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Title: Molecular Modelling of Simple Organic Compounds and Water

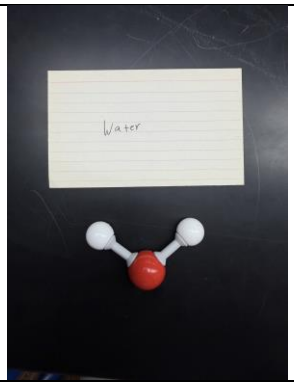
Purpose/Objective: To identify and explain components of various compounds by using modelling pieces to create a visual three-dimensional diagram to better understand chemical bonding and functional groups.

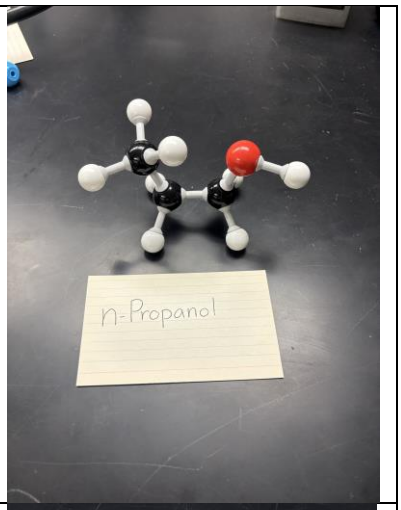
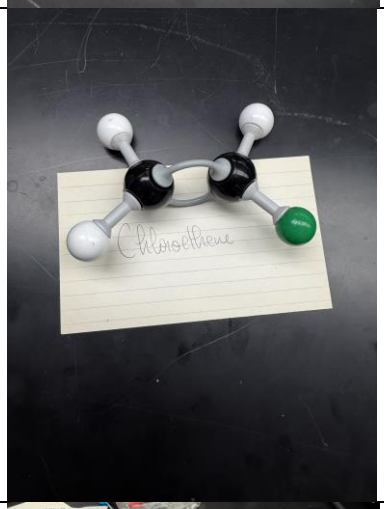
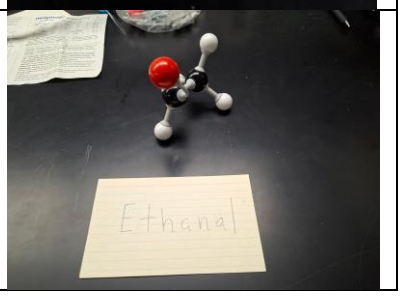
Introduction: The molecular structure of a compound determines both the chemical and physical properties of that compound. A three-dimensional model provides insight into the molecular geometry, types of bond connections, and visually shows whether a compound has polar or nonpolar properties. Polar Molecules are molecules with atoms of different electronegativities that share electrons unevenly. Nonpolar Molecules are moles with atoms that share electrons equally with little electronegative difference. Single bonds can rotate, but double bonds make parts of a molecule flat and rigid.

Materials/Methods:

- Used pens/pencils to write the following molecule names on a notecard including: Ethanal, N-Propanol, water, and Chloroethene.
- Additionally, the Moly Mod: Individual Pack for Organic Chemistry Molecule kit was used to create these previously stated molecules.
- The Model kids included colored balls to represent: Oxygen, Hydrogen, Chlorine, Carbon, etc., and flexible/rigid sticks to represent single and double bonds

Data/Results:

Molecule	Chemical Formula	Key Bonds	
Water	H_2O	2 singles covalent bonds (O – H)	

n-Propanol	C_3H_8O	Single covalent bonds (C – C, C – H, C—O, O – H)	
Chloroethene	C_2H_3Cl	1 carbon double bond (C = C) and single covalent bonds (C – H, C – C)	
Ethanal	C_2H_4O	1 double bond (C = O), single bonds (C – C, C – H)	

Discussion and Conclusion: Through these models, my group and I were able to successfully demonstrate multiple simple chemical compounds. The models served as helpful tools to see each model's molecular geometry and to understand why some components are polar or non-polar. This experiment also aided in showing how all parts of the component need to be completed when sharing electrons through the bonds. By using physical balls and sticks in the model, it effectively bridges the gap between the two-dimensional drawings and formulas of the diagram and an actual three- dimensional

structure, further focusing on the relationship between molecular shape and chemical functions.

References:

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