UNIT OF STUDY

Title: Chemistry of Cells	Subject/Course: Biology	Length: 2 weeks
Topic: Molecules and Cells 1	Grade: 10th grade	Designer: Woods

UNIT GOALS AND EXPECTATIONS

IMPORTANT CONCEPTS/UNDERSTANDINGS:	ESSENTIAL QUESTIONS:
Matter and energy are never lost, but conserved through energy transformations. Most cell functions involve chemical reactions. Food molecules taken into cells react to provide the chemical constituents needed to synthesize other molecules. Both breakdown and synthesis are made possible by large set of protein catalysts, called enzymes. The breakdown of some of the food molecules enables the cell to store energy in specific chemicals that are used to carry out the many functions of the cell. Cell functions are regulated. Regulation occurs both through changes in the activity of the functions performed by proteins and through the selective expression of individual genes. This regulation allows cells to respond to their environment and to control and coordinate cell growth and division. The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Cells usually store their energy temporarily in phosphate bonds of a small high-energy compound called ATP. The energy for life primarily derives from the sun. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing (organic) molecules. These molecules can be used to assemble larger molecules with biological activity (including proteins, DNA, sugars, and fats). In addition, the energy stored in bonds between the atoms (chemical energy) can be used as sources of energy for life processes.	How is matter arranged at the atomic level? What role do electrons play in the structure and function of matter? How do the characteristics of water determine the properties of water? What are the structures and functions of the four types of organic molecules? Why are enzymes important to chemical reactions?

STUDENT LEARNING EXPECTATIONS:	
MC.1.B.3 Investigate the properties and importance of water and its significance for life: o surface tension o adhesion o cohesion o polarity o pH o specific heat o diffusion MC.1.B.1 Describe the structure and function of the major organic molecules found in living systems: o carbohydrates o proteins o enzymes --describe the relationship between an enzyme and its substrate molecule(s) (MC.1.B.2)	MC.1.B.4 Explain the role of energy in chemical reactions of living systems: o activation energy o exergonic reactions o endergonic reactions

o lipids o nucleic acids	
SPECIFIC DECLARATIVE KNOWLEDGE –know Identify the three subatomic particles found in atoms. Explain how all the isotopes of an element are similar and different. Explain what chemical compounds are. Describe the two main types of chemical bonds. Explain why water molecules are polar. Differentiate between solutions and suspensions. Explain what acidic and basic solutions are. Describe the functions of each of the organic compounds. Explain how chemical reactions affect chemical bonds in compounds. Describe how energy changes affect how easily a chemical reaction will occur.	SPECIFIC PROCEDURAL KNOWLEDGE – do Balance and recite the equation for cell respiration and photosynthesis.

UNIT ASSESSMENTS (Include tasks related to Dimensions 3 and 4 and Bloom's Taxonomy)
Evaluate and compare the equations for photosynthesis/cellular respiration based on energy requirements and product/reactants.(continuing) Analyze the affect of enzymes on chemical reactions using a TI-83 calculator. "Metabolic Magician" Lab-Individual Work using TI-83's "Properties of Water" Lab Assignment "Toothpick-ase: Introduction: to Enzymes" Lab Assignment "The Heat Is On" Lab—Cooperative Group Work Open Response: "The Proteins of Eggs"

Traditional Assessments:	Other Evidence of Learning:
"Metabolic Magician" TI-83 Lab Review Organic Compounds Quiz	Bellringers Vocabulary Strategy Daily Notebook Entries

ACTIVITIES AND LEARNING EXPERIENCES	Resources
Investigating the Properties of Water and Organic Compounds using graphic organizers Compare and Contrast Organic Compounds using students designed GO Establish Habits of Mind for Science in Critical Thinking, Creative thinking, and Self Regulated Thinking Vocabulary Strategy Daily Notebook Entries Note-taking powerpoints	Prentice Hall Textbook: Biology TI-83's Internet Powerpoint Lab Equipment Lab Handouts

Career Connections
Forensic Scientist