CONCEPT: INHIBITION EFFECTS ON REACTION RATE

●If _____ & α' *quantify* the effect an inhibitor has on the V_0, then, in the inhibitor's presence, α & α' must be included in….

1) Michaelis-Menten Equation. 2) Lineweaver-Burk Equation.

Degree of Inhibition in Michaelis-Menten & Lineweaver-Burk

●**K_I** &/or **K'_I** are included into Michaelis-_____ & Lineweaver-_____ equations to measure *inhibitor effects* on V_0.

□ In these equations, inhibition constants are expressed via degree of inhibition factors (____ and/or ____).

□ Depending on the *type* of inhibitor, α and/or α' can impact K_m and/or V_{max} in _____ ways.

●So, in the presence of an inhibitor, just _____ K_m and V_{max} respectively with the appropriate K_m^{app} and V_{max}^{app}.

EXAMPLE: Substituting K_m^{app} and V_{max}^{app} into the Michaelis-Menten & Lineweaver-Burk equations.

Depending on the _____ of inhibitor:

	Michaelis-Menten Equation:	**Lineweaver-Burk Equation:**
_____Inhibitor	$V_0 = \frac{V_{max}[S]}{\alpha K_m + [S]}$	$\frac{1}{V_0} = \frac{\alpha K_m}{V_{max}}\left(\frac{1}{[S]}\right) + \frac{1}{V_{max}}$
_____Inhibitor	$V_0 = \frac{\left(\frac{V_{max}}{\alpha'}\right)[S]}{\left(\frac{K_m}{\alpha'}\right) + [S]}$	$\frac{1}{V_0} = \frac{K_m}{V_{max}}\left(\frac{1}{[S]}\right) + \frac{\alpha'}{V_{max}}$
_____ & _____ Inhibitors	$V_0 = \frac{\left(\frac{V_{max}}{\alpha'}\right)[S]}{\left(\frac{\alpha K_m}{\alpha'}\right) + [S]}$	$\frac{1}{V_0} = \frac{\alpha K_m}{V_{max}}\left(\frac{1}{[S]}\right) + \frac{\alpha'}{V_{max}}$

PRACTICE: Select the option below that best fills in the blanks in order of their appearance in the following sentence:

In terms of the effects that the common types of reversible inhibitors can have on an enzyme's kinetic variables such as K_m and V_{max}, notice that regardless of the type of inhibitor used, the _____ is always either unaltered or _____, whereas the _____ can either be increased, decreased or remain unchanged depending on the type of inhibitor.

a) K_m ; increased ; V_{max}.

b) K_m ; decreased ; V_{max}.

c) V_{max} ; increased ; K_m.

d) V_{max} ; decreased ; K_m.