

## Genetic Objectives:

### Define these key terms:

genetics nucleotide hydrogen bond DNA RNA protein synthesis mRNA tRNA  
rRNA nitrogen bases guanine adenine thymine cytosine uracil polymerase  
triplet base transcription translation nucleus ribosome codon anticodon amino  
acid protein peptide bond mutation substitution addition deletion inversion  
translocation Recombinant DNA (bioengineering) plasmid restriction enzyme transgenic  
bacteria Cloning (Somatic Cell Nuclear Transfer) Gel Electrophoresis karyotyping

- Describe the genetic contributions of Watson, Crick, and Wilkins.
- Draw and label a diagram to sequence the cell, nucleus, chromosome, gene, and DNA.
- Draw and label the three parts of a nucleotide.
- List the four nitrogen bases for DNA and RNA.
- Describe the experiment by Griffith that showed DNA to be the genetic material for heredity.
- Compare and contrast the chemical differences between DNA from RNA.
- Define the functions for 3 different types of RNA.
- Examine the process of DNA replication during a hands-on demonstration.
- Pair complimentary bases for DNA replication.
- Sequence mRNA for a DNA strand.
- Describe the process of transcription & translation for protein synthesis.
- Identify the specific amino acid for each mRNA codon using a genetic chart.
- Explain the effects genes have on protein synthesis.
- State two examples that support the concept of gene expression.
- State two causes of mutations.
- Compare and contrast gene and chromosome mutations.
- Explain what happens in nondisjunction during meiosis.
- Explain the type of mutation for color-blindness, Down Syndrome, Turner Syndrome, and Klinefelter Syndrome.
- State two types of selective breeding.
- Explain how hybridization differs from inbreeding.
- List the advantages and disadvantages of selective breeding.
- Provide two examples for selective breeding.
- State one reason for the natural occurrence of inbreeding for some organisms.
- Draw and explain the steps involved in Recombinant DNA and provide examples.
- Describe the pros and cons of bioengineering for examples such as drought resistant corn and the BT corn and Corn Borer.
- Define plasmid and restriction enzyme.
- Draw and list the procedure for cloning.
- Explain the technique for gel electrophoresis.
- State three uses for gel electrophoresis in real life situations.
- State the type of trait, the system(s) affected, an explanation of the disease, and the symptoms for the following disorders: Cystic Fibrosis, Sickle Cell Anemia, Phenylketonuria (PKU), Tay-Sachs, and Down Syndrome.