### **Lesson 7 - Mendel & Monohybrid Crosses**

**Learning Target: #6.** I can predict phenotypic and genotypic ratios in monohybrid and dihybrid crosses using Punnett squares.

**Lesson Questions: *What tools/methods can be used to predict the inheritance of traits in offspring?***

***What are the principle patterns of inheritance?***

**Gregor Mendel**

· An Austrian monk who used garden pea plants to explain the inheritance of characteristics.

· Mendel examined seven different pea traits.

· Each trait had only two possible variations (alleles).

· Mendel was the first individual to propose the principle of dominance, the law of segregation, and the law of independent assortment.

Principle of Dominance

· When individuals with different alleles reproduce, the offspring will only express the dominant trait.

Law of Segregation

· **Each gene (allele) separates from the other so that the offspring get only one gene from each parent**

**Test Cross** - A homozygous recessive individual (bb) is bred to an individual with an unknown genotype (BB or Bb) in order to determine their genotype.

**Generation Terms**

· P1 = parent generation

· F1 = first filial generation (children)

· F2 = second filial generation(grandchildren)

**Punnett Squares**

· A punnett square is a chart used by geneticists to determine the probability of results when two individuals are crossed.

· The possible gametes produced by the parents are written at the top and along the side.

· The gametes are combined to produce all of the possible F1 genotypes.

The genotype for all the offspring (F1: Generation) is **Tt**.

The **genotype ratio** is:

The phenotype for all the offspring is **tall**.

The **phenotype ratio** is:

F2 Generation

To find the F2 generation, you cross the offspring produced in the F1 generation. Draw a punnett square to determine the phenotype and genotype ratios of the F2 generation.

F2 will always have a:

• Genotypic ratio of 1:2:1 (1 homozygous dominant, 2 heterozygous,1 homozygous recessive)

• Phenotypic ratio of 3:1 (3 dominant,1 recessive)

**Monohybrid (1 trait) Cross**

1. A heterozygous yellow seed pea is crossed with another heterozygous yellow seed pea. Determine the possible genotypes and phenotypes of the offspring

Let Y represent the dominant allele for yellow seed . Let y represent the recessive allele for green seed

2. In dinosaurs, the gene (T) for sharp teeth is dominant over the gene for (t) dull teeth. Cross a heterozygous sharp toothed dinosaur with a dull-toothed dinosaur to produce the F1 offspring. List the phenotype and genotype ratios.