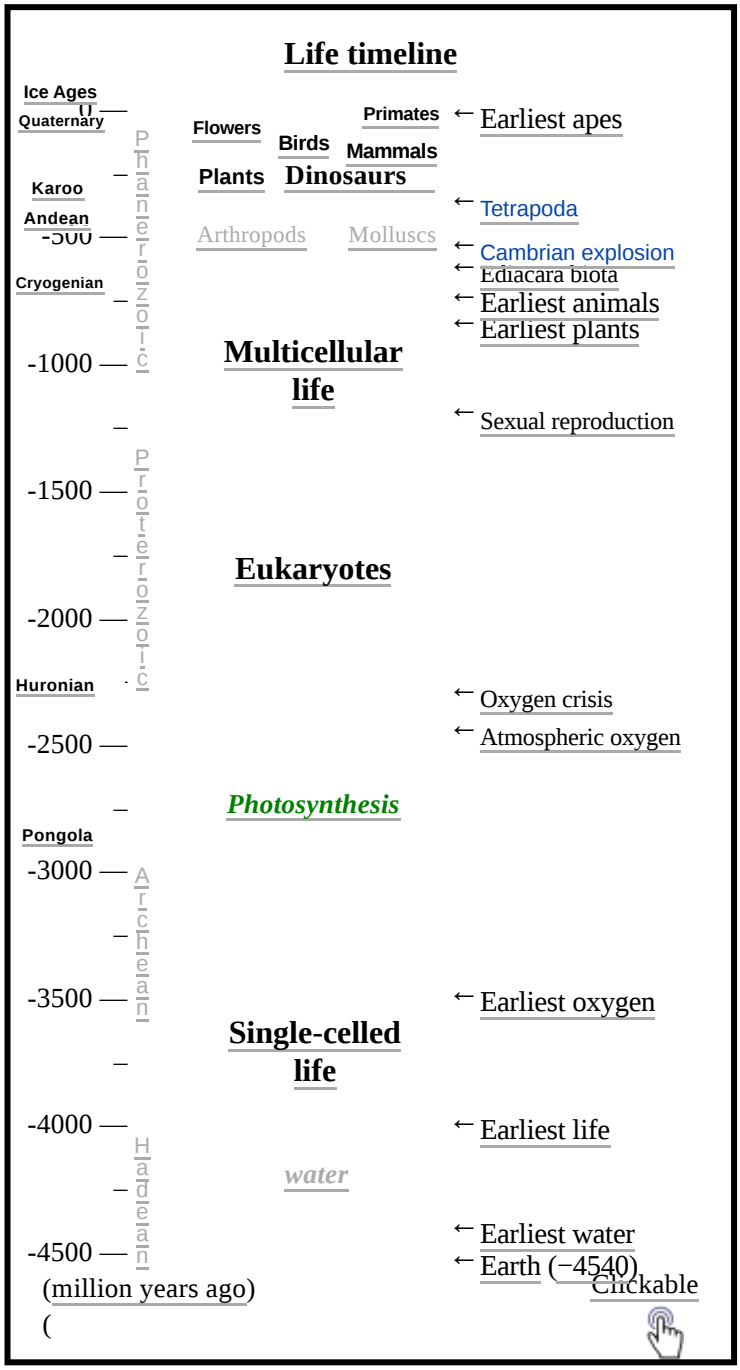
Timeline of the evolutionary history of life

This **timeline of the evolutionary history of life** represents the current scientific theory outlining the major events during the development of life on planet Earth. In biology, evolution is any change across successive generations in the heritable characteristics of biological populations. Evolutionary processes give rise to diversity at every level of biological organization, from kingdoms to species, and individual organisms and molecules, such as DNA and proteins. The similarities between all present day organisms indicate the presence of a common ancestor from which all known species, living and extinct, have diverged through the process of evolution. More than 99 percent of all species, amounting to over five billion species,[1] that ever lived on Earth are estimated to be extinct.[2][3] Estimates on the number of Earth's current species range from 10 million to 14 million,[4] of which about 1.2 million have been documented and over 86 percent have not yet been described.[5] However, a May 2016 scientific report estimates that 1 trillion species are currently on Earth, with only one-thousandth of one percent described.[6]

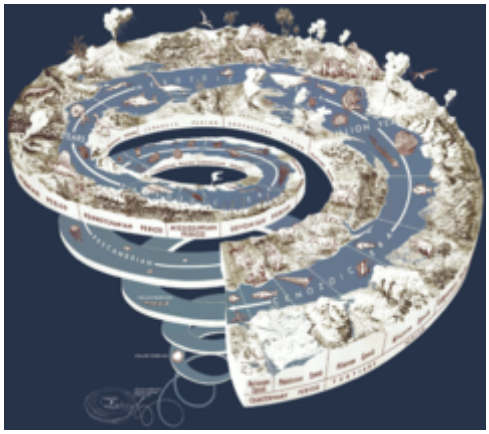


While the dates given in this article are estimates based on scientific evidence, there has been controversy between more traditional views of increased biodiversity through a cone of diversity with the passing of time and the view that the basic pattern on Earth has been one of annihilation and diversification and that in certain past times, such as the Cambrian explosion, there was great diversity.[7][8]

Contents

Extinction

Species go extinct constantly as environments change, as organisms compete for environmental niches, and as genetic mutation leads to the rise of new species from older ones. Occasionally biodiversity on Earth takes a hit in the form of a mass extinction in which the extinction rate is much higher than usual.[9] A large extinction-event often represents an accumulation of smaller extinction- events that take place in a relatively brief period of time.[10]



Visual representation of the history of life on Earth as a spiral

The first known mass extinction in earth's history was the Great Oxygenation Event 2.4 billion years ago. That event led to the loss of most of the planet's obligate anaerobes. Researchers have identified five major extinction events in earth's history since:[11]

- End of the Ordovician: 440 million years ago, 86% of all species lost, including graptolites
- Late Devonian: 375 million years ago, 75% of species lost, including most trilobites
- End of the Permian, "The Great Dying": 251 million years ago, 96% of species lost, including tabulate corals, and most extant trees and synapsids
- End of the Triassic: 200 million years ago, 80% of species lost, including all of the conodonts
- End of the Cretaceous: 66 million years ago, 76% of species lost, including all of the ammonites, mosasaurs, ichthyosaurs, plesiosaurs, pterosaurs, and nonavian dinosaurs

(Dates and percentages represent estimates.)

Smaller extinction-events have occurred in the periods between these larger catastrophes, with some standing at the delineation points of the periods and epochs recognized by scientists in geologic time. The Holocene extinction event is currently under way.[12]

Factors in mass extinctions include continental drift, changes in atmospheric and marine chemistry, volcanism and other aspects of mountain formation, changes in glaciation, changes in sea level, and impact events.[10]

Detailed timeline

In this timeline, **bya** means "billion years ago", **Ma** (for *megaannum*) means "million years ago," **ka** (for *kiloannum*) means "thousand years ago," and **ya** means "years ago."

Hadean Eon

4000 Ma and earlier.

Date	Event
4600 Ma	The planet Earth forms from the accretion disc revolving around the young Sun, with organic compounds (complex organic molecules) necessary for life having perhaps formed in the protoplanetary disk of cosmic dust grains surrounding it before the formation of the Earth itself.[13]
4500 Ma	According to the giant impact hypothesis, the Moon originated when the planet Earth and the hypothesized planet Theia collided, sending a very large number of moonlets into orbit around the young Earth which eventually coalesced to form the Moon.[14] The gravitational pull of the new Moon stabilised the Earth's fluctuating axis of rotation and set up the conditions in which abiogenesis could occur.[15]
4400 Ma	First appearance of liquid water on Earth.
4280 Ma	Earliest possible appearance of life on Earth.[16][17][18][19]

Moon

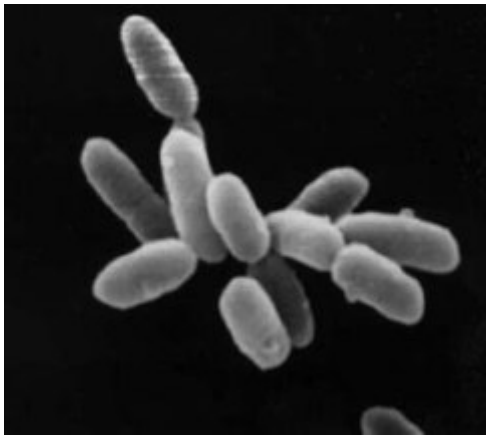
Archean Eon

4000 Ma – 2500 Ma

Fragment of the Acasta Gneiss exhibited at the Museum of Natural History in Vienna

Date	Event
4000 Ma	Formation of a greenstone belt of the Acasta Gneiss of the Slave craton in Northwest Territories, Canada, the oldest rock belt in the world.[20]
4100–3800 Ma	Late Heavy Bombardment (LHB): extended barrage of impact events upon the inner planets by meteoroids. Thermal flux from widespread hydrothermal activity during the LHB may have been conducive to abiogenesis and life's early diversification.[21] "Remains of biotic life" were found in 4.1 billion-year-old rocks in Western Australia.[22][23] This is when life most likely arose.
3900–2500 Ma	Cells resembling prokaryotes appear.[24] These first organisms are chemoautotrophs: they use carbon dioxide as a carbon source and oxidize inorganic materials to extract energy. Later, prokaryotes evolve glycolysis, a set of chemical reactions that free the energy of organic molecules such as glucose and store it in the chemical bonds of ATP. Glycolysis (and ATP) continue to be used in almost all organisms, unchanged, to this day.[25][26]
3800 Ma	Formation of a greenstone belt of the Isua complex of the western Greenland region, whose rocks show an isotope frequency suggestive of the presence of life.[20] The earliest evidences for life on Earth are 3.8 billion-year-old biogenic hematite in a banded iron formation of the Nuvvuagittuq Greenstone Belt in Canada,[27] graphite in 3.7 billion-year-old metasedimentary rocks discovered in western Greenland[28] and microbial mat fossils found in 3.48 billion-year-old sandstone discovered in Western Australia.[29][30]
3500 Ma	Lifetime of the last universal common ancestor (LUCA);[31][32] the split between bacteria and archaea occurs.[33] Bacteria develop primitive forms of photosynthesis which at first did not produce oxygen.[34] These organisms generated Adenosine triphosphate (ATP) by exploiting a proton gradient, a mechanism still used in virtually all organisms.[35]
3200 Ma	Diversification and expansion of acritarchs.[36]
3000 Ma	Photosynthesizing cyanobacteria evolved; they used water as a reducing agent, thereby producing oxygen as a waste product.[37] The oxygen initially oxidizes dissolved iron in the oceans, creating iron ore. The oxygen concentration in the atmosphere slowly rose, acting as a poison for many bacteria and eventually triggering the Great Oxygenation

The cyanobacterial-algal mat, salty lake on the White Sea seaside

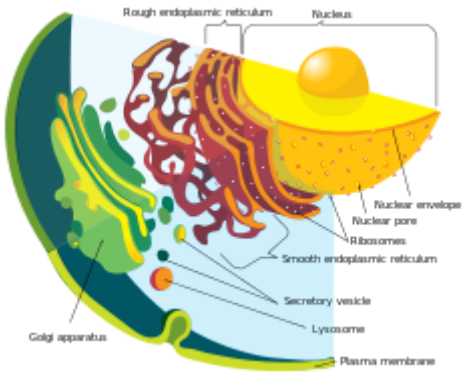


Halobacterium sp. strain NRC-1

	Event. The Moon, still very close to Earth, caused tides 1,000 feet (305 m) high. The Earth was continually wracked by hurricane-force winds. These extreme mixing influences are thought to have stimulated evolutionary processes.
2800 Ma	Oldest evidence for microbial life on land in the form of organic matter-rich paleosols, ephemeral ponds and alluvial sequences, some of them bearing microfossils.[38]

Proterozoic Eon

2500 Ma – 542 Ma. Contains the Palaeoproterozoic, Mesoproterozoic and Neoproterozoic eras.



Detail of the eukaryote endomembrane system and its components

Dinoflagellate *Ceratium furca*

Blepharisma japonicum, a free-living ciliated protozoan

Date	Event
2500 Ma	Great Oxygenation Event led by cyanobacteria's oxygenic photosynthesis.[37] Commencement of plate tectonics with old marine crust dense enough to subduct.[20]
By 1850 Ma	Eukaryotic cells appear. Eukaryotes contain membrane-bound organelles with diverse functions, probably derived from prokaryotes engulfing each other via phagocytosis. (See Symbiogenesis and Endosymbiont). Bacterial viruses (bacteriophage) emerge before, or soon after, the divergence of the prokaryotic and eukaryotic lineages.[39] The appearance of red beds show that an oxidising atmosphere had been produced. Incentives now favoured the spread of eukaryotic life.[40][41][42]
1400 Ma	Great increase in stromatolite diversity.
1300 Ma	Earliest land fungi[43]
By 1200 Ma	Meiosis and sexual reproduction are present in single-celled eukaryotes, and possibly in the common ancestor of all eukaryotes.[44] Sex may even have arisen earlier in the RNA world.[45] Sexual reproduction first appears in the fossil records; it may have increased the rate of evolution.[46]
1 bya	The first non-marine eukaryotes move onto land. They were photosynthetic and multicellular, indicating that plants evolved much earlier than originally thought.[47]
750 Ma	First protozoa (ex: *Melanocyrillium*); beginning of animal evolution[48][49]
850–630 Ma	A global glaciation may have occurred.[50][51] Opinion is divided on whether it increased or decreased biodiversity or the rate of evolution.[52][53][54] It is believed that this was due to evolution of the first land plants, which increased the amount of oxygen and lowered the amount of carbon dioxide in the atmosphere.[55]
600 Ma	The accumulation of atmospheric oxygen allows the formation of an ozone layer.[56] Prior to this, land-based life would probably have required other chemicals to attenuate ultraviolet radiation enough to permit colonisation of the land.[38]
580–542 Ma	The Ediacara biota represent the first large, complex aquatic multicellular organisms — although their affinities remain a subject of debate.[57]
580–500 Ma	Most modern phyla of animals begin to appear in the fossil record during the Cambrian explosion.[58][59]
550 Ma	First fossil evidence for Ctenophora (comb jellies), Porifera (sponges), Anthozoa (corals and sea anemones)

Dickinsonia costata, an iconic Ediacaran organism, displays the characteristic quilted appearance of Ediacaran enigmata.

Phanerozoic Eon

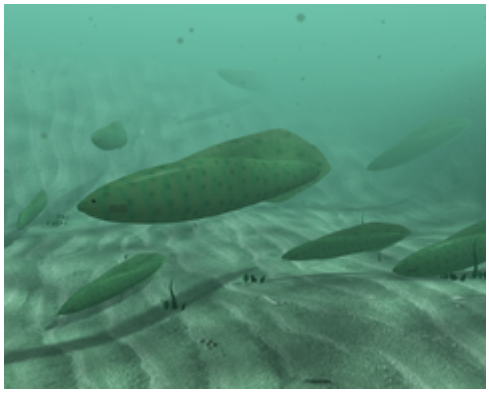
542 Ma – present

The Phanerozoic Eon, literally the "period of well-displayed life," marks the appearance in the fossil record of abundant, shell-forming and/or trace-making organisms. It is subdivided into three eras, the Paleozoic, Mesozoic and Cenozoic, which are divided by major mass extinctions.

Palaeozoic Era

542 Ma – 251.0 Ma and contains the Cambrian, Ordovician, Silurian, Devonian, Carboniferous and Permian periods.

With only a handful of species surviving today, the Nautiloids flourished during the early Paleozoic era, from the Late Cambrian, where they constituted the main predatory animals.[60]



Haikouichthys, a jawless fish, is popularized as one of the earliest fishes and probably a basal chordate or a basal craniate.[61]

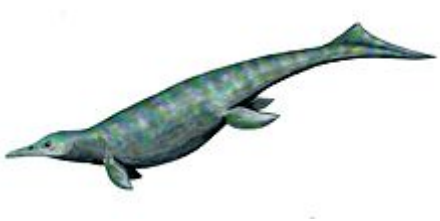
Date	Event
535 Ma	Major diversification of living things in the oceans: chordates, arthropods (e.g. trilobites, crustaceans), echinoderms, molluscs, brachiopods, foraminifers and radiolarians, etc.
530 Ma	The first known footprints on land date to 530 Ma.[63]
525 Ma	Earliest graptolites
511 Ma	Earliest crustaceans
510 Ma	First cephalopods (nautiloids) and chitons
505 Ma	Fossilization of the Burgess Shale
500 Ma	Jellyfish have existed since at least this time.
485 Ma	First vertebrates with true bones (jawless fishes)
450 Ma	First complete conodonts and echinoids appear
440 Ma	First agnathan fishes: Heterostraci, Galeaspida, and Pituriaspida
420 Ma	Earliest ray-finned fishes, trigonotarbid arachnids, and land scorpions[64]
410 Ma	First signs of teeth in fish. Earliest Nautilida, lycophytes, and trimerophytes.
395 Ma	First lichens, stoneworts. Earliest harvestmen, mites, hexapods (springtails) and ammonoids. The first known tetrapod tracks on land.
365 Ma	*Acanthostega* is one of the earliest vertebrates capable of walking.
363 Ma	By the start of the Carboniferous Period, the Earth begins to resemble its present state. Insects roamed the land and would soon take to the skies; sharks swam the oceans as top predators,[65] and vegetation covered the land, with seed-bearing plants and forests soon to flourish. Four-limbed tetrapods gradually gain adaptations which will help them occupy a terrestrial life-habit.
360 Ma	First crabs and ferns. Land flora dominated by seed ferns. The Xinhang forest grows around this time[66]
350 Ma	First large sharks, ratfishes, and hagfish
340 Ma	Diversification of amphibians
330 Ma	First amniote vertebrates (*Paleothyris*)
320 Ma	Synapsids (precursors to mammals) separate from sauropsids (reptiles) in late Carboniferous.[67]
305 Ma	Earliest diapsid reptiles (e.g. *Petrolacosaurus*)
296 Ma	Earliest known octopus (*Pohlsepia*)
280 Ma	Earliest beetles, seed plants and conifers diversify while lepidodendrids and sphenopsids decrease. Terrestrial temnospondyl amphibians and pelycosaurs (e.g. *Dimetrodon*) diversify in species.

Ferns first appear in the fossil record about 360 million years ago in the late Devonian period.[62]

275 Ma	Therapsid synapsids separate from pelycosaur synapsids
270 Ma	Gorgonopsians appear in the fossil record
251.4 Ma	The Permian–Triassic extinction event eliminates over 90-95% of marine species. Terrestrial organisms were not as seriously affected as the marine biota. This "clearing of the slate" may have led to an ensuing diversification, but life on land took 30 million years to completely recover.[68]

Mesozoic Era

From 251.4 Ma to 66 Ma and containing the Triassic, Jurassic and Cretaceous periods.



Utatsusaurus is the earliest-known form of an ichthyopterygian.

Plateosaurus engelhardti

Cycas circinalis

Date	Event
250 Ma	The Mesozoic Marine Revolution begins: increasingly well adapted and diverse predators pressurize sessile marine groups; the "balance of power" in the oceans shifts dramatically as some groups of prey adapt more rapidly and effectively than others.
250 Ma	*Triadobatrachus massinoti* is the earliest known frog
248 Ma	Sturgeon and paddlefish (Acipenseridae) first appear.
245 Ma	Earliest ichthyosaurs
240 Ma	Increase in diversity of gomphodont cynodonts and rhynchosaurs
225 Ma	Earliest dinosaurs (prosauropods), first cardiid bivalves, diversity in cycads, bennettitaleans, and conifers. First teleost fishes. First mammals (*Adelobasileus*).
220 Ma	Seed-producing Gymnosperm forests dominate the land; herbivores grow to huge sizes to accommodate the large guts necessary to digest the nutrient-poor plants. First flies and turtles (*Odontochelys*). First coelophysoid dinosaurs.
205 Ma	The Massive extinction of Triassic/Jurassic, that wiped out most of the group of pseudosuchians and gave the opportunity of dinosaurs including the Apatosaurus, Tyrannosaurus, Perrotasaurus, and Stegosaurus to enter their golden age.
200 Ma	The first accepted evidence for viruses that infect eukaryotic cells (at least, the group Geminiviridae) existed.[69] Viruses are still poorly understood and may have arisen before "life" itself, or may be a more recent phenomenon. Major extinctions in terrestrial vertebrates and large amphibians. Earliest examples of armoured dinosaurs
195 Ma	First pterosaurs with specialized feeding (*Dorygnathus*). First sauropod dinosaurs. Diversification in small, ornithischian dinosaurs: heterodontosaurids, fabrosaurids, and scelidosaurids.
190 Ma	Pliosauroids appear in the fossil record. First lepidopteran insects (*Archaeolepis*), hermit crabs, modern starfish, irregular echinoids, corbulid bivalves, and tubulipore bryozoans. Extensive development of sponge reefs.
176 Ma	First members of the Stegosauria group of dinosaurs
170 Ma	Earliest salamanders, newts, cryptoclidids, elasmosaurid plesiosaurs, and cladotherian mammals. Sauropod dinosaurs diversify.
165 Ma	First rays and glycymeridid bivalves. First vampire squids[70]
163 Ma	Pterodactyloid pterosaurs first appear[71]
161 Ma	Ceratopsian dinosaurs appear in the fossil record (*Yinlong*) and the oldest known Eutherian Mammal appear in the fossil record: *Juramaia*.
160 Ma	Multituberculate mammals (genus *Rugosodon*) appear in eastern China
155 Ma	First blood-sucking insects (ceratopogonids), rudist bivalves, and cheilostome bryozoans. *Archaeopteryx*, a possible ancestor to the birds, appears in the fossil record, along with triconodontid and symmetrodont mammals. Diversity in stegosaurian and theropod dinosaurs.
153 Ma	First pine trees
140 Ma	Orb-weaver spiders appear
130 Ma	The rise of the angiosperms: Some of these flowering plants bear structures that attract insects and other animals to spread pollen; other angiosperms were pollinated by wind or water. This innovation causes a major burst of animal evolution through coevolution. First freshwater pelomedusid turtles. Earliest krill.

120 Ma	Oldest fossils of heterokonts, including both marine diatoms and silicoflagellates
115 Ma	First monotreme mammals
112 Ma	*Xiphactinus*, a large predatory fish, appears in the fossil record
110 Ma	First hesperornithes, toothed diving birds. Earliest limopsid, verticordiid, and thyasirid bivalves.
106 Ma	*Spinosaurus*, the largest theropod dinosaur, appears in the fossil record
100 Ma	Earliest bees
95 Ma	First crocodilians evolve
90 Ma	Extinction of ichthyosaurs. Earliest snakes and nuculanid bivalves. Large diversification in angiosperms: magnoliids, rosids, hamamelidids, monocots, and ginger. Earliest examples of ticks. Probable origins of placental mammals (earliest undisputed fossil evidence is 66 Ma).
80 Ma	First ants
70 Ma	Multituberculate mammals increase in diversity. First yoldiid bivalves.
68 Ma	*Tyrannosaurus*, the largest terrestrial predator of what is now western North America appears in the fossil record. First species of *Triceratops.*

Cenozoic Era

66 Ma – present

Mount of oxyaenid *Patriofelis* from the American Museum of Natural History

Date	Event
66 Ma	The Cretaceous–Paleogene extinction event eradicates about half of all animal species, including mosasaurs, pterosaurs, plesiosaurs, ammonites, belemnites, rudist and inoceramid bivalves, most planktic foraminifers, and all of the dinosaurs excluding the birds.[72]
66 Ma-	Rapid dominance of conifers and ginkgos in high latitudes, along with mammals becoming the dominant species. First psammobiid bivalves. Earliest rodents. Rapid diversification in ants.
63 Ma	Evolution of the creodonts, an important group of meat-eating (carnivorous) mammals
62 Ma	Evolution of the first penguins
60 Ma	Diversification of large, flightless birds. Earliest true primates, along with the first semelid bivalves, edentate, carnivoran and lipotyphlan mammals, and owls. The ancestors of the carnivorous mammals (miacids) were alive.
59 Ma	Earliest sailfish appear
56 Ma	*Gastornis*, a large flightless bird, appears in the fossil record
55 Ma	Modern bird groups diversify (first song birds, parrots, loons, swifts, woodpeckers), first whale (*Himalayacetus*), earliest lagomorphs, armadillos, appearance of sirenian, proboscidean, perissodactyl and artiodactyl mammals in the fossil record. Angiosperms diversify. The ancestor (according to theory) of the species in the genus *Carcharodon*, the early mako shark *Isurus hastalis*, is alive.
52 Ma	First bats appear (*Onychonycteris*)
50 Ma	Peak diversity of dinoflagellates and nannofossils, increase in diversity of anomalodesmatan and heteroconch bivalves, brontotheres, tapirs, rhinoceroses, and camels appear in the fossil record, diversification of primates
40 Ma	Modern-type butterflies and moths appear. Extinction of *Gastornis*. *Basilosaurus*, one of the first of the giant whales, appeared in the fossil record.
38 Ma	Earliest bears
37 Ma	First nimravid ("false saber-toothed cats") carnivores — these species are unrelated to modern-type felines. First alligators
35 Ma	Grasses diversify from among the monocot angiosperms; grasslands begin to expand. Slight increase in diversity of cold-tolerant ostracods and foraminifers, along with major extinctions of gastropods, reptiles, amphibians, and multituberculate mammals. Many modern mammal groups begin to appear: first glyptodonts, ground sloths, canids, peccaries, and the first eagles and hawks. Diversity in toothed and baleen whales.
33 Ma	Evolution of the thylacinid marsupials (*Badjcinus*)
30 Ma	First balanids and eucalypts, extinction of embrithopod and brontothere mammals, earliest pigs and cats

The bat *Icaronycteris* appeared 52.2 million years ago

Grass flowers

28 Ma	*Paraceratherium* appears in the fossil record, the largest terrestrial mammal that ever lived. First pelicans.
25 Ma	*Pelagornis sandersi* appears in the fossil record, the largest flying bird that ever lived
25 Ma	First deer
24 Ma	First pinnipeds
23 Ma	Earliest ostriches, trees representative of most major groups of oaks have appeared by now[73]
20 Ma	First giraffes, hyenas, and giant anteaters, increase in bird diversity
17 Ma	First birds of the genus Corvus (crows)
15 Ma	Genus *Mammut* appears in the fossil record, first bovids and kangaroos, diversity in Australian megafauna
10 Ma	Grasslands and savannas are established, diversity in insects, especially ants and termites, horses increase in body size and develop high-crowned teeth, major diversification in grassland mammals and snakes
9.5 Ma	The Great American Interchange, where various land and freshwater faunas migrated between North and South America. Armadillos, opossums, hummingbirds Phorusrhacids, Ground Sloths, Glyptodonts, and Meridiungulates traveled to North America, while horses, tapirs, saber-toothed cats, Jaguars, Bears, Coaties, Ferrets, Otters, Skunks and deer entered South America.
9 Ma	First platypuses
6.5 Ma	First hominins (*Sahelanthropus*)
6 Ma	Australopithecines diversify (*Orrorin*, *Ardipithecus*)
5 Ma	First tree sloths and hippopotami, diversification of grazing herbivores like zebras and elephants, large carnivorous mammals like lions and the genus *Canis*, burrowing rodents, kangaroos, birds, and small carnivores, vultures increase in size, decrease in the number of perissodactyl mammals. Extinction of nimravid carnivores. First leopard seals.
4.8 Ma	Mammoths appear in the fossil record
4.5 Ma	Marine iguanas diverge from land iguanas
4 Ma	Evolution of *Australopithecus*, *Stupendemys* appears in the fossil record as the largest freshwater turtle, first modern elephants, giraffes, zebras, lions, rhinoceros and gazelles appear in the fossil record
3.6 Ma	Blue whales grow to their modern sizes
3 Ma	Earliest swordfish
2.7 Ma	Evolution of *Paranthropus*
2.5 Ma	The earliest species of *Smilodon* evolve
2 Ma	First members of the genus *Homo*, Homo Habilis, appear in the fossil record. Diversification of conifers in high latitudes. The eventual ancestor of cattle, aurochs (*Bos primigenus*), evolves in India.
1.7 Ma	Extinction of australopithecines

1.2 Ma	Evolution of *Homo antecessor*. The last members of *Paranthropus* die out.
1 Ma	First coyotes
800 Ka	Short-faced bears (*Arctodus simus*) become abundant in North America
600 ka	Evolution of *Homo heidelbergensis*
400 ka	First polar bears
350 ka	Evolution of Neanderthals
300 ka	*Gigantopithecus*, a giant relative of the orangutan from Asia dies out
250 ka	Anatomically modern humans appear in Africa.[74][75][76] Around 50,000 years before present they start colonising the other continents, replacing the Neanderthals in Europe and other hominins in Asia.
40 ka	The last of the giant monitor lizards (Varanus priscus) die out
30 ka	Extinction of Neanderthals, first domestic dogs
15 ka	The last woolly rhinoceros (*Coelodonta antiquitatis*) are believed to have gone extinct
11 ka	Short-faced bears vanish from North America, with the last giant ground sloths dying out. All Equidae become extinct in North America.
10 ka	The Holocene epoch starts 10,000[77] years ago after the Late Glacial Maximum. The last mainland species of woolly mammoth (*Mammuthus primigenus*) die out, as does the last *Smilodon* species.
8 ka	The Giant Lemur died out

Historical extinctions

Caribbean monk seal

Illustration of a Baiji, declared functionally extinct by the Baiji.org Foundation in 2006.[78][79]

Date	Event
6000 ya (c. 4000 BC)	Small populations of American mastodon die off in places like Utah and Michigan
4500 ya (c. 2500 BC)	The last members of a dwarf race of woolly mammoths vanish from Wrangel Island near Alaska
c. 600 ya (c. 1400)	The moa and its predator, Haast's eagle, die out in New Zealand
393 ya (1627)	The last recorded wild aurochs die out
332 ya (1688)	The dodo goes extinct
252 ya (1768)	The Steller's sea cow goes extinct
137 ya (1883)	The quagga, a subspecies of zebra, goes extinct
114 ya (1905)	Wolves become extinct in Japan.
106 ya (1914)	Martha, last known passenger pigeon, dies
84 ya (1936)	The thylacine goes extinct in a Tasmanian zoo, the last member of the family Thylacinidae
82 ya (1937)	The last Bali tiger was shot.
68 ya (1952)	The Caribbean monk seal goes extinct[80]
12 ya (2008)	The baiji, the Yangtze river dolphin, becomes functionally extinct, according to the IUCN Red List[81]
9 ya (2011)	The western black rhinoceros is declared extinct

Western black rhinoceros, holotype specimen of a female shot in 1911

Thylacine shot in 1936

See also

- Evolution of fungi
- Evolution of plants (timeline)
- Geologic time scale
- History of the Earth
- Natural history
- Sociocultural evolution
- Timeline of human evolution
- Timeline of natural history
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