

Introduction for Module 10 – Molecular Geometry

Textbook: [Open Stax Chemistry 2e](#)

Suggested Reading: Chapter 7.6

Learning Objectives:

- **Determine the geometry for molecules with up to 4 domains**
- **Recognize the role of lone pairs vs. bonded pairs for determining geometry**
- **Demonstrate how different electronegativities between atoms results in bond dipoles**
- **Determine whether a molecule is polar vs. non-polar based on geometry and existence of bond dipoles**

Captions and Attributions:

- 1) Electron pair repulsion around methane (CH_4) can be shown by portraying each electron domain as an individual lobe, each of which spreads evenly around the central atom with an angle of 109.5° . [Figure 7.16, The basic electron-pair geometries predicted](#) by [Open Stax](#) is licensed under [CC BY 4.0](#).
- 2) Chart featuring two, three, or four electron domains highlights Valence Shell Electron Pair Repulsion (VSEPR) theory and provides parent structures for many molecules. [Figure 7.16, The basic electron-pair geometries predicted](#) by [Open Stax](#) is licensed under [CC BY 4.0](#).
- 3) Replacing bonded electron pairs with non-bonded does not change the fundamental parent structure, but does cause distortion when comparing structures with the same number of bonded domains. [Figure 7.19, The molecular structures are identical](#) by [Open Stax](#) is licensed under [CC BY 4.0](#).
- 4) Molecules with multiple centers will have geometry around each of these central atoms, which can be clearly defined. Labeled acetic acid (c) 2020 used with permission of Becca Ciancanelli
- 5) The lone pairs on a molecule will cause bonded pairs to spread at angles based on their parent electron geometry and explains the polarity of water (H_2O) compared to the non-polarity of carbon dioxide (CO_2). [Figure 7.27, The overall dipole moment of a molecule](#) by [Open Stax](#) is licensed under [CC BY 4.0](#).



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