

1. Why must a recessive trait always be pure and never a hybrid when it appear in an organism? Explain.
2. Brown eyes are dominant over blue eyes. A brown-eyed man (Andrew) whose father (Mike) was brown-eyed and whose mother (Jill) was blue-eyed married a blue-eyed woman (Sarah) whose father (Rob) and mother (Kate) were brown-eyed. The couple has a blue-eyed son (Brian). For which of the individuals mentioned can you be sure of the genotypes? What are their genotypes? What genotypes are possible for the others?
3. Cross a purebred tall (TT) plant with a purebred dwarf (tt). Show both the F₁ and F₂ generations. Show the genotypic ratio and phenotypic ratio for both crosses.
4. If all the offspring in a cross are Gg, what are the genotypes of the parents?
5. If 50% of the offspring are round and 50% are wrinkled, what are the genotypes of the parents?
6. Red carnations were crossed with white carnations. 25 seeds were produced which all developed red flowers. Was dominance shown? What could you do to prove this?
7. A pure-breeding red flecker was mated with a pure-breeding white flecker. They produced 200 white flecker offspring. What are the genotypes of the F₁ and how many of each genotype were produced? What are the phenotypes of the F₁ and how many of each phenotype were produced?
8. You decide to start your own flecker farm. You take two of the F₁ generation from the previous question and you successfully get them to mate. They produce 600 offspring. What genotypes are produced and how many of each type should you get? What are the phenotypes and how many of each should you get?
9. Mendel did not limit his experiments on peas to ones in which single characteristics were involved. For example, he crossed plants characterized by wrinkled green seeds.

This is called a dihybrid cross.

Parental generation:	RRGG	X	rrgg
	round yellow		wrinkled

green

F ₁ generation:	RrGg
	round yellow

You want to determine what the F₂ generation would be like. To do this, you must determine the possible gametes the F₁ produce. The big hint: there are four possible types of gametes that could be produced. Show a Punnett square for this cross. (over)

X				

Phenotypic ratio:

10. Complete the following dihybrid cross between a tall blue rose and a dwarf red rose
 Tall is dominant to dwarf. Red is dominant to blue

Parent: $TTrr$ x $ttRR$

Gametes: all _____ all _____

F₁: _____

Crossing hybrids: _____ x _____

Gametes: _____

X				

Phenotypic ratio: _____ tall red: _____ tall blue: _____ dwarf red: _____ dwarf blue

Bonus: 1. In a trihybrid cross (such as $RrTtBb$ x $RrTtBb$) how many possible offspring is there and how many genotypes are possible?

Bonus: 2. What is a flecker?