‘Lock and key’ model

SEREN Finally…so tired. Note to self: studying all night and then going to school isn’t the best feeling in the world.

Why. Won’t. You. Fit. In. The. Lock!

ALFRED Hey Seren, having some trouble with your lock and key?

SEREN Not a good time Alfred…but yes.

ALFRED Don’t you just hate it when the substrate doesn’t match up with the active site of an enzyme?

SEREN What?

ALFRED I am glad you asked. Enzymes are protein molecules that are shaped in various ways in order to allow substrate molecules to attach to them.

Enzymes are proteins composed of chains of bonded amino acids that form and fold into specific shapes.

Enzymes speed up reactions involving substrates. The enzyme must match the shape of the substrate, otherwise it will fail to attach. The grooves and divots in the enzyme, which attaches to the substrate, is called the ‘active site’.

These molecules have kinetic energy and are moving all the time.

The kinetic energy increases as more heat is introduced. This means that the molecules move about more, which increases the chances of the enzymes and substrates bumping into one another.

The warmer temperature, around 37 °C, makes successful collisions more likely. But it can’t be too hot, otherwise the shape of the active site will change,

making the enzyme incompatible and unable to attach to a substrate. This is called denaturing.

When an enzyme and substrate, have matching shapes, plus the temperature level is good and the pH level is optimum, the substrate attaches to the enzyme's active site, and it is now called an enzyme-substrate complex. In short, the right substrate must fit into the right enzyme, just like the right key must fit into the right lock. That is why this process is called the 'Lock and key' model.

SEREN Alfred! How is that supposed to help me get in?

SEREN'S MUM Seren! What are you doing in front of the neighbour's house?

SEREN Mum? What do you mean 'the neigh…'