



Cycle 6 Chemistry I Lesson 2

Lone Pairs, Bonds, and VSEPR

Warmup: Draw Lewis structures of Methane (CH_4), Ammonia (NH_3), and water (H_2O). Label each with the number of BONDS and the number of LONE PAIRS it has. Leave space to label geometry!

Handout: VSEPR Reference Chart



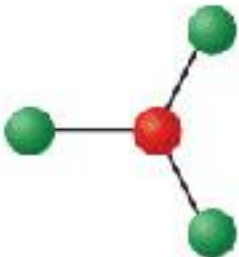

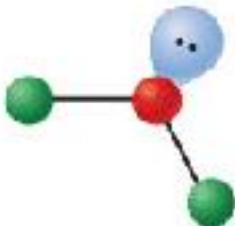
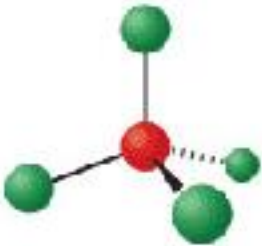

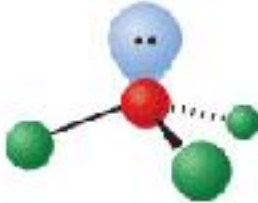
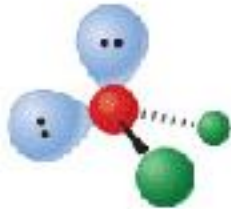
Homework: VSEPR Practice WS

Honors Problems: Find the molecular geometry of ClF_3 , ClF_5 , XeF_4 , SF_4 . Note that these are all hypervalent – the center atom has more than 8 electrons.



Chapter 6

Section 3 Molecular Shapes

Bond angles	Spatial geometry	Electron pair geometry	Lone pair substitutions	
180°	 Linear	 (<i>sp</i>)	...	
120°	 Trigonal planar	 (<i>sp</i> ²)	 Bent	
109.5°	 Tetrahedral	 (<i>sp</i> ³)	 Trigonal pyramidal	 Bent

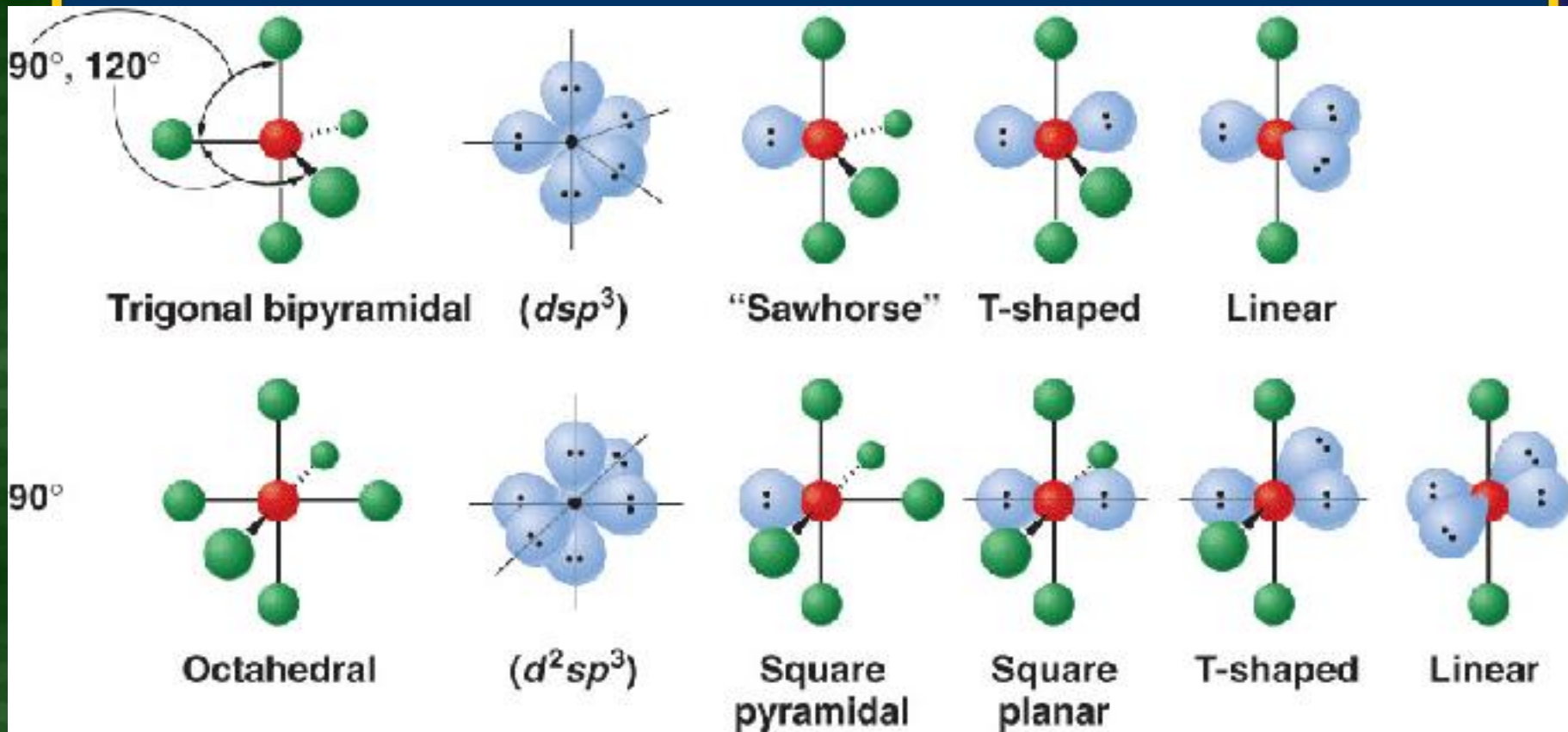
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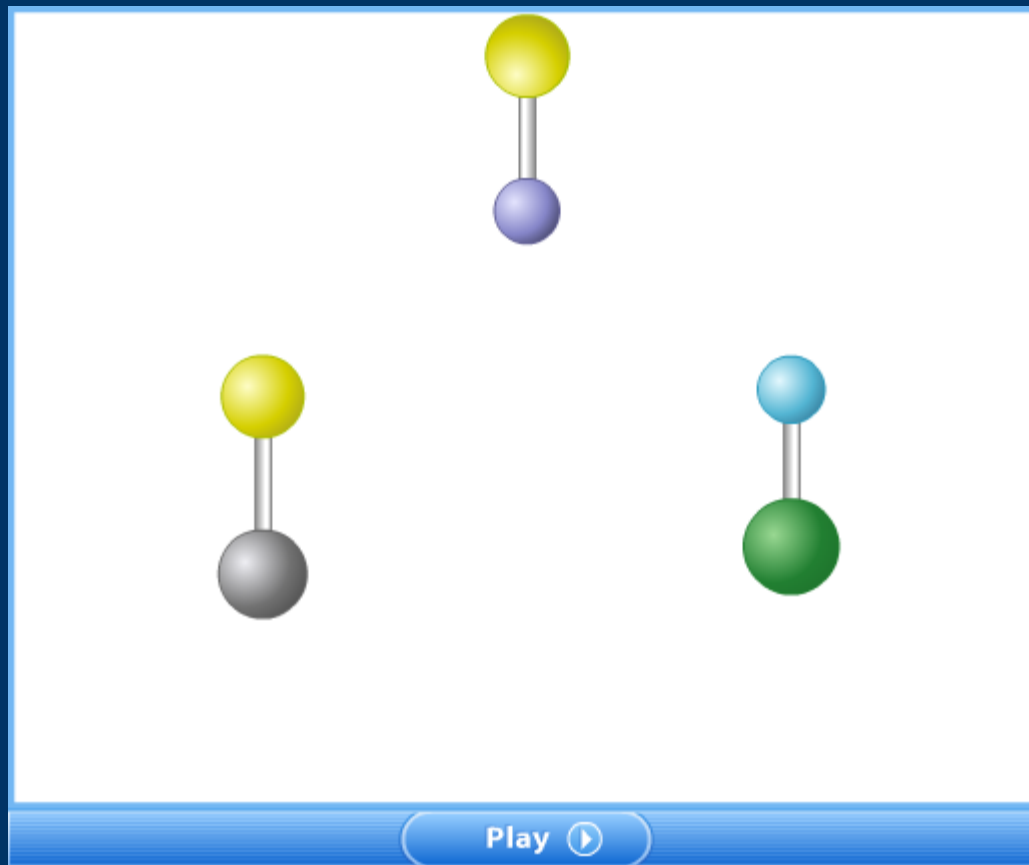
HONORS ONLY



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VSEPR and Lone Electron Pairs



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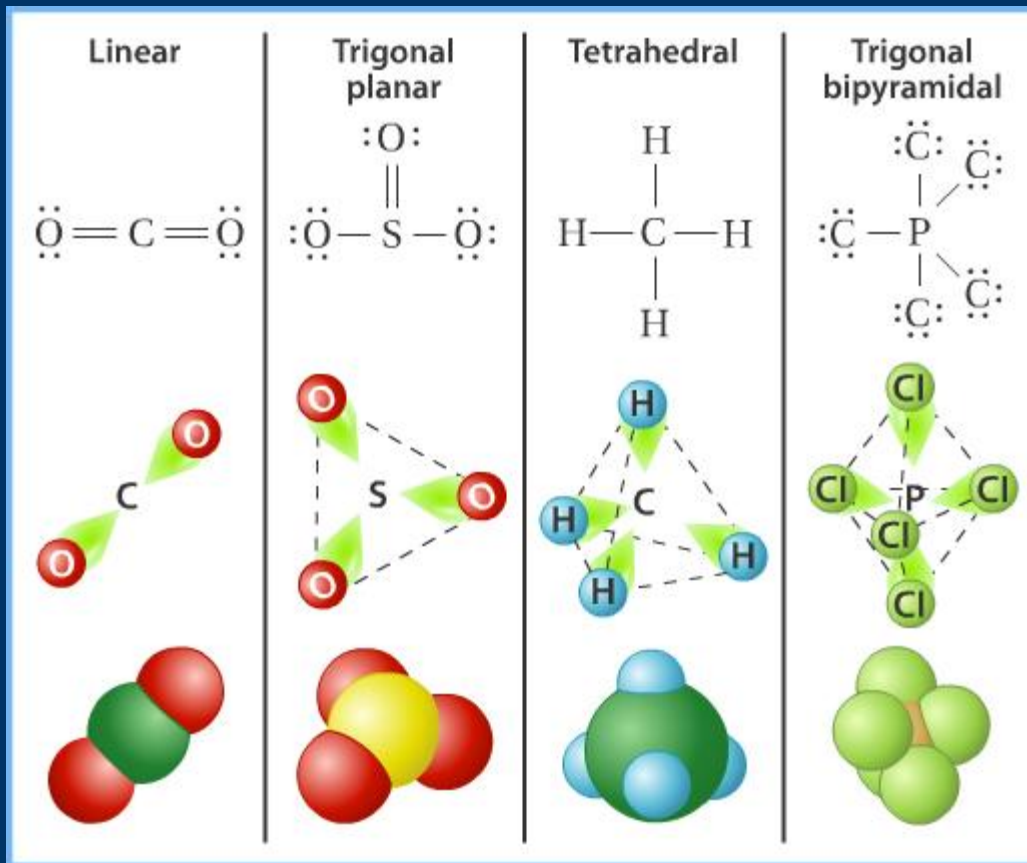
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VSEPR and Basic Molecular Shapes



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Predicting Molecular Shapes

Sample Problem D

Determine the shape of H_2O .



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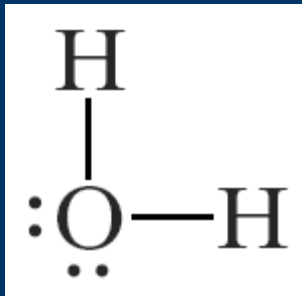




Predicting Molecular Shapes

Sample Problem D Solution

Draw the Lewis structure for H_2O .



Count the number of shared and unshared pairs of electrons around the central atom.

H_2O has two shared pairs and two unshared pairs.





Predicting Molecular Shapes

Sample Problem D Solution, *continued*

Find the shape that allows the shared and unshared pairs of electrons to be as far apart as possible.

The water molecule will have a bent shape.

