



# Sheep Genetics

The following table shows genetic features of sheep.

	Dominant	Recessive
Ear Colour	white (E)	black (e)
Wool Type	long (T)	short (t)
Number of Lower Teeth	three (N)	five (n)
Has Multiple Births	no (B)	yes (b)
Tail Length	long (A)	short (a)
Bleat	deep (D)	high pitched (d)



1. Shaun the sheep has the following genotypes. Describe his phenotype.

Aa nn EE dd Bb tt

2. Shaun is mated with a female sheep (Betty). She is homozygous recessive for all features.

Betty's genotype is

Betty's phenotype is

3. Use Punnett squares to work out the chance of their offspring having each feature.

Feature	Punnett Square	Phenotypes of Offspring									
<p><b>Ear Colour</b></p> <p>Shaun: <input style="width: 80px; height: 20px;" type="text"/></p> <p>Betty: <input style="width: 80px; height: 20px;" type="text"/></p>	<table border="1" style="width: 100%; height: 100%; text-align: center;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> </table>										
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<p><b>Number of Lower Teeth</b></p> <p>Shaun: <input type="text"/></p> <p>Betty: <input type="text"/></p>	<table border="1"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table>										
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4. Shaun is said to be pure-bred for white ears. What does this mean?

5. Complete the following by filling in the gaps and completing the Punnett squares.

Because Shaun has white ears, he could have the genotype  or . As he is pure-bred, we would expect him to have the genotype . We can test if he is pure-bred by mating him with a female sheep that is h  r  for ear colour and would have the genotype  and the phenotype . If Shaun was pure-bred, then as Punnett square 1 shows, all offspring would have  ears. If he wasn't pre-bred, then as Punnett square 2 shows, there would be a mixture of  and  ears in the lambs.

Punnett Square 1:  
Pure-Bred Shaun

Punnett Square 2:  
Not Pure-Bred Shaun

