Introduction to Natural Selection: Darwin & Lamarck

Written by Jennifer Folsom

Grade Level: Middle School

Overview

In this activity students will read two theories about how species change over time. Then, they will participate in an activity that requires them to apply their knowledge. Students will arrange sets of pictures in a way that demonstrates the two different theories.

Objectives

Upon completion of this activity, students will be able to:

- Describe the theories of Acquired Characteristics and Natural Selection.
- Arrange a set of cards to illustrate each theory.
- Explain why most scientists believe in Natural Selection.

Important Words

- Variation
- Benefit
- Adaptation
- Population
- Survival
- Inheritance
- Acquired Characteristics

Materials

Copies of **How do species change over time?**
Copies of **Activity Sheet 1: Compare the theories**

Copies of **Activity Sheet 2: Lamarck's theory** (white paper)
Copies of **Activity Sheet 3: Lamarck's Elephants** (white paper)

Copies of **Activity sheet 4: Darwin's theory** (colored paper)
Copies of **Activity Sheet 5: Darwin's Elephants** (colored paper)

Time Needed

60 minutes (less if reading is done ahead of time)

Teacher Preparation

Read the background information and **How species change over time**. Review Teacher Keys for the elephant card activities. Determine if you will have the students read the material individually, round robin, or if you will read it to them. You may want to assign the reading as homework or earlier in the week, and, then read it again in class.

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Background Information

Natural Selection is a scientific theory that has been supported by tremendous amounts of scientific evidence. In this lesson, students will be exposed to Natural Selection and an earlier alternate theory—Acquired Inheritance. Both of these theories are founded on the belief that animal species change over time and that offspring inherit traits from their parents. The two theories differ on how animals change and what traits offspring inherit from their parents.

The theory of **Acquired Inheritance** was introduced by Jean Baptiste Lamarck. It was based on his belief that individual organisms made changes in themselves and passed those changes on to their offspring. In his theory, individual organisms had the ability to change their physical characteristics. Giraffes that needed longer necks, or elephants that needed longer trunks would use them more and they would extend them through use. Lamarck not only believed that animals could make these changes, but also that they could pass them on to their offspring. For example, when mama giraffe stretched her neck a little to reach more food, it would stay stretched,and her new baby would have that long neck too.

Charles Darwin introduced **Natural Selection** to the scientific community. He said that organisms could neither willfully change themselves nor pass those changes on to their offspring. He said that individuals survived (or didn't) based on the specific traits they possessed. His well-known saying "survival of the fittest" meant that out of the entire population of one type of organisms, only the fittest will survive in an environment with limited resources. Those with the best adaptations for survival stayed alive and were most likely to reproduce. When they reproduce, they passed on their beneficial traits to their offspring. Eventually, the population had a higher percentage of individuals with those more "fit" traits. If the environment changed again in some way, the process happened again. As long as environments continue to change, so will makeup of populations of organisms. Natural Selection is the driver behind evolution.

This activity builds a foundation for understanding evolution, but does not explain the whole process of evolution. The goal is simply to describe a method by which plant and animal species can change over time. Evolution is taught in the upper grades. By giving your students an introduction to one of its mechanisms, you can provide them with a strong base for future learning. Standards in higher grades require mastery of these concepts.

There are many of web pages out with information on Darwin, Lamarck, their theories, evolution, and the controversy surrounding teaching evolution in public schools. Here are just a few:

- **www.nsta.org** is a comprehensive website for the National Science Teachers Association. Read their position statements on a variety of topics to learn what they think should be taught in science classes.
- **www.nap.edu/readingroom/books/evolution98** is an activity guide for teaching the foundations of evolution. It has some good teaching recommendations and explanations.
- **www.ncseweb.org** is a national organization that actively defends teaching evolution in the classroom. This organization acts as a clearinghouse for information on this topic.

- **www.wikipedia.org/wiki/Charles_Darwin or www.wikipedia.org/wiki/Jean_Baptiste_Lamarck** These web pages give basic background information on these two scientists.

Activity 1: Introduction — 5 minutes

Explain that a long time ago scientists noticed that the earth's organisms had changed over time. They started wondering how this could have happened. Two main theories developed—the theory of **Acquired Characteristics** and **Natural Selection**. Explain to your students that today you are going to study what those two theories said about how organisms changed.

Activity 2: — 20 minutes

Complete the reading selection, **How do species change over time**, which is in the form of a question and answer sheet. Analyze the reading selection and have students complete **Activity Sheet 1: Compare the theories.** Encourage your students to think carefully about the information they just read. They will need to collect information from the reading to complete their sheet.

Review the students' responses and answer any questions they may have.

Activity 3: Order the Elephants — 20 minutes

This activity requires students to apply their knowledge of the two theories. Using the pictures and the information provided in their labels, they will need to place each set of cards in order. Have the students work in pairs so they can discuss their ideas.

Hand out **Activity Sheets 2 and 3**. Have the students cut apart the pictures of Lamarck's elephants on **Activity Sheet 3**. They need to use what they learned about his theory to glue them down in the proper order on **Activity Sheet 2**.

Once the students are finished, hand out **Activity Sheets 4 and 5**. Have the students cut apart the pictures of Darwin's elephants on **Activity Sheet 5**. They need to use what they learned about his theory to glue them down in the proper order on **Activity Sheet 4**.

If your students are struggling with this you may want to do this activity as a class.

Conclusion — 15 minutes

Review the two theories. Be sure to cover their main differences and how both theories agree on the fact that species did change.