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## Reptiles



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Photo credit: Anole Lizard (*Anolis carolinensis*) by Catherine Morrison. CC BY-NC-SA

### Introduction

Reptiles do not form a distinct evolutionary group as birds and mammals do. Rather, the Class Reptilia consists of four orders which are very different from each other. For example, lizards are more closely related to birds than to turtles! As a result, reptiles are as easily defined by what they aren't as by what they are.

Living species of the class Reptilia are placed in four orders. The order Testudines includes turtles, the order Squamata includes lizards and snakes, the order Crocodylia contains crocodiles and alligators, and the order Rhynchocephalia contains the lizard-like tuataras.

As opposed to mammals and birds, reptiles have neither fur nor feathers, but scales. Reptiles cannot be confused with amphibians because reptiles have dry, water-proof skin and eggs, as well as internal fertilization and more advanced circulatory, respiratory, excretory, and nervous systems.

Reptiles evolved from labyrinthodont amphibians 300 million years ago. The success of this terrestrial vertebrate group is due in large part to the evolution of shelled, large-yolked eggs in which the embryo has an independent water supply. This advance, as well as the development of internal fertilization, enabled reptiles to be the first vertebrates to sever their ties with water. They radiated out across the landscape, diversifying quickly and becoming the dominant life form on the planet during the Mesozoic Era, otherwise known as the age of the reptiles.

This cladogram is a very approximate illustration of the complex evolutionary relationships among vertebrates. It shows several things:



- all vertebrates evolved from an amphibian ancestor thought to have been a labyrinthodont.
- amphibians diverged from the other vertebrates very early on.
- turtles, crocodiles, and dinosaurs appeared before the other vertebrate taxa.
- dinosaurs, birds, crocodiles, and snakes are more closely related to each other than to turtles or mammals.

Image Credit: Biodiversity Institute of Ontario

## Reproduction

While the process of copulation and egg-laying differs slightly among reptiles, they share the ability to produce a large-yolked, shelled egg. This evolutionary innovation allowed them to dominate the terrestrial landscape for 100 million years. Some lizards and snakes have advanced a step further, evolving the ability to retain their eggs internally until they have hatched, and giving birth to fully developed young (this is called vivipary).

Most reptiles, however, lay eggs which have leathery shells which are resistant to drying. Inside, the amnion encloses the embryo in a protected, moist environment in which nourishment is supplied by the yolk sac, and metabolic waste is stored by the allantois. Parental care is very rare in reptiles. In most species, the young are independent from the moment they've hatched.

## Poikilothermic

Reptiles are poikilothermic, which means that they cannot regulate heat internally (as opposed to birds and mammals which are homeothermic). However, the name "cold blooded" is a misnomer, because reptiles can maintain high body temperatures by relying on external sources of heat. Reptiles bask in the sun to increase their body temperature or hide in their burrows or in water to cool down. At northern latitudes, during cold periods, reptiles are dormant from a few days to several months, their body processes slowed until temperatures increase.

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