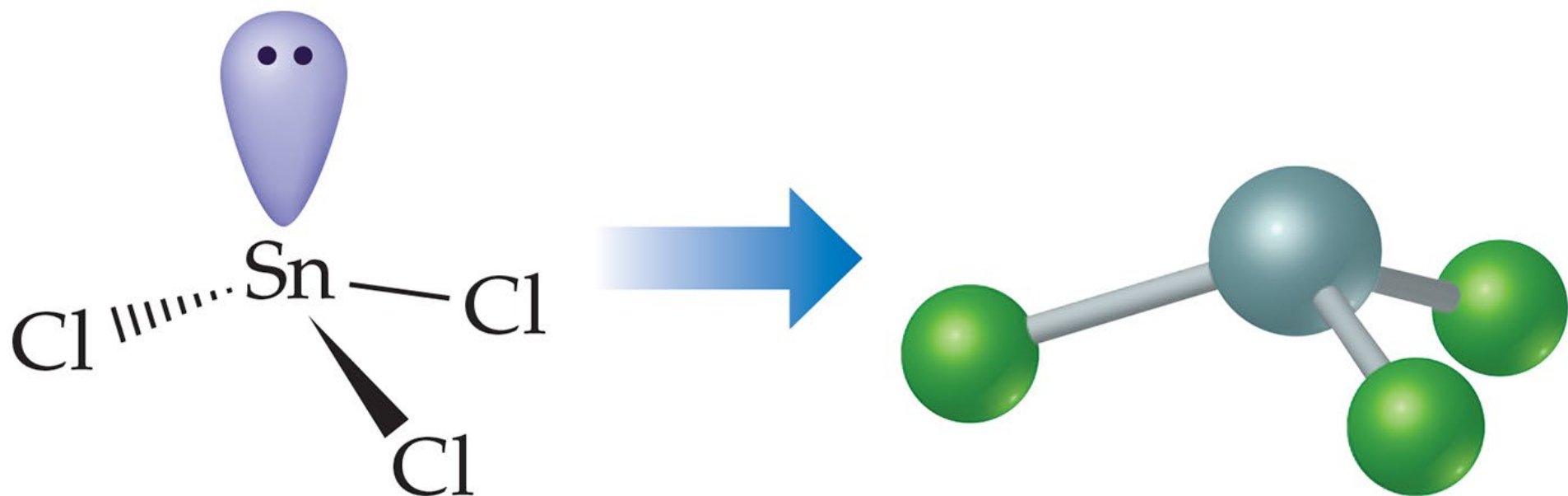
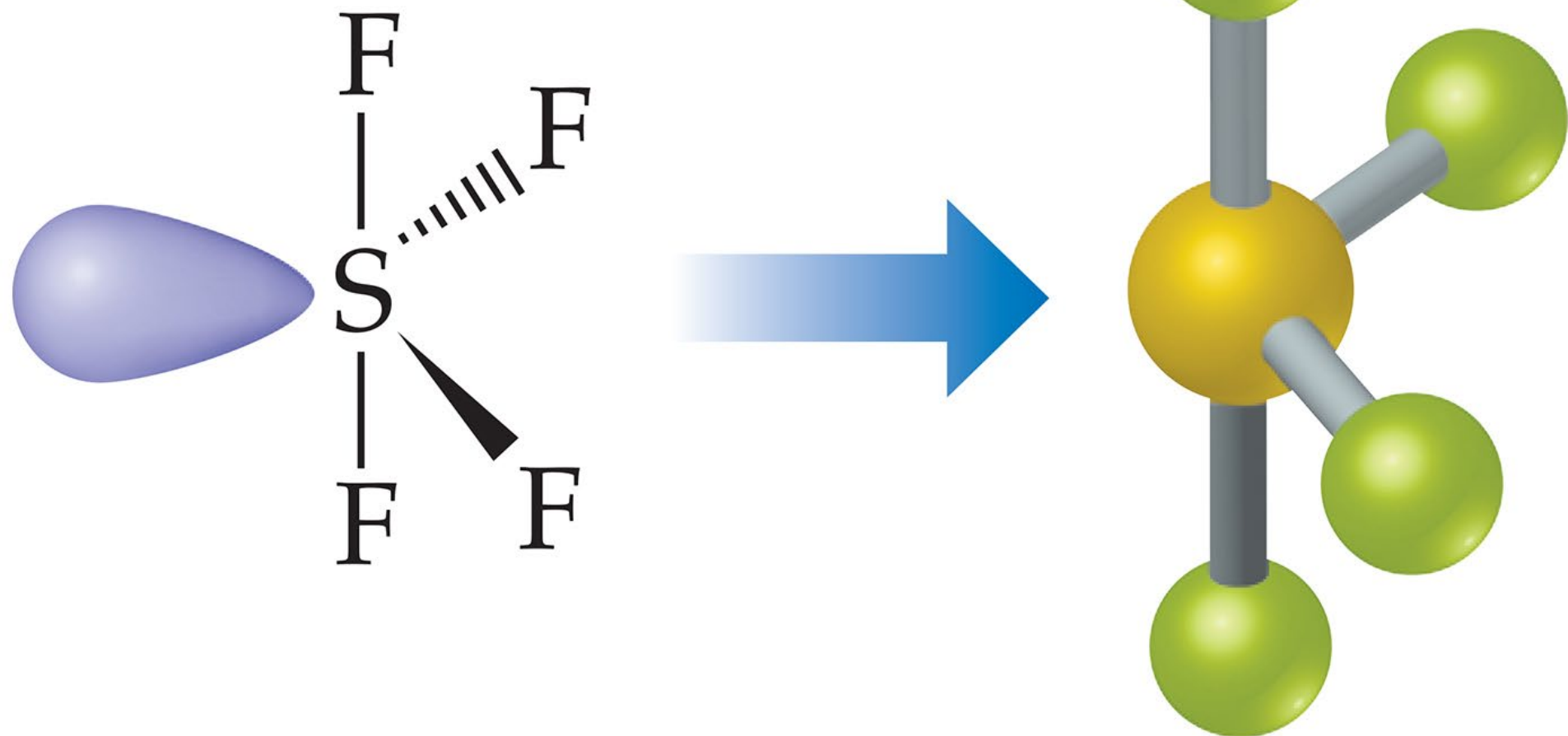


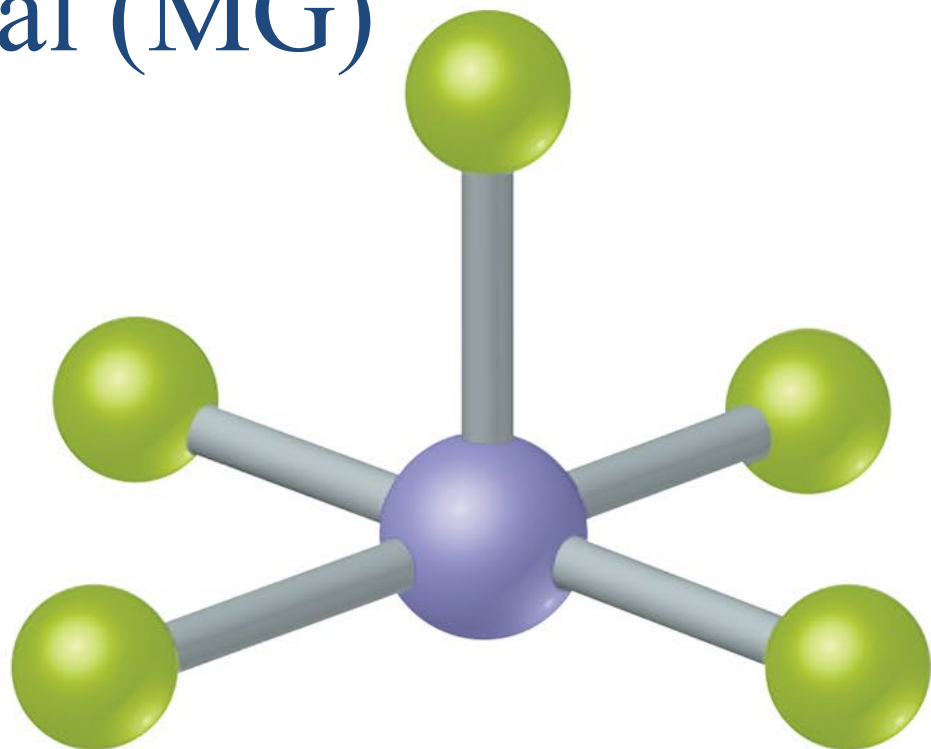
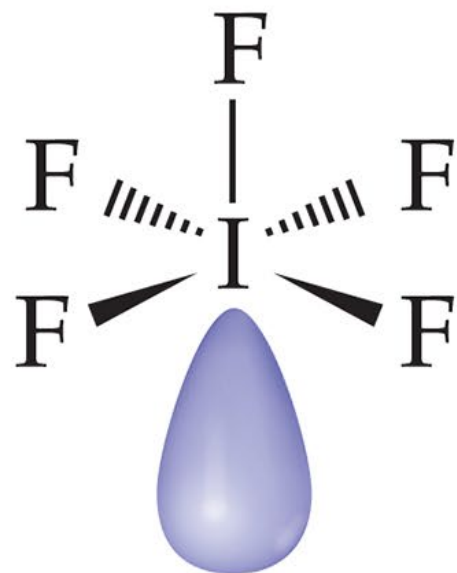
Tetrahedral (EG) to Trigonal pyramidal (MG)



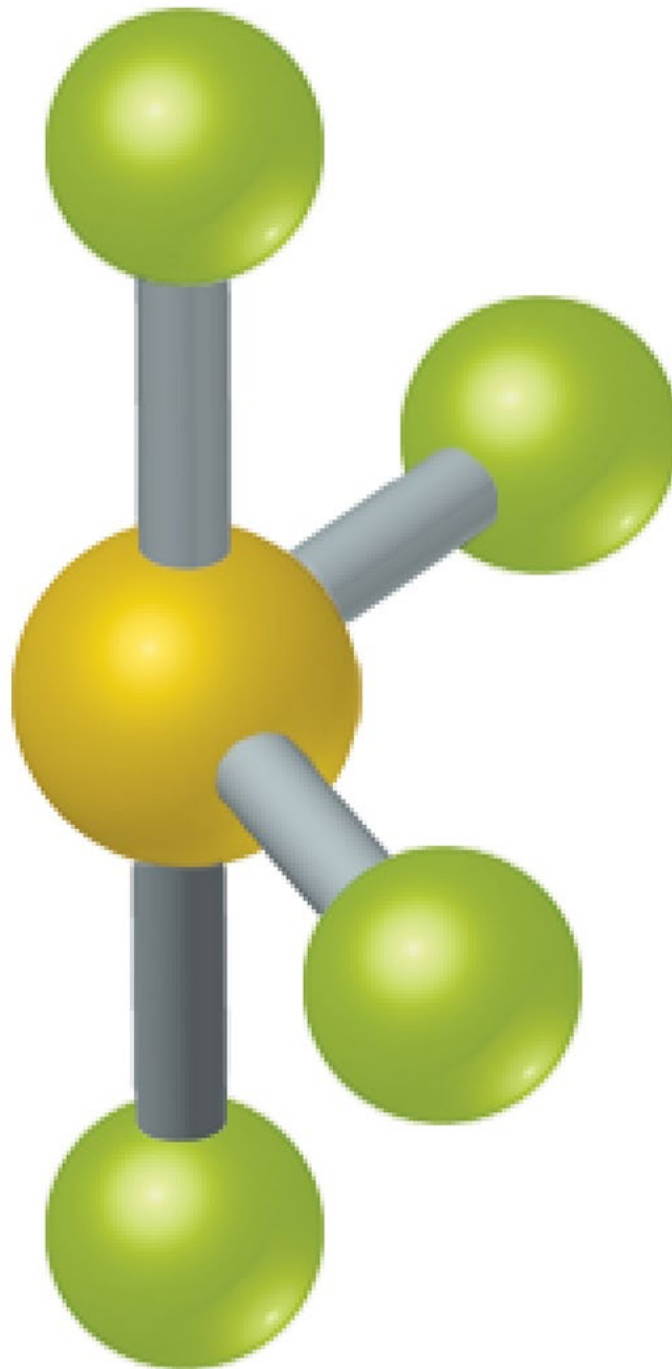
Trigonal Bipyramid (EG) to seesaw(M G)

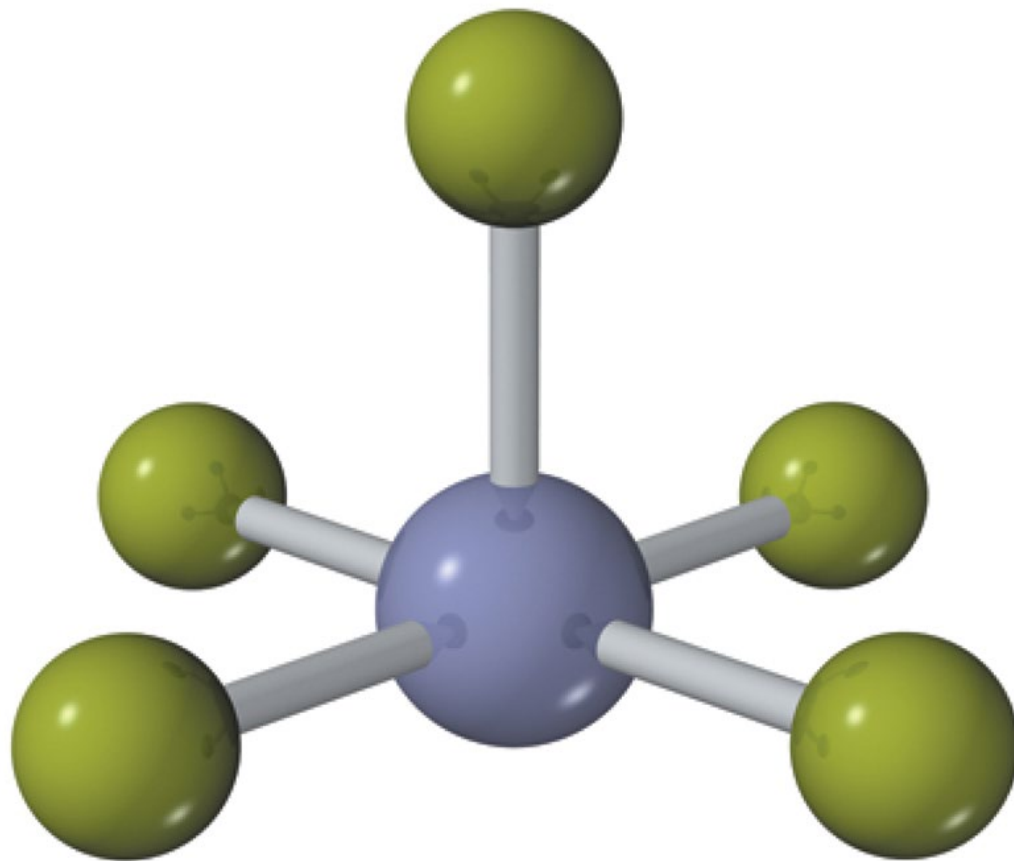


Octahedral (EG) to Square Pyramidal (MG)

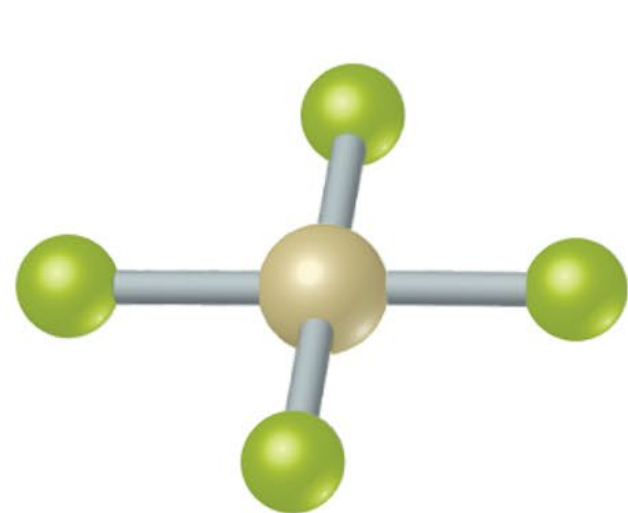


seesaw

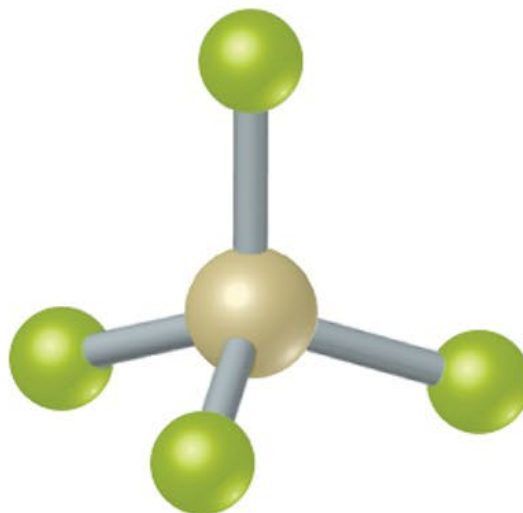




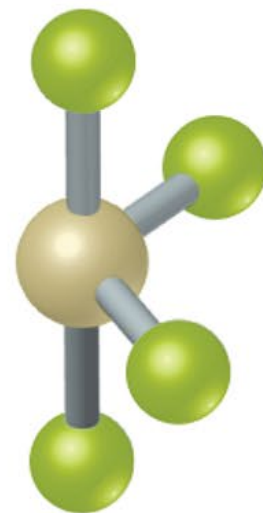
Square pyramidal



(i)



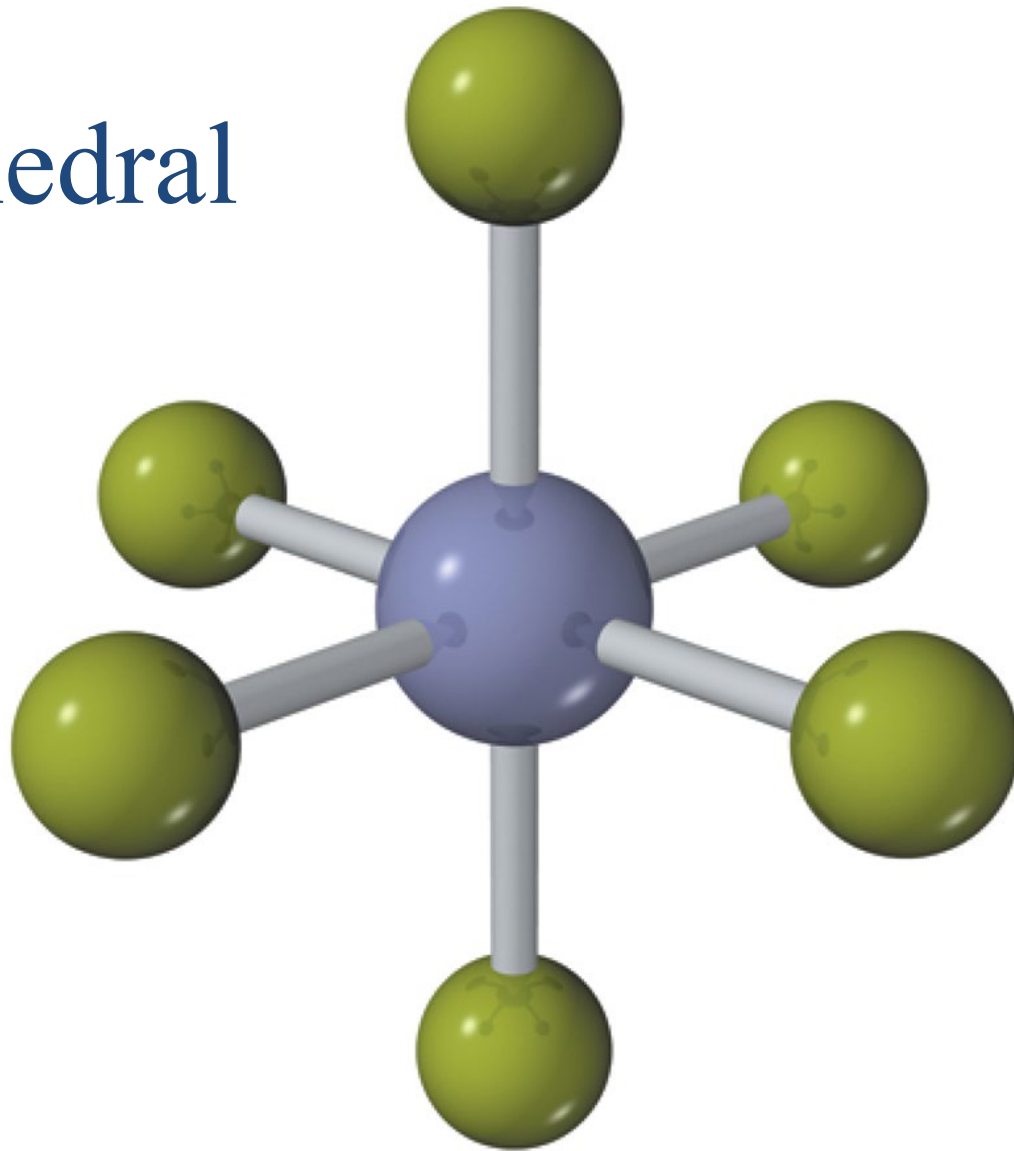
(ii)

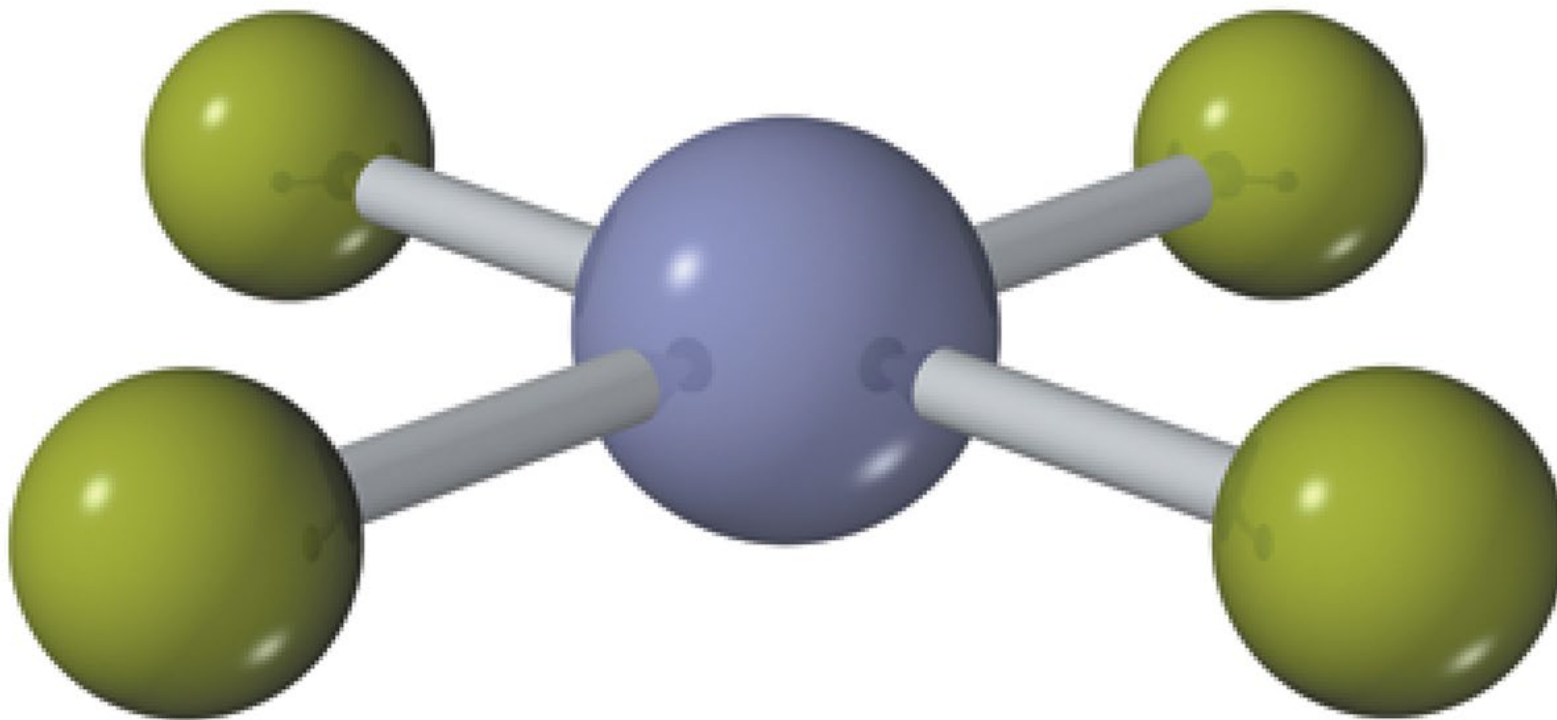


(iii)

Square planar – tetrahedral - seesaw

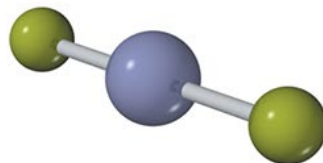
octahedral



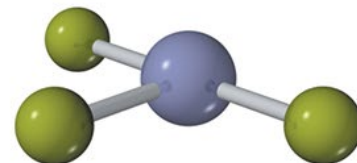


Square planar

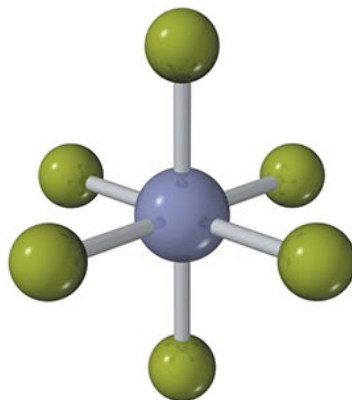
Identify the
following
shapes



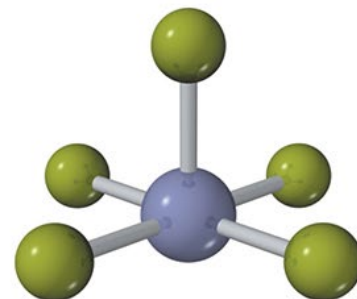
(a)



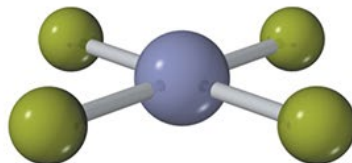
(b)



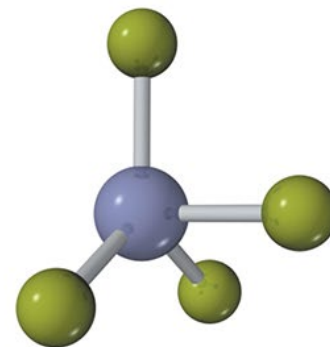
(c)



(d)



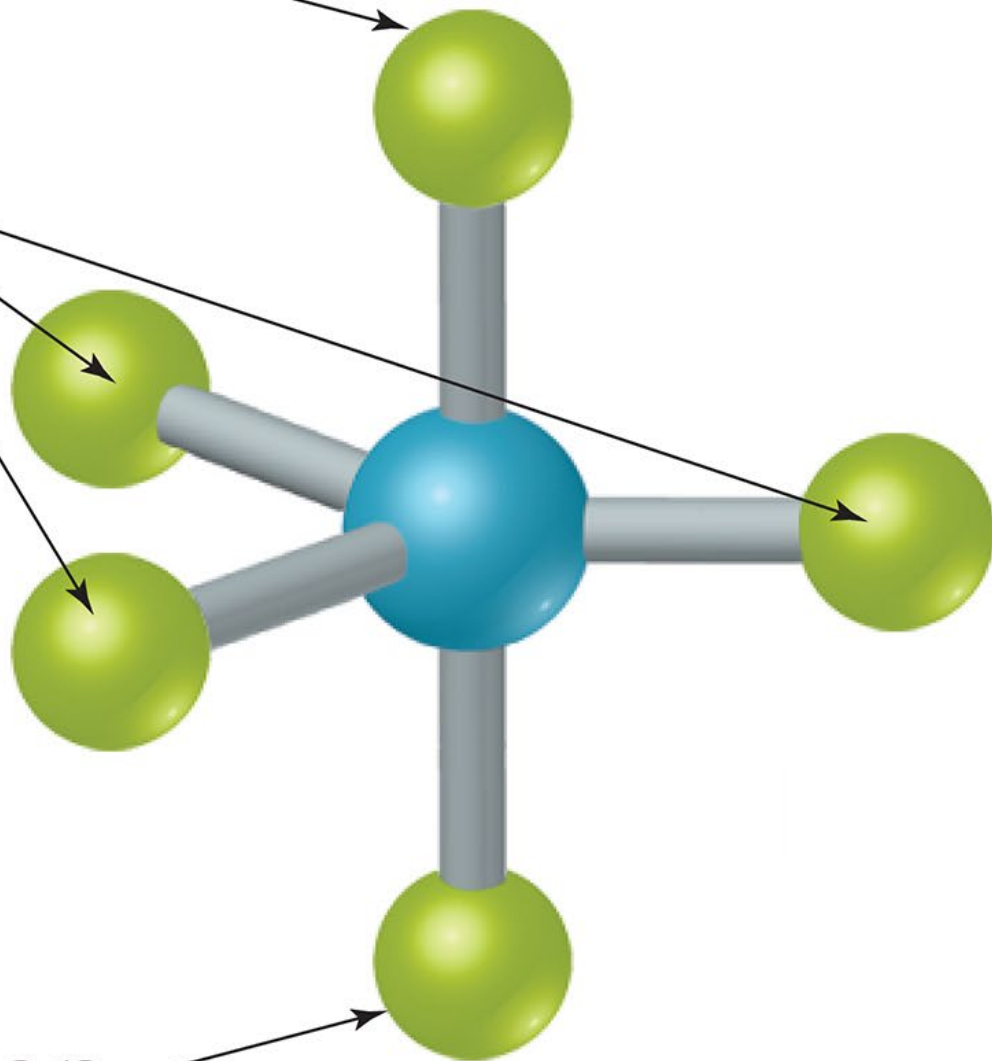
(e)



(f)

Axial position

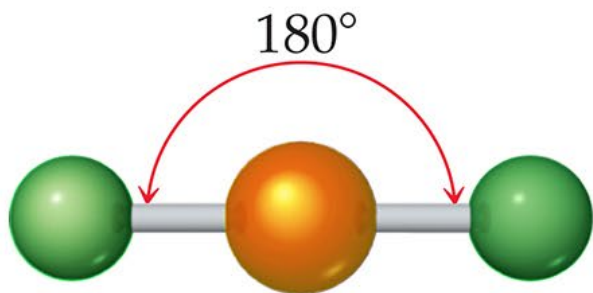
Three equatorial positions form an equilateral triangle.



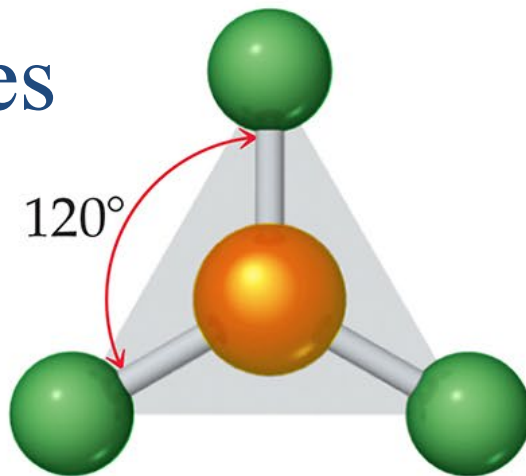
Trigonal bipyramid

Axial position

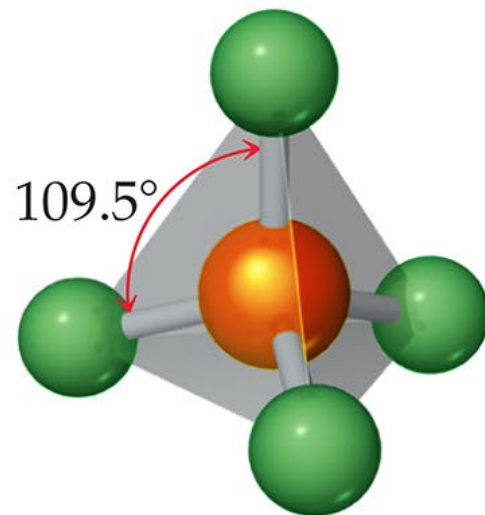
Bond angles



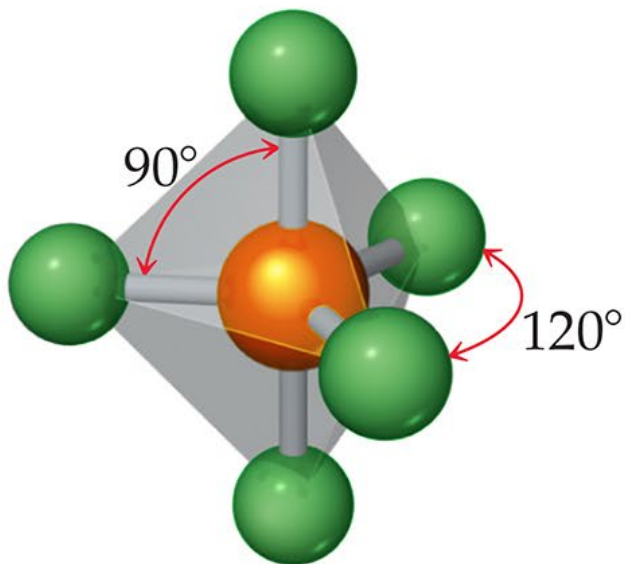
AB_2 linear



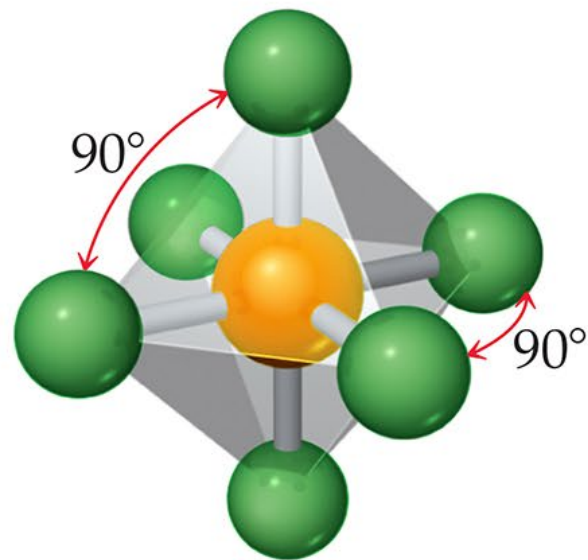
AB_3 trigonal planar



AB_4 tetrahedral

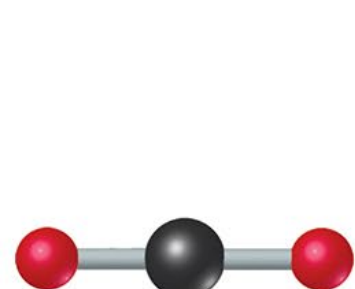


AB_5 trigonal bipyramidal

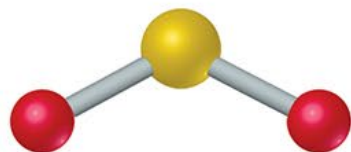


AB_6 octahedral

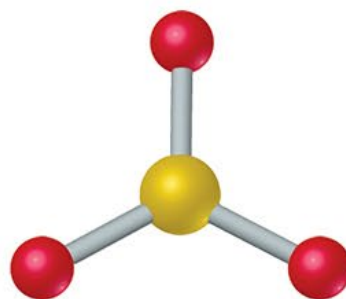
Examples of AB(E) notation



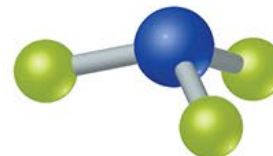
CO₂
AB₂ linear



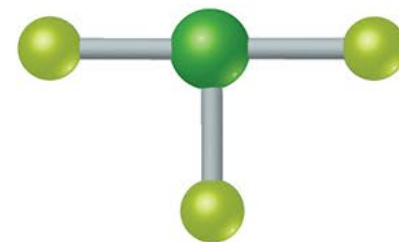
SO₂
AB₂ bent



SO₃
AB₃ trigonal planar

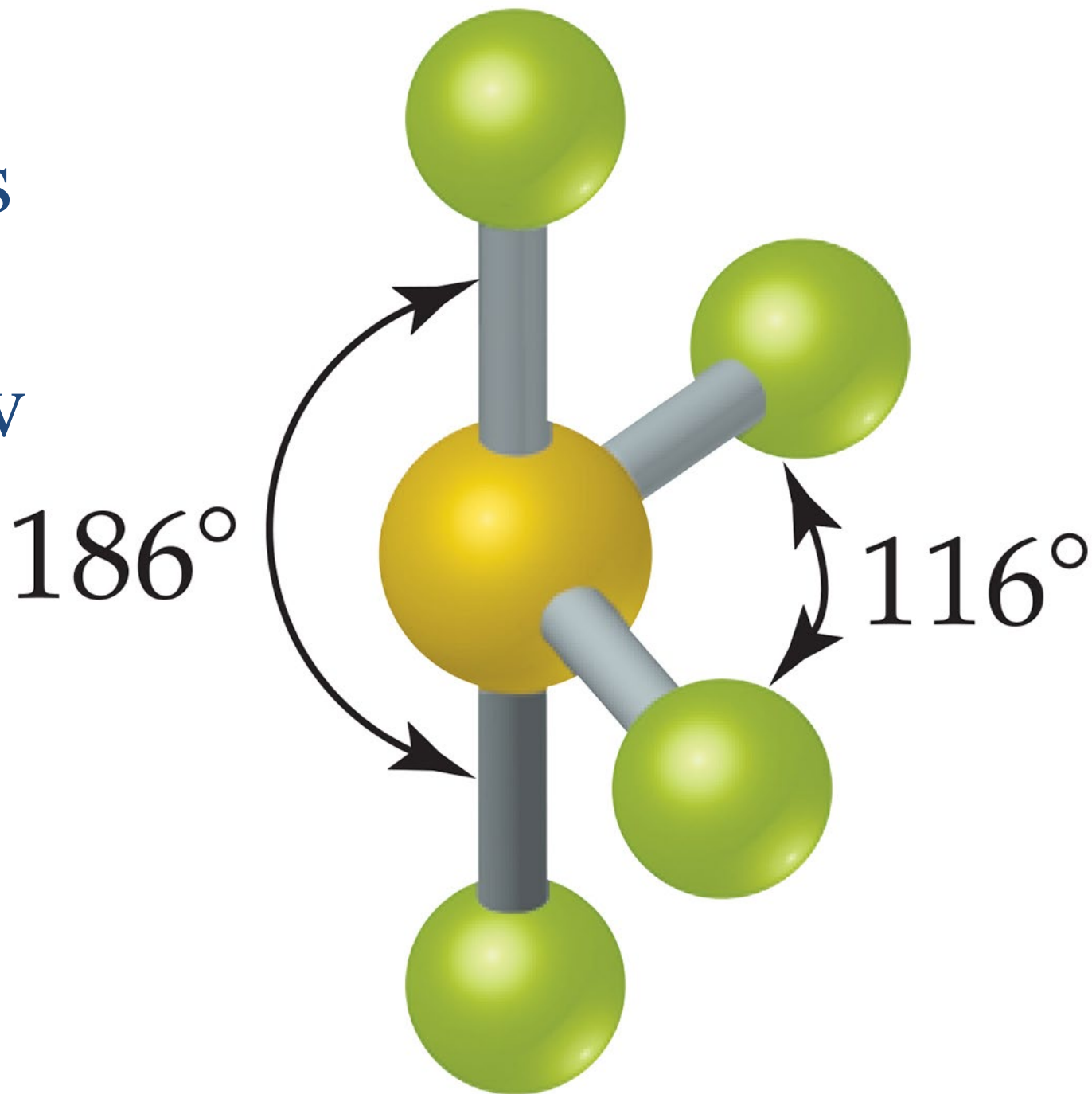


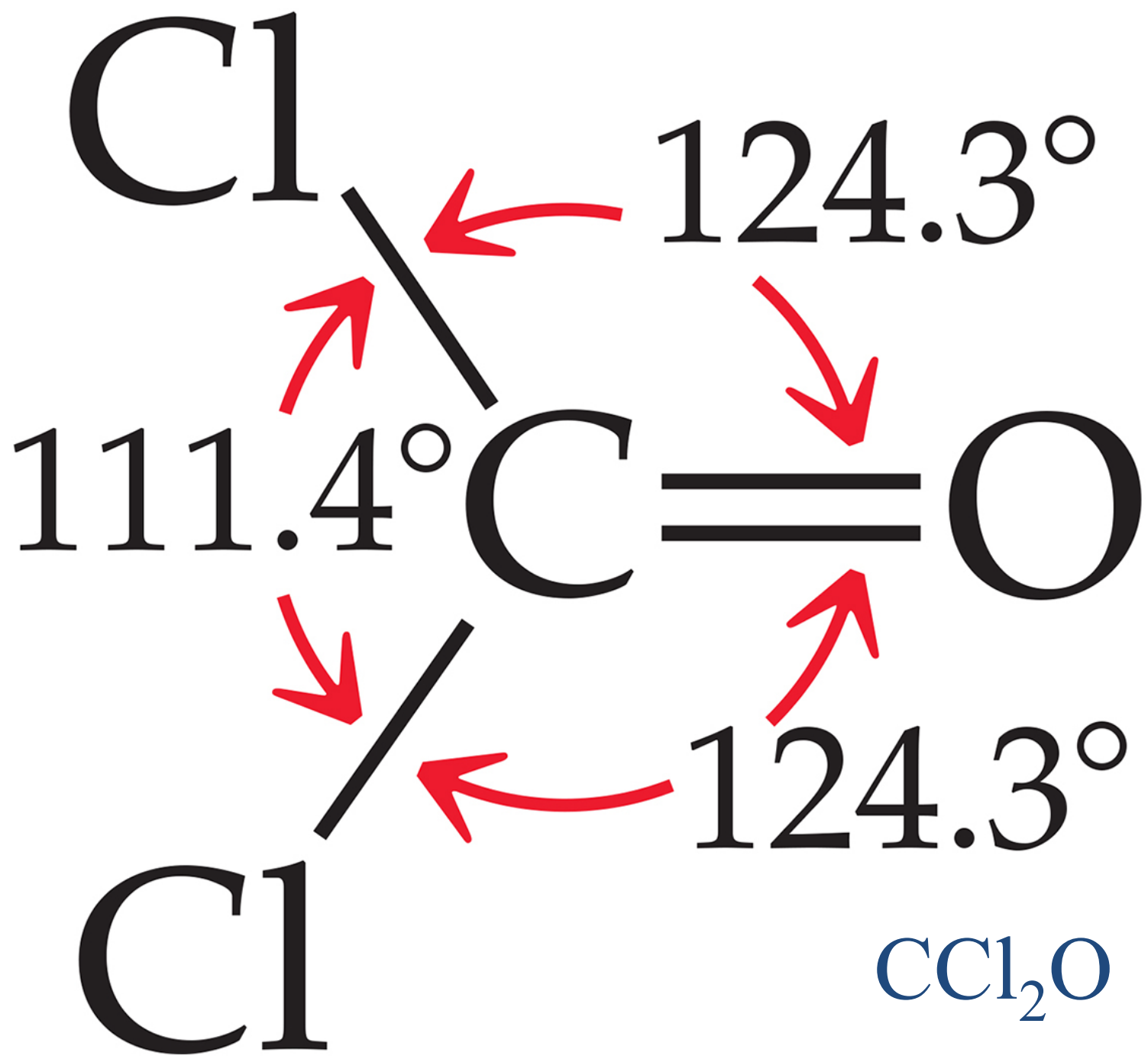
NF₃
AB₃ trigonal
pyramidal



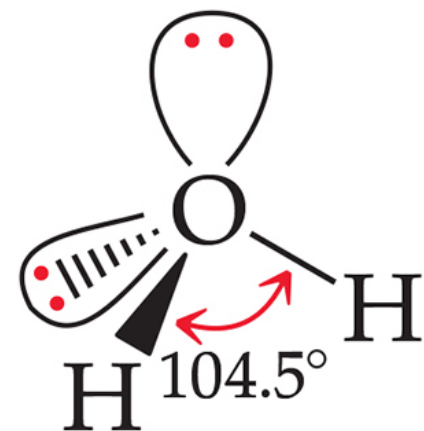
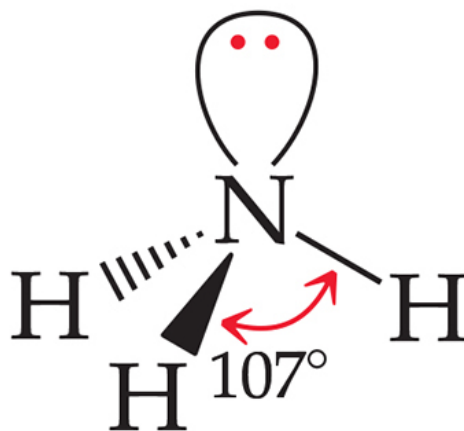
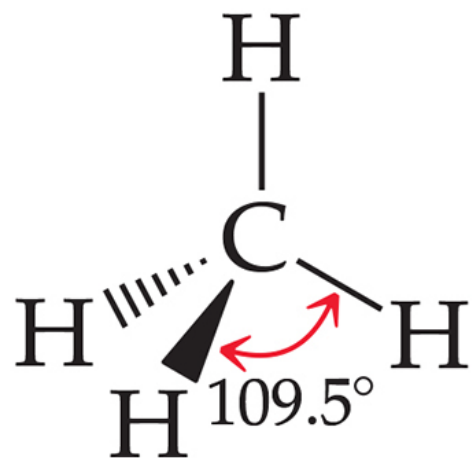
ClF₃
AB₃ T-shaped

Bond
angles
for
seesaw

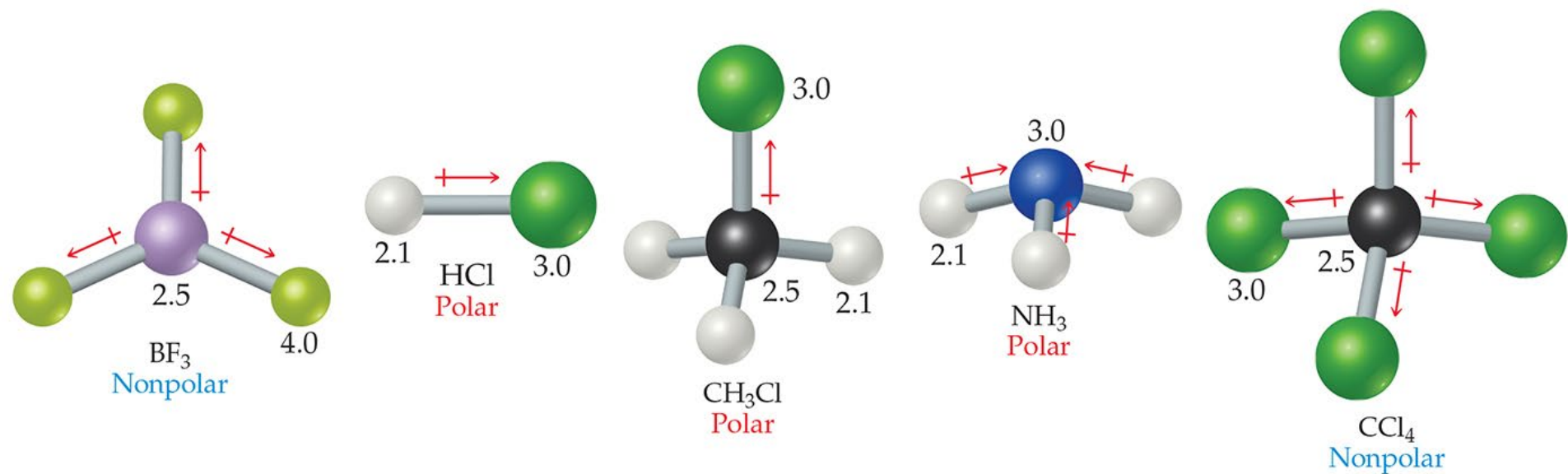




Bond angles vary due to lone pairs of electrons (nonbonding)

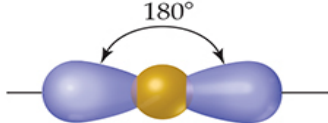
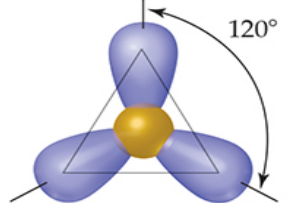
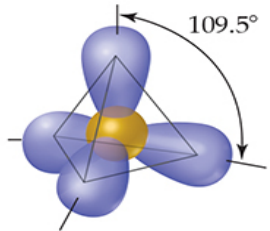
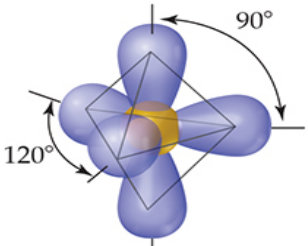
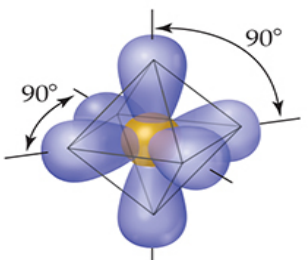


Polarity of molecules based on VSEPR Theory



Textbook summary

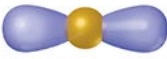

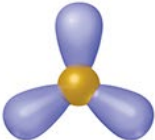
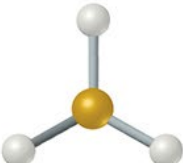
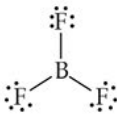
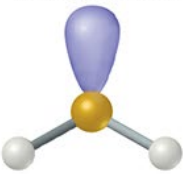
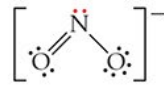
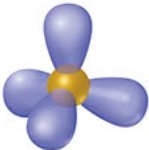
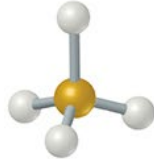
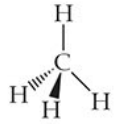
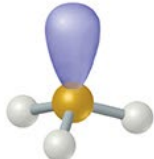

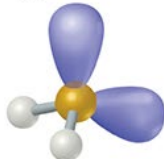

TABLE 9.1 Electron-Domain Geometries as a Function of Number of Electron Domains

| Number of Electron Domains* | Arrangement of Electron Domains | Electron Domain Geometry | Predicted Bond Angles |
|-----------------------------|--|--------------------------|-----------------------|
| 2 |  | Linear | 180° |
| 3 |  | Trigonal planar | 120° |
| 4 |  | Tetrahedral | 109.5° |
| 5 |  | Trigonal bipyramidal | 120° 90° |
| 6 |  | Octahedral | 90° |

*The number of electron domains is sometimes called the *coordination number* of the atom.

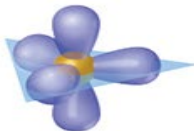


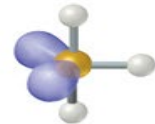
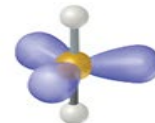


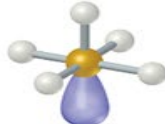

Textbook summary page 2

TABLE 9.2 Electron-Domain and Molecular Geometries for Two, Three, and Four Electron Domains around a Central Atom

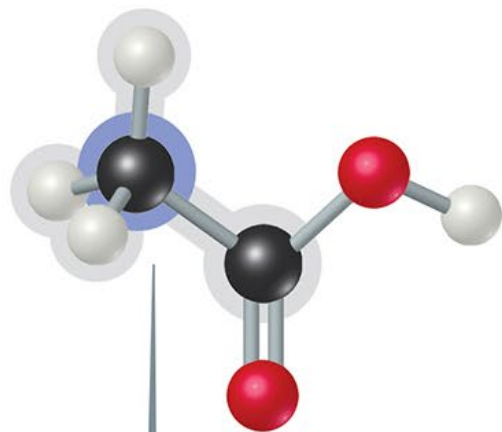
| Number of Electron Domains | Electron-Domain Geometry | Bonding Domains | Nonbonding Domains | Molecular Geometry | Example |
|----------------------------|--|-----------------|--------------------|--|---|
| 2 |  Linear | 2 | 0 |  Linear | $\ddot{\text{O}}=\text{C}=\ddot{\text{O}}$ |
| 3 |  Trigonal planar | 3 | 0 |  Trigonal planar |  |
| | | 2 | 1 |  Bent |  |
| 4 |  Tetrahedral | 4 | 0 |  Tetrahedral |  |
| | | 3 | 1 |  Trigonal pyramidal |  |
| | | 2 | 2 |  Bent |  |

Textbook summary page 3

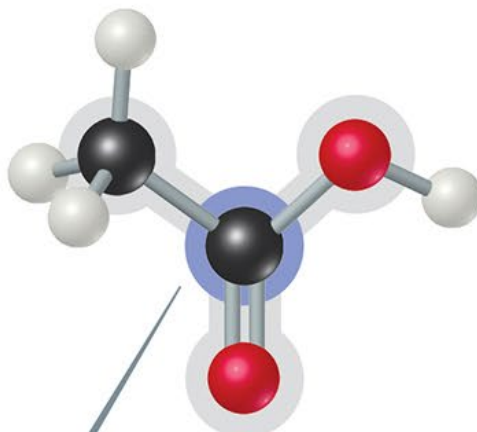
TABLE 9.3 Electron-Domain and Molecular Geometries for Five and Six Electron Domains around a Central Atom

| Number of Electron Domains | Electron-Domain Geometry | Bonding Domains | Nonbonding Domains | Molecular Geometry | Example |
|----------------------------|--|-----------------|--------------------|---|------------------|
| 5 |  Trigonal bipyramidal | 5 | 0 |  Trigonal bipyramidal | PCl ₅ |
| | | 4 | 1 |  Seesaw | SF ₄ |
| | | 3 | 2 |  T-shaped | ClF ₃ |
| | | 2 | 3 |  Linear | XeF ₂ |
| 6 |  Octahedral | 6 | 0 |  Octahedral | SF ₆ |
| | | 5 | 1 |  Square pyramidal | BrF ₅ |
| | | 4 | 2 |  Square planar | XeF ₄ |

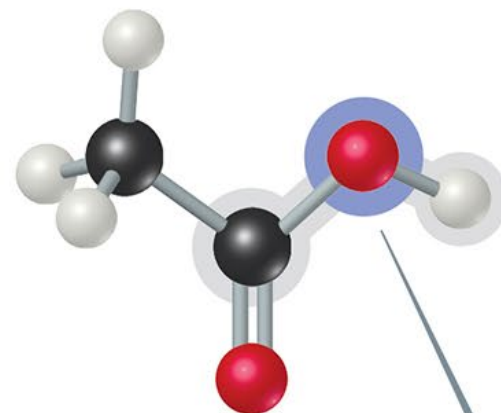
ORGANIC MOLECULES



Electron-domain geometry tetrahedral,
molecular geometry tetrahedral



Electron-domain geometry trigonal planar,
molecular geometry trigonal planar

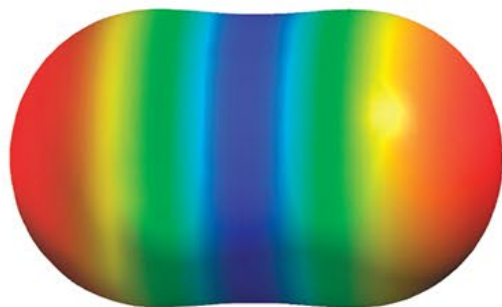
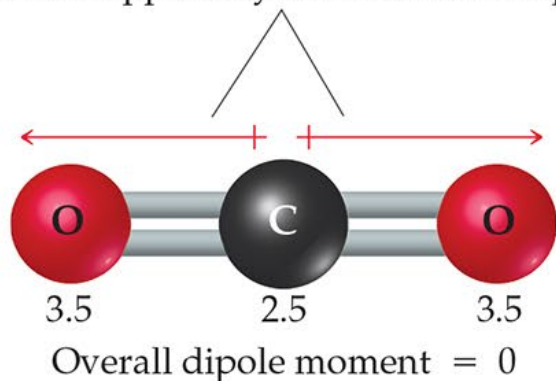


Electron-domain geometry tetrahedral,
molecular geometry bent

POLARITY OF THE MOLECULE

CO_2 , nonpolar

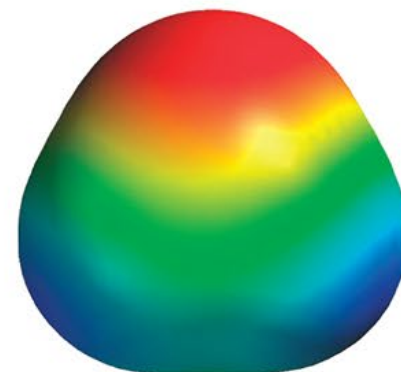
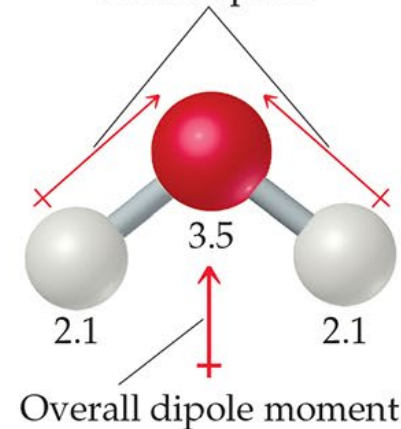
Equal and oppositely directed bond dipoles



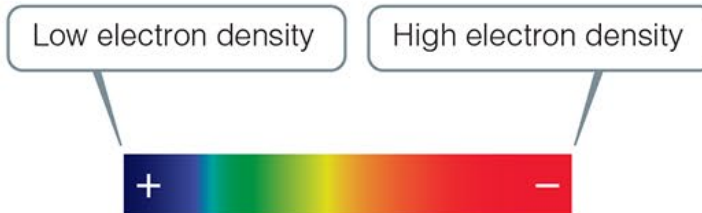
(a)

H_2O , polar

Bond dipoles

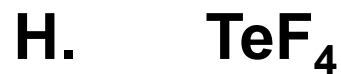
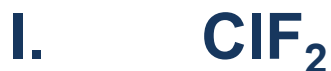


(b)



Lecture Examples on Lewis structure & VSEPR:

Draw the best possible Lewis dot structures incorporating VSEPR model for each of the following compounds or ions shown below, and include resonance hybrids or isomers where appropriate:



More
examples
in canvas