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# CLASSICAL GENETICS QUIZ

1. In pea plants, yellow seed colour is dominant to green seed colour and round seeds are dominant to wrinkled seeds. If a homozygous yellow-round seed is crossed with a homozygous green-wrinkled seed, what percentage of the F1 generation will be yellow and wrinkled?

SHOW ALL WORK!

homozygous yellow-round  $\times$  homozygous green wrinkled

Y = yellow  
y = green  
R = round  
r = wrinkled

YYRR  $\times$  yyrr  
~~YR~~ ~~YR~~ ~~YR~~ ~~YR~~ ~~yR~~ ~~yR~~ ~~yR~~ ~~yR~~

$\frac{YR}{yR} \times \frac{YR}{yR} = \text{yellow round}$

So, 0% will be yellow wrinkled

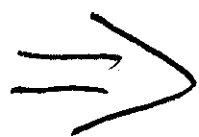
2. A man has blood type A and his wife has type B. A physician types the blood of their four children and is amazed to find one of each of the four blood types among them. He is not familiar with genetics and calls upon you for an explanation. Provide one.

man = A =  $I^A i$

wife = B =  $I^B i$

possible blood types:  
 A -  $I^A i$  or  $I^A I^A$   
 B -  $I^B i$  or  $I^B I^B$   
 AB -  $I^A I^B$   
 O -  $ii$

	$I^A$	$i$
$I^B$	$I^A I^B$	$I^B i$
$i$	$I^A i$	$ii$



each parent has a recessive "i" allele.

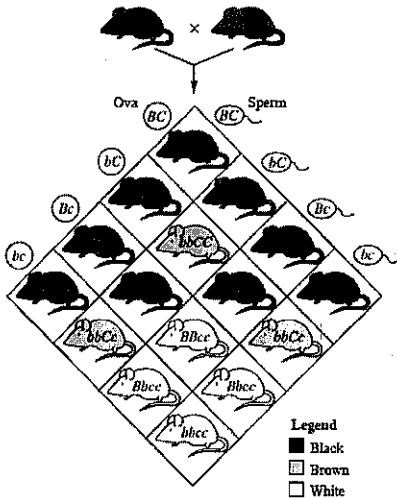
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5.

Punnett Square for a Dihybrid Cross to Investigate Coat Colour in Mice

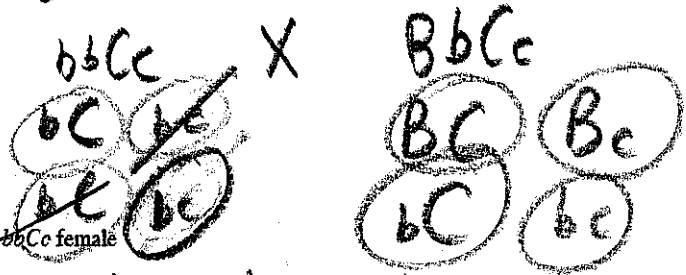


Coat colour in mice is controlled by the interaction of two genes. Three phenotypes result: black coat, brown coat, and white coat.

—from Campbell, 1993

if has 'cc' then NO color.  
if has 'Cc or CC' then YES color

B = black  
b = brown.



What is the expected phenotypic ratio resulting from a cross between a  $bbCc$  female mouse and  $BbCc$  male mouse?

Phenotypic Ratio:  $\frac{3}{3} : \frac{3}{3} : \frac{2}{2}$   
Coat Colour: Black : Brown : White

SHOW YOUR WORK!

	BC	Bc	bC	bc
bC	BbCc	BbCc	bbCc	bbCc
bc	BbCc	BbCc	bbCc	bbCc

6. Yellow coat color in guinea pigs is produced by the homozygous genotype, cream color by the heterozygous genotype, and white by the homozygous genotype.

What genotypic ratio are matings between cream-colored individuals likely to produce? SHOW YOUR WORK!

YY  
CC  
yellow

YW  
CC  
cream

WW  
CC  
white.

	CY	CW
CY	C <sup>y</sup> C <sup>y</sup>	C <sup>y</sup> C <sup>w</sup>
CW	C <sup>y</sup> C <sup>w</sup>	C <sup>w</sup> C <sup>w</sup>

yellow-cream-white  
1-2-1