

# Lesson Outline for Teaching

## Lesson 3: The Cambrian Explosion

### A. The Cambrian Explosion

1. The time from 542 million years ago until today is called the Phanerozoic eon.
  - a. Life-forms during this eon were visible and formed fossils that could be seen without a magnifying device.
  - b. The time at the beginning of the Phanerozoic eon was called the Cambrian period.
  - c. During this time, animals with bones and shells developed, which means they formed fossils more readily.
  - d. This change in life-forms was called the Cambrian Explosion.
2. Early in the Phanerozoic eon, continents were breaking apart, temperatures were increasing, and sea levels were rising.
  - a. The Cambrian Explosion was caused by the formation of warm, shallow seas.
  - b. These seas formed an environment that favored rapid evolution of organisms.
3. Some organisms are better suited to an environment than others.
  - a. Adaptations are the characteristics that species develop over time that help them survive in a particular environment.
  - b. A species is considered extinct when all its members have died.
  - c. As climate changed, some organisms became successful because they adapted to the new environment, and some organisms became extinct.

### B. The Impact of Asteroids

1. When large numbers of organisms become extinct in a short amount of time, the event is called a(n) mass extinction.
  - a. One possible cause of mass extinction is the impact of a(n) asteroid with Earth.
  - b. Scientists hypothesize that such an event might have caused a mass extinction at the end of the Cretaceous period.
2. Debris from an asteroid collision blocked sunlight, cooling Earth quickly.
  - a. Organisms that did not have time to adapt died.
  - b. Mass extinctions are usually followed by times when rapid evolutionary changes occur.

### C. Earth's Changing Surface

1. The same sources of internal thermal energy that drove the earliest volcanism and plate tectonics still operate today.
  - a. Thermal energy still escapes from Earth's interior.
  - b. Tectonic plates and the continents on the plates have not stopped moving.

## Lesson Outline continued

2. Volcanic activity still occurs, being most active at the boundaries between tectonic plates.
3. Volcanoes form oceanic crust, help build mountains, and fuel part of the rock cycle.
4. As Pangaea broke apart, Africa moved toward Europe, forming the Alps in the area that is now Europe.
5. The processes that changed ancient Earth continue to change present-day Earth; the evidence of these changes is recorded in Earth's rock layers.

### Discussion Question

How do scientists know that humans and dinosaurs did not exist at the same time?

Dinosaurs existed during the Paleozoic and Mesozoic eras. Humans did not exist until the Cenozoic era. Further fossil evidence shows that no common fossils existed from the same geologic time.