Cretaceous–Paleogene extinction event (End Cretaceous, K-T extinction, or K-Pg extinction): 66 MYA at

- About 17% of all families, 50% of all genera and 75% of all species became extinct.
- In the seas it reduced the percentage of sessile animals to about 33%.
- All non-avian dinosaurs became extinct during that time.
- Iridium anomaly in sediments may indicate comet or asteroid induced extinctions

Triassic–Jurassic extinction event (End Triassic): 200 Ma at the Triassic-Jurassic transition.

- About 23% of all families, 48% of all genera (20% of marine families and 55% of marine genera) and 70-75% of all species went extinct.
- Most non-dinosaurian archosaurs, most therapsids, and most of the large amphibians were eliminated
- Dinosaurs had with little terrestrial competition in the Jurassic that followed.
- Non-dinosaurian archosaurs continued to dominate aquatic environments
- Theories on cause:

1.) Gradual climate change, perhaps with ocean acidification has been implicated, but not proven.

2.) Asteroid impact has been postulated but no site or evidence has been found.

3.) Massive volcanics, flood basalts and continental margin volcanoes might have damaged the atmosphere and warmed the planet.

Permian–Triassic extinction event (End Permian): 251 Ma at the Permian-Triassic transition. Known as “The Great Dying”

- Earth's largest extinction killed 57% of all families, 83% of all genera and 90% to 96% of all species (53% of marine families, 84% of marine genera, about 96% of all marine species and an estimated 70% of land species,
- The evidence of plants is less clear, but new taxa became dominant after the extinction. The "Great Dying" had enormous evolutionary significance: on land, it ended the primacy of reptiles.
- The recovery of vertebrates took 30 million years
- The whole late Permian was a difficult time for at least marine life, even before the "Great Dying".
- Impact and excessive volcanics have been implicated but not proven.

Late Devonian extinction: 375–360 Ma near the Devonian-Carboniferous transition.

- In the later part(s) of the Devonian, a prolonged series of extinctions eliminated 20% of all families, 50% of all genera and 70% of all species.
- This extinction event lasted perhaps as long as 20 Ma, and there is evidence for a series of extinction pulses within this period.
- Lots of environmental change, oxygen content in ocean, tectonics etc. There may not be a single cause for the protracted event.

Ordovician–Silurian extinction events (near end Ordovician): 450–440 Ma at the Ordovician-Silurian transition.

- Two events occurred that killed off 27% of all families, 57% of all genera and 60% to 70% of all species.
- Together they are ranked by many scientists as the second largest of the five major extinctions in Earth's history in terms of percentage of genera that went extinct.
- Gondwanaland (most continents) all moved into South Polar region. Land was cold, ocean currents were affected.