



SUBJECT	ZOOLOGY
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Module No. and Title	<b>Amphibia</b>
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### **Class-Amphibia**



## **Learning outcome:**

- Group animals on the basis of their morphological characteristics/ structures.
- Develop critical understanding how morphological change due to change in environment helps drive evolution over a long period of time.

Develop understanding on the diversity of life with regard to amphibians

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## **Introduction**

Amphibians are the first vertebrates to come from water on land but not fully adapted to terrestrial life. They lead double life so they are called as amphibians.

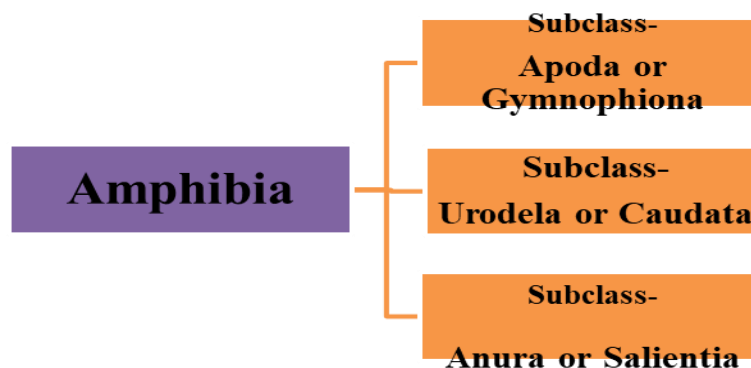
### **General characters:**

- They are aquatic, only fresh water as well as terrestrial.
- Body is divided into head, neck and trunk. Tail may or may not be present.
- Skin is without scales, smooth, moist and rich in mucous glands.
- Respiration is through lungs, skin and gills.
- Limbs may be pentadactyle with 4-5 digits. Some are without limbs.
- Endoskeleton is large and bony. Vertebral column , pelvic and pectoral girdles are present.
- Heart is 3 chambered.

- Brain is well developed with 10 pairs of cranial nerves.
- Cold blooded animals
- Alimentary canal, excretory canal and urino-genital tract all open to outside through cloaca.
- Sexes are separate, oviparous, metamorphosis and development occur in water only.
- Generally larva aquatic and adult terrestrial.

## Classification of Amphibia

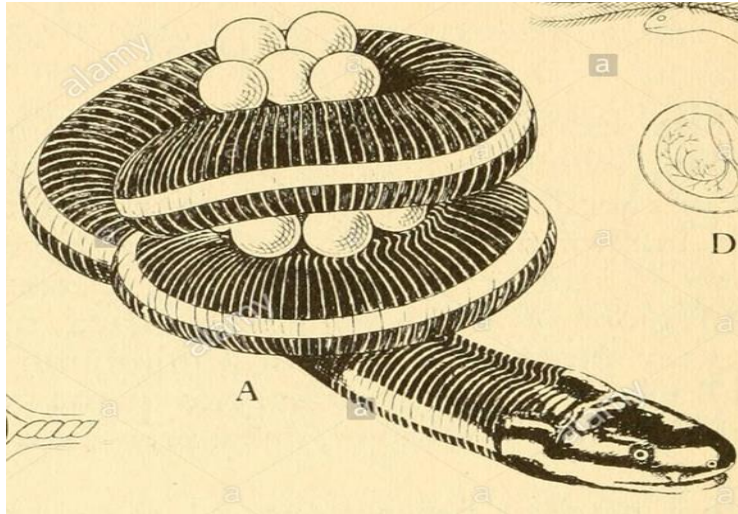
The class amphibia is divided into 3 subclasses



### Subclass 1- Apoda or Gymnophiona

- They have no limbs and tail.
- Girdles are absent.
- Body elongated, worm like and consists of only head and trunk.
- Skin contains minute dermal scales.

- Eyes are small, non- functional.
  - Skull compact and has complete bony roof.
  - Males have copulatory organs so fertilization is internal.
  - Development may be direct or with a larval stage having external gills.
  - They are strictly burrowing forms.
- Examples: Ichthyophis, Siphonops



Ichthyophis

### **Subclass 2- Urodela or Caudata**



- Tail is present.
- Body long, narrow, comprising of head, trunk and tail.
- Tail is useful for locomotion both on land and in water.
- Adults and larvae are similar in appearance.

- Gills and gill slits may persist in adult but internal gills are absent.
- Fertilization is usually internal
- Example: Salamander and Newts.



Salamander



**The Subclass Urodela or Caudata is divided in 2 orders**

Order- Perennibranchiata	Order- Caducibranchiata
<ul style="list-style-type: none"> <li>• Tail is laterally compressed and bears tail-fin.</li> <li>• Gills and gill-slits persists in the adult.</li> <li>• Eyes lack eyelids.</li> <li>• Example: Necturus, Proteus and Siren.</li> </ul>	<ul style="list-style-type: none"> <li>• Gills and gill-slits disappear in the adults.</li> <li>• Tail is cylindrical and without tail fin.</li> <li>• Eyes have eyelids</li> <li>• Example: Salamandra and Triton.</li> </ul>
 <p style="text-align: center;">Necturus</p>	 <p style="text-align: center;">Triton</p>

### Subclass 3- Anura or Salientia









- They have short, broad body consist of head and trunk.
- Tail is absent in adults.
- Skin is scale less.
- They are first vocal vertebrates.
- Eyes are large and have eyelids and lacrimal glands.
- They are aquatic, terrestrial and arboreal.
- Fertilization is external.
- Larva undergo Metamorphosis.
- Forelimbs short with 4 digits and hind limbs long and stout with 5 digits.
- Hind limbs are adapted for leaping and swimming.
- Caudal vertebrae are fused to form urostyle.

The Subclass Anura or Salientia is divided into 2 orders

Order- Aglossa	Order- Phaneroglossa
<ul style="list-style-type: none"><li>• They have no tongue and tympanum.</li><li>• The Eustachian tubes open into the pharynx by a common aperture,</li><li>• Example: Pipa</li></ul>	<ul style="list-style-type: none"><li>• They have tongue and tympanum.</li><li>• The Eustachian tube open separately into the pharynx.</li><li>• Example: Rana, Bufo, Hyala.</li></ul>
 <p>Pipa</p>	 <p>Rana      Hyala      Rhacophorus</p>

## Summary

Summary- Classification of Amphibia		
Class Amphibia		
Subclass - Apoda	Subclass- Urodela	Subclass-Anura
	Order 1- Perennibranchiata	Order 1- Aglossa
	Order 2- Caducibranchiata	Order 2- Pheneroglossa

Examples of Amphibia:			
			
Ichthyophis	Necturus	Amphiuma	Salamandra
			
Triton	Pipa	Hyla	Rhacophorus

### Links:

<https://drive.google.com/file/d/1Bfl4mhgI6lUXQOBgWHQjKmgInjiFCHBo/view>

<https://docs.google.com/presentation/d/1UeijOdcR2l--YOvgyVMdqMz24pEpYK5E/edit#slide=id.p1>

<https://docs.google.com/presentation/d/1oBwg19OuhKm3ZsLjvOMIH51ELqBY4oGb/edit#slide=id>

[https://docs.google.com/presentation/d/1LPIKzYNrkSop\\_0qveWahAN04Tvwo\\_65C/edit#slide=id.p1](https://docs.google.com/presentation/d/1LPIKzYNrkSop_0qveWahAN04Tvwo_65C/edit#slide=id.p1)

[https://drive.google.com/file/d/1O86y5RBwZhLNB5IzCFvrIqVg3Aw\\_1kH0/view](https://drive.google.com/file/d/1O86y5RBwZhLNB5IzCFvrIqVg3Aw_1kH0/view)

## Explore more:

- Hickman, C.; Roberts, L.S.; Keen, S.L.; Larson, A. and Eisenhour, D. (2018) Animal Diversity, McGraw-Hill.
- Holland, P. (2011) The Animal Kingdom: A Very Short Introduction, Oxford University Press
- Kardong, K.V. (2006) Vertebrates: Comparative Anatomy, Function, Evolution (4th edition), McGraw- Hill.

## Assessment

Units	Out-of –class activity Details of Activity	In-class activity Details of Activity	Assessment
1.1	Students should observe the specimens	Discussion on the topic Check the level of understanding through Question – answer session	Question – answer session
1.2	Students should classify the specimen Students should observe characters and identify amphibians	Discussion on the topic Check the level of understanding through Question – answer session Help students to apply the knowledge	Question to write in detail classification with examples