Basic and Biochemistry:

The student will KNOW:

* What pH means
* What it means if a molecule is polar
* The 4 families of biochemical, subunits, examples of each and their purposes
* How enzymes and substrates interact
* Factors determining protein shape
* What catalyst means and how the term relates to enzymes.
* The code on the DNA molecule determines the amino acid sequence and thus the protein structure.

The student will UNDERSTAND:

* That all things are made up of atoms that bond to make monomers and polymers (concept only, vocab terms are honor-only)
* That all living things depend upon and are made from biochemicals
* That knowledge of biochemistry helps one to lead a healthy life
* That enzymes are essential to proper body function

The student will be able to:

* Distinguish between a monomer and polymer (concept only, vocab terms are honors-only)
* Predict the impact of temperature, pH on enzyme activity
* Recognize subunits of biochemicals
* Analyze enzymes’ effects on activation energy with graphs
* Connect the shape of the active site to the shape of the substrae

Topics for Honors Extensions:

* Difference between saturated and unsaturated fats, trans fats
* Know what monomer and polymer means
* Additional examples of biochemical families (such as antibodies, HFCS, fiber)
* Application of biochemistry to diet and nutrition (macronutrients)
* That interactions of biochemicals in organisms are its metabolism
* Predict the impact of enzyme/substrate concentration and salinity on enzyme activity

**NC Unpacked Essential Standards Covered in this Unit:**

**Bio.4.1.1** Compare the structure and function of each of the listed organic molecules in organisms:

▪ Carbohydrates (glucose, cellulose, starch, glycogen)

▪ Proteins (insulin, enzymes, hemoglobin)

▪ Lipids (phospholipids, steroids)

▪ Nucleic Acids (DNA, RNA)

**Bio.4.1.2** Identify the five nitrogenous bases (A, T, C, G and U) found in nucleic acids as the same for all organisms. *Note:* Students are not expected to memorize the names and/or structures or characteristics of the 20 amino acids. The focus should be on the fact that side chains are what make each of the amino acids different and determine how they bond and fold in proteins.

**Bio.4.1.3** Develop a cause and effect model for specificity of enzymes - the folding produces a 3-D shape that is linked to the protein function, enzymes are proteins that speed up chemical reactions (catalysts) by lowering the activation energy, are re-usable and specific, and are affected by such factors as pH and temperature. *Note:* Students should understand that enzymes are necessary for all biochemical reactions and have a general understanding of how enzymes work in terms of the connection between shape and function.