Name _____ Date_____ Period _____ Score out of 25 ____

Corrected by _____

# Geological Timeline Activity

**Significant developments and extinctions of plant and animal life can be shown on a geologic time scale.**

To understand evolution, humans must think in units of time much larger than those we use to define our lives. After all, evolutionary change occurs too slowly to be measured in days, months, or years. Instead, it's documented in layers upon layers of rock deposited over the course of 4.6 billion years.

The earth has been significantly altered during this time by climate swings, volcanism, drifting continents, and other "earth shattering" events. These dynamic conditions, in turn, have influenced every living thing that has inhabited the planet. Because of this, biology alone cannot fully explain the evolution of life on our planet. It's necessary to include the physical sciences -- geology, chemistry, and physics -- in order to understand the conditions in which life arose and evolved.

*The story of life is told primarily by its victims.* Scientists say that only one in a thousand species that have ever lived survives today. The other 99.9 percent are extinct, gone forever. With few exceptions, the lifespan of individual species is short by geological standards, on average between 2 and 10 million years. No matter how well adapted a creature is to its environment, history has shown that even the most dominant can be wiped away. Ironically, extinction is a springboard to other life. Even in the most catastrophic of events, species survive and continue to evolve, often filling niches left by the victims.

Extinction is by and large a natural process in which species, groups, and even whole families of organisms disappear. Background extinctions, which are ongoing throughout the history of life, eliminate one family every million years or so. The more destructive and relatively sudden kind of extinction -- the mass extinction event -- is caused by environmental influences and has a global impact on diversity. All extinctions identified in this timeline are mass extinction events.

The geologic time scale we use to study the history of the earth and of it life forms is commonly referred to as "deep time," and it's a concept perhaps as difficult to conceive as deep space. Can humans measure deep time? Yes. Will we ever truly comprehend such immensity of time? Probably not. But to develop a better understanding of evolutionary change in its proper historical context, we must try. This timeline provides a framework for doing so.

**Procedure to make a Geological Timeline of Major Events**

1. Work in a group of four students.
2. Lay the adding machine tape on the floor where it won't interfere with other students. Tape the ends to the floor.
3. Within the first 20 centimeters in the **top left corner**:
    a. Write a **full heading** – Geological Timeline, names in the group, date, and period
    b. Underneath the heading, make a **scale.** 1 meter = 1 billion years
       1 centimeter = 10 million years
       1 millimeter = 1 million years
4. Measurement for the timeline will begin with "**Today,** Starting on the **left side of the paper, measure 20 cm** to the right on the line, and make a vertical mark. Label this mark – **Today**

Today

5. Using the Major Events listed in **Table 1, measure and write the major events** on your geologic time line.
6. Each student will answer the Analysis questions; however, you will turn in one timeline per group.

Table 1 Major Events in Geological Time

| Time | Scale | Major Event | |
|---|---|---|---|
| Today | 0 cm | The Present | CENOZOIC ERA (write in blue) |
| ~100,000 ya | 0.1 mm | Homo Sapiens (Modern Form of Human Species) | |
| ~ 22 mya | 2.2 cm | Grasses | |
| ~ 33 mya | 3.3 cm | First Apes | |
| ~50 mya | 5 cm | Eohippus (First Known Horse) | |
| 65 mya | 6.5 cm | **CENOZOIC ERA** | |
| ~ 65 mya | 6.5 cm | Dinosaurs Extinction | MESOZOIC ERA (write in red) |
| ~140 mya | 14 cm | First Flowering Plants | |
| ~200 mya | 20 cm | Earthworms | |
| ~220 mya | 22 cm | First Mammals | |
| ~240 mya | 24 cm | Start of the age of the dinosaurs | |
| 248 | 24.8 cm | **MESOZOIC ERA** | |
| ~330 mya | 33 cm | Winged Insects | PALEOZOIC ERA (write in green) |
| ~380 mya | 38 cm | First Insects | |
| ~390 mya | 39 cm | First Sharks | |
| ~395 mya | 39.5 cm | Amphibians | |
| ~400 mya | 40 cm | Ferns | |
| ~440 mya | 44 cm | First Land Plants | |
| ~440 mya | 44 cm | First Jawed Fish | |
| 540 MYA | 54 cm | **PALEOZOIC ERA** | |
| ~550 mya | 55 cm | Jellyfish | PRECAMBRIAN TIME (write in orange) |
| ~1.8 bya | 1 m 8 cm | First Eukaryotes | |
| ~2.4 bya | 2 m 40 cm | Significant rise in oxygen, to ~2% level | |
| ~3.5 bya | 3 m 50 cm | Prokaryotes (bacteria) | |
| ~4.6 bya | 4 m 60 cm | Formation of Earth and Moon | |
| 4.6 bya | 4 m 60 cm | **PRECAMBRIAN TIME** | |

**Analysis**

1. For how long has there been life on Earth? _____
2. For what percentage of time has life existed on Earth (round to the nearest whole number).

   _____
3. For about how many years of geological time have humans existed on Earth?

   _____
4. For about how many years of geological time have the dinosaurs existed on Earth?

   _____
5. Did dinosaurs exist at the same time as humans? _____
6. How do scientists determine when an era begins and when it ends?

   _____

   _____
7. What is the purpose of making a geological timeline?

   _____

   _____