SN1, SN2, E1, or E2 Reaction? Cheat Sheet

by pokemonsz via cheatography.com/44231/cs/13159/

Step 1: The Solvent

Is it **Protic**?

> Hydrogen-donating (H bonded to electronegative molecule) will add lots of H^+ to the solution. Would stablilize *strong base/nucleophile*.
>
> ~~**SN2 and E2 unlikely.**~~
> **Necessary for SN1 or E1.**

Is it **Aprotic**?

> No Hydrogens attached to electronegative molecules. Would not react with *strong base* or *strong nucleophile*.
>
> ~~**SN1 or E1 unlikely.**~~
> **Necessary for SN2 or E2.**

Step 2: The Leaving Group

Is it a **good** leaving group?

> Favors all reactions, but is **necessary** for SN1 or E1 because the LG must leave *on its own* first.

Some Examples:

> I, Br, Cl

Step 3: The Reactant

Is it a **strong Nucleophile**?

> Small (not "bulky") nucleophilic.
> Able to perform **backside attack** in SN2 reaction.

Is it a **strong base**?

> If there is no *protic solvent*, will attack Beta-carbon-hydrogens to form *carbocations* in E2 reaction.

Step 4: The Substrate

Is the alpha carbon **Primary** (1^o)?

> Can only go through an SN2 reaction.

Is the alpha carbon **Secondary** (2^o)?

> Favors either SN2 or E2 reaction.

Is the alpha carbon **Tertiary** (3^o)?

> Favors an E1 or E2 reaction through alkene stability.

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