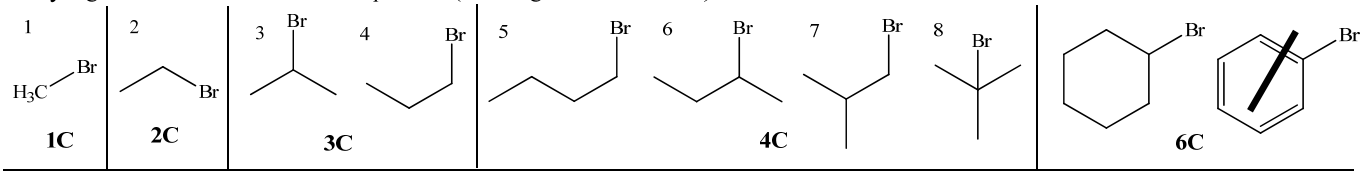
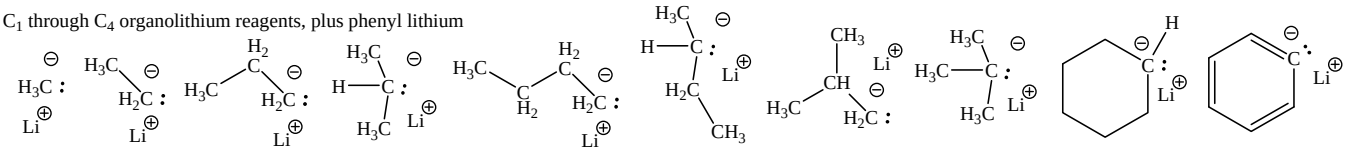
RX electrophiles, where X = Br (1C, 2C, 3C, 4C, 5C and 6C examples) - much S_N and E chemistry is possible with these RX compounds, and many organometallic reactions are also possible (R-Li is given in Chem 201).

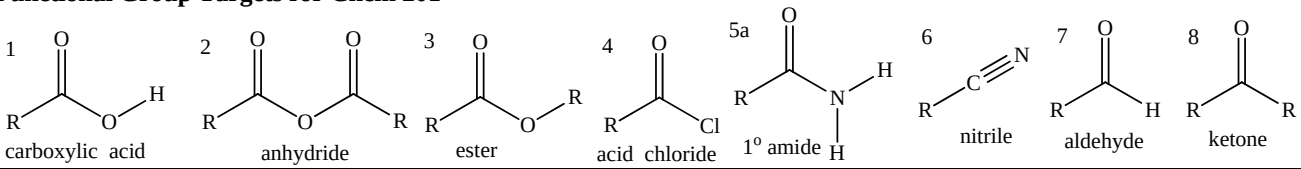


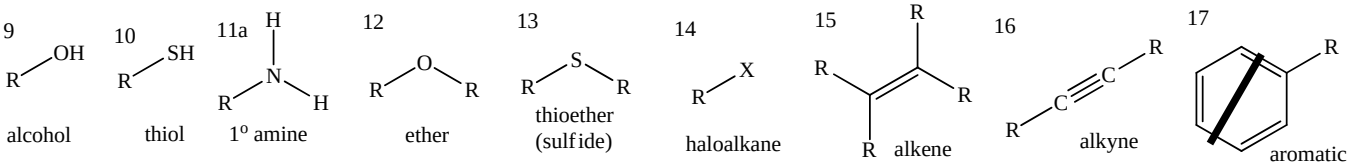
Given R-Li Reagents (in Chem 201)

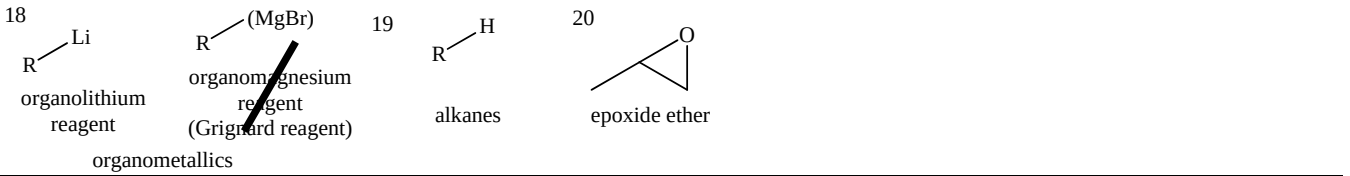
C_1 through C_4 organolithium reagents, plus phenyl lithium



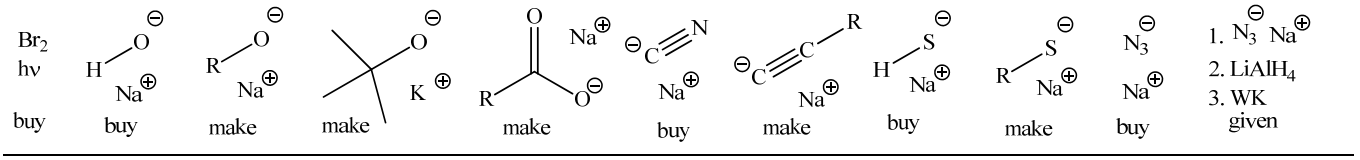
Functional Group Targets for Chem 201

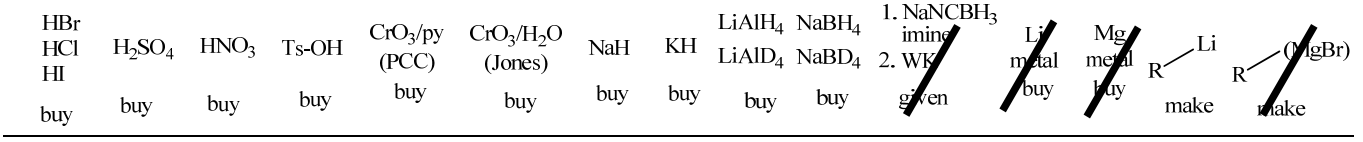


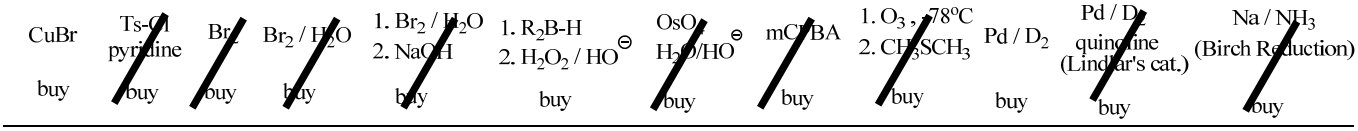


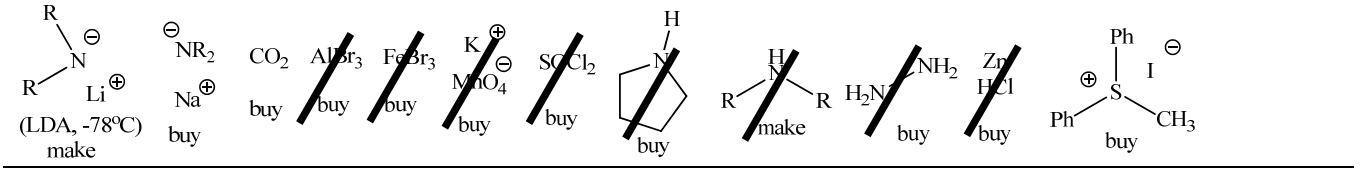


Reagents and/or Reaction Conditions for Chem 201 ("buy" means you can use it whenever you need it)

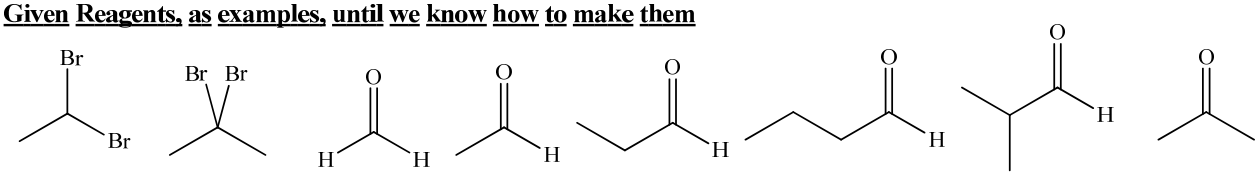


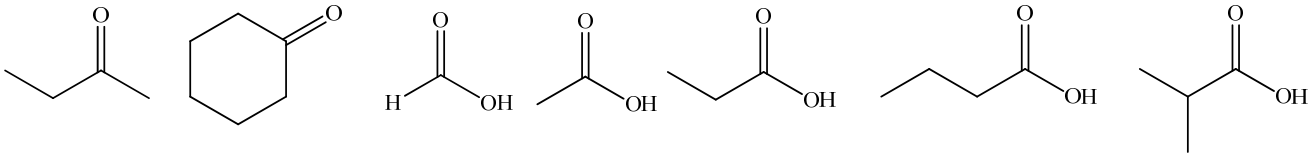


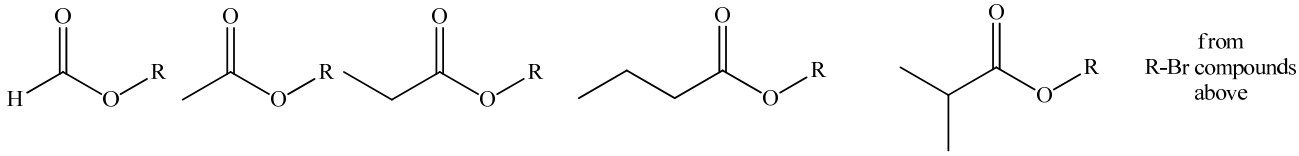


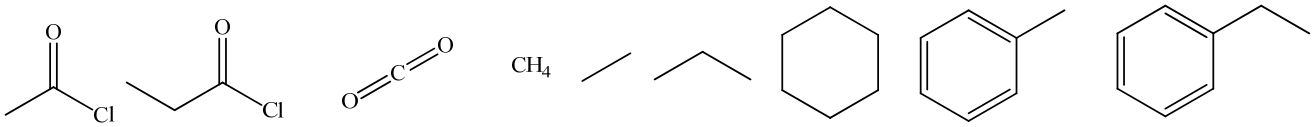


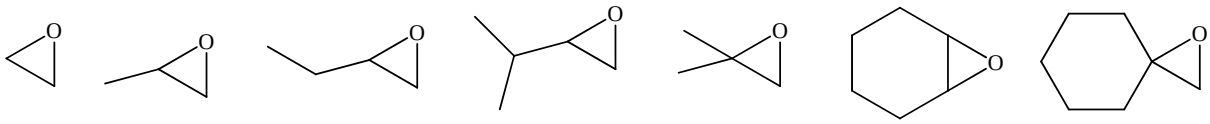
Given Reagents, as examples, until we know how to make them



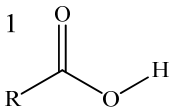
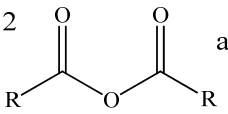
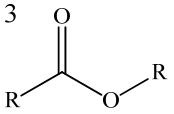
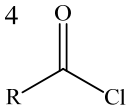
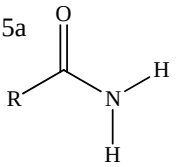
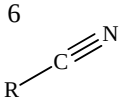
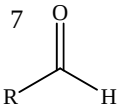
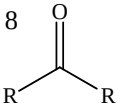








Functional Group Targets (using reactions from Chem 201)

1  carboxylic acid oxidation of 1° alcohols with CrO_3 / H_2O / H_3O^+ oxidation of 1° aldehydes with CrO_3 / H_2O / H_3O^+ 1. RLi + CO_2 2. workup	2  anhydride acid chloride + carboxylic acid	3  ester S_N2 using carboxylate + RBr S_N1 using carboxylic acid + RBr acid chloride + alcohols	4  acid chloride carboxylic acid + $SOCl_2$ (not covered)
5a  1° amide acid chloride + 1° amine	6  nitrile S_N2 using NaCN + RBr	7  aldehyde oxidation of 1° aldehydes with CrO_3 / pyridine  anti-Markovnikov addition to alkynes 1. R_2B-H 2. H_2O_2 / $HO^{\ominus}$	8  ketone oxidation of 1° aldehydes with CrO_3 / pyridine  Markovnikov addition to alkynes using H_3O^+ / H_2O

9

alcohol

S_N2 using hydroxide + RBr

S_N1 using water + RBr

1. RLi + ketone or aldehhyde
2. workup

1. RLi + epoxide
2. workup

anti-Markovnikov addition to alkenes

1. R_2B-H
2. H_2O_2 / $HO^{\ominus}$

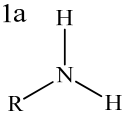
Markovnikov addition to alkenes = H_3O^+ / H_2O

10

thiol

S_N2 using NaSH + RBr

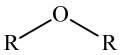
11a



1° amine

1. S_N2 using NaN_3 + RBr
2. S_N2 using $LiAlH_4$
3. workup

12



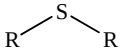
ether

S_N2 using alkoxide + RBr

S_N1 using alcohol + RBr

Markovnikov addition to alkenes = ROH_2^+ / ROH

13



thioether (sulfide)

S_N2 using NaSR + RBr

14

haloalkane

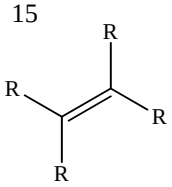
S_N2 or S_N1 usingHBr + ROH

anti-Markovnikov addition to alkenes = HBr / ROOR (free radical)

Markovnikov addition to alkynesH = HBr

R-H + B_{r2} / hν (free radical)

15

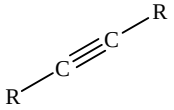


alkene

E2 using potassium t-butoxide + RBr

E1 using H_2SO_4 + RBr / Δ ($-H_2O$)

16



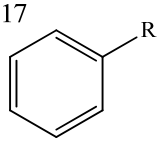
alkyne

double E2 using $NaNR_2$ + RBr_2

workup 4 ways

1. neutralize with acid
2. add methyl or 1° RBr
3. react with C=O, then workup
4. react wtih epoxide, then workup

17



aromatic

none - no time

18

organolithium reagent

none - these are given

19

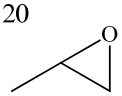
alkane

S_N2 using $LiAlH_4$ or $LiAlD_4$ + RBr

reduction of alkenes and alkynes with H_2 / Pd (maybe not time)

1. make cuprate ($R_2Cu^{\ominus}$ $Li^{\oplus}$ from 2 R-Li + CuBr
2. S_N2 using cuprate + RBr

20



epoxide (ether)

1. react sulfur salt with n-butyl lithium
2. react sulfur ylid with carbonyls