Hardy Weinberg Problem Set

***1. If 98 out of 200 individuals in a population express the recessive phenotype, what percent of the population would you predict would be heterozygotes?***

(a) I have given you information on the frequency of the homozygous recessive (or q*2*). So start by determining q*2* and then solving for q.

(b) Now that you have q, you can solve for p. Remember there are only two alleles in the population, so if you add the frequency of the two alleles, you have accounted for all possibilities and it must equal 1. So p + q = 1.

(c) Now what is the formula for heterozygotes? Think back to the Hardy-Weinberg equation -- it is dealing with the genotypes of individuals in the population.

(d) Now that you have figured out the % of heterozygotes, can you figure out the % of homozygous dominant? Does the % of homozygous dominant, heterozygotes and homozygous recessive individuals add up to 100%? If not, you have made an error. Those are the only three genotypes possible with only two alleles and a simple dominant and recessive relationship.

***2. Your original population of 200 was hit by a tidal wave and 100 organisms were wiped out, leaving 36 homozygous recessive out of the 100 survivors. If we assume that all individuals were equally likely to be wiped out, how did the tidal wave affect the predicted frequencies of the alleles in the population?***

Again, start with the frequency you know -- homozygous recessive. Follow the same step-by-step procedure as above.

What is the frequency of homozygous recessive?

What is the predicted frequency of heterozygotes?

What is the predicted frequency of homozygous dominant?

NOTE -- I am not necessarily asking the questions in the order in which you should answer them, given the step-by-step approach.

***3. Lets say that brown fur coloring is dominant to gray fur coloring in mice. If you have 168 brown mice in a population of 200 mice........***

What is the predicted frequency of heterozygotes?

What is the predicted frequency of homozygous dominant?

What is the predicted frequency of homozygous recessive?

4. ***If 81% of a population is homozygous recessive for a given trait..........***

What is the predicted frequency of homozygous dominant?

What is the predicted frequency of heterozygotes?

What is the frequency of the dominant and recessive alleles in the population?