



Red Rock Canyon NCA Environmental Education Program

Geology Timeline

Grades: 3-12

Estimated Time: 15-30 minutes

Standards Met:

- 3-5 grade:
 - Science E.5.C Students understand that features on the Earth's surface are constantly changed by a combination of slow and rapid processes.
- 6-8 grade:
 - Science E.8.C Students understand that landforms result from a combination of constructive and destructive processes.
- 9-12 grade:
 - Science E.12.C Students understand evidence for processes that take place on a geological time scale.

Materials Needed:

- Ball of yarn or twine
- Method for measuring
- Brightly colored tape or contrasting yarn pieces
- Geological Timeline (attached)

Sources:

Adapted from *Mojave Desert Discovery*.
Joshua Tree National Park Association,
1998.

Submitted by Anica Mercado

Objective:

Demonstrate the relative distance of events in time

Procedure:

Lead in to topic by discussing the age of the earth and how long students think various things of the surrounding area are.

Ask a chaperone to hold one end of the yarn to mark the beginning of the earth. Explain that the earth is 4.6 billion years old, and that you'll be doing an activity to get a better understanding of the age of everything around you.

Have the students walk with you to when rocks first appear on earth, 12 feet from the chaperone, and mark it with tape or yarn. Explain that to scale this represents 600 million years and how geology is measured on a much larger scale that we are used to looking at things.

Note: Depending on your class, it may be helpful to have the measurements pre-marked on the yarn before doing activity with students.

Continue on as a group to the third point, when life begins on earth, 16 feet from the chaperone. Mark it clearly and explain what this point represents. Have students look at the distance between the beginning of the earth and the two points you've stopped at. Make sure they understand that it is to scale and what that means.

Continue walking with the students to all of the points on the list, talking about each one and the distance. You might want to have another chaperone hold the yarn at when multicellular life

first existed, at 68 feet, to keep the yarn off the ground.

Variation: For older and/or well behaved students, after the third point you can have the students make guesses and stand where they think each upcoming event in time would be, then discuss the distances and amount of time each event took. Make sure to set boundaries, either natural or with a chaperone, of how far the students can go.

Suggested Locations:

Long, straight, and relatively flat section of trail.

Pine Creek Trail:

Between 1&2 or 4&5

Red Spring Boardwalk:

Between 5&6 or 7&9

Fire Ecology Loop:

Between 1&2

Moenkopi Loop:

Between 1&2

Geological Timeline

Distance from start of earth	Years Ago	Events
0	4.6 billion	Earth begins
12'	4 billion	First rocks on earth
16'	3.8 billion	Life on earth begins
68'	1.2 billion	Multicellular organisms appear
80'	600 million	Red Rock Canyon under deep ocean and coastline was western Utah
83'	450 million	First primitive fish
84'	400 million	Earliest land plants (ferns and mosses)
85'	350 million	Earliest land animals (amphibians)
85'9 ³ / ₄ "	310 million	First reptiles
87'1 ¹ / ₄ "	245 million	Age of dinosaurs begins
87'6"	225 million	Pangaea begins to break apart Sea bed in Red Rock Canyon slowly begins to rise
88'4 ³ / ₄ "	180 million	Flowering plants develop Red Rock Canyon completely arid and a giant dune field
88'9 ³ / ₄ "	160 million	Birds evolve
90'8 ¹ / ₂ "	65 million	Keystone Thrust Fault begins to develop Dinosaurs extinct Mammals begin
91'2 ¹ / ₄ "	40 million	First elephant
91'10 ³ / ₄ "	5 million	First humans
91'11.64"	1.5 million	Beginning of ice ages
91'11.998"	10,000	End of most recent ice age
91'11.99994"	235	Declaration of Independence signed
92'	0	Present Day

Scale:

1' = 50 million years

¼" = 1,041,667 years

1/16" = 260,417 years