Chapter 8: Study Guide
An Introduction To Metabolism

Name:_____

Period:_____

Directions: Answer the following questions on a separate sheet of paper and in complete thought. Typed answers are preferred to hand written.

Metabolism, Energy, and Life:

1: Explain the role of catabolic and anabolic pathways in the energy exchanges of cellular metabolism.
2: Distinguish between kinetic and potential energy.
3: Distinguish between open and closed systems.
4: Explain in your own words, the first and second law of thermodynamics.
5: Explain why highly ordered living organisms do not violate the second law of thermodynamics.
6: Write and define each component of the equation for free-energy change.
7: Explain how changes in temperature influence the maximum amount of usable energy that can be harvested from a reaction.
8: Describe the relationship between free energy and equilibrium.
9: Distinguish between exergonic and endergonic reactions.
10: Explain why metabolic disequilibrium is one of the defining features of life.
11: Describe the three main kinds of cellular work.
12: Describe the function of ATP in a cell.
13: List the three components of ATP and identify the major class of macromolecules to which ATP belongs.
14: Explain how ATP performs cellular work.

Enzymes:

15: Describe the function of enzymes in biological systems.
16: Explain the relationship between enzyme structure and enzyme specificity.
17: Explain the induced-fit model of enzyme function and describe the catalytic cycle of an enzyme.
18: Describe several mechanisms by which enzymes lower activation energy.
19: Explain how substrate concentration affects the rate of an enzyme-controlled reaction.
20: Explain how enzyme activity can be regulated or controlled by environmental factors, co-factors, and enzyme inhibitors.

The Control of Metabolism: A Review

21: Explain how metabolic pathways are regulated.
22: Explain how the location of enzymes in a cell influences metabolism.

Directions: Define each of the following terms. It is suggested that you use your own words for better understanding and retention.

Metabolism
Catabolic pathway
Anabolic pathway
Bioenergetics
Energy
Kinetic energy
Potential energy
Chemical energy
Thermodynamics
First law of Thermodynamics
Second law of Thermodynamics
entropy
free energy
exergonic reaction
endergonic reaction
energy coupling
ATP (adenosine triphosphate)
phosphorylated
catalyst
enzyme
free energy of activation
activation energy
substrate
active site
induced fit
cofactor
coenzyme
competitive inhibitor
noncompetitive inhibitor
allosteric site
feedback inhibition
cooperativity