

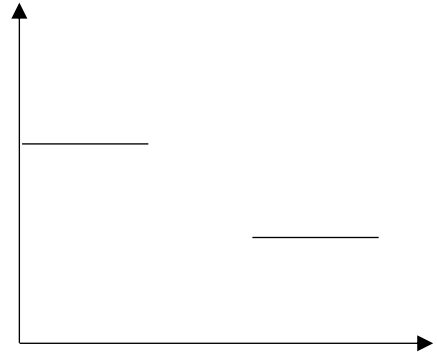
Enzymes (SL)

1. Enzymes are _____ catalysts composed of _____. They function by _____ the _____ energy needed to start chemical reactions. This allows many _____ to take place at _____ temperature.

Complete the graph showing impact of enzymes have on the energy of the reaction.

Label both axes as well.

Bonus point: What type of reaction is this, where the products contain less energy than reactants?



2. Enzymes have an _____ site with a _____ shape that will only allow one type of _____ to bind. Once they have _____, the resulting structure is the _____-_____ complex. The enzyme facilitates the reaction and releases the _____.
3. One example of many enzymes used industrially is _____, which converts _____, the sugar in milk into _____ and _____. Recall, this is a _____ reaction because _____ must be consumed in the reaction. Also, this is the conversion of a _____ into 2 _____.

The _____ enzyme could be added directly to the milk, but then it would be difficult to _____ it and there might be an impact the _____ of the milk. Instead, _____ is attached to _____ beads. This _____ the enzyme, so it can readily be used again and again. The milk is simply _____ over the _____ beads and the finished product (given sufficient time) will no longer contain _____.

This process is convenient for individuals who are _____ intolerant and could otherwise not drink milk, and for making _____ because the products, _____ and _____ are sweeter and less gritty.

4. Enzymes can only function after _____ collisions between the _____ and the _____ site. Several factors can impact whether or not _____ collisions take place. Firstly, the number of collisions will increase as _____ increases, because the molecules possess more _____ energy. However, past the _____ temperature, the _____ energy will _____ bonds in the enzyme, _____ altering the 3D shape of the _____ site. This is called _____ and _____ the rate of enzyme _____.

This can be shown in a graph.

Complete the one opposite,

labeling the axes and key components:



Another factor is _____. Enzymes have an _____, as before, for which the rate is the _____. If the solution containing the enzyme becomes too _____ or too _____, the enzyme will _____.

Complete the graph for this factor,

labeling axes and key components:



Lastly, the _____ concentration will impact the _____ of enzyme activity. Initially, an _____ in _____ concentration will _____ the reaction rate.

However, once the enzymes become _____, that is, working to _____ capacity, the reaction rate ceases to _____ and simply _____. Complete the graph:



alginate poured glucose disaccharide temperature ice cream active denature/denaturation galactose

hydrolysis reactions lowers activity plateau alkaline products specific lactose reducing/reduces acidic

effective substrate permanently immobilizes biological rate body enzyme lactase monosaccharides

reuse/remove water joined flavor protein break kinetic fastest increase saturated pH