
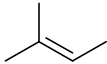
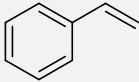
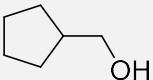
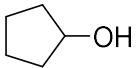
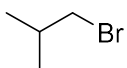
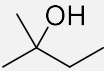
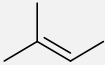


Chapter 13 Worksheet – Ethers & Epoxides**13A. Alkene Reactions** - Draw the product of the reaction between each alkene (1-3) with reagents (a)-(c).

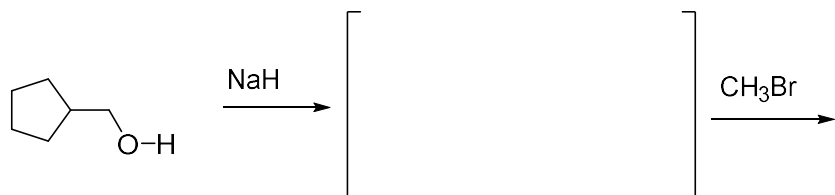
	Starting Material	Reagents & translation	Draw the Product
1		(a) 1. $\text{Hg}(\text{OAc})$, H_2O 2. NaBH_4 Oxymercuration / demercuration <i>Mercury (II) acetate and water,</i> <i>followed by sodium borohydride</i>	
2		(b) 1. $\text{Hg}(\text{OAc})$, ROH 2. NaBH_4 Alkoxymercuration / demercuration <i>Mercury (II) acetate and alcohol,</i> <i>followed by sodium borohydride</i>	
3		(c) <i>m</i> -CPBA <i>meta-chloroperoxybenzoic acid</i>	

13B. Alcohol Reactions - Draw the product between each alcohol (4-6) and reagents (d – f).

	Starting Material	Reagents & translation *know this mechanism	Draw the Product
4		*(d) 1. NaH 2. CH_3Br <i>Sodium hydride followed by methyl bromide</i>	
5		*(e) 1. NaH 2.  <i>Sodium hydride followed by isobutyl bromide</i>	
6		(f) 1. $\text{Hg}(\text{OAc})_2$  2. NaBH_4 Alkoxymercuration / demercuration <i>Mercury (II) acetate and alkene,</i> <i>followed by sodium borohydride</i>	

13B Alcohol Reaction Mechanisms – Draw the reaction mechanism and product for the reactions below.

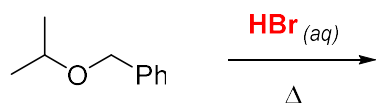
(4d)



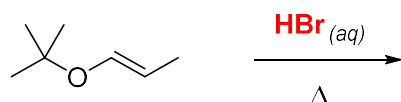
(5e)

**13C Acidic Ether Cleavage.** React ethers **7** & **8** with **aqueous HBr** and **heat**. Draw the mechanism for each.

7.


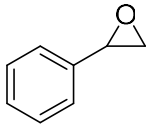

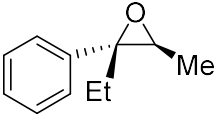
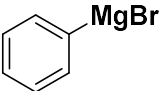

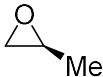


8.



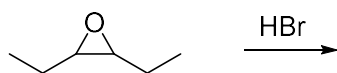
13D Epoxide-Opening Reactions. Draw the product of the reaction between epoxides **9-14** and reagents **g-l**.

- Consider drawing the mechanisms on the next page to come up with the product.

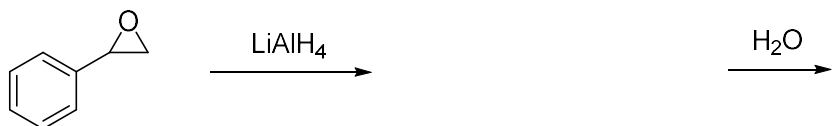
	Starting Material	Reagents & translation *know this mechanism	Draw the Product with stereochemistry (wedges & dashes on chiral centers)
9		* (g) HBr <i>Hydrobromic acid</i>	
10		* (h) 1. LiAlH ₄ 2. H ₂ O <i>lithium aluminum hydride followed by water</i>	
11		* (i) 1. NaSCH ₃ 2. H ₂ O <i>Sodium methyl thiolate followed by water</i>	
12		* (j) 1.  2. H ₂ O <i>Phenyl magnesium bromide followed by water</i>	
13		* (k) 1. NaCN 2. H ₂ O <i>Sodium cyanide followed by water</i>	
14		* (l) EtOH, [H ₂ SO ₄] <i>Ethanol with sulfuric acid catalyst</i>	

13D Epoxide-Opening Reaction Mechanisms - Draw the reaction mechanism and product for each reaction.

(9g)



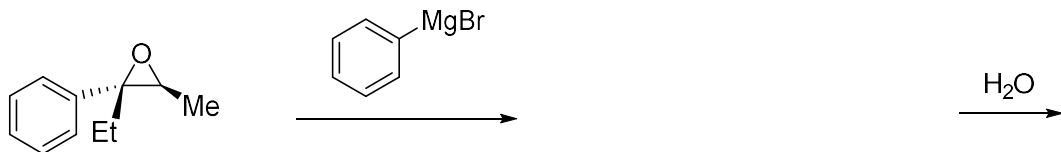
(10h)



(11i)



(12j)



(13k)


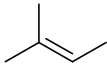
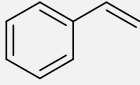


(14l)

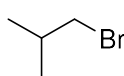
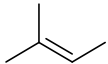
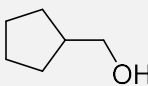
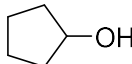
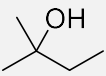


BONUS: Mix & Match with Reaction Bootcamp!





13A Alkene Reactions

Starting Material		(a) 1. Hg(OAc), H ₂ O 2. NaBH ₄	(b) 1. Hg(OAc), ROH 2. NaBH ₄	(c) <i>m</i> -CPBA
1				
2				
3				

13B Alcohol Reactions

Starting Material		(d) 1. NaH 2. CH ₃ Br	(e) 1. NaH 2. 	(f) 1. Hg(OAc) ₂  2. NaBH ₄
4				
5				
6				

BONUS: Mix & Match with Reaction Bootcamp!

Reagents	9. 	11. 	14. 
(g) HBr <i>Hydrobromic acid</i>			
(h) 1. LiAlH ₄ 2. H ₂ O <i>lithium aluminum hydride followed by water</i>			
(i) 1. NaSCH ₃ 2. H ₂ O <i>Sodium methyl thiolate followed by water</i>			
(j) 1.  MgBr 2. H ₂ O <i>Phenyl magnesium bromide followed by water</i>			
(k) 1. NaCN 2. H ₂ O <i>Sodium cyanide followed by water</i>			
(l) EtOH, [H ₂ SO ₄] <i>Ethanol with sulfuric acid catalyst</i>			