

VSEPR Exercise

Draw Lewis structures of molecules in the chart.

1. Find the total number of valence electrons donated by each atom and add them together. (add one electron for each unit of charge on a negative ion; subtract one electron for each unit of charge on a positive ion)
2. Write the symbol for the central ion and then arrange the other atoms around it. Connect them to the central ion using single bonds. Usually two electrons shared in a covalent bond are drawn as one straight line.
3. Subtract two electrons from the total for each single bond.
4. Place the remaining electrons as lone pairs, first on the central atom, then on the outer atoms to give each atom an octet (8 electrons); except hydrogen atoms can only have two electrons. Lone pairs can be drawn as two dots or one line.
5. If you run out of electrons, move lone pairs from the central atom to form double or triple bonds.

Formula	Lewis Structure	Geometry	Is the molecule polar?
CO₂			
CO₃²⁻			
H₂O			
NH₄⁺			
NH₃			

Expanded octets (> 8 electrons): Put extra lone pairs on the central atom

Formula	Lewis Structure	Geometry	Is the molecule polar?
XeBr₂			
BrI₃			
SCl₄			
AsF₅			
RnCl₄			
BrI₅			
PF₆⁻			