

POPULATION GENETICS: A QUICK OVERVIEW!

INTRODUCTION: Complete the following questions using the website:

http://phschool.com/science/biology_place/labbench/lab8/intro.html

Once you have navigated to the website, go through the screens by clicking the “next” button. Please note that you may have to view some of the provided animations to answer the questions.

1. What are the 5 conditions that must be met in order for a population to stay at Hardy-Weinberg equilibrium?
2. Why would nature prefer a large breeding population over a smaller one?
3. What is the difference between random mating and assortative mating? Which would nature prefer?
4. Why does nature like mutations?
5. How does natural selection play a role in equilibrium?
6. To answer the question about the pigs and black coats: Why can we not tell the frequency of the black coat allele?
7. What is the equation for Hardy-Weinberg? What does p stand for? What does q stand for?
8. What is the difference between allele frequency and genotypic frequency?
9. Solve the following problem: In a certain population of 1000 fruit flies, 320 have sepia eyes while the remainder have red eyes. The sepia eye trait is recessive to red eyes. How many individuals would you expect to be homozygous for red eye color?

Problem: 1 in 1700 US Caucasian newborns have cystic fibrosis. C for normal is dominant over c for cystic fibrosis.

1. When counting the phenotypes in a population why is cc the most significant?
2. What percent of the above population have cystic fibrosis (cc or q^2)?

Problem 2: If 9% of an African population is born with a severe form of sickle-cell anemia (ss), what percentage of the population will be more resistant to malaria because they are heterozygous (Ss) for the sickle-cell gene?