



Unit 4: History of the Earth

Lesson 14: History of Earth through Geologic Time Scale



Introduction

The nature of our Earth—its materials and processes—has been a focus of study for centuries. However, the late 1700s is generally regarded as the beginning of modern geology. It was during this time that James Hutton published his important work *Theory of the Earth*. Prior to that time, a great many explanations about Earth history relied on supernatural events.

Like the pages in a long and complicated history book, rocks record the geologic events and changing life-forms of the past. The book, however, is not complete. Many pages, especially in the early chapters, are missing. Others are tattered, torn, or smudged. Yet enough of the book remains to allow much of the story to be deciphered. Interpreting Earth history is a prime goal of the science of geology. Like a modern-day sleuth, a geologist must interpret the clues found preserved in the rocks. By studying rocks and the features they contain, geologists can unravel the complexities of the past. Geologic events by themselves, however, have little meaning until they are put into a time perspective. Studying history, whether it is the Civil War or the age of dinosaurs, requires a calendar. Among geology's major contributions to human knowledge are the geologic time scale and the discovery that Earth history is exceedingly long. This module will discuss the history of the Earth through geologic time.



Learning Objectives

After studying this module, you should be able to:

- Describe how index fossils (also known as guide fossils) are used to define and identify subdivisions of the geologic time scale; and
- Describe the history of the Earth through geologic time.



Pre-requisite Skills / Review

REVIEW: Formation and Dating of Rocks

- ❖ Stratification is the general term for layering of sedimentary rocks. It serves as a reflection of changing conditions during deposition where every strata or layer represents an interval of time where conditions have remained uniform. A change in color can reflect differences in grain size and/or composition.
- ❖ Geological specimens that are unearthed need to be assigned an appropriate age. To find their age, two major geological dating methods are used. These are called relative and absolute dating techniques. Absolute dating, also called numerical dating, arranges the historical remains in order of their ages. Whereas relative dating arranges them in the geological order of their formation.
- ❖ To establish a relative time scale, a few basic principles or rules had to be discovered and applied. These are: Principle of Superposition, Principle of Original Horizontality, Principle of Lateral Continuity, Principle of Cross-Cutting Relationship, Principle of Inclusions, and Unconformities.
- ❖ Absolute Dating determines the age of a rock/object using radiometric techniques and is quantitative. The dating is based on atomic structure, radioactivity, and half-life.
- ❖ The different methods used in absolute dating are Radiocarbon Dating, Potassium-Argon Dating and Uranium-Lead Dating.

MOTIVATION:

Directions: Read the [Fossils, Rocks, and Time](#) by Lucy E. Edwards and John Pojeta, Jr.

- Explain the difference between "relative time" and "numerical time."
- Explain the overarching structure of the geologic time scale (i.e., the placement of eons, eras, periods, and epochs).
- What is a paleontologist?
- Why do the authors say that the layers of rocks are the pages in Earth's history book?
- What is the Law of Superposition and why is it critical to our interpretation of earth's history?
- What is the Law of Original Horizontality and what does it help us understand about sedimentary rocks that are no longer horizontal?

Atrip Through Geologic Time Study Guide

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Prentice Hall Science Explorer Michael J. Padilla,2002 **Earth Science** ,2001 *Ohio River Basin Energy Study*, V. II-A ,1977 **Science Explorer Earths Changing Surface Guided Reading and Study Workbook 2005** Michael J. Padilla, Ioannis Miaoulis, Martha Cyr, Prentice-Hall Staff,2004-04 1 Mapping Earth s Surface 2 Weathering and Soil Formation 3 Erosion and Deposition 4 A Trip Through Geologic Time **EVO Teachers Guide** Rodger W. Bybee, John Feldman,2012 In this film you ll learn among other things that evolution and religion are indeed compatible ways of looking at the world that Darwin was a creationist before he was an evolutionist and that cooperation is just as important as competition in the struggle for existence From Hummingbird Films website **The College Courant** ,1872 Prentice Hall Science Series, 1994 Prentice-Hall Staff,1993 *A Laboratory Manual of Physical and Historical Geology* Kirtley Fletcher Mather, Chalmers John Roy,1934 **Subject Guide to Books in Print** ,1971 Evolution ,1994 *The Mojave-Sonora Megasear Hypothesis* Thomas Howard Anderson,2005-01-01 Energy Research Abstracts ,1978 *Prentice Hall Exploring Earth Science* ,1997 **Public Roads** ,1950 *Scenic Routes & Byways Yellowstone & Grand Teton National Parks* Susan Springer Butler,2012-05-15 Pack up the car and enjoy 28 gorgeous drives through the crown jewels of the National Park system Yellowstone and Grand Teton Offering nearly 1 200 miles of riding pleasure this indispensable highway companion maps out short trips for exploring the region s scenic byways and back roads Discover areas of Yellowstone and Grand Teton that many visitors miss from marvelous Firehole Canyon to the ever changing face of Norris Geyser Basin from Flagg Ranch to the geologic wonders of the Gros Ventre Slide area Inside you ll find Itineraries ranging from 5 miles to 155 miles in length Full color photos and route maps for each drive In depth descriptions of attractions along the way Historical information and suggested side trips Optional side trips to museums parks and landmarks Tips on lodging camping dining travel services and best driving seasons A Trip Through Space and Time Russell E. Clemons,1996 **U.S. Geological Survey Circular** ,1984 *Owens River Basin, 7 Hydroelectric Projects* ,1986 **Proceedings of a U.S. Geological Survey Workshop on Environmental Geochemistry** Bruce R. Doe,1990 *Special Energy Research and Development Appropriations Bill for 1975* United States. Congress. House. Committee on Appropriations,1974

Uncover the mysteries within is enigmatic creation, Discover the Intrigue in **Atrip Through Geologic Time Study Guide** . This downloadable ebook, shrouded in suspense, is available in a PDF format (Download in PDF: *). Dive into a world of uncertainty and anticipation. Download now to unravel the secrets hidden within the pages.

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