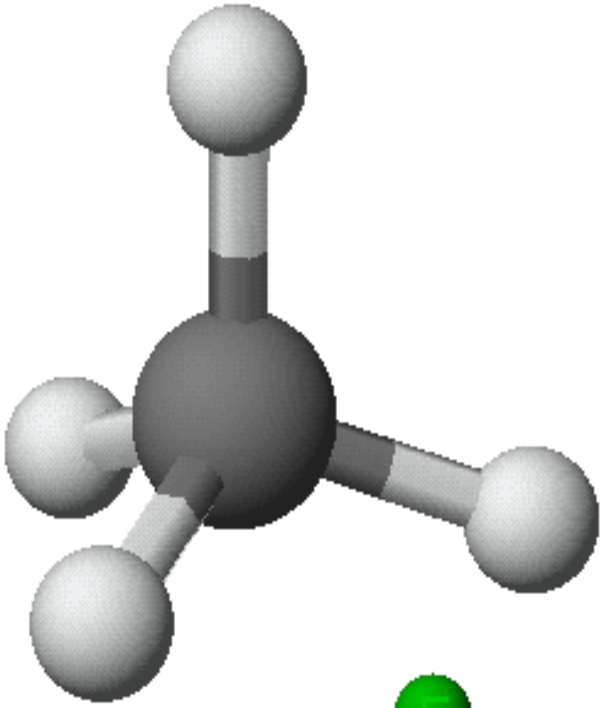
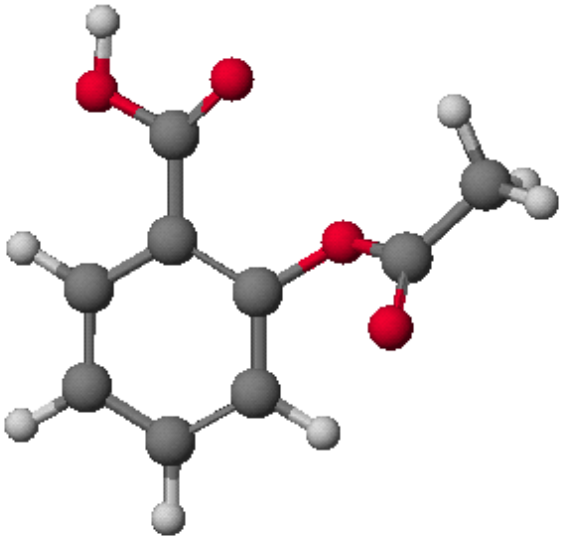
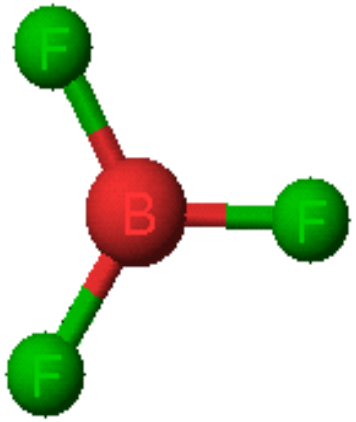
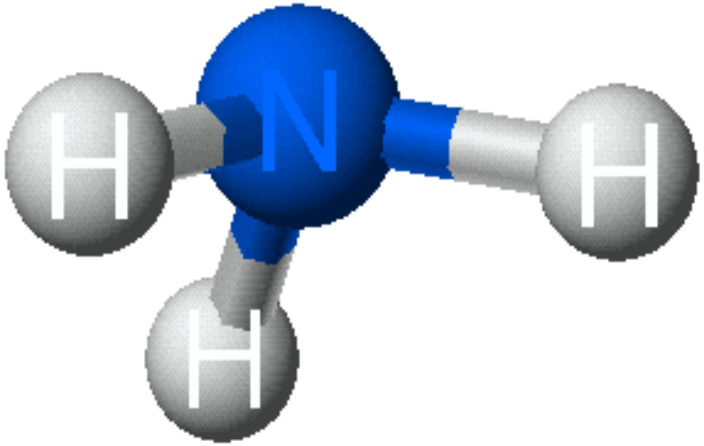
GEOMETRIA MOLECULAR









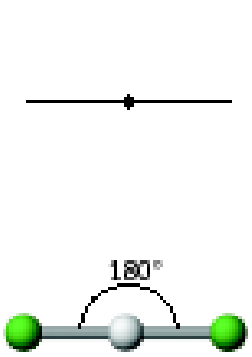
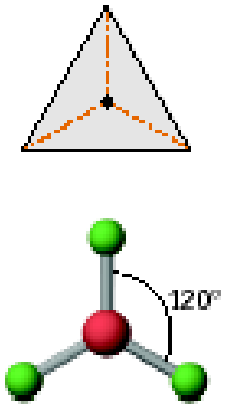
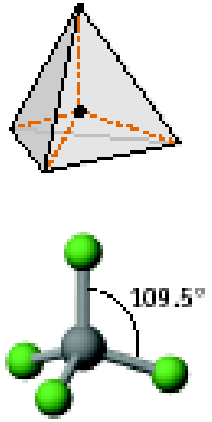
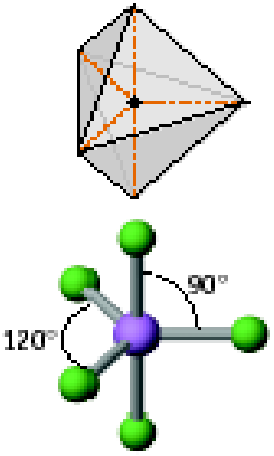
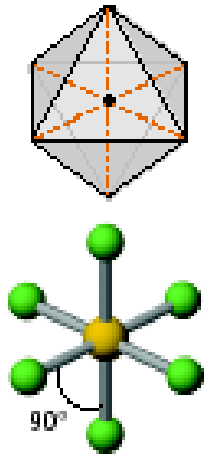
GEOMETRIA MOLECULAR

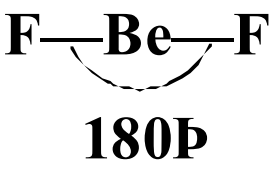
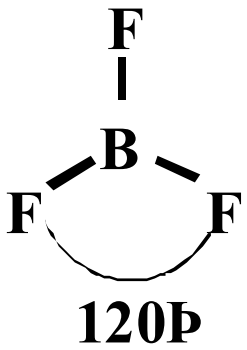
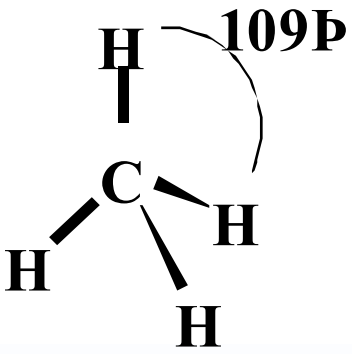
VSEPR-RPECV

- **V**alence **S**hell **E**lectron **P**air **R**epulsion theory.
- **T**eoria da **R**epulsão entre os **P**ares de **E**létrons da **C**amada de **V**alência
- O fator mais importante na determinação da geometria é a repulsão relativa entre os pares de elétrons.

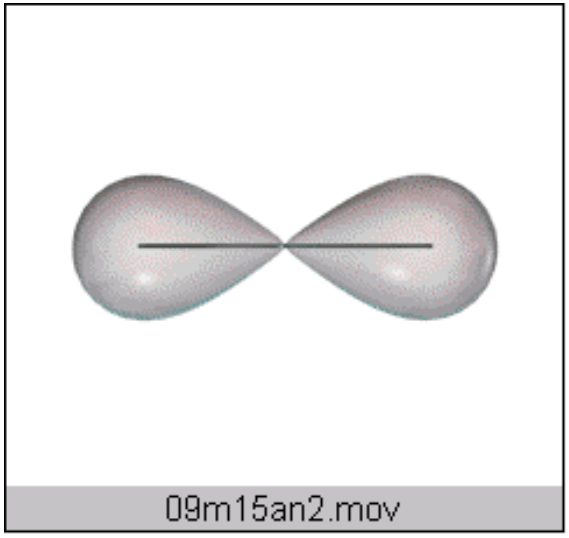
A molécula adota a forma que minimiza as repulsões entre os pares de elétrons.

Geometrias de Pares de Elétrons

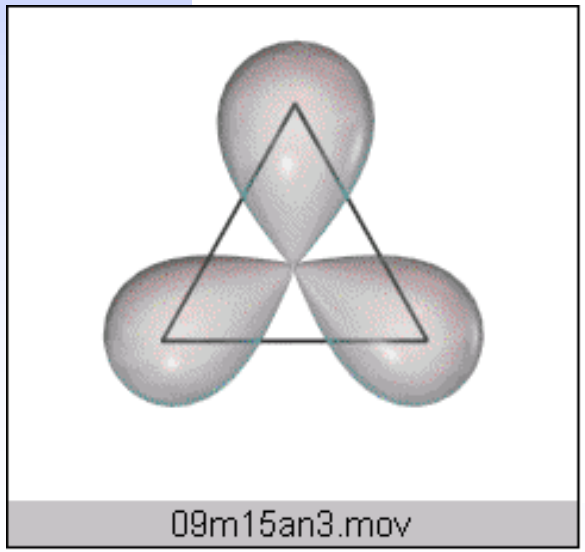
Linear	Trigonal-planar	Tetrahedral	Trigonal-bipyramidal	Octahedral
				
AX_2 Example: BeF_2	AX_3 Example: BF_3	AX_4 Example: CF_4	AX_5 Example: PF_5	AX_6 Example: SF_6

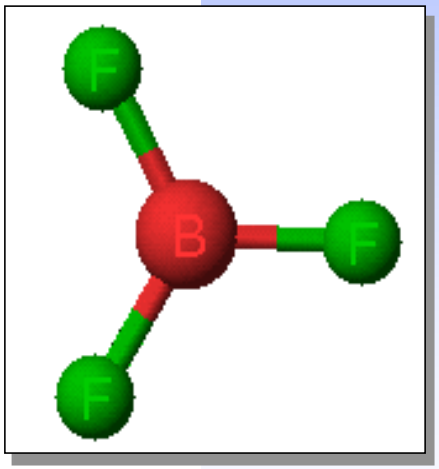
No. of e- Pairs Around Central Atom	Example	Geometry
2		linear
3		planar trigonal
4		tetrahedral

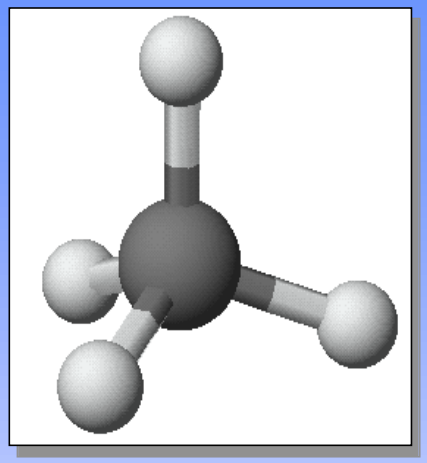
No. of e- Pairs Around Central Atom	Example	Geometry
2	F—Be—F 180Þ	linear



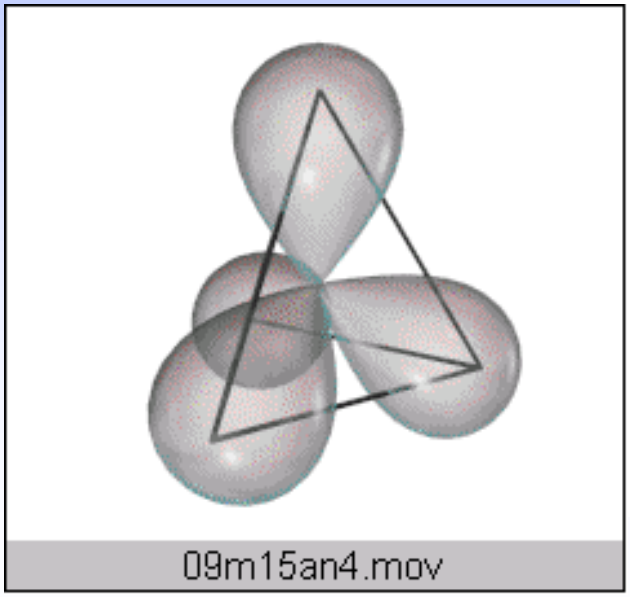
No. of e- Pairs Around Central Atom	Example	Geometry
2	F—Be—F 180Þ	linear
3	F B F F 120Þ	planar trigonal



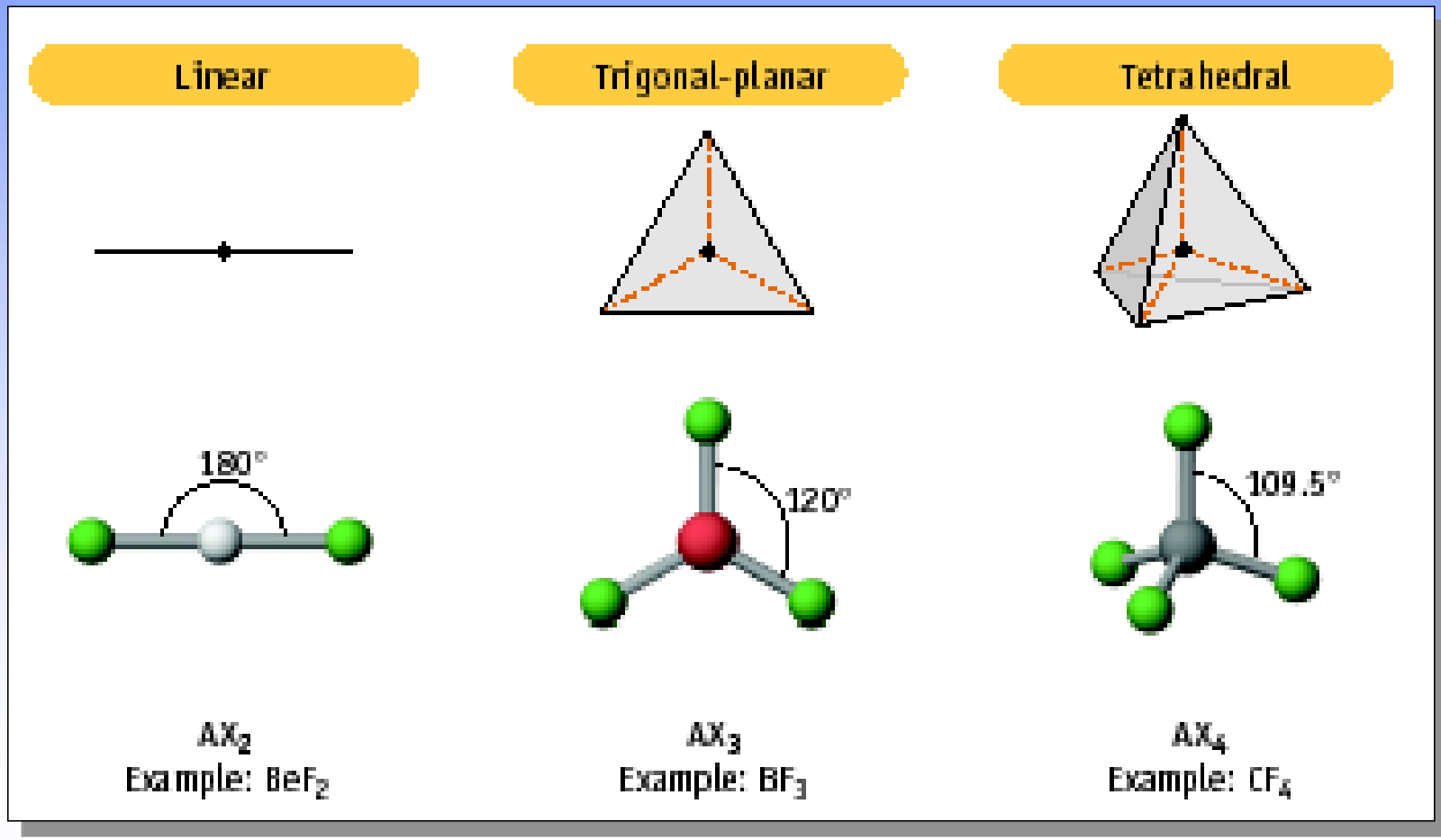




No. of e- Pairs Around Central Atom	Example	Geometry
2	F—Be—F 180Þ	linear
3	F B F F 120Þ	planar trigonal
4	H 109Þ C H H H	tetrahedral

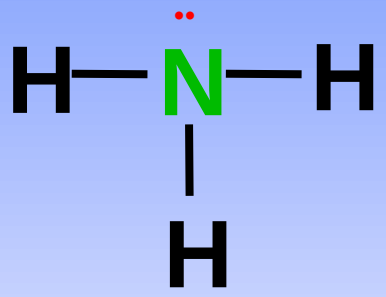


Geometrias de Pares de Elétrons

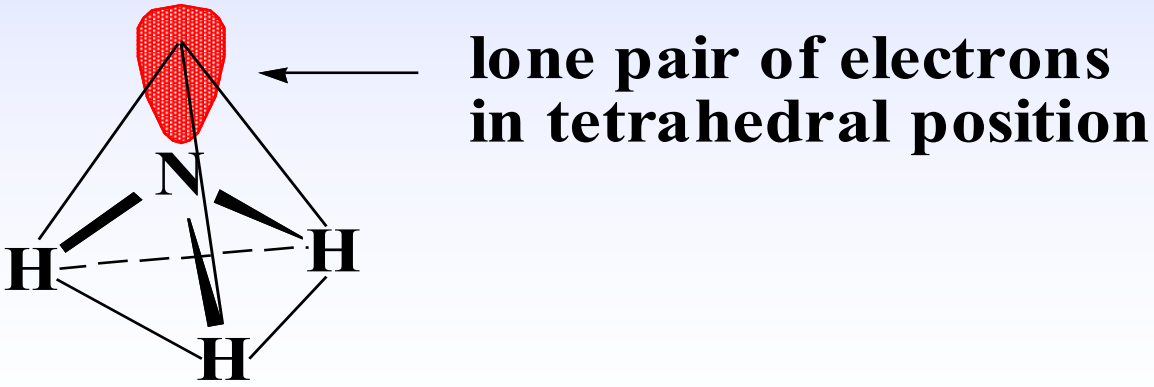


Determinação de Estrutura por VSEPR

Amônia, NH_3



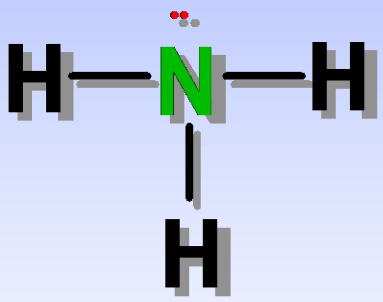
1. Escrever a estrutura de Lewis
2. Contar PL's e Pl's: 4
3. Os 4 pares de elétrons estão dispostos nos vértices de um **tetraedro**.

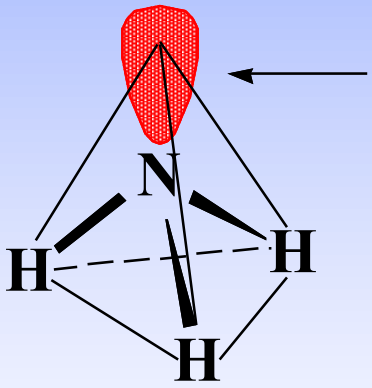


Determinação de Estrutura por VSEPR

Amônia, NH_3

Há 4 pares de elétrons nos vértices do tetraédro.





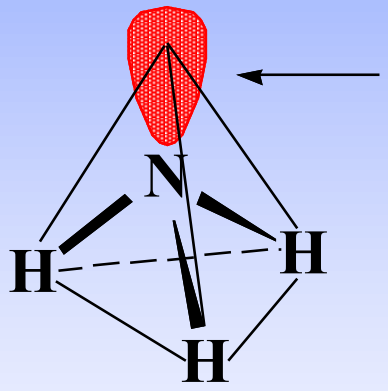
lone pair of electrons in tetrahedral position

A GEOMETRIA de PARES de ELÉTRONS é tetraédrica.

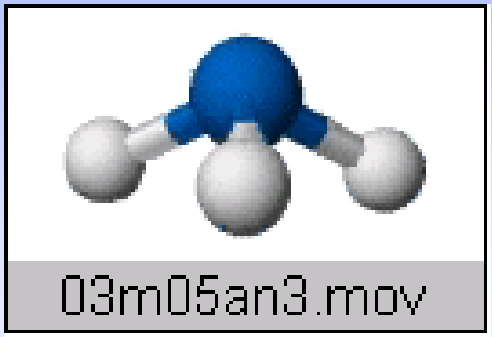
Determinação de Estrutura por VSEPR

Amônia, NH_3

A geometria de pares de elétrons é tetraédrica.



lone pair of electrons
in tetrahedral position

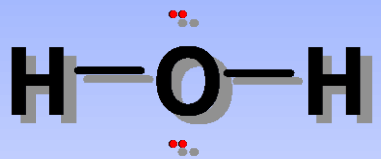


A GEOMETRIA MOLECULAR — as posições dos átomos — é PIRAMIDAL.

Determinação de Estrutura por VSEPR

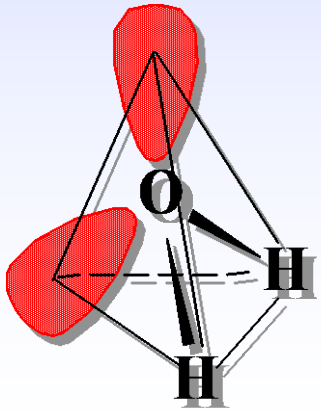
Água, H_2O

1. Escrever a estrutura de Lewis



2. Contar os PL's e os PI's: 4

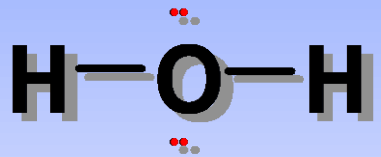
3. Os 4 pares de elétrons estão nos vértices de um tetraedro.

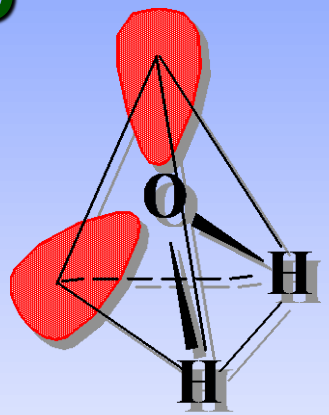


A geometria de pares de elétrons é TETRAÉDRICA.

Determinação de Estrutura por VSEPR

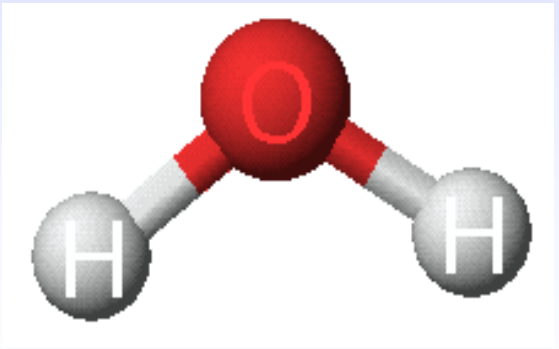
Água, H_2O



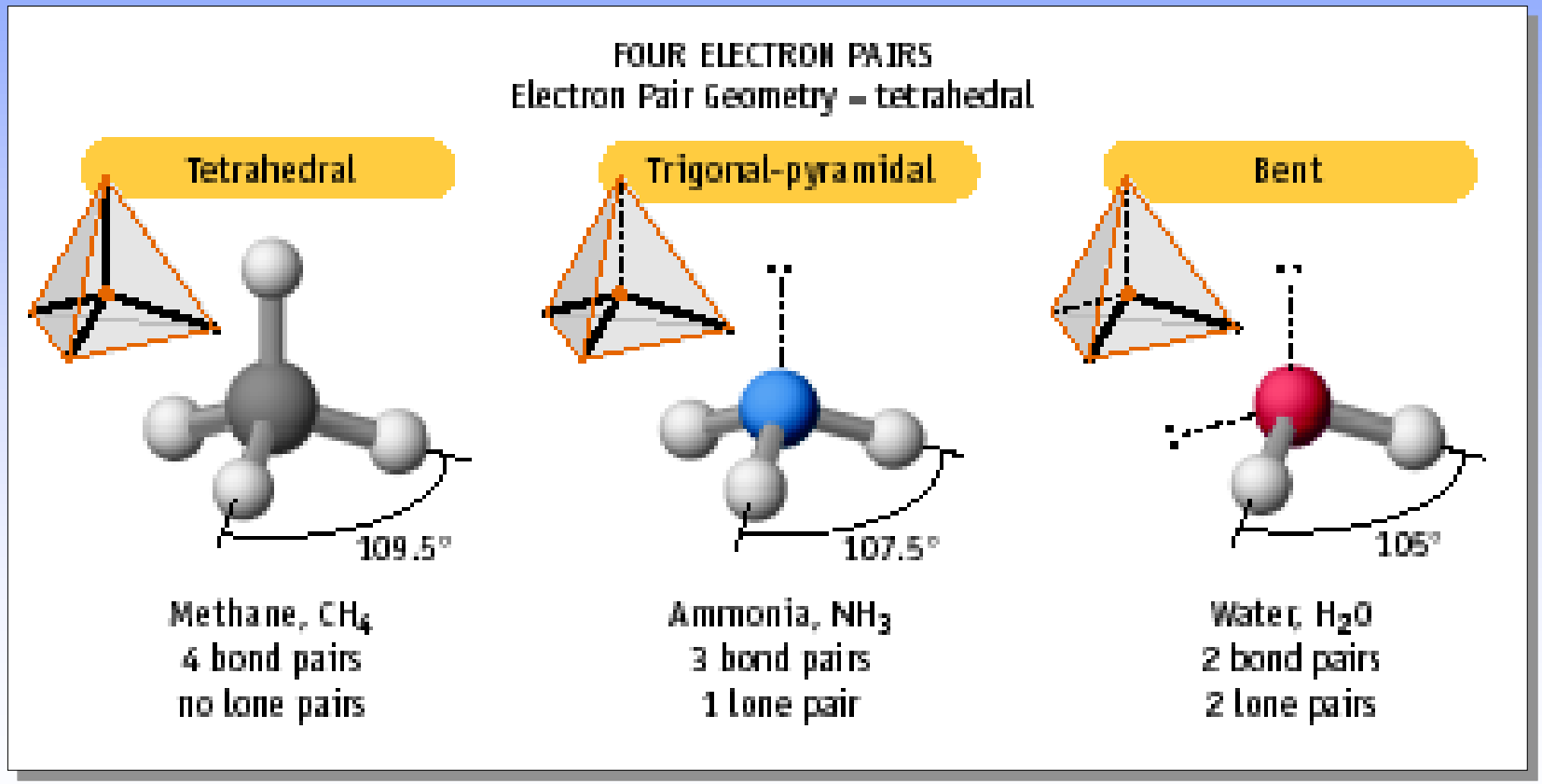


A geometria de pares de elétrons é TETRAÉDRICA

A geometria molecular é ANGULAR.

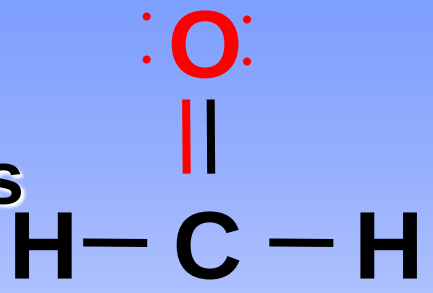


Geometrias para Quatro Pares de Elétrons

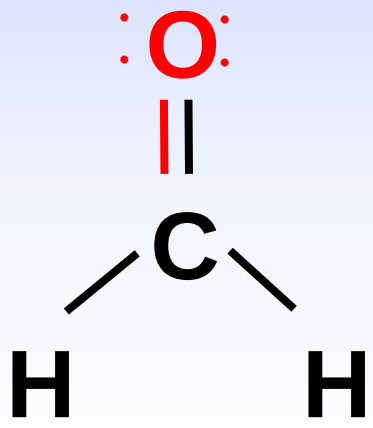


Determinação de Estrutura por VSEPR

Formaldeído, CH_2O



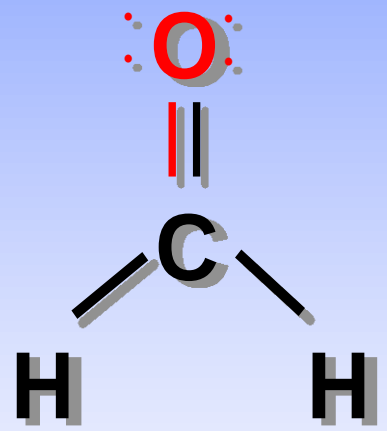
1. Escrever a estrutura de Lewis
2. Contar os PL's e os PI's no C
3. Há 3 "pares" de elétrons ao redor do C nos vértices de um triângulo (planar).



A geometria de pares de elétrons é **TRIGONAL PLANAR com** ângulos de ligação de ~120°.

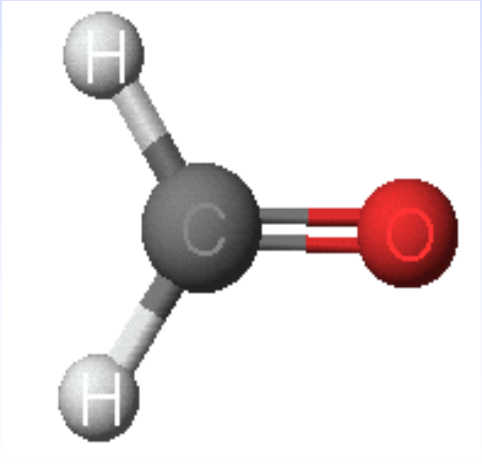
Determinação de Estrutura por VSEPR

Formaldeído, CH_2O



A geometria de pares de elétrons é TRIGONAL PLANAR.

A geometria molecular também é trigonal planar.



Determinação de Estrutura por VSEPR

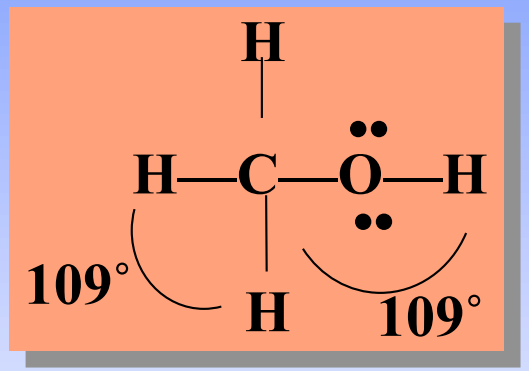
Metanol, CH_3OH

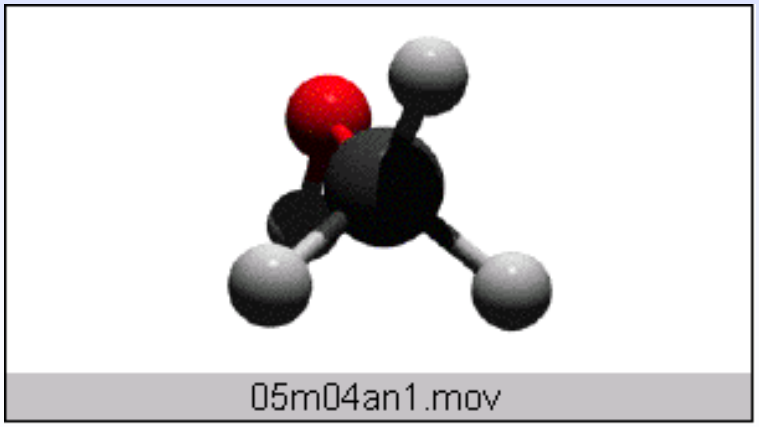
Definir os ângulos de ligação H-C-H e C-O-H

H-C-H = 109º

C-O-H = 109º

Em ambos os casos o átomo central está circundado por 4 pares de elétrons.





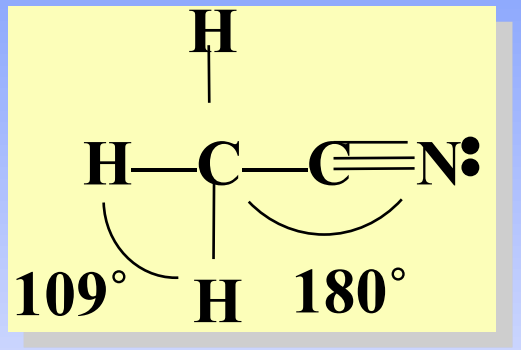
Determinação de Estrutura por VSEPR

Acetonitrila, CH_3CN

Definir os ângulos de ligação

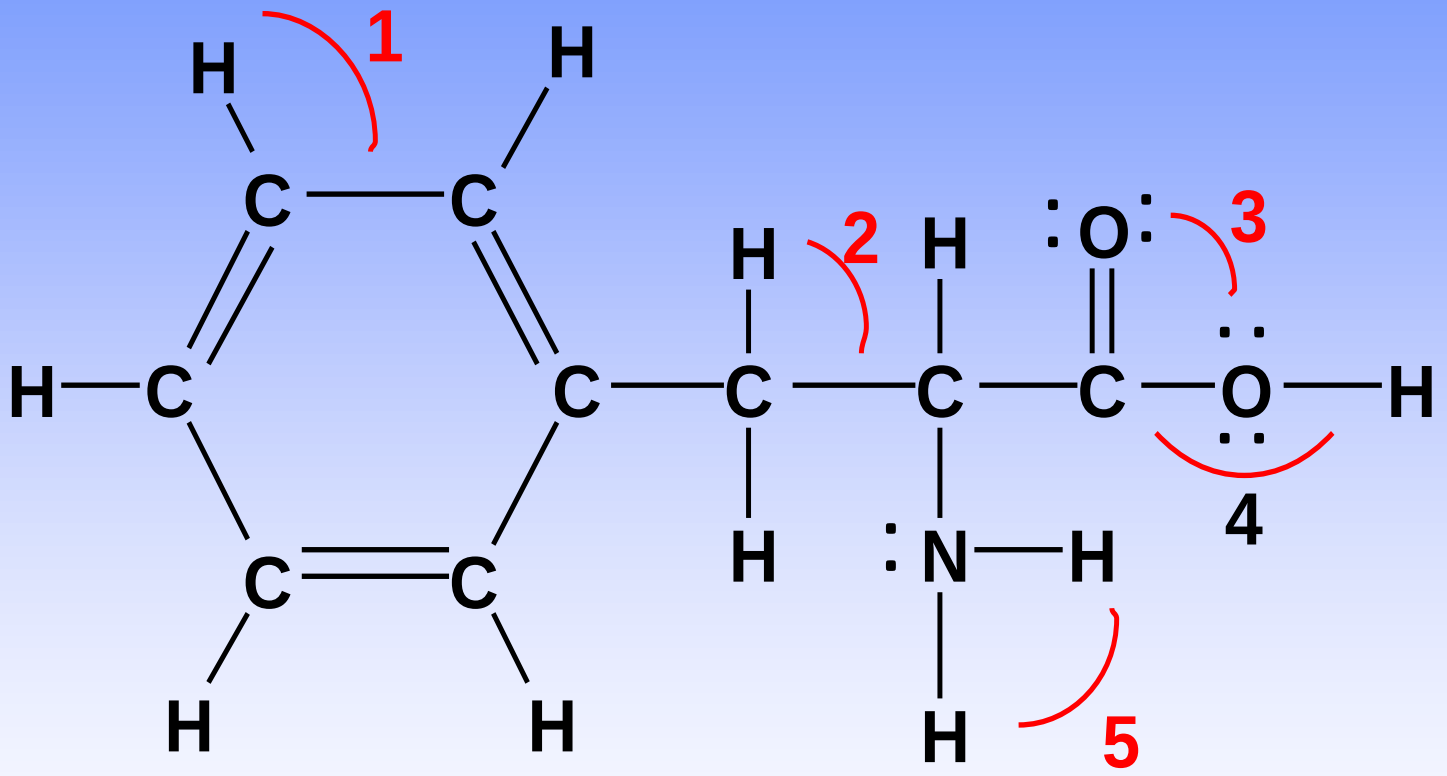
H-C-H = 109º

C-C-N = 180º

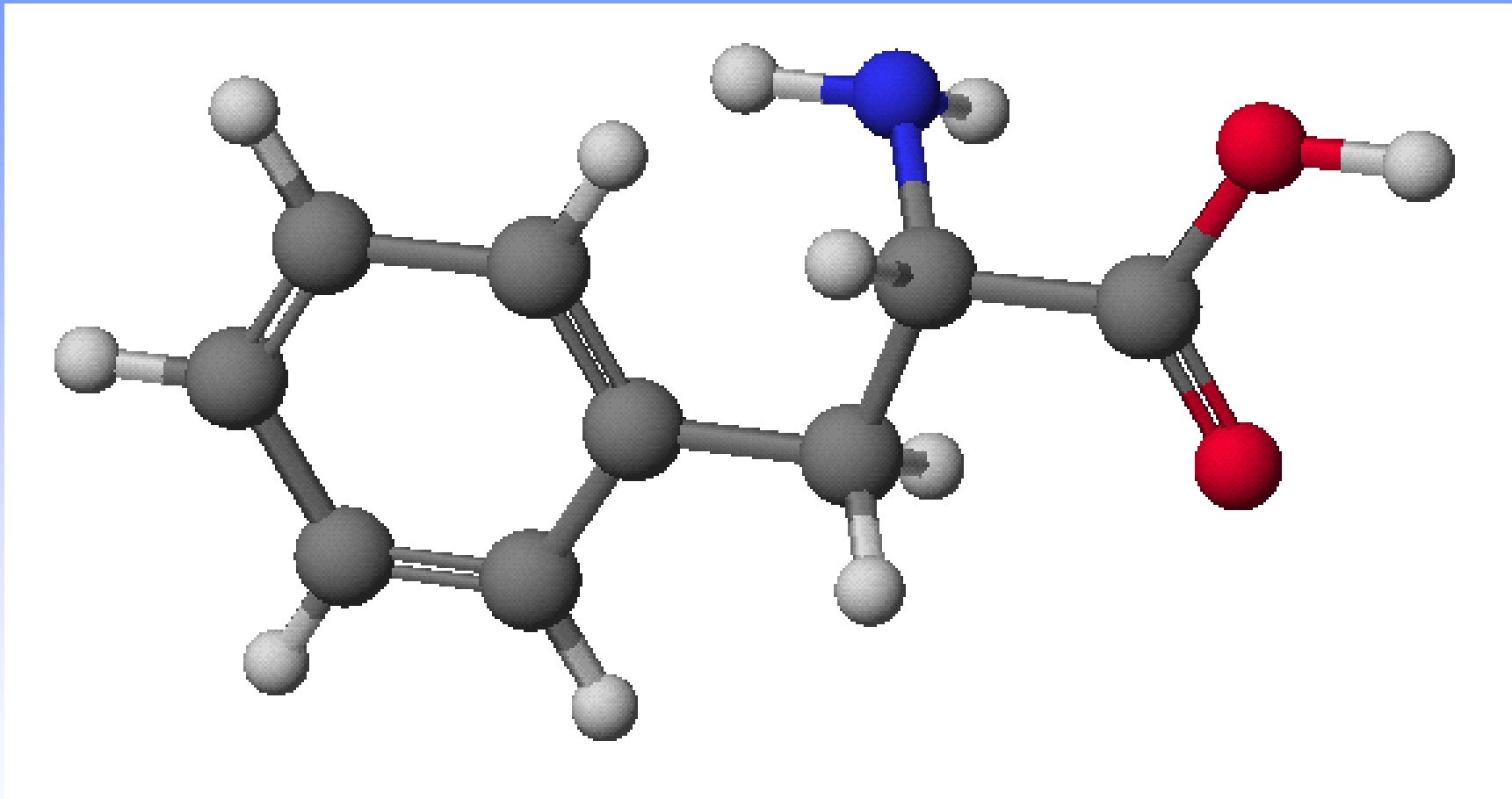


Um dos C´s está circundado por 4 pares de elétrons e o outro por 2.

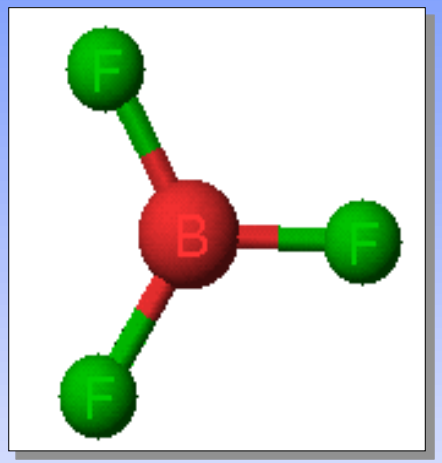
Fenilalanina, um aminoácido

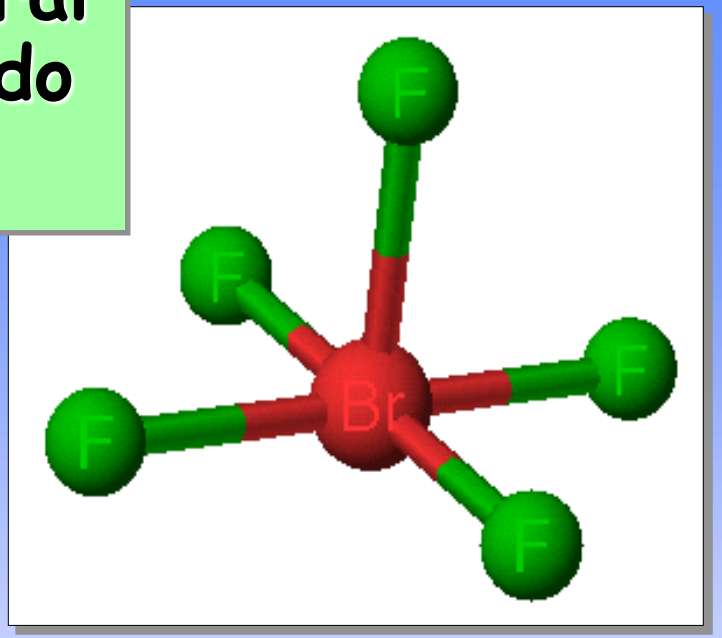


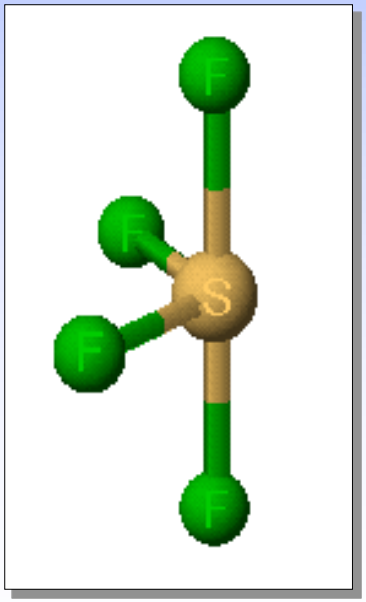
Fenilalanina



Estruturas cujo Átomo Central tem Mais do que ou Menos do que 4 Pares de Elétrons



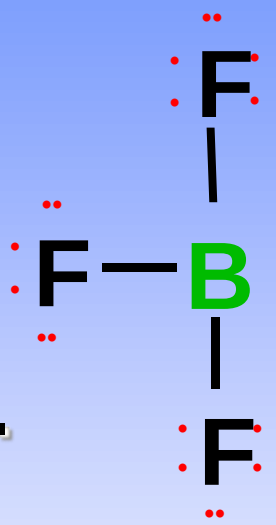




Frequentemente, ocorrem com elementos do Grupo 3A e com os do 3º período (e seguintes).

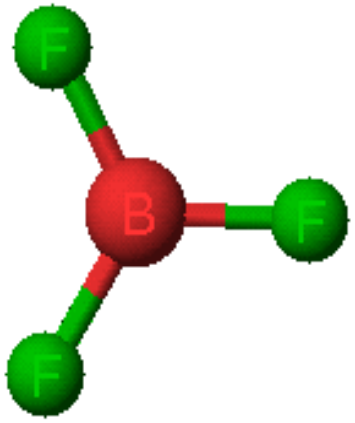
Compostos de Boro

Considere o trifluoreto de boro, BF_3



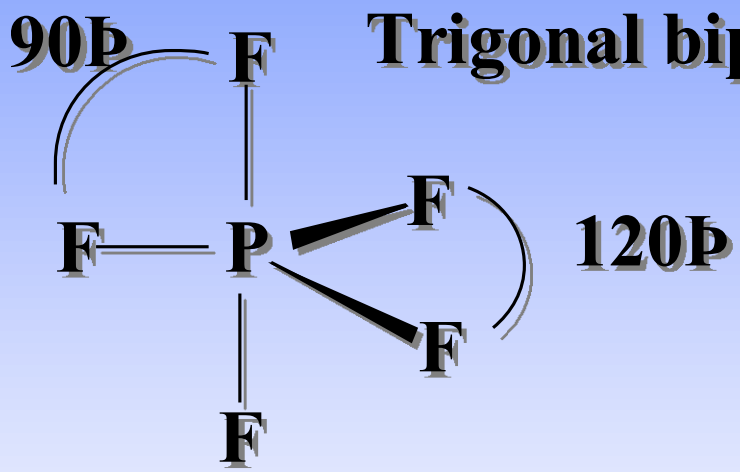
O átomo de B está circundado por somente 3 pares de elétrons.

Ângulos de ligação são 120º

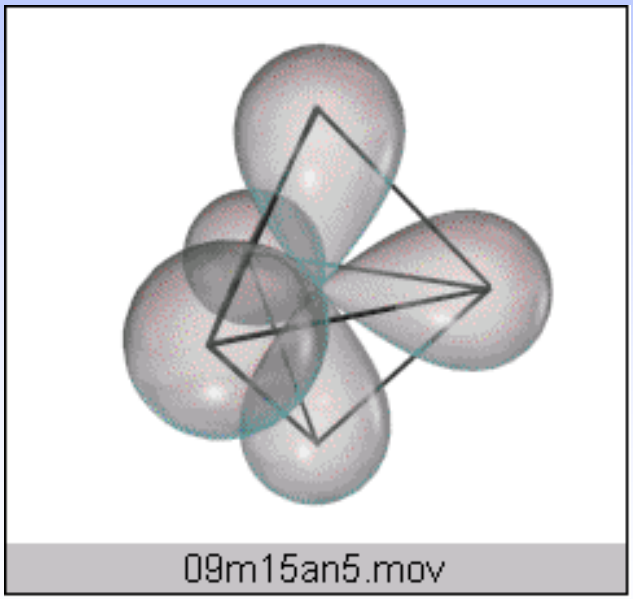


A geometria é descrita como **planar trigonal.**

Compostos com 5 ou 6 Pares ao redor do Átomo Central

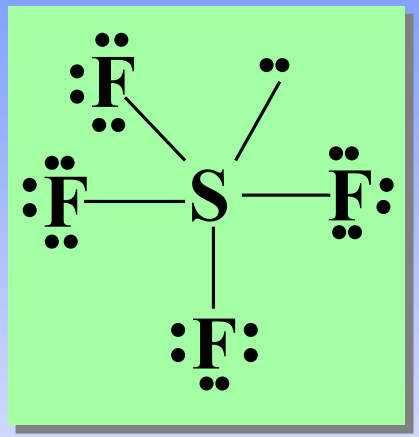


5 pares de elétrons



Tetrafluoreto de Enxofre, SF_4

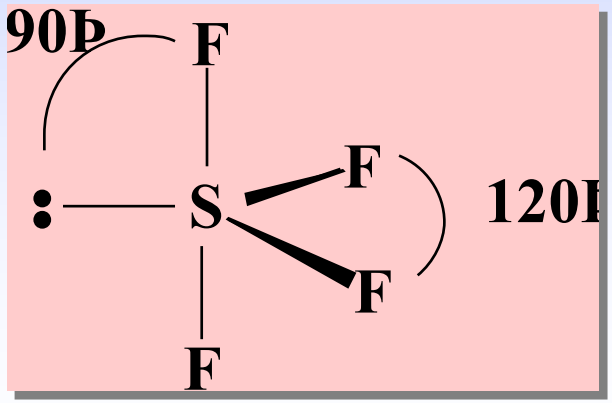
- Número de elétrons de valência = 34
- Átomo Central = S
- Estruture de Lewis



Geometria de pares de elétrons

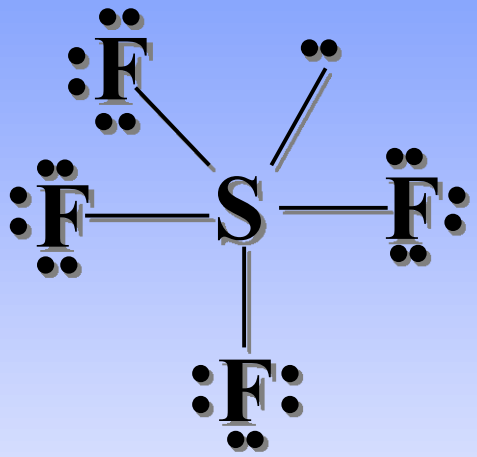
→ **Bipirâmide trigonal**

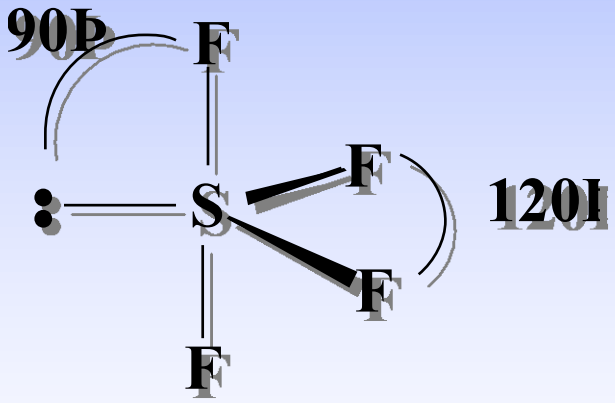
(porque há 5 pares ao redor do S)

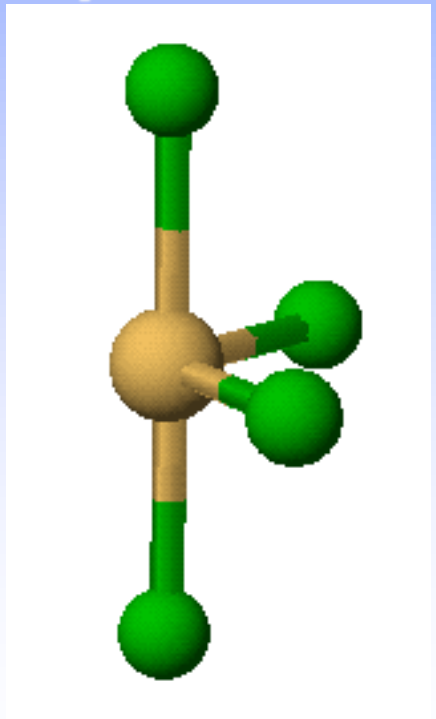


Tetrafluoreto de Enxofre, SF_4

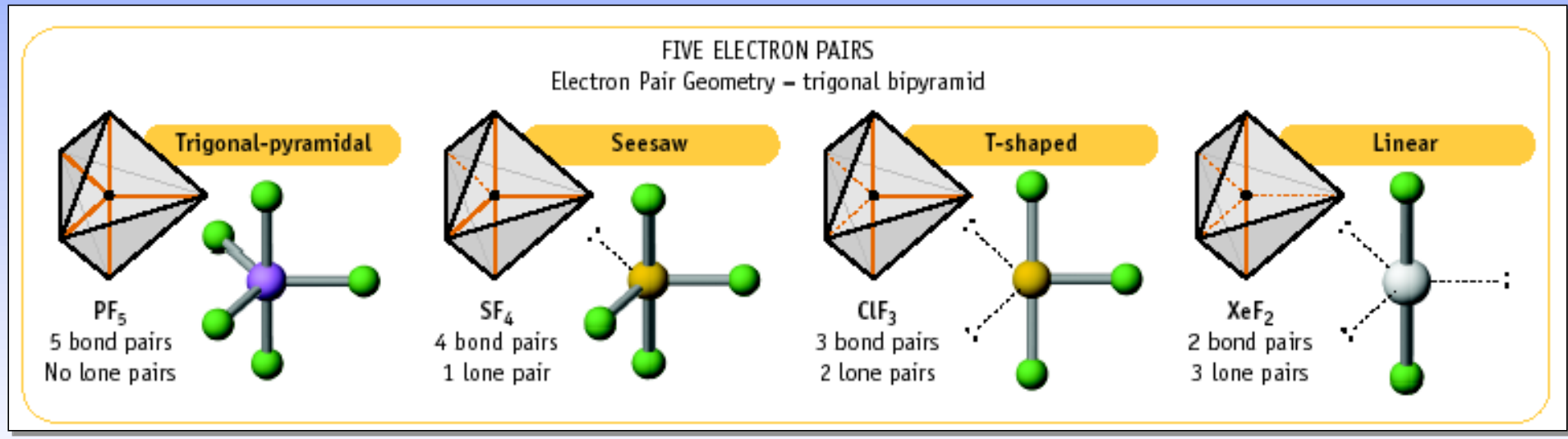
Par isolado está no equador porque minimiza a interação entre os pares.



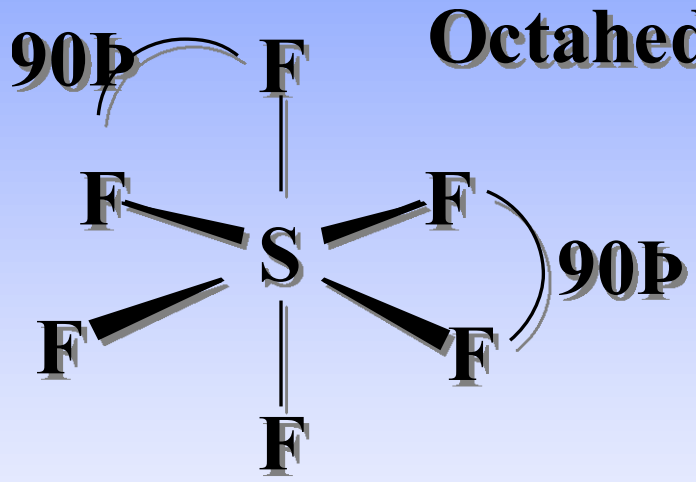




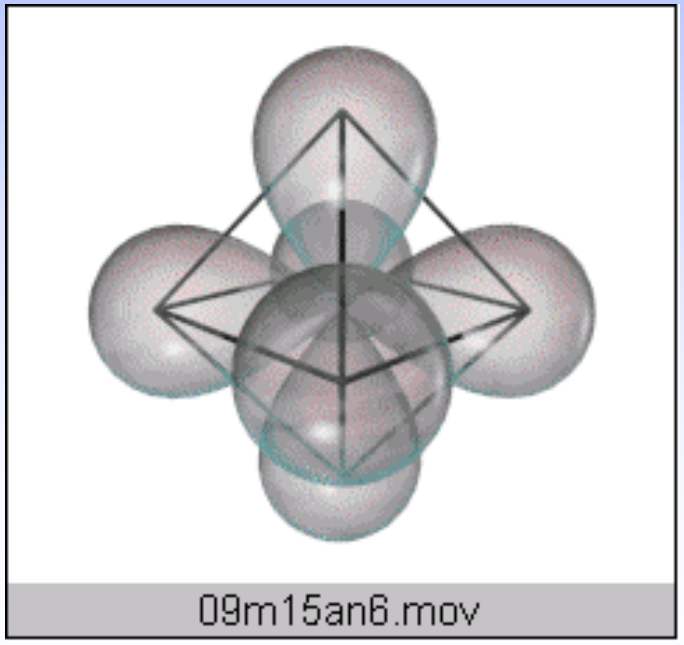
Geometrias Moleculares para Cinco Pares de Elétrons



Compostos com 5 ou 6 Pares ao redor do Átomo Central



6 pares de elétrons



Geometrias Moleculares para Seis Pares de Elétrons