**Geologic Time Scale Assignment**

**Objectives of Lab:**

* To create a model of the geologic time scale and its major events
* To use the time scale to answer questions about earth history

**Materials needed:**

* Pre-measured piece of adding machine paper
* Masking tape
* Colored pencils
* Extinction #5 Cretaceous
* Ruler and meter stick
* Geologic Time Scale handout

**Step 1)** Stretch out the paper and tape it to the floor with the masking tape.

**Step 2)** Label one end of the paper with “Today” and the other end with “Origin of the Earth”

For the scale you are making: 1 millimeter = 1 million years. 1 centimeter =10 million years

 10 centimeters= 100 million years 1 meter= 1 billion years

**Step 3)** Using the meter stick, mark the paper with 1 billion, 2 billion 3, billion and 4 billion years ago, working back from the present day. You are assigning an age of “0” to “Today” and 1 meter=1 billion years ago.

**Step 4)** Draw a line and label the “0” line with “Today” and draw a line across the paper at the other end of the paper at 4.6m (460 cm) before the present. This will be the “Origin of the Earth” at 4.6 billion years ago.

**Step 5)** Using the dates listed below, label the time periods on the paper with your colored pencils, drawing boundaries where the different geologic eras begin and end. Use your geologic time scale handout as a guide for what this should look like. Note: It is possible to have multiple time intervals starting or ending at the same time—for example, if you look at your time scale handout, you will see that the Phanerozoic Eon and the Paleozoic Era start at the same time.

* Precambrian Eon (4.6 billion years ago-542 million years ago “mya”)
* Phanerozoic Eon (542 mya- Present)
* Paleozoic Era (542 mya to 251 mya)
* Mesozoic Era (251 mya to 66 mya)
* Cenozoic Era (66 mya-present day)

Other events to put on your time scale:

* + Oldest rocks on earth- 4.1 billion years (410cm before “today”)
	+ Oldest fossils- 3.5 billion years (350cm before “today”)
	+ First fish ~525 million years (52.5cm before “today”)—*note there is a BIG gap from oldest fossils to this point, and that is normal. Most of earth history does not have much going on in the fossil record.*
	+ First plants on land- 460 million years ago (46cm before “today”)
	+ First amphibians 375 million years ago (37.5cm before “today”)
	+ First reptile 315 million years ago (31.5 cm before “today”)
	+ First dinosaur 228 million years ago (22.8cm before "today”)
	+ First mammals 210 million years ago (21cm before "today”)
	+ First birds 150 million years ago (15 cm before "today”)
	+ First flowers 130 million years ago (13cm before "today”)
	+ First horses 50 million years ago (5cm before “today”)
	+ First hominins (human ancestors that walked on two legs) 7 million years ago (7mm before “today”)
	+ First anatomically modern humans—300,000 years ago. 0.3mm—Won’t be possible to put on time scale at this resolution, pretty much coincident with “today” on timeline

Using the geologic time scale handout to determine the dates, draw stars on the timeline when of each of the five largest mass-extinctions occurred on our planet. They take place near the end boundary of each of the time periods that they are named for.

* Extinction #1 Ordovician
* Extinction #2 Devonian
* Extinction #3 Permian
* Extinction #4 Triassic
* Extinction #5 Cretaceous

Questions and Review based on the scale you created and your guided notes:

1. Are the eras of the Phanerozoic equal in length of time?

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2) Why do you think they are or are not equal in time?

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1. Spend some time looking up information on the internet about the “Big Five” mass extinctions. This is a good resource: <https://www.discovermagazine.com/planet-earth/mass-extinctions>

3a) Which of the “Big-5” was the largest?

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3b) What do scientists think caused this extinction?

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4) Which of the extinctions wiped out the dinosaurs?

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5) Stromatolites, which are among the first fossils to appear in the fossil record, appear approximately 3.5 billion years ago. What percentage of earth history do stromatolites represent (they still exist today)? (Hint: divide their length of time on the earth by the age of the earth and then multiply by 100 to transform to a percentage)

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6) As you indicated on the time scale, the modern humans appear in the fossil record approximately 300,000 years before the present. What percentage of the age of the earth does 300,000 years represent?

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7) Now take a minute to look over the entire time scale. Reflect in a few sentences how the age of the earth compares to the length of time that humans have been on our planet. How does that change the way you think about humanity as it compares to our ancient earth?

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8) As you discovered, anatomically modern humans did not arise until 300,000 years before the present. We began to grow our own food around 12,000 years ago, and progressively started to use more technology, with a large leap forward during the industrial revolution in the mid-19th century.

Considering that the earth is much, much older than these time frames, reflect in a few sentences about the ways that humans have changed our planet and how this relates to the rest of the history of the Earth.

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