Introduction to Evolution

Biology

Objectives

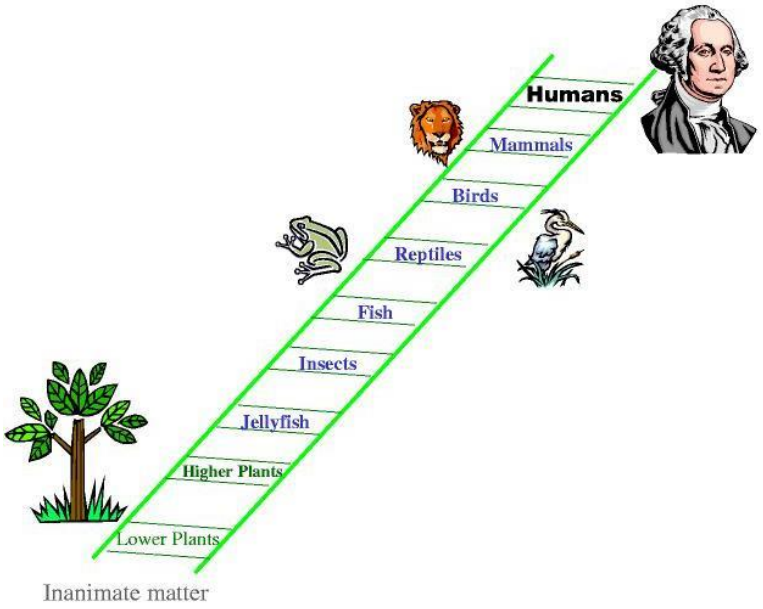
- Students will know the definition of biological evolution
- Students will understand the complexity of the diversity of life
- Students will be able to describe some examples of evolution and explain how they illustrate basic evolutionary concepts

Biological Evolution

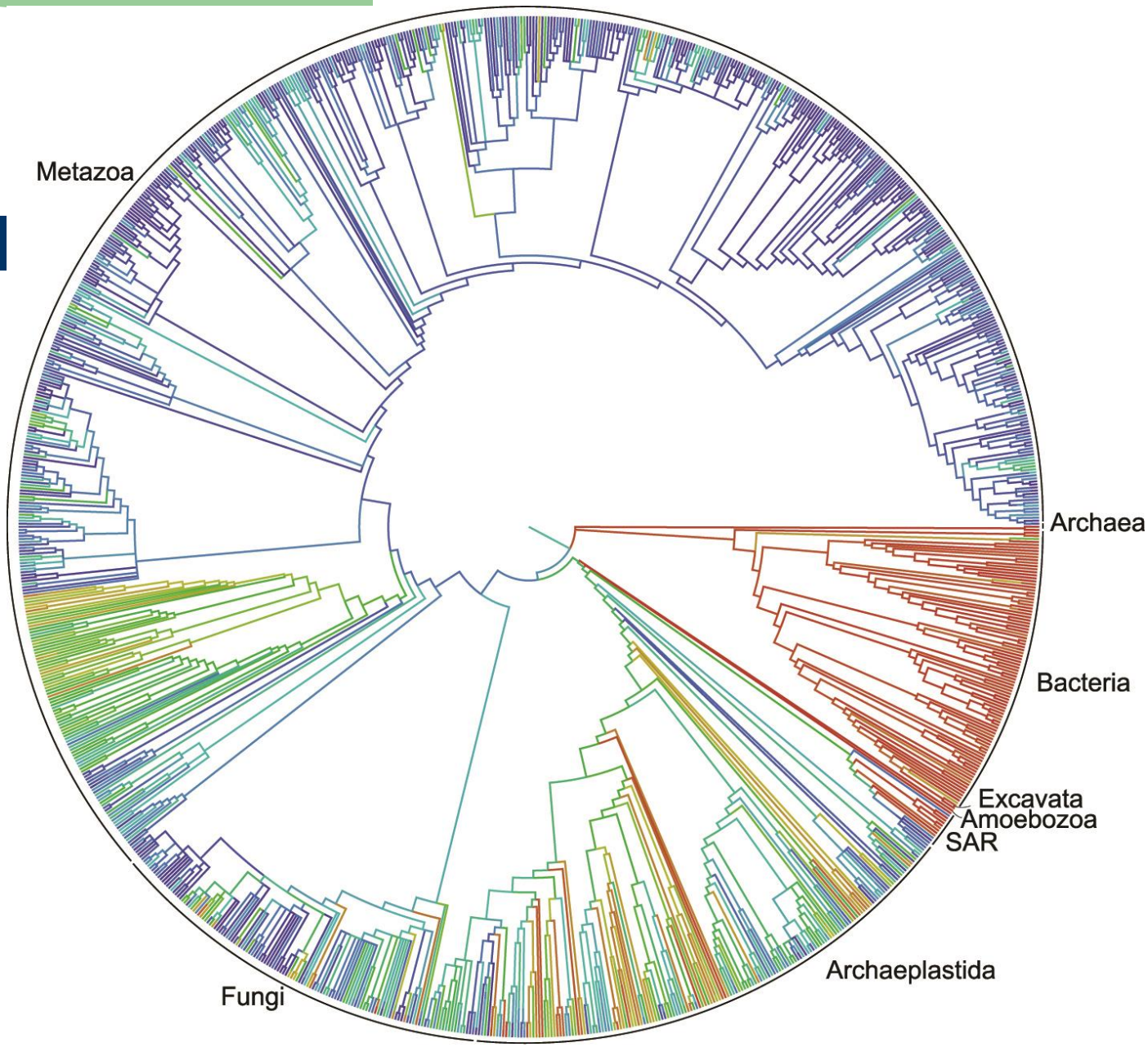
- A change in the alleles present in a population of organisms over time
- Evolution is SPECIFIC to changes in the genetic makeup of a population
- Evolution can occur without a new species occurring – and can in fact occur without any visible changes at all

The Tree of Life

- People used to imagine that the diversity of living organisms was like a ladder, with humans at the top
- Now we know that organisms have evolved much like a tree or shrub with multiple branches

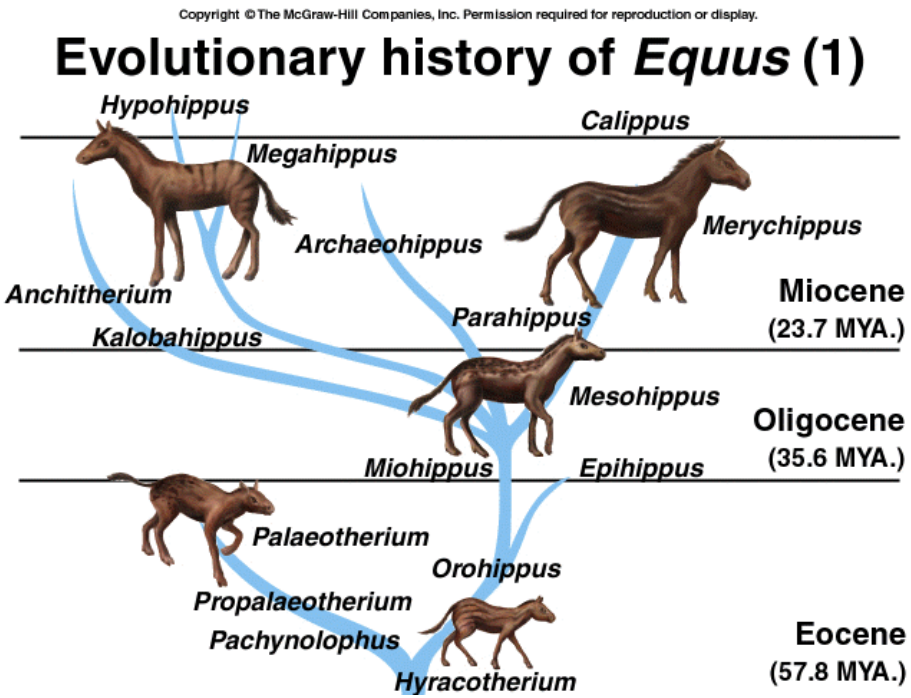


The Tree of Life, Continued



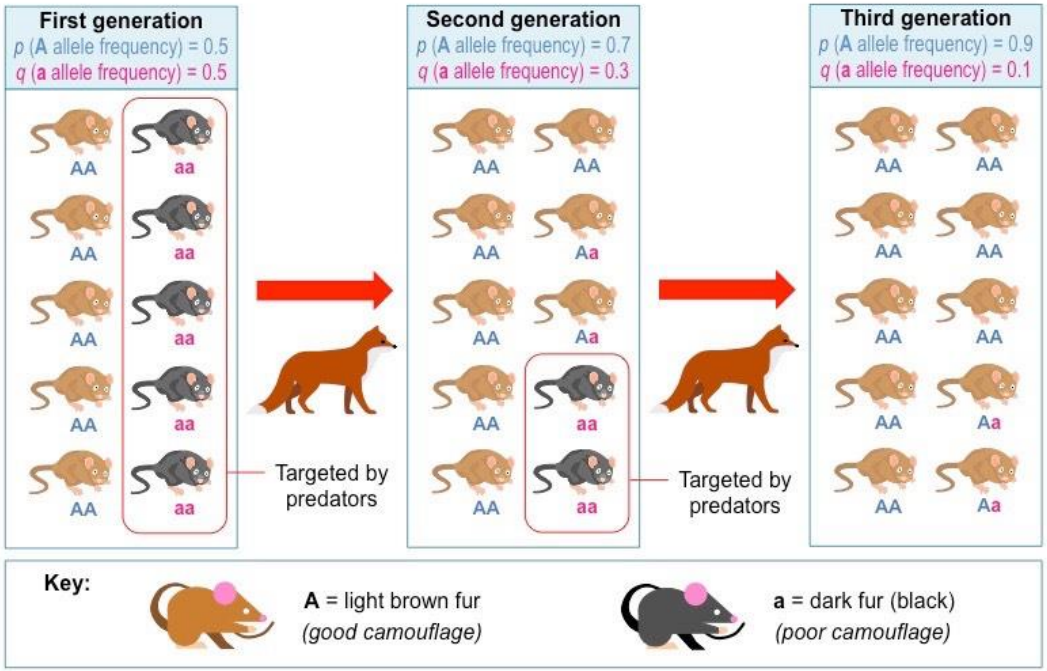
General Mechanism of Evolution

- Organisms inherit genes (and their resulting traits) from their parents
- This is called "Descent with Modification"

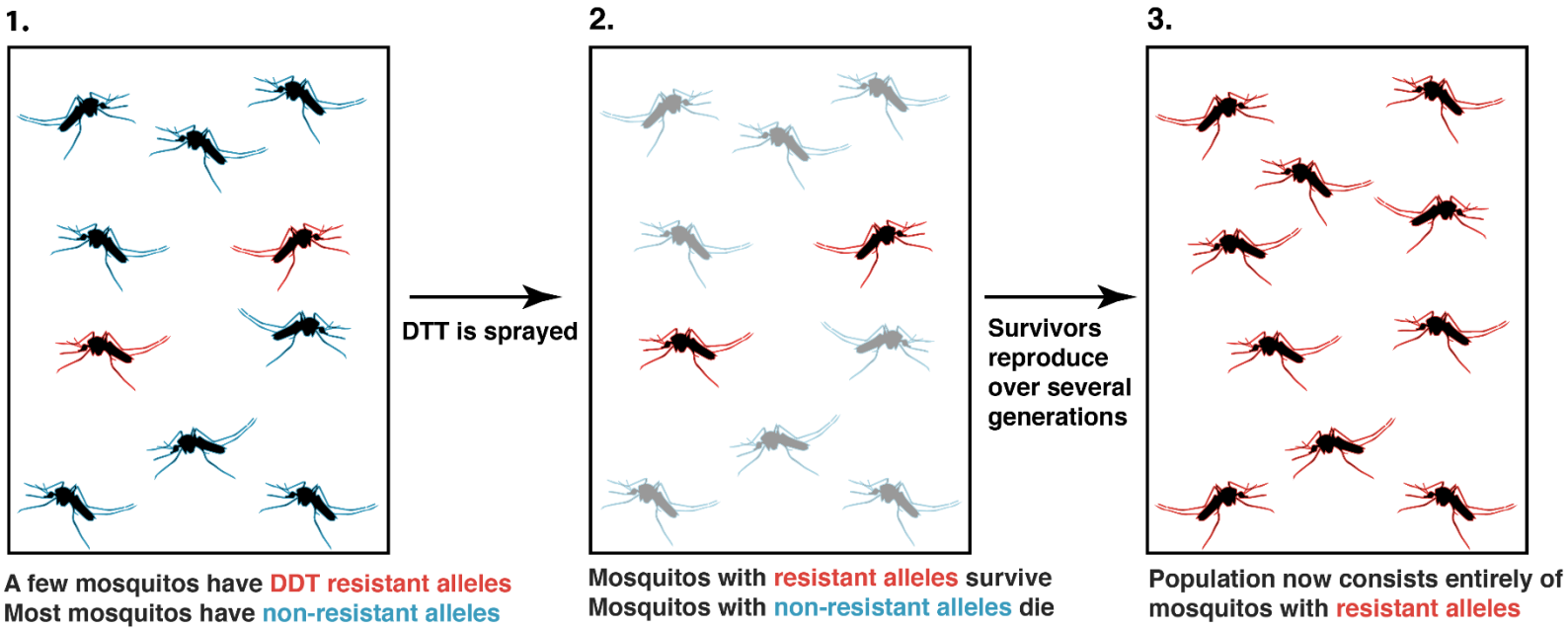


Requirements for Evolution

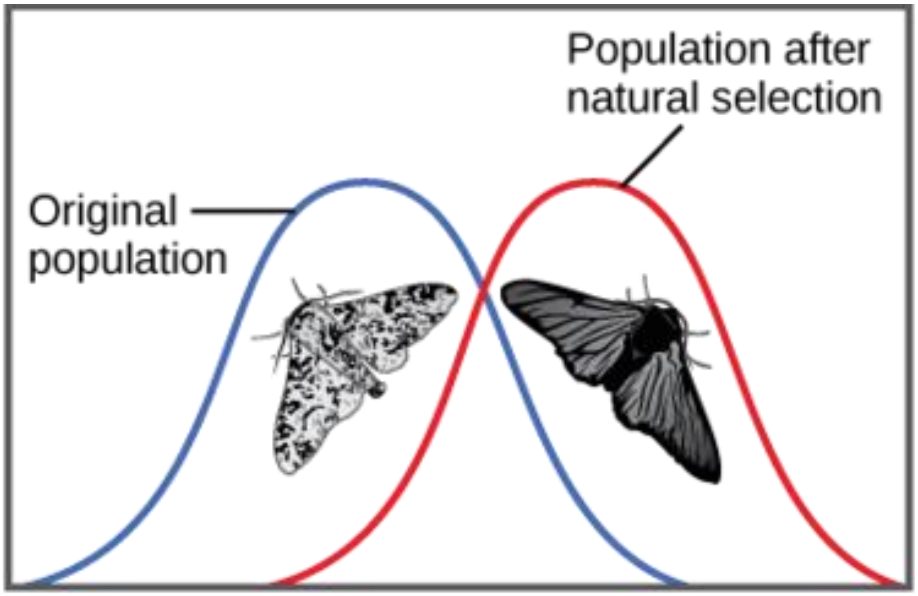
- Acts on a population (not necessarily the whole species)
- Results in a change of allele frequencies



Example: Pesticide Resistance



Example: Change in Color



Light-colored peppered moths are better camouflaged against a pristine environment; likewise, dark-colored peppered moths are better camouflaged against a sooty environment. Thus, as the Industrial Revolution progressed in nineteenth-century England, the color of the moth population shifted from light to dark, an example of directional selection.

Our Goals:

- Understand what evolution is about (and what it is NOT about!)
- Master the vocabulary to minimize semantic confusion
- Use the discussion of evolution as a platform to consider larger issues related to the nature of science