

Genetics Assignment

Part A: Single Trait Inheritance

1. For each genotype below, indicate whether it is a heterozygous (He) OR homozygous (Ho)

TT _____ Bb _____ DD _____ Ff _____ tt _____ dd _____
 Dd _____ ff _____ Tt _____ bb _____ BB _____ FF _____

2. Determine the phenotype for each genotype using the information provided for tulips
Yellow tulip flowers are dominant to Red

YY _____ Yy _____ yy _____

Round is dominant to Square

RR _____ Rr _____ rr _____

3. For each phenotype, give the genotypes that are possible for crocus flowers

Tall is dominant to short

Tall = _____ Short = _____

Purple colour is dominant to Pink

Purple = _____ Pink = _____

4. A heterozygous Yellow tulip cross pollinates with a Red tulip. Create a Punnett square to show the possibilities that would result in the new tulips

- List the possible genotypes and phenotypes for the new tulips
- What are the chances of a new tulip with Yellow flowers?
- What are the chances of a new tulip with Red flowers?

5. Two crocuses are cross pollinated. Both plants are heterozygous for their Purple colour. Create a Punnett square to show the possibilities that would result in new crocuses

- List the possible genotypes and phenotypes for the new crocus
- What are the chances of a new crocus with purple flowers?
- What are the chances of a new crocus with pink flowers?

6. A farmer has pea plants that give green peas which is the dominant colour. The farmer claims that his plants are all "purebred". Recently a neighbor starting planting peas that give yellow peas, which is a recessive trait. Create a punnett square to show the possibilities that would result if the two types of pea plants cross pollinated. Use G to show the dominant green colour.

- List the possible genotypes and phenotypes for the new peas
- What are the chances of a new plant with green peas?
- What are the chances of a new plant with yellow peas?
- Would the new plants still be considered purebred? Explain

7. Assume that two of the new pea plants, both heterozygous, cross pollinated. Create a punnett square to show the possibilities that would result.

- List the possible genotypes and phenotypes for the new peas
- What are the chances of a new plant with green peas?
- What are the chances of a new plant with yellow peas?

8. Mr. Krabbs and his wife recently had a Lil' Krabby, but it has not been a happy occasion for them. Mrs. Krabbs has been upset since she first saw her new baby who had short eyeballs. She claims that the hospital goofed and mixed up her baby with someone else's baby. Mr. Krabbs is homozygous for his tall eyeballs, while his wife is heterozygous for her tall eyeballs. Some members of her family have short eyes, which is the recessive trait. Create a Punnett square using T for the dominant gene and t for the recessive one.

- a. List the possible genotypes and phenotypes for their children
- b. Did the hospital make a mistake? Explain your answer

Part B: Sex-Linked Traits

Use these genotypic symbols for the sex linked trait of red-green colour blindness in humans to solve the problems that follow. Show your work

"Normal" Female	$X^E X^E$
Carrier female	$X^E X^e$
Colour-blind Female	$X^e X^e$
"Normal" male	$X^E Y$
Colour-blind male	$X^e Y$

1. A normal female marries a colour blind male (*Show your work below*)
- a. What are the chances that the offspring will be colour blind if they are females? _____
- b. What are the chances that the offspring will be colour blind if they are males? _____

2. A colour-blind female marries a normal male. (*Show your work below*)
- a. How many of the female offspring will be carriers of the colour-blind gene? _____

3. A carrier female marries a normal male. (*Show your work below*)
- a. How many of the male offspring can be expected to be colour-blind? _____
- b. How many of the male offspring can be expected to have normal vision? _____
- c. How many of the female offspring can be expected to be carriers? _____
- d. How many of the female offspring can be expected to be normal? _____

4. A man whose mother is colour blind marries a woman with normal vision. (*Show your work below*)
- a. What is the genotype of the husband? _____
- b. What percent of their offspring can be expected to be colour-blind? _____
- c. What percent of the male offspring can be expected to be colour-blind? _____
- d. What percentage of their offspring can be expected to be carriers? _____

5. A normal man marries a woman whose mother is a known carrier of a sex-linked recessive lethal gene on the X chromosome. This gene results in the slow degenerative death of all male infants within the first year. (*Show your work below*)
- a. What are the chances of this couple having a normal offspring? _____
- b. What are the chances of this couple having a normal male offspring? _____