



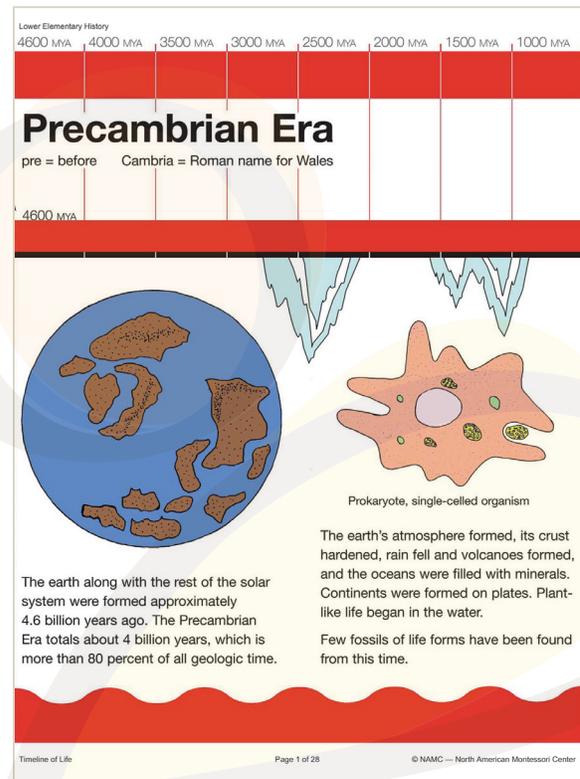
Timeline of Life: An Overview

Background Information

Once the students have an understanding of time and timelines, they can be introduced to the Timeline of Life (see NAMC's curriculum support material). This timeline summarizes the earth's history, including its geological changes and developing animal and plant life.

The Timeline of Life consists of sheets of paper 8 1/2 x 11 inches (216 mm x 279 mm) that can be joined, each sheet connecting with the sheet before and after, to form a long horizontal timeline. The sheets are organized this way:

- The top of each sheet shows a horizontal black line separated into sections, each section labeled above with a time. The first sheet of the timeline starts with 4600 MYA (4.6 BYA) and the last sheet ends with 10,000 YA (years ago).
- The white border under the black line names one of the earth's four **eras**, which represent a way of organizing earth's geologic time since 4600 MYA into four long parts. Sometimes information about the origin of the name of the era is added to this space.
- Under the era space, a gray horizontal line names one of the **periods**, which are subdivisions of eras.
- Under the line showing periods, illustrations and brief notes describe the geologic changes and developing life forms associated with the period. For



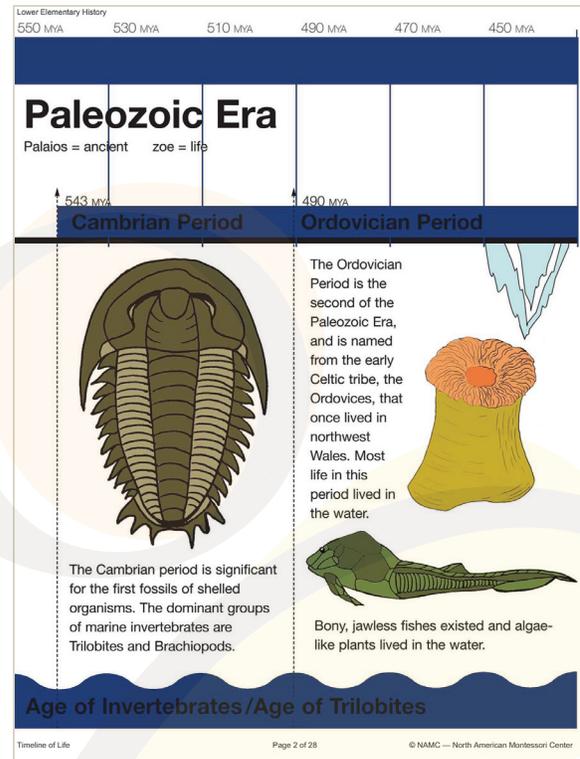
example, illustrations of mountains indicate that mountain ranges were formed during a specific time period, and illustrations of icicles hanging down indicate that glacial activity took place.

- Below the illustrations, at the bottom of the page, a gray wavy line shows an **age**, which in the Timeline of Life is a time within a geologic period that is characterized by a dominant life form. For example, the Devonian Period is known as the Age of Fishes. The exception is the Cenozoic Era, which instead of ages shows **epochs**, subdivisions of periods characterized by large amounts of rock formation.

By studying rocks and **fossils**, which are the remains or impressions of prehistoric plants or animals that were trapped, buried, and preserved in rock and other materials, scientists have estimated the earth's age as 4.6 billion years. This estimated time of the earth's existence based on rock and fossil evidence is called **geologic time**. Scientists have organized the long span of earth's geologic time into four eras: Precambrian, Paleozoic, Mesozoic, and Cenozoic.

The Precambrian Era dates from about 4.6 BYA to 543 MYA. It is the longest era, covering 80–90 percent of earth's estimated existence, and it marks the beginnings of the earth's oceans, atmosphere, continents, and early life forms. This era received its name from rocks found in Wales that were thought to date from the time before 543 MYA. In ancient times, Wales was known as Cambria. Precambrian thus means “before Wales.”

The Paleozoic Era dates from around 543 to about 250 MYA. It covers about 10 percent of earth's timeline and has been subdivided into six periods. In this era, the numbers of animals increased enormously, and diverse plant life developed. Near the end of this era, for reasons unknown, many plants and animals also became **extinct**, where no living members of a species were left anywhere on earth. This era received its name from the Greek words palaios, meaning ancient, and zoe, meaning life.



The Mesozoic Era dates from about 250 to 65 MYA. It is subdivided into three periods. This era is known as the Age of Reptiles because reptiles such as dinosaurs were the dominant land creatures. The first birds and mammals also appeared, along with a proliferation of plant life. As in the Paleozoic Era, a large percentage of animals became extinct at the end of the Mesozoic Era. This era received its name from the Greek words mesos, meaning middle, and zoe, meaning life.

The Cenozoic Era dates from about 65 MYA to the present. It is subdivided into two periods, which are further subdivided into epochs. Many new mammals, including humans, developed during the Cenozoic Era, and for this reason it is called the Age of Mammals. This era received its name from the Greek words kainos, meaning new, and zoe, meaning life.

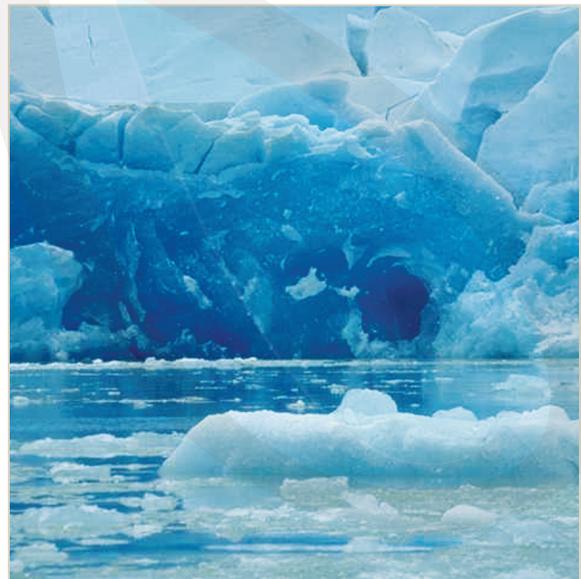
Note to the Teacher About the Timeline of Life

Some teachers might have seen a Montessori Timeline of Life that included a Neozoic Era, a tiny section following the Cenozoic Era and referring to recent times. However, since the Cenozoic Era has not yet ended, most of today's scientists do not refer to a Neozoic Era.

It is easy for teachers to overwhelm students with information about Timeline of Life topics. This manual follows an approach that allows students to engage actively in finding information that truly interests them rather than depend on the teacher to supply it. Teachers are encouraged to keep factual information brief and simple, just enough to touch on the most important points about each time period and catch students' interest.

For Timeline of Life activities, teachers can provide copies of individual Timeline of Life sheets for the students to work with.

This section also provides a sample sheet of basic statements about each of the four eras. As a follow-up to each presentation on an era, the students can use the sheet of basic statements as a guide for doing research, compiling information cards, and collecting or drawing pictures that add new details to the Timeline of Life.



ACTIVITY 2

Examining the Timeline of Life

Purpose

To become familiar with how the Timeline of Life portrays the history of life on earth.

Material

Clock of Eras (see NAMC's curriculum support material).

Timeline of Life (see NAMC's curriculum support material).

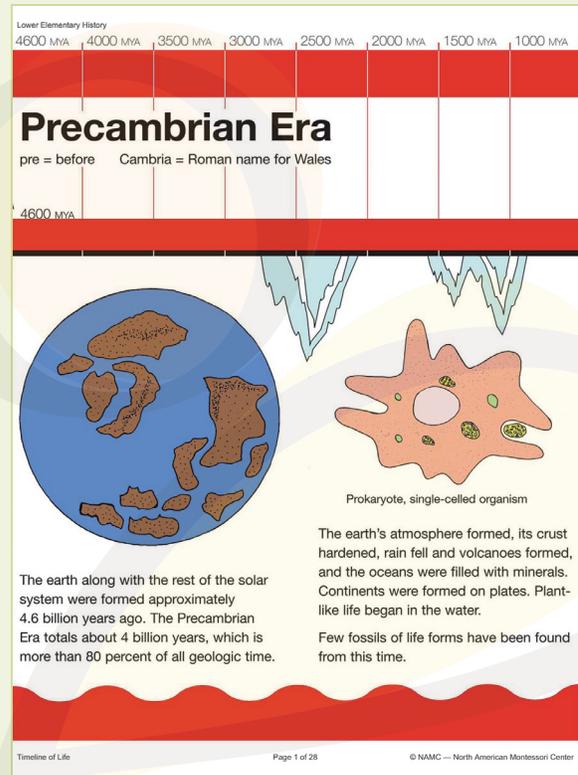
History journals and pencils.

Presentation

- Most Montessori teachers introduce this concept in Year 1 and review as needed in Year 2. This activity can be presented in parts over one day or several consecutive days.

Part 1

- Demonstrate and review the Clock of Eras. Invite the students to name the four eras.
- Announce that you are going to learn about another tool that gives information about the history of the earth, called the Timeline of Life. Explain that this timeline shows the development of life forms on earth.
- With the students, lay out the sheets of the Timeline of Life, in chronological order, on a floor or long table, or pin the



sheets to a long wall. Explain that the Timeline of Life represents earth's eras in a different, more detailed way than the Clock of Eras. The Timeline of Life stretches out in a line and so has room to show some of the major events that took place during each era.

- With the students, walk the length of the timeline, from left to right. Invite the students to read aloud the era titles under the black line, from left to right: Precambrian, Paleozoic, Mesozoic, and Cenozoic.
- Return to the first sheet of the timeline. Point out that the black line across the

top of the page shows how long each era lasted. Invite the students to look at the black line and describe how long the Precambrian Era lasted (4600 MYA or 4.6 BYA to approximately 543 MYA). Repeat with the sheets showing the other eras.

- Place the Clock of Eras under the Timeline of Life and invite the students to read aloud again the era titles on the Clock, from right to left. Point out that the Timeline of Life and the Clock of Eras both show the same four eras.

Part 2

- Point to the second row on the Timeline of Life, the row under the black line, then walk slowly along it. Show that within each era there are shorter spans of time called periods and that in each period there were big changes in the earth's geography and life forms.
- Explain first that scientists have not divided the Precambrian Era into periods, likely because scientists have found few life forms from this time.
- Point out that scientists have divided the Paleozoic Era into six periods: Cambrian, Ordovician, Silurian, Devonian, Carboniferous, and Permian. With the students, read the names aloud. Define periods and briefly discuss the differences between eras and periods. Discuss the illustrations accompanying the periods, which show geological changes and emerging life forms.

- Show that scientists have divided the Mesozoic Era into three periods: Triassic, Jurassic, and Cretaceous. With the students, read the names aloud. Discuss the illustrations accompanying the periods, which show geological changes and emerging life forms.

- Show that scientists have divided the Cenozoic Era into two periods: Tertiary and Quaternary. With the students, read the names aloud. Discuss the illustrations accompanying the periods, which show geological changes and emerging life forms.

Part 3

- Point out that the wavy gray bottom row on the chart shows ages for the Paleozoic and Mesozoic Eras and epochs for the Cenozoic Era.
- Explain that ages describe what life forms were most numerous during each period. For example, the Devonian Period of the Paleozoic Era is called the Age of Fishes because so many kinds of fish thrived during that time.
- With the students, name aloud the ages of the Paleozoic Era (Trilobites, Fishes, Amphibians, Ferns) and the Mesozoic Era (Cycads, Reptiles). Explain that you will study what these words mean in later activities.

- Point to the seven epochs of the Cenozoic Era. Define epoch and briefly discuss the difference between an age and an epoch. With the students, read aloud the epochs of the Tertiary Period (Paleocene, Eocene, Oligocene, Miocene, Pliocene) and the Quaternary Period (Pleistocene, Holocene). Discuss the animals, plants, mountain formation, and glacial activity of each epoch, as shown by the illustrations.
- Encourage the students to note the many animals depicted along the Timeline of Life and say that you will study more about these animals in upcoming activities.

- Invite the students to share ideas about how glacial activity would have affected the earth's climate and therefore, the survival of certain plants and animals.
- Ask the students to use their journals to draw a labeled picture showing how the world's geologic time has been divided into four main sections (the four eras). The labels should show the names of the eras and the periods, ages, and epochs into which the eras have been divided. Students can check their work by referring to the Timeline of Life.

