School Wide Benchmark Assessment Plan
10th Grade Science Standards

Test 1 September Test 3 January
Test 2 November Test 4 March

			10th GRADE
Test	**# of STAR Questions**	**Category**	**Essential Science Standards**
1	4	**Cell Biology Grade 7**	**1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope. As a basis for understanding this concept:** c. Students know the nucleus is the repository for genetic information in plant and animal cells. d. Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis. e. Students know cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes.
	2	**Cell Biology Grade 8**	**6. Principles of chemistry underlie the functioning of biological systems. As a basis for understanding this concept:** b. Students know that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur. c. Students know that living organisms have many different kinds of molecules, including small ones, such as water and salt, and very large ones, such as carbohydrates, fats, proteins, and DNA.
	4	**Cell Biology Biology/Life Sciences**	**1. The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. As a basis for understanding this concept:** a. Students know cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings. c. Students know how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure. f. Students know usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide.
1	4	**Genetics Grade 7**	**2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences. As a basis for understanding this concept:** a. Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms. c. Students know an inherited trait can be determined by one or more genes. d. Students know plant and animal cells contain many thousands of different genes and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive. e. Students know DNA (deoxyribonucleic acid) is the genetic material of living organisms and is located in the chromosomes of each cell.

	8	**Genetics Biology/Life Science**	**2. Mutation and sexual reproduction lead to genetic variation in a population. As a basis for understanding this concept:** b. Students know only certain cells in a multicellular organism undergo meiosis. d. Students know new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization). e. Students know why approximately half of an individual's DNA sequence comes from each parent. f. Students know the role of chromosomes in determining an individual's sex. **3. A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:** a. Students know how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and mode of inheritance (autosomal or X-linked, dominant or recessive). **5. The genetic composition of cells can be altered by incorporation of exogenous DNA into the cells. As a basis for understanding this concept:** a. Students know the general structures and functions of DNA, RNA, and protein.
2	**4**	**Ecology Grade 6**	**5. Organisms in ecosystems exchange energy and nutrients among themselves and with the environment. As a basis for understanding this concept:** b. Students know matter is transferred over time from one organism to others in the food web and between organisms and the physical environment. c. Students know populations of organisms can be categorized by the functions they serve in an ecosystem. e. Students know the number and types of organisms an ecosystem can support depends on the resources available and on abiotic factors, such as quantities of light and water, a range of temperatures, and soil composition.
	7	**Ecology Biology/Life Science**	**6. Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:** a. Students know biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats. b. Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size. c. Students know how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death. d. Students know how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration. e. Students know a vital part of an ecosystem is the stability of its producers and decomposers. f. Students know at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.
3	**3**	**Evolution Grade 7**	**3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept:** a. Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms. b. Students know the reasoning used by Charles Darwin in reaching his conclusion that natural selection is the mechanism of

			evolution. c. Students know how independent lines of evidence from geology, fossils, and comparative anatomy provide the bases for the theory of evolution.
	8	**Evolution Biology/Life Science**	**7. The frequency of an allele in a gene pool of a population depends on many factors and may be stable or unstable over time. As a basis for understanding this concept:** a. Students know why natural selection acts on the phenotype rather than the genotype of an organism. b. Students know why alleles that are lethal in a homozygous individual may be carried in a heterozygote and thus maintained in a gene pool. c. Students know new mutations are constantly being generated in a gene pool. d. Students know variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions. **8. Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept:** a. Students know how natural selection determines the differential survival of groups of organisms. b. Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment. e. Students know how to analyze fossil evidence with regard to biological diversity, episodic speciation, and mass extinction.
4	**3**	**Physiology Grade 7**	**5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept:** a. Students know plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism. c. Students know how bones and muscles work together to provide a structural framework for movement. **6. Physical principles underlie biological structures and functions. As a basis for understanding this concept:** j. Students know that contractions of the heart generate blood pressure and that heart valves prevent backflow of blood in the circulatory system.
	7	**Physiology Biology/Life Science**	**9. As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment. As a basis for understanding this concept:** a. Students know how the complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide. b. Students know how the nervous system mediates communication between different parts of the body and the body's interactions with the environment. **10. Organisms have a variety of mechanisms to combat disease. As a basis for understanding the human immune response:** b. Students know the role of antibodies in the body's response to infection. c. Students know how vaccination protects an individual from infectious diseases.

			d. Students know there are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.
		Investigation and Experimentation Grade 6	**7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:** c. Construct appropriate graphs from data and develop qualitative statements about the relationships between variables. e. Recognize whether evidence is consistent with a proposed explanation.
4		**Investigation and Experimentation Grade 7**	**6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:** c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.
		Investigation and Experimentation Grade 8	**9. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in other three strands, students should develop their own questions and perform investigations. Students will:** b. Evaluate the accuracy and reproducibility of data. c. Distinguish between variable and controlled parameters in a test.
		Investigation and Experimentation Grades 9-12	**1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop their own questions and perform investigations. Students will:** c. Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions. f. Distinguish between hypothesis and theory as scientific terms. i. Analyze the locations, sequences, or time intervals that are characteristic of natural phenomena (e.g., relative ages of rocks, locations of planets over time, and succession of species in an ecosystem). j. Recognize the issues of statistical variability and the need for controlled tests.