

Valence Shell Electron Pair Repulsion (VSEPR) Theory Notes

The Shape of Molecules

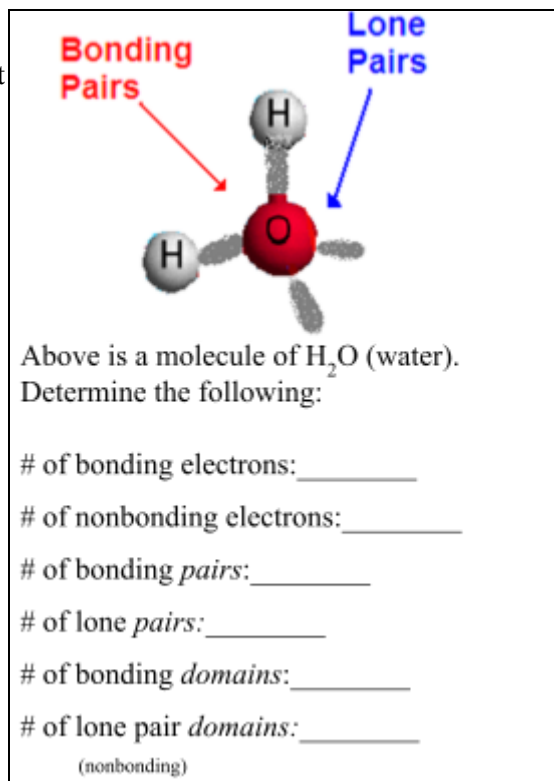
- The shape of a molecule has an important impact on _____ and _____ behavior.
- The shape depends on:
 - _____

Valence Shell Electron Pair Repulsion Theory

- AKA: VSEPR → Break it down...
 - Valence Shell: electrons in the _____ (highest) _____.
 - Electron Pair: electrons like to _____bonding or nonbonding.
 - Repulsion: electrons are _____ charged, so they _____ (push away) each other.
- In summary: electrons have _____ charges, so they _____ each other and _____ as much as possible.
 - *Unit 4 Connection: Remember when talking about ionic radius? When we add more electrons into the valence shell, the radius increases because the like charges of the electrons force them to spread out away from each other more (repulse each other)*

Bonding & Nonbonding Electrons

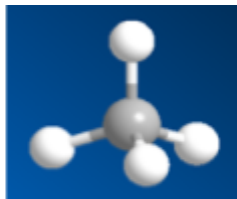
- Bonding pair: A pair of _____ that are shared in a _____ between _____.
- Nonbonding pair: A pair of _____ not involved in bonding within a molecule. The _____ electrons belong to _____.
- Electron domains: _____ of _____ that are occupied by electrons.
- There are two types of e- domains:
 - Bonding Domains: area of space occupied with _____
 - Lone Pair Domains: area of space occupied by _____ that do _____ participate in bonding.
AKA _____
- Molecules can have 2-6 electron domains.



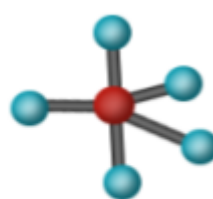
2 domains



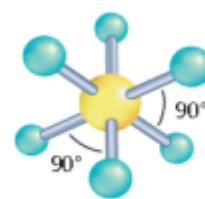
3 domains



4 domains



5 domains



6 domains

don't worry about these last two for this class!

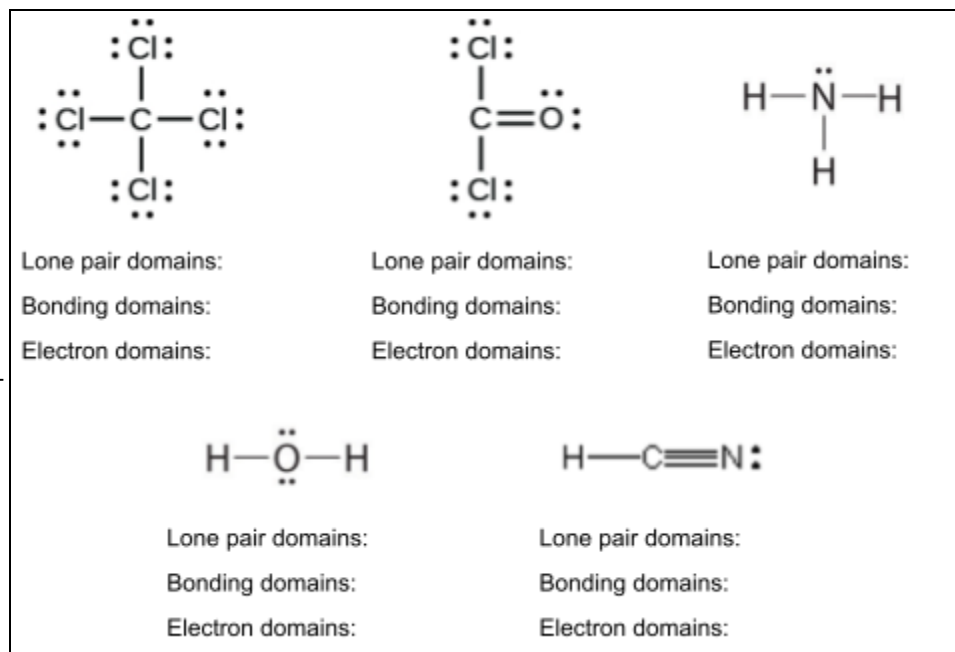
- Now you practice! →

Big Idea of VSEPR:

* Electron domains want to be as _____

_____!

...because they have like charges...



Electron Geometry vs Molecular Geometry

- The shape of a molecule based on either the total number of _____ OR _____ around the central atom.
- Electron Geometry
 - The shape of a molecule based on the _____ of electron domains around the _____ atom.
 - Only _____ electron geometry possible for a given number of electron domains.
- Molecular Geometry
 - The shape of a molecule based _____ on the number of _____ around the central atom.
 - _____ molecular shape is possible for a given number of bonding domains.
 - This is how the molecule actually looks to us because we cannot see the lone pair electrons. (they're too small!)
- One surprise (*and a MAJOR hint for the VSEPR Lab*)
 - Lone pair domains occupy _____ than the bonding domains, so they push the bonding domains closer together creating _____ in molecular geometries.