**Review for Benchmark 1**

**Scientific Process**

Describe the characteristics of a good experiment:

Independent variable

Dependent variable

Controls

How many variables can be tested with a controlled experiment?

Interpret data tables and graphs.

**Energy Processes**

The reactants and products of:

Photosynthesis Cellular respiration Fermentation

What is the relationship between photosynthesis, cellular respiration, and fermentation in terms of products, reactants, energy, and types of organisms that carry out the processes?

What are organic molecules?

What is ATP? Which cellular processes produce the most ATP?

**Chemistry of Living Things**

Building blocks of large biological molecules:

Monosaccharides (Simple sugars) – carbohydrates amino acids – proteins

Fatty acids and glycerol – lipids nucleotides – nucleic acids

 What are the functions of biological molecules – Carbohydrates, Lipids, Proteins, Nucleic Acids – as well as

Glucose Starch Glycogen Insulin hemoglobin Cellulose

Characteristics, Structure and Function of enzymes (specifically catalase); how are enzymes affected by temperature, pH, concentration. What do we mean when we say that enzymes are reusable? Specific?

**Ecology**

Describe the flow of energy in a food web (10% rule).

List and describe the ecological levels of organization.

Describe the basics of the cycles:

Carbon cycle (which processes put carbon into the atmosphere, which remove carbon)

Nitrogen cycle (what process do bacteria use to convert nitrogen gas to ammonia or nitrates).

Water cycle (what are the processes involved in the water cycle).

What are the roles in a food web (producer, primary consumer, secondary consumer, decomposer, etc.).

Describe the community interactions in an ecosystem (mutualism, competition, predator-prey, parasitism).

Identify the parts of a food pyramid.

Identify the ultimate source of almost all energy in most ecosystems.

Describe the difference between biotic and abiotic characteristics.

Compare habitat and a niche.

Compare density dependent and density independent limiting factors.

Describe a typical graph for a population that has reached carrying capacity and a population that is in exponential growth.

Explain the human impact on the environment; explain the effect of acid rain, beach erosion, urban development, and hog farm lagoons on North Carolina ecosystems.

**Cell Structure and Function, Plasma membrane**

Compare prokaryotic and eukaryotic cells in terms of their general structures and degree of complexity.

Summarize the structure and function of organelles in eukaryotic cells (nucleus, plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes).

Explain cell differentiation (specialization) and how instructions in DNA lead to cells specialized to perform specific functions.

Describe the Lipid Bilayer, the roles of phospholipids and proteins in the membrane , and why this structure is called the Fluid Mosaic Model.

**Cell Transport**

Compare passive and active transport and give examples of each.

Examine and analyze examples of osmosis that describe different concentrations of molecules to explain the flow of water molecules (into or out of cell) and the effect on the cell.

Explain how cells maintain homeostasis by regulating temperature, glucose levels, and salt.

Describe cell to cell communication in terms of signals and receptors.

Define hormone and how it affects the activity of a cell.

**Animal Behavior**

Compare innate and learned behavior. Give examples of each type of behavior.

Describe and give examples of the different types of social behavior.

Describe behavioral adaptations such as, suckling, taxis, migration, estivation, hibernation, habituation, imprinting, classical conditioning, and trial-and-error learning (operant conditioning).