

MONOHYBRID GENETIC PROBLEMS

- Consider the following problems:
 - If a plant that is homozygous for round seeds is crossed with a plant that has wrinkled seeds, determine the F_1 genotypic and phenotypic ratios. Assume round seeds is dominant to wrinkled seeds.
 - Why is it not necessary to specify if the plant producing wrinkled seeds is homozygous or heterozygous?
 - Find the F_2 genotypic and phenotypic ratios of the offspring.
- Large noses are dominant over small noses. What would be the genotypes and phenotypes of the children of two parents, one who is heterozygous large nose and the other with a small nose?
- If dimples are dominant over no dimples, what are the most probable genotype and phenotype of two parents who produce two children with dimples and two without?
- Long eyelashes are dominant over short eyelashes in humans. Determine the genotype and phenotype of a child whose father is homozygous for long eyelashes and whose mother has short eyelashes.
- Biologists have found that six fingers are dominant over five. Why do we not all have six fingers? Is it possible for parents with extra fingers to have a child with normal fingers?
- Albinism in corn is due to a recessive gene, which is normally lethal because the plant cannot manufacture food without the green chlorophyll, and dies as soon as it exhausts the food stored in the seed. It is possible, however, to keep albino plants alive by special feeding techniques by means of which sugar is supplied to the plant through the leaves. Show the expected offspring from a cross between such an albino plant and a normal plant heterozygous for albinism.
- Consider blue eyes to be recessive to brown eyes. Show the expected ratio children with brown eyes from a marriage between a blue-eyed woman and a brown-eyed man who had a blue-eyed mother.
- A man who has sickle cell anemia marries a woman whose father has sickle-cell disease. The trait is recessive.
 - Can the man and woman produce offspring who have neither sickle cell disease nor the trait?
 - What proportion of the offspring will have sickle cell disease?
 - What proportion of the offspring will have sickle cell trait?
- In guinea pigs, the allele for a black coat is dominant over the allele for a white coat. A black guinea pig was crossed with a white guinea pig. All F_1 offspring have black coats.
 - Describe how you can determine whether or not the black parent is homozygous or heterozygous for the condition. Indicate the letter you will use to represent an allele.
 - If 10 offspring were produced, indicate how many you would expect to have black coat colour, if the black parent were heterozygous.

