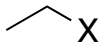
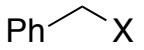
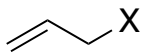
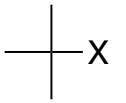
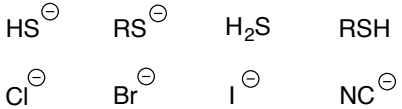
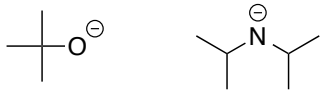
Elimination Versus Substitution

Substrate		S_N1	E1	S_N2	E2
Primary		NEVER *primary carbocation is too unstable*	NEVER *primary carbocation is too unstable*	Highly favored with a strong **nucleophile**	Occurs with strong bulky base or a strong base plus heat
Secondary **Benzylic** **Allylic**	  	Favored with a weak **nucleophile** *Favored over E1 at lower temperatures	Favored with a weak **base** *Favored over S_N1 with heat	Favored with a strong **nucleophile**	Favored with a strong **base** *Favored over S_N2 with heat
Tertiary		Favored with a weak **nucleophile** *Favored over E1 at lower temperatures	Favored with a weak **base** *Favored over S_N1 with heat	NEVER	Favored with a strong base *Heat not required
		Carbocations are involved. Always look for resonance or possible rearrangement.		*Inversion of Stereochemistry*	*H and LG must be antiperiplanar*

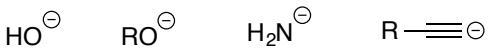
Strong Nucleophiles & Weak Bases - Preference for S_N2



Strong Bases & Weak Nucleophiles - E2 Only



Strong Nucleophiles & Strong Bases - Preference for S_N2 & E2



Weak Nucleophiles & Weak Bases - Can only do S_N1 & E1

H_2O ROH RNH_2 R_2NH

- **E1 Elimination:**
  - Zaitsev Product = Major Product
- **E2 Elimination:**
  - Small Base – Zaitsev = Major
  - Bulky Base – Hoffmann = Major
- Strong Bases will always undergo E2 over E1.
- Strong nucleophiles can do S_N1 if the substrate can only undergo S_N1.