

# GEOLOGIC TIME SCALE

YA = years ago  
MYA = millions of years ago

| EON                                                                | ERA                                                                | PERIOD        | EPOCH               | BEGAN     | ENDED     | LIFE FORMS                                                                             | MAJOR GEOLOGIC EVENTS                                                                                                                          |
|--------------------------------------------------------------------|--------------------------------------------------------------------|---------------|---------------------|-----------|-----------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| P<br>H<br>A<br>N<br>E<br>R<br>O<br>Z<br>O<br>I<br>C                | C<br>E<br>N<br>O<br>Z<br>O<br>I<br>C<br><br>(Age of Mammals)       | Quaternary    | Holocene            | 11,000 YA | present   | Modern humans<br>Extinction of large mammals & birds                                   | Worldwide glaciation (110,000 YA)                                                                                                              |
|                                                                    |                                                                    |               | Pleistocene         | 1.6 MYA   | 11,000 YA | Homo erectus (early humans)                                                            |                                                                                                                                                |
|                                                                    |                                                                    |               | Pliocene            |           |           | Large carnivores<br>Earliest hominid fossils                                           | Beginning of cascade volcanic arc<br>(2 MYA)<br>Uplift of Sierra Nevada Mts.<br>(4 MYA)<br>Linking of N. & S. America<br>(4.5 MYA)             |
|                                                                    |                                                                    |               | Miocene             | 5.3 MYA   | 1.6 MYA   | Whales & apes<br>Large browsing mammals<br>Monkey-like primates                        | Volcanic activity in Yellowstone<br>(17 MYA)                                                                                                   |
|                                                                    |                                                                    |               | Oligocene           | 23.7 MYA  | 5.3 MYA   | Formation of grasslands (40 MYA)                                                       | Opening of Red Sea                                                                                                                             |
|                                                                    |                                                                    | Tertiary      | Eocene              | 36.6 MYA  | 23.7 MYA  | Primitive horse & camel (52 MYA)                                                       | Beginning of Antarctic ice caps<br>(45.5 MYA)<br>Collision of India & Eurasia<br>(55 MYA)                                                      |
|                                                                    |                                                                    |               | Paleocene           | 57.8 MYA  | 36.6 MYA  | Extinction of dinosaurs & many other species                                           | Eruption of Deccan basalts<br>(65 MYA)                                                                                                         |
|                                                                    |                                                                    |               |                     | 65 MYA    | 57.8 MYA  | Placental mammals appear (65 MYA)<br>Early flowering plants (144 MYA)                  | Rise of Alps, Himalaya Mts. begin to form (70 MYA)<br>Formation of Rocky Mts.<br>(80 MYA)<br>Most of North America under inland seas (100 MYA) |
|                                                                    |                                                                    |               |                     | 144 MYA   | 65 MYA    | Early birds (150 MYA)<br>Early mammals (200 MYA)                                       | Opening of Atlantic Ocean<br>(180 MYA)                                                                                                         |
|                                                                    |                                                                    | Cretaceous    |                     | 208 MYA   | 144 MYA   | Flying reptiles (228 MYA)<br>First dinosaurs (245 MYA)<br>Largest mass extinction ever | Breakup of Pangaea begins<br>(200 MYA)                                                                                                         |
|                                                                    |                                                                    |               |                     | 245 MYA   | 208 MYA   | Coal-forming forests abundant<br>Sharks abundant<br>First reptiles (320 MYA)           | End of Mountain building in eastern North America                                                                                              |
|                                                                    |                                                                    |               |                     | 286 MYA   | 245 MYA   | First amphibians (370 MYA)<br>Giant insects (400 MYA)<br>First evergreen forests       | Mt. building in Europe, Urals<br>(395 MYA)                                                                                                     |
|                                                                    |                                                                    |               |                     | 408 MYA   | 360 MYA   | Early land plants (425 MYA)                                                            | Life invades land                                                                                                                              |
|                                                                    |                                                                    |               |                     | 438 MYA   | 408 MYA   | Invertebrates dominate<br>First primitive fishes (500 MYA)                             | Beginning of Mt. building in eastern North America<br>(480 MYA)                                                                                |
| P<br>A<br>L<br>E<br>O<br>Z<br>O<br>I<br>C<br><br>(Age of Reptiles) | P<br>A<br>L<br>E<br>O<br>Z<br>O<br>I<br>C<br><br>(Age of Reptiles) | Permian       | (Age of Fishes)     | 320 MYA   | 286 MYA   | Multicelled organisms diversify<br>Early shelled organisms                             | Extensive oceans cover most of North America                                                                                                   |
|                                                                    |                                                                    |               | (Age of Amphibians) | 360 MYA   | 320 MYA   | Jellyfish fossil (670 MYA)<br>First multicellular organisms                            |                                                                                                                                                |
|                                                                    |                                                                    |               |                     | 505 MYA   | 438 MYA   | Early Bacteria & algae (oldest fossil)<br>Formation of Earth                           | Primitive atmosphere begins to form<br>Oldest known rocks (3.96 BYA)                                                                           |
|                                                                    |                                                                    |               |                     | 545 MYA   | 505 MYA   |                                                                                        |                                                                                                                                                |
|                                                                    |                                                                    |               |                     | 2500 MYA  | 545 MYA   |                                                                                        |                                                                                                                                                |
|                                                                    |                                                                    | Carboniferous |                     | 3800 MYA  | 2500 MYA  |                                                                                        |                                                                                                                                                |
|                                                                    |                                                                    |               |                     | 4600 MYA  | 3800 MYA  |                                                                                        |                                                                                                                                                |
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| P<br>R<br>O<br>T<br>E<br>R<br>O<br>Z<br>O<br>I<br>C                | P<br>R<br>O<br>T<br>E<br>R<br>O<br>Z<br>O<br>I<br>C                | Precambrian   |                     |           |           |                                                                                        |                                                                                                                                                |
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