

Monohybrid Crosses

True Breeding

- Mendel started his experiments using **true breeding** pea plants also called **purebreds**.
- For example tall pea plants always fertilized by tall pea plants produce only tall offspring.
- Tall x tall $\rightarrow$ tall
- Short or dwarf pea plants always fertilized by tall pea plants produce only short offspring.
- Short x short $\rightarrow$ short

Cross Breeding

- Cross breeding occurs when two purebreds cross fertilize
- Cross breeding a **tall x short** pea plant produces only tall plants because tall is the dominant allele for pea plant height.

Allele Combinations

Each allele combination has a name:

Homozygous Dominant - 2 dominant alleles (YY) - See the dominant phenotype

Heterozygous - 2 different alleles (Yy) - still see the dominant phenotype

Homozygous Recessive - 2 recessive alleles (yy) - See the recessive phenotype

Mendel's Law's

1. Each parent contributes one allele during cross fertilization. If a pure-breeding plant self fertilizes, each offspring receives identical copies of the same allele.
2. Dominant alleles are always expressed when the recessive allele is present.
3. Each pair of alleles segregates during the formation of sex cells.

Law of Segregation

States that inherited traits are determined by pairs of genes and that each of the genes separates into separate gametes.

Law of Independent Assortment

States that inheritance of one trait does **not** affect the inheritance of alleles for another trait.

Parent and Filial Generations

- The first generation is always called the parent or P1 GENERATION.
- The offspring of the P1 generation are called the first filial or F1 generation.
- The offspring of the F1 generation are called the F2 generation or second filial generation.

Punnett Squares

The results of fertilization are shown in a Punnett Square

Step 1 - Show the parents alleles

Mother phenotype = homozygous dominant tall

Genotype = TT

Father phenotype = homozygous recessive short

Genotype = tt

Mother =	T	T
Father ↓		
t		
t		

Step 2 – complete Punnett square

- Show the possible genotypes for the offspring with the parental gametes
- All the offspring have the same genotype Tt
- What phenotype are all the children?

Step 3 – do offspring ratios

- Offspring genotype ratio = 4Tt
- Offspring phenotype ratio = all tall

Monohybrid Crosses

True Breeding

- Mendel started his experiments using _____ pea plants also called _____.
- For example tall pea plants always fertilized by tall pea plants produce only tall offspring.
- Tall x tall $\Rightarrow$ _____
- Short or dwarf pea plants always fertilized by tall pea plants produce only short offspring.
- Short x short $\Rightarrow$ _____

Cross Breeding

- Cross breeding occurs when _____
- Cross breeding a _____ pea plant produces only _____ plants because tall is the _____ allele for pea plant height.

Allele Combinations

Each allele combination has a name:

Homozygous Dominant - 2 dominant alleles (_____) - See the _____ phenotype

Heterozygous - 2 different alleles (_____) - still see the _____ phenotype

Homozygous Recessive - 2 recessive alleles (_____) - See the _____ phenotype

Mendel's Law's

1. Each parent contributes _____ during cross fertilization. If _____ plant self fertilizes, each offspring receives _____ of the same allele.
2. _____ alleles are always expressed when the _____ allele is present.
3. Each pair of alleles _____ during the formation of sex cells.

Law of Segregation

States that inherited traits are determined by _____ and that each of the genes separates into separate gametes.

Law of Independent Assortment

States that inheritance of one trait _____ the inheritance of alleles for another trait.

Parent and Filial Generations

- The first generation is always called the _____ generation.
- The offspring of the P1 generation are called the _____ generation.
- The offspring of the F1 generation are called the _____ generation.

Punnett Squares

The results of _____ are shown in a Punnett Square

Step 1 - Show the parents alleles in the Punnett Square

Mother phenotype ☐ _____

Genotype ☐ _____

Father phenotype ☐ _____

Genotype ☐ _____

Mother ☐ Father ↓		

Step 2 – Complete Punnett square

- Show the possible genotypes for the offspring with the parental gametes

Step 3 – do offspring ratios

- Offspring genotype ratio ☐ _____
- Offspring phenotype ratio ☐ _____