

Molecular Modeling and VSEPR Theory

Purpose: to use VSEPR to predict the geometry of simple molecules and build models to study these characteristic shapes.

Equipment: molecular model kit OR pHet simulation (<http://url.d219.org/moleculebuilder>). Click run now and a java file will be downloaded. Click to open and run the download.

Procedure:

- 1) Write Lewis dot structures for each of the molecules in the list below.
- 2) Use VSEPR to predict the electron domain geometry *and* molecular shape of the molecules.
- 3) Draw a 3D sketch of the molecule (using the wedge and dash notation).
- 4) Build each of the molecules with the kit or pHet website (<http://url.d219.org/moleculebuilder>) to check your answers.

Data Table

Name	Formula	Lewis dot structure (rough draft)	Electron Domain Geometry & Molecular Shape	3-D Shape (wedge and dash formation)	Answers correct?
water	H ₂ O				
ammonia	NH ₃				
methane	CH ₄				
nitrogen	N ₂				
oxygen	O ₂				

Name	Formula	Lewis dot structure (rough draft)	Electron Domain Geometry & Molecular Shape	3-D Shape (wedge and dash formation)	Answers correct?
carbon dioxide	CO ₂				
phosphorus pentachloride	PCl ₅				
sulfur hexafluoride	SF ₆				
sulfate ion	SO ₄ ⁻²				
sulfur dioxide	SO ₂				
carbonate ion	CO ₃ ⁻²				
ammonium ion	NH ₄ ⁺				