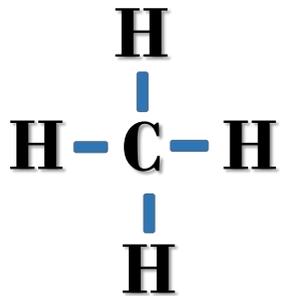


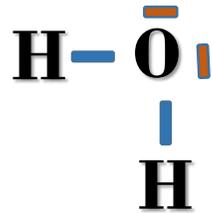
Valence Shell Electron Pair Repulsion: modello VSEPR

Modello previsionale della geometria delle molecole

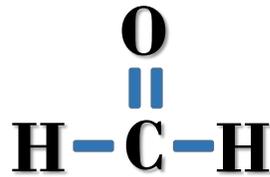
Si parte dalla formula di struttura di Lewis comprese le eventuali forme risonanti



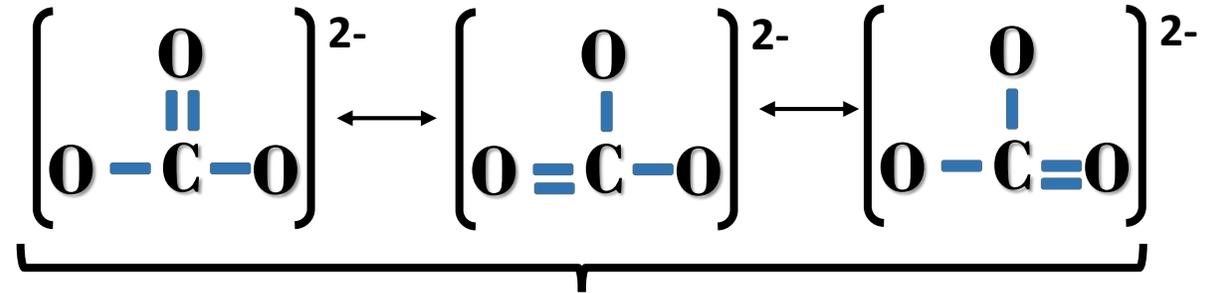
metano



acqua



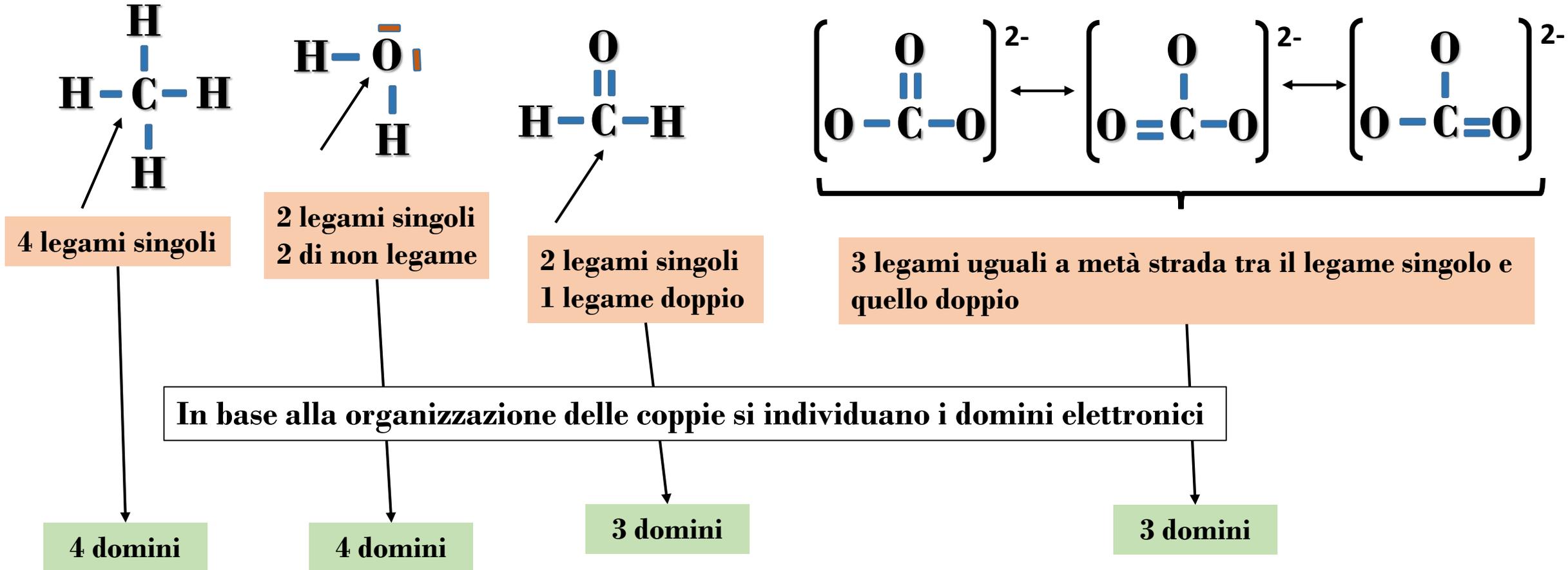
formaldeide



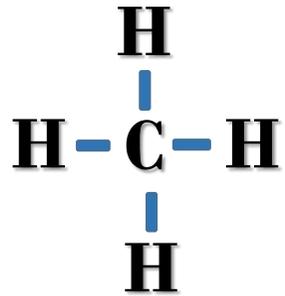
Ione carbonato

Valence Shell Electron Pair Repulsion: modello VSEPR

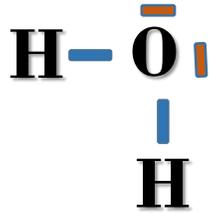
Si individua l'atomo centrale e si analizza l'organizzazione delle coppie di elettroni attorno ad esso



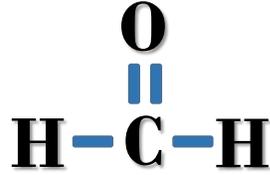
Valence Shell Electron Pair Repulsion: modello VSEPR



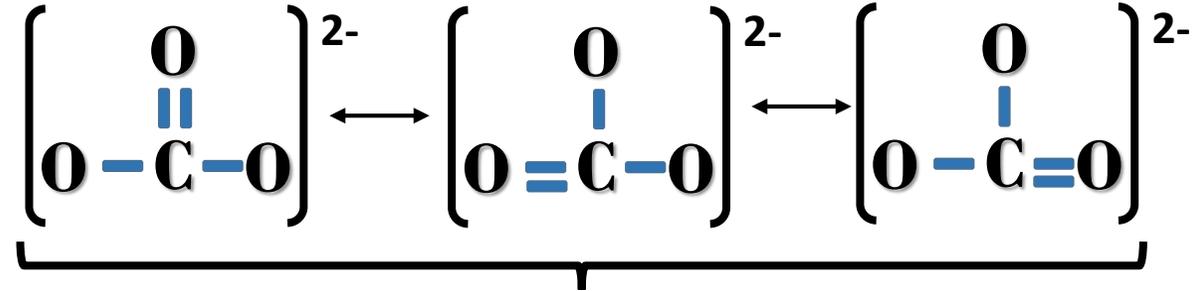
4 domini



4 domini



3 domini



3 domini

I domini elettronici si dispongono attorno all'atomo centrale in modo tale da massimizzare la distanza reciproca a causa della repulsione di Pauli

Il numero dei domini definisce la loro geometria attorno all'atomo centrale

tetraedrica

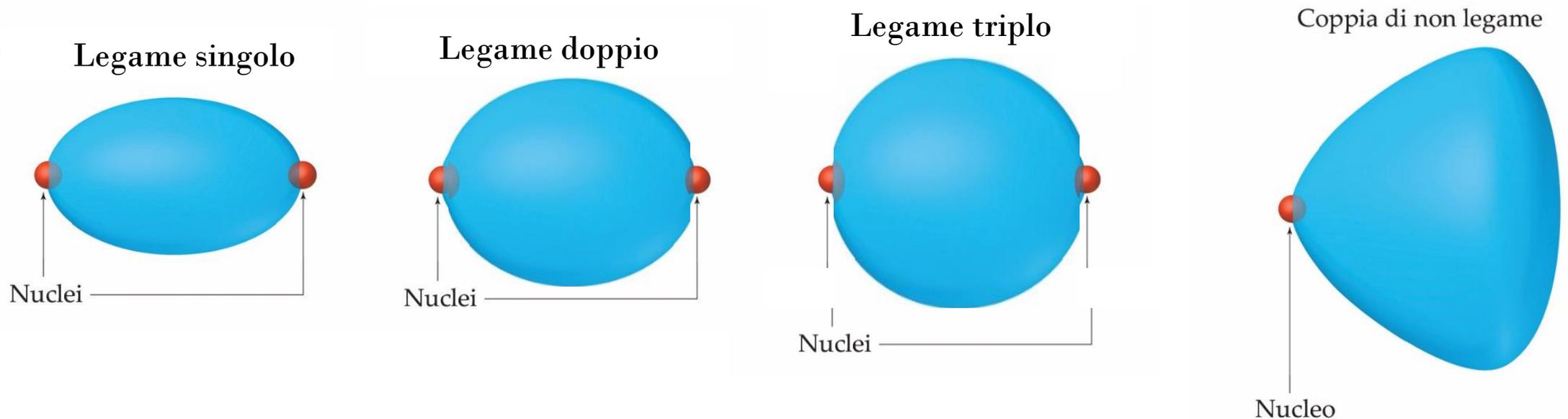
tetraedrica

Trigonale planare

Trigonale planare

Valence Shell Electron Pair Repulsion: modello VSEPR

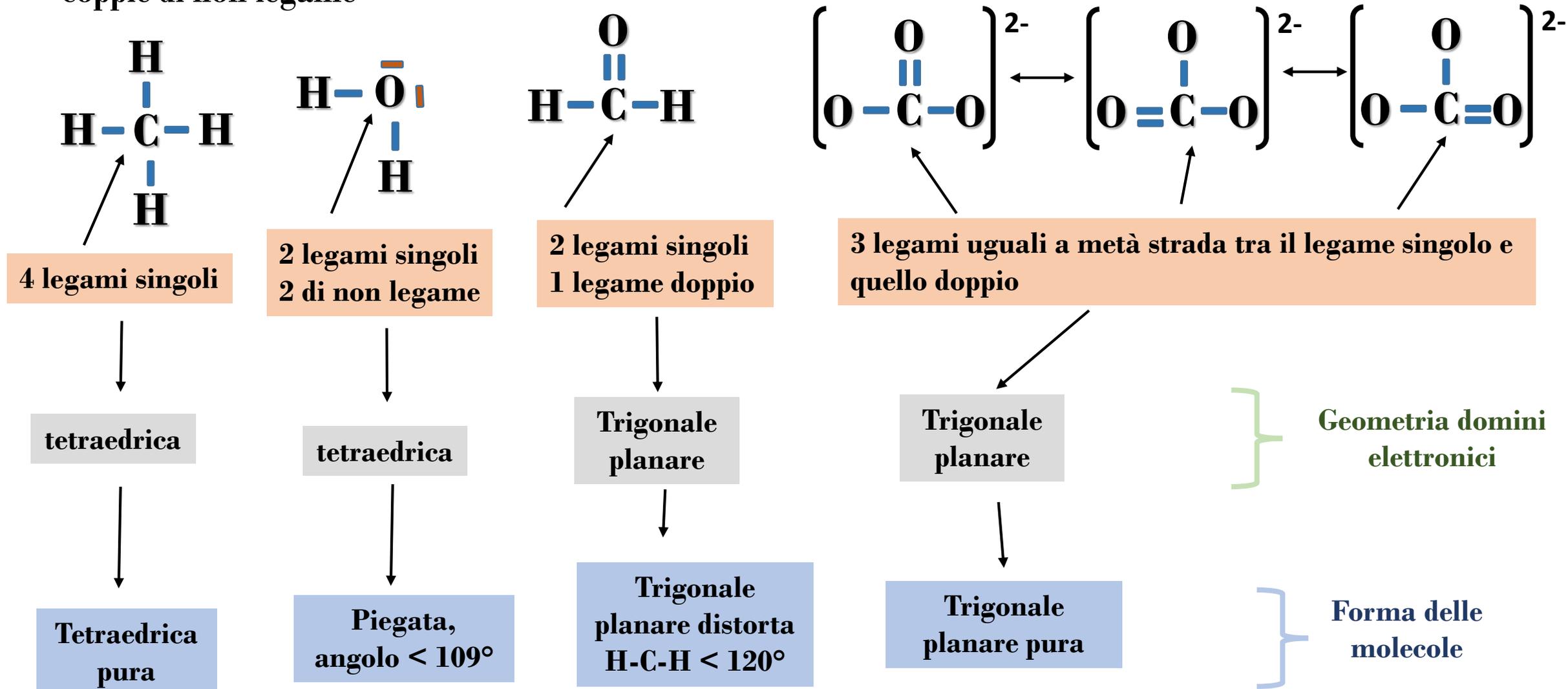
Possibili organizzazioni delle coppie elettroniche e relativo spazio occupato



Aumenta lo spazio occupato dai domini elettronici

Valence Shell Electron Pair Repulsion: modello VSEPR

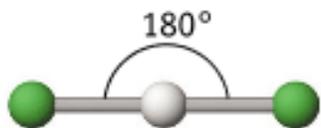
Dalla geometria delle coppie ioniche si risale alla forma molecolare togliendo le posizioni occupate dalle coppie di non legame



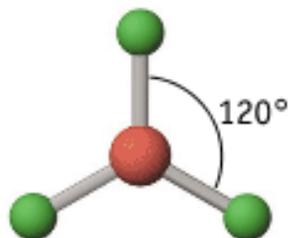
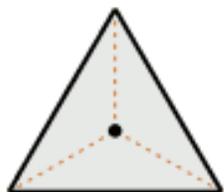
Valence Shell Electron Pair Repulsion: modello VSEPR

Numero di domini elettronici (legami singoli, doppi, tripli e coppie di non legame) attorno all'atomo centrale e relativa geometria dei domini elettronici

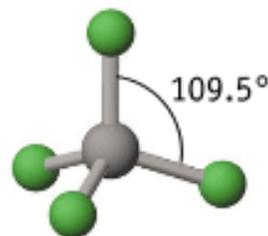
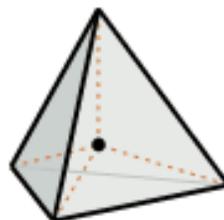
Lineare



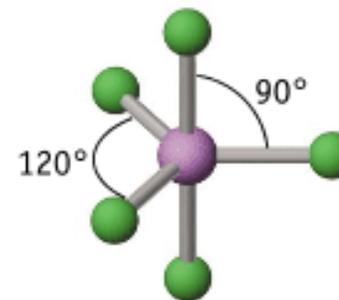
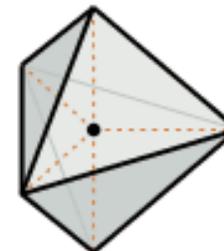
Trigonale planare



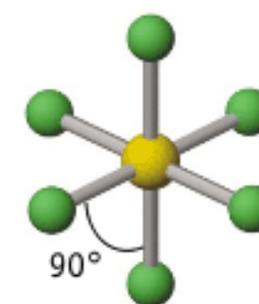
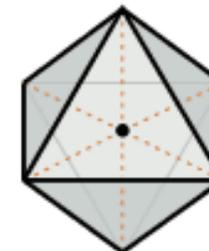
Tetraedrica



Trigonale bipiramidale

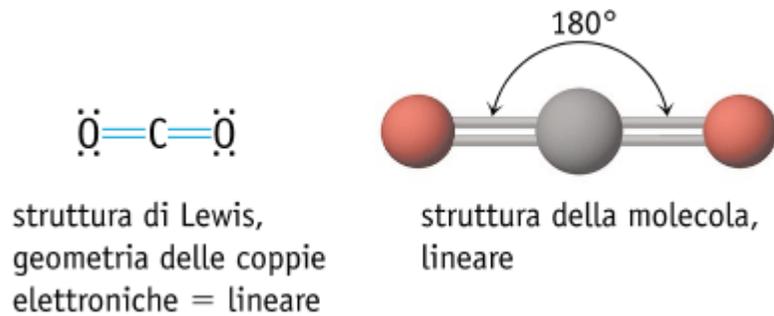


Ottaedrica

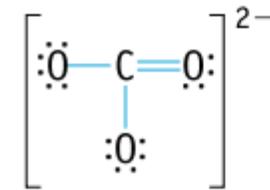


Forme molecolari possibili per ogni numero di domini elettronici

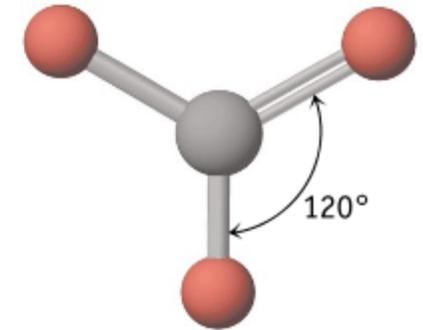
2 domini elettronici: lineare



3 domini elettronici: trigonale planare

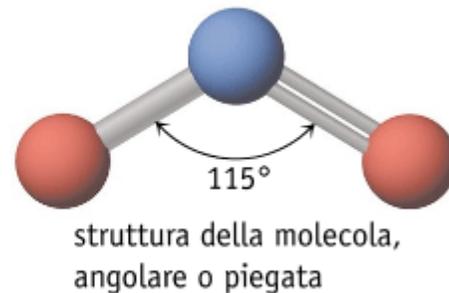
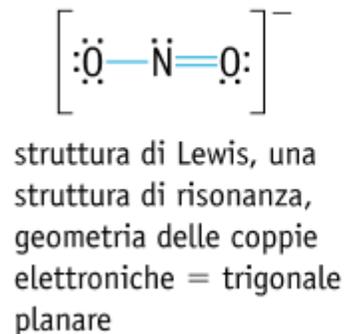


struttura di Lewis, una struttura di
risonanza, geometria delle coppie
elettroniche = trigonale planare



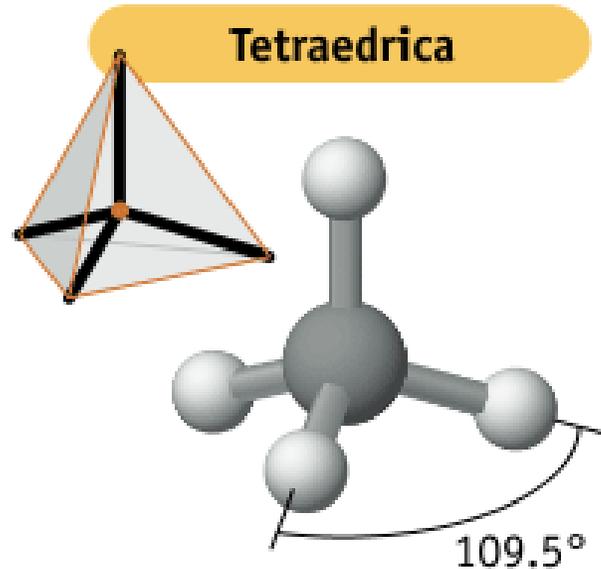
struttura della molecola,
trigonale planare

3 domini elettronici: piegata



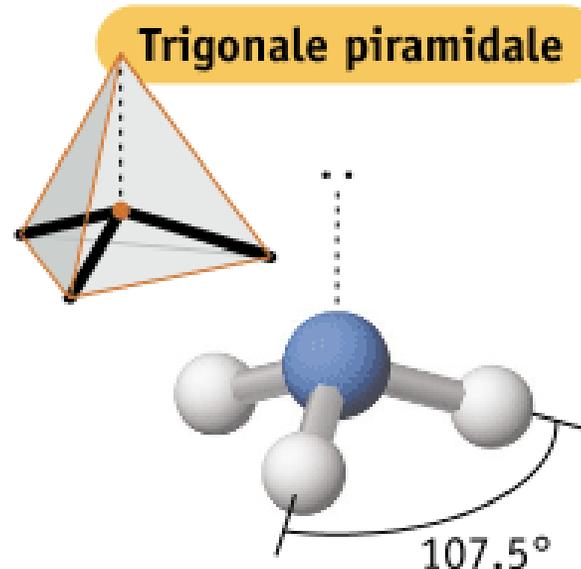
Forme molecolari possibili per ogni numero di raggruppamento elettronico

4 domini elettronici



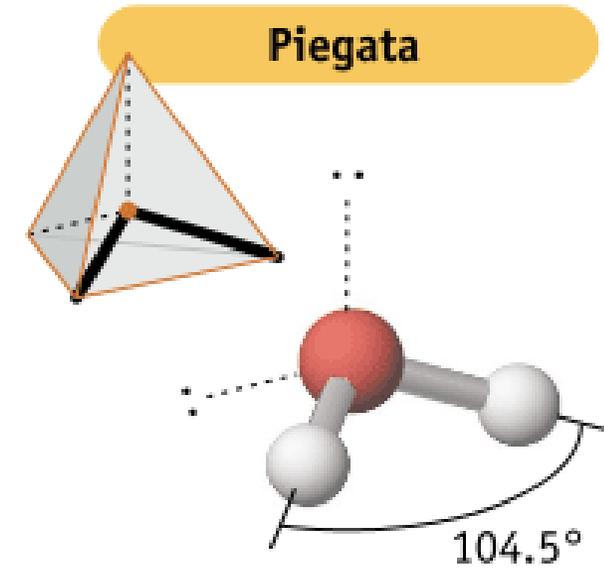
Metano, CH₄
4 coppie di legame
nessuna coppia solitaria

(a) Il metano ha quattro coppie di legame e, quindi, una geometria molecolare tetraedrica.



Ammoniaca, NH₃
3 coppie di legame
1 coppia solitaria

(b) L'ammoniaca ha tre coppie di legame ed una coppia solitaria ed ha, quindi, una geometria molecolare trigonale piramidale.

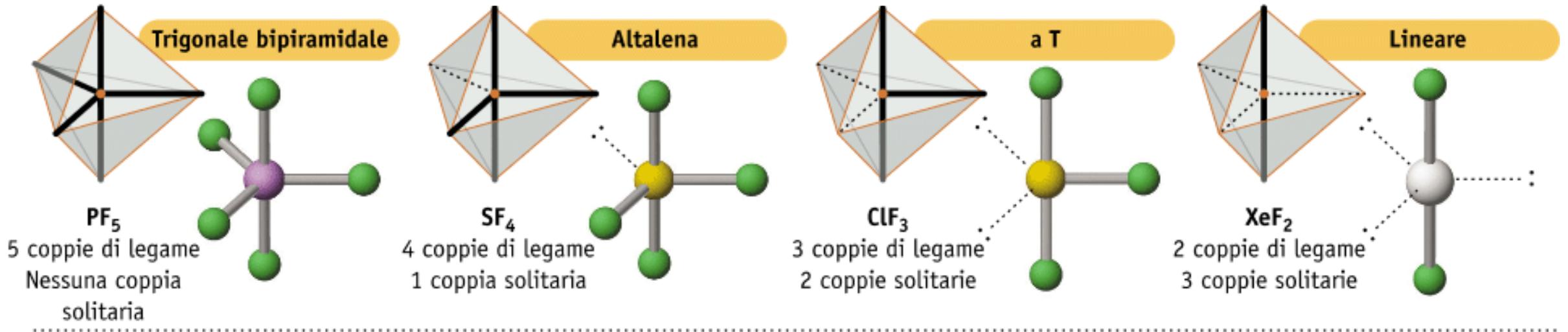


Acqua, H₂O
2 coppie di legame
2 coppie solitarie

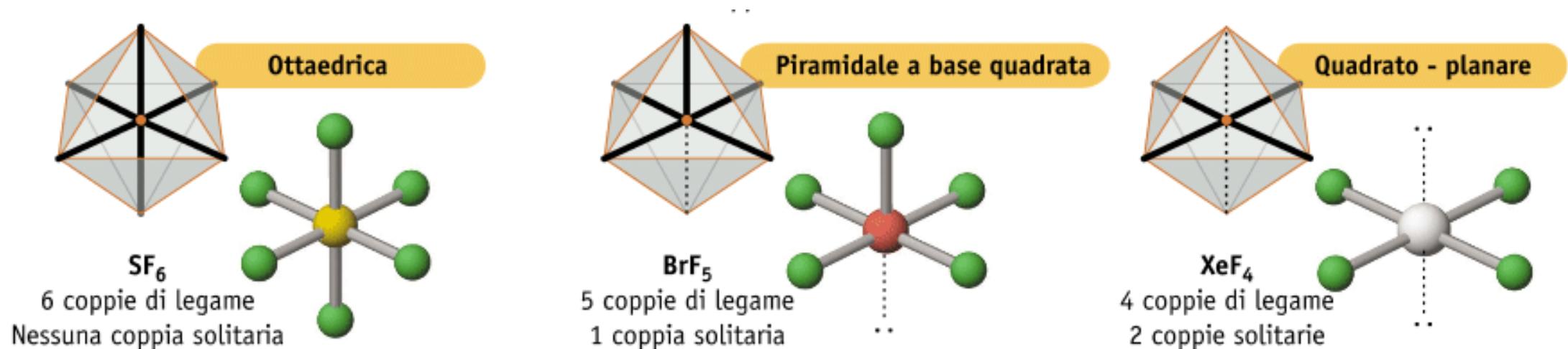
(c) L'acqua ha due coppie di legame e due coppie solitarie e ha quindi una geometria molecolare piegata o angolare.

Forme molecolari possibili per ogni numero di raggruppamento elettronico

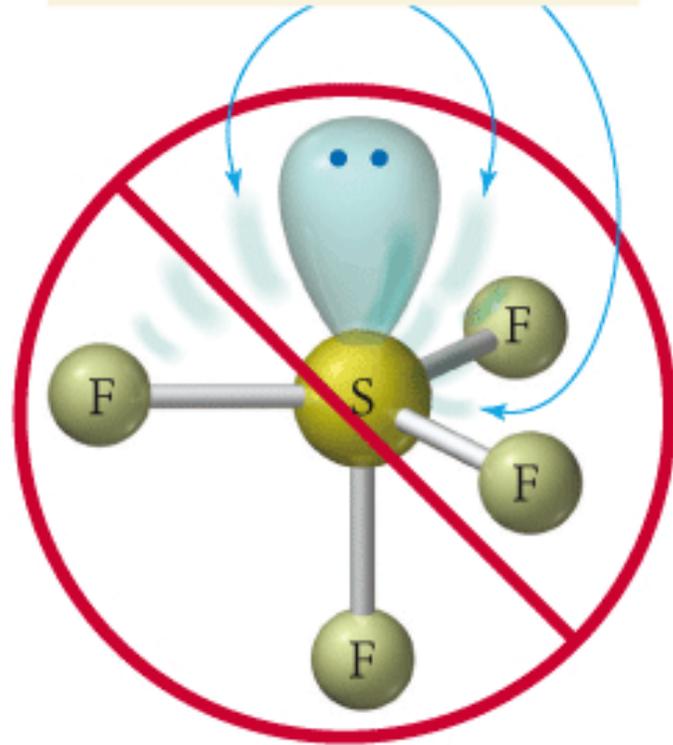
5 domini elettronici



6 domini elettronici

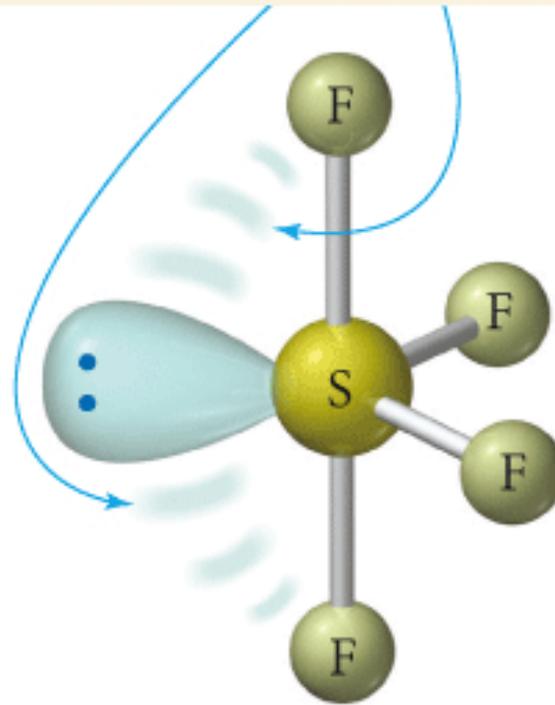


Tre repulsioni a 90° coppia di legame-coppia solitaria

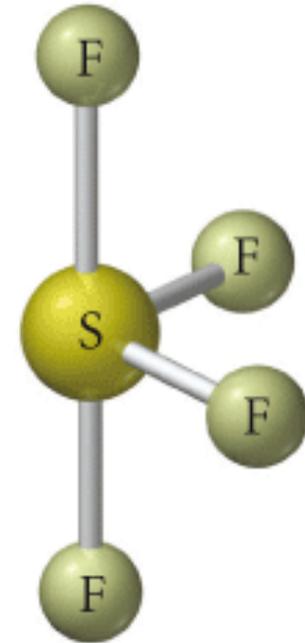


Coppia solitaria in posizione assiale
Non si verifica

Due repulsioni a 90° coppia solitaria-coppia di legame



Coppia solitaria equatoriale



Geometria molecolare:
ad altalena