S_N1 or Consider a X-RX Nu: RNu + + S_№2 substitution Leaving Group Alkyl Halide Nucleophile reaction: Electrophile (E⁺) (LG) S_N1 S_N2 Rate = k[RX][Nu:] Rate = k[RX] bimolecular no reaction both unimolecular inversion of on 1° RX backside attack stereochemistry $S_N 1 \& S_N 2$ *t*-BuBr = fastest Mel = fastest good LG no reaction MeOH Nu: sterics H₂O Nu: on 3° RX a bond breaks in unhindered E⁺ rate-determining step carbocation solvolysis NaOMe Nu: HO⁻ Nu: racemization no reaction weak Nu: only one on vinyl RX strong Nu: transition state rearrangement a bond forms in 2° RX 1° RX more than one 3° RX rate-determining step transition state protic solvent aprotic solvent

Library of Organic Chemistry Active Learning (LOCAL) Resources **Comparison of S_N1 and S_N2 Mechanisms**

Categorize each of the following items as being related to S_N1 , S_N2 , or both.

