

Example: 3-bromo-2-methoxyhexane (R,R), (S,S), (R,S), (S,R)







vertical view

4 2 1 3 1	2-bromo-3-deuteriobutane (R,R) (S,S) (R,S) (S,R)	2-bromo-3-methylbutane (R or S)		
	2-bromo-3-deuteriopentane (R,R) (S,S) (R,S) (S,R)	3-bromo-2-deuteriopentane (R,R) (S,S) (R,S) (S,R)	2-bromo-3-methylpentane (R,R) (S,S) (R,S) (S,R)	3-bromo-2-methylpentane (R or S)
	2-bromo-3-deuteriohexane (R,R) (S,S) (R,S) (S,R)	3-bromo-2-deuteriohexane (R,R) (S,S) (R,S) (S,R)	2-bromo-3-methylhexane (R,R) (S,S) (R,S) (S,R)	3-bromo-2-methylhexane (R or S)
	3-bromo-4-deuteriohexane (R,R) (S,S) (R,S) (S,R)		3-bromo-4-methylhexane (R,R) (S,S) (R,S) (S,R)	
	2-bromo-3-deuterioheptane (R,R) (S,S) (R,S) (S,R)	3-bromo-2-deuterioheptane (R,R) (S,S) (R,S) (S,R)	2-bromo-3-methylheptane (R,R) (S,S) (R,S) (S,R)	3-bromo-2-methylheptane (R or S)
	3-bromo-4-deuteriopentane (R,R) (S,S) (R,S) (S,R)	4-bromo-3-deuteriopentane (R,R) (S,S) (R,S) (S,R)	3-bromo-4-methylpentane (R,R) (S,S) (R,S) (S,R)	4-bromo-3-methylpentane (R,R) (S,S) (R,S) (S,R)
$S_{N}2 / E2$ $\frac{\Theta}{Nu:} = \Theta \qquad Na^{\oplus} \qquad Na^{\oplus} \qquad Sa^{\oplus} $	$\dot{\vec{c}}$ $\dot{\vec{c}}$ \vec{c} \vec{c} \vec{c} \vec{c} $\dot{\vec{c}}$ $\dot{\vec{c}$	- Na ⊕ e carboxylates hy (acetate)	Na Θ \vdots gdrogen sulfide (thiolate) (buy) (make)	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
$ \begin{array}{c} & & \\ & & $	$\begin{array}{c} O \\ P \\$	$\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset{\overset$	$S_N 2/E2 \longrightarrow$ concerted $S_N 2 = alwa (inv E2 = anti C (for$	reactions (one step) ays backside attack version of configuration) C_{β} -H / C_{α} -X elimination rms pi bonds)
$\frac{S_{N}1 / E1}{H - Nu:} = H $ $Water$	H R Alcohols	carboxylic acids	$S_N 1/E1 \longrightarrow$ form carbo <u>R⁺ has three</u> 1. rearrang 2. add nucl 3. lose any (forms p	ecation (R ⁺) in first step, ee common choices e to similar or more stable R leophile (top/bottom) beta proton (top/bottom) bi bonds)

Examples - you can use the vertical views or side views presented above.

H Na⊕ One $S_N 2$ product and four E2 products. ň secondary RX (2°) 3R-bromo-2S-deuteriohexane H₃C_{////,} D CH₃ a "1CH3 с CHDCH₃ a, b, c нö b 0 н CH₂CH₂CH₃ Ē H₃CH₂C^{WW} (2S,3R) (2S,3S) (2E, with "D") CH₂CH₃ CH₂CH₃ (3E, lost H_a) only one $S_N 2$ product sigma bond rotations four possible E2 products CH₂ н,,, e CHDCH₃ d d, e Θ CH₂CH₂CH₃ Ö Ē H_a\\\\\' CH₂CH₃ (2Z, without "D") (3Z, lost H_b) CH₃ 1. The first $2^{\circ} R^+$ forms two $S_N 1$ products and three E1 products H₂(н Н secondary RX (2°) 2. the rearranged 3° $R^{\rm +}$ forms two S_N1 products and five E1 products 2R-bromo-3R-methylhexane b "NCH₃ d ,,,,,CH3 а H₃C Ð н /"±/ Ð H₃Ć H. CH₂CH₃ CH₂CH₂CH₃ CH₂CH₂CH₃ H₃C CH₂CH₃ S_N1 product from attack of left face a, b, c show attack on left face of carbocation, attack also occurs from the right side of R⁺. -H b с с d C_BH₃ н,,, H_//1, C_BH₂ b, c H æ CH ĊΗ CH₂CH₂CH₃ $\underline{\underline{\Xi}} \qquad \underline{CH_2CH_2CH_3}$ $\frac{1}{C}$ H₃ н CH₂CH₂CH₃ CH₂CH₂CH₃ E1 product after CH₂CH₂CH₃

rearrangement

(next page)

S_N1 product from attack of right face



loss of beta proton

from methyl (CH₃)

E1 product after loss of beta proton

from methine (CH) from either face

Example Mechanisms (continued with rearrangement)

