Earth's Time Line

You've probably been alive for nearly a decade. Many things have happened in your life already. Maybe you got a baby sister or brother. Maybe you started day care or preschool. Then you started kindergarten. After that came first grade. Events in your life happened in an order.

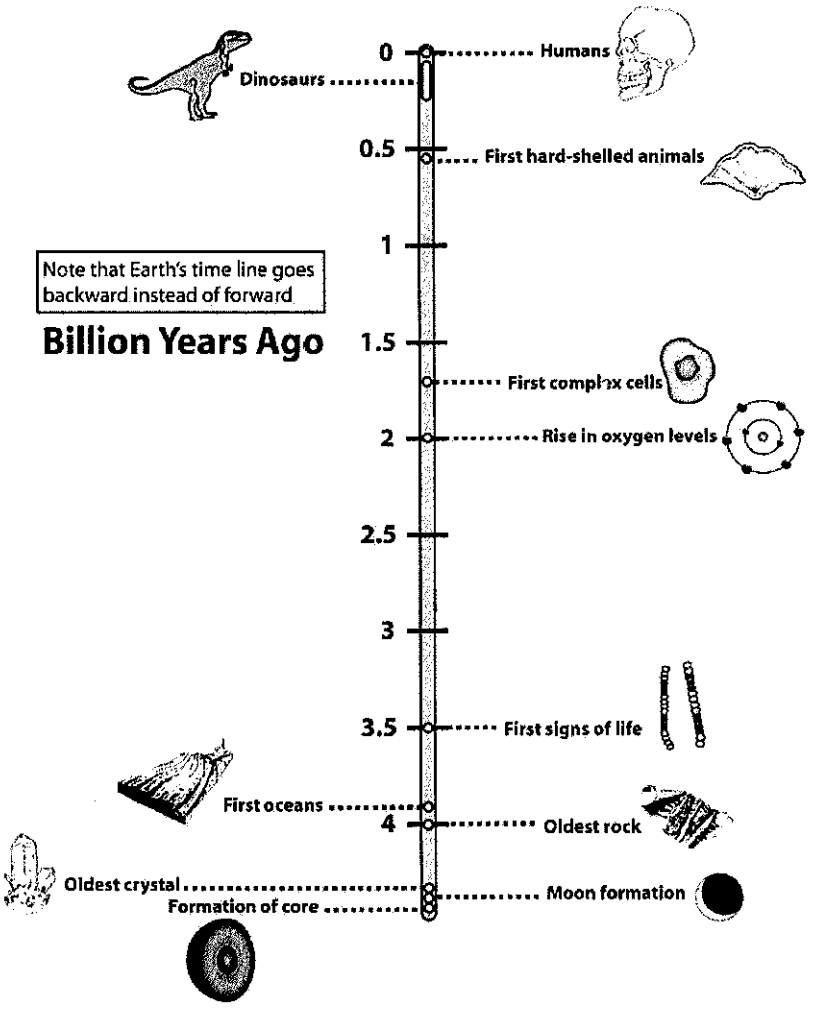
You can make a *time line* of your life. A time line shows all the big events in your life. It shows them in the order they happened.

Scientists make a **geologic** time line of the **Earth**. This time line shows important events in the history of the Earth. It begins with the formation of the Earth. It leads up to today.

Your time line covers about eight years. The time line of the Earth is much longer. It covers billions of years!

Each unit in your time line could be a year. Or it could be a month. The smallest units measured in Earth's time line are millions of years!

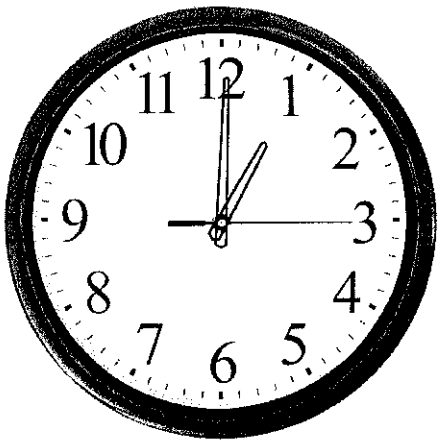
Can you imagine how long that is? It's such a long time that it can be really hard to imagine!



A Day of Earth's History

Earth is 4.6 billion years old. That might be hard to imagine. The oldest person on Earth lived to be 122. Earth has been around for 37 million times as long!

Keeping track of all the things that have happened over the last 4.6 billion years is hard to do. That's why scientists use a **geologic** time line. A geologic time line shows important events in the Earth's history in the order they happened. This helps us picture the entire history of Earth. On a geologic time line, even the smallest units of time are millions of years long.



A time line of your life would be measured in years, not millions of years. A time line of your day would be in hours. You would start with the first thing that happened, like eating breakfast. You would end your time line with the last thing that happened, like going to sleep. Earth's time line is much longer, and it has many more events.

So many things happened in geologic time that it is impossible to include them all on the time line. Scientists put only the most important events on the geologic time line. It starts with the formation of Earth and ends in present day.

It can be hard to understand how long 4.6 billion years is. To help you understand how long it is, imagine that all of Earth's history was squeezed into a single day. If that were true, each hour of the day would represent about 200 million years. Earth forms at midnight. The moon forms at 1:16 a.m. It takes about 7½ more hours—until about 8:41 a.m.—for the first living things, bacteria, to appear. At 1:28 p.m., the atmosphere first starts to have plenty of oxygen in it. At 8:10 p.m., the first sea creatures appear. Land plants appear at 10:20 p.m. Dinosaurs roam the Earth from 11:05 p.m. to 11:40 p.m. Humans don't even appear until the last half second of the day!

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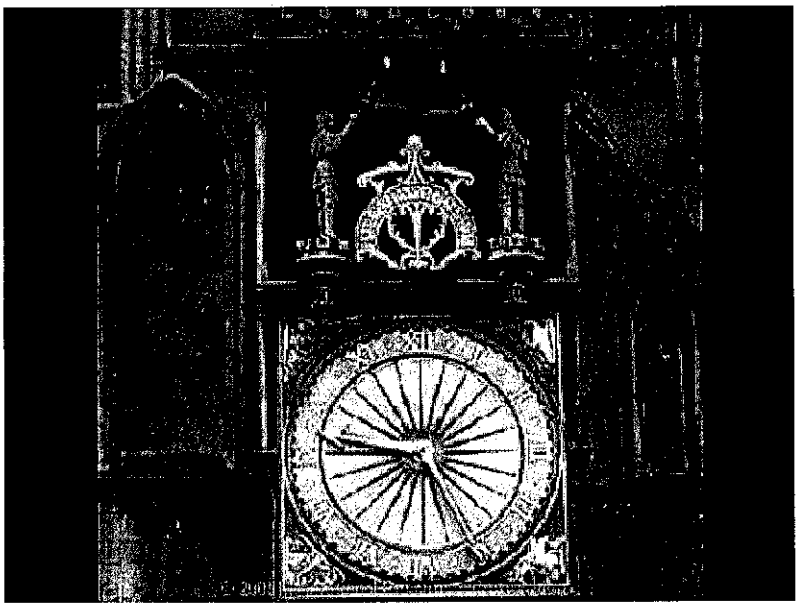
Geologic Time



If you made a time line of your day, you might include things like waking up, getting ready for school, catching the bus, and going to class. Time lines tell us the order that events happened. You can use a time line to show the order of important events in the history of the United States. Time lines can go back even further, too. Scientists have divided Earth's history into a time line.

Earth's history spans 4.5 billion years. That's a long time line! The length of Earth's history is hard to comprehend. Many events have happened over the last 4.5 billion years. That is why scientists have divided Earth's history into *eons*, *eras*, and *periods*. Periods are the smallest division of time. But even they each span millions of years! During each period, important events happened. When Earth's history is laid out in a time line, scientists can see how these important events have changed Earth. They can see how Earth and life on Earth have changed over time.

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Getting to Know: Time Line in Geology

This week your class went on a field trip to a museum. You explored lots of exhibits. Your favorite part was looking at the dinosaur fossils.

"Wow!" you said. "These look like they're really old! Dinosaurs must have been around at the start of history!"

The guide said, "Many scientists believe Earth's history is much older than these fossils. When dinosaurs first appeared, Earth was billions of years old! Dinosaurs are just a small part of the *geologic timeline*."

You can see dinosaur fossils in museums.

What is the geologic timeline?

Earth's history can be shown on a geologic timeline. Different parts of the timeline represent periods in Earth's history. Each section spans millions of years.

Misconception 1: ***Earth can't be that old, right?***

Many scientists believe Earth formed about 4,600,000,000 years ago. That is a very long time!

How is geologic time measured?

Earth's history is billions of years old. It is very hard to picture such a large number. To make it easier to understand, we divide Earth's history into periods.

There are four large periods, called *eons*. Each eon is millions of years long. The first three eons are the Hadean eon, the Archean eon, and the Proterozoic eon. Together these are called the Precambrian period. This period covers about 90% of Earth's history.

What about the fourth eon in Earth's history?

We are living in the fourth eon! It is called the Phanerozoic eon. It is divided into *eras*. The Paleozoic era was when fish, plants, and insects began to develop. The next era was the Mesozoic era. That was when the dinosaurs lived on Earth. The last era is the Cenozoic era. That is the era we are living in now.

How do we know what happened millions of years ago?

The fossil record helps us understand Earth's history. Fossils can help us figure out how old something is. Rocks of the same age tend to contain fossils of the same type. Each major period on the geologic timeline contains some fossils that are only found in that period. If we find one of these fossils, we can figure out the age of the rock layer that contained it.

Fossils tell us what life was like in Earth's past.

What do fossils tell us about each period?

Rocks from the Precambrian period have very few fossils. This is because little life existed on Earth during that time. An explosion of life happened during the Paleozoic era. There are many fossils from this time period. They are mainly invertebrates, fish, and insects.

Fossils from the Mesozoic era contain the first reptiles and mammals. All of the dinosaur fossils come from this era. Ancestors of modern mammals also appeared during this period.

The last era in the fossil record is the Cenozoic era. Plant and animal fossils from this era are closer to the living things we know today. The first human ancestors also began to appear around the start of this era.

Misconception 2: ***I always thought that people were around for most of Earth's history. Is that true?***

That is not true according to many scientists. Modern humans have only been around for about 100,000 years. That is a small fraction of Earth's history. Think about it. If the geologic timeline were 12 hours long, humans would appear in the last second!

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Title: *Include the title and your name here.*	**Main Idea:** *What's the main idea? Write a complete sentence.*	**Key Details:** *Provide at least three key facts that support the main idea.*	**Vocabulary:** *List and define (in your own words) at least three important vocabulary words.*
Connections: *How does this text remind you of something in your life or another concept or text you've read or seen?*	**Chart, Illustrate, or Graph:** *Create a chart, illustration, or graph to display some of the information you learned.*	**Questions:** *After reading, create at least two questions.*	**Answers:** *Choose at least one of your questions and provide an answer with supporting details from the text.*