

# Codominance

Both alleles are fully expressed



## Codominance: coat colour in cattle



Red [RR]

All hairs are red



Roan [RR']

Red & white hairs occur together: both alleles are expressed



White [R'R']

All hairs are white



Roan cow



Black



Speckled



White

Phenotype

Genotype

$C^B C^B$

$C^B C^W$

$C^W C^W$

### Example:

A red cow genotype :  $H^R H^R$

A white bull genotype:  $H^W H^W$

H is for hair  
R and W are colour

Codominant alleles are represented using a capital letter for gene, with different superscript letters for each allele

	$H^R$	$H^R$
$H^W$	$H^R H^W$	$H^R H^W$
$H^W$	$H^R H^W$	$H^R H^W$

Offspring are  $H^R H^W$  = white and red expressed

<p><b>Example:</b>          Roan (red and white)          Roan cow and roan bull mate          A roan cow genotype : <math>H^R H^W</math>          A roan bull genotype: <math>H^R H^W</math></p> <p>H is for hair          R and W are colour</p> <p>What is the phenotype of offspring?</p> <p>1 red (<math>H^R H^R</math>)          2 roan (<math>H^R H^W</math>)          1 white (<math>H^W H^W</math>)</p>	<table style="margin: auto;"> <tr> <td></td> <td style="padding: 5px;"><math>H^R</math></td> <td style="padding: 5px;"><math>H^W</math></td> </tr> <tr> <td style="padding: 5px;"><math>H^R</math></td> <td style="border: 1px solid black; padding: 10px;"><math>H^R H^R</math></td> <td style="border: 1px solid black; padding: 10px;"><math>H^R H^W</math></td> </tr> <tr> <td style="padding: 5px;"><math>H^W</math></td> <td style="border: 1px solid black; padding: 10px;"><math>H^R H^W</math></td> <td style="border: 1px solid black; padding: 10px;"><math>H^W H^W</math></td> </tr> </table>		$H^R$	$H^W$	$H^R$	$H^R H^R$	$H^R H^W$	$H^W$	$H^R H^W$	$H^W H^W$
	$H^R$	$H^W$								
$H^R$	$H^R H^R$	$H^R H^W$								
$H^W$	$H^R H^W$	$H^W H^W$								

**Assignment:**

1. Checkered feathers in chickens are a mixture of black feathers ( $F^B$ ) and white feathers ( $F^W$ ). If a rooster with black feathers mates with a hen with white feathers, what are the probable genotypes and phenotypes of their offspring? Complete a Punnett square

<table border="1" style="margin: auto; width: 80px; height: 80px;"> <tr><td style="width: 40px; height: 40px;"></td><td style="width: 40px; height: 40px;"></td></tr> <tr><td style="width: 40px; height: 40px;"></td><td style="width: 40px; height: 40px;"></td></tr> </table>					<p><b>Genotypes:</b></p> <p>_____ % <math>F^B F^B</math></p> <p>_____ % <math>F^B F^W</math></p> <p>_____ % <math>F^W F^W</math></p>	<p><b>Phenotypes:</b></p> <p>_____ % black</p> <p>_____ % checkered</p> <p>_____ % white</p>

2. A female has type A blood ( $I^A I^A$ ) and a male has type AB blood ( $I^A I^B$ ). Determine the blood type of offspring

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