Name _____ Date _____ Class _____

Math Skills for Science

MATH IN SCIENCE: EARTH SCIENCE

MATH SKILLS USED
Subtraction
Division
Decimals
Percentages
Scientific Notation

Geologic Time Scale

Understand geologic time using the geologic time scale.

If you wanted to find out how long it has been since your last birthday, you would simply look at a yearly calendar, right? But what would you do if you wanted to find out how long ago a dinosaur lived or a volcano was formed? Then you would need a calendar that goes much farther back in time—maybe all the way back to the beginning of Earth's history. There is such a calendar—it is called the **geologic time scale.** It begins about 4.6 billion years ago and continues up to the present. Instead of months and days, it divides Earth's history into *eons, eras,* and *periods.*

Geologic Time Scale

Eon	Era	Period	Millions of years ago
Phanerozoic	Cenozoic	Quaternary	1.8
		Tertiary	65
	Mesozoic	Cretaceous	144
		Jurassic	206
		Triassic	248
	Paleozoic	Permian	290
		Pennsylvanian	323
		Mississippian	354
		Devonian	417
		Silurian	443
		Ordovician	490
		Cambrian	540
Proterozoic			2500
Archean			3800
Hadean			4600

It's Been a Long, Long Time . . .

1. Calculate the number of years that each era and eon lasted, starting with the present era.

_____

_____

_____

_____

2. How many years passed between the end of the Pennsylvanian period and the beginning of the Tertiary period? Be careful!

_____

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Managing Huge Numbers

The geologic time scale measures extremely long periods of time. When numbers are very large, it is often easier to do calculations or comparisons using scientific notation, which simplifies large numbers.

3. Write the following times in scientific notation:

a. the beginning of the Quaternary period _____

b. the end of the Proterozoic eon _____

c. the beginning of the Earth's history _____

d. the beginning of the Jurassic period _____

e. the end of the Jurassic period _____

4. The Archean eon lasted 1.3×10^9 years. The era in which we live, the Cenozoic, meaning "recent life," has lasted 6.5×10^7 years. How many times longer was the Archean eon than the present era?

_____

_____

The Fossil Record

As plants and animals appeared and disappeared from the Earth, they left a fossil record. In fact, the divisions in the geologic time scale are based on distinct changes in the fossil record. For example, the extinction of the dinosaurs separates the Mesozoic era from the Cenozoic era. In the chart below, you can see that the appearance of different living things characterizes different periods in the Earth's history.

Animals in the Fossil Record

Animals	First appearance
Birds	Jurassic period (late)
Mammals	Jurassic period (early)
Reptiles	Pennsylvanian period
Amphibians	Mississippian period
Fishes	Ordovician period

5. Approximately how much longer have fishes been on Earth than mammals?

_____

_____

6. The earliest plant life began to appear on land during the Silurian period, about 420 million years ago. During approximately what percentage of the total history of the Earth were plants *not* growing on land?

_____

_____

Calendar Challenge

Another way to understand the geologic time scale is to picture Earth's history as it would appear on a typical calendar. To begin, determine how many years a "day" is in geologic time. Then determine in which months the eras fall. Fill in the calendar below with the names of the eras. Write the name of the eon if there is no name for the era.

Earth's Historical Calendar

January (31 days)	February (28 days)	March (31 days)	April (30 days)
May (31 days)	**June (30 days)**	**July (31 days)**	**August (31 days)**
September (30 days)	**October (31 days)**	**November (30 days)**	**December (31 days)**

7. How many years in geologic time is represented by one day on the calendar above?

_____

8. On what date does the Proterozoic eon end?

_____

9. How many days did the Paleozoic era last?

_____

10. How many days are there from the beginning of the Cenozoic era to the end of the year?

_____