

SBI4U: Biology, Grade 12, University Preparation

Unit 1: Biochemistry

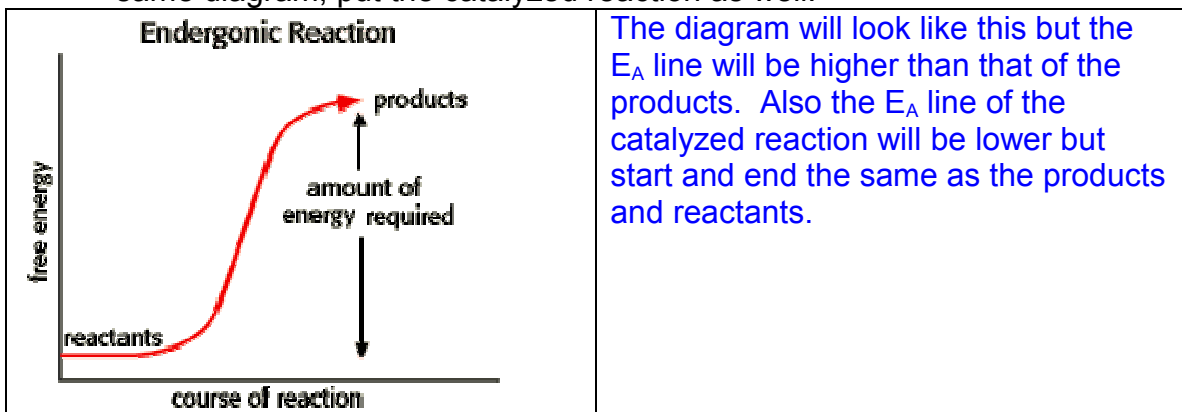
Activity 4: Food and Enzymes

Teacher Notes



Assignment 1

1. Draw a labelled energy-level diagram for an endergonic reaction. Label the products, reactants, transition state, activation energy and, on the same diagram, put the catalyzed reaction as well.



Refer to:

http://www.biology.arizona.edu/biochemistry/problem_sets/energy_enzymes_catalysis/16t.html

2. Define free energy and how it applies to chemical reactions. Explain how the enzyme affects the energy of a reaction but not the free energy.
Free energy – is the energy change of a reaction. It is the energy that can do useful work. Free energy is not affected by enzymes because it is due to the energy state of the products and reactants.
3. What happens to an enzyme after it has catalyzed a reaction?
It can catalyzed other reactions or be deactivated by feedback inhibition.
4. Describe optimal conditions for enzymes in your body.
pH 6.8- 7.3 and about 37°C.
5. Describe feedback inhibition, precursor activation, and allosteric regulation.

Feedback Inhibition -If the product of a series of enzymatic reactions, e.g., an amino acid, begins to accumulate within the cell, it may specifically inhibit the action of the first enzyme in the sequence. Thus further production of the enzyme is halted. Precursor Activation - The accumulation of a substance within a cell may specifically activate an enzyme that sets in motion a sequence of reactions for which that substance is the initial substrate.

6. Carbonic anhydrase is an enzyme found in blood plasma that converts carbon dioxide into bicarbonate



Certain pollutants in the air can inhibit this enzyme. Explain how you would determine the type of inhibition and how it could be overcome? If it is competitive inhibition – more carbon dioxide will displace the pollutant. If it is not, it will not be overcome with more substrate.

Use lab rubrics to assess the labs