A monohybrid cross is performed by breeding two individuals that differ in a particular trait being studied. While Gregor Mendel never used this term, he did in fact perform monohybrid crosses. In this lab, you will repeat Mendel's monohybrid cross experiment using a model system of randomly selecting two paper clips from a set of four, and then analyze your results.

Suggested Materials

- 2 silver paper clips and 2 white paper clips

Procedure for F1 generation

1.) If you place two silver paper clips in a bag and pull one out you will get a _____ paper clip.
2.) If you place two white paper clips in a bag and pull one out you will get a _____ paper clip.

Let S be silver and s be white, complete the Punnett Square below showing the possible combinations.

Parent 1 ➡ Parent 2 ⬇	S	S
s		
s		

The white squares are the Parent generation (P), their genotypes are _____ X _____

The gray squares are the F_1 generation, what is their genotype? _____

What was the phenotype of all the F_1 generation the cross above? _____

3.) Next, we will **cross two individuals from the F_1 generation** you and your partner will close your eyes and randomly draw two paper clips out of a bag that has two silver (S) and two white (s) paper clips in it. Record your results (using a tally 𝍸). **Repeat this 10 times.**

My F_1 generation offspring are my F_2 generation Parents, their genotypes are _____ X _____

Results of Crosses

	2 Silver (SS) Flower Colour Silver				2 White (ss) Flower Colour White				1 Silver/1 White (Ss) Flower Colour Silver			
F_1									IIII (4)			
F_2												
F_2 (class)												
TOTAL												

Complete the Punnett Square for the F_2 generation below

What is the theoretical genotypic ratio above? _____

What is the theoretical phenotypic ratio above? _____

Calculate using your data

What is your genotypic ratio? _____

What is your phenotypic ratio? _____

Calculate using class data

What is the class data genotypic ratio? _____

What is the class data phenotypic ratio? _____

Was the class data closer to the theoretical data ratios? Why?

_____

_____

The table below shows the results of some of Mendel's monohybrid crosses.

Trait	Homozygous Dominant Form	Homozygous Recessive Form	F_1 Offspring (from cross between true-breeding plants)	F_2 Offspring (from cross between F_1 plants)
flower colour	purple	white	all purple	705 purple 224 white
seed colour	yellow	green	all yellow	6022 yellow 2001 green
seed shape	round	wrinkled	all round	5474 round 1850 wrinkled
pod colour	green	yellow	all green	428 green 152 yellow

Calculate the phenotypic ratio of the F_2 generation that resulted from each F_1 cross. Are all of the ratios exactly 3:1? If they are not, why did this occur? **Remember we want the one of the right to be 1 so we divide by that number on both sides**

F_2 offspring phenotypic ratios	Flower Colour	Seed Colour	Seed Shape	Pod Colour

_____

_____

Were they close? _____