## 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  $\rightarrow$  Break it down... • Valence Shell: electrons in the \_\_\_\_\_\_(highest) \_\_\_\_\_. o 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 Lone Bonding **Pairs** • 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 Above is a molecule of H<sub>2</sub>O (water). • Electron domains: \_\_\_\_\_ of \_\_\_\_ that are Determine the following: occupied by electrons. # of bonding electrons: • There are two types of e- domains: # of nonbonding electrons: o Bonding Domains: area of space occupied with # of bonding pairs: # of lone pairs: o Lone Pair Domains: area of space occupied by # of bonding domains: that do \_\_\_\_\_ participate in bonding. AKA # of lone pair domains: (nonbonding)

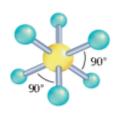




• Molecules can have 2-6 electron domains.







5 domains 6 domains \*don't worry about these last two for this class!\*

2 domains

4 domains

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<ul> <li>Now you practice! →</li> </ul>	:CI:	:cl:		
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Big Idea of VSEPR:	Long pair domains:	Lone pair demains:	Lone pair demains:	
* Electron domains want to	Lone pair domains: Bonding domains:	Lone pair domains: Bonding domains:	Lone pair domains: Bonding domains:	
ha as	Electron domains:	Electron domains:	Electron domains:	
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*because they have like charges*	H—Ö	—н н-	—c≡n:	
	Lone pair do	mains: Lone	pair domains:	
	Bonding dom	ains: Bondi	ng domains:	
	Electron dom	ains: Electr	on domains:	
Electron Geometry vs Molecular Geom	etry			
• The shape of a molecule based on either the total number of OR				
around the central atom.				
• Electron Geometry		<b>0111</b>		
• 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 description of the des				
o The shape of a molecule based on the number of around				
the central atom.				
o molecular shape is possible for a given number of bonding domains.				
o This is how the molecule actually	looks to us because we	cannot see the lone pair el	ectrons. (they're too small!)	
• One surprise (and a MAJOR hint for	the VSEPR Lab)			
o Lone pair domains occupy		than the bonding dom	than the bonding domains, so they push the	
bonding domains closer together creating in molecular geomet			_ in molecular geometries.	