Lab: Making a Geologic Time Scale **Do Not Write on This**

Background:

How old is the Earth? Well, if the Earth celebrated its birthday every million years, there would be 4,600 candles on its birthday cake! Humans have been around only long enough to light the last candle on the cake. Because the Earth is 4.6 billion years old, geologists have created a geologic time scale to make their job of studying Earth's history easier. The geologic time scale is a standard method used to divide the Earth's long history into smaller parts. Just as your life's history is broken up into sections, the history of the Earth is broken up into smaller sections called time. Your history can be broken up into sections and labeled as birth, elementary years, middle school years, high school years, professional years, etc. Time can be broken down even further, they call these eras. Just think how your school years can be broken down into grades (elementary = 1st, 2nd, 3rd, 4th, 5th grades). Eras can be further broken down to periods. Think of this like every 9 weeks in each grade.

Objective

In this activity you will construct a scale model of geologic time that will show the relative amount of time of the events in Earth's history.

Materials

5 meters of adding machine tape, Meter stick, Colored pencils, internet (if needed)

Directions

1. Measure out 5 meters of adding-machine tape and cut.

2. Stretch out the adding-machine tape on the floor or on your table. Tape each end of the adding-machine tape onto the floor or a stable surface.

3. Use a meter stick to draw a continuous horizontal line (i.e., lengthwise) 2 cm from the top of the 5 m strip of adding-machine tape. Use a scale of **1 meter equals 1 billion years**. Each **millimeter then represents 1 million years**.

4. At one end of the tape, draw a vertical line across the entire tape and label it "TODAY" using a black marker.

5. Measure off the distance starting from the "TODAY" line that represents 4.6 billion years (b.y.) ago. Draw a vertical line across the entire tape at that point and label it "Earth's Beginning" using a black marker. Then fill out the data table on page 2.

6. Between the top of the paper and the line marked at 2cm, write down the time and the eon name using a colored pencil that applies and draw a vertical line at the beginning and end of each eon. For example, Hadean, Archean, Proterozoic or Phanerozoic (see data table on page 2).

7. Using the Geologic Time Scale chart:

a. Mark with a vertical line for each era and period in the Phanerozoic Eon. Write the name of each era below the line marking 2cm with one color. Write each period at the bottom of the paper with a different color than the eon or era color.

Major geologic time division	Time Period	Measurement on tape
Precambrian Time	4,500 – 543 m.y.a.	
Hadean Eon	4,500 - 3,800 m.y.a	
Archean Eon	3,800 – 2,500 m.y.a	
Proterozoic Eon	2,500 – 543 m.y.a	
Phanerozoic Eon- Paleozoic Era	543 – 248 m.y.a.	
Paleozoic Era – Cambrian Period	543 – 490 m.y.a.	
Paleozoic Era- Ordovician Period	490 – 443 m.y.a.	
Paleozoic Era- Silurian Period	443 - 417 m.y.a.	
Paleozoic Era- Devonian Period	417 – 354 m.y.a.	
Paleozoic Era- Mississippian Period	354 – 323 m.y.a.	
Paleozoic Era- Pennsylvanian Period	323 – 290 m.y.a.	
Paleozoic Era- Permian Period	290 – 248 m.y.a	
Phanerozoic Eon- Mesozoic Era	248 - 65 m.y.a.	
Mesozoic Era- Triassic Period	248 – 206 m.y.a.	
Mesozoic Era- Jurassic Period	206 – 144 m.y.a.	
Mesozoic Era- Cretaceous Period	144 - 65 m.y.a.	
Phanerozoic Eon -Cenozoic Era	65 m.y.a. - today	
Cenozoic Era - Tertiary Period	65 – 1.8 m.y.a.	
Cenozoic Era - Quaternary Period	1.8 m.y.a. - today	

- Suggestion: Start from the “TODAY” line and work your way back through Earth’s history.

b. Write down each of the following events on your timeline using a marker.

i. Humans appear

ii. First land plants

iii. First fish

iv. First flowering plants

v. First dinosaurs, first mammals

vi. First birds

vii. First multicellular organisms

viii. The first prokaryote

ix. First reptiles

x. Primates appear

xi. First eukaryote

xii. First amphibians

xiii. First insects

xiv. Oxygen starts to accumulate in atmosphere

xv. First water

xvi. Extinction that wiped out the dinosaurs

xvii. Extinction wiped out apprx 95% of species

xviii. Oldest fossils – bacteria microfossils

c. Draw in colored pencils an example of the major organisms to evolve for each period. Lightly color each era a different color using colored pencils.

Analysis:

1. How many years does your tape-time scale represent? _____

2. The largest sections of geologic time are called _____. List them in order from youngest to oldest.

3. The largest sections are broken up into subsections called _____. List them in order from youngest to oldest.

4. By far, the longest geologic time is _____.

5. Which era is longest? _____ The shortest? _____

6. In which eras and periods did dinosaurs, mammals, flowering plants and birds appear on Earth?

7. Which lived on Earth the longer time, dinosaurs or mammals? Calculate the range of time for each.

8. Why would it be hard to outline the history of the United States on the geologic scale?

9. Why is it impossible for a cat fossil to be found in the same sedimentary rock layer as a dinosaur fossil?

10. Were humans around during the time of the dinosaurs? Explain.

11. How much of the tape has man been around? (use a percentage).

12. How much of earth's existence will you see in your lifetime? (use a percentage).