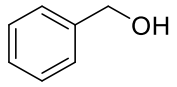
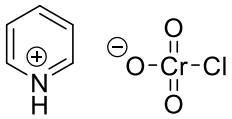
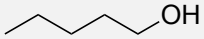
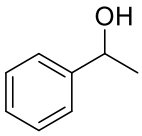
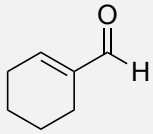
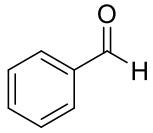
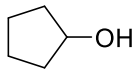
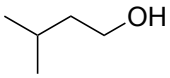
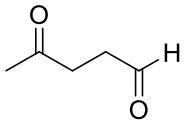
Chapter 20 Homework – Redox Reactions

20A. REDOX Reactions

	Starting Material	Reagents *& translation*	Draw the Product
1		 **pyridinium chlorochromate** (PCC) ***PCC**: Pyridinium chlorochromate in methylene chloride solvent*	
2		**$NaCrO_4$** *Chromic Acid* or **$KMnO_4$** *Potassium permanganate* *Reagents may also be listed as…* 1. $KMnO_4$, KOH 2. H_2O, HCl	
3		PCC	
4		**1 mole H_2, Pd** *1 mole of hydrogen gas over palladium catalyst* *Alternate metals to Pd: platinum (Pt) or nickel (Ni)*	
5		**$NaCrO_4$** or **$KMnO_4$**	

20B. Mix & Match with Reaction Bootcamp!
Not all molecules react with all reagents – look out for seven combinations that result in "NO REACTION".

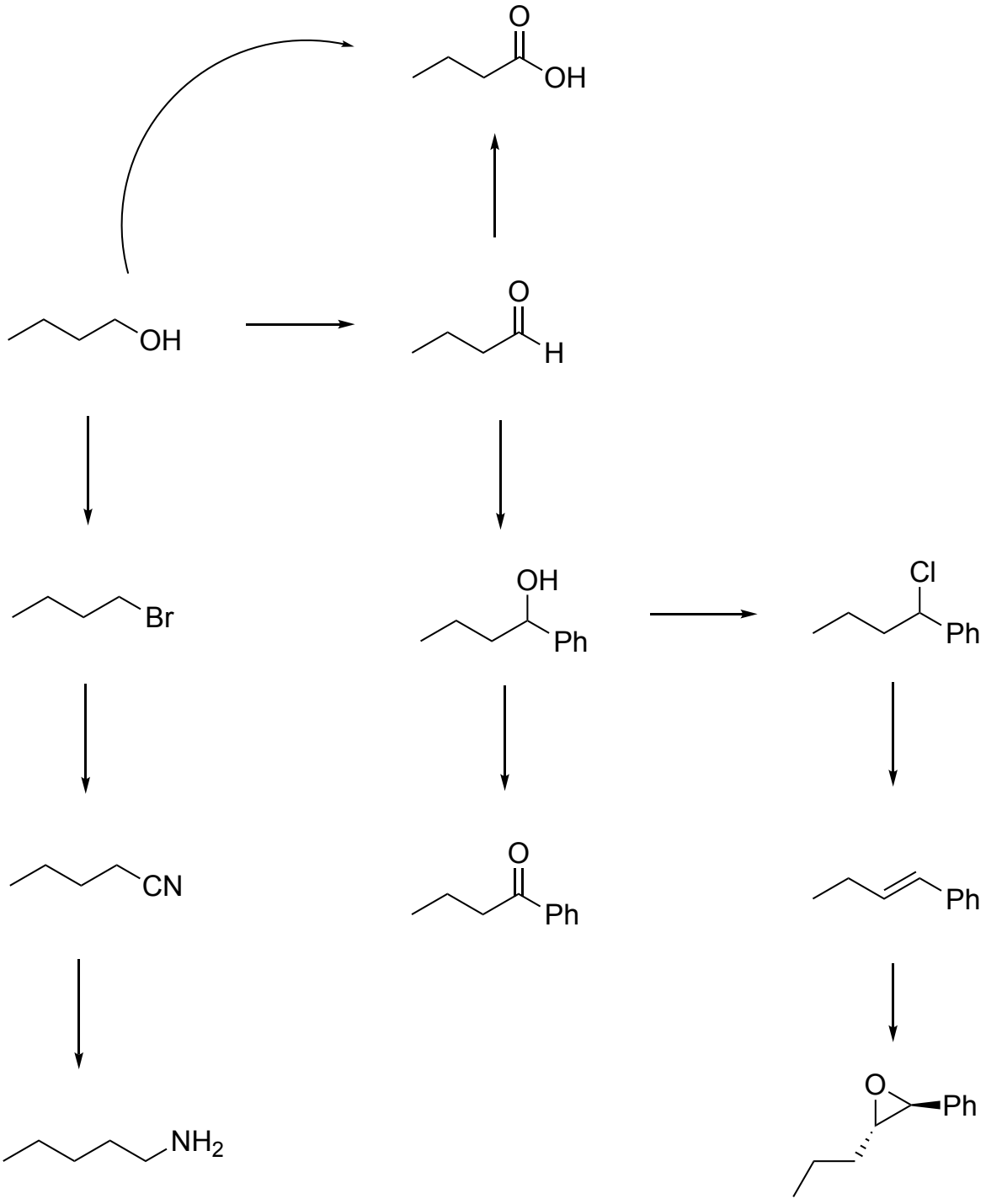
React each **molecule** with each **reagent** and **draw the product** in the box.			
PCC			
$NaCrO_4$			
1. $LiAlH_4$ (excess) **2. H_2O**			
1 mole H_2, Pt			
$NaBH_4$ (1 mol) **CH_3OH**			

20D. Reaction Puzzle - “training wheels” for multi-step synthesis

The “puzzle” below covers Chapter 20 and previous reactions. Take it one step at a time.

Add all missing reagents to the arrows.

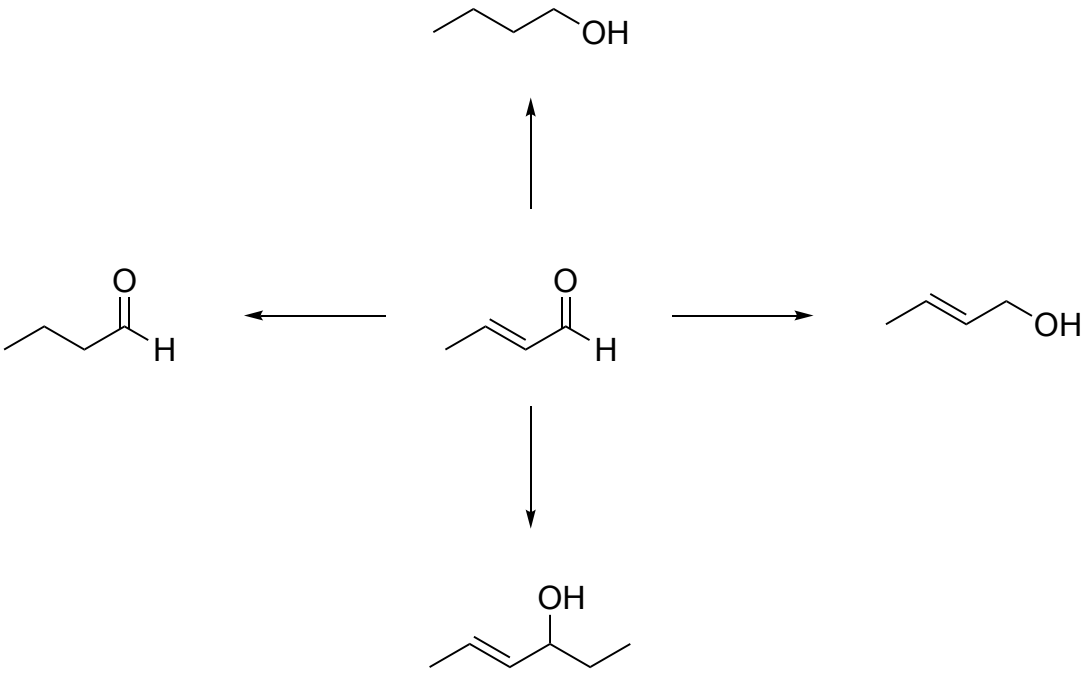
- Hydride and organometallic addition reactions require a separate, second step for addition of water.
- Be sure to add those numbers for separate steps (1…. 2….) where applicable for full credit.



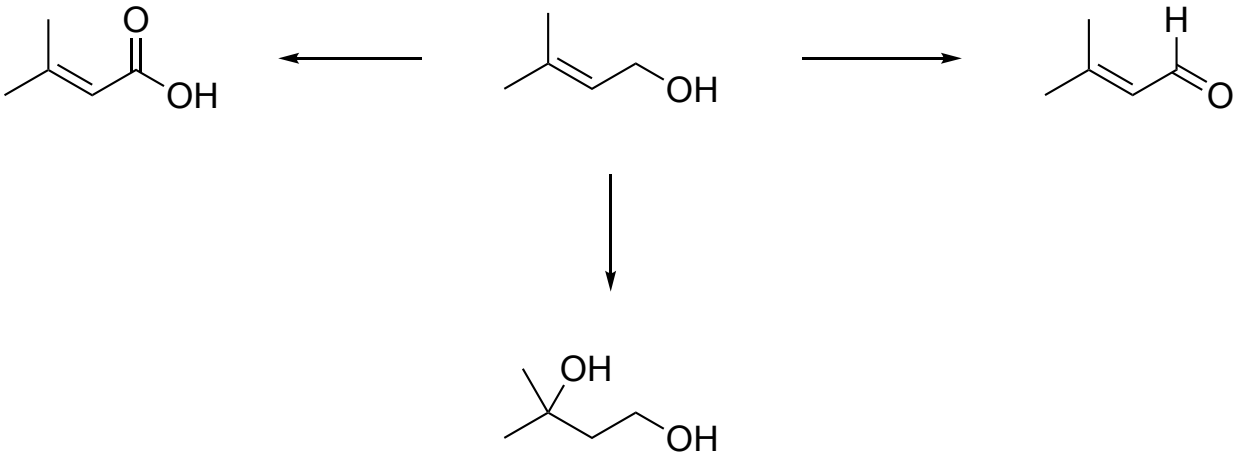
20E. Chemoselective Readuction Puzzles - “training wheels” for multi-step synthesis

- Fill in the proper **reagent** over the arrows below.
- Include the **amount** of each reagent added (1 mole or 2 moles).

11. Aldehyde & Alkene



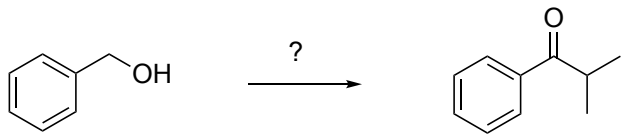
12. Alcohol & Alkene



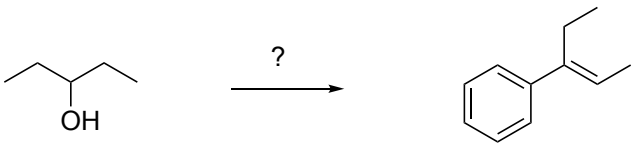
20F. Multi-Step Synthesis

- Each transformation requires **at least two synthetic steps** to reach the target product.
  - All problems below require an organometallic reagent to add carbons. Be sure you're using it with the correct type of functional group!
  - These problems were designed to use no more than four reactions. There are multiple pathways and it's ok if you use a feasible pathway with more than four steps ☺
- Show each set of **reagents and reaction products** on the journey.
- Mechanisms are not required, but may be helpful.
- If there is a mixture of products (ex. *major* and *minor*), assume the minor product can be removed.

13.



14.



15.