

# Molecular Geometry Notebook Quiz

Name Key

For each of the following molecules, draw the VSEPR structure, describe the shape and identify if it is polar.

Molecule	Formula	Structure	Shape	Polar (yes/no)
Ethanol	C <sub>2</sub> H <sub>5</sub> OH	$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{H}-\text{C}-\text{C}-\ddot{\text{O}}-\text{H} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $	Tetrahedral Tetrahedral Bent	yes
Cyanidic acid	HCN	$\text{H}-\text{C}\equiv\text{N}:$	Linear	yes
Phosphorus Trichloride	PCl <sub>3</sub>	$  \begin{array}{c}  \ddot{\text{P}} \\  / \quad \backslash \\  :\text{Cl} \quad \text{Cl}: \\    \\  :\text{Cl}:  \end{array}  $	Trigonal pyramidal	yes
Difluoro-Oxide	F <sub>2</sub> O	$  \begin{array}{c}  :\ddot{\text{F}}-\ddot{\text{O}}: \\    \\  :\text{F}:  \end{array}  $	Bent	yes
Dichloro-ethene	C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>	$  \begin{array}{c}  \text{H} \quad \quad \text{H} \\  \backslash \quad / \\  \text{C}=\text{C} \\  / \quad \backslash \\  :\text{Cl}: \quad \text{Cl}:  \end{array}  $	Trigonal Planar	yes + no
Hypochlorous acid	HOCl	$\text{H}-\ddot{\text{O}}-\ddot{\text{Cl}}:$	Bent	yes
Dichloroethane	C <sub>2</sub> H <sub>4</sub> Cl <sub>2</sub>	$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  :\text{Cl}-\text{C}-\text{C}-\text{Cl}: \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $	Tetrahedral	
Formaldehyde	CH <sub>2</sub> O	$  \begin{array}{c}  :\text{O}: \\     \\  \text{H}-\text{C}-\text{H}  \end{array}  $	trigonal planar	yes
Dichloro difluoro methane	CCl <sub>2</sub> F <sub>2</sub>	$  \begin{array}{c}  :\text{F}: \\    \\  :\text{Cl}-\text{C}-\text{Cl}: \\    \\  :\text{F}:  \end{array}  $	tetrahedral	

Molecule	Formula	Structure	Shape	Polar (yes/no)
Perchlorate ion	$\text{ClO}_4^-$		tetrahedral	
Hydrazine	$\text{N}_2\text{H}_4$		trigonal planar	
Nitrate ion	$\text{NO}_3^-$		trigonal planar	
Carbon monoxide	$\text{CO}$	$:\text{C} \equiv \text{O}:$	linear	

CO A compound is 40.8 % carbon and 54.4 % oxygen. Draw the resulting molecule.

$:\text{C} \equiv \text{O}:$

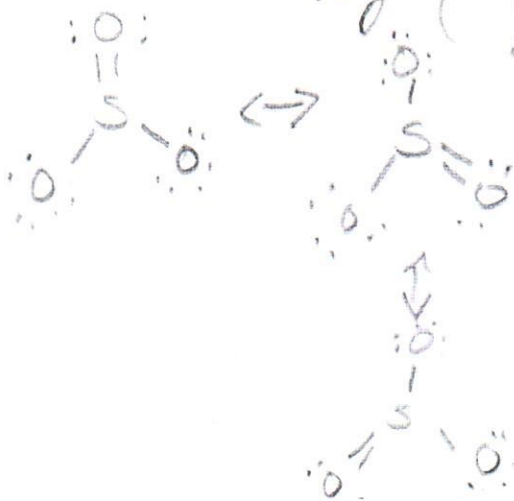
$$40.8 \text{ g C} \left( \frac{1 \text{ mol}}{12.01 \text{ g}} \right) = 3.397 \text{ mol} \quad \frac{3.397}{3.397} = 1$$

$$54.4 \text{ g O} \left( \frac{1 \text{ mol}}{15.99 \text{ g}} \right) = 3.40 \quad \frac{3.40}{3.397} = 1$$

SO<sub>3</sub> A 150 gram compound contains 60 grams of sulfur and 90 grams of oxygen. What is the empirical formula? Draw this molecule.

$$60 \text{ g S} \left( \frac{1 \text{ mol}}{32.06 \text{ g}} \right) = 1.871 \text{ mol} \quad \frac{1.871}{1.871} = 1$$

$$90 \text{ g O} \left( \frac{1 \text{ mol}}{15.99 \text{ g}} \right) = 5.629 \text{ mol} \quad \frac{5.629}{1.871} = 3$$



SO<sub>3</sub>

"Gratitude can transform common days into thanksgivings, turn routine jobs into joy, and change ordinary opportunities into blessings."

William Arthur Ward

