

Enzymes

Reading and Objectives

IB/AP Biology

I. Energy Review

*83-90

A. Thermodynamics and ATP

1. Identify forms of Energy and Energy Transformations
 2. Recognize the Laws of Thermodynamics
 3. Recognize that organisms live at the expense of Free Energy
 4. Relate Free-energy to metabolism
 5. Identify exergonic and endergonic reactions
 6. Identify the structure and hydrolysis of ATP
 7. Recognize how ATP works and is coupled to metabolism
 8. Recognize how ATP is generated
- ➔ How do the laws of thermodynamics relate to the biochemical processes that provide energy to living systems?
- ➔ What is the role of ATP in coupling the cells anabolic and catabolic processes?

II. Enzymes

*91-97

9. Relate enzymes and activation energy
 10. Recognize factors that affect enzymes specificity and enzyme activity
 11. Recognize factors that control metabolism.
- 2.3.1 Define enzyme and active site. 1
 - 6.6.1 State that metabolic pathways consist of chains and cycles of enzyme catalysed reactions. 1
 - 2.3.2 Explain enzyme–substrate specificity. 3
 - 6.6.2 Describe the induced fit model. 2
 - 6.6.3 Explain that enzymes lower the activation energy of the chemical reactions that they catalyse. 3
 - 6.6.4 Explain the difference between competitive and non-competitive inhibition, with reference to one example of each. 3
 - 6.6.5 Explain the role of allostery in the control of metabolic pathways by end-product inhibition. 3
 - 2.3.3 Explain the effects of temperature, pH and substrate concentration on enzyme activity. 3
 - 2.3.4 Define denaturation. 1.
 - 2.3.5 Explain the use of pectinase in fruit juice production, and one other commercial application of enzymes in biotechnology. 3
- Applications could include the use of enzymes in biological washing powder, tenderizing meat or production of glucose syrup.
- ➔ How do enzymes regulate the rate of chemical reactions?
- ➔ How does the specificity of an enzyme depend on its structure?
- ➔ How is the activity of an enzyme regulated?