**Geologic Time Scale Notes**

**Precambrian (supereon)**

**4.6 BYA** – Creation of Earth: gravity clumps (i.e., accretes/accretion) together rock and debris

**4.6/5 BYA** –Creation of Moon (Theia): small planet crashes into Earth, turning into ring of debris, gravity clumps (i.e., accretes) debris together to form moon

**3.9 BYA** – Creation of Oceans: meteors, with frozen H2O ice crystals, bombard Earth for 20 million years

**3.8 BYA** – Creation of Continents: Volcanic islands collided together because of plate tectonics

**3.8 BYA** – Single Celled Bacteria: one hypothesis is that minerals, carbon, and amino acids from dissolved meteorites, in the oceans, mixed as gasses and minerals at underwater chimneys (i.e. hydrothermal vents) to form the first life; a type of single-celled bacteria.

**3.5 BYA** – Stromatolite: colony of bacteria that releases oxygen as byproduct (increased O2 leads to iron deposits)

**1.5 BYA** – Start of Plate Tectonics: Crust of Earth cools enough to break into plates and plates move because of molten rock under surface

**1.1 BYA** – Rodinia: first supercontinent

**650 MYA** –Creation of Snowball Earth: CO2 is absorbed out of the atmosphere by rock, causing less heat energy (i.e., infrared radiation) to be trapped, decreasing temperature of planet

**635 MYA** – End of Snowball Earth: Volcanic eruptions release carbon dioxide (CO2) into atmosphere, causing more heat (i.e., infrared radiation) to be trapped, raising temperature of Earth

**650-635MYA** – Creation of large amounts of Oxygen: sun’s radiation causes ice in Snowball Earth to change chemical composition into oxygen (O2)

Paleozoic Era

**544 MYA**- Cambrian Explosion: extreme increase of the amount of life in oceans (none on land), most likely due to the increased oxygen levels or a “bottle necking” during Snowball Earth

Items: Pikaia, trilobites

**460 MYA** – Creation of Ozone Layer: sun’s radiation turns oxygen (O2) into Ozone (O3), this layer protects biologic material on land and allows it to grow

**360 MYA** – Carboniferous Period: an increase in plant and animals on the continents, due to increased ozone protection

Items: plants, insects

**360-286 MYA** – Coal Forests: trees in a swampy area that died millions of years ago. Over time they got buried by sediment (e.g., rock), and heat/pressure from ground turned them into coal.

**286 MYA** – Permian Period: a time full of large water and land animals - Items: reptiles, Pangaea forms

**245 MYA** – Permian Extinction: mass extinction of 95% of all species on the planet (i.e., ocean & land). It was caused by a lava plume eruption that lasted 500,000 years. The volcanic eruption increased carbon dioxide levels and raised the temperature of the Earth.

Mesozoic Era

**245 MYA** – Pangaea Supercontinent (Formation 260 MYA): an important supercontinent in the study of plate tectonics and the dinosaurs

**200 MYA** – Oil Formation: fish die and get buried by sediment over time. The pressure from the sediment and heat from the ground chemically changes the fish into oil.

**180 MYA** – Pangaea breaks up: plate tectonics (i.e., movement of Earth’s crust) splits up Pangaea

**65 MYA** – KT Extinction/Boundary: An asteroid impacted Earth in the Gulf of Mexico (east of Mexico). This impact caused tsunamis, earthquakes, fires, and the complete blocking of the sun for months. This was the mass extinction of the dinosaurs.

Cenozoic Era

**47 MYA** – Himalaya Mountains: India was at one time its own continent. Plate tectonics moved India north and crashed it into Asia. Because the rock was of similar density (i.e., hardness) the two plates crushed together and built up the mountains. Today, the mountains continue to grow.

**40,000 YA** – Start of Pleistocene Ice Age: the ice age is (most likely) due to the orbit of the Earth around the sun. Because of the Earth’s orbit it is at times further away from the sun making it cooler, carbon dioxide levels also decreased leading up to the ice age, and ocean currents slowed/changed course (i.e., change to the Thermohaline Circulation).

**14,000 YA** – Great Lakes: the glaciers are so heavy that they left an indentation in the ground. After they melted the glacial water was left behind in those ground depressions.