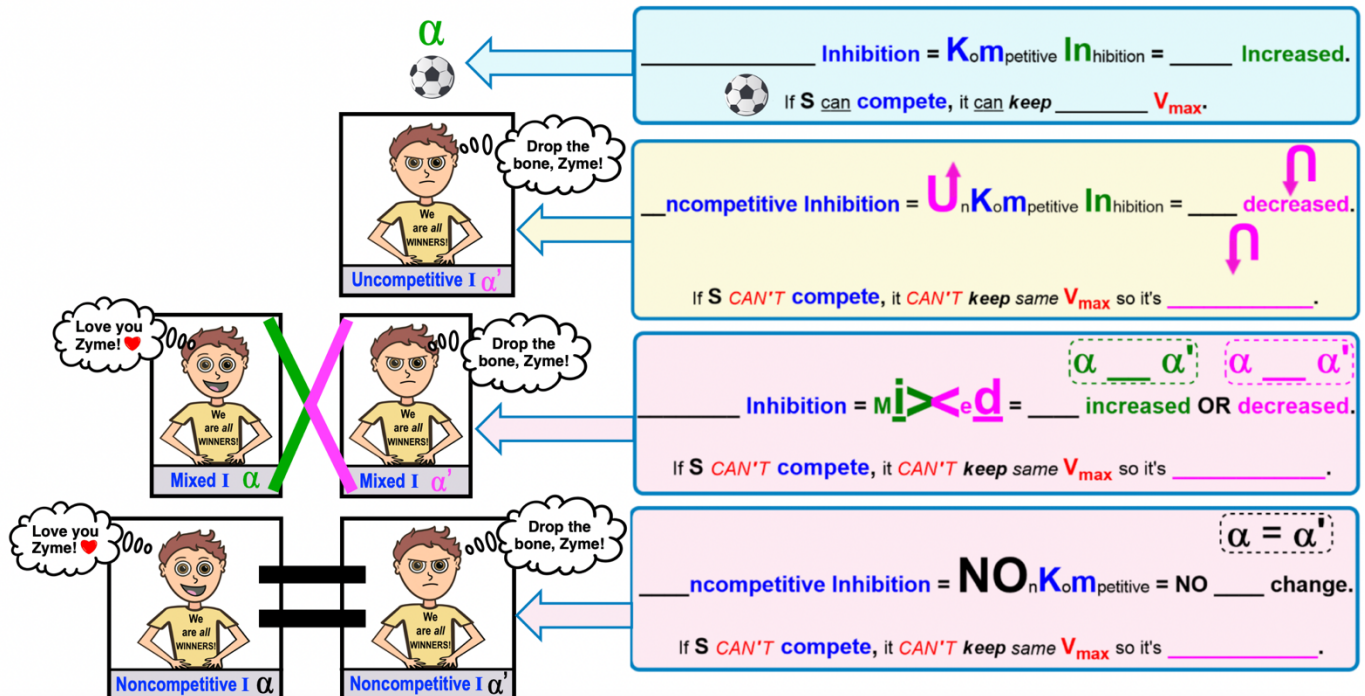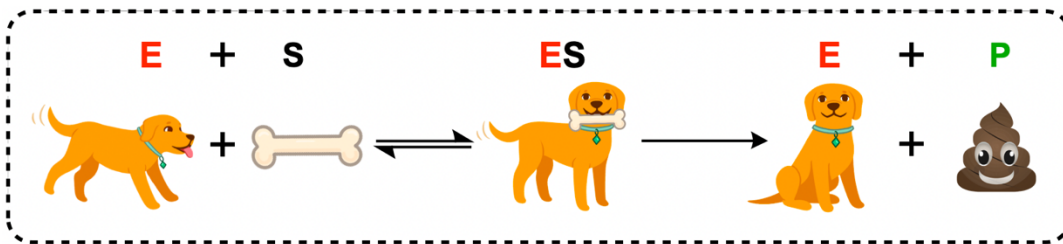**CONCEPT:** RECAP OF REVERSIBLE INHIBITION

●Let's do a recap on the common types of _____ inhibitors:

□ *Competitive* Inhibitors.   □ *Uncompetitive* Inhibitors.   □ *Mixed* Inhibitors.   □ *Noncompetitive* Inhibitors.

Type of Inhbition	Apparent K_m	Apparent V_{max}	Overall Effect
Competitive	$K_m^{app} = \alpha K_m$	$V_{max}^{app} = V_{max}$	K_m _____ V_{max} _____
Uncompetitive	$K_m^{app} = \dfrac{K_m}{\alpha'}$	$V_{max}^{app} = \dfrac{V_{max}}{\alpha'}$	K_m _____ V_{max} _____
$(\alpha > \alpha')$ - - - Mixed - - - $(\alpha < \alpha')$	$K_m^{app} = K_m\left(\dfrac{\alpha}{\alpha'}\right)$ $K_m^{app} = K_m\left(\dfrac{\alpha}{\alpha'}\right)$	$V_{max}^{app} = \dfrac{V_{max}}{\alpha'}$ $V_{max}^{app} = \dfrac{V_{max}}{\alpha'}$	K_m _____ V_{max} _____ K_m _____ V_{max} _____
Noncompetitive $(\alpha = \alpha')$	$K_m^{app} = K_m\left(\dfrac{\alpha}{\alpha'}\right)$	$V_{max}^{app} = \dfrac{V_{max}}{\alpha'}$	K_m _____ V_{max} _____

E + S ⇌ ES → E + P

α

_____ Inhibition = **K**o**m**petitive **In**hibition = _____ Increased.

If **S** can **compete**, it can *keep* _____ V_{max}.

__ncompetitive Inhibition = **U**n**K**o**m**petitive **In**hibition = ____ decreased.

If **S** *CAN'T* **compete**, it *CAN'T keep* same V_{max} so it's _____.

α ___ α' α ___ α'

_____ Inhibition = M**i** > < e**d** = ____ increased OR decreased.

If **S** *CAN'T* **compete**, it *CAN'T keep* same V_{max} so it's _____.

$\alpha = \alpha'$

____ncompetitive Inhibition = **NO**n**K**o**m**petitive = NO ____ change.

If **S** *CAN'T* **compete**, it *CAN'T keep* same V_{max} so it's _____.

Drop the bone, Zyme!   Uncompetitive I α'

Love you Zyme!   We are all WINNERS!   Mixed I α

Drop the bone, Zyme!   We are all WINNERS!   Mixed I α'

Love you Zyme!   We are all WINNERS!   Noncompetitive I α

Drop the bone, Zyme!   We are all WINNERS!   Noncompetitive I α'

<u>CONCEPT:</u> RECAP OF REVERSIBLE INHIBITION

PRACTICE: Below are kinetic data comparing aldehyde dehydrogenase activity in the absence and presence of Agent A.
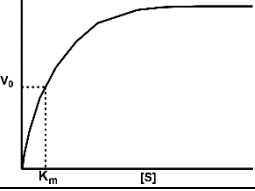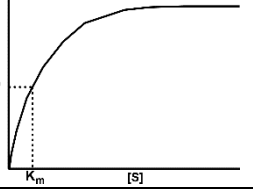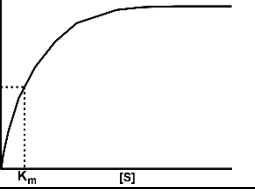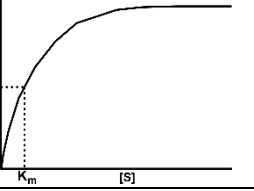
What type of inhibitor is Agent A?

a) Competitive inhibitor.

b) Noncompetitive inhibitor.

c) Uncompetitive inhibitor.

d) Irreversible inhibitor.

[Alcohol], mM	Aldehyde Dehydrogenase Activity (V_0, mM/min)	Aldehyde Dehydrogenase Activity + Agent A (V_0, mM/min)
0.1	14	2
0.5	45	8
1	65	10
2	72	12
4	80	14
8	88	15
32	90	16

PRACTICE: Which of the following statements are true about enzyme inhibitors?

a) Competitive inhibitors change the slope of the Lineweaver-Burk line but not the y-intercept.

b) Noncompetitive inhibitors are a type of mixed inhibitor.

c) Uncompetitive inhibitors change K_m & V_{max} in a way to create a parallel Lineweaver-Burk line.

d) Noncompetitive inhibitors result in lines with increasing [I] to share the same x-intercept.

e) All the above are true.

PRACTICE: Complete the chart below.

Type of Inhibition	Competitive	Uncompetitive	Mixed	Noncompetitive
Binding Site?				
K_m Change?				
V_{max} Change?				
Michaelis-Menten Plot Change?				
Lineweaver-Burk Plot Change?				