|  |  |  |  |
| --- | --- | --- | --- |
| Sheets | Event | Geological time (Number of years before present) | Comments |
| *0.00* | *Present* | *0* |  |
| 0.0005 | Modern man | 10,000 |  |
| 0.01 | Neanderthal man | 100,000 |  |
| 0.03 | First use of fire | 500,000 |  |
| 0.06 | Worldwide glaciation | 1,100,000 |  |
| 0.07 | Homo erectus | 1,300,000 |  |
| 0.08 | Linking of North and South America | 1,500,000 |  |
| 0.08 | Oldest stone tools | 1,600,000 |  |
| **1.15** | **Beginning of Quaternary period (end Tertiary/Neogene)** | **23,000,000** |  |
| 0.15 | Australopithecus | 3,000,000 |  |
| 0.50 | Beginning of Antarctic ice caps | 10,000,000 |  |
| 0.50 | Opening of Red Sea | 10,000,000 |  |
| 0.75 | Formation of Himalayan Mountains | 15,000,000 |  |
| **1.15** | **Beginning of Tertiary/Neogene period (end Paleogene)** | **23,000,000** |  |
| 1.25 | First evidence of ice at the poles | 25,000,000 |  |
| 2.00 | Collision of India with Asia | 40,000,000 |  |
| 2.50 | Early horses | 50,000,000 |  |
| 2.50 | Separation of Australia and Antarctica | 50,000,000 |  |
| 3.00 | Early primates | 60,000,000 |  |
| 3.00 | Opening of Norwegian Sea and Baffin Bay | 60,000,000 |  |
| 3.00 | Alps form | 60,000,000 |  |
| **3.25** | **Beginning of Tertiary/Paleogene period** | **65,000,000** |  |
| **3.25** | **Beginning of Cenozoic Era** | **65,000,000** | **"recent life"** |
| **3.25** | **Cretaceous Period, Mesozoic Era end** | **65,000,000** |  |
| 3.25 | Dinosaurs became extinct | 65,000,000 |  |
| 4.00 | Rocky Mountains form | 80,000,000 |  |
| **7.00** | **Cretaceous Period begins (Jurassic ends)** | **140,000,000** |  |
| 7.50 | Early flowering plants | 150,000,000 |  |
| 9.00 | Early birds and mammals | 180,000,000 |  |
| **10.40** | **Jurassic Period begins (end Triassic)** | **208,000,000** |  |
| 11.00 | Opening of Atlantic Ocean | 220,000,000 |  |
| **12.25** | **Triassic Period begins** | **245,000,000** |  |
| **12.25** | **Beginning of Mesozoic Era (end Paleozoic)** | **245,000,000** | **"middle life"** |
| 14.00 | Final assembly of Pangaea | 280,000,000 |  |
| **14.50** | **Beginning of Permian period (end Carboniferous/Pennsylvanian)** | **290,000,000** |  |
| 16.25 | First reptiles | 325,000,000 |  |
| **16.15** | **Beginning of Carboniferous/Pennsylvanian period (end Mississippian)** | **323,000,000** |  |
| 18.15 | Early trees, formation of coal deposits | 363,000,000 |  |
| **18.15** | **Beginning of Carboniferous/Mississippian period (end Devonian)** | **363,000,000** |  |
| **20.45** | **Beginning of Devonian period (end Silurian)** | **409,000,000** |  |
| 21.50 | Early land plants | 430,000,000 |  |
| **21.95** | **Beginning of Silurian period (end Ordovician)** | **439,000,000** |  |
| 24.50 | Early fish | 490,000,000 |  |
| **25.50** | **Beginning of Ordovician period (end Cambrian)** | **510,000,000** |  |
| 28.50 | Early shelled organisms | 570,000,000 |  |
| **28.50** | **Beginning of Cambrian period (end of Precambrian time)** | **570,000,000** | **rise of multicellular animals** |
| **28.50** | **Beginning of Paleozoic Era** | **570,000,000** | **"ancient life"** |
| **28.50** | **Beginning of Phanerozoic Eon (end Proterozoic)** | **570,000,000** | **"visible life" (or 544 million years ago)** |
| 35 | Early multicelled organisms | 700,000,000 |  |
| 40 | Breakup of early supercontinent | 800,000,000 |  |
| 70 | Formation of early supercontinent | 1,400,000,000 |  |
| 60 | First known animals | 1,200,000,000 |  |
| **125** | **Beginning of Proterozoic Eon (end Archeon)** | **2,500,000,000** | **"earlier life"** |
| 135 | Buildup of free oxygen in atmosphere | 2,700,000,000 |  |
| 170 | Early bacteria & algae | 3,400,000,000 |  |
| 190 | Oldest known Earth rocks | 3,800,000,000 |  |
| **200** | **Beginning of Archeon Eon** | **4,000,000,000** |  |
| **230** | **Precambrian time begins** | **4,600,000,000** |  |
| 230 | Origin of earth | 4,600,000,000 |  |

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Deep Time Toilet Paper Model**

**Task**

Create a timeline of Earth’s life on toilet paper. Use the scale on the back of this sheet to mark out points on Earth’s timeline. Our scale will use one sheet of toilet paper to represent 23 million years.

**To Do**

At each point on your assigned section of the timeline, you are responsible for labeling the important events that occurred. Present time is represented by the beginning of the sheet.

Every 10th sheet is labeled

**Materials**

Toilet paper

Post-Its

Scissors

Meter Stick

**Assignments**

Group 1: Present- Formation of Himalayan Mountains

Group 2: Beginning of Quaternary period (end Tertiary/Neogene)- Alps form

Group 3: Beginning of Tertiary/Paleogene period- Beginning of Mesozoic Era (end Paleozoic)

Group 4: Final assembly of Pangea – Early Shelled organisms

Group 5: Beginning of Cambrian Period – Origin of Earth

**Wrap Up Questions**

1. Which events on the time scale do you feel are most significant and why?
2. Why is it difficult for humans to contemplate the age of the Earth and the times at which events occurred?
3. Given the following list of events, how can you determine the order in which they occurred?

My mother's birth, My maternal grandmother meets my maternal grandfather, My father meets my mother, My mother's birth, I graduate from high school, My maternal grandmother's birth

1. How does your approach to the problem above relate to our understanding of the order of events in Earth’s history that we could not see directly?
2. Does your method for question 3 help you to tell how much time occurred between events? Why or why not?
3. In geology, radiometric dating is often used to determine the age of rock samples. However, this technique cannot be employed with most fossils. How can geologists determine the age of fossils without radiometric decay?