



Human Geologic Time Line

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Age:

4th and 5th grade

Objective:

This activity is designed to give the student a relative understanding of geologic time. Earth history is difficult to comprehend because of the vast amount of time that is represented. To conceptualize geologic time, various analogues relate geologic time to the duration of a single day, length of a football field, length of a roll of toilet paper, or distance between cities has been used. The analogues themselves, however, can be difficult to understand simply because they all convert large numbers. For nongeologists, it is not important to know the actual time an event occurred, but it is more important to place geologic events in a relative sequence. This activity uses the human body as a relative timeline.

Materials Needed:

Balloon

Sandstone rock

Clear plastic bottle with green-colored water in it

Various Paleozoic fossils (trilobite, pelecypod, brachiopod, etc.) in a clear plastic bag

Dinosaur model

Mammal model

Human model

All items should have a string attached to them so that they can be hung from a student's body.

Directions:

Students are told that geologists do two major activities. They study Earth materials (air, water, soil, and rock) and Earth history. Few other sciences except for archeology and astronomy place as much emphasis on events through time. Students are asked how old they think the Earth is. We let them speculate and encourage them by telling them that their estimate is "higher" or "lower" than the true age. Eventually, 4.6 billion years (by) is reached.

Students are told that Earth history will be shown to them by using a human body. A volunteer is solicited. The volunteer is asked to stand in front of the class with her/his arms extended to the sides. The tip of the fingers on one arm is used as the beginning of the Earth (4.6 by) and the tip of the fingers on the other arm is today. Hang items on the student and comment about them. Below is a list of important events and approximate locations on the human body (left to right):

4.6 by: Beginning of the solar system and Earth/Moon system. Tip of left hand fingers.

4.2 by: Development of the atmosphere and hydrosphere. Balloon at base of left hand fingers.

3.8 by: Oldest rocks on Earth, metamorphosed sedimentary rock from Isua, Greenland. Sandstone at elbow of left arm.

3–3.5 by: First microfossils of cyano-bacteria (prokaryotes) at Transvaal, South Africa, and Western Australia.

Bacteria begin supplying oxygen to the atmosphere. Bicep of left arm.

2.7 by: Abundant stromatolites (sticky bacterial mats) in many forms and environments. Increasing accumulation of oxygen in the atmosphere. Shoulder of left arm.

1–2 by: One billion years of complex cell development (eukaryotes) in the form of photosynthesizing algae and other open ocean forms. Increasing accumulation of oxygen in the atmosphere. Bottle of green water representing algae over head to hang off neck.

700–800 my: Early multicelled organisms. Metazoans and first invertebrates. Forearm of right arm.

245–540 my: Paleozoic Era. Initial exoskeletal invertebrates (trilobites, molluscs, brachiopods, echinoderms, foraminifera, ostracods) followed by vertebrates (fish) and land plants. Later, land plants with seeds, and land vertebrates (amphibians, reptiles). Bend of right wrist to base of fingers, place fossils in palm of hand while showing and talking about them.

245 my: Permian extinction. Largest extinction (90% loss of all living things). Base of fingers of right hand.

65–245 my: Mesozoic Era. Age of the dinosaurs. Also the appearance of mammals, flowering plants, and boney fish. Base of fingers of right hand to first joint at tip of middle finger. Hang dinosaur.

0–66 my: Cenozoic Era. Age of the mammals, beginning with rodents and horses, ending in hominids about 3.8 million years ago. First joint at right hand, middle finger to tip of finger. Hang mammal. Try to hang human on tip of fingernail.

All of these times are approximate and you may find variations between sources. The important points to make are:

1. There is a vast amount of time encompassed in Earth history.
2. The Earth today is not like it was billions of years ago. The increasing abundance of oxygen was important for the development of higher life forms.
3. Most of what we know about the history of the Earth is only the past 600 to 700 years.
4. Dinosaurs did not live with cavemen.
5. Major extinctions are a common event.
6. Humans are a very recent component of Earth history.

Make sure the student that is having all these items hung upon him or her is having a good time. The student's arms will start to droop in a short time, so we get other students to come forward and prop up the arms at the elbows. Be sure to summarize the events as you take items off the student.



Students use their bodies to illustrate the concept of geologic time, fingertip to fingertip. (Photo courtesy of Indiana Geological Survey)