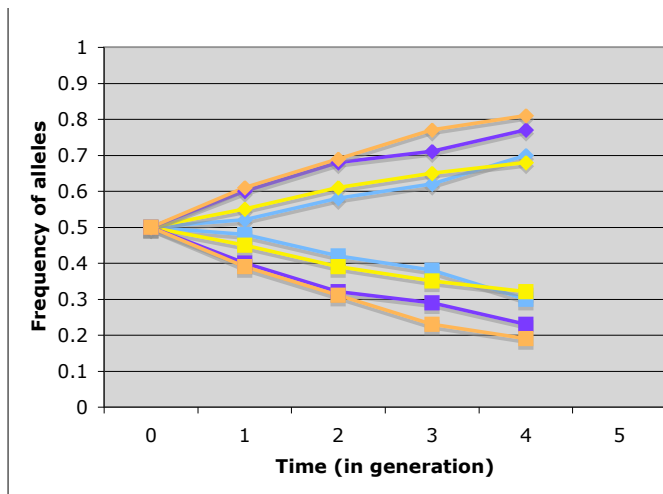


3. Explain how the biogeography provides evidence for evolution (1pt).

Organisms found in close geographic proximity show a greater degree of similarities with each other than they do with more distant though similar organisms. The similarities between organisms in close proximity suggest that the organisms shared a common ancestor and a more recent common ancestor than organisms from more distant locations. Species which have split off and diverged from a parent species are likely not to have traveled great distances, therefore, there should be a similarity seen among the organisms in close geographic space.

4. The two graphs below represent changes in allele frequencies due to two different agents of evolutionary change. Write under each graph which the agent of evolutionary change that is depicted. **Explain your reasoning** for choosing the mechanism of evolutionary change that you did. (4pts)

Note: the squares represent the frequency of the dominant allele and the triangles represent the frequency of the recessive alleles. The graphs are showing multiple "runs" the same type of evolutionary mechanism for each graph.

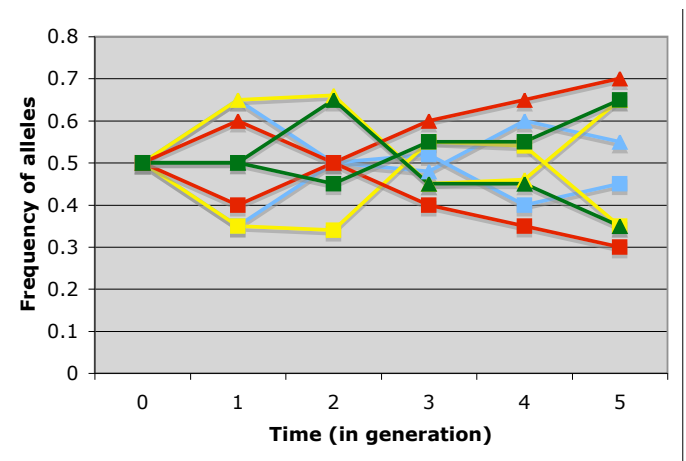


Mechanism of microevolution:

NATURAL SELECTION

Reasoning:

The graph shows a change in the allele frequencies over time. There is an increase in the frequency of the recessive alleles with a corresponding decrease in the dominant allele. There consistency of the multiple run suggestion strong selection against the dominant allele, such that individuals carrying the dominant allele (homozygous dominant and heterozygous individuals) have been selected against.



Mechanism of microevolution:

Genetic Drift

Reasoning:

The allele frequencies are changing in in different directions in the different runs. In some cases the dominant allele goes up and the comes down and in others the dominant allele steadily decreases in frequency. The differences suggest a randomness in the changes in allele frequencies. Gene flow could only account for the differences if there was a different rate of gene flow in the different runs. Mutations would introduce a new allele or repeated mutations of the allele from dominant to recessive and vice versa would have to occur.

5. Doctors impress upon their patients to complete the entire course of their antibiotics. Given what you know about evolution, why is not completing the antibiotics problematic and potentially a very dangerous practice? **Explain using the concepts of evolutionary theory, think about what the antibiotics are doing in terms of evolutionary terms!** (4pts)

Antibiotics are taken to kill off the bacteria causing an illness. When a patient first takes the antibiotics, the bacteria that are killed initially are the least resistant to the drugs. As the drugs are continued, more and more bacteria are killed off. By taking the entire prescription of antibiotics, the goal is to completely get rid of the bacteria in the person's system.

If you DO NOT complete the antibiotics, and there are remaining bacteria, the ones that are remaining are the most resistant to the antibiotic. So you have SELECTED for the resistant bacteria. The bacteria will replicate and pass down the resistance to their offspring and as the bacteria gains hold again as it increases in number, the illness will be harder to fight with the drugs, since it is the drug-resistant bacteria that have survived and reproduced. In addition to being problematic for the patient, the bacteria can be spread to other individuals, so resistant bacteria would be spread and infections would be harder to control with the available antibiotics.