

## 17-3 Evolution of Multicellular Life

### Precambrian Time

Few fossils exist from Precambrian time because the animals were all soft-bodied. Life existed only in the sea.

### Paleozoic Era

**Rich fossil evidence shows that early in the Paleozoic Era, there was a diversity of marine life.**

The **Paleozoic Era** is divided into the following **periods**:

- Cambrian
- Ordovician
- Silurian
- Devonian
- Carboniferous
- Permian

#### Cambrian Period

The diversification of life at this time is called the “Cambrian Explosion.”

The first known representatives of most animal phyla evolved. These included:

- invertebrates
- brachiopods
- trilobites

#### Ordovician and Silurian Periods

Some arthropods became the first land animals.

The first vertebrates appeared.

The first land plants evolved from aquatic ancestors.

#### Devonian Period

Some plants adapted to drier areas and invaded more habitats.

Insects appeared on land.

The Devonian is often called the Age of Fishes because many groups of fishes were present in the oceans.

Most fishes had jaws, bony skeletons, and scales.

**During the Devonian, vertebrates began to invade the land.**

Some of these early four-legged vertebrates evolved into the first amphibians.

#### Carboniferous and Permian Periods

Reptiles evolved from certain amphibians.

Winged insects evolved into many forms.

Giant ferns and other plants formed vast swampy forests.

Remains of ancient plants formed thick deposits of sediment that changed into coal over millions of years.

At the end of the **Permian Period**, there was a mass extinction in which many living things became extinct at the same time.

**The mass extinction at the end of the Paleozoic affected both plants and animals on land and in the seas. As much as 95% of the complex life in the oceans disappeared.**

### Mesozoic Era

During the Mesozoic Era, dinosaurs became dominant. The Mesozoic is also marked by the appearance of flowering plants.

The Mesozoic Era is often called the Age of Reptiles.

The **Mesozoic Era** is divided into the following **periods**:

- Triassic
- Jurassic
- Cretaceous

### **Triassic Period**

Organisms that survived the Permian mass extinction became the main life forms early in the Triassic. These organisms included fishes, insects, reptiles, and cone-bearing plants.

### **Jurassic Period**

Dinosaurs became the dominant animals on land.

One of the first birds, *Archaeopteryx*, appeared.

Many paleontologists think that birds are close relatives of dinosaurs.

### **Cretaceous Period**

Dominant animals during this period included: reptiles, birds, turtles, crocodiles, fishes, and marine invertebrates.

New forms of plant life included leafy trees, shrubs, and small flowering plants.

The Cretaceous Period ended with a mass extinction.

More than half of all plant and animal groups were wiped out, including all of the dinosaurs.

### **Cenozoic Era**

**During the Cenozoic, mammals evolved adaptations that allowed them to live in various environments—on land, in water, and even in the air.**

The Cenozoic often is called the Age of Mammals.

The **Cenozoic Era** is divided into

- Tertiary Period
- Quaternary Period.

### **Tertiary Period**

The climate was generally warm and mild.

Marine mammals such as whales and dolphins evolved.

Grasses evolved, providing food for grazing mammals.

Some mammals became very large, as did some birds.

### **Quaternary Period**

Earth's climate cooled, causing a series of ice ages.

About 20,000 years ago, Earth's climate began to warm and sea levels began to rise.

In the oceans, algae, coral, mollusks, fishes, and mammals thrived.

Insects, birds, and land mammals were common.

The fossil record suggests that the early ancestors of our species appeared about 4.5 million years ago.

The first fossils of *Homo sapiens* may have appeared as early as 200,000 years ago in Africa.

According to one hypothesis, members of our species migrated from Africa and ultimately colonized the world.