

Course work on genetics exercise

[Science](#), [Genetics](#)



Genetics Exercise

Directional selection entails natural selection favoring one phenotype causing its allele frequency to shift in one direction. The constant increase in frequency of the favored allele is independent of its dominance compared to other alleles; thus, even recessive alleles can ultimately become fixed. For instance, environment pressures and changes of diet affect the size (depth) of beaks of a population of cardinals in the subsequent generations. During the rainy spells, there is a huge supply of small seeds as compared to large seeds; therefore, the cardinals seldom ate large seeds and their beaks become shorter. Throughout the dry spells, neither the small seeds nor large seeds are in large supply, but the cardinals eat more large seeds; their beaks become longer. This variation in the diet of the birds affects the depth of the cardinals' beaks in the future generations.

Disruptive selection describes the alteration in the genetics of the population where by the extreme attributes of a trait are favored over an intermediate attribute. If there is a population of hares whose fur color is determined by two moderately dominant traits: White fur represented by " W" and black fur represented by " w". A hare having the genotype of " WW" would attain a phenotype of white fur; a genotype of " Ww" would have grey fur (both white and black) while a genotype of " ww" would have a phenotype of black fur. If a population of the hares inhabits an environment with very white colored stone as well as very black rocks, the hares with white fur would be easily concealed from predators amid the white rocks and the black furred hares would be easily hidden in the black rocks. However, the grey furred hares would be highly conspicuous in both of the environments and would be

preyed on greatly. As a result of the selective force of their environment, the hare population would be disruptively selected for intense attributes of the fur color trait: either white or black, but not grey.

Stabilizing selection is a natural selection mode where by genetic diversity declines as the population stabilizes on a certain trait value. For instance, in calf birth weight; calves delivered with low-body weight lose body heat more rapidly and suffer from infectious illnesses more easily. On the other hand, calves with high-body weight are more difficult to calve via the pelvis, and usually pose grave complications during birth.

Genetic drift is a mode of evolution that takes place by random chance instead of natural selection. For example, if there are there are fifty red guinea pigs and fifty white guinea pigs in a population, and a geneticist randomly selects ten guinea pigs of each color to monitor. Suppose two red guinea pigs and seven white guinea pigs are left in the environment after a tree catastrophe and disease kill the other eleven worms; as the guinea pigs reproduce, less red guinea pigs will appear until finally there are no red guinea pigs left. All the future generations of guinea pigs will be red. This is genetic drift and stops when one allele replaces another totally or one allele dies off.

Gene flow refers to the transfer of gene alleles from one population to another of the same species. If certain species of plants is cultivated on both sides of a main road, pollen grains will be transported from and to the two sides of the road. If the transported pollen grains fertilize the plants and make a viable progeny, then the alleles in the pollen have successfully been able to move from the plants on one side of the road to the other.

Speciation is the progression by which new biological species arise due to evolution. Fruit flies when fed on different meals can undergo speciation. Initially, if a single species of fruit flies is separated into two groups, one is fed on maltose based food, and the other on starch based food, several generations later, the two will develop into two distinct species that will not interbreed between themselves.

Social Darwinism is the hypothesis of natural selection model to political, societal, and economic matters. It is based on the mantra of only the strongest and/or fittest survive. A classic example is that, in class, one has to put lots of effort in his/her studies to enable him/her to perform well and pass the exams. Excellence in education means one can secure a good job after, have better living standards and be able to comfortably bring up a family. Besides they will become role models to the children. Failure to work hard in studies mean that life will be hard in future and with lots of difficulties dealing with life.