

## EXTRA CREDIT: PROBLEMS IN GENETICS

DIRECTIONS: Find the answers to the following problems. Use the capital letter of the name of the dominant trait to express this allele, and the lower case of this letter to show the recessive. In the case of incomplete dominance, use the capital letter of each trait or color. Punnett Squares are handy in working these problems. Show all your work on this sheet and record your answers in the spaces provided. Express proportions as fractions. Turn in the completed sheets for a grade.

1. In peas, yellow color is dominant to green. What colors and proportions of offspring would result from a cross between a heterozygous yellow and a homozygous yellow?

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2. In snapdragons, the red (R) flower color is incompletely dominant to white (W) flower color. If a red snapdragon is crossed with a white one, what will be the color of the offspring (F1)?

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3. Two of the offspring (F1) from question 2 were crossed. What would be the genotypes and phenotypes, and in what proportions, of the F2 generation?

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4. Two green-leafed corn plants are crossed and the first generation includes 77 green-leafed plants and 24 albino plants. What are the genotypes of the offspring? What are the genotypes of the parents?

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5. In peas, a phenotypically tall plant crossed with a dwarf one produces offspring of which about one-half are tall and one-half are dwarf. What are the genotypes of the parents? (Tall is dominant.)

6. Peas may be tall or dwarf. For each of the sets of offspring listed below, determine the possible genotypes of the parents.

A. 100% tall

B. 48% tall  
52% dwarf

C. 77% tall  
23% dwarf

7. In peas, tall plants (T) are dominant to dwarf (t) , and yellow color (Y) is dominant to green (y). What would be the genotypes and phenotypes, and in what proportions, of the offspring of this mating: TtYy x TtYy.

Genotypes \_\_\_\_\_

Phenotypes \_\_\_\_\_

8. In petunias, tall (T) is dominant to short (t) and red color (R) is incompletely dominant to white (W). A homozygous tall red petunia is crossed with a short white petunia. What will the offspring (F1) look like?

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9. If two of the  $F_1$  generation from question 8 are crossed, determine the phenotypes and proportions of the  $F_2$  generation.

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10. Tall plants (T) are dominant to short (t) in peas; yellow color (Y) is dominant to green (y); and smooth seed (S) is dominant to wrinkled (s). What would be the phenotypes and proportions of offspring of this mating:  $TtYySs \times ttYySs$ ? (Be sure each gamete has one of each pair of genes.)

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