MN Science Standards Covered

High School Biology Spring Semester 2016

**Strand**

1. Life Science

**Substrand**

1. Structure and Function in Living Systems

**Standard**

1. Organisms use the interactions of cellular processes as well as tissues and organ systems to maintain homeostasis.
2. Cells and cell structurers have specific functions that allow an organism to grow, survive and reproduce.

**Code Benchmark**

9.4.1.1.1 Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.1.2 Describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

9.4.1.2.1 Recognize that cells are composed primarily of a few elements (carbon, hydrogen, phosphorus, and sulfur), and describe the basic molecular structures and the primary functions of carbohydrates, lipids, proteins, and nucleic acids.

9.4.1.2.2 Recognize that the work of a cell is carried out primarily by proteins, most of which are enzymes, and that protein function depends on the amino acid sequence and the shape it takes as a consequence of the interactions between those amino acids.

9.4.1.2.3 Describe how viruses, prokaryotic cells, and eukaryotic cells differ in relative size, complexity and general structure.

9.4.1.2.4 Explain the function and importance of cell organelles for prokaryotic and/or eukaryotic cells as related to basic cell processes or respiration, photosynthesis, protein synthesis and cell reproduction.

9.4.1.2.5 Compare and contrast passive transport (including osmosis and facilitated transport) with active transport, such as endocytosis and exocytosis.

9.4.1.2.6 Explain the process of mitosis in the formation of identical new cells and maintaining chromosome number during sexual reproduction.

**Strand**

1. Life Science

**Substrand**

1. Interdependence Among Living System

**Standard**

1. Matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.

**Code Benchmark**

9.4.2.2.1 Use words and equations to differentiate between the processes of photosynthesis and respiration in terms of energy flow, beginning reactants and end products.

**Strand**

4. Life Science

**Substrand**

1. Evolution in Living Systems

**Standard**

1. Genetic information found in the cell provides information for assembling proteins, which dictate the expression of traits in an individual.

2. Variation within a species is the natural result of new inheritable characteristics occurring from new combinations of existing genes or from mutations of genes in reproductive cells.

**Code Benchmark**

9.4.3.1.1 Explain the relationships among DNA, genes and chromosomes

9.4.3.1.2 In the context of a monohybrid cross, apply the terms phenotype, genotype, allele, homozygous and heterozygous

9.4.3.1.3 Describe the process of DNA replication and the role of DNA and RNA in assembling protein molecules.

9.4.3.2.1 Use concepts from Mendel’s laws of segregation and independent assortment to explain how sorting and recombination (crossing over) of genes during sexual reproduction (meiosis) increases the occurrence of variation in a species.

9.4.3.2.2 Use the processes of mitosis and meiosis to explain the advantages and disadvantages of asexual and sexual reproduction.

9.4.3.2.3 Explain how mutations like deletions, insertions, rearrangements or substitutions of DNA segments in gametes may have no effect, may harm, or rarely may be beneficial, and can result in genetic variation within a species.