

Mendelian Crosses Made Easy - A step-by-step guide

1. Make a key to show which symbols will be used for the dominant and recessive alleles.
2. Determine the genotypes of the parents. Keep the alleles for each gene together and always write dominant alleles first.
3. Determine the gametes that are produced by the parents. Remember that each parent makes their own gametes. Also, each gamete has to get one allele of each gene (*i.e.*, one letter from each trait). “FOIL” method.
4. Use random fertilization to combine the gametes in all possible combinations. A Punnett square can be used. If you use a Punnett square, write the gametes for one parent across the top and the gametes for the other parent on the left side.
5. Determine the genotypes of the offspring.

An alternate route:

1. Don't find 4 sex cells of each parent. Instead, “FOIL” each gene pair from each parent. You will now be able to write a probability as a fraction.
2. Use the rule of independent events (*i.e.*, multiply the fractions for each gene together) to find the overall probability.

How to Solve Genetics Problems - things to keep in mind

1. If an individual shows the recessive trait, you know s/he is homozygous recessive.
2. If an individual expresses a dominant trait that individual has AT LEAST one dominant allele.
3. If an intermediate phenotype or blending of phenotypes is observed, expect incomplete dominance or codominance.
4. If a trait expresses itself disproportionately in males or females, suspect sex-linkage.
5. Monohybrid heterozygous crosses result in 3:1 phenotypic ratios.
6. Dihybrid heterozygous crosses result in 9:3:3:1 phenotypic ratios.
7. Incomplete dominance and codominance result in 1:2:1 phenotypic ratios.