#941 SCIENCE 9B SMALL GROUP

GRADE: 10

LEVEL: Small Group

CREDITS: 2.5

PREREQUISITES: An Individualized Educational Plan with this component

BASIC TEXT: Prentice Hall Science Explorer series or Miller and Levine Biology

REQUIRED MATERIALS: Scientific calculator, notebook, agenda book, writing tool

MISSION RELATED GOALS:	Foster communication
	Foster problem solving
	Academic excellence
	Intellectual curiosity
	Respect rights of others
	Successful, contributing society
	Self-confidence

COURSE DESCRIPTION: Students in Science 9B will receive small group instruction which addresses concepts and factual information in a manner consistent with their identified special needs. Characteristics of living things will be explored as a continuous theme. Commonalities include chemistry of life, structure and function of cells, evolution, biodiversity, and ecological relationships. These commonalities will be explored using the local habitat as a laboratory whenever possible. Students will also be able to make a personal connection by applying the topics above to the study of their own human Anatomy and Physiology.

SCHOOLWIDE LEARING EXPECTATIONS:

Students will enhance their intellectual curiosity through exposure to inquiry style teaching. Students will foster problem-solving skills while producing products that demonstrate academic excellence. Students will communicate effectively and work towards a common goal while developing appropriate problem solving skills. The students will respect the rights of others while promoting personal growth in accepting responsibility and working individually within a group setting.

GENERAL PERFORMANCE OBJECTIVES: The students will be able to:

- Become familiar with measuring techniques
- Improve graphing skills
- Apply the scientific method to problem solving
- Collect and analyze data
- Arrive at conclusion
- Develop skills to use the microscope properly
- Identify examples of the six kingdoms of organisms in the local habitat
- Describe nutrient cycles

- Compare and contrast various cycles exhibited by organisms
- Demonstrate understanding of the interrelationship of cycles
- Demonstrate an understanding of primary producers and consumers
- Illustrate food webs, food chains, and energy pyramids
- Compare/Contrast the four organic compounds
- Create a cell model to describe structure and function of organelles
- Explain how a change in variables will effect the rate of photosynthesis
- Describe the interrelated nature of photosynthesis and cellular respiration
- Create a visual representation of how the eleven organ systems work together to achieve homeostasis
- Relate and discuss current events and their role in changing an ecosystem

CURRICULUM FRAMEWORK LEARING STANDARDS:

1. The Chemistry of Life

Broad Concept: Living things are made of atoms bonded together to form organic molecules.

- 1.1 Explain the significance of carbon in organic molecules.
- 1.2 Recognize the six most common elements in organic molecules (C, H, N, O, P, S).
- 1.3 Describe the composition and functions of the four major categories of organic molecules (carbohydrates, lipids, proteins, and nucleic acids).
- 2. Structure and Function of Cells

Broad Concept: All living things are composed of cells. Life processes in a cell are based on molecular interactions.

- 2.1 Relate cell parts/organelles to their functions.
- 2.2 Differentiate between prokaryotic cells and eukaryotic cells, in terms of their general structures and degrees of complexity.
- 2.3 Distinguish between plant and animal cells.
- 2.4 Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, and active transport).
- 2.5 Identify the reactants and products in the general reaction of photosynthesis.
- 2.6 Provide evidence that the organic compounds produced by plants are the primary source of energy and nutrients for most living things.
- 2.7 Identify how cellular respiration is important for the production of ATP.
- 2.8 Explain the interrelated nature of photosynthesis and cellular respiration.
- 3. Genetics

Broad Concept: Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism.

- 3.1 Describe the structure and function of DNA, including replication.
- 4. Human Anatomy and Physiology

Broad Concept: There is a relationship between structure and function in organ systems of humans.

4.1 Explain how major organ systems in humans (e.g., kidney, muscle, lung) have functional units (e.g., nephron, sarcome, alveoli) with specific anatomy that perform the function of that organ system.

- 4.2 Describe how the function of individual systems within humans are integrated to maintain a homeostatic balance in the body.
- 5. Evolution and Biodiversity

Broad Concept: Evolution and biodiversity are the result of genetic changes that occur in constantly changing environments.

- 5.1 Explain how the fossil record, comparative anatomy, and other evidence support the theory of evolution.
- 5.2 Describe how the taxonomic system classifies living things into domains (eubacteria, archeabacteria, and eukaryotes) and kingdoms (animals, plants, fungi, protests...)

6. Ecology

Broad Concept: Ecology is the interaction between living organisms and their environment.

- 6.1 Explain how biotic and abiotic factors cycle in an ecosystem (water, carbon, oxygen, and nitrogen).
- 6.2 Use a food web to identify and distinguish producers, consumers, and decomposers, and explain the transfer of energy through trophic levels.
- 6.3 Identify the factors in an ecosystem that influence fluctuations in population size.
- 6.4 Analyze changes in an ecosystem resulting from natural causes, changes in climate, human activity, or introduction of non-native species.
- 6.5 Explain how symbiotic behavior produces interactions within ecosystems.

COURSE OUTLINE:

The Chemistry of Life

Structure and Function of Cells

Genetics: DNA structure and function Included in 1 week of chemistry of life

Human Anatomy and Physiology Evolution and Biodiversity

Ecology

SUGGESTED INSTRUCTIONAL STRATEGIES: videos (process skills and curriculum oriented), visual aids, models, preserved specimens, songs

SUGGESTED INTEGRATED ACTIVITIES:

Possible integrated activities:

- Discussing how organic compounds are used to form art and determine the authenticity of a piece.
- Relating naming system of taxonomy with languages offered at TMHS
- Debate the theory of nature vs. nurture as it may apply to infamous historical figures (ie. Hitler)
- Use science current events as a forum for class discussion
- Have students act the role of historical figures in Biology
- Use the concepts of exponential growth and graphing to discuss changes in population size
- As specifed by Individual Education Plan

USE OF TOOLS/TECHNOLOGY: Video programs, powerpoint presentations, microscope video adapter, Vernier probes, internet webquests, incubation chamber, electrophoresis, digital cameras

ASSESSMENT TECHNIQUES: All assessments follow the school wide rubric.