# JAG01 Unit 8 Past Life and Fossils

## Task 1 The Standard Geologic Time Scale

Geologists can use fossils in rock to refer the age of the rock to the standard geologic time scale, a worldwide relative time scale. Based on fossil assemblages, the geologic time scale subdivides geologic time and so has had tremendous significance as a unifying concept in the physical and biological sciences.

**A) Complete the table of the abbreviated time scale with the following expressions:**

***Epoch*** ***Period*** *Cretaceous* *Miocene* *Permian* *Pleistocene* *Recent (Holocene)*

| **Era** | | |
|---|---|---|
| **Cenozoic** | *Quaternary* | |
| | *Tertiary* | Pliocene<br><br>Oligocene<br>Eocene<br>Paleocene |
| **Mesozoic** | *Jurassic*<br>*Triassic* | |
| **Paleozoic** | *Pennsylvania*<br>*Mississippian*<br>*Devonian*<br>*Silurian*<br>*Ordovician*<br>*Cambrian* | |
| **Precambrian time** | | |

**B) Match the events with one of the eras / periods / epochs:**

- first large mammals appear
- dinosaurs became the dominant animals
- the second largest mass extinction
- oldest rocks form as the Earth cools
- breakup of Pangea begins
- human ancestors appear
- trilobites are dominant
- photosynthesising cyanobacteria appear
- spread of grassy ecosystems

**Can you add more information/ events to the table?**

## Task 2 Speculating

**A) Read the text. How did life on Earth begin?**

**B) In the first paragraph highlight expressions/ phrases used to speculate.**

**The first microbes**

It seems that life on Earth began maybe as long as 4 billion years ago, most likely in the form of microscopic single-celled organisms (microbes), like bacteria or less familiar group called archaea, on the fringes of underwater hydrothermal vents where they would have been nourished by the abundant supply of chemical energy. Chemical reactions occurring across the skin of tiny bubbles could have led to the origin of the first cell membranes. There are varieties of microbes still around today that obtain their energy chemically and can survive only in oxygen-free conditions. These are probably little changed from the primitive cells that developed beside those ancient hot vents.

After bacteria-like organisms had arisen, eventually new varieties evolved and migrated to less chemically rich regions where energy had to be extracted from sunlight (by photosynthesis). The simplest photosynthetic organisms today are cyanobacteria, formerly called blue-green algae. When these organisms spread and multiplied, they also began slowly to change the chemical balance of the atmosphere. In particular they liberated oxygen, which was at only 1 per cent of its present level about 2 billion years ago.

(Rothery, D. A. (2015). *Geology. A Complete Introduction.* McGraw-Hill.)

**C) Speaking**

A quarter of a billion years ago, long before dinosaurs or mammals evolved, the 10-foot (0.3-meter) predator *Dinogorgon*, whose skull is shown here, hunted floodplains in the heart of today's South Africa. In less than a million years *Dinogorgon* vanished in the greatest mass extinction ever, along with about nine of every ten plant and animal species on the planet.
(https://www.nationalgeographic.com/science/prehistoric-world/permian-extinction/)

**What do you think caused the "great dying" (end Permian extinction)? Speculate about the following:**

- asteroid impact
- volcanism
- widespread ocean anoxia (deficiency of oxygen)
- formation of Pangea
- exponential reproduction of microbes
- dimming of the Sun

**You can use the phrases below:**

*It is unlikely that…*
*It seems to me that…*
*I imagine that…*
*I´m not sure but I suppose/ I´d say that…*
*It must / might / may have been caused by…*

## Task 3 EXAM PRACTICE Reading

## Complete the text with the parts of sentences.

A) as well as drop the temperature worldwide
B) that were not favourable to dinosaur survival
C) were extinguished
D) further evidence to support each was sought
E) and were wiped out
F) that populate the earth today
G) would be the right size to have been formed by a 10-km asteroid
H) and scientists usually have attributed them to climate changes

**Demise of the Dinosaurs**

Dinosaurs dominated the continents during the Mesozoic Era. Now they prey on the imaginations of children of all ages. It is hard to accept that beings so powerful and varied as dinosaurs existed (1) ……. . But the fossil record is clear – when the Mesozoic came to a close, dinosaurs became extinct. Not a single one of the numerous species survived into the Cenozoic Era. Not only did the dinosaurs go, but about 75% of all plant and animal species, marine as well as terrestrial, (2) …….. . This was one of the Earth´s "great dyings" – an even greater dying was when the Paleozoic era ended with the extinction of over 95% of all species. Most major extinctions have been gradual (3) …….. .

In the late 1980s, geologist Walter Alvarez and his father, physicist Luis Alvarez, and two other scientists proposed a hypothesis that the dinosaur extinction was caused by the impact of an asteroid. The scientists put forward a scenario in which an asteroid 10 kilometres in diameter struck the earth. This produced a gigantic dust cloud, which darkened the earth long enough to disrupt plant life growth and reproduction (4) …….. . Creatures perished because of the disruption in their food supply or because of their inability to withstand the sudden climate change.

Other scientists proposed an alternative hypothesis blaming exceptional volcanic activity for the extinction. Debate between the two hypotheses became heated and (5) …….. . In 1990, evidence was found suggesting a large crater centred off the coast of Mexico´s Yucatan peninsula. The crater, now buried beneath sediment, (6) …….. .

We do know that climates were changing towards the end of the Cretaceous and dinosaur species were decreasing. Perhaps exceptional volcanic activity led to climate changes (7) …… and the asteroid dealt with the final unfortunate blow to dinosaurs. "Unfortunate" is from the perspective of dinosaurs, not humans. The only mammals in the Cretaceous were mouse-sized creatures. They survived the K – T extinction and, with dinosaurs no longer dominating the land, evolved into the many mammal species (8) ….. , including humans.

(adapted from McGeary, D., Plummer, C., Carlson, D. 2001. *Physical Geology.* McGraw-Hill.)