

The Theory of Evolution

(Acquired Characteristics vs. Natural Selection)

Name _____

Date _____

Block _____

What is evolution?

- _____
- any change in the _____ of the alleles in the gene pool of a population

Acquired Characteristics

- The first scientist to recognize that organisms change over time and somehow adapt to their environment was _____.

Lamarck based his explanation of adaptation on three assumptions:

- A _____: Organisms change because they have an inborn urge to become more fit for their environments.
- _____: Organisms can alter the shape of their bodies. Depending on the needs of the organism, organs could increase in size or change shape. If an organism did not use a particular body part, it would decrease in size and/or disappear.
Example: _____
- 3. _____: The characteristics that an organism acquires over its lifetime are passed on to its offspring.
Example:

_____.

Giraffe Example

The most widely used example to explain Lamarck's theory of acquired characteristics is as follows:

Ancestors of giraffes had shorter necks than giraffes do today. Giraffes developed longer necks as they competed successfully for food. Originally, giraffes had shorter necks, and ate vegetation from the lower branches of trees. As this vegetation became scarce, giraffes stretched their necks to reach the higher branches. The neck stretching that occurred over the course of a giraffe's lifetime was passed on to its offspring. As the food on the higher branches became scarce, giraffes stretched their necks even further to reach even higher branches. Again, the neck stretching that occurred over the course of a giraffe's lifetime was passed onto its offspring.

True or False?

Lamarck's theory of evolution was _____, however he is credited with bringing the concept of evolution to the attention of scientists.

Lamarck's Theory Disproved

- tails of mice were _____
- mice were placed together to _____
- offspring of tailless mice born _____ (prior to reproducing)

Natural Selection

- The scientist that proposed the current theory of evolution was _____.
- Darwin proposed his theory after several years of observation and research of organisms of the _____.
- natural selection: _____

Darwin's Observations & Conclusions

- High birthrates and a shortage of _____ results in a constant "_____".
- Animals and plants showed variation or diversity. No two organisms are exactly alike. These differences may be obvious or subtle. Individuals whose characteristics are well suited to their environment will survive and reproduce, whereas those organisms whose characteristics are not well suited to their environment will not survive, or will produce fewer offspring. This principle, developed by Darwin, is called: _____.

Giraffe Example

Ancestors of giraffes had shorter necks than giraffes do today. Giraffes developed longer necks as they competed successfully for food. Originally, giraffes had shorter necks, and ate vegetation from the lower branches of trees. As this vegetation became scarce, giraffes with slightly longer necks were able to reach the food on the higher branches, whereas the giraffes with the shorter necks could not. The giraffes with the slightly longer necks survived and reproduced, whereas the giraffes with shorter necks did not survive to reproduce. The offspring of the longer necked giraffes also had slightly longer necks. As the food source on the higher branches became scarce, only the giraffes that had EVEN longer necks were able to reach the EVEN higher food source. The other giraffes did not survive, as they could not reach the food. Once again, the EVEN longer-necked giraffes reproduced. Their offspring also had EVEN longer necks.

- ## The Peppered Moth

Favourable adaptations enable a species to survive within its environment. When something within the environment changes, the species must adapt or die out. Those species able to adapt are said to be "selected" by the environment or by nature. This process is called *natural selection*.

The environment may change due to natural events such as a forest fire, a volcanic eruption, or a change in climate. Humans and human activities may also change the environment. One such change occurred near Manchester, England between 1845 and 1890. This change affected a population of peppered moths.

Before the Industrial Revolution, the trees in the forests near Manchester were light greyish-green in colour due to the lichens growing on the tree trunks. Peppered moths that lived in the area were also light coloured. Their colour served to camouflage the moths when they landed on the tree trunks. The light-coloured moths were not easily seen by birds who preyed on moths.

As the Industrial Revolution progressed, the trees became dark with soot from the nearby factories. In 1848, the first dark-coloured moth was observed. Over a period of 45 years, the peppered moth population changed to a mostly dark-coloured species. Today, 90% or more of the peppered moths are dark in colour.

Refer to Figure 14-8 on page 297 of your textbook for pictures of the peppered moths on the tree trunks.