**BI-102 Learning Objectives – Chapter 6: Energy and Metabolism**

**Fall '08**

1. Be able to state a practical definition of *energy*.
2. Be able to name and describe 3 forms of energy.
3. Be able to illustrate how energy moves from sun light, through cellular work and ultimately heat (this is on the “Big Picture” slide).
4. Be able to state what life uses energy for.
5. Be able to explain what the terms *oxidation* and *reduction* mean (this is a repeat from earlier in the quarter).
6. Be able to define thermodynamics and state the 1st and 2nd laws of thermodynamics.
7. Be able to recognize and explain the difference between endothermic and exothermic reactions.
8. Be able to explain how the *Gibbs free energy* of a chemical reaction relates to the reaction’s spontaneity.
9. Be able to explain the difference between endergonic and exergonic reactions in terms of the free energy of their reactants and products and their spontaneity.
10. Be able to describe what the activation energy of a chemical reaction is and explain how it can be affected by catalysis (enzymes).
11. With respect to enzyme catalyzed reactions, be able to recognize and define the following terms: enzyme, substrate, product, inhibitor, active site, cofactor and coenzyme.

1. Be able to name a type of biological catalyst that that is **not** a protein.
2. Be able to describe (probably using sketches) how temperature and pH typically effect enzyme activity.
3. Be able to name and describe two types of enzyme inhibition.
4. Be able to explain (in words or with a picture) how ATP is used as “energy currency” in cells.
5. Be able to sketch the overall (not the atomic) structure of ATP (see the labeled parts of Figure 6.6).
6. Be able to explain what is meant by the term *ATP Cycle* (and no, it’s not something ATP’s ride).
7. Be able to define the term *metabolism* and explain the difference between *catabolism* and *anabolism*.
8. Be able to explain what a *biochemical pathway* is.
9. Be able to explain why it is important to regulate biochemical pathways and describe a way in which this regulation can be accomplished.