ATOMIC ENERGY CENTRAL SCHOOL, INDORE

CLASS XI

BIOLOGY

MODULE 4.4

UNIT – I / CHAPTER 4

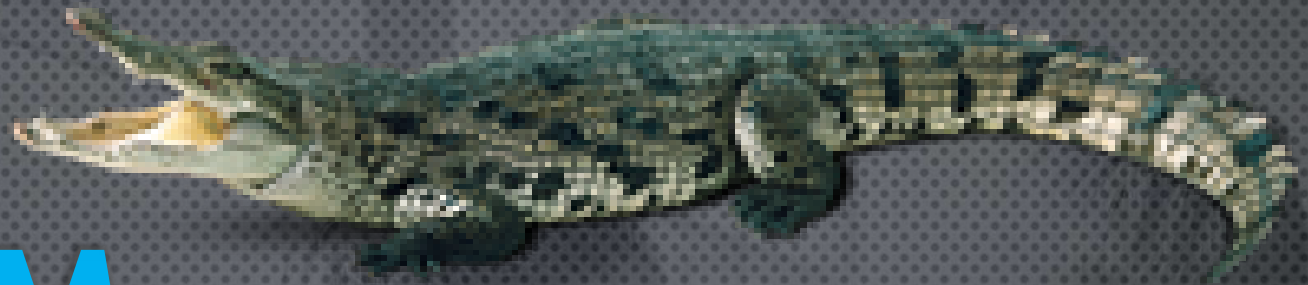
ANIMAL KINGDOM

NEERAJ KUMAR BAMANIA

PGT(SS) - BIOLOGY

ATOMIC ENERGY CENTRAL SCHOOL, INDORE

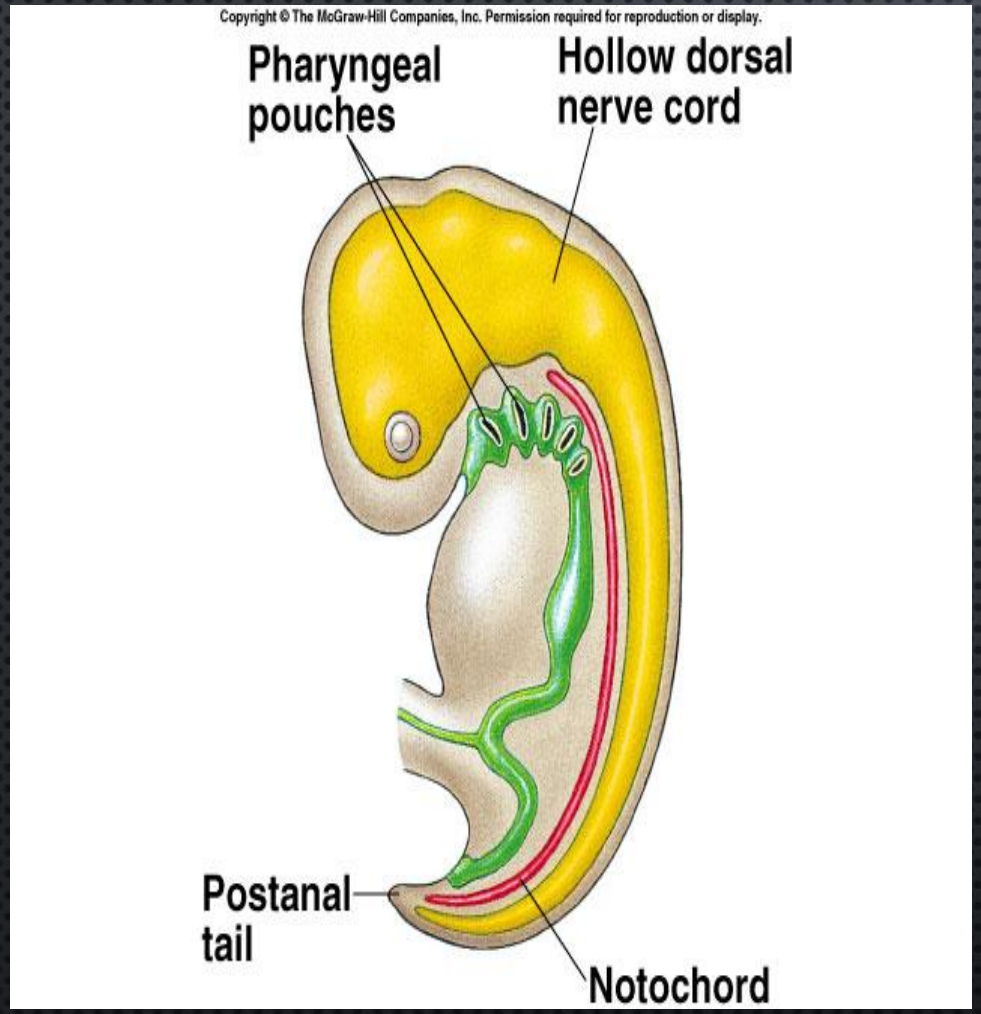
ANIMAL KINGDOM



MODULE 4.4

- CHORDATA

PHYLUM CHORDATA



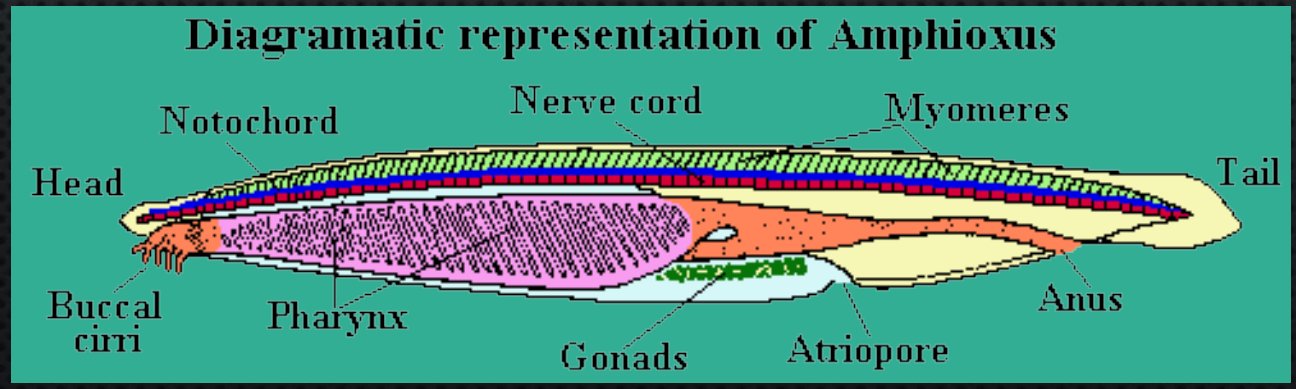
All Chordates have all four of these characteristics at some time in their lives

- Includes all vertebrates (Subphylum Vertebrata)
- All have (at one stage of their life cycle)
  - A notochord - a flexible rod; "backbone"
  - A hollow, dorsal nerve cord; develops into spinal cord and brain
  - Pharyngeal slits* - filtering apparatus for feeding
  - An endostyle* - longitudinal ciliated groove in pharynx, produces mucus to capture food particles
  - A post-anal tail*

*only present during embryonic stage in advanced vertebrates

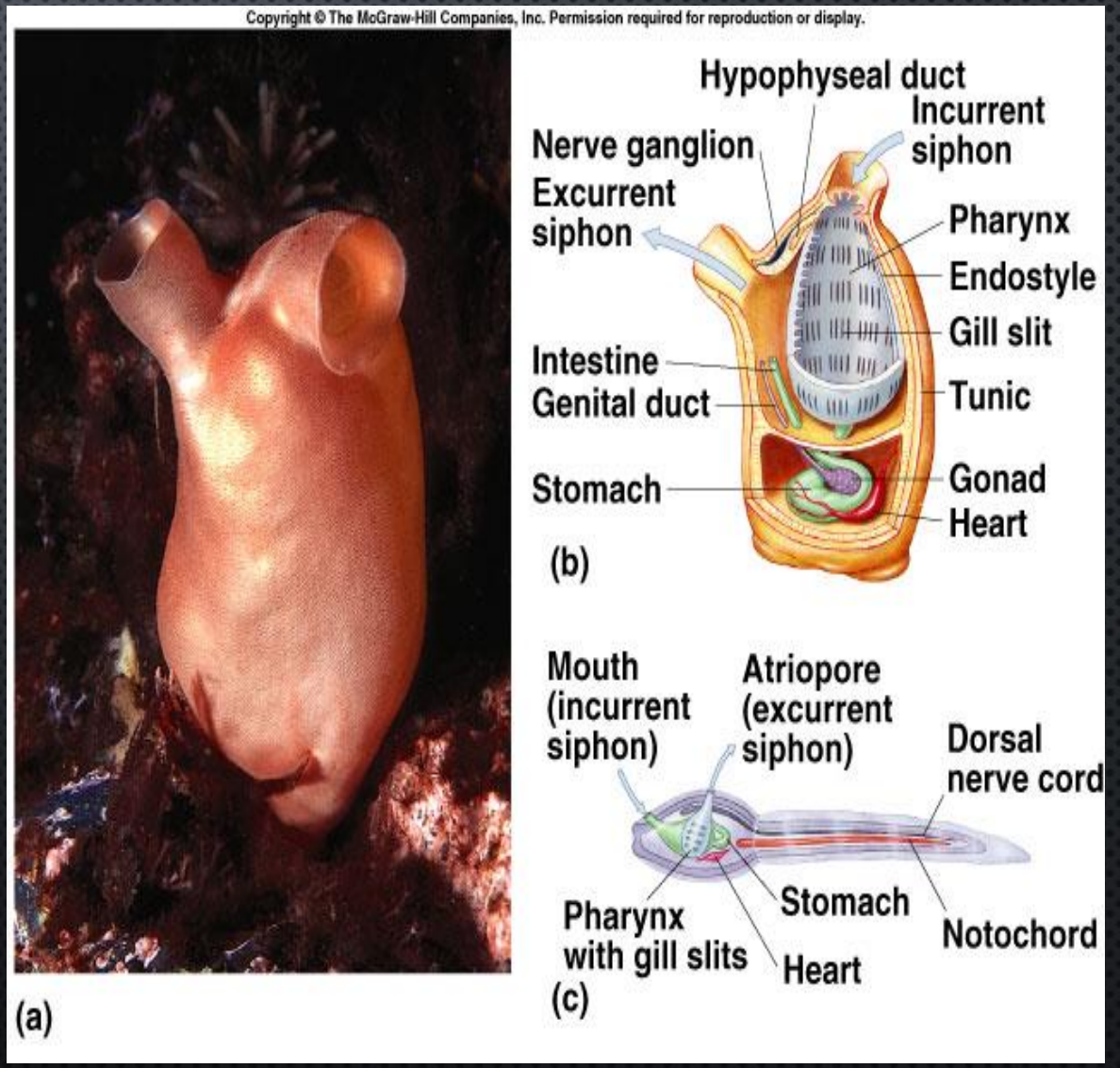
PHYLUM CHORDATA

- Includes 2 invertebrate groups (no vertebrae)
  - Urochordates – only the larvae has a notochord and nerve cord, adults usually lose tail; includes Tunicates and Salps (marine)
  - Cephalochordates – notocord persists throughout animal's life; includes Lancelots; the closest relatives to the Vertebrates



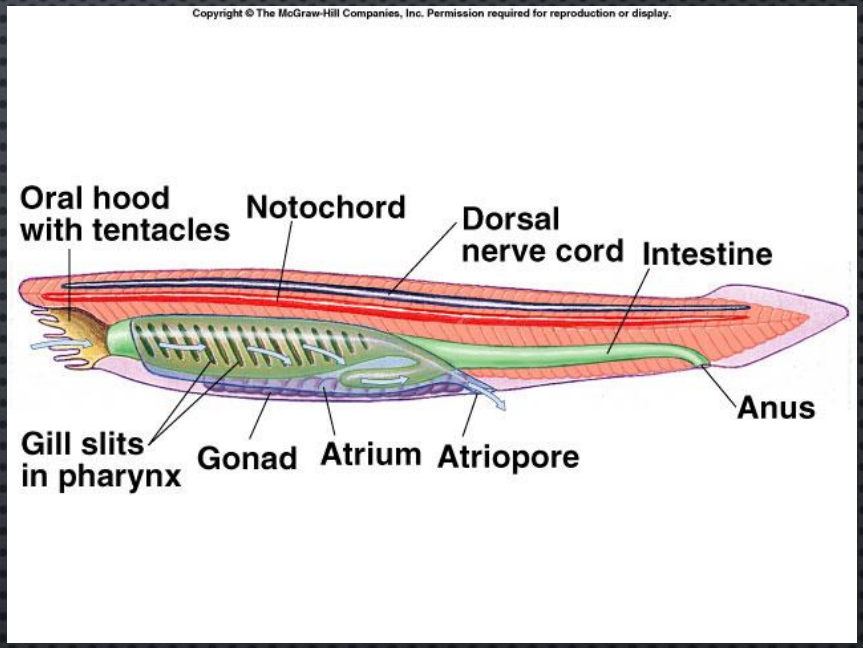
SUBPHYLUM UROCHORDATA (TUNICATE)

- Body shows variation in size and form.
- The body is un segmented and has no tail.
- The body is covered by a test. It is formed by tunicine which is rallied to cellulose. Hence the name Tunicata.
- Larva has notochord in the tail. It disappears during metamorphosis.
- Respiratory system contains gills in the pharyngeal wall.
- Nervous system is represented by a single dorsal ganglion in the adult.
- Excretion is carried on by nephrocytes.
- Asexual reproduction is by budding.
- Bisexual animal and cross fertilisation is favored.
- Fertilization is external.



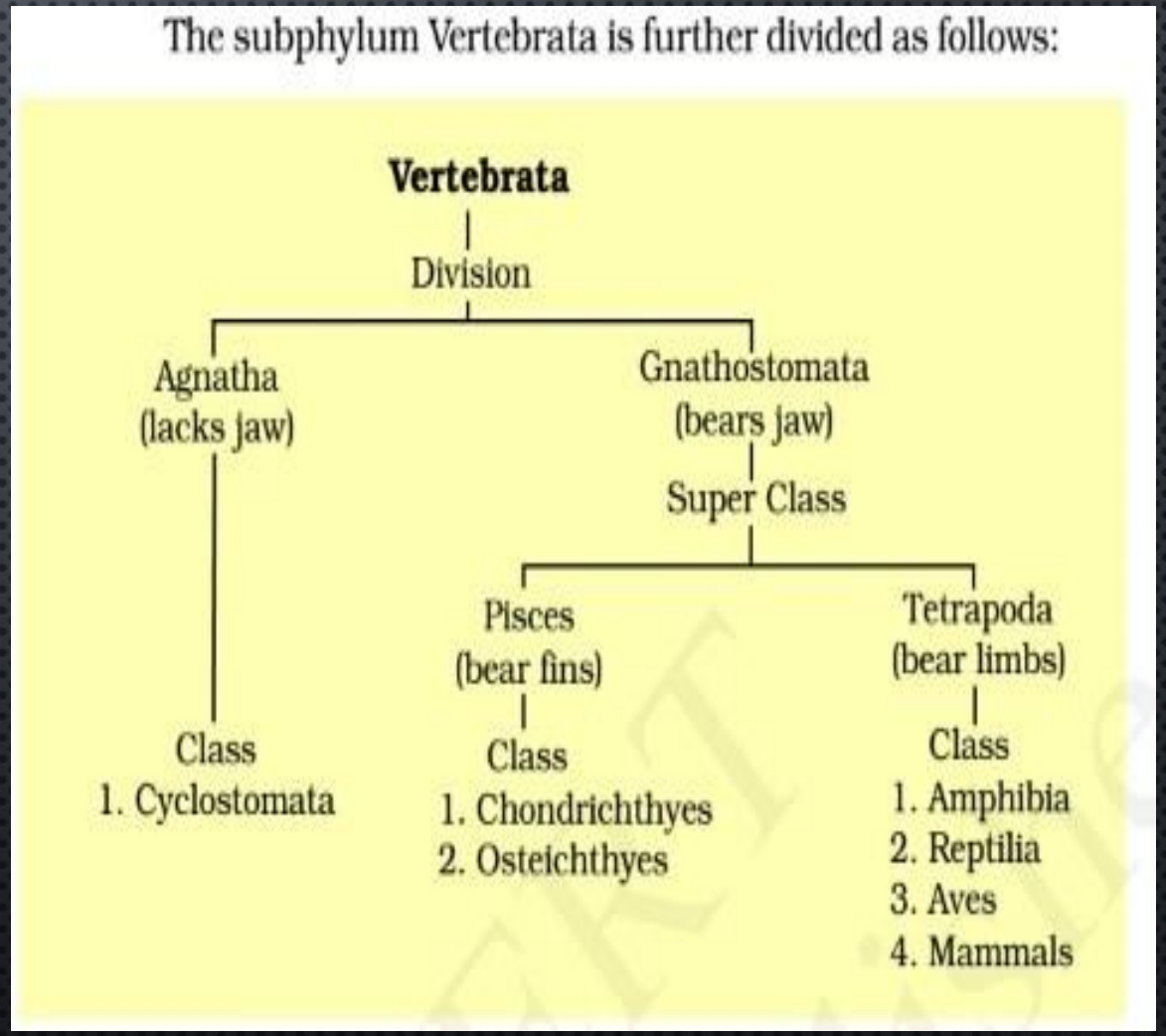
SUBPHYLUM CEPHALOCHORDATA (LANCELETS)

- Apendages are absent.
- Dorsal, caudal and ventral fins are present.
- Body-wall shows one- cell thick, non-ciliated epidermis, dermis, connective tissue, striated muscle and parietal peritoneum. It has no exoskeleton.
- Notochord extends from the anterior end to posterior end. Enterocoelic coelom is present. However, reduced in the pharyngeal region by atrium.
- Alimentary canal is long. It includes a large pharynx with many gill-slits ciliary mode of feeding is developed.
- Excretory system shows paired protonephridia with solenocytes.
- Sexes are separate. Gonads are metamerically arranged and with out gonoducts.
- Asexual reproduction will not take place.
- Fertilization is external.

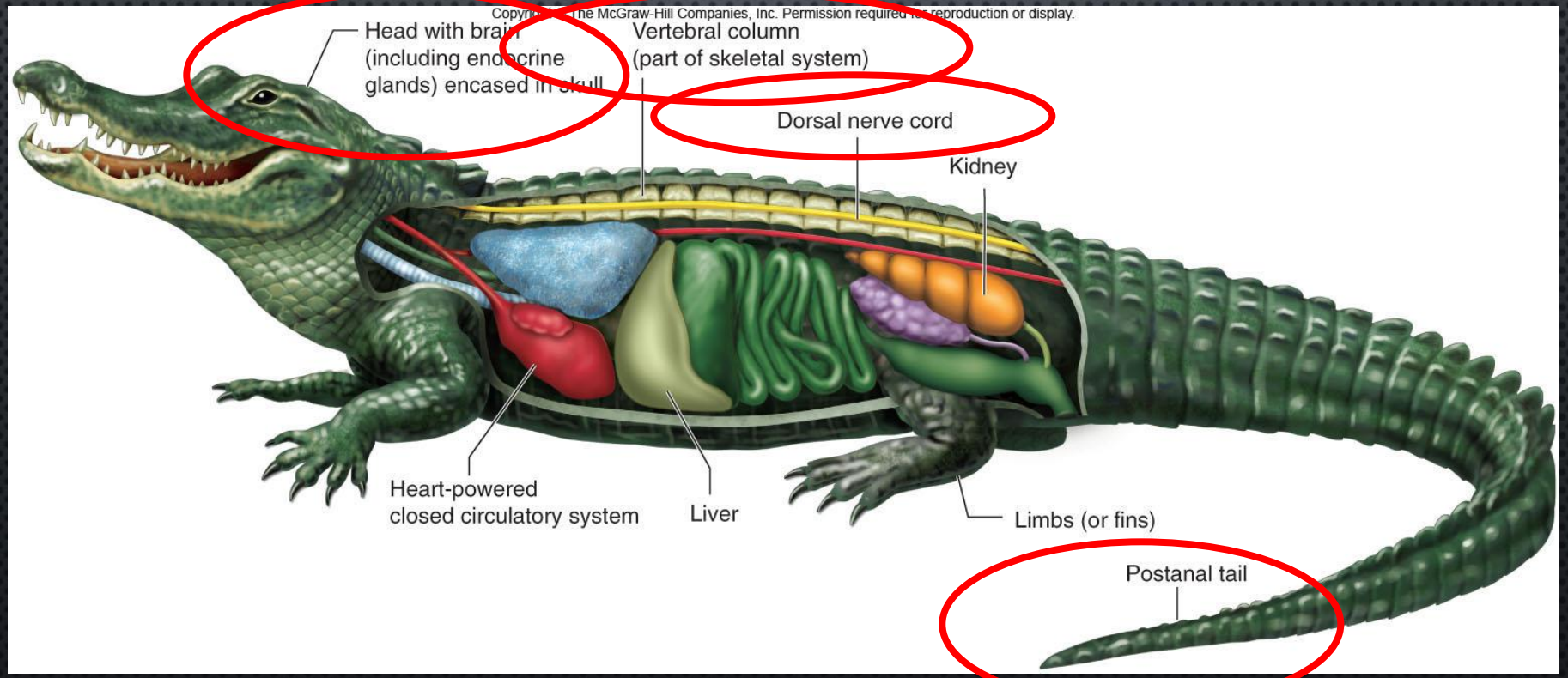


SUBPHYLUM VERTEBRATA

- A VERTEBRAL COLUMN – ENCLOSES AND PROTECTS THE DORSAL NERVE CORD
- A DISTINCT HEAD – HOUSES SENSORY ORGANS
- ENDOSKELETON – MADE OF CARTILAGE OR BONE
- INTERNAL ORGANS – LIVER, KIDNEYS, ENDOCRINE GLANDS, HEART AND CLOSED CIRCULATORY SYSTEM, ETC.



SUBPHYLUM VERTEBRATA



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PHYLUM CHORDATA - SUBPHYLUM VERTEBRATA

CLASS AGNATHA

- JAWLESS VERTEBRATES
- MOST PRIMITIVE, LIVING VERTEBRATES
- LACK PAIRED APPENDAGES
- CARTILAGINOUS SKELETON
- NOTOCHORD PRESENT THROUGHOUT LIFE
- RASPING MOUTH
- 2-CHAMBERED HEART
- HAGFISH – NO LONGER CONSIDERED TO BE VERTEBRATES BY SOME TAXONOMISTS; SCAVENGERS
- LAMPREYS – USUALLY PARASITIC

PHYLUM CHORDATA - SUBPHYLUM VERTEBRATA

CLASS CHONDRICHTHYES

- CARTILAGINOUS FISHES
- DORSOVENTRALLY FLATTENED
- SHARKS, SKATES, RAYS
- WELL-DEVELOPED JAWS; PAIRED FINS
- CONTINUAL WATER FLOW OVER GILLS
- LATERAL LINE SYSTEM (WATER PRESSURE CHANGES)
- INTERNAL FERTILIZATION; MAY BE
  - *OVIPAROUS*- EGGS HATCH OUTSIDE MOTHER'S BODY
  - *OVOVIVIPAROUS*- RETAIN FERTILIZED EGGS; NOURISHED BY EGG YOLK; YOUNG BORN LIVE

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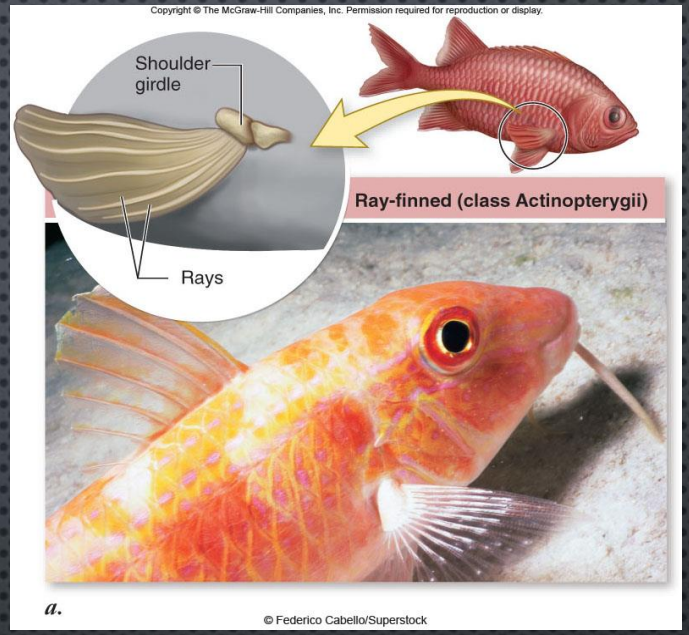
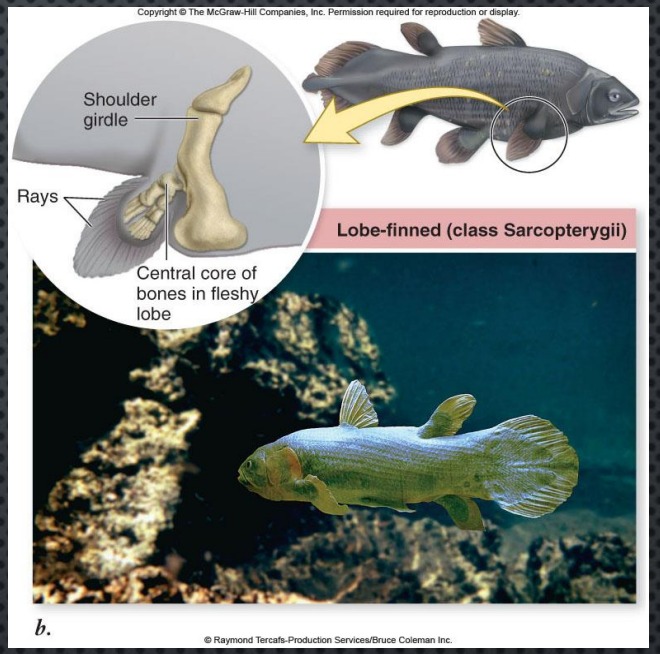
PHYLUM CHORDATA - SUBPHYLUM VERTEBRATA

CLASS OSTEICHTHYES





- OSSIFIED ENDOSKELETON
- SCALES
- OPERCULUM
- SWIM BLADDER
- ECTOTHERMS
- MOST NUMEROUS OF ALL VERTEBRATES
- RAY-FINED – MOST COMMON TYPE; FINS SUPPORTED BY LONG, BONY RODS ARRANGED IN A RAY PATTERN; BASS, TROUT, PERCH, TUNA, HERRING
- LOBE-FINNED - FINS SUPPORTED BY ROD-SHAPED BONES SURROUNDED BY A THICK LAYER OF MUSCLE; COELOCANTH; LUNGFISHES

PHYLUM CHORDATA - SUBPHYLUM VERTEBRATA

CLASS AMPHIBIA

- FIRST TETRAPODS, LAND ANIMALS
- FROGS, TOADS, SALAMANDERS
- METAMORPHOSIS
- ECTOTHERMS
- EXTERNAL FERTILIZATION; LACK SHELLED EGG
- MOIST SKIN FOR GAS EXCHANGE
- 2 → 3 CHAMBERED HEART

PHYLUM CHORDATA - SUBPHYLUM VERTEBRATA

CLASS REPTILIA

- LIZARDS, SNAKES, TURTLES, AND CROCODILIANS
- INTERNAL FERTILIZATION
- AMNIOTES – EGGS HAVE SHELLS, EXTRAEMBRYONIC MEMBRANES WHICH AID IN GAS EXCHANGE, TRANSFER OF NUTRIENTS, PROTECTION
- ECTOTHERMS
- 3-CHAMBERED HEART IN MOST; 4-CHAMBERED HEART IN CROCS
- SCALES WITH KERATIN

CLASS REPTILIA

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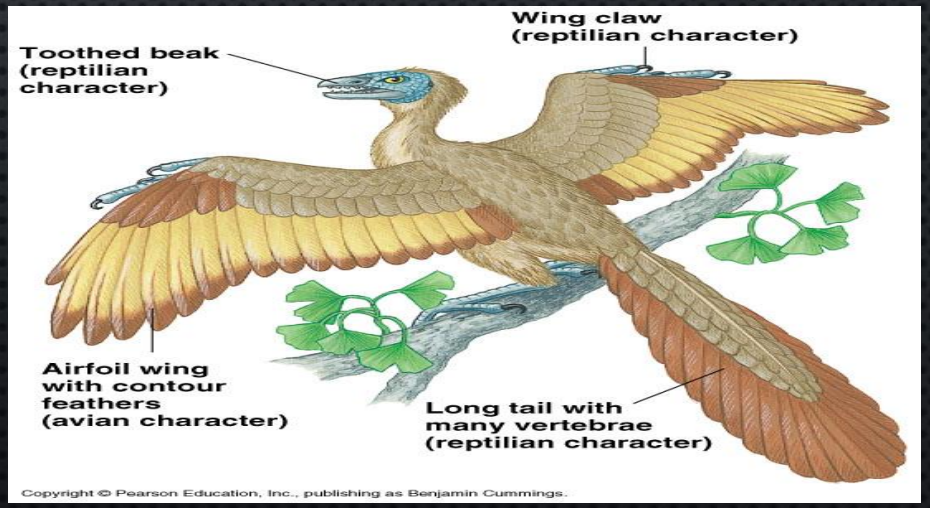
PHYLUM CHORDATA - SUBPHYLUM VERTEBRATA

"CLASS AVES"

- HAVE MANY ADAPTATIONS FOR FLIGHT
  - WINGS
  - HONEYCOMBED BONE
  - FEATHERS (KERATIN)
  - TOOTHLESS
  - LACK URINARY BLADDER
  - ONE OVARY
  - LARGE BREASTBONE
- ENDOTHERMIC
- 4-CHAMBERED HEART
- FOSSIL STUDIES SHOW CONNECTION BETWEEN REPTILES AND BIRDS; BIRDS NOW INCLUDED IN CLASS REPTILIA



Archaeopteryx – earliest known bird

PHYLUM CHORDATA - SUBPHYLUM VERTEBRATA

CLASS MAMMALIA

- MAMMARY GLANDS
- HAIR (KERATIN)
- ENDOTHERMIC
- 4-CHAMBERED HEART
- LARGE BRAINS (RELATIVE TO SIZE)
- TEETH DIFFERENTIATION
- DIAPHRAGM
- DIVIDED INTO THREE GROUPS
  - MONOTREMES – EGG-LAYERS; PLATYPUS, ANTEATERS
  - MARSUPIALS – EMBRYONIC DEVELOPMENT OF YOUNG COMPLETED IN POUCH; KANGAROOS, KOALAS, OPOSSUMS
  - EUTHERIANS – PLACENTAL MAMMALS; ALL OTHER MAMMALS






CLASS **MAMMALIA**

SUBCLASS PROTOTHERIA

- **THE "MONOTREMES"**
  - **HAVE SINGLE OPENING FOR DIGESTIVE AND REPRODUCTIVE TRACTS**
  - **ONLY 3 EXTANT SPECIES – SHORT AND LONG-NOSED ECHIDNA AND DUCK-BILLED PLATYPUS**

SUBCLASS THERIA

- **INCLUDES MARSUPIAL AND PLACENTAL ANIMALS**
  - **MARSUPIALS – POUCHED ANIMALS; SHELL-LESS EGG, EMBRYO IS NOURISHED BY YOLK AND AFTER BIRTH CRAWLS INTO MARSUPIAL POUCH WHERE IT LATCHES ONTO NIPPLE AND CONTINUES TO DEVELOP**
  - **PLACENTAL – INCLUDES MOST LIVING MAMMALS; PRODUCES A TRUE PLACENTA THAT NOURISHES EMBRYO THROUGHOUT ITS DEVELOPMENT**

b.

TABLE 35.6 Major Orders of Placental Mammals

Order	Typical Examples	Key Characteristics	Approximate Number of Living Species
Rodentia	Beavers, mice, porcupines, rats 	*Small plant-eaters* Chisel-like incisor teeth	1814
Chiroptera	Bats 	*Flying mammals* Primarily fruit- or insect-eaters; elongated fingers; thin wing membrane; mostly nocturnal; navigate by sonar	986
Insectivora	Moles, shrews 	*Small, burrowing mammals* Insect-eaters; the most primitive placental mammals; spend most of their time underground	390
Lagomorpha	Rabbits, hares, pika 	*Rodentlike jumpers* Four upper incisors (rather than the two seen in rodents); hind legs often longer than forelegs, an adaptation for jumping	69
Edentata	Anteaters, armadillos, sloths 	*Toothless insect-eaters* Many are toothless, but some have degenerate, peglike teeth	30
Perissodactyla	Horses, rhinoceroses, tapirs 	*Hoofed mammals with odd number of toes* Herbivorous teeth adapted for chewing	17
Proboscidea	Elephants 	*Long-trunked herbivores* Two upper incisors elongated as tusks; largest living land animal	2

Carnivora	Bears, cats, raccoons, weasels, dogs 	*Carnivorous predators* Teeth adapted for shearing flesh; no native families in Australia	274
Primates	Apes, humans, lemurs, monkeys 	*Tree-dwellers* Large brain size; binocular vision; opposable thumb; group that evolved from a line that branched off early from other mammals	233
Artiodactyla	Cattle, deer, giraffes, pigs 	*Hoofed mammals with two or four toes* Most species are herbivorous ruminants	211
Cetacea	Dolphins, porpoises, whales 	*Fully marine mammals* Streamlined bodies; front limbs modified into flippers; no hindlimbs; blowholes on top of head; no hair except on muzzle	79

- MODERN HUMANS FIRST APPEARED IN AFRICA ~600,000 YEARS AGO (→*HOMO SAPIENS*)

KINGDOM ANIMALIA

TABLE 4.2 Salient Features of Different Phyla in the Animal Kingdom

Phylum	Level of Organisation	Symmetry	Coelom	Segmentation	Digestive System	Circulatory System	Respiratory System	Distinctive Features
Porifera	Cellular	Various	Absent	Absent	Absent	Absent	Absent	Body with pores and canals in walls.
Coelenterata (Cnidaria)	Tissue	Radial	Absent	Absent	Incomplete	Absent	Absent	Cnidoblasts present.
Ctenophora	Tissue	Radial	Absent	Absent	Incomplete	Absent	Absent	Comb plates for locomotion.
Platyhelminthes	Organ & Organ-system	Bilateral	Absent	Absent	Incomplete	Absent	Absent	Flat body, suckers.
Aschelminthes	Organ-system	Bilateral	Pseudo coelomate	Absent	Complete	Absent	Absent	Often worm-shaped, elongated.
Annelida	Organ-system	Bilateral	Coelomate	Present	Complete	Present	Absent	Body segmentation like rings.
Arthropoda	Organ-system	Bilateral	Coelomate	Present	Complete	Present	Present	Exoskeleton of cuticle, jointed appendages.
Mollusca	Organ-system	Bilateral	Coelomate	Absent	Complete	Present	Present	External skeleton of shell usually present.
Echinodermata	Organ-system	Radial	Coelomate	Absent	Complete	Present	Present	Water vascular system, radial symmetry.
Hemichordata	Organ-system	Bilateral	Coelomate	Absent	Complete	Present	Present	Worm-like with proboscis, collar and trunk.
Chordata	Organ-system	Bilateral	Coelomate	Present	Complete	Present	Present	Notochord, dorsal hollow nerve cord, gill slits with limbs or fins.

THANK YOU

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