

Directions: Complete the problems below on a separate piece of paper. Make sure you identify the type of cross (complete dominance, incomplete dominance, co-dominance, or polygenic), include a key showing all possible genotypes and phenotypes of the parents and offspring, perform a Punnett Square, include the genotypic and phenotypic ratios for the offspring, and answer any other questions contained within the problem.

1. The A pair of alleles is known to govern cotyledon leaf color in soybeans. One type of plant that is homozygous produces dark green cotyledons, the heterozygous genotype produces light green cotyledons, and the other homozygous genotype produces yellow leaves so deficient in chloroplasts that the seedlings do not grow to maturity. If dark-green plants are pollinated only by light-green plants, what types of offspring may result?
2. Thalassemia is a type of human anemia that appears most frequently among Mediterranean populations. This disorder occurs in two forms. The severe form known as thalassemia major occurs among individuals who are homozygous for the gene. The milder form is called thalassemia minor and occurs among individuals who are heterozygous for the gene. If a mildly affected woman marries a normal man, what percentage of their offspring are expected to be normal? Will any of their children have thalassemia major?
3. Eye color is affected by multiple genes as noted in the key below. Show types of eye color a couple could expect in their children if their genotypes are AaBb and aaBb. What are the phenotypes of the parents?

Genotype	Phenotype	Genotype	Phenotype
AABB	Black	aaB_	Green
AaBa	Brown	aabb	aabb
A_bb	Hazel		

4. Cystic fibrosis (CF) is an inherited condition characterized by faulty metabolism of fats. Affected individuals are homozygous for the gene and typically have a shorter life span than the general population. Such individuals also produce much higher concentrations of chlorides in their sweat than people who are homozygous normal. Individuals who are heterozygous have moderate levels of chlorides in their sweat but have a normal life span. A couple planning marriage decides to have a sweat test because the brother of the man died in infancy from the disease. The test discloses that the man is heterozygous and the woman is homozygous normal. If they plan to have 8 children, how many of their children will have cystic fibrosis?
5. What eye colors could be expected from a couple who both have green eyes? Choose both possible green genotypes.
6. Show what the parent's genotypes and phenotypes if they have four children, each with a different blood type.