

Biology 40S

Relating crosses to Mendelian Laws

Assignment 3

Name: _____

Partner: _____

Partner: _____

Instructions:

With a partner or in a group of 3, randomly find 2 pairs of homologous chromosomes from the somatic cell.

Use the 2 pairs of homologous chromosomes, you are to:

1st – Law of Segregation

- Describe with Mendel's observations, what **Law of Segregation** is with your homologous chromosomes. You need to **include** meiosis but **do not** need to describe every stage of meiosis.
- You may use a 'step by step' storyline, comic, diagrams, etc... to showcase your understanding.

2nd – Law of Independent assortment

- By using the 2 pairs of homologous chromosomes, describe and relate what the **Law of Independent Assortment is** and how that leads to a **dihybrid cross** Punnett Square setup.
- Again, you may use a 'step by step' storyline approach similar to the one done in class.

3rd - Dihybrid Cross questions:

Complete the following 2 questions for submission

1. In grasshoppers, the body color of **brown** is **dominant** over **green**. Also, having **strong** legs is **dominant** over having **weak legs**. A **heterozygous brown, homozygous strong-legged male** meets a **heterozygous brown, homozygous weak legged female**.

They produce a number of offspring. Complete the following.

Possible genotypes for brown body color: _____ Green body color: _____

Possible genotypes for strong legs: _____ Weak legs: _____

Male Genotype: _____ Male possible genotypes gametes: _____

Female Genotype: _____ Female possible genotypes gametes: _____

Setup the Punnett Square and determine the **Phenotypic** and **Genotypic** Ratio

What percentage of the offspring will exhibit both dominant traits : _____

What percentage of the offspring will have a brown body and weak legs: _____

2. The chestnut coat color of horses is due to a recessive gene, while the dominant allele results in black. The pacing gait is due to a recessive gene, whereas the dominant allele results in the trotting gait.

Show the types of offspring that could result from a cross of a black trotter (male), heterozygous for both genes, with a chestnut pacer (female).

Possible genotypes for Black coat: _____ Chestnut coat: _____
Possible genotypes for Trotting gait: _____ Pacing gait: _____

Male Genotype: _____ Male possible genotypes gametes: _____

Female Genotype: _____ Female possible genotypes gametes: _____

Setup the Punnett Square and determine the **Phenotypic** and **Genotypic** Ratio

What percentage of the offspring will exhibit both dominant traits : _____

What percentage of the offspring will be chestnut trotters: _____