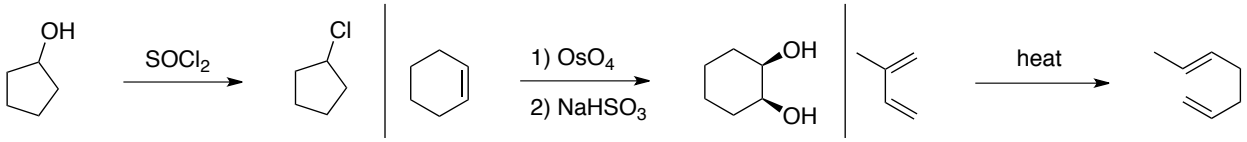
CHAPTER 6: AN OVERVIEW OF ORGANIC REACTIONS (part 1)

Classify each reaction as addition, elimination, substitution or rearrangement.

A) $CH_3CH_2Br + LiOH \longrightarrow CH_3CH_2OH + LiBr$

B) $CH_3CH_2CH_2Cl \longrightarrow CH_3CH{=}CH_2 + HCl$

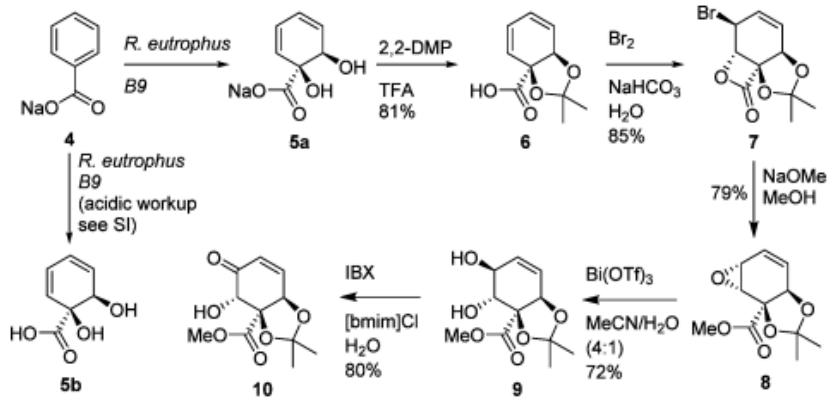
C) $CH_3CH{=}CH_2 + H_2 \longrightarrow CH_3CH_2CH_3$



For the following synthesis scheme, identify the reactions as addition, elimination, substitution or rearrangement, as indicated:

1. alkene forming reaction from **5b** to **4**.
2. **4** —> **5a**
3. **5a** —> **6**
4. **8** —> **9**

Scheme 1. Synthesis of Enone 10 from Sodium Benzoate



Mechanisms (curved arrows) to show electron motion. In a polar reaction, electrons will always flow toward an area of low electron density. Here's some important definitions: In a chemical reaction,

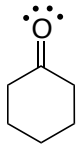
A *nucleophile* is either negative or partial negative, and has electrons that can be delocalized to participate in a reaction to create a new covalent bond.

a base can also be a nucleophile.

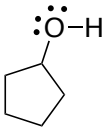
An *electrophile* is either positive or partial positive, and will receive electrons in order to create a new covalent bond.

- an acid can also be an electrophile.

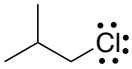
For the following molecules, identify the potential nucleophiles and/or electrophiles.

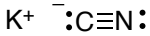


NaOH



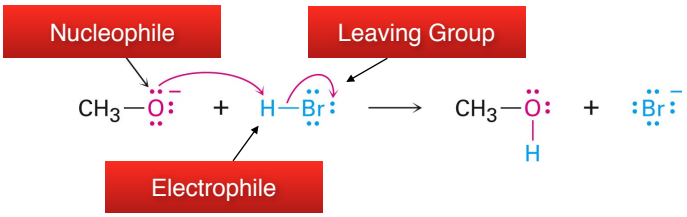
H-Cl





A *leaving group* is an atom or group of atoms that are released (sigma bond is broken) either before, during or after a bond is created.

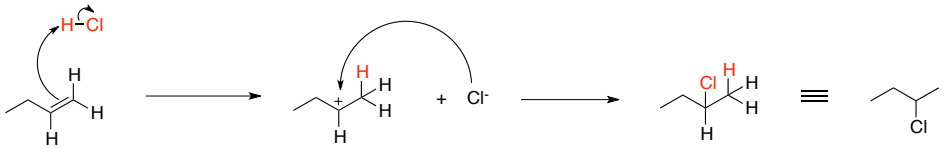
A *polar reaction* is driven by… well, differences in polarity :-) In other words, something that is either negatively charged or partially negative AND has available electrons (lone pair or pi electrons) will be naturally attracted to something that is either positively charged or has a partial positive charge. When you view a reaction, ask yourself WHY each step happens



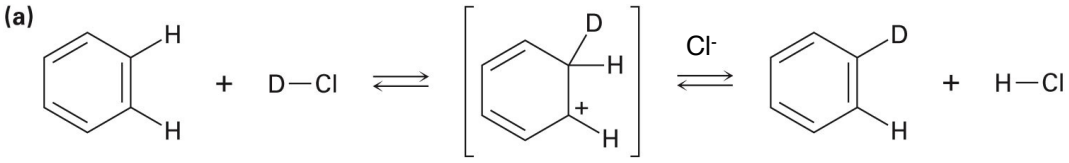
In the following reactions, identify the nucleophile (N), electrophile (E) and leaving group (LG) in the following reactions - there may only one or more than one example of each in a reaction, and not all three may be relevant in these examples.

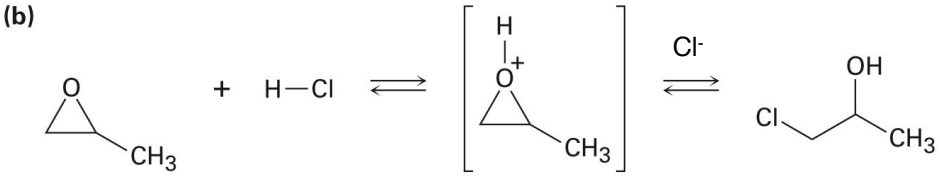
Next, ask WHY the nucleophile was attracted to the electrophile, and why the leaving group 'left'…

Try these, too:



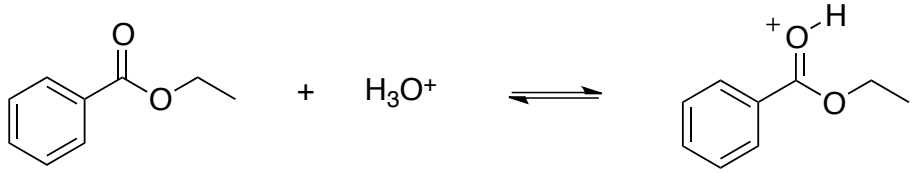
Now you try adding arrows to indicate the flow of electrons.



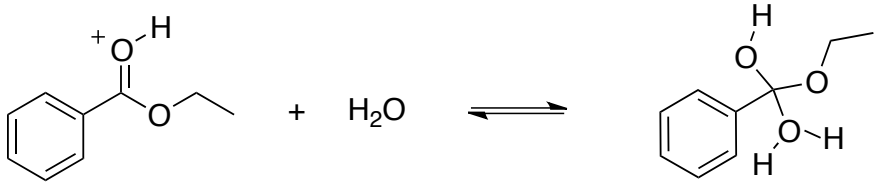


Draw an arrow-pushing mechanism that details the acid-catalyzed hydrolysis of an ester. Always ask yourself WHY, at each step. It would be helpful to first draw the Lewis structure of H_3O^+.

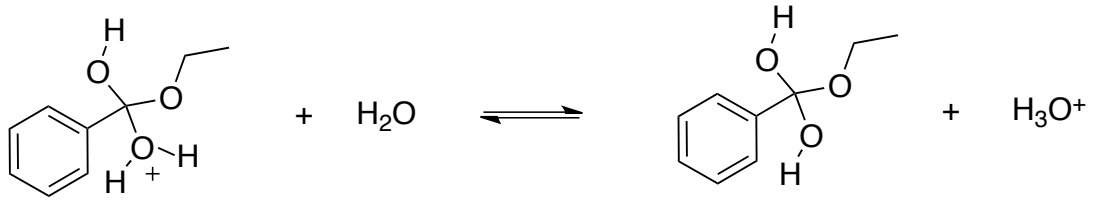
Step 1.



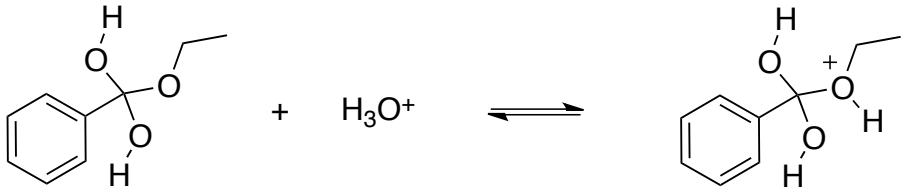
Step 2.



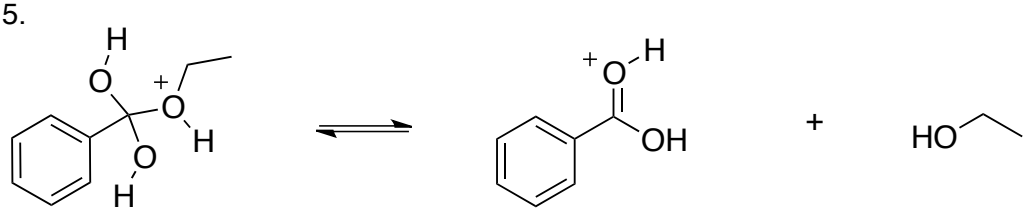
Step 3.



Step 4.



Step 5.



Step 6.