

Lesson Outline**LESSON 2*****Theory of Evolution by Natural Selection*****A. Charles Darwin**

1. Charles Darwin was a(n) _____, a person who studies plants and animals by observing them.
2. Darwin was not the first to develop a theory of _____, but his theory is the one best supported by evidence today.
3. The type of tortoise, mockingbird, and finch that live on each of the Galápagos Islands was slightly different; Darwin later figured out that some varieties were different enough to be classified as different _____.

B. Darwin's Theory

1. Darwin noticed that there was a relationship between each _____ and the food sources of the island it lived on.
2. The species of tortoise that lived on an island with tall cacti had _____ necks; the species of tortoise that lived on an island with lots of short grass had _____ necks.
3. Darwin thought all the Galápagos tortoises shared a common _____ that came to one of the islands millions of years ago.
4. Darwin knew that in any species, members of the same species each have slight differences, called _____.
5. Darwin didn't know about _____, but he realized that _____ in populations could help explain how the different species of Galápagos tortoises and other organisms evolved.
 - a. Darwin knew that food is a(n) _____ resource, so members of a species that live in the same area compete for food.
 - b. If a variation _____ a tortoise, allowing it to compete for food better than other tortoises, the tortoise lived longer, reproduced more, and passed on its variations to its _____.
6. _____ is the process by which populations of organisms with variations that help them survive in their environments live longer, compete better, and reproduce more than populations that do not have the _____.

Lesson Outline continued

C. Adaptations

1. A(n) _____ is a characteristic of a species that enables the species to survive in its environment.
2. Scientists classify adaptations into _____ categories.
 - a. _____ adaptations involve shape, size, color, and other physical features; the length of a Galápagos tortoise species' neck is an example of this type of adaptation.
 - b. _____ adaptations involve the way organisms act; hunting at night is an example of this type of adaptation.
 - c. _____ adaptations involve internal body systems that affect organisms' biochemistry; expanding blood vessels that cool a jackrabbit's blood is an example of this type of adaptation.
3. A structural adaptation that aids members of a species in blending in with their environment is called _____.
4. An adaptation in which one species resembles another species is called _____.
5. The living and the nonliving parts of the _____ are always changing; species that cannot _____ to such changes will become extinct.

D. Artificial Selection

1. Darwin's theory of evolution by _____ predicts that species will develop adaptations and, therefore, eventually closely match Earth's changing environments.
2. _____ is the breeding of organisms for desired characteristics.
3. Darwin realized that _____ and _____ are similar processes.
 - a. In _____, nature causes the changes in the species; in _____, humans cause the changes in the species.
 - b. For this reason, Darwin called selective breeding _____ selection.
4. _____ explains and supports Darwin's theory.

Lesson Outline**LESSON 3*****Biological Evidence of Evolution*****A. Evidence for Evolution**

1. Evolution does not occur in a straight line with one species _____ another in a series of orderly steps.
 - a. Living species that are closely related share a common _____.
 - b. How closely related two species are depends when they _____, or split, from their common ancestor.
2. The study of similarities and differences among structures of living species is called _____.
 - a. Body parts of organisms that are similar in position but different in function are called _____. The forelimbs of different mammals are examples.
 - b. If species have homologous structures, this suggests that the species are _____.
 - c. The more similar two structures are to each other, the more likely it is that the species have evolved from a recent _____.
 - d. _____ are body parts that perform a similar function but differ in structure. The wings of flies and birds are examples.
 - e. The existence of analogous structures indicates that the species are not _____ related.
3. Body parts that have lost their original function through evolution are called _____. The _____ of flightless birds are an example.
 - a. The best explanation for _____ is that the species that have vestigial structures are _____ to ancestral species that still use the structures for a specific purpose.
 - b. Whales have a tiny _____ bone, which is a vestigial structure for walking on land.

Lesson Outline continued

4. Studying the development of _____ can also provide scientists with evidence that certain species are related.
 - a. _____ is the study of the development of embryos from fertilization to birth.
 - b. All species of _____ have pharyngeal pouches at some stage during their development.
 - c. The similarities in location and function of the _____ is a sign that the vertebrate species share a common ancestor.
5. The study of gene structure and function is called _____.
 - a. The existence of _____ provides evidence of evolution because they have been shown to be the source of variation upon which _____ acts.
 - b. The more closely related two species are, the more similar their _____ and _____ are.
 - c. Studies in molecular biology have shown that some stretches of _____ that are common to many species change through time at steady, predictable rates like a kind of molecular clock.
 - d. Scientists use this molecular clock to estimate the time in the past when living species _____ from common ancestors.

B. The Study of Evolution Today

1. Since the publication of Darwin's theory, scientists have _____, refined, and _____ his work.
2. Scientific studies of fossils, anatomy, embryology, and molecular biology have provided evidence of relatedness among _____ and _____ species.
3. The continuous discovery of new _____ that have features of species that lived before and after them is strong evidence of evolution of species.
4. Scientists today are studying how _____ can be reorganized in simple ways that cause dramatic changes in organisms.
5. Though scientists now study evolution at the _____ level, the basic principles of Darwin's theory of evolution by natural selection have remained unchanged for more than _____ years.