

	S_N2	S_N1	E1	E2
Molecularity	single step bimolecular	multiple steps unimolecular	multiple steps unimolecular	single step bimolecular
Rate Law	$R = k[RX][Nu]$	$R = k[RX]$	$R = k[RX]$	$R = k[RX][Nu]$
Intermediate	none	carbocation	carbocation	none
Stereochemistry	inversion	racemization	none	H/X anti preferred

	S_N2	S_N1	E1	E2
Branching in RX	$CH_3 > 1^\circ > 2^\circ > 3^\circ$ (no 3°)	$3^\circ > 2^\circ > 1^\circ, CH_3$ (no $1^\circ/CH_3$)	$3^\circ > 2^\circ > 1^\circ, CH_3$ (no $1^\circ/CH_3$)	$1^\circ, 2^\circ, 3^\circ$ (no preference)
Leaving Group	rate \uparrow as leaving group ability \uparrow	rate \uparrow as leaving group ability \uparrow	rate \uparrow as leaving group ability \uparrow	rate \uparrow as leaving group ability \uparrow
Nucleophile	rate \uparrow as nucleophile strength \uparrow	rate independent of Nu	rate independent of Nu	rate increases as base strength increases
Solvent	faster in polar aprotic	faster in polar protic	faster in polar solvents, especially polar aprotic	works well in most solvents with strong base

	Examples
Leaving Group Ability	weak bases (from strong acids), halides (except fluoride) $TsO^- > NH_3 > I^-$, $H_2O > Br^- > Cl^- \gg F^-$, HO^- , NH_2^- , RO^-
Nucleophiles	molecules with negative charge or at least one lone pair increases down periodic table ($I^- > Br^- > Cl^- > F^-$) increases left to right on periodic table ($H_2N^- > CH_3O^- > F^-$) $SH^- > CN^- > I^- > OH^- > N_3^- > Br^- > CH_3COO^- > Cl^- > F^- > H_2O$
Solvents (Polar Aprotic)	Dimethyl Sulfoxide (DMSO), Dimethyl Formamide (DMF), aldehydes (R-CHO), ketones (C=O), ethers (R-CO-R)
Solvents (Protic)	(Any molecule with H bonded to N or O.) H_2O , alcohols (R-OH), amines (R-NH ₂), carboxylic acids such as formic acid (H-COOH) or acetic acid (CH ₃ -COOH)