

Monohybrid and Dihybrid Practice

These are sample word problems for genetics probability. Make sure that you understand the terms genotype, phenotype, pure-bred, hybrid, allele, gene, dominant, recessive, homozygous and heterozygous before you begin. Also remember that you are limited by the observations that have been made. **Remember, Punnett squares show probability not actual numbers. In real life, the percentages are usually close to the predicted outcomes but are seldom exactly as predicted.** Assume NOTHING about an example. (For instance, just because most animals are brown-eyed, don't assume that brown eyes is a dominant trait. You need to prove that mathematically if you are given enough data. Not all problems have only one correct explanation. For some, there is not enough data to decide the genetics of the parents or to predict the types of offspring that can be produced. If that is the case, explain each of the possible solutions to the problem.

Give the genotype and phenotype of both parents and the offspring. Draw one or more Punnett squares to show the crosses described.

Monohybrid Problems

1. In a cross between a brown duck and a blue duck, 32 blue ducks were produced.
2. Two spotted dogs were mated. 11 puppies were produced. 8 were spotted, 3 were solid brown.
3. A plant having red flowers is crossed with another plant having red flowers. The offspring were 95 red-flowering plants and 31 white-flowering plants.
4. A banded snake is mated with another banded snake. 12 banded snake babies were born.
5. One of the banded snake babies was mated with its banded mother----this bit of incest produced 64 young of which 16 were solid and 48 banded.
6. Two brown squirrels are crossed. If only one is a heterozygote, what are the genotypes of the parents and what will be the genotypes and the phenotypes of the offspring?
7. A tall plant is crossed with another tall plant. all tall plants are produced.
8. A striped frog is crossed with a green frog. The offspring include 100 striped frogs and 101 green frogs.
9. When a white-eyed fly is crossed with a tan-eyed fly, all 87 offspring were white-eyed. When two of the matured babies were crossed, 88 flies were produced—66 were white-eyed and 22 were tan-eyed.
10. We cross a red snap-dragon with a white snap-dragon. The 38 offspring have pink flowers.
11. If we cross an albino corn plant with a normal corn plant, what will the offspring look like?
12. If we cross a fuzzy worm with a smooth worm, what will the offspring look like?

Dihybrid Problems

13. Crossing two beautiful green frogs with long dorsal spots results in 320 progeny (offspring). Four different phenotypes are seen: 180 are like their parents (green with long spots), 60 are green with round spots, 60 are tan with long spots and 20 are tan with round spots.
14. When a short plant with big flowers is crossed with a tall plant with small flowers, the progeny consists of 298 short plants with big flowers. If both plants were homozygous for both traits, what is the genotype of the offspring?
15. The offspring from the cross in problem #14 are mated. Show this cross and describe the phenotypes and genotypes you would expect to get.
16. We mate a brown, short-tailed mouse with a white, long-tailed mouse. 18 brown, long-tailed mice are produced.
- *****17. We cross a long-haired, red-eyed mouse with one having short hair and black eyes. The offspring are all short haired with red eyes. Two of these offspring are mated. Their offspring include: 4 long-haired, red-eyed mice, 4 short-haired, red-eyed mice, 4 long-haired, black-eyed mice and 4 short-haired, black-eyed mice. Careful, this one is tricky.