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Organic Mechanisms: Nucleophiles & Bases 56:160:508

Rationale:
By investigating *how* and *why* chemical reactions occur, it generates the understanding of molecular transformations. Such knowledge then allows the prediction of *new* chemistry (e.g. how to make things never prepared before; how to design a molecule with 'better' properties, etc), and the improvement of *existing* chemistry (e.g. higher yield, produce a different stereoisomer; use less reagents, etc).

Course Objective:
Upon successful completion, students will understand the direct connection between the reactivity of a substance and its molecular structure, from a mechanistic (electron movement) point of view. Using skills developed and refined through critical thinking and problem solving activities, students will then be able to predict/deduce/explain how A was converted into B by the appropriate and relevant electron movement.

Learning goals:
Students will be familiar with the following subject matter, and be able to apply these concepts and principles to any molecule or chemical process.

Chapter 1 covers a recap of fundamental undergraduate organic chemistry including ways to represent Organic structures; geometry and hybridization; polarity, resonance, aromaticity equilibrium, acidity/basicity and nucleophilicity/electrophilicity.
Chapter 2 covers how to correctly write a mechanism; curly arrows; acidic and basic media; stabilities of intermediates; driving forces for reaction steps; determining the structural relationship between starting material and product.
Chapter 3 covers A) Nucleophilic Substitution (at sp^3, sp^2 centers, and aromatic systems). B) Eliminations (E2 and Ei). C) Nucleophilic Addition to Carbonyl compounds (including organometallics, N nucleophiles, Aldol condensation, Michael reactions. D) Base Promoted Rearrangements (including Favorskii and Benzillic Acid rearrangements).