

Grand Canyon National Park's Ranger Audio Tour Stop # 15 **Geologic Clock**

Hi there, my name is Ranger Haley, and I'd like to welcome you to Grand Canyon National Park, home to a geologic wonder whose depths reveal 1.84 billion years of our Earth's history. The walls of the Grand Canyon record evidence of worldwide ecological and geological change. Yet, the stories written in the Grand Canyon are only a small part of our ever changing planet's story.

To better appreciate this epic saga, take a look at your watch or the clock just above you. Our Earth was born 4.54 billion years ago. Let's take those 4.54 billion years and compress them down to just 24 hours. On this geologic clock, every minute represents a little over 3 million years and every hour is just under 190 million years. Let the story of our ever changing planet begin.

The day opens at midnight. Our planet has just formed from cosmic dust 4.54 billion years ago. Primordial earth is a far cry from where we live today. She is scorched and battered. Massive asteroids and comets continually bombard our lifeless planet while volcanoes spew toxic gases into the air. This restless unstable planet must undergo many changes before life can even survive.

Nearly 4 hours go by as the earth cools and stabilizes. Then, the first simple life forms appear at 3:55 in the morning. Over 2 billion years must pass before the first multi-cellular creatures evolve at 5:39 in the evening. These first few steps of life are slow, but momentous.

At 9:46 pm the first insects, scorpions, and centipedes scuttle over the earth. Scarcely an hour passes when at 10:47 pm early dinosaurs walk the planet. Over 96 percent of the earth's history has gone by at this point.

At 11:37 pm North America shakes and quakes as the Rocky Mountains and Colorado Plateau are uplifted, setting the stage for the future carving of the Grand Canyon. At 11:40 pm after only an hour alive on earth the dinosaurs perish in the most famous of mass extinctions, ushering in the age of mammals.

At 90 seconds till midnight the Colorado River begins to carve the Grand Canyon. That leaves less than two minutes for the last 6 million years of history. At 2 seconds to midnight the first humans appear. Their lineage will change the planet in ways never seen before, and you are one of their descendents.

The clock has struck midnight, and so ends the past four and half billion year history of our ever changing planet. Our own great story, which spans many thousands of years, barely lasted 2 seconds. When faced with the immense scale of our ever changing Earth's history, we humans are but pygmies in comparison.