Problems Involving Dihybrid Inheritance

Dihybrid inheritance involves two genes. For autosomal unlinked genes, the offspring appear in predictable ratios. This activity will allow you to test your understanding of dihybrid inheritance by solving problems involving the inheritance of two genes.

1. In cats, the following alleles are present for coat characteristics: black (B), brown (b), short (L), long (l), tabby (T), blotched tabby (tb). Use the information to complete the dihybrid crosses below:

(a) A black short haired (BBLl) male is crossed with a black long haired (Bbll) female. Determine the genotypic and phenotypic ratios of the offspring:

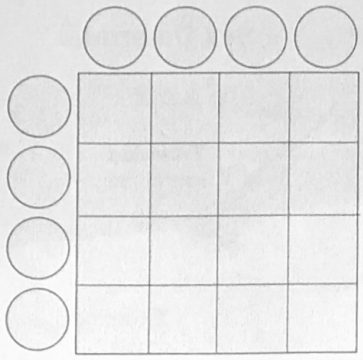
Genotype ratio: _____

_____

Phenotype ratio: _____

_____

_____



(b) A tabby, short haired male (TtbLl) is crossed with a blotched tabby, short haired (tbtbLl) female. Determine ratios of the offspring:

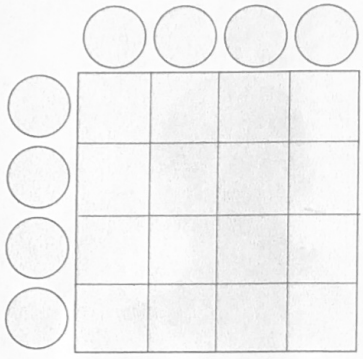
Genotype ratio: _____

_____

Phenotype ratio: _____

_____

_____



2. A plant with orange-striped flowers was cultivated from seeds. The plant was self-pollinated and the F_1 progeny appeared in the following ratios: 89 orange with stripes, 29 yellow with stripes, 32 orange without stripes, 9 yellow without stripes.

(a) Describe the dominance relationships of the alleles responsible for the phenotypes observed: _____

_____

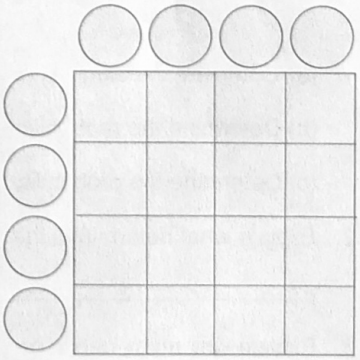
_____

(b) Determine the genotype of the original plant with orange striped flowers: _____

_____

_____

3. In rabbits, spotted coat **S** is dominant to solid color **s,** while for coat color, black **B** is dominant to brown **b**. A brown spotted rabbit is mated with a solid black one and all the offspring are black spotted (the genes are not linked).



(a) State the genotypes:

Parent 1: _____

Parent 2: _____

Offspring: _____

(b) Use the Punnett square to show the outcome of a cross between the F_1 (the F_2):

(c) Using ratios, state the phenotypes of the F_2 generation: _____

_____

_____

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