

Darwin Was Not Alone

Subject: Biology

Grade Level: 9th

Rational or Purpose: Most students know that Darwin was influential in many theories of natural selection and evolution, but they do not know much about his predecessors or those who have built other theories from his work. This activity gives students an introduction to many of these scientists.

Materials:

- Butcher paper
- Rulers
- Index cards
- Reference materials on the history of the science of evolution or access to relevant internet search engines
- Staples, pushpins, or tape to attach the paper to the wall and the index cards to the paper

Required Documents:

Review Questions Worksheet

Lesson Duration: 90 minutes

TEKS:

112.43. Biology
(3C) (3F) (7)

Background Information:

Ideas about evolution such as common descent and the transmutation of species have existed since at least the 6th century BC. The founders of natural science include those from ancient times, such as Aristotle, to the Enlightenment, including Leonardo da Vinci and Robert Hooke. As biological thought advanced, the preludes to evolution were introduced in the 18th and 19th century by scientists like Jean-Baptiste Lamarck, Thomas Malthus, and Adam Sedgwick. This early work opened the door Charles Darwin and his work in natural selection and evolution. Many scientists, such as Henry Fairfield Osborn and Alfred Wegener, have continued to further the studies and theories into the present.

Activity:

Students will be able to summarize Darwin's contributions to the theories of natural selection and evolution, and identify several other scientists who have also influenced those theories.

Procedure:

1. Tell students that they will produce a large-scale timeline, called “The History of the Science of Evolution”. This timeline will have dates and, above or below the dates, will provide details about the people who have played major roles in advancing knowledge about the evolution of plants and animals. Go on to tell students that after they collaborate to finish the time line, they will individually write a brief analysis of what the overall timeline shows.
2. Ask students to figure out how long a piece of paper they should mount horizontally for the timeline, beginning with the year A.D. 1700. Help students to remember how much space this will require. If, for example, they choose to mark one foot per decade, this will take thirty feet of paper, and unless the classroom is that long, the students may need rethink their measurements.
3. On the piece of butcher paper-attached to the wall-have one or several students draw a continuous horizontal line and tick off on it the equal segments of 10 years each. They should begin on the left with A.D. 1700 and end on the right with the current year. Students should label each tick mark with its corresponding year. Note the publication of Darwin’s *On the Origin of Species by Means of Natural Selection* at 1859.
4. Assign one or more of the following names to individual students or pairs of students:
 - Bateson, William
 - Buffon, George
 - Crick, Francis, and Watson, James
 - De Vries, Hugo
 - Dobzhansky, Theodosius
 - Eldredge, Niles, and Gould, Stephen Jay
 - Haldane, J.B.S.
 - Hardy, G.H., and Weinberg, W.
 - Hutton, James
 - Lamarck, Jean Baptiste
 - Linnaeus, Carolus
 - Lyell, Charles
 - Mayr, Ernst
 - Mendel, Gregor
 - Ray, John
 - Simpson, George
 - Stebbins, G. Ledyard
 - Wallace, Alfred Russel
 - Wegener, Alfred

Explain to students that the list consists of scientists who preceded or followed Darwin or worked at the same time as Darwin. It will be each student’s or pair’s responsibility to prepare one or more 3”x5” cards with information about their assigned scientist’s contribution(s) to or against the theory of evolution. The card

should also include the date of the scientist's contribution. Acknowledge that not only Darwin himself but other scientists, too, won and lost favor over time among the scientific community.

5. Identify which printed and electronic resources students may use to identify key events in building the theory of evolution.
6. As students finish, have them attach their index cards to the timeline according to the year.
7. After students have finished their individual or paired work, review with them the timeline as a whole. Give students time to study the timeline on their own or in small groups. Then ask each student to write a short analysis of what the timeline says about forming a theory of evolution.

Name _____

Period: _____

Date _____

Review Questions

Choose and answer three of the following questions on a separate sheet of paper:

1. In what way is the modern-day theory of evolution more complete than Darwin's?
2. Discuss how a population of bacteria becomes resistant to antibiotics. How does this relate to Darwin's theory of natural selection?
3. Summarize the main components of the evolutionary process. How do these apply to individuals?
4. Hypothesize what the world would be like if significant numbers of dinosaur species had managed to escape extinction.
5. Explain the statement: "Natural selection acts on populations, not individuals."
6. What criteria must be met in order for an explanation to be considered scientific?