

# The Geology of Pacific Northwest Rocks & Minerals

## Lab 1: Geologic Time Scale

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### 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 Eons. Your life history can be broken up into sections and labeled as decades, like, the 90's (1990-1999), the teens (2010-2019). Eons can be broken down even further, they call these Eras. Just think how decades can be broken down into years, 1991, 1992, 1993, etc. Eras can be further broken down to Periods. Just think about how years can be broken down into months, January, February, March, etc.

### 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, ruler, colored pencils/crayons

### Directions

1. Measure out 5 meters of adding-machine tape and cut.
2. Stretch out the adding-machine tape on the floor. Tape each end of the adding-machine tape onto the floor or a stable surface. This adding machine tape is your geologic time scale.
3. Use a scale of **1 meter equals 1 billion years**. Each **millimeter then represents 1 million years**.
4. At one end of the time scale, 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 (Ba) ago. Draw a vertical line across the time scale at that point and label it "Earth's Beginning" using a black marker. Then fill out the data table on page 2.
6. Using the Geologic Time Scale chart:
  - a. Mark with a vertical line each Era and Period in Phanerozoic Time. Write the name of each Era with a red marker. Write each Period at the bottom of the paper with a blue marker.

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Major geologic time division	Time Period	Time Beginning Measurement on tape (mm)
<b>PreCambrian Eon</b>	4,500 – 543 Ma	
<b>Phanerozoic Eon - Paleozoic Era</b>	543 – 248 Ma	
Paleozoic Era – Cambrian Period	543 – 490 Ma	
Paleozoic Era- Ordovician Period	490 – 443 Ma	
Paleozoic Era- Silurian Period	443 - 417 Ma	
Paleozoic Era- Devonian Period	417 – 354 Ma	
Paleozoic Era- Carboniferous Period	354 – 290 Ma	
Paleozoic Era- Permian Period	290 – 248 Ma	
<b>Phanerozoic Eon - Mesozoic Era</b>	248 to 65 Ma	
Mesozoic Era- Triassic Period	248 – 206 Ma	
Mesozoic Era- Jurassic Period	206 – 144 Ma	
Mesozoic Era- Cretaceous Period	144 - 65 Ma	
<b>Phanerozoic Eon -Cenozoic Era</b>	65 Ma - today	
Cenozoic Era - Tertiary Period	65 – 1.8 Ma	
Cenozoic Era - Quaternary Period	1.8 Ma - today	

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

b. You are provided with the time, in Ma, that the following species first appeared. Write down each of the following events on your timeline using a black marker.

- |   |        |
|---|--------|
| i. Humans appear  | 0.2 Ma |
| ii. First land plants   | 450 Ma |
| iii. First fish   | 530 Ma |
| iv. First flowering plants                                    | 160 Ma |
| v. First dinosaurs  | 234 Ma |
| vi. First birds   | 201 Ma |
| vii. First multicellular organisms                            | 2.1 Ba |
| viii. The first prokaryote                                    | 3.6 Ba |
| ix. First reptiles  | 300 Ma |
| x. Extinction that wiped out approximately 95% of all species | 251 Ma |
| xi. Primates appear   | 60 Ma  |
| xii. First eukaryote  | 1.2 Ba |
| xiii. First amphibians  | 360 Ma |
| xiv. First insects  | 400 Ma |
| xv. Oxygen starts to accumulate in atmosphere                 | 2.1 Ba |
| xvi. First mammals  | 320 Ma |

c. Draw in colored pencils an example of the major organisms to evolve for each period.

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### 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).