

## SINGLE TRAIT INHERITANCE--EXTRA CREDIT

1. White color (W) is dominant over yellow (w) in squash. If a heterozygous white fruited plant is crossed with a yellow fruited plant, show using ratios the genotypes and phenotypes you would expect in the offspring.
2. In humans, brown eyes (B) are usually dominant over blue eyes (b). Suppose a blue-eyed man marries a brown-eyed woman whose father was blue-eyed. What proportion of their children would you predict will have blue eyes?
3. If a brown-eyed man marries a blue-eyed woman and they have ten children all brown-eyed, can you be certain that the man is homozygous? If the eleventh child is brown-eyed, will that prove what the father's genotype is?
4. A brown-eyed man, whose father was brown-eyed and whose mother was blue-eyed, married a blue-eyed woman whose father and mother were both brown-eyed. The couple has a blue-eyed son. Diagram their family tree and assign everyone a genotype.
5. If the litter resulting from the mating of two short-tailed cats contained three kittens without tails, two with long tails and six with short tails, what would be the simplest way of explaining the inheritance of tail length in these cats? Show their genotypes.
6. Heterozygous black guinea pigs (Bb) are crossed among themselves.
  - A) What is the probability of the first three offspring being alternately black-white-black or white-black-white?
  - B) What is the probability among three offspring of producing two black and one white in any order?
7. The absence of legs in cattle ("amputated") has been attributed to a completely recessive lethal gene. A normal bull is mated with a normal cow and they produce an amputated calf (usually dead at birth). The same parents are mated again.
  - A) What is the chance of the next calf being amputated?
  - B) What is the chance of these parents having two calves, both of which are amputated?
  - C) Bulls carrying the amputated allele (heterozygous) are mated to non-carrier cows. Their offspring are allowed to mate at random. What genotypic ratio is expected in the next generation?