

Variation and Natural Selection Lab

Objective

- To study how variation within a species is the basis for natural selection

Process Skills

- Measuring, collecting and analyzing data, inferring

Materials

- Metric ruler, graph paper, humans

Background

How much variation in genetic expression is there within a population? Clasp your hands together so that your fingers interlock. Is your left or right thumb on top? The trait of having either the left or right thumb on top is like left- or right-handedness. Both traits are genetically determined characteristics that occur naturally within the human population and are passed on to children by parents. You are in the majority if your left thumb falls on top.

Many variable traits can be identified within a population, and sometimes these variations, which are mutations, seem to have no apparent survival advantage or disadvantage. It is possible that a mutation occurs infrequently may eventually prove to be beneficial in response to an environmental change. In this case, the few members of the population that have the new characteristic are more likely to survive and to reproduce thus passing the gene on to future generations. Eventually, a previously uncommon variation a population might become the standard.

1. Variation has been described as "the raw material of natural selection." What is variation?
2. What determines an individual's phenotype?
3. How might a mutation of a genotype prove beneficial to a species?
4. Explain why it is advantageous for a species to show variation among individuals.

Inquiry

1. Measure the height of the person, length of index finger, and ear lobe length.
2. Make a bar graph using the your data from step 1. What should you label the vertical axis? The horizontal axis? Which is the independent variable? the dependent variable?
3. Combine the class data and graph them in a separate bar graph. Describe any differences between your data and the class data. How can you account for these differences?

Questions:

1. What are the ranges of the values for the traits?
2. What are the means of the values for the traits?
3. What are the modes of the values for the traits?
4. How do the modes and means compare for the traits?
5. What is the standard deviation?
6. What is the advantage of having longer ear lobes (taller, larger finger) than others?
7. What is the disadvantage of having longer ear lobes (taller, larger finger) than others?
8. Does variation exist in this data?