

### **Lesson 3: Mutations**

#### **Introduction**

This lesson is designed to help students explore different types of genetic mutations and how they can affect an organism from the molecular level to the systemic level and even extending into the population.

#### **Student Background Knowledge**

Students must understand transcription and translation for this lesson. They must be familiar with mitosis and meiosis, as well as DNA replication.

#### **Teacher Background Knowledge**

Mutations are an important player in many issues in biology. They work for populations by increasing genetic diversity and increasing species odds for survival in varying environments. They also work against us in bacterial resistance to antibiotics, sickle cell anemia, and cancer.

Genetic mutations occur when bases of a DNA or RNA sequence are changed.. This often occurs during DNA replication in preparation for cell division or when mistakes are made during transcription and translation in protein synthesis. Point mutations occur when changes in DNA bases do not affect the triplet reading frame of tRNA. Substitution or inversions are point mutations. Though they may change one or two amino acids, the majority of the DNA sequence is unaltered. Silent mutations are point mutations that do not alter the amino acid outcome. Often, more than one codon will code for a certain amino acid, so silent mutations are harmless. Frameshift mutations like deletions and insertions change the entire codon reading frame by shifting each base over one position. Frameshift mutations can be disastrous.

#### **TEKS Objectives:**

BIOL.1.05 Organize, analyze, evaluate, make inferences, and predict trends from data.

BIOL.2.02 Interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory and immune.

BIOL.2.10 Compare the structures and functions of different biomolecules including carbohydrates, lipids, proteins, and nucleic acids.

BIOL.2.23 Relate cellular functions and processes to specialized structures within cells.

BIOL.2.25 Investigate and identify cellular parts and processes including homeostasis, permeability, energy production, transportation of molecules, disposal of wastes, and synthesis of new molecules.

BIOL.2.35 Describe the components and structure of DNA and illustrate how it carries the information for traits

BIOL.2.38 Compare genetic variations observed in plants and animals

#### **Materials**

Pencils

Paper

Notecards

Mutation Practice Worksheet