

Covalent Bonding**VESPR and Polarity Practice****Learning Target**

Describe how electronegativity values determine the charge distribution in a polar molecule.

Evaluate the strengths of intermolecular attractions compared with the strengths of ionic and covalent bonds.

Directions: Fill in the chart below to represent the correct shape for each molecular compound below.

Molecule	Lewis Dot Structure	# Electron Pairs on Central Atom	3D Sketch of Model	Name of Shape
NH ₃		Bonding: 3 Nonbonding: 1		Trigonal Pyramid
SeO		Bonding: 2 Nonbonding: 0 (no central atom)	Se=O	Linear
BF₃		Bonding: 3 Nonbonding: 1		Trigonal Pyramid
CF ₄		Bonding: 4 Nonbonding: 0		Tetrahedral
CH ₄		Bonding: 4 Nonbonding: 0		Tetrahedral
H ₂	H:H	Bonding: 1 Nonbonding: 0 (no central)	H-H	Linear
SBr ₂		Bonding: 2 Nonbonding: 2		Bent
CHBr ₂		Bonding: 4 Nonbonding: 0		Tetrahedral

Directions: Draw the dot structure for the molecules below. Draw and name the molecular shape.

Formula	Shape	Formula	Shape
O ₂	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:}\text{:}\ddot{\text{O}}\text{:} \\ \text{O}=\text{O} \end{array}$ Linear	SF ₂	$\begin{array}{c} \text{:}\ddot{\text{F}}\text{:}\text{:}\ddot{\text{S}}\text{:}\text{:}\ddot{\text{F}}\text{:} \\ \text{F}-\ddot{\text{S}}-\text{F} \\ \text{F}-\ddot{\text{S}}-\text{F} \end{array}$ Bent
N ₂	$\begin{array}{c} \text{:}\text{N}::\text{N}: \\ \text{N}\equiv\text{N} \end{array}$ Linear	NI ₃	$\begin{array}{c} \text{:}\ddot{\text{I}}\text{:}\text{:}\ddot{\text{N}}\text{:}\text{:}\ddot{\text{I}}\text{:} \\ \text{:}\ddot{\text{I}}\text{:} \\ \text{I}-\ddot{\text{N}}-\text{I} \\ \text{I} \end{array}$ Trigonal Pyramid
F ₂	$\begin{array}{c} \text{:}\ddot{\text{F}}\text{:}\text{:}\ddot{\text{F}}\text{:} \\ \text{F}-\text{F} \end{array}$ Linear	CO ₂	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:}\text{:}\ddot{\text{C}}\text{:}\text{:}\ddot{\text{O}}\text{:} \\ \text{O}=\text{C}=\text{O} \end{array}$ Linear
CBr ₄	$\begin{array}{c} \text{:}\ddot{\text{Br}}\text{:} \\ \text{:}\ddot{\text{Br}}\text{:}\text{:}\ddot{\text{C}}\text{:}\text{:}\ddot{\text{Br}}\text{:} \\ \text{:}\ddot{\text{Br}}\text{:} \\ \text{Br} \\ \\ \text{C} \\ \\ \text{Br} \text{ Br } \text{Br} \end{array}$ Tetrahedral	SiO ₂	$\begin{array}{c} \text{:}\ddot{\text{O}}\text{:}\text{:}\ddot{\text{Si}}\text{:}\text{:}\ddot{\text{O}}\text{:} \\ \text{O}=\text{Si}=\text{O} \end{array}$ Linear
CS ₂	$\begin{array}{c} \text{:}\ddot{\text{S}}\text{:}\text{:}\ddot{\text{C}}\text{:}\text{:}\ddot{\text{S}}\text{:} \\ \text{S}=\text{C}=\text{S} \\ \text{Linear} \end{array}$	H ₂ O	$\begin{array}{c} \text{H}:\ddot{\text{O}}:\text{H} \\ \text{H}-\ddot{\text{O}}-\text{H} \end{array}$ Bent
PI ₃	$\begin{array}{c} \text{:}\ddot{\text{I}}\text{:}\text{:}\ddot{\text{P}}\text{:}\text{:}\ddot{\text{I}}\text{:} \\ \text{:}\ddot{\text{I}}\text{:} \\ \text{I}-\ddot{\text{P}}-\text{I} \\ \text{I} \end{array}$ Trigonal pyramid	H ₂	$\begin{array}{c} \text{H}:\text{H} \\ \text{H}-\text{H} \end{array}$ Linear
HF	$\begin{array}{c} \text{H}:\ddot{\text{F}}\text{:} \\ \text{H}-\text{F} \end{array}$ Linear	SiBr ₄	$\begin{array}{c} \text{:}\ddot{\text{Br}}\text{:} \\ \text{:}\ddot{\text{Br}}\text{:}\text{:}\ddot{\text{Si}}\text{:}\text{:}\ddot{\text{Br}}\text{:} \\ \text{:}\ddot{\text{Br}}\text{:} \\ \text{Br} \\ \\ \text{Si} \\ \\ \text{Br} \text{ Br} \end{array}$ Tetrahedral

Molecule	Lewis Dot	Name the Shape & Draw the Shape	E.N.D.	Type of Bond NPC/PC/I	P/NP Molecule
NF ₃		 Trigonal Pyramidal	N=3.0 F=4.0 1.0	Polar covalent	Polar
BF₃		 Trigonal Planar	F= 3.98 B= 2.04	Ionic	Ionic Attraction
BH₂F		 Trigonal Planar	F= 3.98 B= 2.04 H= 2.2	Does this make sense? Ionic non polar	Polar
HF		H - F Does This Make Sense?	H=2.2 F=4.0	Ionic	Ionic Attraction
MgF ₂			2.8 Mg = 1.2 F = 4.0	Ionic	Ionic Attraction
N ₂		N≡N	N=3.0 0	nonpolar	nonpolar
O ₂		O=O	O=3.5 0	nonpolar	nonpolar

Directions: Complete the table below.

Molecule	Lewis Dot	Name the Shape & Draw the Shape	E.N.D	Type of Bond NPC/PGI	P/NP Molecule
H ₂ O	$\text{H}:\ddot{\text{O}}:\text{H}$	 Bent	H=2.2 O=3.4 1.2	polar covalent	Polar
SI ₂	$:\ddot{\text{I}}:\ddot{\text{S}}:\ddot{\text{I}}:$	 Bent	S=2.6 I=2.7 0.1	non polar covalent	Polar
CF ₄		 Tetrahedral	C=2.5 F=4.0 1.5	polar covalent	non polar
CH ₃ Br	$\begin{array}{c} \text{Br} \\ \\ \text{H}:\text{C}:\text{H} \\ \\ \text{H} \end{array}$	 Tetrahedral	C=2.5 H=2.2 Br=3.0	C → H non polar C → Br polar	Polar
CaO	$\text{Ca} \rightarrow \ddot{\text{O}}:$		Ca=1.0 O=3.5 2.5	ionic	ionic attraction
BI₃	$:\ddot{\text{I}}:\ddot{\text{B}}:\ddot{\text{I}}:$ $:\ddot{\text{I}}:$	 Trigonal Planar	B = 2.04 I = 2.66 0.62	polar covalent	non polar
NBr ₃	$:\ddot{\text{Br}}:\ddot{\text{N}}:\ddot{\text{Br}}:$ $:\ddot{\text{Br}}:$	 Trigonal pyramid	N=3.04 Br=2.96 0.08	non polar	Polar