

## Defining Evolution

The word "evolution" can evoke a variety of meanings, especially for students and members of the general public. For some, evolution is equated with natural selection. Others think that evolution addresses the origin of life. Still others impose a distinction between micro-evolution and macro-evolution. Part of the issue stems from an unclear understanding of what evolution is in a scientific sense.

There are three important concepts within evolutionary biology:

1. the definition of evolution (common ancestry and descent with modification)
2. the processes of evolutionary change (for example, natural selection and genetic drift)
3. The patterns of evolutionary relationships (depicted as phylogenetic trees or cladograms).

Common ancestry forms the core of evolutionary biology. The processes and patterns represent the frontiers of evolutionary biology, where current research yields new discoveries and increases our understanding of the how descent with modification occurs, how species change over time, and how new species form. Evolution happens. The relative importance of various processes and the inference of patterns of evolutionary change are hypotheses that evolutionary biologists test. For example, scientists continue to explore when and why feathers evolved and how birds gained flight. Scientists, however, do not doubt that species have changed over time, that is, descended with modifications from previous species, and that all known organisms share common ancestry.

Evolution (common ancestry) provides an excellent framework for making and testing predictions - for instance, why humans have 46 chromosomes, while all of our closest relatives, the other great apes, have 48. By collecting evidence from the physical appearance of chromosomes as well as the sequence of DNA, biologists found support for the hypothesis that during the course of evolution, human chromosome 2 formed through the fusion of two pre-existing chromosomes, thereby reducing the total number of chromosomes.

For a specific activity discussing this evidence, we suggest the [Teacher's Guide](#) that accompanies Nova's [Judgment Day: Intelligent Design on Trial](#).