

Introduction to Herpetology

Lesson Aims

- Discuss the nature and scope of reptiles.
- Identify credible resources, and begin to develop networking with organisations and individuals involved with the study of reptiles around the world.

WHAT IS HERPETOLOGY?

Herpetology is the study of reptiles and amphibians. The term is derived from Linnaeus's classification in which he combined reptiles and amphibians into the one category. Herpetology examines the biology and ecology of these animals and their importance at a global scale. Herpetology as a scientific study and as a hobby can have positive impacts on the conservation of threatened reptile and amphibian species.

INTRODUCTION TO REPTILES

Reptiles include turtles, lizards, snakes and crocodiles. They are ectothermic (cold-blooded) vertebrates. They can live independently from the water and ambient air humidity due to their drying-resistant integument (skin) and they have foetal membranes that protect their embryos (egg shells or membranes).

- Taxonomy and Classification
- Evolution
- Classes and Sub Classes
- Comparing Characteristics of Orders
- Comparing Characteristics of Families
- Resources
- Reptile Associations
- Legislation?

ANIMALS

Animals are given both scientific and common names. Common names can vary from place to place and the same animal may sometimes have several different common names which can create confusion. For example, the skink *Tiliqua rugosa* of Australia is called the Sleepy Lizard in South Australia, the Stumpy-tail in Victoria, a Boggi in western New South Wales, a Bobtail in Western Australia and a Shingleback throughout Australia.

Scientific names are generally more accurate. They are given to the animals by scientists and the scientific name being used for a particular animal is largely the same across the world, in all countries and even in different languages.

Exceptions to the rule

Sometimes scientists will change a scientific name when new genetic evidence arises. Occasionally there can be discrepancies and one expert may continue using the old name while others use the new one.

Despite occasional anomalies such as this the use of scientific names is vastly more accurate than the use of common names.

TAXONOMIC CLASSIFICATION

Scientific names are organised in a hierarchical fashion.

- All animals belong to what is called the Kingdom "Animalia"
- The Kingdom is divided into Phyla (singular: Phylum)

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- Phyla are divided into Divisions
- Divisions are divided into Classes (eg. Amphibians belong to the class Amphibia)
- Classes are divided into Orders
- Orders are divided into Families
- Families are divided into Genera (singular: Genus)
- Genera are divided into Species

Species can sometimes be divided into subspecies (eg. the kookaburra). Some plant species can also be divided further into varieties.

When writing the scientific name of a particular species we include both the genus and species eg. *Varanus komodoensis* (Komodo Dragon)

There are other levels of classification apart from those mentioned above; such as “subclass” (a level between class and order) or “sub family” (a level between family and genus).

CLASSIFICATION OF REPTILES

Reptiles are classified into the class Reptilia.

Living reptiles can be divided into the following subclasses:

- Subclass Anapsida (turtles)
- Subclass Lepidosauria (tuataras, scaled reptiles)
- Subclass Archosauria (crocodilians)

These subclasses can then be further divided into orders and families.

Subclass Anapsida. Animals within this subclass are distinguished by a skull that characteristically has no openings in the bone that covers the temporal area. These animals are ancient and many consider them to be ancestors to all other groups of reptiles (for this reason they are called “stem reptiles”).

Order Testudines (turtles) also referred to as Testudinata

- Suborder Chelydridae (snapping turtles)
- Suborder Pleurodira (sideneck turtles)

Subclass Lepidosauria

Order Rhynchocephalia (tuataras)

- Suborder Sphenodontida

Order Squamata (scaled reptiles – snakes and lizards)

- Suborder Sauria (lizards, skinks, geckos and monitors)
- Suborder Amphisbaenia (worm lizards)
- Suborder Ophidia (Serpentes) (snakes)

Subclass Archosauria

Order Crocodilia (alligators, gharials, caimans and crocodiles)

Note Lepidosauria and Crocodilia are sometimes considered “infra classes; which is a sub division of sub class.

Other sub classes that you may encounter include:

- Subclass Synapsida –Extinct animals. Mostly terrestrial carnivores, moderate size, mammal-like reptiles with string legs, teeth specialised for a carnivorous diet.
- Subclass Diapsida –Includes many extinct species, but is sometimes used to encompass Lepidosauria and Crocodilia as well.

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CHARACTERISTICS OF REPTILES

The biological and ecological characteristics will be explored in greater depth in later lessons. Below is a brief summary of some of the major features:

- Vertebrates (have backbone).
- Young are produced from eggs. Most lay the eggs (oviparous), but a few hold the eggs inside the body until the young hatch (viviparous) eg. Boa Constrictor.
- All reptiles are cold blooded (with the exception of the Leatherback Sea Turtle that can regulate its body temperature). This means that they require external heat to warm their bodies. Without adequate heat, they become inactive until the environment heats up again.
- All are covered by scales. Testudinia and Lepidosauria shed scales periodically, but Crocodilia do not shed scales.

Testudines (Turtles)

- Generally life histories are relatively similar between the different species.
- All lay eggs and do not exhibit any signs of parental care for the young.
- Sex of individuals is determined by the temperature of the developing eggs in a nest.
- Most are long lived.
- There are three types of turtle –marine, freshwater and terrestrial –each has different morphological characteristics adapted to their environment.

Squamata (Snakes & Lizards)

- Most are terrestrial, some are secondarily aquatic (particularly snakes).
- Bodies are covered with scales.
- There are only two living species of Tuatara; but thousands of species of snakes, and of lizards.

Rhynchocephalia – Tuatara

The Tuatara (genus *Sphenodon*) is the only living representative of this order, sometimes separated into two species. Two species of the genus exist.

Tuatara has a lizard-like appearance, but its anatomy shares features from both the snakes and lizards. It also shares characteristics with the amphibians related to its locomotion and brain.

It is a nocturnal animal living in mainly burrows and feeding upon insects and other small animals including lizards. They do bask in the sun at times raising body temperatures as high as 28 degrees Celsius; but more commonly they will be active when body temperatures are between 6 and 16 degrees Celsius (which is low in comparison to most lizards)

The Tuatara is extremely slow growing, only reaching maturity at around 35 years of age and it usually lives to 60-70 years of age. Tuataras inhabit a group of around 30 islands in New Zealand.



Giant Tree Frog (*Litoria infrarufa*) of Queensland, Australia

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CLASSIFICATION OF AMPHIBIANS

Amphibians belong to the Class “Amphibia”

The class “Amphibia” is divided into three sub classes:

- Lepospondyli (all representatives are extinct)
- Labyrinthodontia (all representatives are extinct)
- Lissamphibia (all living amphibians belong to this group)

The subclass “Lepospondyli” were slender bodied, aquatic animals. They evolved from fish and many retained physical characteristics similar to fish

The subclass “Labyrinthodontia” includes most of the species of amphibians that ever lived. They have all been extinct for more than 150 million years. They included both aquatic and terrestrial animals, of varying sizes, some as large as alligators. They are distinguished by a complicated teeth structure, and varied structure of vertebrae.

The sub class “Lissamphibia” encompasses three orders of animals:

- Order Anura (Frogs and Toads) tailless (“without tail”)
- Order Apoda (Caecilians) these are legless animals
- Order Urodela (Salamanders and Newts) these animals have a tail
- Characteristics of “Lissamphibia”
- Most less than 30cm long
- Skin is moist, with a profusion of mucous glands (very occasionally a species can have scales)
- The outer skin is shed periodically
- Four toes on the hand
- Teeth are not complex (as in “Labyrinthodontia”)
- Parts of the skeleton can be cartilaginous

CHARACTERISTICS OF AMPHIBIANS

Again, the characteristics of amphibians will be discussed in greater detail in following lessons. In summary, defining characteristics of amphibians are:

- Ectothermic – rely on external environment for thermal regulation.
- Tetrapods – they are four-limbed.
- Two distinct life phases (frogs and toads) eg. tadpole/frog.
- Have gills for at least part of their life.
- They spend at least part of their lives in water and on land.
- Cutaneous respiration – can exchange gases through the skin surface.
- Two types of skin glands – mucous glands (for cutaneous respiration) or parotoid glands (toxic secretions in toads).
- Oviparous – Lay eggs. Usually in aquatic environments.

BUILDING YOUR RESOURCES AND DEVELOPING NETWORKS

Knowledge never stands still. The more you learn about reptiles and amphibians, the more questions you will have about these fascinating animals (if you are learning properly).

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While a course like this can certainly provide a great overview of the subject; you will need to continue building your knowledge beyond the scope of the course, if you truly want to become an expert in herpetology.

There are many different ways that you can continue to grow your knowledge and understanding of reptiles and amphibians. Here are a few:

1. Get involved as a volunteer
 - Join a friends group at a zoo or wildlife park.
 - Join a conservation group, club or society that is involved with reptiles or amphibians.
 - Volunteer with a wildlife rescue group.
2. Visit zoos, wildlife parks, pet shops or anywhere else where you can see reptiles or amphibians in captivity.
3. Visit places where you can find reptiles or amphibians. Learn how to find them in the wild. Photograph them. Identify what you photograph and label the photographs.
4. Join social networking groups (eg on facebook or linked in) where you can interact with other people who have knowledge or interest in amphibians or reptiles.
5. Collect books, magazines, brochures or any other literature containing information about amphibians or reptiles. For example, field guides, herpetology books, brochures about local wildlife may often be produced by national parks, government conservation departments or even local government authorities; as well as wildlife groups and conservation societies.
6. Attend relevant events such as seminars, lectures, conferences, pet shows, environment or conservation shows or exhibitions, etc. These can be places to meet people, develop relationships with colleagues, and find literature and other resources.

TERMINOLOGY

- Ectothermic – relies on external environment to maintain body temperature and function.
- Viviparous – embryo develops within the body of the female.
- Oviparous – embryo develops without a placenta within an egg.

SET TASK

Question 1

Contact two different organisations that may help you develop or extend networking with people involved in herpetology. For example, herpetological societies, zoos, wildlife parks, pet shops (selling herps), wildlife rescue, national parks, etc.

Question 2

Where possible, obtain literature and contact details etc. For example, what is their purpose? Who are they targeted at? What information do they provide? Provide examples. Write notes on your findings.

Congratulations on finishing the Lesson

Now do the SAT on the next page

SAMPLE

Assignment One

Question 1 – Describe three characteristics that differentiate reptiles from amphibians (write up to 300 words).

Question 2 - Report on your set task. You can provide the information you collected as a table. This information can form the basis of a catalogue to build on for future reference.

Question 3 - List the scientific and common names of 2 different species of reptiles, and produce a series of 10 bullet points below the name, listing interesting and important facts that relate to each of those species.

Don't forget to submit your interpretive collection on 5 members of the Order Crocodilia (Crocodiles, Alligators, Caimens and Gavials).

Congratulations on finishing this

[Now start the next section on the next page](#)