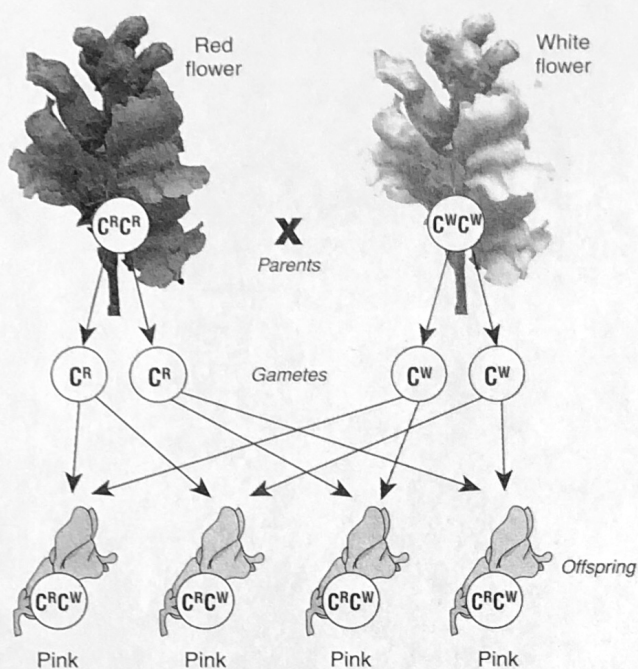


Incomplete Dominance

Incomplete dominance refers to the situation where the action of one allele does not completely mask the action of the other and neither allele has dominant control over the trait. The heterozygous offspring are intermediate in phenotype between the contrasting homozygous parental phenotypes. In crosses

involving incomplete dominance the phenotype and genotype ratios are identical. Examples of incomplete dominance includes flower color in snapdragons (*Antirrhinum*) and four o'clocks (*Mirabilis*) (below). In this type of inheritance the phenotype of the offspring results from the partial influence of both alleles.



Pure breeding snapdragons produce red or white flowers (left). When red and white-flowered parent plants are crossed a pink-flowered offspring is produced. If the offspring (F_1 generation) are then crossed together all three phenotypes (red, pink, and white) are produced in the F_2 generation.



Four o'clocks (above) are also known to have flower colors controlled by incompletely dominant alleles. Pure breeding four o'clocks produce crimson, yellow or white flowers. Crimson flowers crossed with yellow flowers produced reddish-orange flowers, while crimson flowers crossed with white flowers produce magenta (reddish-pink) flowers.

1. Explain how incomplete dominance of alleles differs from complete dominance: _____

2. A plant breeder wanted to produce snapdragons for sale that were only pink or white (i.e. no red). Determine the phenotypes of the two parents necessary to produce these desired offspring. Use the Punnett square (right) to help you:

| | Gametes from male | |
|---------------------|-------------------|--|
| Gametes from female | | |
| | | |

3. Another plant breeder crossed two four o'clocks, known to have its flower color controlled by a gene which possesses incompletely dominant alleles. Pollen from a magenta flowered plant was placed on the stigma of a crimson flowered plant.

(a) Fill in the spaces on the diagram on the right to show the genotype and phenotype for parents, and offspring.

(b) State the phenotype ratio:

