Genetic Drift and Mutations

Genetic Drift- Change in allele frequencies in a population from one generation to the next due to probability. Chance events lead to some alleles being passed on and some not. In other words, genetic drift is the random passing (or not) of alleles to the next generation. Genetic drift isn't like natural selection, it doesn't select for anything, and it doesn't favor adaptations. The alleles that can get passed on can be good OR bad.

Mutation- Change in genetic make-up of an organism. It can be positive or negative. It can be dramatic (an organism born without an arm, eye, etc) or subtle (something small that isn't very noticeable. Some mutations are non-inherited and just happen by chance, like cancer. Others are inherited mutations that get passed on to offspring. It is the *inherited* mutations that lead to variation in a population.

How do genetic drift and mutations relate to evolution?

Mutations and genetic drift increase the variation of alleles, genes and thus, characteristics within a population. Remember, natural selection needs variation or else it won't work. It needs variation among a species to select between different versions of a trait (for example blue fur or brown fur). Without variation, everyone and everything would be the same.

Variation is just a variety. Just like you can have a variety of different hair, eye or skin colors you can also have different lengths of legs (which allow animals to hunt or run better depending on their environments) and different sizes of leaves in plants (to catch sunlight better), variation is endless. Remember also, *adaptations* are favored variations.

Activity

http://darwin.eeb.uconn.edu/simulations/jdk1.0/drift.html
Go to the website above, if it doesn't work, go to the bottom of the page and click "try this one". We are going to simulate genetic drift. The handout, if you don't have it, can also be found on Mr. Bregar's webpage.

A little bit about the program;

- P=allele frequency it goes 0-1 (0=0% and 100=100%, therefore 0.1=10%, etc). The allele frequency represents the percent of the population that has the allele you're observing (remember alleles are A and a)
- So if you're looking at one allele (say dominant) and the frequency of this allele is 0.3 (or 30%), the frequency of your other allele (the recessive) would be 0.7 (or 70%) because your allele frequencies need to add up to 1 (or 100%).
- N=population size. The larger the population, the chances are the more offspring are going to be produced.
- Generation= the number of generations the simulation will run through (one generation is mom and dad, generation 2 is their babies, generation 3 is the baby's babies, etc)
- If you set them and hit start, a trend line will appear on your graph. If you hit clear, it will go away. You can keep up to 8 trend lines on your graph before you have to clear it.
- If your line is going up, that means p is increasing, which means the frequency of the allele you're looking at is increasing as well.