

Name: _____ Date Completed: _____
Class: _____ Lab Minutes: _____ Teacher: _____

Monohybrid Crosses and Some Modes of Inheritance

Note: This lab has been modified from an excellent lab created by Troy High School. All credit is given to them for the original creation of this activity.

Introduction:

Scientists use a grid-like tool (Punnett Square) to make predictions about various genetic problems. The Punnett Square shows only the probability of what might occur and not the actual results. Probability is the chance of something occurring. If one wants to flip a coin 100 times, since there are 2 sides to the coin, he would expect 50 heads and 50 tails. If he flips the coin 100 times, he may actually get 60 heads and 40 tails. Prediction is one thing, and actually getting the predicted results is another. The Punnett square only shows the chances of what might occur each time the event is undertaken.

Objective:

In this investigation you will use a Punnett square to predict the possible genotypes and phenotypes and their ratios from a monohybrid cross.

Materials:

index cards
writing implement to label the index cards

Procedure:

1. Each group of 3 students will be given a male parent and a female parent as represented by the envelopes. Each envelope will contain four alleles labeled **G** and four alleles labeled **g**, Hence each will be representing a hybrid **Gg** parent.
2. One student in the group will be in charge of the male envelope, the second student will be in charge of the female envelope, and the third student will be the data keeper.
3. The students should randomly shuffle their cards representing these alleles in each individual envelope.
4. Now, each of the students controlling the envelope of gametes, will reach into their envelope and pull out one of the cards representing an allele for a trait.. The only possibilities that can be made from this selection are: **GG**, **Gg**, or **gg**. **GG** is homozygous green, **Gg** is heterozygous green, and **gg** is homozygous yellow. The third student will mark the resulting combination in the data sheet at the bottom of the page.

5. Return the alleles to the envelope and conduct the same process 29 more times.

Data Table

Trial	Offspring's Genotype	Offspring's Phenotype
1		
2		
3		
4		
5		
6		
7		
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29		
30		

Summary:

1. What is the dominant trait? _____.
2. How do we know it is dominant? _____
3. Which one is the recessive trait? _____.
4. What is the genotype of the parents? _____
5. What is the phenotype of the parents? _____
6. Fill in the Punnett square below using the parents given in the procedure.

(Male) _____ X (Female) _____

7. What is the genotypic ratio? _____.
8. What is the phenotypic ratio? _____.

Additional Questions

9. What is Mendel's Law of Segregation and Recombination? How does it relate to this experiment?
10. How many allele(s) are inherited from each parent when an individual inherits a genetic trait?
- 11/12. Based on the results of this experiment, how could an individual inherit a genetic disorder when neither parent has the disorder. Explain fully in writing or by use of a Punnett square.
13. Show in a Punnett square how a cross between a male and a female determines the gender of the offspring formed.

14/15. This lab involved Mendel's Law of Dominance, but there are many other modes of inheritance. Explain what is meant by

a.) incomplete dominance and list an example of this

b.) codominance and list an example of this