

Integrated Science II

Monohybrid Crosses and the Punnett Square

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, they would expect 50 heads and 50 tails. If they flip the coin 100 times, they 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:

-Pinto beans -White beans - 2 small paper bags (one labeled male and one labeled female)

Procedure:

1. Each lab group will have 2 bags, each filled with 15 Pinto (**B**) beans and 15 white (**b**) beans. This represents 2 heterozygous parents Bb x Bb.
2. One student in the group will be in charge of the male bag, the second student will be in charge of the female bag, and the third student will be the data keeper.
3. At the same time, each of the students controlling the bag of gametes, will reach into their bag and pull out one of the beans. The only possibilities that can be made from these selections are: BB, Bb, or bb. BB is homozygous brown, Bb is heterozygous brown, and bb is homozygous white. Each team will mark the resulting combination in the data table below.
4. Return the beans back into the bag from which they came and conduct the same process 29 more times.

Data Table

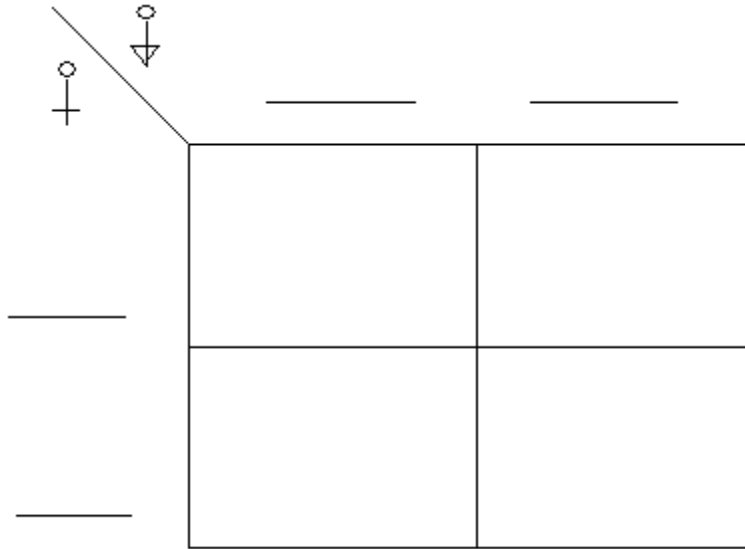
Trial	Offspring's Genotype	Offspring's Phenotype	Trial	Offspring's Genotype	Offspring's Phenotype
1			16		
2			17		
3			18		
4			19		
5			20		
6			21		
7			22		
8			23		
9			24		
10			25		
11			26		
12			27		
13			28		
14			29		
15			30		

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Summary:

1. What is the dominant trait?
2. How do we know it is dominant?
3. Which one is the recessive trait?
4. What are the genotypes of the parents?
5. What are the phenotypes 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?