Biology- Unit #6 – Basic Genetics

Essential Skills
- Be able to show the expected **phenotype** and **genotype ratios** for any single trait **Punnett Square** cross.
- Recognize the terms **genotype, phenotype, dominant, recessive, heterozygous and homozygous**.

Study Guide

1. Who was **Gregor Mendel**? What were his contributions to our understanding of heredity?

2. Using the height of plant (Tall & Short). Explain how Mendel obtained his **P generation**, the results of the **F1 generation** and the results of the **F2 generation**.

3. How did Mendel's results with pea plants show that **alleles** are either **dominant** or **recessive**? Use examples to explain.

4. Explain how the following terms relate to each other:
   a. **DNA – Chromosome**

   b. **Gene – Chromosome**

   c. **Gene – Trait**

   d. **Trait – Allele**

5. What is the **Law of Segregation**? How is this related to the **Law of Independent Assortment**?

6. Explain the purpose of **Meiosis**. How many cells? Types of cells? Chromosome Number?

7. Draw a picture of **Crossing-over**. Show the alleles on different **chromatids** and the new combinations of genes produced.

8. Compare and contrast the following sets of terms:
   * **Dominant vs. Recessive –**

   * **Genotype vs. Phenotype –**

   * **Homozygous vs. Heterozygous –**

   * **Purebred vs. Hybrid -**

9. How does **genotype** affect **phenotype**? Use the terms dominant, recessive, homozygous and heterozygous.

10. If short tails are dominant to long tails, what are the **phenotypic and genotypic ratios** of a cross between a dog with a long tail and a dog with a short tail (who had a parent with a long tail)?

11. If you had a long tailed dog and did not know the phenotypes of its parents, how could you conclusively determine the genotype of your dog? Explain using examples of a **Test Cross**.