

# 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.

## Inquiry

1. Measure the height of the person, length of index finger, and ear lobe length and record your data for each partner.
2. Create another chart of the class data to show the number of students that fall under each measurement. There will be 3 separate charts for the 3 body measurements.
3. Make 3 line graphs using your data from step 2. What data is the independent variable? the dependent variable? Label the x-axis with the independent variable and the y-axis with the dependent variable. Give the graph an appropriate title and include units of measurement.

## Questions:

1. What are the mean values for each trait?
2. What are some advantages of having longer/shorter ear lobes (taller, larger finger) than others? Create a scenario that explains your answer.
3. What are some disadvantages of having longer/shorter ear lobes (taller, larger finger) than others? Create a scenario that explains your answer.
4. Variation has been described as "the raw material of natural selection." What is variation?
5. Does variation exist in this data?
6. What determines an individual's phenotype?
7. How might a mutation of a genotype prove beneficial to a species?
8. Explain why it is advantageous for a species to show variation among individuals.
9. How does variation relate to natural selection?