

CLASS : REPTILIA

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Creeping
or
crawling organisms

REPTILES

- ▶ Diverse group of animals
 - Lizards
 - Snakes
 - Tortoises
 - Crocodiles
 - Extinct dinosaurs etc.



STUDY OF REPTILES- HERPATOLGY

SMALLEST REPTILE- DWARF GECKO
(17mm)

Sphaerodactylus aurius



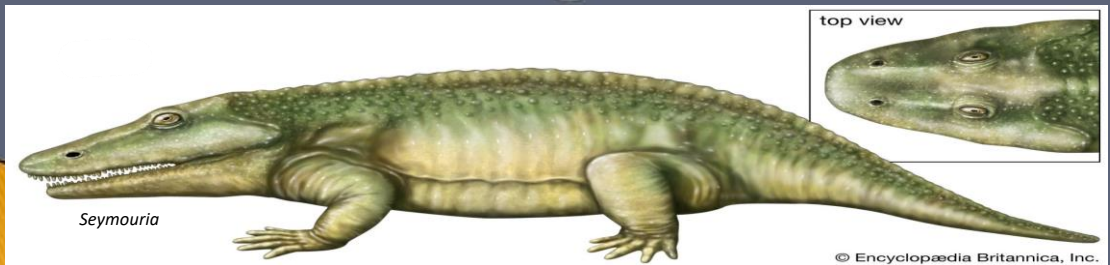
LARGEST LIVING REPTILE – SALT-
WATER CROCODILE
(20 feet, over 1900kgs)

Crocodylus porosus



REPTILES ...

- ▶ Originated in Carboniferous period from labyrinthodont Amphibian stock
- ▶ Flourished during Mesozoic era– Golden age



REPTILES ...

First vertebrates which became independent of water and took possession of dry land

Modern Reptiles Inhabit Every Continent with the exception Antarctica.

(Due To The Continent's Extremely Cold And Harsh Climate)

Living subgroups are recognized as:

1. **Testudines** (Turtles, Terrapins and Tortoises) approx. 400 species
2. **Sphenodontia** (Tuatara from New Zealand) 1 species
3. **Squamata** (lizards, snakes and worm lizards) over 9600 species
4. **Crocodylia** (crocodiles, gavialis, alligators and caimans) 25 species.

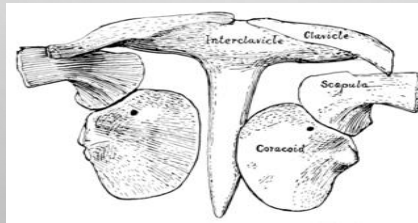


Sphenodon punctatum

CHARACTERISTICS OF REPTILES

Creeping or crawling organisms

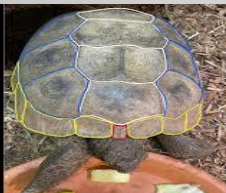
- **Terrestrial or aquatic,,** Creeping Or Burrowing, Mostly Carnivorous, **Cold-blooded Vertebrates & Air Breathing Animals**
- **Jawed vertebrates- upper and lower jaw.** Mandible(lower Jaw)- more mobile & Consists Usually Six Pieces Of Bones.
- Body **Bilaterally symmetrical**, divided into **4 regions**- head, neck, trunk and **A Post-anal Tail Is Present.**
- Tetrapod vertebrates (**Limbs 2 pairs**) pentadactyl, digits with horny claws. limbs absent in few lizards (Ophiosaurus) & all snakes
- Reptilian Body Covered With **Horny Epidermal Scales**, And Sometimes With **Dermal Plates Called Scutes** -Exoskeleton. **Endoskeleton Is Bony.** Ribs Connected To Sternum Except In Snakes. T- Shaped Interclavicle (Bone Between Clavicle) Present.
- **Skin dry**, cornified(Hardened or tough Death Cells Filled With Keratin) and devoid of glands, but some lizards- femoral gland (**releases waxy substances-chemical communication and reproductive signaling**), musk gland (anal gland-secretes musk i.e., a substance with penetrating odor) covered with horn scales or scutes.



scute

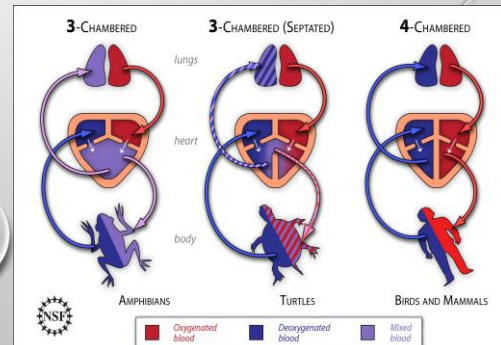
a bony plate or shield-like scale

- nuchal scute
- marginal scute
- costal scute
- vertebral scute



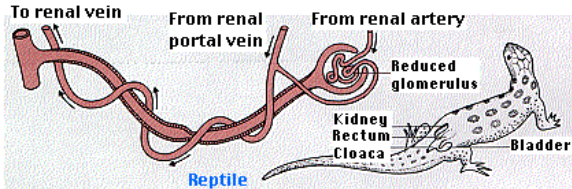
CHARACTERISTICS OF REPTILES

- Mouth terminal, Generally Jaws bear **acrodont dentition** (Simple Pointed Teeth) but in crocodile **thecodont dentition** (Teeth Embedded In Sockets) present. Teeth replaced by horny beaks in turtles and tortoises.
- Alimentary canal- **complete**, terminates into a cloacal aperture.
- The Cloacal Opening Is Either Transverse Or Longitudinal
- **Respiration-Lungs**, but **Chelonia** (tortoise) - cloacal respiration, turtles- cutaneous gas exchange
- Circulatory system- Heart **usually 3** chambered- The Heart Is Composed Of Two Auricles And A Partially Divided Ventricle. There Are Right And Left Systemic Arches. Crocodile (**4 chambered**)



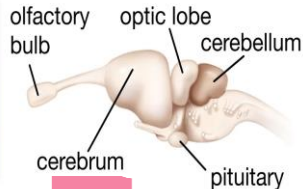
CHARACTERISTICS OF REPTILES

Excretory system well developed.
Kidney **metanephric**. Excretion **uricotelic** (excrete most of their waste nitrogen in the form of uric acid, usually in the urine).



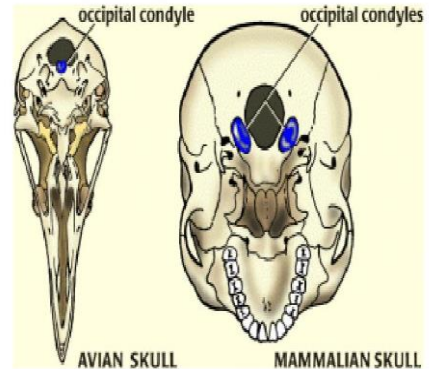
The Metanephric Kidney in Lizard

Brain structure of the reptile (caiman)



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Birds have a single occipital condyle, just like reptiles



- **Cerebrum of brain well developed (larger). Cranial nerves 12 pairs**
- **Skull monocondylic** present for the attachment with atlas. (At the posterior end of cranium there is one rounded projection called the occipital condyle or bone that connects the skull with the vertebral column)
(allows head to move)

CHARACTERISTICS OF REPTILES

- Sense Organs- Lateral line system absent

External Ear(pinna) absent. Vomero-nasal Organ (**Jacobson's organ-smell sense organ**) **present** in the roof of the mouth.

- **Sexes separate.**

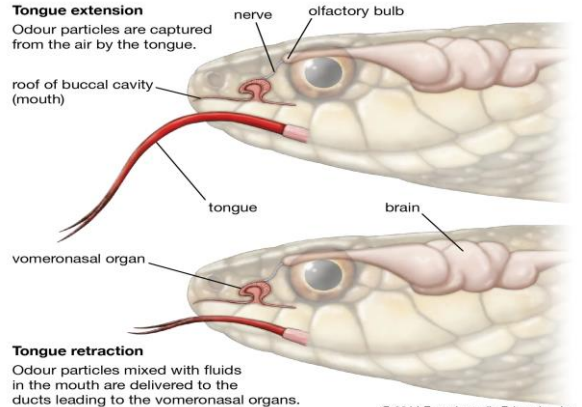
- Mullerian Duct Persists As Oviduct In Female And Wolffian Duct Is Retained As Vas Deference In Male. Males Possess Copulatory Organs.

Male usually with a pair of Muscular copulatory organ-body part used to transfer sperm from a male to a female during reproduction-- (hemipenis-snakes & lizards) & unpaired in Chelonia and Crocodilia.

- **Fertilization Internal.** Mostly **oviparous.** Some **viviparous**

Tongue extension

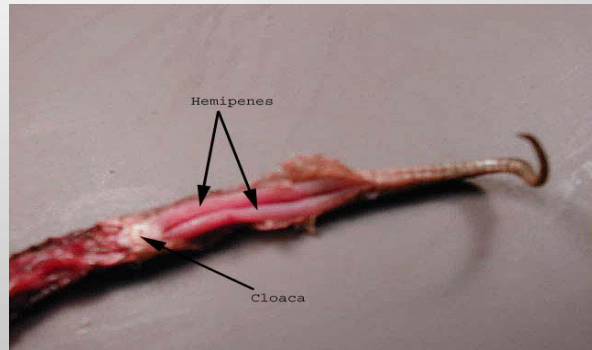
Odour particles are captured from the air by the tongue.



Tongue retraction

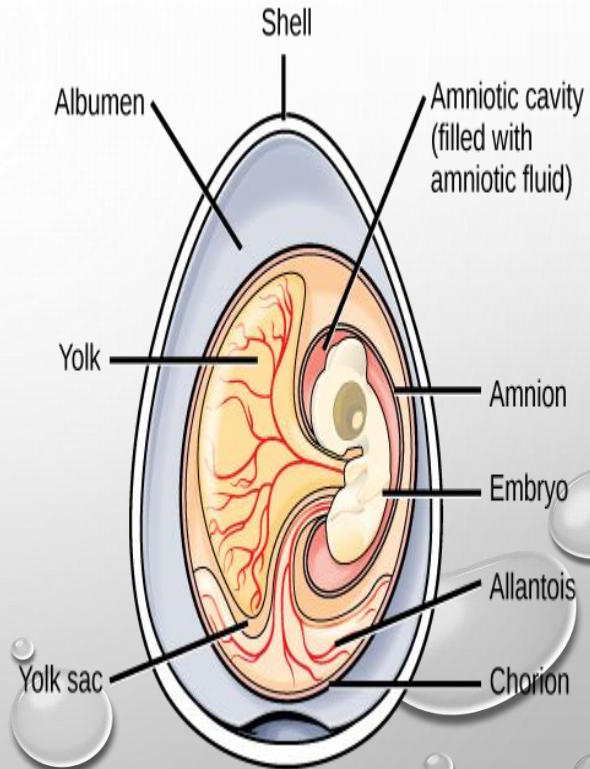
Odour particles mixed with fluids in the mouth are delivered to the ducts leading to the vomeronasal organs.

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CHARACTERISTICS OF REPTILES

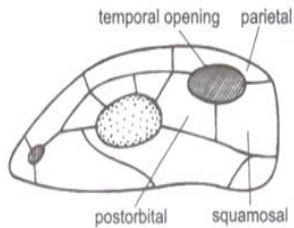
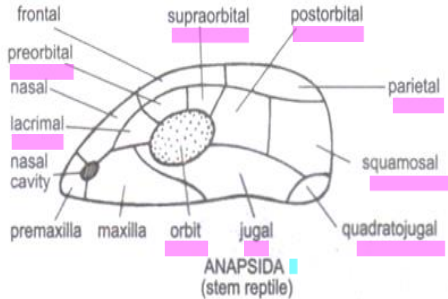
- **Cleidoic eggs** (Eggs With A Hard Outer Shell That Protects The Embryo And Allows It To Develop On Land) are large. The calcareous shell serves for protection against desiccation and external injury.
- Embryos are provided with **extra-embryonic membranes**, like amnion, chorion, yolk sac and allantois.
- **Development direct**
- **Parent care usually absent**



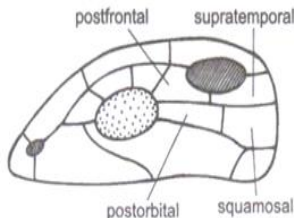
SKULL TYPES IN REPTILIA

- Reptiles are **cold-blooded** vertebrates, **breath by lungs** and having the **body covered by scales or scutes**.
- A **basioccipital bone** is present in the skull which articulates with the **vertebral column** by a **single condyle**.
- In 1895, herpetologists separated reptiles from Amphibia as a different class.
- They classified reptiles especially on the **basis of skeletal characters**.
- The major characteristic feature is the **fossa** (these are shallow depressions or openings in the temporal region of the skull, which are **used for muscle attachment and to lighten the skull**) of the temporal region, i.e., behind the orbit, of the skull.

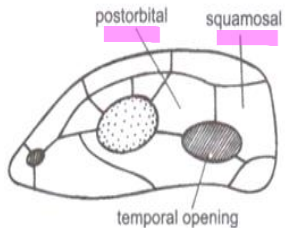




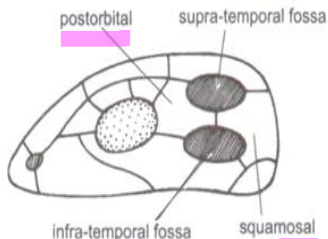
EURYAPSIDA
Plesiosaurs



PARAPSIDA



SYNAPSIDA
(mammal stock)



DIAPSIDA
(bird stock)

Fig. 24.1. Five types of skulls in lateral view in five subclasses of reptiles.

On the basis of fossa or fossae of the reptilian skull they are classified into four groups

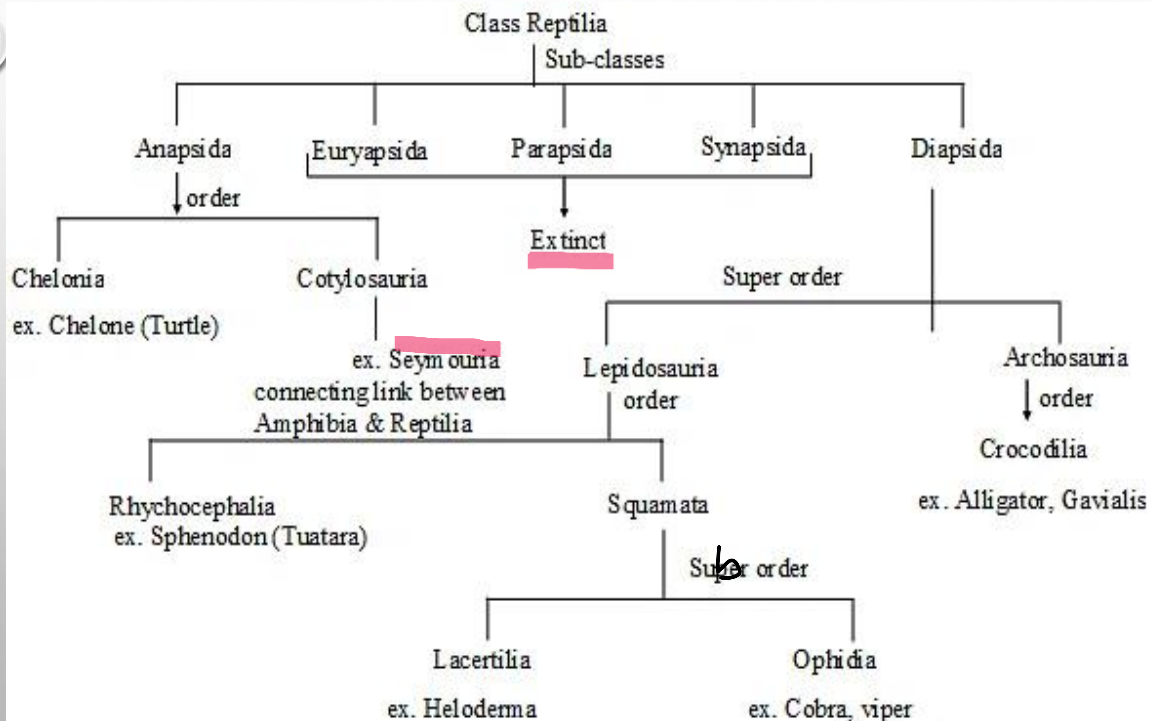
1. Anapsida - without any opening in the temporal region (ie., reptiles-like turtles, lack temporal fossae, and have a complete roof over their skull)

2. Parapsida - The skull possesses an upper opening in which the post-orbital and squamosal meet below (reptiles like Ichthyosaurs, dolphin-like aquatic reptiles have one temporal fossa located high on the skull)

3. Diapsida - In this case there are two openings on each side, separated by postorbital and squamosal bones (reptiles, like lizards, snakes, and crocodilians, have two temporal fossae: an upper (supratemporal) and a lower (infratemporal) fossa.

4. Synapsida - In this group a single opening is present with postorbital and squamosal meeting above. (Reptiles, which are ancestral to mammals or extinct mammal-like reptiles like pelycosaurs (like Dimetrodon) and therapsids, have one temporal fossa located on the lower side of the skull)

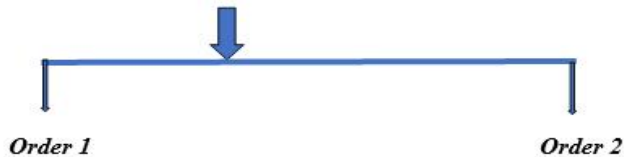
CLASSIFICATION OF REPTILIA



CLASSIFICATION OF REPTILIA

Subclass 1: Anapsida

*Primitive reptiles with solid roof skull
No temporal opening or fossa in the skull*



Order 1

Cotylosauria (Extinct)

Eg: Seymouria

Connecting link between Amphibia & Reptiles



Jaws and teeth less developed

Limbs are feeble and projects laterally

Body size from 1 to 10 feet



Order 2

Chelonia (Tortoise & turtles)

Terrestrial or aquatic

Body short, broad and oval

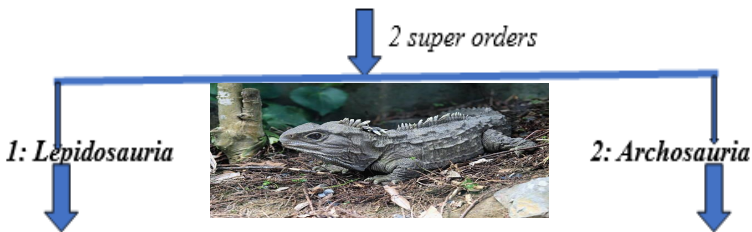
Whole body is covered by firm **bony shell carapace** (dorsal) and **plastron**(ventral)

Teeth absent but jaws with horny sheaths/beaks

Web or membrane found in between the digits for swimming

Subclass 2: Diapsida

Two temporal opening or fossa in the skull on each side of the skull which are separated by a bar of post orbital and squamous bones.



2 Orders

1. Rhynchocephalia

Body small, elongated and lizard like
Skin covered by granular scales, mid dorsal row of spines. Limbs pentadactyl with claws

Ex: Sphenodon punctatus and S. guntheri.

2. Squamata (includes lizards and snakes)

2 SUBORDERS:

1. Lacertilia or sauria (lizards)
2. Ophidia or Serpentina (snakes)

1 Orders

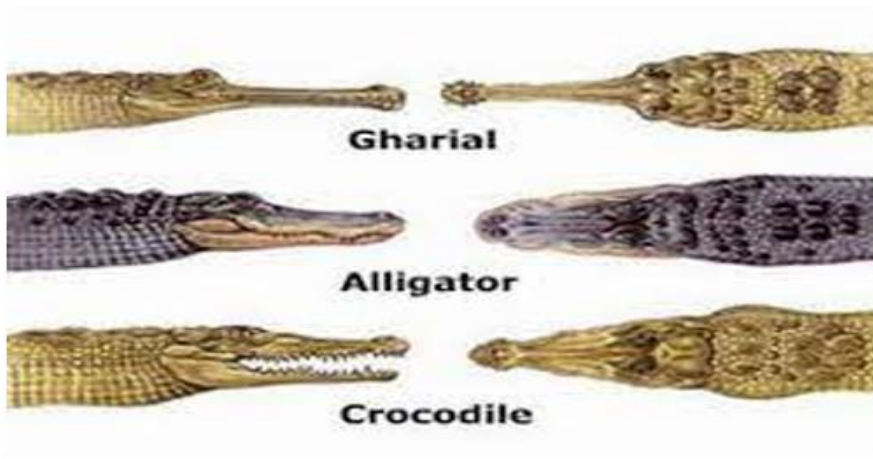
Crocodylia are the only living descendants of this group

1. Crocodylia

Large sized carnivorous aquatic reptiles. Tail long, strong and laterally compressed. Limbs short but powerful, clawed and webbed.

Skin thick with horny epidermal scales.

Crocodiles, alligator, gharial



Members have legs and feet designed for walking on land and a strong flattened tail used for swimming

These three groups are distinguished from one another by shape of their head.

- *Alligators have a **broad rounded snout.***
- *Crocodiles have a **triangular head and a more pointed snout.***
- *Gharials have a very **long and narrow snout.***