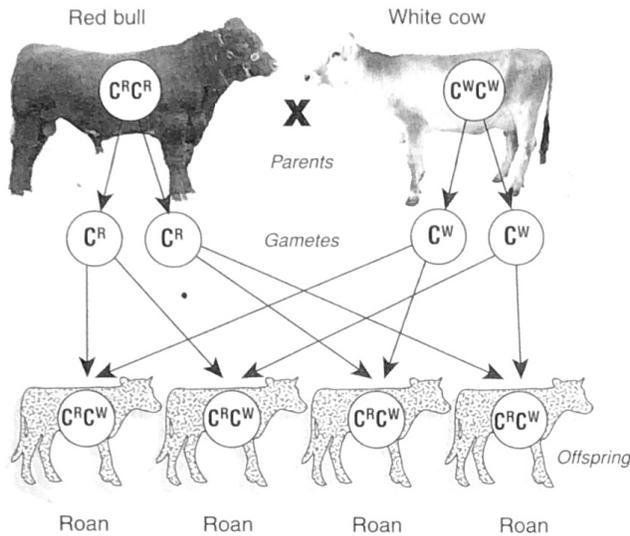


Codominance

Codominance refers to an inheritance pattern in which both alleles in a heterozygote contribute to the phenotype. Both alleles are **independently** and **equally expressed**. One example includes the human blood group AB which is the result of two alleles: A and B, both being equally expressed. Other examples

include certain coat colors in horses and cattle. Reddish coat color is equally dominant with white. Animals that have both alleles have coats that are roan-colored (coats with a mix of red and white hairs). The red hairs and white hairs are expressed equally and independently (not blended to produce pink).



In the shorthorn cattle breed, coat color is inherited. White shorthorn parents always produce calves with white coats. Red parents always produce red calves. However, when a red parent mates with a white one, the calves have a coat color that is different from either parent; a mixture of red and white hairs, called roan. Use the example (left) to help you to solve the problems below.

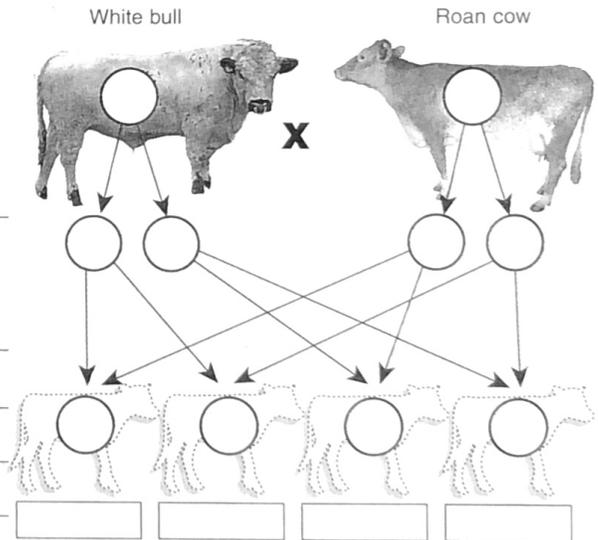
1. Explain how codominance of alleles can result in offspring with a phenotype that is different from either parent:

2. A white bull is mated with a roan cow (right):

(a) Fill in the spaces to show the genotypes and phenotypes for parents and calves:

(b) What is the phenotypic ratio for this cross?

(c) How could a cattle farmer control the breeding so that the herd ultimately consisted of only red cattle?



3. A farmer has only roan cattle on his farm. He suspects that one of the neighbors' bulls may have jumped the fence to mate with his cows earlier in the year because half the calves born were red and half were roan. One neighbor has a red bull, the other has a roan.

(a) Fill in the spaces (right) to show the genotype and phenotype for parents and calves.

(b) Which bull serviced the cows? **red** or **roan** (delete one)

4. Describe the classical phenotypic ratio for a codominant gene resulting from the cross of two heterozygous parents (e.g. a cross between two roan cattle):

