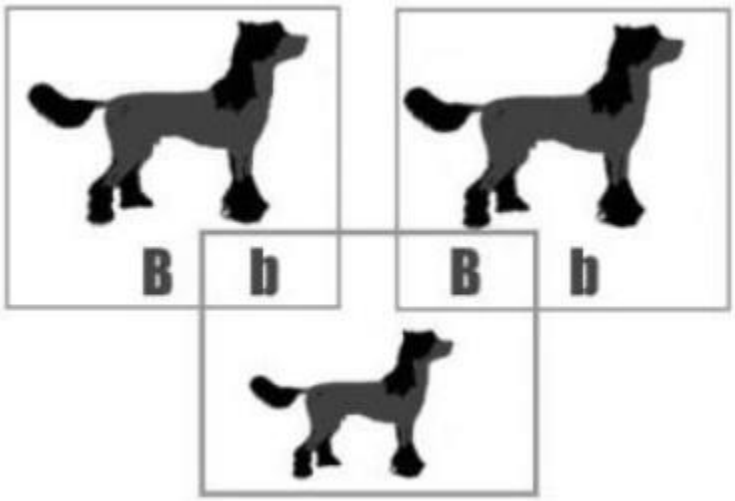
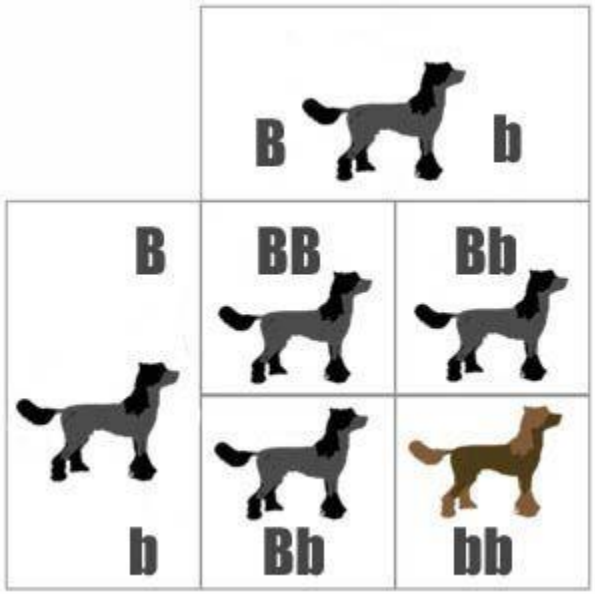
Genetics part II: Defining and Calculating Traits



If both parents of a dog are Bb (B coding for the color black, b coding for the color liver) the offsrping could get any of the following combinations: B+B, B+b, b+b.

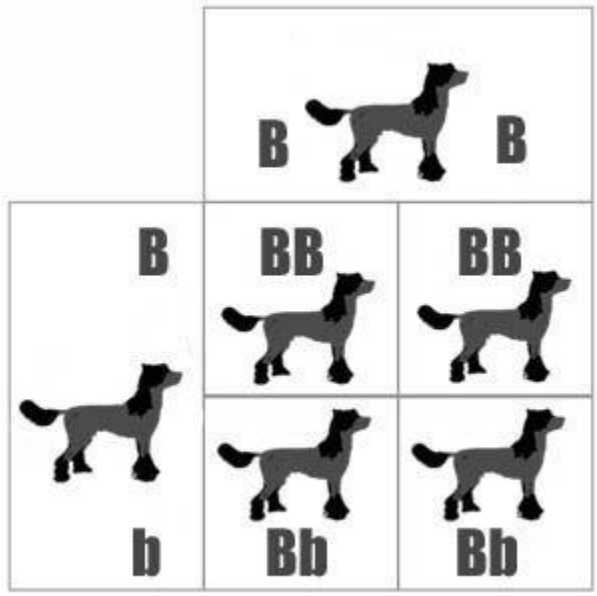
The easiest way to calculate which results are possible is to use a punnet square. A Punnett square is a tool in genetics, developed by British geneticist Reginald Punnett, that biologists still use to determine the probability of an offspring expressing a particular genotype.



The Punnett square example above represents the possible genotypes resulting from the cross between a two heterozygous parents.

It demonstrates that there are three possible genotypes of the offspring;

- 25% chance for BB (dominant homozygous for Black; black fenotype and genotype),
- 50% chance for Bb (heterozygous) and
- 25% chance for bb (recessive homozygous for liver: Liver fenotype & genotype)



The Punnett square example above represents the possible genotypes resulting from the cross between a dominant homozygous parent (BB) and a heterozygous parent (Bb).

It demonstrates that there are two possible genotypes of the offspring;

- BB (dominant homozygous) or
- Bb (heterozygous).

There is a 50% probability that the offspring will have a dominant homozygous genotype (BB), and a 50% probability that the genotype will be heterozygous (Bb).

However, there is a 100% chance that the phenotype (the actual trait) for B will be expressed, because the dominant allele B is present in all four possible genotypes.