Geologic Time in a Calendar Year

*Adapted from Kentucky Geological Survey ©*

The scale of geologic time is vast, currently estimated at nearly 4.6 billion years. During that time, life evolved into the familiar forms we see today. These materials are provided to assist in understanding time relationships and how life on Earth changed through time.

The dates shown were compiled from several available sources. Table 1 shows some important events in Earth history, presented in the order in which they occurred. The data are also shown on the scale of a calendar year. When geologic time is compressed to the scale of a calendar year, 1 second equals about 146 years. At this scale, World War II began about 0.4 second before midnight on December 31; because of rounding, this is shown as midnight of the new year.

 **Paleozoic Era**

|  |  |  |
| --- | --- | --- |
| **544** | **Cambrian period begins** | **11/18 20:02** |
| 515 | Burgess Shale animals, animals with a notochord | 11/21 3:15 |
| **505** | **Ordovician period begins** | **11/21 22:18** |
| 505 | First fish | 11/21 22:18 |
| 470 | First fossil evidence of land plants | 11/24 16:57 |
| **438** | **Silurian period begins** | **11/27 5:53** |
| 430 | First vascular land plants | 11/27 21:07 |
| 414 | Oldest lung fish fossils | 11/29 3:36 |
| **408** | **Devonian period begins** | **11/29 15:01** |
| 408 | Oldest fossil evidence of mosses | 11/29 15:01 |
| 385 | First insects (beetles), scorpions, and centipedes | 12/1 10:49 |
| 380 | First lobe-finned fish | 12/1 20:20 |
| 375 | First land animals (amphibians) | 12/2 5:52 |
| 370 | First sharks | 12/2 15:23 |
| 365 | First seed plants (ferns) | 12/3 0:54 |
| **360** | **Mississippian period begins** | **12/3 10:26** |
| 330 | First possible reptiles | 12/5 19:33 |
| **320** | **Pennsylvanian period (Kentucky coal)** | **12/6 14:36** |
| 286 | Permian system begins | 12/9 7:21 |
| 260 | Sail-backed reptiles (Dimetrodon) | 12/11 8:52 |
| 245 | End of Paleozoic, 96% of all life on Earth perishes | 12/12 13:26 |
|  |  **Mesozoic, the "Age of Reptiles"** |  |
| **245** | **Triassic period begins** | **12/12 13:26** |
| 240 | First crocodiles | 12/12 22:57 |
| 228 | First dinosaurs (Eoraptor and Saltoposuchus) | 12/13 21:48 |
| 221 | First mammals (shrew-like) | 12/14 11:08 |
| 210 | First turtles | 12/15 8:05 |
| **208** | **Jurassic period begins** | **12/15 11:53** |
| 195 | Dilophosaurus, an early Jurassic dinosaur | 12/16 12:39 |
| 155 | First bird, Archeopteryx | 12/19 16:49 |
| 152 | Apatosaurus and Brachiosaurus (long-necked | 12/19 22:32 |
| 150 | Allosaurus, (meat-eating dinosaur) | 12/20 2:20 |
| 148 | Stegosaurus, (plate-backed dinosaur) | 12/20 6:09 |
| **144** | **Cretaceous period begins** | **12/20 13:46** |
| 115 | First flowering plants | 12/22 21:00 |
| 82 | Duck-billed dinosaurs (Maiasaurus) | 12/25 11:50 |
| 80 | Protoceratops (first dinosaur eggs discovered) | 12/25 15:39 |
| 75 | Triceratops | 12/26 1:10 |
| 70 | Tyrannosaurus rex and Velociraptor | 12/26 10:41 |
| 65 | End of Mesozoic, probably meteor or comet impact | 12/26 20:13 |

 **Table 1**

**Millions years Era, System or Event Relative to calendar**

**before present year (date, time)**

 **Precambrian Era**

**4600 Earth formed from planetary nebula 1/1 0:00**

3900 Inferred origin of life (first cells) 2/25 13:02

3800 Oldest age-dated rocks on Earth 3/5 11:28

3600 Fossil algae and stromatolites (prokaryots) 3/21 8:20

3250 Fossil evidence of bacteria 4/18 2:52

2100 Fossil evidence of cells with a nucleus (eukaryots) 7/18 8:52

1500 First multi-celled organisms (seaweed and algae) 9/3 23:28

670 Oldest marine worms and jellyfish 11/8 20:05

600 Vendian period begins: Edicarian fossils 11/14 9:23

 **Cenozoic, the "Age of Mammals"**

**65 Tertiary period begins 12/26 20:13**

64 First ancestors of dogs and cats 12/26 22:07

60 Grasses become widespread 12/27 5:44

57 First ancestors of pigs and deer 12/27 11:27

55 First horses (Eohippus) 12/27 15:15

45 First ancestors of rabbits 12/28 10:18

39 First monkeys 12/28 21:43

4 Oldest human like ancestors (hominids) 12/31 17:20

**2 Quaternary period begins 12/31 20:57**

1 First of four ice ages 12/31 22:05

1 Oldest direct human-ancestor fossil, Homo habilis 12/31 23:02

0.1 First modern man, Homo sapiens 12/31 23:48

0.05 Mammoth and mastodon bones, Big Bone Lick, KY 12/31 23:54 235 years Revolutionary War 12/31 23:59

70 years World War II 1/1 0:00

Directions:

Using the blank calendar provided you and your group will label all the significant events that have taken place since Earth began (January 1st ).

* Label each month and write in the correct corresponding days (January has 31 days, February has 29, etc)
* You must label all events on your calendar
	+ If multiple events happen in one day put them in the correct order, bulleted (times aren’t necessary)
* You must color, shade or box the following eras in a particular color:
	+ Precambrian- Red
	+ Paleozoic – blue
	+ Mesozoic- green
	+ Cenozoic- yellow
* For each period you must label the days/weeks it spans on your calendar similar to this:



* For each month, like a typical wall calendar, you must draw an appropriate image that relates to the happenings of the month (use the empty box to the right)
	+ Must have color
* When finished answer the questions on the back as a group (all members will be responsible for knowing this information on their test)

**Geologic Time Scale Questions:**

1. What era is the longest?
2. How many years does/did it span?
3. What era is the shortest?
4. How many years does/did it span?
5. What era do we live in?
6. What period do we live in?
7. What percentage of time did dinosaurs roam?
8. What percentage of time have hominids existed?
9. What percentage of time have land plants existed?
10. Why do you think the Paleozoic era is divided into many different time periods while Precambrian is not?
11. Come up with an acronym that will help you memorize the eras from most recent to older

