

It's About Time: Find Your National Natural Landmark



Grades 5-9

Source: National Park Service. Adapted with permission.

The National Park Service's National Natural Landmarks (NNL) Program recognizes and encourages the conservation of sites that contain outstanding biological and geological resources. NNLs are designated for their outstanding condition, illustrative character, rarity, diversity, and value to science and education.

What makes an NNL special often is, in a sense, its age -- the vast expanse of time over which it has come into being. Geologic time can be difficult for people to understand. Our own lives are so short when we compare them to the age of the Earth, the hundreds of millions of years of geologic time are almost too much to grasp.

For us to understand Earth activities today, we must have at least some basic understanding of geologic time. For example, how can we predict the effect of human activities on the global climate without understanding past climate changes and periods of mass extinction? By studying the past, we can better understand the present and more accurately predict future changes.

Scientists do not measure geologic time on a clock or calendar. They use a *timeline* that is based on the age of rocks and the fossils found in those rocks. The geologic timeline also includes the changes in life that occurred over millions of years.

To understand how a timeline works, you will make a personal timeline and compare it to the geologic timeline shown here. Then you will use that timeline to better understand the vastness of geologic time over which an NNL near you has come into being.

Materials

- Very large sheets of paper
- Clean floor with a hard surface
- Pencils, crayons, or non-toxic markers
- Computer with internet access

Procedure

1. First, go online and visit the website of Garden of the Gods (<https://coloradosprings.gov/GOG>). Garden of the Gods provides an outstanding illustration of the physical characteristics of sedimentary rocks and the massive forces

that produced the front range of the Rocky Mountains. This NNL is also home to two unusual animals; the present-day honey ant and fossils from a Cretaceous Period plant-eating dinosaur (*Theiophytalia kerri*).

Do your own online research about Garden of the Gods. Over what period of time did the geology of this site develop? What time period did the *Theiophytalia* dinosaur live and how does that relate to the timing of the formation of the Rocky Mountains? Are the plants and animals found there today different from those that lived in this area in the past? What significant events might be recorded on a timeline of Garden of the Gods?

2. With the help of a partner, make a timeline diagram of your own development. You will be using your arm span from fingertip to fingertip, so make sure your paper is big enough. Lie down with your arms stretched out to both sides on your paper. Have your partner carefully trace the outline of your hands, arms, and, if there is enough room, your head, too!

Choose the longest fingertip of one hand on the diagram and label it “Birthday.” Label the longest fingertip on the other hand “Today.” Draw a straight line from the Birthday fingertip all the way to the Today fingertip. This is your timeline.

3. To turn your timeline into a ruler, divide the straight line you just drew into as many equal pieces as your age in years. (If you’re 12, for instance, your timeline will have 12 equal pieces.)

Number each of the lines on your timeline using years. Put the year you were born on the line where it says Birthday. Mark each equal section with the next year from your birth. Your Today line should have the current year under it.

4. Go back as far as you can remember in your life. Make a list of important events that have happened in your lifetime. For example:
 - First tooth lost
 - First year at school
 - Younger sibling born

You might also want to include important world events, like “NASA Space Rover lands on Mars” (2004) and “Instagram launches” (2010).

5. When you finish, compare your timeline to others in your class. Now, compare your timeline to the geologic timeline here.

Where would your timeline fit into Earth’s timeline? How much space would your timeline take up on Earth’s timeline? What does this tell you about the age of the Earth compared to your age? What about the age of Rainbow Basin compared to your age?

6. Now, go online and visit the NNL website (<http://www.nature.nps.gov/nnl/>). Scroll down and click on “National Natural Landmarks Directory.” Click on your state to find out what NNLs exist in your state. If there is none in your state, try a nearby state.

What is the NNL nearest to where you live? Can you visit in person? Over what time period did the geology of the NNL develop? What can you learn online about the outstanding biological and geological resources represented there?

EON	ERA	PERIOD	EPOCH	Ma		
Phanerozoic	Cenozoic	Quaternary	Holocene	0.01		
			Pleistocene	Late	0.8	
		Early		1.8		
		Tertiary	Neogene	Pliocene	Late	3.6
					Early	5.3
				Miocene	Late	11.2
					Early	16.4
					23.7	
			Paleogene	Oligocene	Late	28.5
					Early	33.7
				Eocene	Late	41.3
					Middle	49.0
					Early	54.8
		Paleocene	Late	61.0		
	Early		65.0			
	Mesozoic	Cretaceous	Late	99.0		
			Early	144		
		Jurassic	Late	159		
			Middle	180		
			Early	206		
		Triassic	Late	227		
			Middle	242		
			Early	248		
			Permian	Late	256	
				Early	290	
	Paleozoic	Pennsylvanian	Mississippian	323		
			Late	354		
			370			
		Devonian	Middle	391		
			Early	417		
423						
Silurian		Late	443			
		Early	458			
Ordovician		Late	470			
		Middle	490			
		Early	500			
Cambrian		D	512			
		C	520			
		B	543			
	A	900				
	1600					
Precambrian	Proterozoic	Late	2500			
		Middle	3000			
		Early	3400			
Archean	Archean	Late	3800?			
		Middle				
		Early				

http://geomaps.wr.usgs.gov/socal/geology/geologic_history/images/geologic_time_scale.jpg