GEOLOGIC TIME SCALE

ERA	Physical and *Biological* EVENT	
P R E C A M B R I A N	570 M.Y.	*Protozoans, sponges, jellyfish, segmented worms emerge.*
		*First **complex** life forms: worms, algae, bacteria, etc. flourish in the oceans.*
	1.0 B.Y.	**Comets** regularly streak through the sky.
		Oxygen atmosphere develops from photosynthesis. *Cells appear with a nucleus.*
	2.0 B.Y.	**Canadian Shield** formed in North America.
		One to five supernovae may explode in our galaxy every century.
		Volcanoes helped to form the atmosphere.
	3.0 B.Y.	*Bacteria and blue-green algae flourish. No other life forms yet.*
		Crust grows thicker; early mountains form.
E R A		*Life begins on Earth in its simplest form: amino acids and then proteins develop.*
	4.0 B.Y.	Meteorites bombard the planets and their moons.
		The Earth's atmosphere began to form. Rain, running water and primitive seas developed.
570 **Million** Years to 4.5 **Billion** Years	4.5 B.Y.	The Earth formed from a spinning disk of gas and dust.

The Precambrian ERA represents about 84 % of the Earth's 4.5 Billion Year history!

GEOLOGIC TIME SCALE

ERA	PERIOD	EPOCH Physical and *Biological* EVENT
PALEOZOIC ERA 250 - 570 M.Y.	250 M.Y. Permian Period	European and Asian plates collided to form the Ural Mts. **Coal** formed in Europe, China and Australia. Salt and gypsum deposits formed in Kansas as seas slowly dried up. Appalachian mountain building ends. Carlsbad Caverns (New Mexico) limestone formed. (the caves formed later) **Oil** and **Gas** formed in the Western U.S.A. Glaciers found in Brazil, Australia and Africa. *Many marine animals become extinct (including trilobites).*
	290 M.Y. Pennsylvanian Period	*Early **Reptiles**.* Swampy lowlands produced many plants which were buried and turned to **coal** in: West Virginia, Indiana, Illinois, Pennsylvania and Kentucky. *Many sharks and amphibians.* *Placoderms become extinct.* Sea level changed many times in North America.
	324 M.Y. Mississippian Period	Many limestone deposits formed in the Mississippi Valley. **Mountains** formed in Western Europe. **Coal** formed in Virginia and Russia. Oil formed in Missouri, Kansas and Oklahoma. Most of the Central U.S.A. was under water (seas). Glaciers advance. *Many scale trees and ferns.*
	345 M.Y. Devonian Period "Age of Fishes"	*Armored fish become extinct.* **Volcanic activity.** Appalachian Mountains continue to rise. **Oil** and **Natural Gas** formed in North America. *Insects emerge.* *Early Amphibians and Ammonites fluorish.*
	400 M.Y. Silurian Period	Shallow seas covered most of North America. Niagra Falls was forming. **Volcanic activity** in Maine and in Canada. Caledonia Mountains were uplifted (Scandinavia and Greenland). *Early land plants and animals.*
	440 M.Y. Ordovician Period	Widespread marine sedimentation (many fossils formed). 70% of North America was under water (seas). Appalachian Mountains begin forming. *Early fish.* *Gastropods emerge (snails, lobsters, crabs slugs, etc.)*
	500 M.Y. Cambrian Period 570 M.Y.	**Volcanic activity.** Mountains formed: Taconic Mts of New York state. Lead and zinc deposits formed in Wisconsin. **Oil** and **Natural Gas** formed in the Central U.S. *Population explosion of marine invertebrates such as Brachiopods (clams), Bryozoans, starfish, and jawless fish.* *Many fossillized shells found in the rocks.*

The Paleozoic ERA represents only about 10 % of the Earth's 4.5 Billion Year history!

GEOLOGIC TIME SCALE

ERA	PERIOD	EPOCH	Physical and *Biological* EVENT
MESOZOIC ERA 65 - 250 M.Y.	65 M.Y. CRETACEOUS PERIOD	UPPER	**Meteorite** impact on Earth. *Many Dinosaurs became extinct.* Mountains formed: Alps, Caucasus, Himalayas and Andes. Western North America covered by seas. *Many Brachiopods become extinct.* **Volcanic activity** in Western U.S.A.
		LOWER	*Early flowering plants.* *Many bony fish.* *Many Dinosaurs lived.* Rocky Mts. forming by uplifting. (They are still rising today) Many chalk beds were formed in France and England. Widespread submergence ... over 50% of the current landmasses were covered with water.
	140 M.Y. JURASSIC PERIOD	UPPER	Mountains formed: Sierra Nevada, Coast Range, Alaskan Range, Cascade and Klamath Mts. *Many Dinosaurs lived.* **Volcanic Activity.**
		MIDDLE	*Many Dinosaurs lived.* Rock formations in Yosemite National Park formed. Continued **Continental Drift**; South America and Africa begin to split up. Mid-Atlantic Ridge is formed. **Coal is formed in:** China, Siberia, Japan, Hungary and Australia.
		LOWER	**Oil is formed in:** Wyoming, Arkansas, Texas and Louisiana. Many **Gold** deposits formed in the western U.S.A. *Early birds and mammals.*
	195 M.Y. TRIASSIC PERIOD 250 M.Y.	UPPER	*Early **dinosaurs** appear.* *Many pine trees.* Petrified forests of Arizona formed.
		LOWER	**Continental Drift:** Pangaea began breaking up. Atlantic Ocean begins forming.

The MESOZOIC ERA represents only about 4 % of the Earth's 4.5 Billion Year history!

GEOLOGIC TIME SCALE

ERA	PERIOD	EPOCH	Physical and *Biological* EVENT
C E N O Z O I C E R A 0 - 65 M.Y.	0 M.Y. QUATERNARY PERIOD	0 M.Y. HOLOCENE .01 M.Y	***MODERN HUMANS !!*** *Mastodons, mammoths and large carnivores.* **Niagra Falls** begins forming. Formation of the Grand Canyon continues. Great Salt lake of Utah formed.
		PLEIS-TOCENE 2.5 M.Y.	Formation of the Great Lakes Many active **volcanoes** in the Cascade Mts. Continental glaciers cover the Northern Hemisphere (over 30% of Earth's land) Formation of the Grand Canyon begins. ***Early HUMANS*** *appear.*
	2.5 M.Y. TERTIARY PERIOD 65 M.Y.	PLIOCENE 6 M.Y.	Many active **volcanoes**: Mt. Etna (Sicily), Mt. Vesuvius (Italy) Many new volcanoes formed: Mt. Shasta, Mt. Rainier, Mt. Hood (Western U.S.A.). *Many modern mammals.*
		MIOCENE 25 M.Y.	Continental uplifting (mountain building): Cascade Mts. (Washington and Oregon), Himalayas (Asia), Alps (Europe) and the Coast Range of California and Oregon. Oil and Natural Gas formed in Louisiana and Texas. *Many modern mammals*
		OLIGOCENE 38 M.Y.	**Volcanic activity** in Iceland, Alps, Himalayas. Formation of the Badlands of South Dakota. (Erosion continues today). Continental Drift continues: Antarctica collides with Asia to form the Himalayas. *Many mammals.*
		EOCENE 55 M.Y.	**Volcanic activity** in Northwestern U.S.A. *Many mammals.*
		PALEOCENE 65 M.Y.	**Volcanic activity** in New Mexico, Colorado and Montana. **Lignite Coal** was formed. *Earliest placental mammals.*

The CENOZOIC ERA represents only about 1 to 2 % of the Earth's 4.5 Billion Year history!