

The Precambrian

Read the article below. Answer the questions. Add the underlined events to your timeline. Also, add the events on the next page.

Precambrian time covers most of the Earth's history, starting with the planet's creation about 4.6 billion years ago and ending with the emergence of complex, multi-celled life forms almost four billion years later.

The Precambrian is the **earliest of the geologic ages**, which are marked by different layers of sedimentary rock. Laid down over millions of years, these rock layers contain a permanent record of the Earth's past, including the fossilized remains of plants and animals buried when the sediments were formed. The planet had cooled down from its original molten state, developing a solid crust and oceans created from water vapor in the atmosphere. Scientists think that undersea volcanic vents may have been the place that first sparked life on earth.

The **earliest living organisms** were microscopic bacteria, which show up in the fossil record as early as 3.8 billion years ago. As their numbers increased, bacteria sought out an alternative energy source. New varieties (cyanobacteria) began to harness the power of the sun through photosynthesis—a move that would ultimately lead to simple plants and which would open the planet up to animal life. Cyanobacteria were well established by 3 billion years ago.

Some three billion years ago, the Earth's atmosphere had almost no oxygen. At about 2.4 billion years ago, oxygen was released from the seas as a byproduct of photosynthesis by cyanobacteria. Levels of the gas gradually climbed, reaching about one percent around two billion years ago. About 800 million years ago, oxygen levels reached about 21 percent and began to breathe life into more complex organisms. The oxygen-rich ozone layer was also established, shielding the Earth's surface from harmful solar radiation.

Unfamiliar Life-Forms

The first multi-celled animals appeared in the fossil record almost 600 million years ago. Known as the Ediacarans, these bizarre creatures bore little resemblance to modern life-forms. They grew on the seabed and lacked any obvious heads, mouths, or digestive organs. Fossils of the largest known among them, *Dickinsonia*, resemble a ribbed doormat. What happened to the mysterious Ediacarans isn't clear. They could be the ancestors of later animals, or they may have been completely erased by extinction.

The earliest multi-celled animals that survived the Precambrian fall into three main categories. The simplest of these soft-bodied creatures were **sponges**. Lacking organs or a nervous system, they lived by drawing water through their bodies and filtering out food particles. The **cnidarians**, which included sea anemones, corals, and jellyfish caught food using tentacles armed with microscopic stinging cells. The third group, the **annelids**, or segmented flatworms, had fluid-filled body cavities and breathed through their skins.

Throughout the precambrian, at least 3 global ice-ages occurred called snowball Earths. During these events, it is believed that the entire Earth was under a sheet of ice. This may have led to mass extinctions toward the end of the precambrian and opened the door for the 'Cambrian Explosion', a time when complex life really took off on Earth.

