

Geologic Time: in Your Hallway

Estimated Time: 45 minutes to 1 hour

SUMMARY

Saying things like “dinosaurs lived for 186 million years” or “the Earth formed 4.6 billion years ago” involves numbers that humans really have no context for. These values are so unbelievably big that they can be hard to imagine. This activity creates a physical model that can drive home exactly how huge a scale we’re talking about when we discuss geologic time.

WHAT YOU’LL LEARN

- The enormous scale of geologic time and the periods of Earth’s history
- Major events in Earth’s history and the development of life on this planet

Materials Used	Resources Used
<ul style="list-style-type: none"> • Stickers or cotton swabs (see Step 2) • Clear tape • Index cards (11) and pen • Tape measure or ruler 	<ul style="list-style-type: none"> • USGS website (https://www.usgs.gov/)

WHAT TO DO

1. Take a look at the chart on the next page. This chart lists major divisions of time in Earth’s history. The top of the chart describes relatively recent events, such as the last Ice Age and the spread of *Homo sapiens* over the planet. Going back farther you will see the dinosaurs, the first land animals and plants, the beginnings of life, and the origins of the Earth entirely. We will be creating this timescale as a physical model down a long hallway or across a yard.
2. Pick a place to start your timescale and place an index card there labeled “Present Day.” If you’re doing your timescale inside, then use a piece of tape to fix the card in place. If you don’t have forty feet of space indoors or you’d prefer to be outside, then you can tape the card to a cotton swab and stick it in the ground.
3. Using your tape measure or ruler, measure the next event on the chart, the start of the Quaternary Period: the period when ice sheets spread and retreated in cycles that defined the Ice Age. This period only started about 2.6 million years ago so it will probably be too close for a new index card. Instead, you can mark it with an arrow on the same index card as the “Present Day” which you’ve already added. Alternatively, you can offset it to fit it in the same space.
4. From here, make a new card for each of the events listed on the timescale using the Model Distance column for the measurement. Students will see the cards get further and further apart as the timescale moves farther back from present day. This has more to do with level of detail, but students will likely see events like “Dinosaurs” come up much more quickly than they expect.
5. Eighty-eight percent of the planet’s lifespan is the Precambrian, the term for the Proterozoic, Archean, and Hadean Eons before life became abundant. In other words, of the 40 feet marked out in this model *more than 35 has nothing bigger than a microbe!*
6. Once you reach the end of the timescale with the formation of the Earth 4.6 billion years ago, walk with students back along the timescale. Take note of the long, early periods of

the timescale and try to imagine what it might have been like. The sheer scale of geologic time is a difficult concept to internalize so sit back and look for a bit to take it in!

Period	Began (Million Years Ago)	Model Distance	Notes
Phanerozoic Epoch (Abundant Animal and Plant Life)			
Cenozoic Era the Age of Mammals			
Quaternary Period	2.6	~0.3 inches A little less than a CD jewel case.	Ice Age followed by extinction of large mammals and birds. Modern humans.
Neogene Period	23.0	2.3 inches	Grassy ecosystems spread. North and South America meet.
Paleogene Period	66.0	6.6 inches	Early primates.
Mesozoic Era the Age of Dinosaurs			
Cretaceous Period	145.0	1 foot, 2.5 inches	Early flowering plants and placental mammals.
Jurassic Period	201.3	1 foot, 9.3 inches	Dinosaurs are diverse, abundant, and huge.
Triassic Period	251.9	2 feet, 1.2 inches	First dinosaurs, mammals, and flying reptiles.
Paleozoic Era Climbing onto Land			
Permian Period	298.9	2 feet, 5.9 inches	Supercontinent of Pangaea forms.
Pennsylvanian Period	323.2	2 feet, 8.3 inches	Coal-forming swamps and abundant sharks.
Mississippian Period	358.9	2 feet, 11.9 inches	First reptiles.
Devonian Period	419.2	3 feet, 5.9 inches	First forests (evergreens) and first amphibians.
Silurian Period	443.8	3 feet, 8.4 inches	First land plants.
Ordovician Period	485.4	4 feet, 0.5 inch	Rise of coral and primitive fish.
Cambrian Period	541.0	4 feet, 6.1 inches	Early shelled organisms.
Proterozoic Eon	2500	20 feet, 10 inches	First multicellular organisms.
Archean Eon	4000	33 feet, 4 inches	Oldest known rocks on Earth. Early bacteria and algae.
Hadean Eon	4600	38 feet 4 inches	Formation of Earth's crust

TIPS

- This timescale can serve as a prop for an imaginative “time travel” game, using sound effects to pretend to be in a time machine moving back along the scale. Once you

“arrive,” step out and take a look around at the strange creatures and strange planet your machine has arrived.

- This chart is very light on details by necessity: detailing every major occurrence on Earth would take up many volumes. However, let your students guide the activity once you finish the time scale. If they have a favorite dinosaur, want to know more about early sea life, or want to look for supercontinents besides Pangaea, then those can be added to the timescale as well.
- Given space, the length of this timescale model could be doubled or even quadrupled with ease. Doing so also doubles or quadruples (at least!) the effort needed to supervise the activity, but it creates more room for adding details as described above.