AP Biology
Hardy-Weinberg Equilibrium **Name:** _____

In this lab you will test the Hardy -Weinberg Equations by predicting the Phenotype of a population based on the Genotype of that population.

From the box of Teddy Grahams randomly select 20 bears and place them in a cup. Record the number of Happy Bears (arms up) to Sad Bears (arms down)

Happy = _____ **Sad =** _____

In this population of bears being Happy is a dominant trait and being Sad is recessive.

In Hardy-Weinberg $\mathbf{p + q = 1}$ so if your entire gene pool consists of 20 alleles (bears) calculate the gene frequency of each allele in the gene pool.

Happy / 20 = _____ **p = Dom** Sad / **20 =** _____**q = Rec**

Each individual in the population inherits two bears for each trait.

Using these numbers you can now calculate the expected Phenotype ratio of Happy or Sad expected in your population using the Hardy-Weinberg equation.

$$\mathbf{p^2 + 2pq + q^2 = 1}$$

_____ + _____ + _____ = 1

Total percentage of Happy Bears is _____**%**

Total percentage of Sad Bears is _____**%**

Percent of Homozygous Recessive Bears _____**%**

Percent of Homozygous Dominant Bears _____**%**

Percent of Heterozygous Dominant Bears _____**%**

Now you are going to test your results to see how accurate Hardy-Weinberg is.

With all the bears in the cup randomly select two bears at a time and record the result. You will be getting two: Happy bears **HH**, a Happy and a Sad **HS** or two Sad bears **SS.**

Return the bears back into the gene pool (the cup) after each selection.

Do three trials of ten each and record your result in the table:

Trail 1			**Trial 2**			**Trial 3**	

Analysis -

Genotype ratios:

Total number of HH _____ **Percent of HH** _____

Total number of HS _____ **Percent of HS** _____

Total number of SS _____ **Percent of SS** _____

Phenotype ratios:

Total number of Happy Bears _____ **Percent of Happy Bears** _____

Total number of Sad Bears _____ **Percent of Sad Bears** _____

1. So how close were your results to what the Hardy-Weinberg Equation predicted?

2. If the percents didn't match, what may be the source of the error?

3. For a population to remain in Hardy-Weinberg equilibrium what are the five requirements?

a.

b.

c.

d.

e.

4. Did your population fulfill all these requirements, if not how?

5. How does the Hardy-Weinberg Equation help to prove the Theory of Evolution?

Make a bar graph showing the total distribution of allelic pairs.