

Steps to determine frequencies in Dihybrid Crosses

Introduction: Dihybrid crosses are when two different traits are crossed and followed (Example: Seed color and Plant height). To determine the predicted frequencies in offspring, you must first determine which allele combinations could exist in each parent's gametes. These possible gametes are then placed into a Punnett square to determine the possible offspring's genotype. From the possible offspring genotypes, phenotypic and genotypic predicted frequencies can be determined.

Steps:

1. Define the alleles of the two traits you are following.

Example: Seed Color: Y-Yellow, y- green. Plant Height: T-Tall, t-short

2. Determine and write the genotype of each parent.

Example: Two heterozygous parents for seed color and shape.

YyTt crossed with YyTt

3. For each parent, determine the possible allele combinations that could be passed on in the gametes (sex cells).

To do this, remember that only one of the two alleles will be passed on per trait (Example: Either the "Y" or the "y" for Seed color).

There is an equal chance that one allele from one trait will be passed on with one of the alleles from the other trait (Example: one "Y" could be passed with either "T" or "t").

You can use FOIL (First, Outside, Inside, Last) to help you determine the allele combination possibilities.

Genotypes of parents: Y y T t

X

Y y T t

4. Put these possible gametes for each parent into a Punnett Square. In the example, there are 4 possible gametes for each parent so the Punnett square will be a 4 X 4 square.

5. Write the genotype for each possible offspring by filling in the squares. Put alleles for the same trait together (Ex: YyTt instead of YTyt).

YYTT			
			yttt

6. Determine the phenotypic frequencies by writing the possible phenotypes and then counting the number of phenotypes out of the total possible offspring in the Punnett Square. It is useful to use symbols or cross out the phenotypes once you count them to keep track. Express your frequencies as a fraction.

Yellow Tall-

Yellow short-

green Tall-

green short-