

Basic Genetics - Monohybrids & Dihybrids

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Basic Genetics Answer Key

1. A tall plant of unknown genotype is test-crossed (meaning it is crossed with a recessive tt plant). Of the offspring, 869 are dwarf and 912 are tall. What is the genotype of the unknown parent, is it TT or Tt? Show the cross to prove it.
2. In humans, tongue rolling is a dominant trait, those with the recessive condition cannot roll their tongues. Bob can roll his tongue, but his mother could not. He is married to Sally, who cannot roll her tongue. What is the probability that their first born child will not be able to roll his tongue?
3. In goats, a recessive gene causes the goats to "faint" when they are startled. A farmer breeds two goats (that have never fainted) and their first offspring faints two days after its birth. What must the parent's genotypes have been? Show the cross to prove it.
4. In guinea pigs, short hair is dominant to long hair. Also in guinea pigs, black eyes are dominant to red eyes. A male guinea pig that is heterozygous for both traits is crossed with a female that is long haired and red eyed. What are the expected phenotypes of their offspring and in what proportion?
5. If both parents are heterozygous for both traits, what are the expected phenotypes of their offspring and in what proportion? (You do not need to show a punnett square for this one)
6. In horses, trotter (T) is dominant over pacer (t). Straight manes (H) are dominant over curly manes. (h)
Give the genotypes of all of the horses.
7. A curly maned pacer horse is mated to one who is homozygous dominant for both traits. What would you expect their offspring to look like?
(It may be helpful to reference the genotypes from #6)
8. If you have two horses that are both heterozygous for both traits – trotting and mane. What ratio of the offspring would you expect to be curly maned and a pacer?
9. In pea plants, purple flowers are dominant to white flowers.
Round seeds are dominant to wrinkled seeds.
Pprr x ppRr

How many offspring are purple with wrinkled seeds? _____
ppRR x Pprr

How many offspring are purple with round seeds? _____
pprr x PpRr

How many offspring are white with wrinkled seeds? _____