**Unit 2: GENETICS unit plan**

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| **ENDURING UNDERSTANDINGS:**  **STUDENTS WILL UNDERSTAND:**   * **How genes are passed from one generation to the next.** * **How their genetic makeup determines their physical characteristics/traits.** * **DNA serves as the blueprint for the production of all the proteins that cells require to function.** * **DNA mutations result in faulty proteins (or no proteins) that prevent normal function** | |
| **ESSENTIAL QUESTIONS**:   * ***Why am I alike, yet different, than my parents?*** * ***Would I want to know my genetic make-up?*** * ***How do genes determine who we are?*** | |
| **Students will KNOW….**   * **The stages of meiosis (1)** * **the difference between diploid and haploid cells (1)** * **that crossing over occurs during meiosis and results in new combinations of genes on a chromosome (1)** * **the structure of a chromosome (1)** * **how to interpret a karyotype including identifying autosomal and sex chromosomes (1)** * **the basic principles of Mendelian genetics (2)**   **-principle of dominance**  **-segregation**  **-independent assortment**   * **how the law of independent assortment and segregation relate to meiosis and result in genetic variability (2)** * **that genotype results in phenotype (2)** * **that some traits are sex-linked (3)** * **that some traits do not follow basic Mendelian genetics (3)**   **critical vocabulary (LT 1-3): allele, gene, chromosome, sister chromatid, diploid, haploid, zygote, mitosis, meiosis, somatic cell, germ/sex cell, gametes, crossing over, synapsis, genetic recombination, autosomes, sex chromosomes, karyotype, mutations, law of independent assortment, law of segregation, heredity, genetics, offspring, genetic variability, monohybrid/dihybrid crosses, alleles, dominant, recessive, homozygous, heterozygous, genotype, phenotype, punnett squares, pedigree, sex-linked traits, codominance, incomplete dominance**   * **The history and major scientists responsible for the discovery of DNA (4)** * **Key scientific experiments that led to the discover of DNA (4)** * **The structure of DNA, including: nucleotide structure & base pairing rules (5)** * **The difference between purines and pyrimidines (5)** * **How DNA is replicated and the enzymes involved in this process (5)** * **That specific genes code for specific proteins (6)** * **How cells use DNA to build proteins (6)** * **the process of transcription and the enzymes involved in that process (6)** * **the process of translation and the enzymes involved in that process (6)** * **the similarities and differences of DNA and RNA (6)** * **how gene expression allows cells to specialize (6)** * **how DNA mutations affect an organism (6)**   **Critical Vocabulary (LT 4-6): deoxyribonucleic acid, ribonucleic acid, nitrogenous base, nucleotide, mutation, gene, double helix, protein synthesis, transcription, translation, codon, anticodon, tRNA (transfer), mRNA (messenger), ribosomes, amino acids, purine, pyrimidine** | **Students will be able to…..**   * **compare mitosis and meiosis (1)** * **model the phases of meiosis (1)** * **use monohybrid and dihybrid crosses to predict the genotypes and phenotypes of offspring (2)** * **use probability to predict the results of genetic crosses (3)** * **use pedigrees to study and predict the inheritance of traits within families (3)** * **Model DNA replication (5)** * **Model transcription and translation (6)** * **Transcibe and translate a gene into the amino acid sequence of a protein (6)** * **Predict changes in amino acid sequence (changes in the structure of a protein) based on the type of DNA mutation. (6)** |
| **LEARNING TARGETS:**  *How are parental genes passed on to their offspring?*   1. **Chromosomes and Meiosis**   *How can we predict which genes we inherit?*   1. **Mendel’s Laws of Inheritance and Patterns of Inheritance** 2. **Non-Mendelian Patterns of Inheritance and Pedigrees**   *How did we learn about DNA and genes?*   1. **History of DNA**   *How does the structure of DNA allow it to be used as the genetic code?*   1. **DNA Structure and Replication**   *How do genes determine our traits?*   1. **Protein Synthesis** | |
| **Assessment/Performance Task**   * **Quiz for each LT** * **Two Tests: LT 1-3 and LT 4-6** * **Genetics Unit Project** | |