

## **Knowledge-based Learning Outcomes**

Upon completion of *Darwinian Snails*, students should be able to:

1. Describe the three conditions necessary (variation, heritability, and differential survival) for evolution by natural selection.
2. Distinguish between change in the allele frequencies for a trait in an individual and change in allele frequencies for a trait in a population (evolution).
3. Understand that in the absence of natural selection, evolution can still occur through random chance changing the allele frequencies of a trait in a population.
4. Explain how genetic mutation creates a source of variation within a population.

Students should also reduce their expression of the following misconceptions:

1. Populations change traits because they need to.
2. Changes in a population occur through gradual change in all members of a population.
3. The environment directly causes change and/or mutation.
4. Mutations are intentional adaptive responses.
5. Offspring only inherit traits that are beneficial.
6. Acquired characteristics are inheritable.

## **Skills-based Learning Outcomes**

Upon completion of *Darwinian Snails*, students should be able to:

1. Predict how the violation of any of the three requirements of evolution by natural selection will affect a population's ability to evolve by natural selection.
2. Support a claim that a population evolved by natural selection using both observational and experimental data.