

2. Multiple alleles for Rabbit fur/coat colour:

CO DOMINANCE (co- (together) + dominance):

Codominance is a form of dominance where both the alleles of a gene pair in a F1 heterozygote are fully expressed. This results in offspring with a phenotype that is neither dominant nor recessive. A typical example showing codominance is the ABO blood group system. For instance, a person having A allele and B allele will have a blood type AB because both the A and B alleles are codominant with each other.

Codominance is different from incomplete dominance in a way that the former has both alleles expressing the phenotypes completely whereas the latter produces an intermediate phenotype because the dominant allele is incompletely dominant. In incomplete dominance, when the dominance is not complete, it is referred to as incomplete dominance. In this form of dominance, the dominant allele is only partially dominant giving rise to an intermediate phenotype in F1 heterozygote (Aa). In another form of dominance, i.e. codominance, the alleles of a gene pair in a heterozygote are fully expressed. This results in offspring that has phenotypes of both the alleles.

INCOMPLETE DOMINANCE:

Mendel's results were groundbreaking partly because they contradicted the (then-popular) idea that parents' traits were permanently blended in their offspring. In some cases, however, the phenotype of a heterozygous organism *can* actually be a blend between the phenotypes of its homozygous parents.

For example, in the snapdragon, *Antirrhinum majus*, a cross between a homozygous white-flowered plant (C^WC^WCWCW) and a homozygous red-flowered plant (C^RC^RCRCR) will produce offspring with pink flowers (C^RC^WCRCW). This type of relationship between alleles, with a heterozygote phenotype intermediate between the two homozygote

phenotypes, is called incomplete dominance.

Ex. Flower color RED × WHITE, that gives pink flower on crossing that shows incomplete dominance.

COMPLETE DOMINANCE:

Complete dominance is a form of dominance in heterozygous condition wherein the allele that is regarded as dominant completely masks the effect of the allele that is recessive. For instance, an individual carrying two alleles that are both dominant (e.g. AA), the trait that they represent will be expressed. But if the individual carries two alleles in a manner that one is dominant and the other one is recessive, (e.g. Aa), the dominant allele will be expressed while the recessive allele will be suppressed. Hence, the heterozygote (Aa) will have the same phenotype as that of the dominant homozygote (AA). This condition is called complete dominance.

EPISTASIS- GENE INTERACTION RATIO:

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|------------------------------------|-----------|
| 1. Mendelian dihybrid ratio- | 9:3:3:1 |
| 2. Supplementary gene interaction- | 9:3:4 |
| 3. Complementary gene interaction- | 9:7 |
| 4. Duplicate gene interaction- | 15:1 |
| 5. Inhibitory gene interaction- | 13:3 |
| 6. Masking gene interaction- | 12:3:1 |
| 7. Polymeric gene interaction- | 9:6:1 |
| 8. Additive gene action- | 1:4:6:4:1 |

CLASS WORK

1. Work out of given problem on multiple alleles, co dominance and epistatic interaction

