

Darwin PowerPoint Notes

Charles Darwin used reasoning in reaching his conclusion that natural selection is the mechanism of evolution.

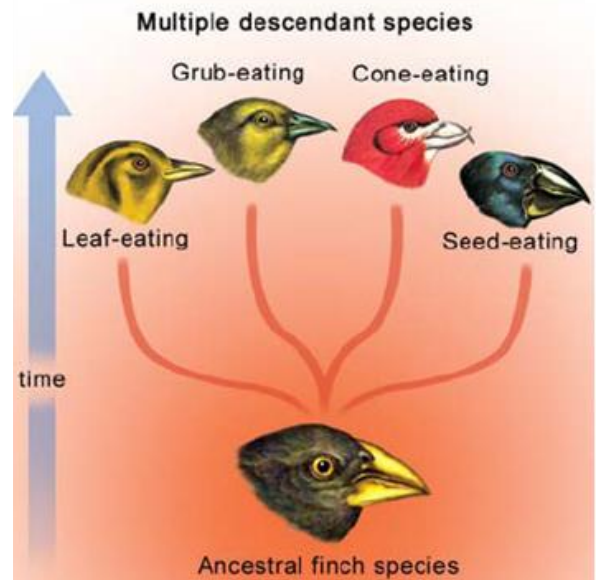
Darwin Travels to Galapagos Islands

In 1831, the research ship _____ left England for a five-year cruise around the world. On the ship was a young man named _____ (1809–1882). During the trip, Darwin collected thousands of plant and animal _____. He was amazed at the _____ of life he encountered. Darwin wrote down his observations and collected _____ about evolution. That evidence led him to propose a theory about how evolution works called _____. The Beagle sailed to the Galapagos Islands located 965 km west of Ecuador.



Darwin's Finches

There, Darwin observed that the _____ were different than those found on the mainland. He also noted differences in finches from island to island. One difference he found was in the shape of their _____. The shape of finch beaks appeared to differ with the type of _____ eaten. Darwin concluded that finch beaks were _____ for the type of food they ate. Darwin hypothesized that an _____ species of finch from the mainland somehow ended up on the Galapagos Islands. The finches of that species scattered to different environments. There, they had to adapt to different conditions. Over many generations, they evolved adaptations that allowed them to get enough food to _____ and reproduce. Each group of finches became _____ from the other groups. Eventually, each group became a different _____.



Darwin Theorizes about How the Adaptations Evolved

When Darwin returned to England from his voyage, he began to develop a _____ about how the adaptations evolved. From _____, Darwin learned that Earth was formed very slowly over a long period of time. Its surface also changed slowly over time through natural processes like sedimentation and erosion. Darwin reasoned that populations of organisms _____ slowly as their environment slowly changed. If the environment changes rapidly from an event like a flood, an earthquake, or a volcanic eruption, a species could become extinct (all members die off completely). Darwin used _____ as evidence that different species evolve over a long period of time. He found fossils of species that lived a few million years ago that resembled living species. For example, the *glyptodon*, an extinct mammal, resembled the armadillo, an organism Darwin knew as a living species. In Darwin's time, animal and plant breeders used _____ breeding to produce organisms with the traits they desired. In wild animals and plants, Darwin observed that traits were selected by the environment. He called this process _____. Mimicry of leaves by insects, such as this katydid, is an adaptation for evading predators. He hypothesized that natural selection took _____ than selective breeding, which he called artificial selection, because it happened by chance.

On the Origin of Species by Means of Natural Selection

In _____, Darwin published the results of his study in a book called *On the Origin of Species by Means of Natural Selection*. Based on his research and evidence, Darwin concluded that:

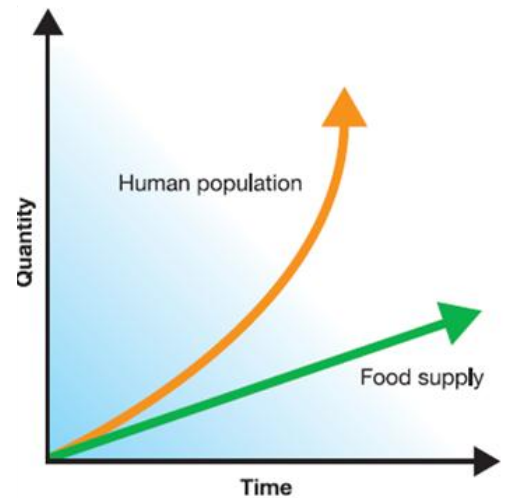
1. Organisms _____ over time.
2. All organisms are descended from _____ by a process of branching.
3. Evolution is _____, taking place over a long time.
4. The mechanism of evolution is _____.

What is natural selection?

Natural selection is the process by which organisms with _____ survive and reproduce at a higher rate than organisms with less-favorable adaptations. Darwin based his ideas about natural selection, in part, on the work of British professor _____

_____ (1766–1834). In 1798, Malthus published his *Essay on Population*. In that essay, he argued that humans have a tendency to grow faster than their food supply. This causes food shortages and a “struggle for _____.”

Darwin’s observations in the Galapagos Islands led him to apply Malthus’ ideas to animals and plants. Darwin proposed that environmental variables affect the _____ of a population. Variables include _____, food supply, _____, and climate. He reasoned that if a species produces too many _____ and only a certain number survive, the survivors must be better adapted to their environment than those that die. Darwin concluded that offspring of the survivors would _____ the favorable adaptations. Organisms with unfavorable adaptations die before they can pass them on to offspring. Darwin proposed that natural selection is the process for _____.



The process of natural selection is summarized in these steps:

Step 1. Populations over-reproduce.

All organisms produce more offspring than can _____ to adulthood and reproduce. This means that many of those offspring will _____ without reproducing. Survivors that are able to reproduce pass their _____ on to their offspring.

Step 2. Individuals in a population vary.

There is _____ variation in traits among individuals in a population of a species. The variations each individual possesses happen by _____. Those variations are _____.

Step 3. Favorable adaptations are selected.

The changing environment causes a selection of favorable _____ (adaptations). Adaptations that fit well with the environment are passed on to _____ in greater numbers than adaptations that do not fit well.

Step 4. Favorable adaptations accumulate.

Favorable adaptations accumulate over many _____. This may lead to new _____.