

LESSON PLANS

Simple ■ Student Friendly ■ Accessible

OBJECTIVES

Students will understand the following:

- Darwin presented a theory of evolution in 1859 that has been accepted and debated over the years.
- From the 18th century to today, many scientists—botanist, zoologists, geologists, geneticists—have contributed to the study of evolution.

PROCEDURES

- 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 them, provide details about the people who have played major roles in advancing knowledge about the evolution of plants and animals. After students collaborate to finish the timeline, they will individually write a brief analysis of what the overall timeline shows.
- 2 Ask students, perhaps those who most often display mathematical intelligence, to figure out how long a piece of roll paper they should mount horizontally for the time line, beginning with the year A.D. 1700. (If you have room to give 1 foot to every decade from 1700 to today, students will need at least 30 feet of paper, plus some paper for left and right margins; if you don't have that much room, ask students to calculate a new length per decade or to propose an alternative to ticking off every 10 years.)
- 3 On the large piece of roll paper—stapled, pinned, or taped to the wall—direct one or more students to draw a continuous horizontal line and to tick off on it the equal segments of 10 years each (or to proceed with the alternative mathematical plan). They should begin on the left with A.D. 1700 and end on the right with the current year.

The 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 on the timeline.

- 4 Assign one or more of the following names to individual or pairs of students; the names are listed here in alphabetical, not chronological, order:

- | | |
|---|--------------------------|
| ■ Bateson, William | ■ Linnaeus, Carolus |
| ■ Buffon, George | ■ Lyell, Charles |
| ■ Crick, Francis, and Watson, James | ■ Mayr, Ernst |
| ■ de Vries, Hugo | ■ Mendel, Gregor |
| ■ Dobzhansky, Theodosius | ■ Ray, John |
| ■ Eldredge, Niles, and Gould, Stephen Jay | ■ Simpson, George |
| ■ Haldane, J.B.S | ■ Stebbins, G. Ledyard |
| ■ Hardy, G.H., and Weinberg, W. | ■ Wallace, Alfred Russel |
| ■ Hutton, James | ■ Wegener, Alfred |
| ■ Lamarck, Jean Baptiste | |



Explain that the list consists of scientists who preceded or followed Darwin or worked at the same time as he. It will be the students' task to prepare one or more 3 x 5" cards with information about their assigned scientist's contribution(s) to or against the theory of evolution, as well as the date of the scientist's contribution.

Acknowledge that not only Darwin but **other scientists**, too, won and lost favor over time among the scientific community. The final timeline as prepared by your students may carry more than one card for a given scientist in order to show when he was in and out of favor or to show that he contributed more than one idea to the theory of evolution.

Since students will be writing about a scientist's work on a small index card, they must write succinctly. Students cannot go into enormous detail; they must make every word count.

- 5 Identify which printed and electronic resources students may use to identify key events in building the theory of evolution.
- 6 Ask each student or pair to submit a draft of the index card(s) to you for review. If a card needs revision or editing, send the student or pair back to do more research or to focus the writing more.
- 7 When you've signed off on each card, have students attach them to the roll paper at the appropriate date.
- 8 After students have finished their individual or paired work, review with them the time line as a whole. Give students time to study the time line on their own or in small groups. Then ask them to write a short (three-paragraph) analysis of what the timeline says about forming a theory of evolution.

Use *Grzimek's Animal Life* to enhance the lesson

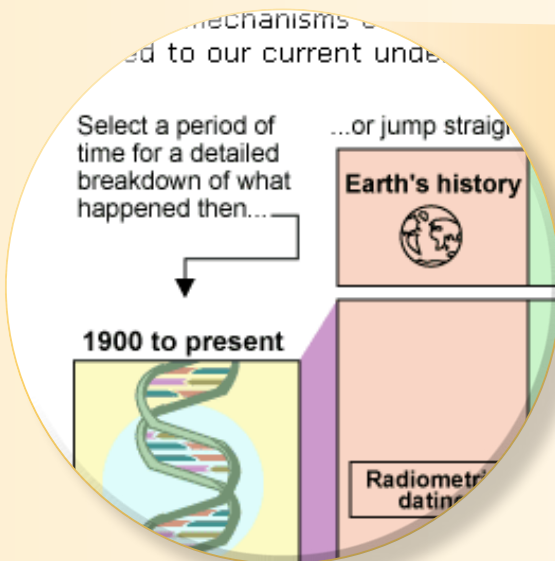
Intuitive, in-depth and easy to access, *Grzimek's Animal Life* supports lesson plans and enhances classroom assignments.

STEP 1

Create a timeline

Interactive tools

Grzimek's Animal Life offers interactive graphics that help students place important events into a historical context.



Understanding Evolution
 your one-stop source for information on evolution

Search | Glossary | Home

The History of Evolutionary Thought
 Pre 1800 | 1800s | 1900 - present

The History of Evolutionary Thought

Just as life has a history, science has a history. Understanding the history of evolutionary thinking illuminates the nature of science.

In this section, you will see how study in four disciplinary areas — Earth's history, life's history, mechanisms of evolution, and development and genetics — has contributed to our current understanding of evolution.

Select a period of time for a detailed breakdown of what happened then... or jump straight to a major concept in one of these four disciplines.

Period	Earth's history	Life's history	Mechanisms of evolution	Development & genetics
1900 to present	Radiometric dating	Endosymbiosis	Speciation	Genetic similarities DNA Modern evolution & development
1800s	Uniformitarianism	Natural selection	Random mutations	Discrete genes Early evolution & development
Pre 1800	Extinction	Biogeography	Chromosomes & mutation	Developmental similarities
	Old Earth & ancient life	Evolution		
	Nested hierarchies			
	Fossils	Ecology of humans		
	Observation			
	Comparative anatomy			

next >>

History of Evolutionary Thought: Pre 1800

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STEP 3

Study Darwin's "Origin of Species"

Engaging Context

A simple search for "origin of species" nets some exceptional perspectives on Charles Darwin's controversial work, from overviews to commentaries.

Previous Article

Evolution's evolution: Darwin's

Rachel Ehrenberg *Science News*, Jan 31, 2009

Just a decade after he published *On the Origin of Species* in 1859, Darwin modified the Origin, and how much the views on all

Calling the Origin a mere "beginning" is like saying Darwin's gifts to science were radical. He not only provided an elegant mechanism to explain how all that diversity came about, but also a painstakingly drawing from zoology, botany, and geology. Later, scientists continue to grapple with the questions posed by modern biology

...and great intuition," says Yale



STEP 4

Assess the views of other scientists

Diverse Voices

Students looking for information on Gregor Mendel, Carolus Linnaeus, Stephen Jay Gould and other authoritative voices can reliable content from both scholarly works and popular periodicals.

...were simply unexplained.

...farmers have exploited heredity in a practical way. Farmers selectively bred several strains of crops that had particular traits. Also, everyone recognizes relatedness among family members. Apart from these practical uses, there was little to explain the underlying mechanisms until the first great insight. His idea was to study hybridization, quantitative methods, that is, by counting offspring and kinds and relative numbers, a novel approach at that time. Having true breeding lines of plants differing in very distinct ways he could begin with a sure knowledge of the pure crosses, and recognize clearly the different types of offspring. Mendel found that hybrids between two true-breeding plants tall. When he allowed the hybrid plants to self-fertilize, the offspring were tall but 277 were dwarf. This can be understood if one parent specifies a dwarf growth pattern, and (2) only one gene of random by each parent to form a new individual.

...principle of inheritance discovered by Mendel's experiments.



STEP 5

Use electronic sources

Screened Websites

Grzimek's Animal Life helps students enhance their projects and presentations with links to educator-selected and -reviewed sites – a true advantage over the random results from a typical Web browser.

The image shows the cover of a booklet titled 'EVOLUTION and the Fossil Record' by John Pojeta, Jr. and Dale A. Springer. The cover features a dinosaur skeleton and a fossil. The text on the cover reads: 'This non-technical introduction to evolution, produced by the American Geological Institute in cooperation with the Paleontological Society, aims to help the general public gain a better understanding of one of the fundamental underlying concepts of modern science. Colorful photos, drawings, and illustrations complement the authors' conversational style as they discuss geologic time, change through time, Darwin's theory of evolution, evolution as a mechanism for change, the nature of species; the nature of theory; paleontology, geology, and evolution; and determining the age of fossils and rocks. Four "case study" examples from the fossil record - evolution of vertebrate legs, evolution of birds, evolution of mammals, and evolution of whales - are presented to provide a time perspective for understanding the evolution of life on Earth. The booklet contains straightforward definitions as well as discussions of complex ideas.'