

Name: _____ Block: _____ Date: _____

Geologic Time Scale Lab

AP Environmental Science

Mr. G

Objective:

To construct a timeline for the appearance of organisms on the Geologic Time Scale in order to conceptually understand the time involved in evolutionary processes.

This lab is designed to be a conceptual activity instead of our traditional science experiment. Due to this, the sections will be slightly different. You will need the following for this lab write-up (with point value for each): *Purpose* (2 pt), *Materials* (1 pt), *Procedure* (2 pt), *Events* (6 pt), *Analysis* (9 pt)

Procedure:

Using 5 meters of adding machine tape, generate a geologic time scale using the following conversions: 1 m = 1 billion years, 10 cm = 100 million years, 1 cm = 10 million years, 1mm = 1 million years. At the end of the tape, draw a line and label it “Present”. Measure to find the spot on the tape where 4.6 billion years ago would be and label this “Earth’s beginning”. Plot all of the events below in the appropriate location on the tape. Color code as instructed and feel free to be artistic!

Events

Begin by adding all of the geologic eons, eras, periods, and epochs (as shown in the diagram to the right) onto the tape. Make sure to record how many millions of years ago each started.

Then, add the following events (color-code):

Evolutionary events (Blue):

- First evidence of life (3,850 million years ago [ma])
- Oldest fossils (3,500 ma)
- First evidence of soft-bodied animals (900 ma)
- The Cambrian Explosion (530 ma)
- First land plants and fish (480 ma)

◆ *continued on next page...*

Geological Timescale				
Eon	Era	Period	Epoch	Date (million years ago)
Phanerozoic	Cenozoic	Quaternary	Holocene	0,01
			Pleistocene	1,8
		Tertiary	Pliocene	5,3
			Miocene	23
			Oligocene	34
			Eocene	56
			Paleocene	65
	Mesozoic	Cretaceous		145
		Jurassic		199
		Triassic		251
		Permian		299
	Paleozoic	Carboniferous		359
		Devonian		416
		Silurian		443
		Ordovician		488
		Cambrian		542
Precambrian	Proterozoic			2500
	Archean			4600

Evolutionary events (Blue):

- First reptiles (350 ma)
- First mammals and dinosaurs (220 ma)
- First birds (150 ma)
- First hominids (5.2 ma)
- Modern humans (0.1 ma)

Extinctions (Red):

- Some single-celled animals and soft-bodied animals (Vendian 543 ma)
- Reef-builders and other shallow-water organisms (Cambrian 520 ma)
- Ninety percent of all species (End Permian 250 ma)
- Dinosaurs and 60 to 80 percent of all species (End Cretaceous 65 ma)
- Foraminifera, gastropods, and sea urchins (Late Eocene 33 ma)
- Many woodland, plant-eating herbivores (Miocene 9 ma)
- Nearly all mammals and birds over 45 lbs. (Late Pleistocene 0.1 ma)

Geologic Events (Yellow):

- Formation of the great oceans (4,200 ma)
- Continents begin shifting (3,100 ma)
- Rodinia supercontinent breaks up (700 ma)
- Gondwana forms (500 ma)
- Great mountain ranges form (425 ma)
- Formation of Pangaea supercontinent (280 ma)
- Pangaea supercontinent breaks up (200 ma)
- Mt. Stuart and the Stuart Range is formed (96 ma)
- Ancestral Cascade Mountains form (37 ma)
- Inland seas dry up (20 ma)
- Columbia River Basalts (forming most of the bedrock of Eastern WA) (17 ma)
- Global ice ages begin (2 Ma)

Please make sure to record the Geologic Time Scale image and all of the above events in your notebook!!!

Analysis:

Discuss the function of time in evolutionary processes. How does this relate to how long humans have been on the planet? Why is it important for scientists to study the history of the Earth? How does that history relate to AP Environmental Science? Also, considering extinctions, during what time frame has species extinctions caused by humans been the highest.