

TABLE 4.1 *The geological time scale*

Era	Period (abbreviation)	Epoch	Millions of years from start to present	Major events
CENOZOIC	Quaternary (Q)	Recent (Holocene)	0.01	} Continents in modern positions; repeated glaciations and lowering of sea level; shifts of geographic distributions; extinctions of large mammals and birds; evolution of <i>Homo erectus</i> to <i>Homo sapiens</i> ; rise of agriculture and civilizations
		Pleistocene	1.8	
	Tertiary (T)	Pliocene	5.3	} Continents nearing modern positions; increasingly cool, dry climate; radiation of mammals, birds, snakes, angiosperms, pollinating insects, teleost fishes
		Miocene	23.0	
		Oligocene	33.9	
		Eocene	55.8	
		Paleocene	65.5	
MESOZOIC	Cretaceous (K)		145	Most continents separated; continued radiation of dinosaurs; increasing diversity of angiosperms, mammals, birds; mass extinction at end of period, including last ammonoids and dinosaurs
	Jurassic (J)		200	Continents separating; diverse dinosaurs and other "reptiles"; first birds; archaic mammals; "gymnosperms" dominant; evolution of angiosperms; ammonoid radiation; "Mesozoic marine revolution"
	Triassic (Tr)		251	Continents begin to separate; marine diversity increases; "gymnosperms" become dominant; diversification of "reptiles," including first dinosaurs; first mammals
PALEOZOIC	Permian (P)		299	Continents aggregated into Pangaea; glaciations; low sea level; increasing "advanced" fishes; diverse orders of insects; amphibians decline; "reptiles," including mammal-like forms, diversify; major mass extinctions, especially of marine life, at end of period
	Carboniferous (C)		359	Gondwanaland and small northern continents form; extensive forests of early vascular plants, especially lycopsids, sphenopsids, ferns; early orders of winged insects; diverse amphibians; first reptiles
	Devonian (D)		416	Diversification of bony fishes; trilobites diverse; origin of ammonoids, amphibians, insects, ferns, seed plants; mass extinction late in period
	Silurian (S)		444	Diversification of agnathans; origin of jawed fishes (acanthodians, placoderms, Osteichthyes); earliest terrestrial vascular plants, arthropods, insects
	Ordovician (O)		488	Diversification of echinoderms, other invertebrate phyla, agnathan vertebrates; mass extinction at end of period
	Cambrian (€)		542	Marine animals diversify: first appearance of most animal phyla and many classes within relatively short interval; earliest agnathan vertebrates; diverse algae
PROTEROZOIC			2500	Earliest eukaryotes (ca. 1900–1700 Mya); origin of eukaryotic kingdoms; trace fossils of animals (ca. 1000 Mya); multicellular animals from ca. 640 Mya, including possible Cnidaria, Annelida, Arthropoda
ARCHEAN			Lower limit not defined	Origin of life in remote past; first fossil evidence at ca. 3500 Mya; diversification of prokaryotes (bacteria); photosynthesis generates oxygen, replacing earlier oxygen-poor atmosphere; evolution of aerobic respiration

Source: Dates from the International Stratigraphic Chart (International Commission on Stratigraphy, 2004).