Inhibitors

This PowerPoint presentation coincides with the following section of the BY1 specification for the Biology and Human Biology AS courses. The relevant section of the Teacher's Guidance material follows, together with some explanatory notes.

Specification:

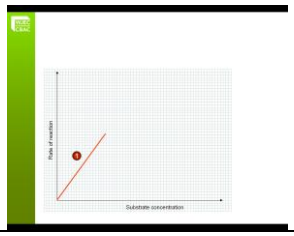
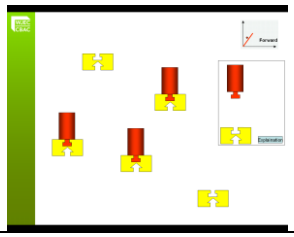
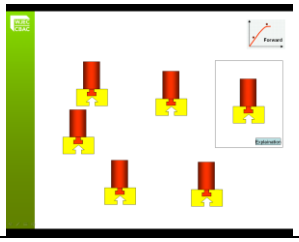
The principles of competitive and non competitive inhibition (references to reversible and irreversible action not required).

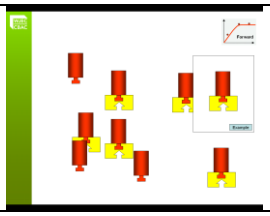
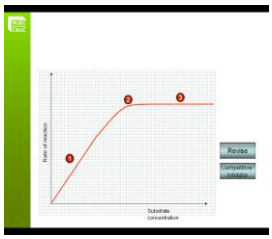
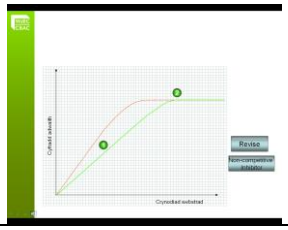
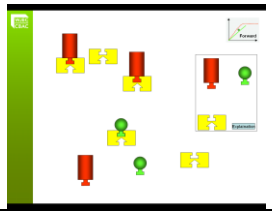
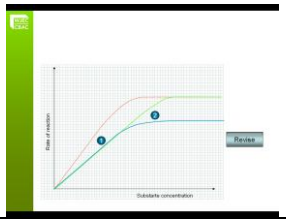
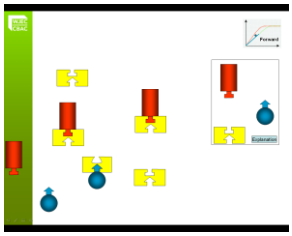
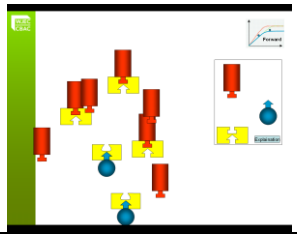
Teacher's Guidance Notes:

Inhibition is when enzyme action is slowed down or stopped by another substance. Enzyme inhibition may be competitive whereby an inhibitor, which is structurally similar to the substrate, associates with the enzyme active site. If the substrate concentration is increased so will the rate of reaction. Non competitive inhibition involves an inhibitor combining away from the active site often altering the enzyme shape as illustrated by potassium cyanide. The rate of reaction is unaffected by substrate concentration.

Explanatory Notes

This PowerPoint presentation illustrates the mechanisms of competitive and non-competitive inhibitors in reactions catalysed by enzymes.

Slide	Notes
	This first graph shows competitive inhibition. The red number 1 needs to be clicked to see an explanation.
	The enzyme is represented by the yellow shapes and the substrate is the red shape. We see here that there are enough free active sites on the enzymes and the rate of reaction steadily increases.
	Clicking on number 2 on the graph brings you to an explanation of why the graph reaches a plateau. All the active sites are seen to be saturated and so the rate of reaction is at its highest.

	Clicking on number 3 on the graph shows that the active sites are saturated and no further increase in the rate of reaction is possible.
	There is an option on this slide to click on the Competitive Inhibitor button in order to follow this type of reaction or to revise the previous slides.
	This gives a similar scenario of numbers on the graph to click for further information.
	The explanation button demonstrates that a competitive inhibitor binds to the enzyme's active site, and slows down the reaction.
	Choosing the Non Competitive option button takes you to the blue plot on the graph.
	The blue shape here represents a non competitive inhibitor. It goes on to explain that the shape of the active site changes because the non-competitive inhibitor has bound to an allosteric site; so preventing an enzyme-substrate complex from forming.
	We see that the reaction rate cannot reach the same point because the non-competitive inhibitors have changed the shape of some of the active sites.