CLASSICAL GENETICS PRACTICE

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?**

Use the following information to answer the next question.

2.

The coat colour of Labrador retrievers is determined by two alleles. The black allele, *B*, is dominant to the brown allele, *b*. A second pair of alleles, *E* and *e*, affects the expression of the coat colour: the homozygous recessive condition, ***ee***, prevents the expression of black or brown and produces a pup with a yellow coat.

Genotype	Phenotype
B _ E _	Black
bbE _	Brown
_ _ ee	Yellow

If two Labrador retrievers with the genotype *BbEe* were to be crossed, what phenotypic ratio would be expected in their offspring?

Ratio: _____ : _____ : _____
Phenotype: Black Brown Yellow

(Record all **three digits** of your answer in the numerical-response section on the answer sheet.)

3.

In tomato plants, purple stems (*P*) are dominant to green stems (*p*), and red tomatoes (*T*) are dominant to yellow tomatoes (*t*). The two genes are located on separate chromosomes.

A purple-stemmed, red-tomato plant is crossed with a purple-stemmed, yellow-tomato plant. They produce:

28 purple-stemmed, red-tomato plants
31 purple-stemmed, yellow-tomato plants
11 green-stemmed, red-tomato plants
9 green-stemmed, yellow-tomato plants

The genetic composition of the parents is

A. *PpTt* and *PPTT*
B. *PPTt* and *PpTT*
C. *PpTt* and *PpTt*
D. *PpTt* and *Pptt*

4. One of the green-stemmed, red-tomato plants was crossed with another tomato plant. One of the offspring was a purple-stemmed, yellow-tomato plant. If this offspring were crossed with a green-stemmed, yellow-tomato plant, then the possible phenotype or phenotypes of the offspring would be

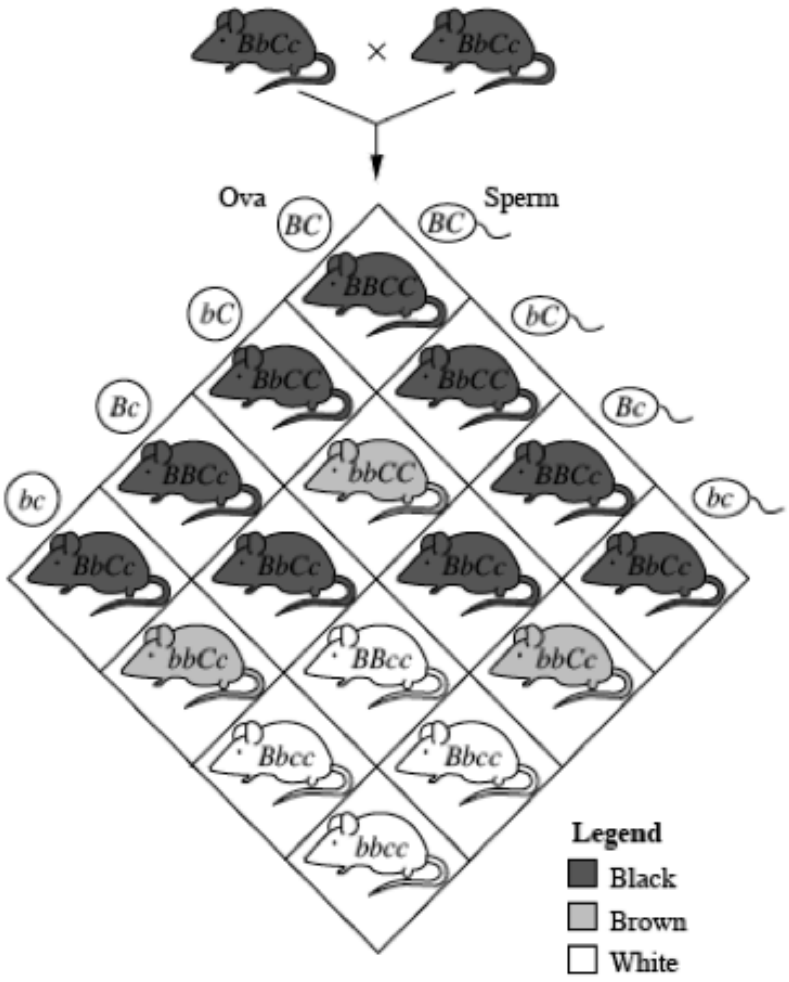
A. green-stemmed, yellow-tomato plants

B. green-stemmed, yellow-tomato plants and purple-stemmed, yellow-tomato plants

C. green-stemmed, yellow-tomato plants; purple-stemmed, yellow-tomato plants; and purple-stemmed, red-tomato plants

D. green-stemmed, yellow-tomato plants; purple-stemmed, yellow-tomato plants; purple-stemmed, red-tomato plants; and green-stemmed, red-tomato plants

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*

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

Phenotypic Ratio: _____ : _____ : _____
Coat Colour: **Black** **Brown** **White**