Exam Information:

Concepts	92 points
Mechanisms	57 points
Reactions ("Box Problems)	67 points
Synthesis	42 points
MCAT Question	16 points
	270 points

MENDING MEDICAL MINDS

Mental Health for Healthcare Workers


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EVENT INFORMATION
GET INVOLVED
MORE...
SATURDAY, APRIL 12
LONGHORN RUN 2025
5K AND 10K RACE ON THE FORTY ACRES
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ENJOY EARLY BIRD PRICING
THROUGH FEBRUARY 23RD
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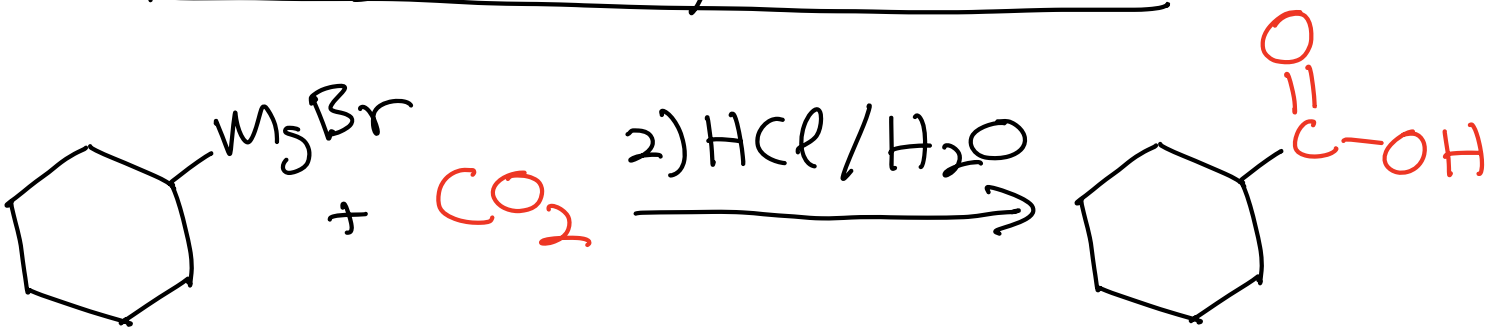
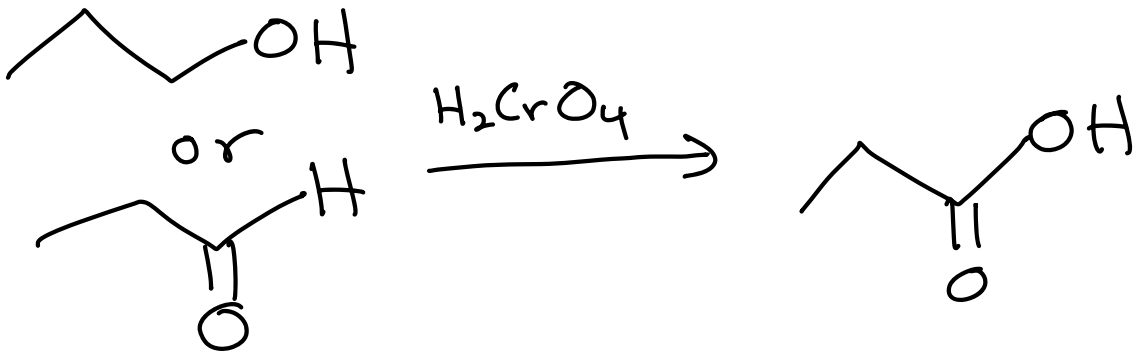
Making Carboxylic Acids



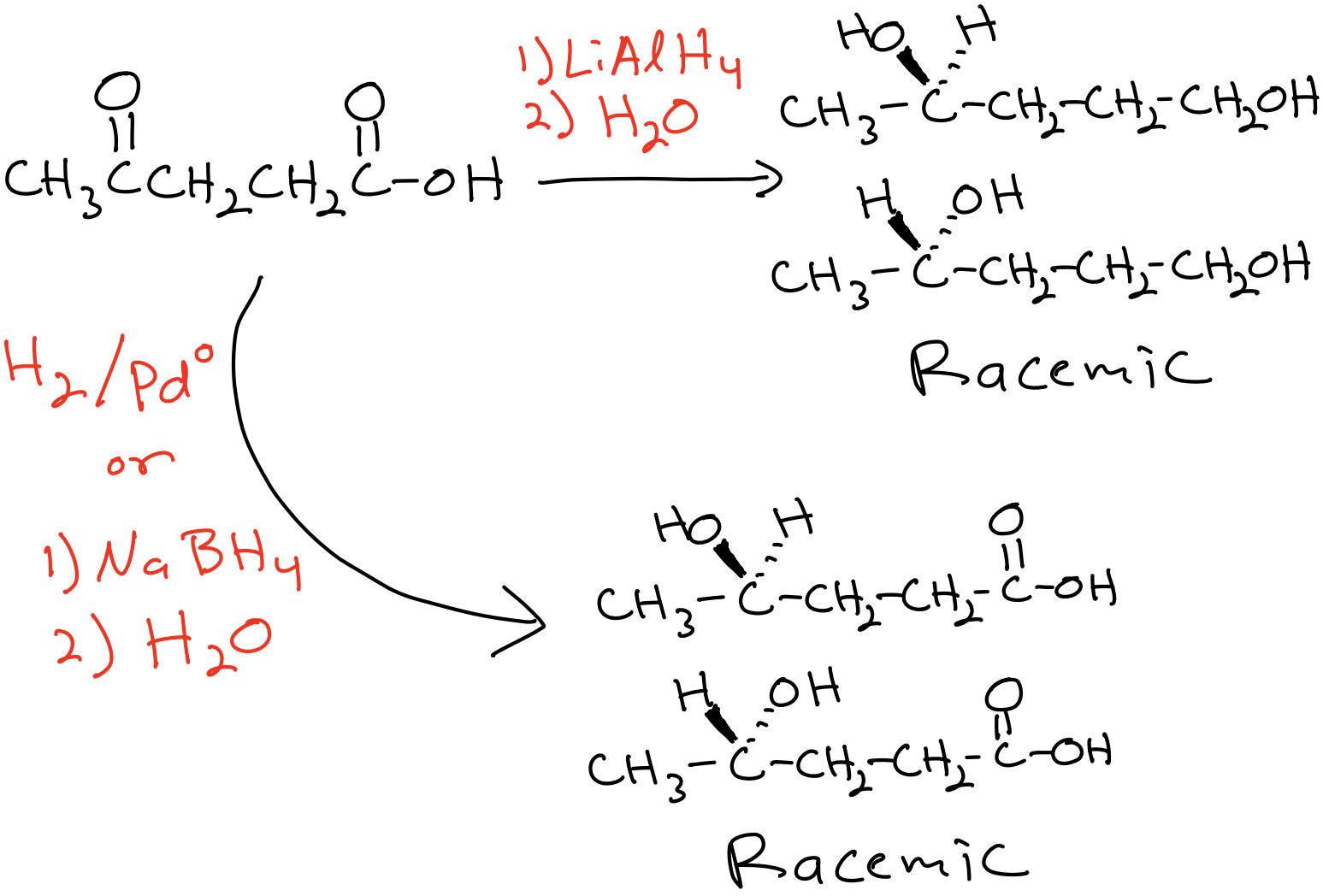


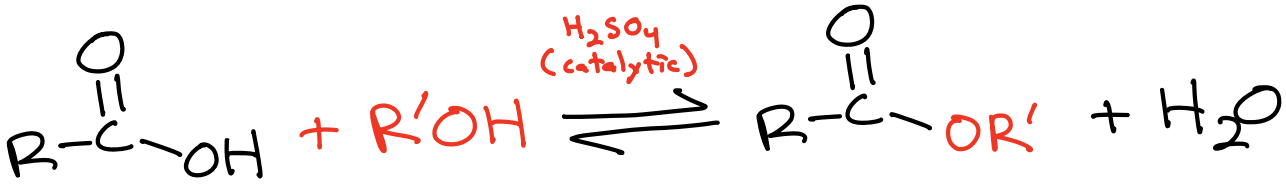
Reactions of Carboxylic Acids

Reduction → H_2/Pd° or
1) $NaBH_4$ 2) H_2O will NOT reduce a carboxylic acid

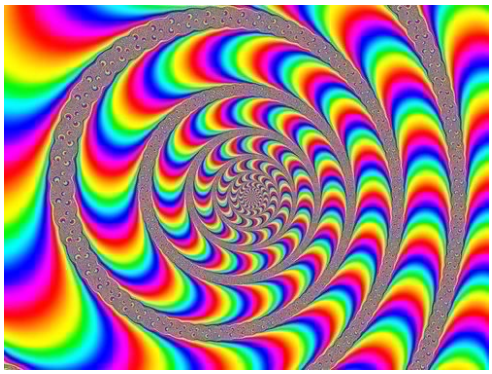
NOT responsible for mechanism

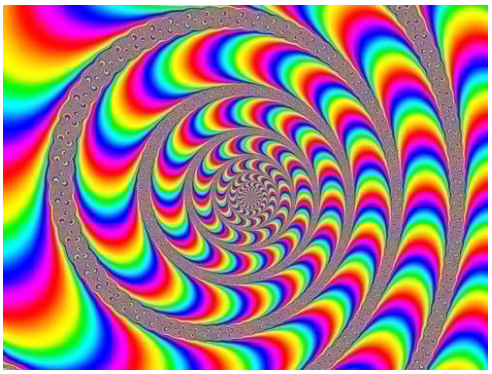
1) $LiAlH_4$ 2) H_2O DOES reduce a carboxylic acid to a primary alcohol

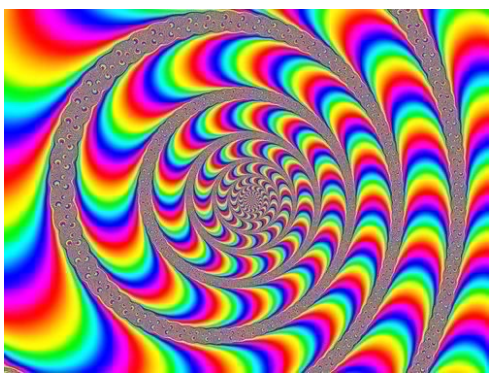


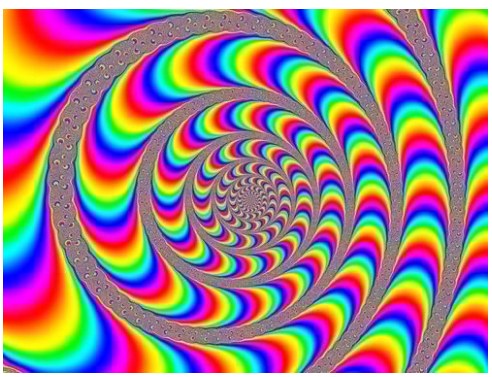


Time Capsule →
This is
Reversible







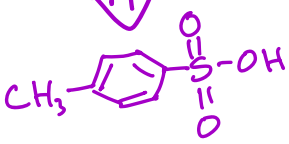


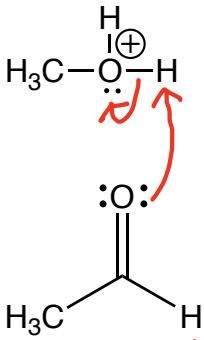
TsOH or H_2SO_4

Tosylic Acid

"Hey, does that thing have a heni in it?" "SWEET!" !

Acid Catalyzed Hemiacetal and Acetal Formation From an Aldehyde or Ketone





Weak Electrophile

Add a proton

Red Hot Electrophile

Major Contributor

Mechanism

Make a bond

-OH and -OR on the same sp^3 C atom

Racemic

Add a proton

Racemic

Take a proton away

Racemic

Hemiacetal intermediate

Not stable

Break a bond

Major Contributor

Stabilized by Charge Delocalization

Make a bond

Racemic

Take a Proton away

Key Recognition Element (KRE):

Two bonds to ether O atoms to an sp^3 C atom

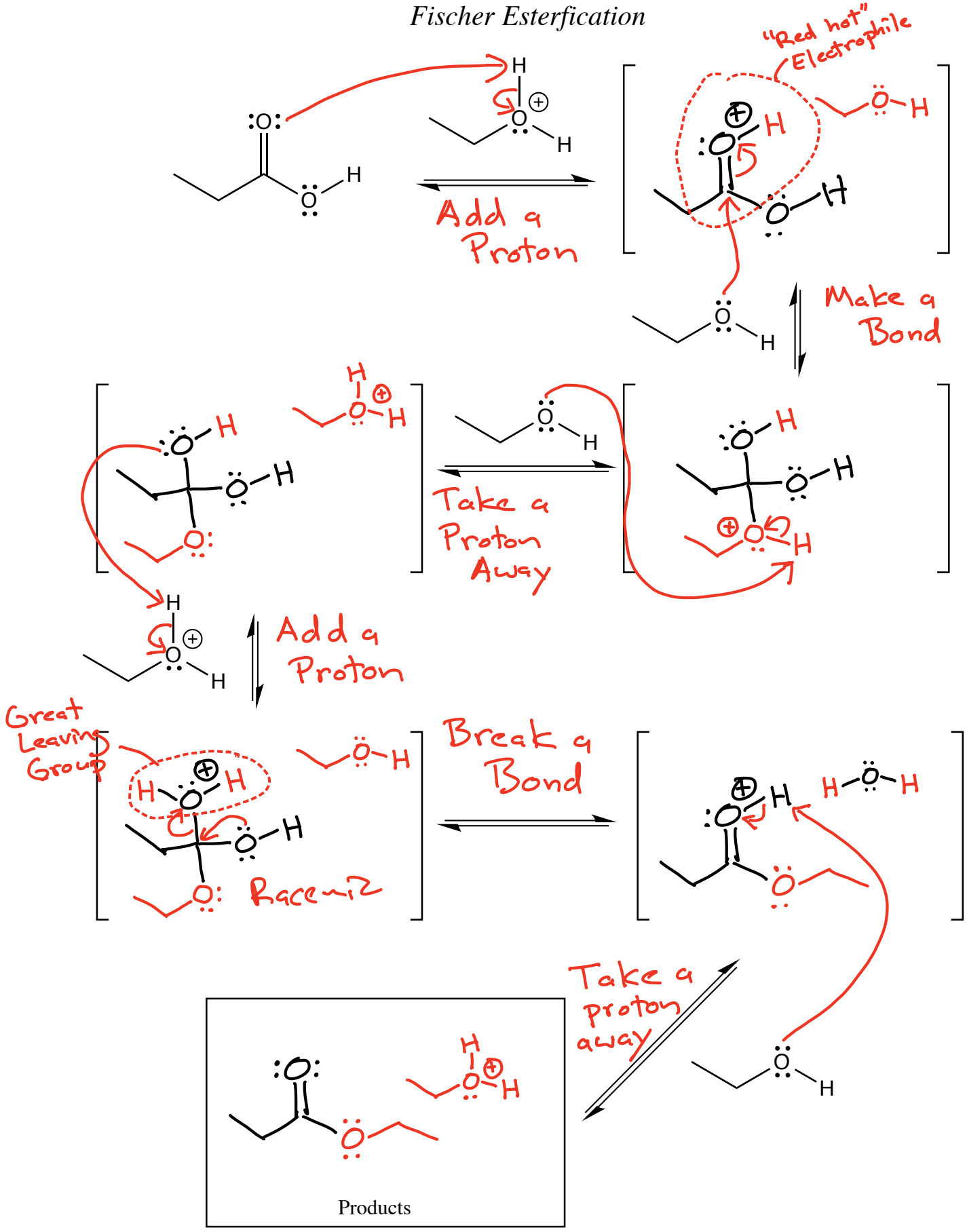
Two -OR on the same sp^3 C atom

An acetal

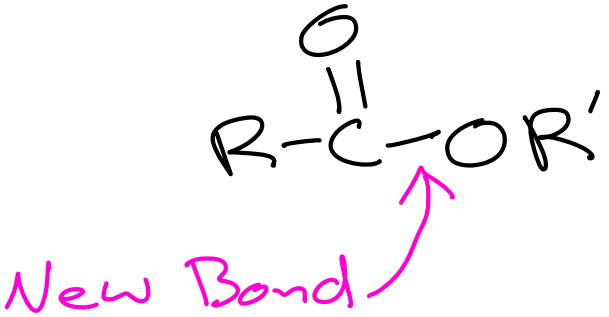
Catalytic in acid

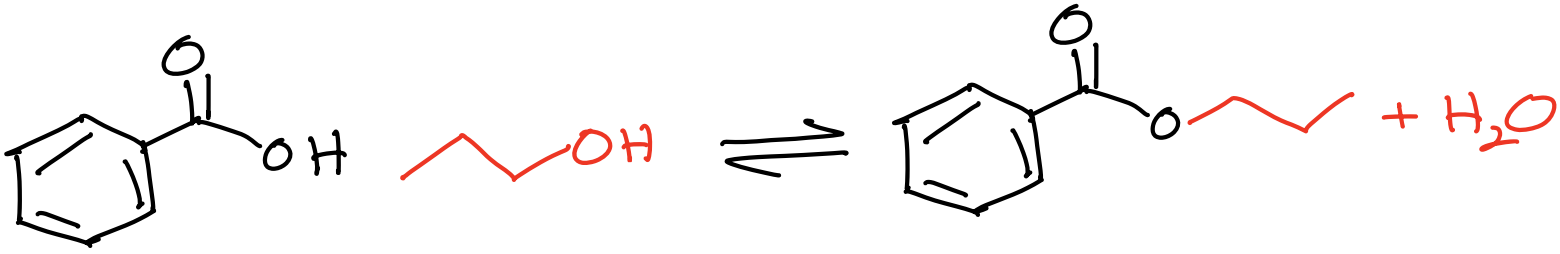
Products

Fischer Esterfication



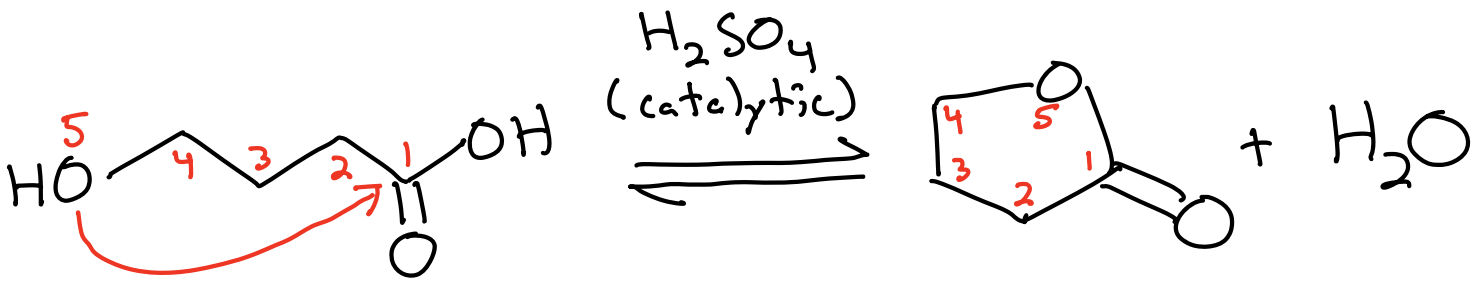
KRE → An ester is formed





Time Capsule →
This is reversible
→ The position of equilibrium depends on the ratio of alcohol to water

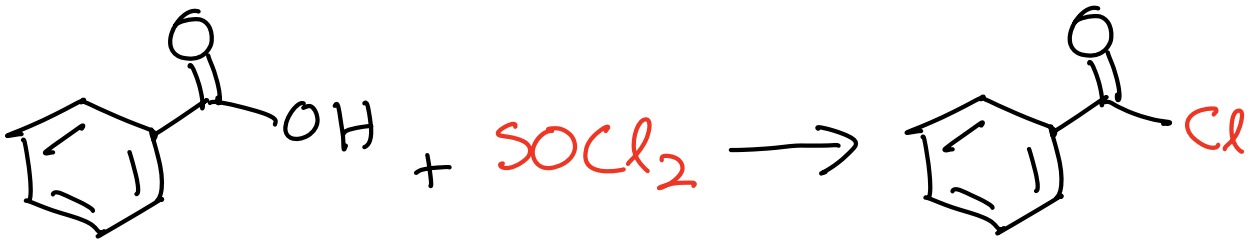
You can make cyclic esters called Lactones



Pro tip: Always put numbers on the atoms when a ring is involved

Carboxylic Acid and $SOCl_2$

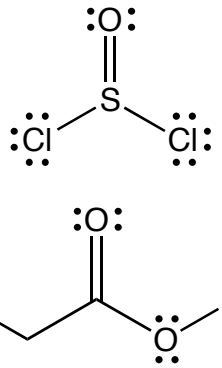
Thionyl Chloride



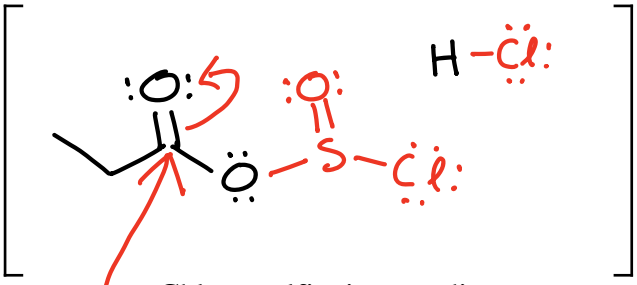
Acid Chloride

Time capsule →
You can make all of the other carboxylic acid derivatives from acid chlorides

Reaction with Thionyl Chloride



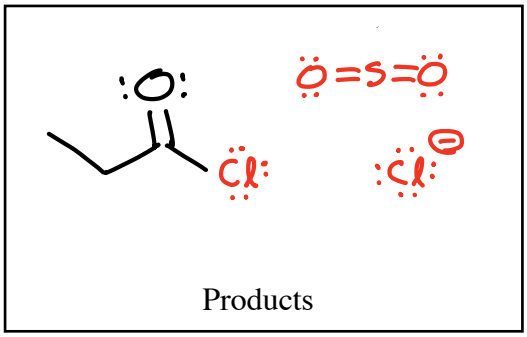
Several Steps



Chlrorosulfite intermediate

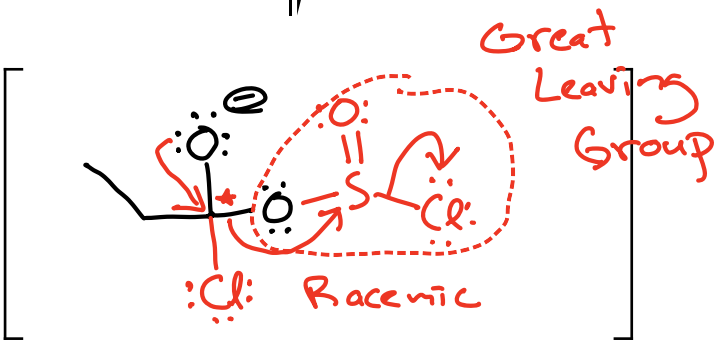
KRE → An acid chloride

Make a bond



Products

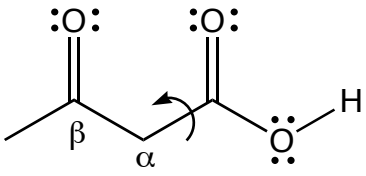
Break a Bond



Great Leaving Group

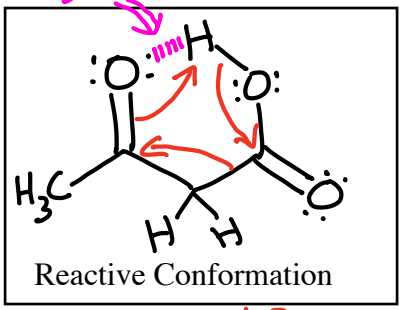
Racemic

Decarboxylation of a β-Keto Acid

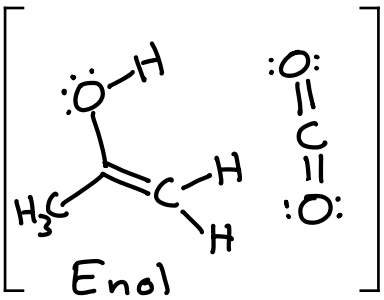


Bond rotates to give a more stable conformation

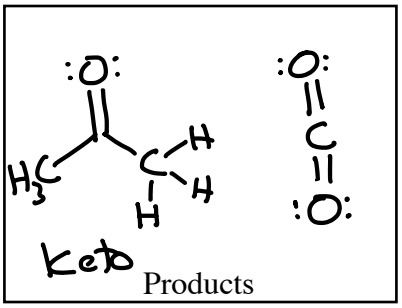
Hydrogen Bond



Reactive Conformation



Enol



Keto

Products

6-Membered Ring
6 "Pi" Electrons
VERY STABLE
"Aromatic"

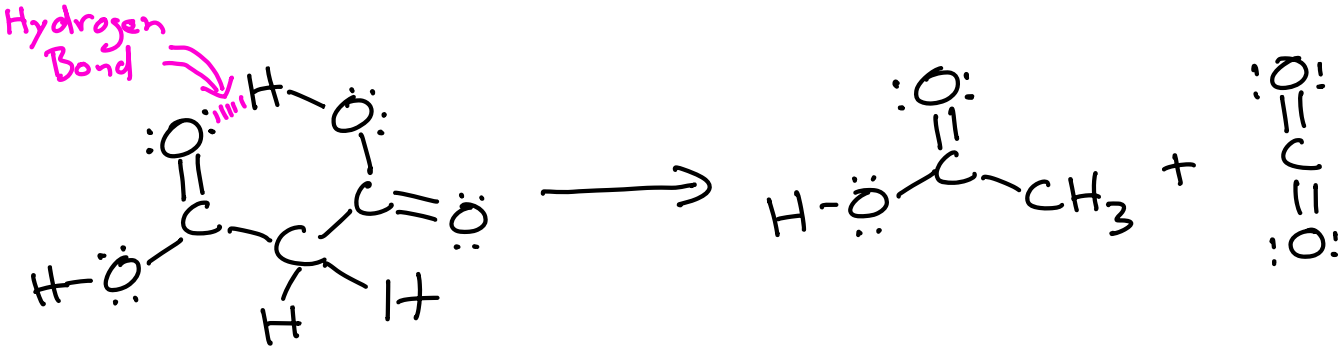
C-C Bond Breaks!

KRE → Ketone and CO_2

Broke a C-C Bond!

Time capsule →
Important for products of Claisen reaction!

This also works with β-diacids



KRE $\longrightarrow$ Ketone + CO_2

Broke a C-C bond

Time Capsule:
This is important for the Claisen condensation reaction.

diacids react the same