Name \_\_\_\_\_ Day, Time \_\_\_\_\_

Date \_\_\_\_\_

**Purpose** To compare and contrast the relative lengths of geologic eras and periods

**Background**

A geologic timetable divides Earth’s history into eras, periods, and epochs. It is difficult, however, for a geologic timetable to show the relative lengths of the eras and periods. You can draw a geologic time line to help you better understand the duration of geologic events.

**Materials** 3 pieces of Computer paper Meter Stick Pencil Metric Ruler Tape

**Procedure**

1. Obtain 3 pieces of computer paper and turn the longer sides horizontally. Tape them end to end with a 1 cm overlap so that you have 3 sheets in a row going horizontally.

Now

4 billion

2. Measure 5 cm from the top edge of the paper on both the left and right top sides. Make a dot at the 5 cm mark.

3. Measure 1 cm from the left edge of the paper and draw a straight, horizontal line across the paper.

4. Add a 2 cm vertical line to the left side of the long line drawn that is perpendicular to the line and centered (as shown above)

5. Write the word “**NOW**” above the 2 cm vertical line you just drew (*this line represents present day and it is the point from which all of your other measurements will be made*).

6. Measuring from your **NOW** line:

* Mark your horizontal line in 20 cm intervals.
* At each 20 cm interval, draw a perpendicular line across the tape as before (#4).
* Label the first 20 cm line (closest to **NOW** line) **1 BILLION** (*above the horizontal line*).
* Label the second 20 cm line **2 BILLION**
* Label the third 20 cm line **3 BILLION**
* Label the fourth 20 cm line **4 BILLION**.

7. Plot the events listed in Chart 1 (page 3) on your paper BELOW the timeline.

* Measure EACH event from the **NOW** line, using the scale of **20 centimeters = 1 billion years**. Put this scale on the timeline at the lower right corner.
  + 0.02 mm = 1 million years;
  + Multiply the million years by 0.02 mm/year … see Chart 1 for lengths.
* At each measurement, draw a perpendicular, straight line across the tape.
  + Label each line with the NUMBER (26 – 9) below the line drawn.
  + The oldest event listed in Chart 1 is the proposed origin of the Earth, 4.6 billion years ago.
* 4.6 billion years represents 4.6 x 1000 x 0.02 mm/ million years = 92 cm according to the scale.
  + - This is off the horizontal line to the right.
    - Place the number “26” just to the right and BELOW the horizontal line ending as shown below.
* Measure 460 cm (4 meters + 60 centimeters) from the **NOW** line.

Now

26

scale

* After drawing codes 26 to 9, make a secondary horizontal timeline as shown below which will represent codes 1 – 8 from Chart 2.
  + Label this secondary timeline (“Recent Timeline”) as shown below.
  + Label each line with the NUMBER (1 – 8) below the line drawn.
  + Divide the million years on Chart 2 by 3 to get the CENTIMETERS on the horizontal line.
  + Code 8 🡪 66 million years/3 = 22 cm from the left mark
  + See Chart 2 for distances along the horizontal line.
  + Place Code 1 just to the left of the left vertical mark.

**Chart 1**

**Take a picture of your timeline and insert it into this document.**

Recent timeline

1

8

26

|  |  |  |
| --- | --- | --- |
| **Number of Years Ago** | **Code** | **Event** |
| 4.6 billion *[92 cm]* | 26 | Origin of Earth |
| 3.8 billion *[76 cm]* | 25 | Beginning of **Archeozoic** Era |
| 3.5 billion *[70 cm]* | 24 | Oldest known rocks |
| 2.5 billion *[50 cm]* | 23 | Beginning of Proterozoic Era |
| 1.2 billion *[24 cm]* | 22 | First known animals – **Precambrian time** |
| 542 million *[10.8 cm]* | 21 | Beginning of **Paleozoic Era** and Cambrian Period |
| 488 million *[9.8 cm]* | 20 | Beginning of Ordovician Period |
| 444 million *[8.9 cm]* | 19 | Beginning of Silurian Period |
| 416 million *[8.3 cm]* | 18 | Beginning of Devonian Period |
| 359 million *[7.2 cm]* | 17 | Beginning of Mississippian Period |
| 318 million *[6.4 cm]* | 16 | Beginning of Pennsylvanian Period |
| 299 million *[5.9 cm]* | 15 | Beginning of Permian Period |
| 251 million *[5.0 cm]* | 14 | Permian Extinction |
| 251 million *[5.0 cm]* | 13 | Beginning of **Mesozoic Era** and Triassic Period |
| 225 million *[4.5 cm]* | 12 | First bird |
| 200 million *[4 cm]* | 11 | Beginning of Jurassic Period |
| 200 million *[4 cm]* | 10 | First mammals |
| 146 million *[2.9 cm]* | 9 | Beginning of Cretaceous Period |

Chart 2

|  |  |  |
| --- | --- | --- |
| **Number of Years Ago** | **Code** | **Event** |
| 11.5 thousand | 1 | End of Ice Age – Pleistocene Extinction |
| 1.8 million *[0.6 cm]* | 2 | Beginning of Pleistocene Epoch |
| 3.5 million *[1.2 cm]* | 3 | Hominid (human) footprints in Footprint Tuff |
| 5 million *[1.7 cm]* | 4 | Beginning of Pliocene Epoch |
| 23 million *[7.7 cm]* | 5 | Beginning of Miocene epoch |
| 34 million *[11.0 cm]* | 6 | Beginning of Oligocene Epoch |
| 56 million *[18.7 cm]* | 7 | Beginning of Eocene Epoch |
| 66 million *[22 cm]* | 8 | Beginning of **Cenozoic Era** and Paleocene Epoch (K/T Boundary Extinction) |

**Conclusions** *(Write answers in complete sentences with supporting data)*

1. Which two events on your timeline are separated by the longest duration of geologic time? By how many years are they separated?

2. Which event was the most difficult to plot? Explain why.

3. From your timeline and using the internet, complete the information in the table below. Include all of the following significant events:

Dinosaurs Formation of the earth Pangaea Earliest Organisms Humans

|  |  |  |
| --- | --- | --- |
| Era | Length in Years (*show work*) | Significant Events |
| Archeozoic Era |  |  |
| Proterozoic Era |  |  |
| Paleozoic Era |  |  |
| Mesozoic Era |  |  |
| Cenozoic Era |  |  |

4. Which of the eras listed in Question 3 was the longest? Which is the shortest?

5. What Era would Alfred Wegener refer to related to his Continental Drift idea (pangea)?

**Conclusions** *(Write answers in complete sentences with supporting data)*

1. Which two events on your timeline are separated by the longest duration of geologic time? By how many years are they separated?

*The two events that are separated the most on the geologic time scale (tape) are the Archeozoic Era and the Proterozoic Era. They are separated by 1.3 billion years.*

2. Which event was the most difficult to plot? Explain why.

*The event that is most difficult to plot is the End of Ice Age – Pleistocene Extinction during the Cenozoic Era. This is because the scale length is about 1/100th of a millimeter, representing 11.5 thousand years.*

3. From your timeline and using the internet, complete the information in the table below. Include all of the following significant events:

Dinosaurs Formation of the earth Pangaea Earliest Organisms Humans

|  |  |  |
| --- | --- | --- |
| Era | Length in Years (*show work*) | Significant Events |
| Archeozoic Era  (*not shown in text*) | 3.8 – 4.6 billion  **0.8 billion** | Formation of the earth |
| Proterozoic Era | 2500 – 542 million  1958 million = **~2 billion** | Earliest Organisms |
| Paleozoic Era | 542 – 251 million  **291 million** | Pangaea |
| Mesozoic Era | 251 – 66 million  **185 million** | Dinosaurs |
| Cenozoic Era | 66 – Now  **66 million** | Humans |

4. Which of the eras listed in Question 3 was the longest? Which is the shortest?

*The longest Era shown in the table is the Proterozoic Era (~2 billion years). The shortest Era is the present Cenozoic Era (66 million years).*

5. What Era would Alfred Wegener refer to related to his Continental Drift idea?

*Wegener proposed the idea of Pangaea in his continental drift theory. According to the geologic time scale, this took place during the Paleozoic Era.*