
 ( $180^\circ$  for linear)

Electron Group Arrangement:  
 trigonal bipyramidal

Ideal Bond Angle =  $90^\circ$

Electron Group Arrangement:  
 octahedral

You are not required to memorize the shape names for SN = 5 and SN = 6. However, you should be able to explain the shapes and bond angles.