**Study Guide – Unit 2**

**Acids/Bases**

* pH scale 0-14
	+ Acids – pH 0-6.9
	+ Neutral – pH 7
	+ Bases – pH 7.1-14

**Organic macromolecules**

* 4 kinds - Carbohydrates, Proteins, Lipids, Nucleic Acids
* All organic molecules contain **carbon**

**Carbohydrates**

* Provide organisms with energy
* Monomer (building block) = sugar (a.k.a. monosaccharide)
* Polymer (many subunits together) = polysaccharide
* Examples of simple carbohydrates – glucose, sucrose
* Animals store extra glucose as glycogen in the liver, plants store extra glucose as starch
* Shape is a hexagon (like a stop sign)

**Proteins**

* Subunits are amino acids
* Found in meat, cheese, eggs
* Include enzymes (enzymes are a type of protein)

**Lipids**

* Monomer (building block) = glycerol and fatty acids
* Examples:
	+ Saturated fat (saturated fats are solid at room temperature, ex. butter)
	+ Unsaturated fat (liquid at room temperature, ex. oil, healthier for you)
	+ Cholesterol
* Uses: long-term energy storage
* Shape is a capital E (glycerol on the side with three fatty acids)

**Nucleic Acids**

* Two types of nucleic acids = DNA (stores hereditary information) and RNA
* Building blocks of nucleic acids = nucleotides
	+ Nucleotides include A, T, C, G, U
* Adenine bonds with Thymine (or Uracil), Guanine bonds with Cytosine

**Enzymes** (type of protein)

* What are enzymes?
	+ Biological catalysts (catalysts speed up reactions by lowering the activation energy)
* Not used up by reaction – can use them over and over again
* Cells contain thousands of them – each one speeds up different types of chemical reactions
* Parts of enzymes:
	+ Substrates – molecules on which enzymes act
	+ Active site – place on enzyme where enzyme bonds to substrate
* Function of enzymes are impacted by pH, temperature (heat), and amount of enzyme present
* Example of an enzyme
	+ Amylase – digestive enzyme that breaks down starch into simple sugars
* Enzymes in the stomach work best at low pHs (acid pHs)

In graph – note that amount of energy needed is less when have more enzymes!

**Review from Unit 1**

* First organisms on earth were most likely bacteria
* Homeostasis – process by which organisms keep their internal conditions in equilibrium
* Autotrophs- make own food (glucose), heterotrophs = do not make their own food
* Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species
* Independent (variable that is changed) vs. dependent (variable that is measured)
* Experiment is a series of steps to test a hypothesis
* Prokaryotic cells = no nucleus