**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**
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| **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?***
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| **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)**
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| **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**
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| **Assessment/Performance Task*** **Quiz for each LT**
* **Two Tests: LT 1-3 and LT 4-6**
* **Genetics Unit Project**
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