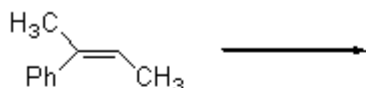
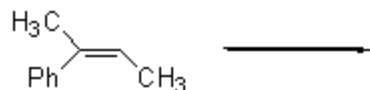


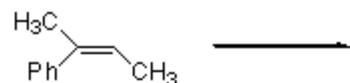
Alkene Addition Reactions

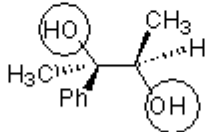
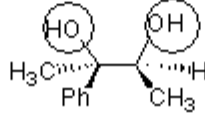
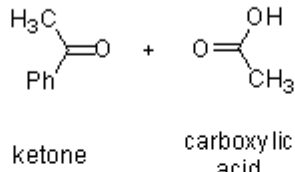
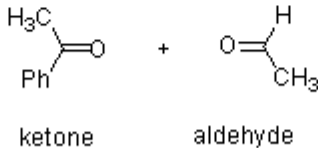


Category	Reagent	Product	Orientation	Mechanism
Hydrohalogenation	H-X		Markovnikov	Stepwise
	H-Br RO-OR		Anti-Markovnikov	Radical chain
Hydration	#1 H ⁺ , H ₂ O		Markovnikov	Stepwise, RAR?, low yield
	#2 1) H ₂ SO ₄ 2) H ₂ O, heat		Markovnikov	Stepwise, RAR?, better yields
	#3 1) Hg(OAc) ₂ , H ₂ O 2) NaBH ₄		Markovnikov	Stepwise, No RAR, good yields
	1) BH ₃ 2) H ₂ O ₂ , OH ⁻		Anti-Markovnikov	Concerted, stereospecific, Syn addition



Category	Reagent	Product	Mechanism
Hydrogenation	H-H catalyst Pd, Pt, Ni Ru, Rh, Ir		Stepwise, syn addition
Halogenation	X-X		Halonium ion intermediate, stepwise, anti addition
Cyclopropanation	<u>3 routes</u> 1. CH ₂ N ₂ , hν or Δ 2. CHX ₃ , strong base 3. Simmon-Smith "CH ₂ I ₂ , Zn(Cu)"	<p>R = H or X</p>	Concerted addition of a carbene to an alkene. Alkene stereochemistry translates directly to the product.
Epoxidation	peracid, "RCO ₃ H"		One step, concerted, alkene stereochemistry is retained in product



Category	Reagent	Product	Mechanism
Dihydroxylation	peracid (RCO ₃ H), H ⁺ , H ₂ O		2 steps. Concerted epoxidation, followed by anti cleavage of epoxide by H ₂ O.
	1) OsO ₄ <u>OR</u> dil. KMnO ₄ 2) H ₂ O ₂ OH ⁻ , H ₂ O		2 steps, 1 st step is concerted, syn addition, followed by osmate or permanganate ester cleavage by H ₂ O ₂ or OH ⁻ .
Oxidative Cleavage	warm concentrated KMnO ₄		Vigorous oxidation. Converts alkene to diol, then cleaves diol to ketone and aldehyde, which is further oxidized to carboxylic acid.
	1) O ₃ , 2) CH ₃ SCH ₃ (DMS)		Concerted [3+2] cycloadditions and cleavages lead to an ozonide intermediate. Dimethyl sulfide then reduces the peroxide intermediate to 2 carbonyl fragments. In predicting products just replace C=C bonds with 2 C=O bonds.