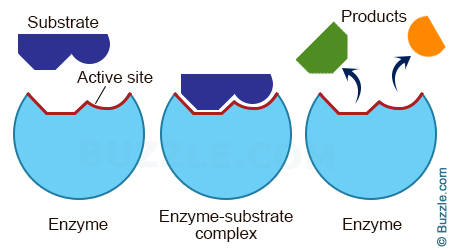
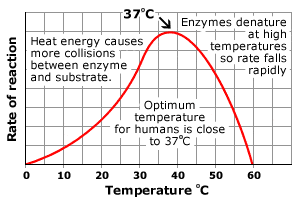
**B3 - ENZYMES**

1. **Define enzymes** -proteins that function as biological catalysts – they speed up chemical reactions but are themselves unchanged. Their action relies on their shape, as their substrate molecule (s) fit into their active site as in the lock & key hypothesis:

[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&docid=FtlKxZ5S2gwZQM&tbnid=iJft1vgeBfqZpM:&ved=0CAUQjRw&url=http%3A%2F%2Fwww.buzzle.com%2Farticles%2Fhow-do-enzymes-work.html&ei=lI9eUuRsj_OtB5vNgJAL&bvm=bv.54176721,d.bmk&psig=AFQjCNHIT9IJxX7I1r-2jKUVKlQCF7cClA&ust=1382014490250021)

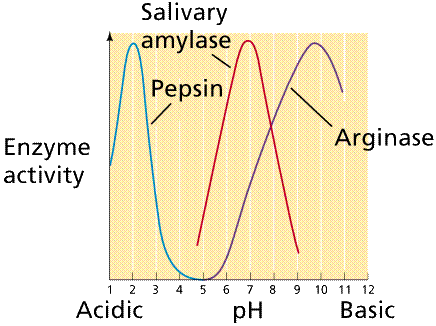
1. **Investigate and describe the effect of changes in temperature and pH on enzyme activity.**
2. **Explain the effect of changes in temperature and pH on enzyme activity.**

***Effect of temperature on enzymes***

[](http://www.google.com.my/url?sa=i&rct=j&q=effect+of+temperature+on+enzyme+activity&source=images&cd=&cad=rja&docid=tKTUSoAGMOTRDM&tbnid=eb2Uvy1CR2CGIM:&ved=0CAUQjRw&url=http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/homeostasis/importancerev4.shtml&ei=MJuYUeTaHMLorAfy1YAI&bvm=bv.46751780,d.bmk&psig=AFQjCNGjCABUnhlxaa5LQa9A2BOutpRDBw&ust=1369041905423008)

* As temperature increases, the chance of chance of substrate molecules and enzymes colliding also increases, so the rate of reaction goes up.
* This continues to an optimum (best) temperature for an enzyme. For most human enzymes the optimum temperature is 37oC (body temperature).
* Above this temperature, the bonds holding the enzyme together start to break so it changes shape
* This deforms the active site, so enzyme and substrate cannot fit together – the enzyme has been denatured. Most enzymes **denature** above 50oC.

***Effect of pH on enzymes***

[](http://www.google.com.my/url?sa=i&rct=j&q=effect+of+ph+on+enzyme+activity&source=images&cd=&cad=rja&docid=YRACkwCWX0w9WM&tbnid=GiSVa-D2y-WlXM:&ved=0CAUQjRw&url=http://www.emc.maricopa.edu/faculty/farabee/biobk/biobookenzym.html&ei=t5-YUYHHHYb-rAekrYDwBg&bvm=bv.46751780,d.bmk&psig=AFQjCNFaYnejxAFgZctYmuVW9S4CMu5ROw&ust=1369043172634045)

* The pH of a solution is how acidic or alkaline it is.
* Most human enzymes have an optimum pH of 7 (neutral). Some exceptions:

Pepsin, a protease in the stomach has an acidic optimum (pH2);

Lipase in the duodenum has an alkaline optimum (pH 9)

Salivary amylase in the mouth prefers a slightly-acidic pH of 6.8.

* Extreme of pH affect the shape of enzymes, denaturing them.