Class Mammalia

BIO 2215

Oklahoma City Community College

Dennis Anderson

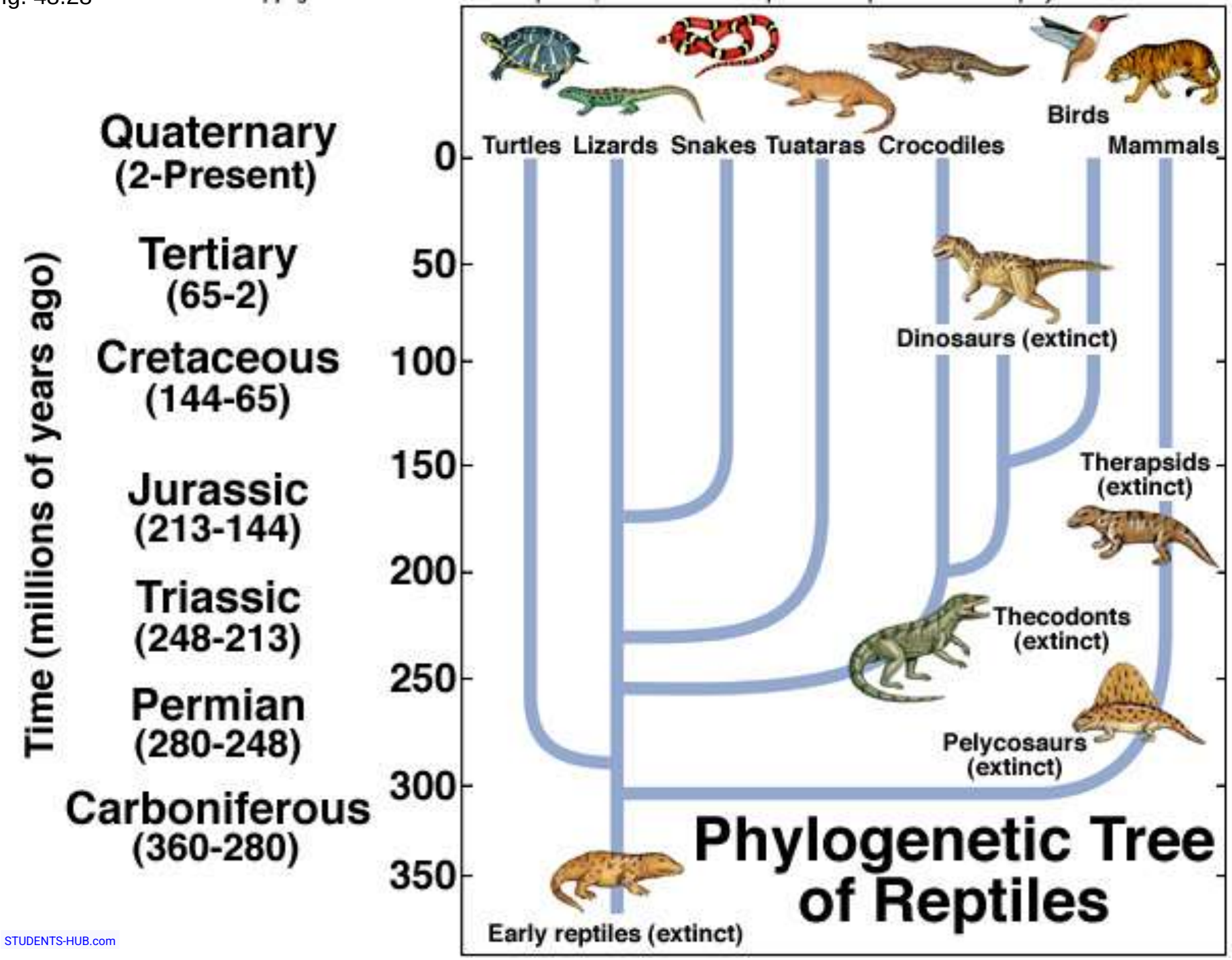
Class Mammalia

- Hair
- Mammary glands
- Sweat glands
- Diphyodont teeth
  - Two sets
- Heterodont teeth
  - Different shapes and functions

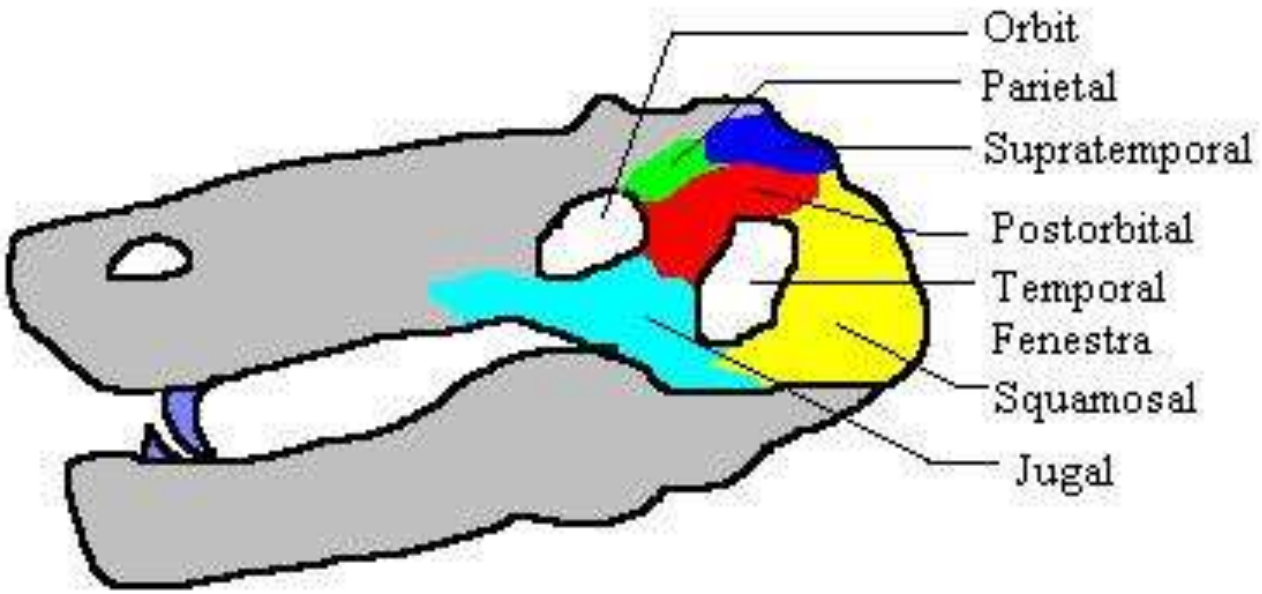
Class Mammalia

- Movable eyelids
- Two occipital condyles
- Three ear bones
- Muscular diaphragm
- Placenta
  - Except two groups
- Endothermic
- Four chambered heart

Fig. 48.28



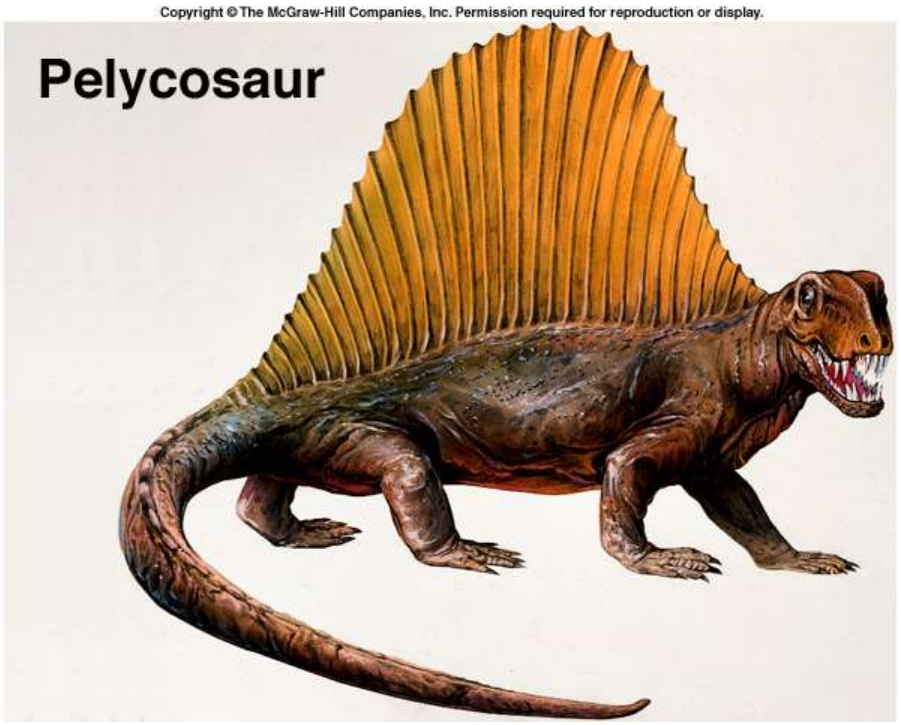
Synapsids



Generalized synapsid skull showing arrangement of skull around temporal fenestra

Pelycosaurs

- Synapsid reptiles from Pennsylvanian and Permian
  - 300-245 MYA
- Body close to ground
- Legs away from body
- Canine like teeth



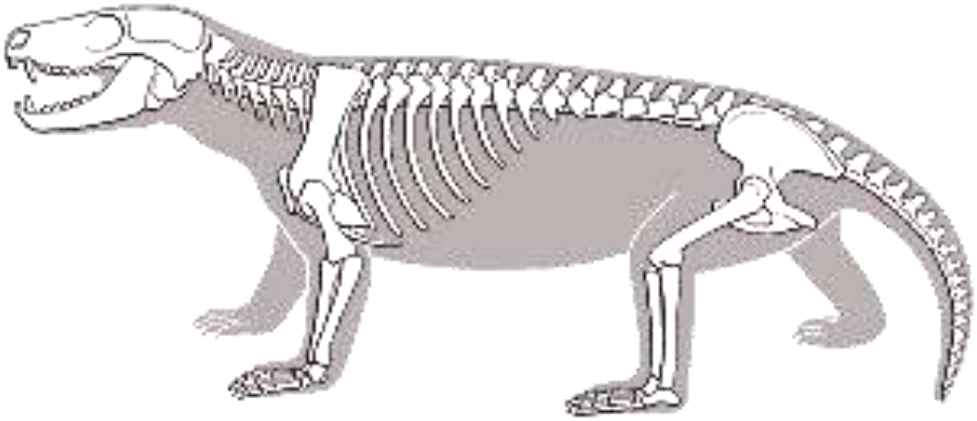
Dimetron

Therapsids

- Body raised off the ground
- Limbs more under the body
- Teeth differentiated into 3 types
- Secondary palate developing
- Phalangeal formula develops 2-3-3-3-3

Lystosaurus

Cynodonts



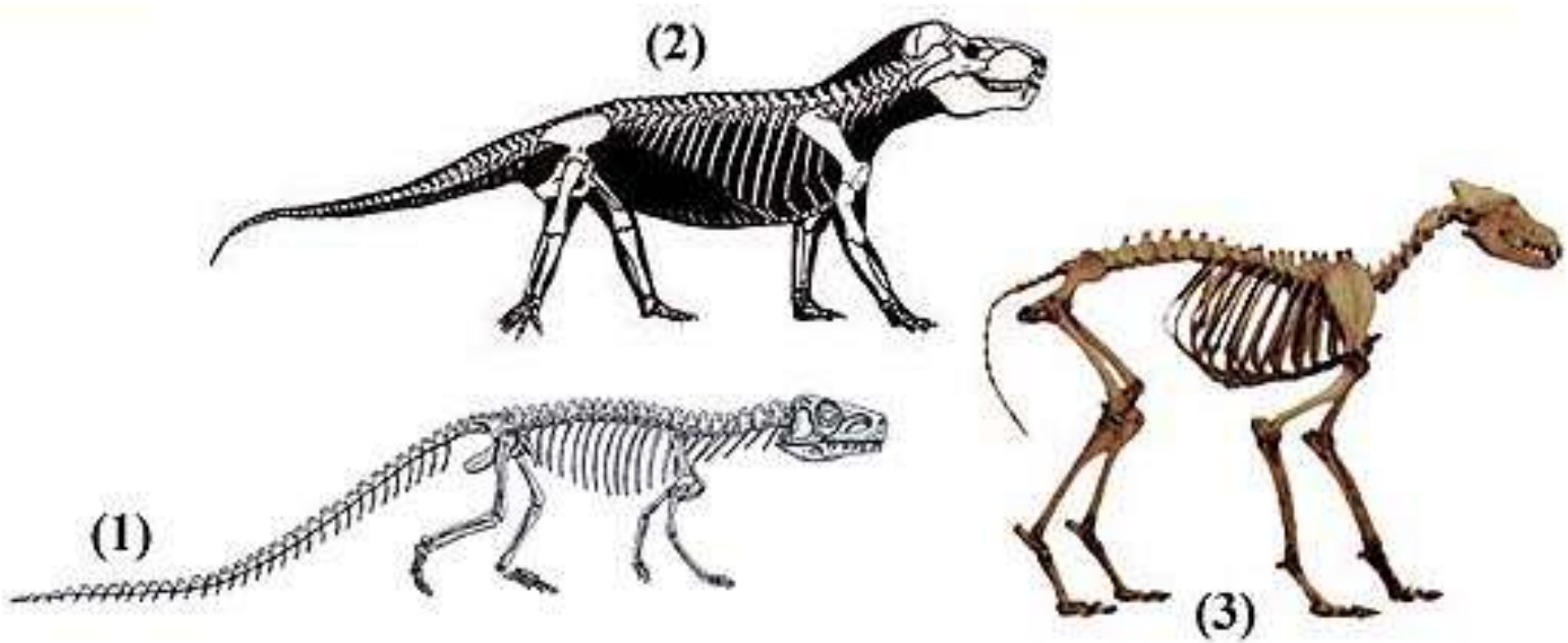
Thrinaxodon

- Lumbar ribs reduced or absent
- Well developed secondary palate
- Lower jaw reduced to one bone

Cynognathus

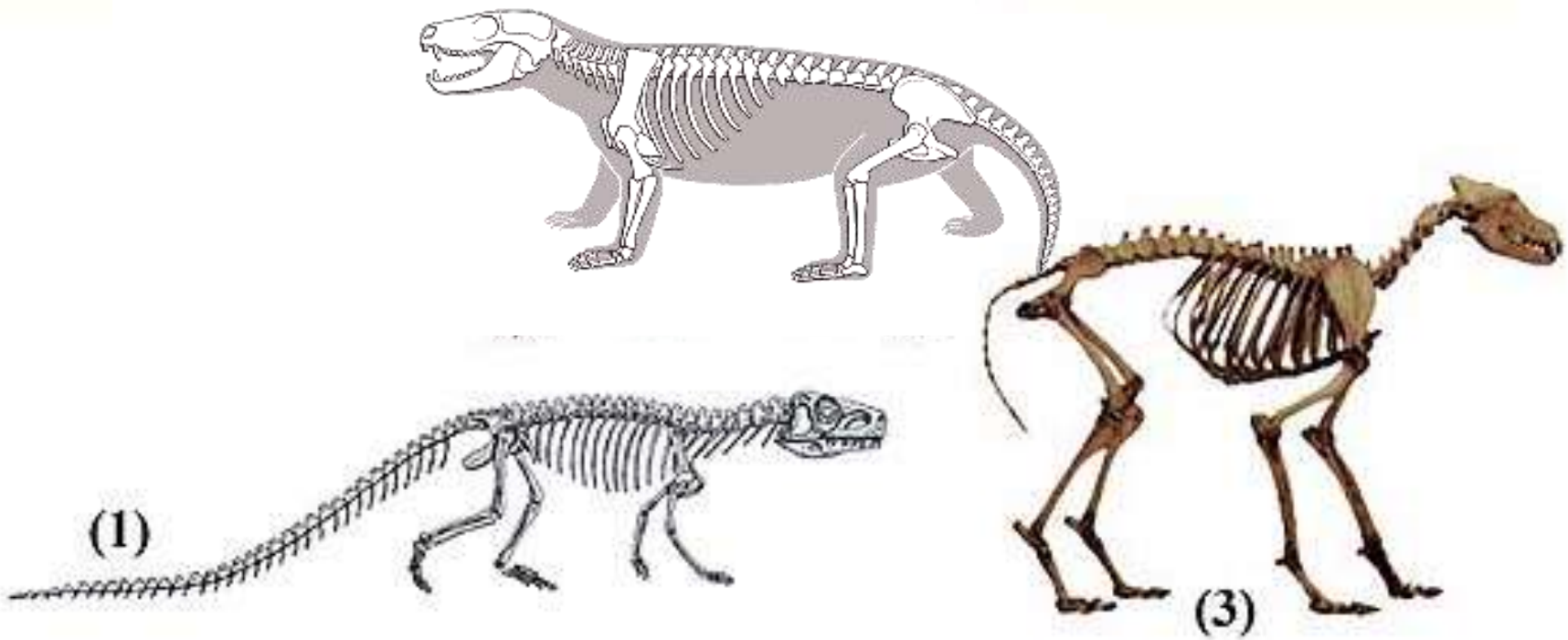
Transitional Fossil

Cynognathus



Transitional Fossil

Thrinaxodon



Early Mammals

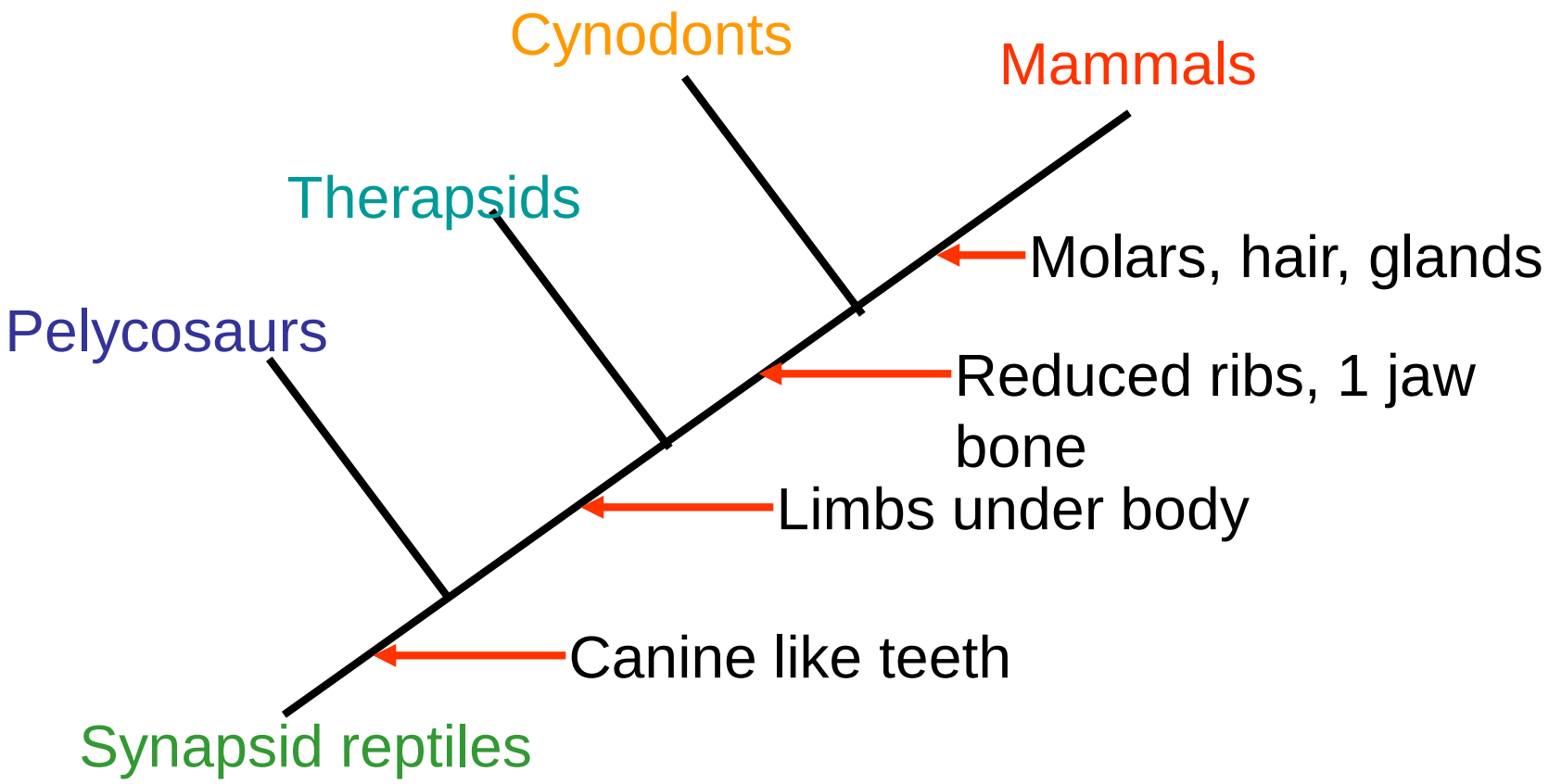
- Triassic
  - 220 MYA
- Small
- Hair
- Mammary glands
- Skin glands
- Molar teeth

Megazostrodon

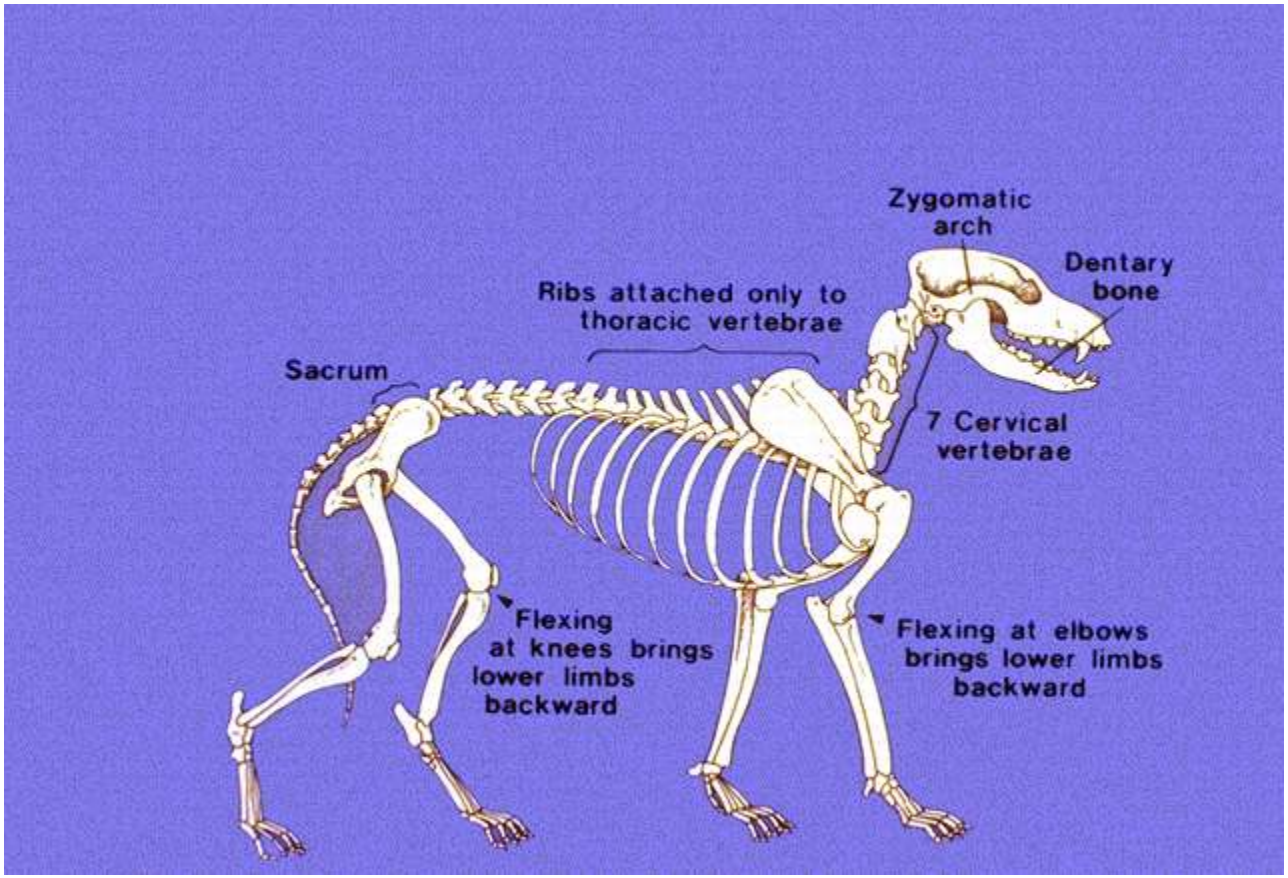
Repenomamus robustus

Ate Dinosaurs

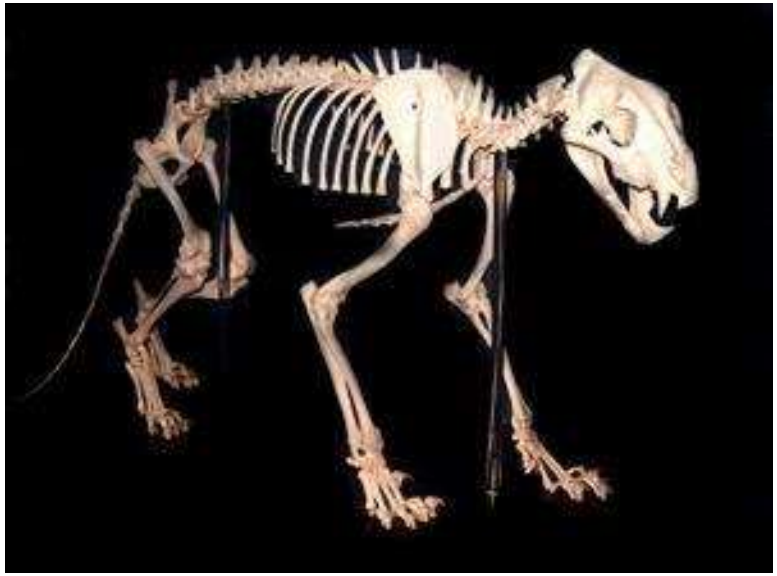
Cladogram of Synapsids

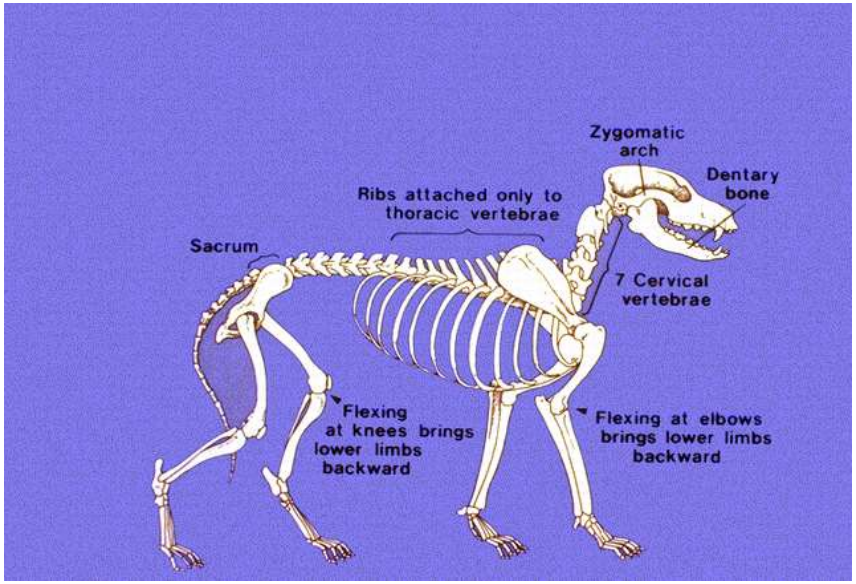


Basic Mammal

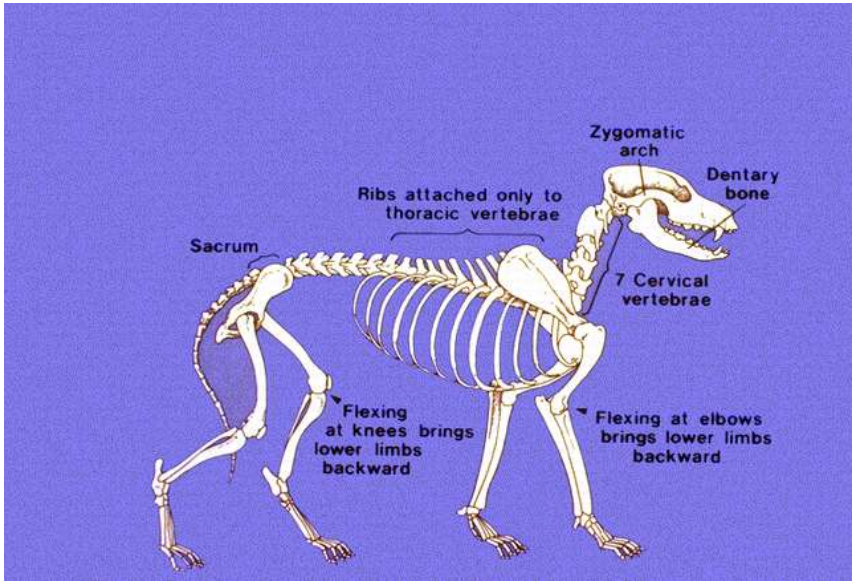


Lion

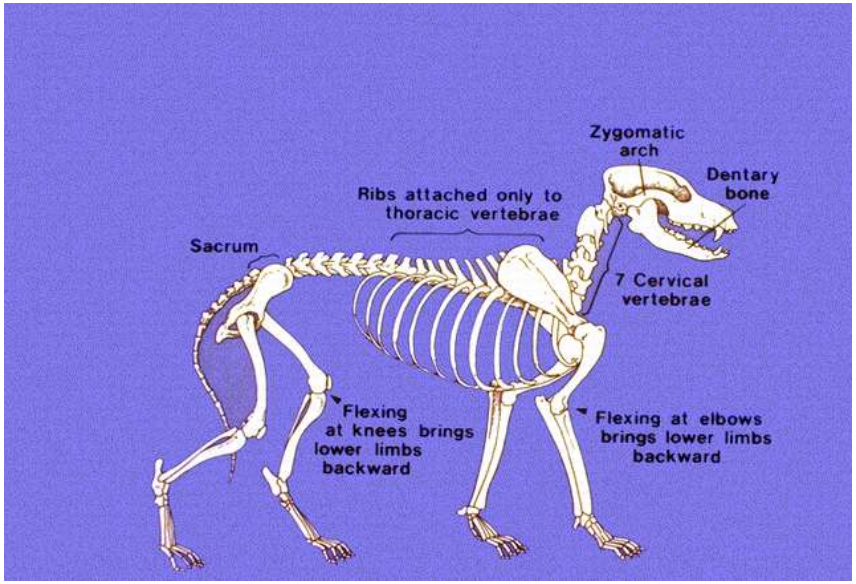




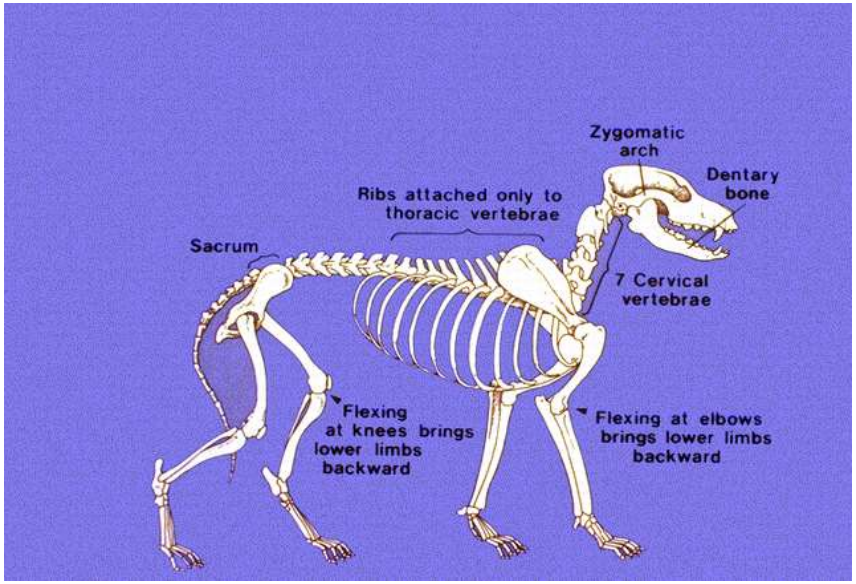
Rhinoceros



Gorilla

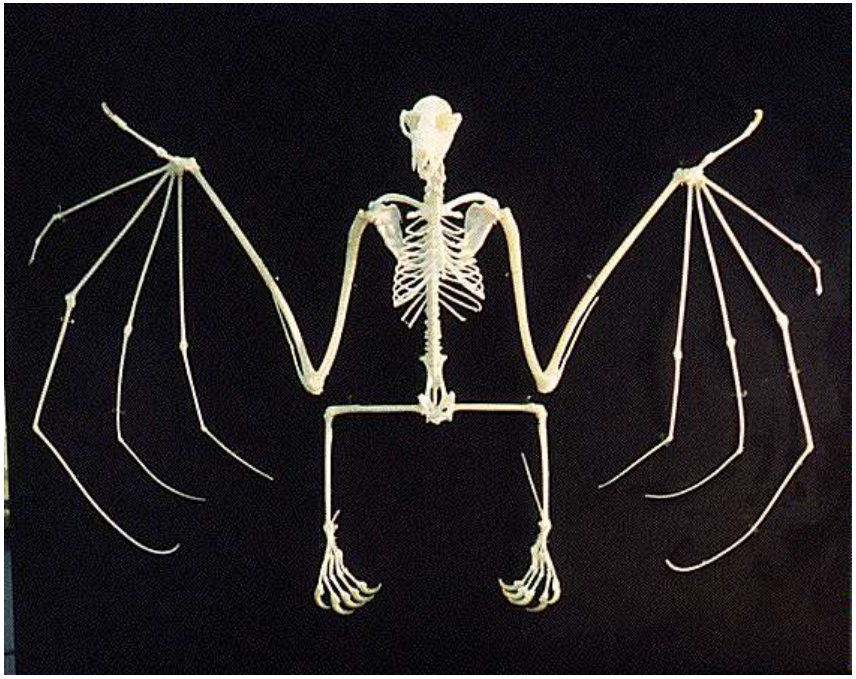


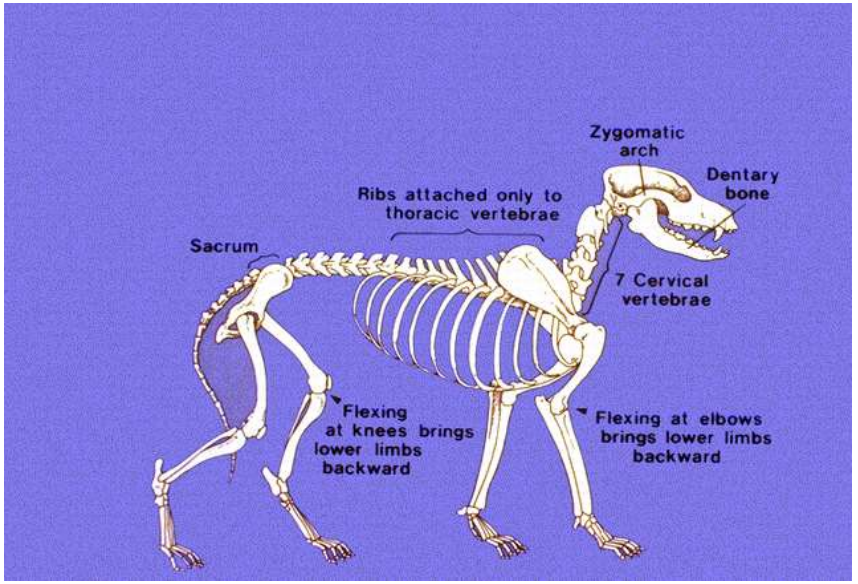
Chimpanzee



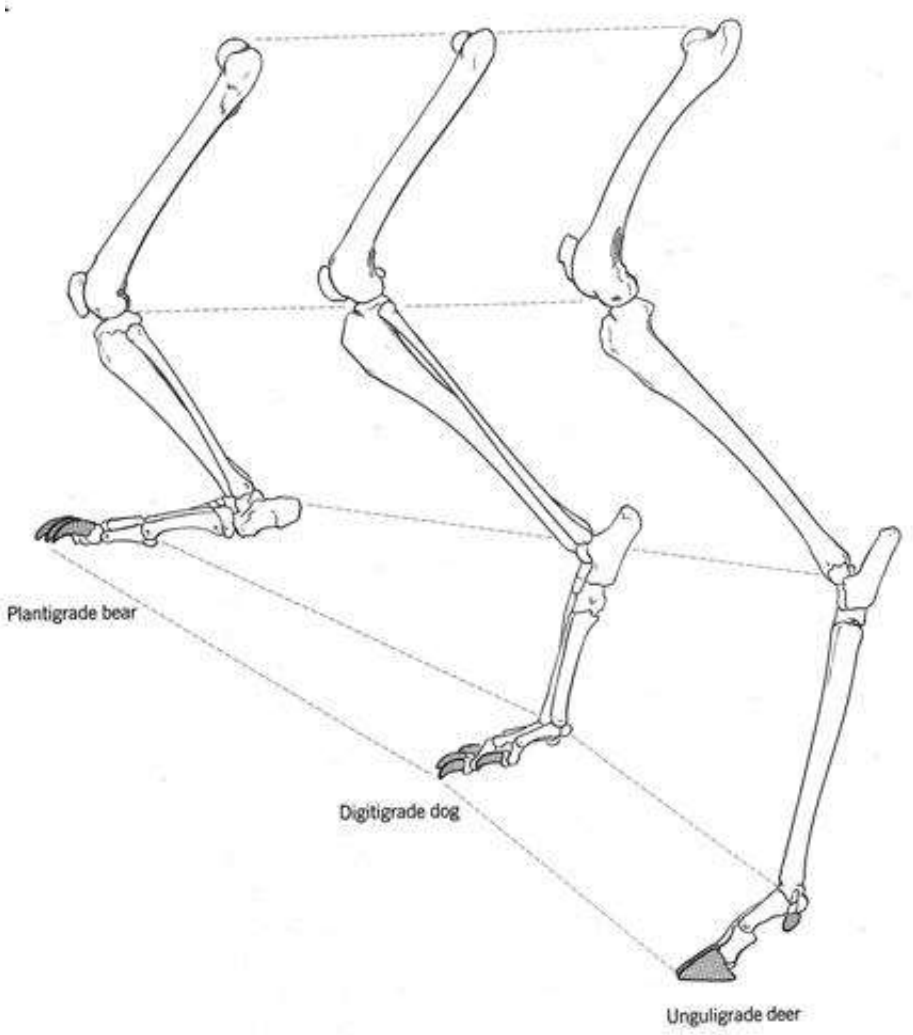
Chimp and Human

Bat



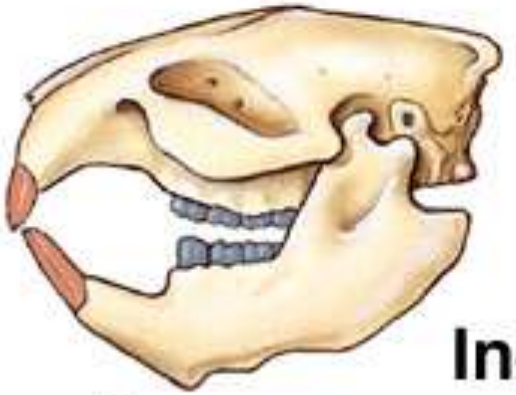


Same bones, different stance

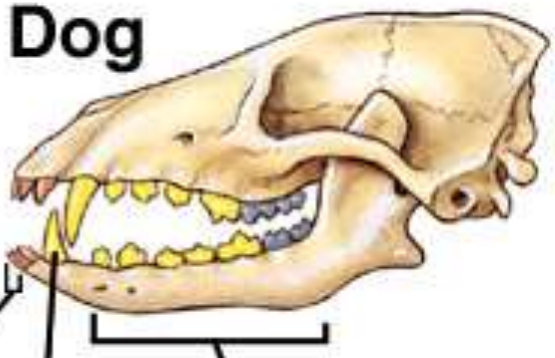


Specialized Teeth of Mammals

Deer



Beaver



Grinding teeth

Ripping teeth

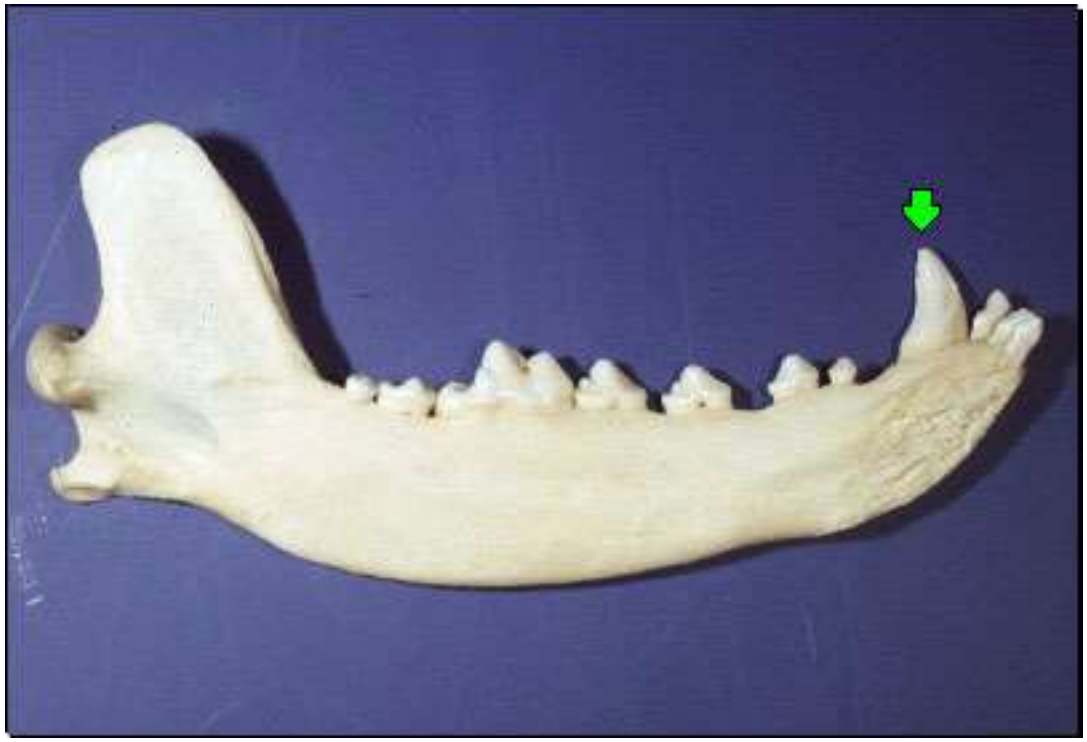
Chiseling teeth

Elephant

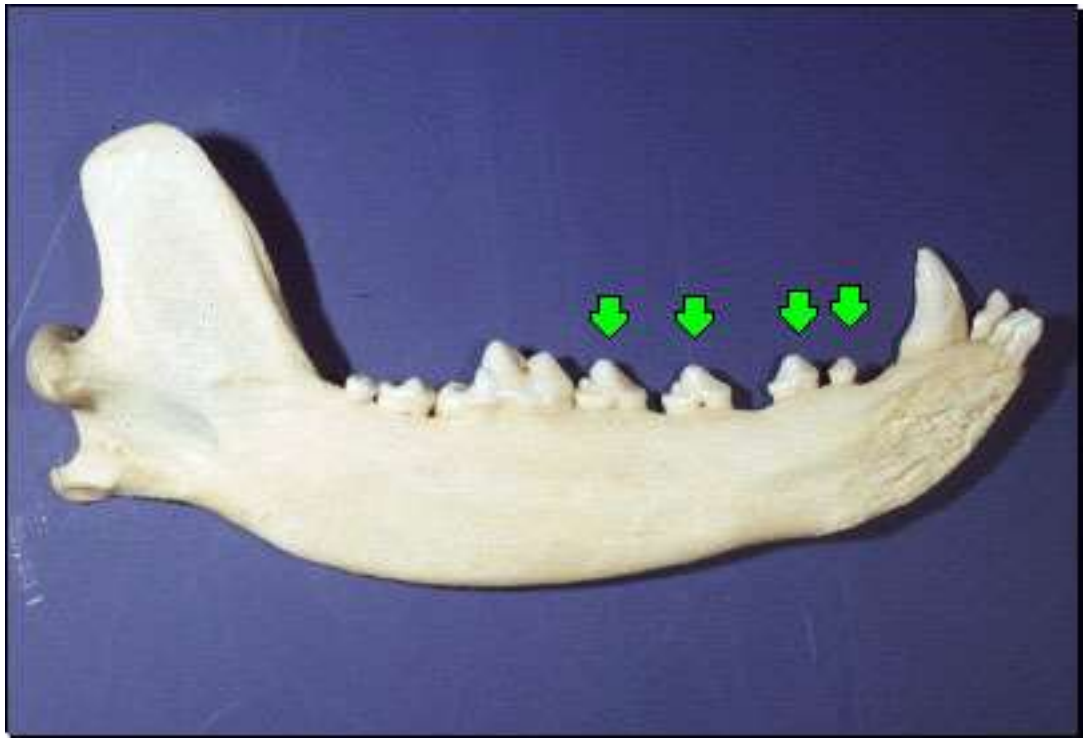
Human

Incissors

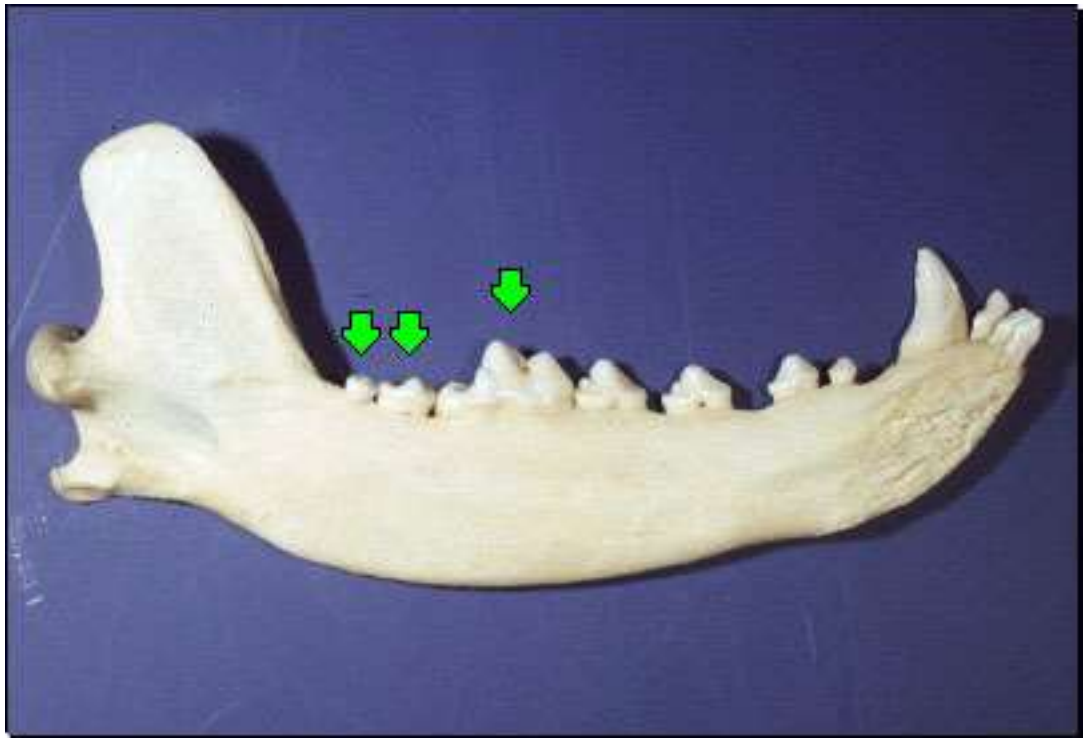
Canine



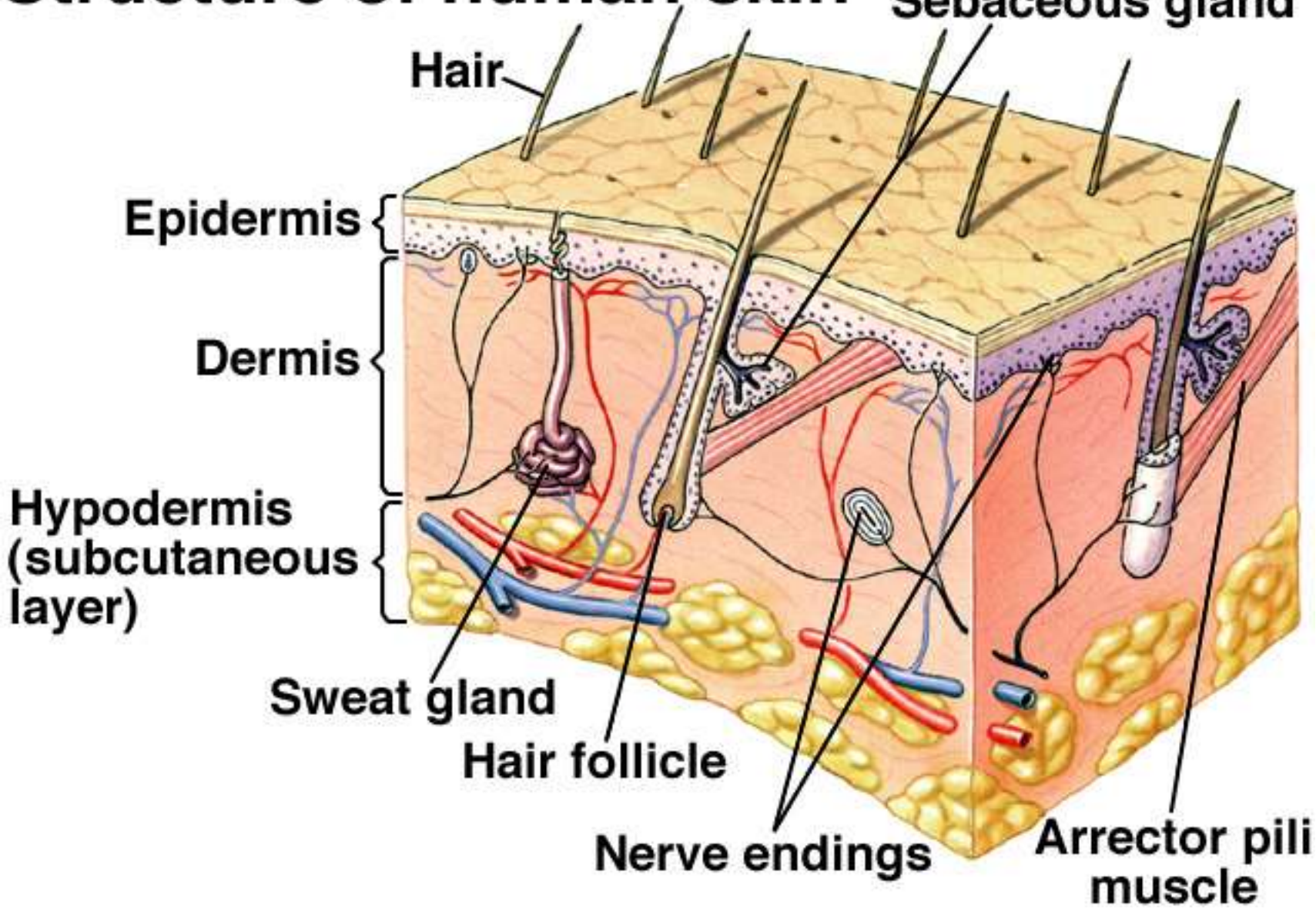
Premolars



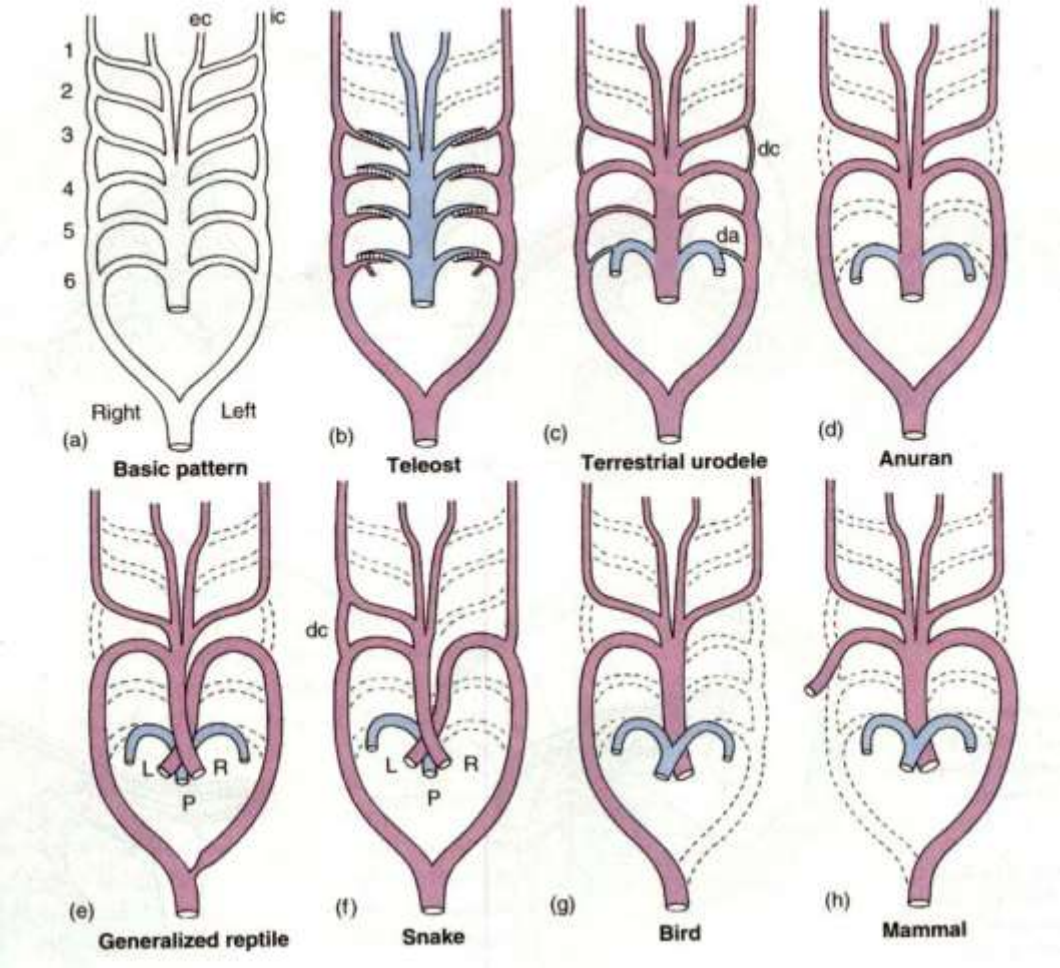
Molars



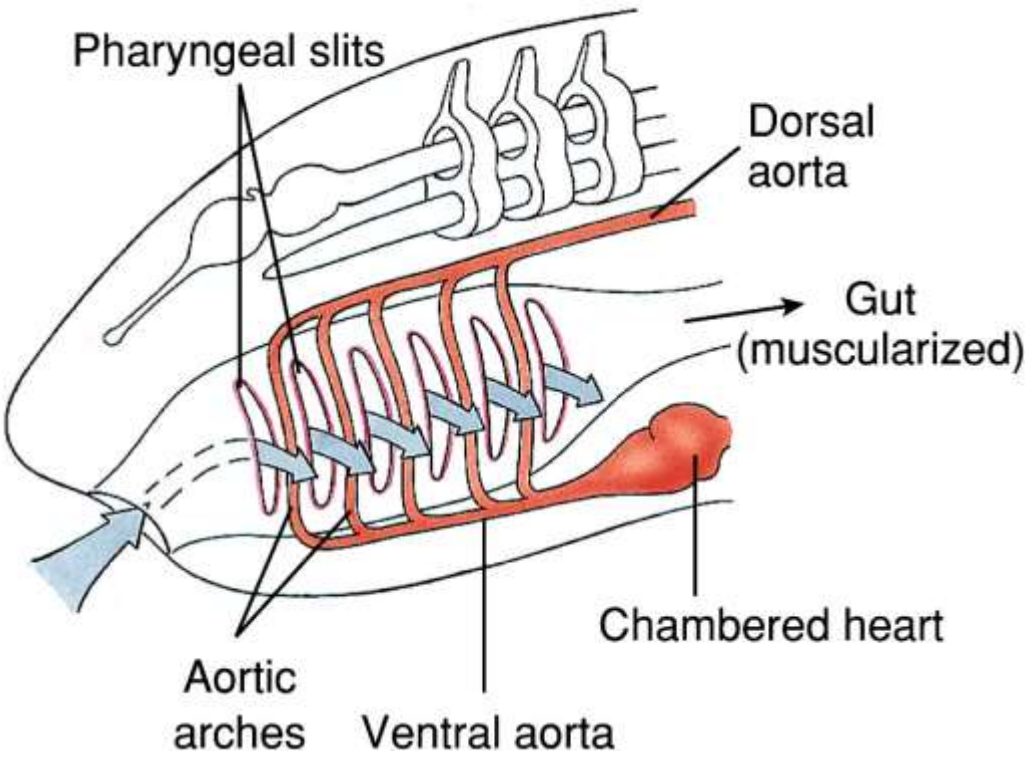
Structure of human skin



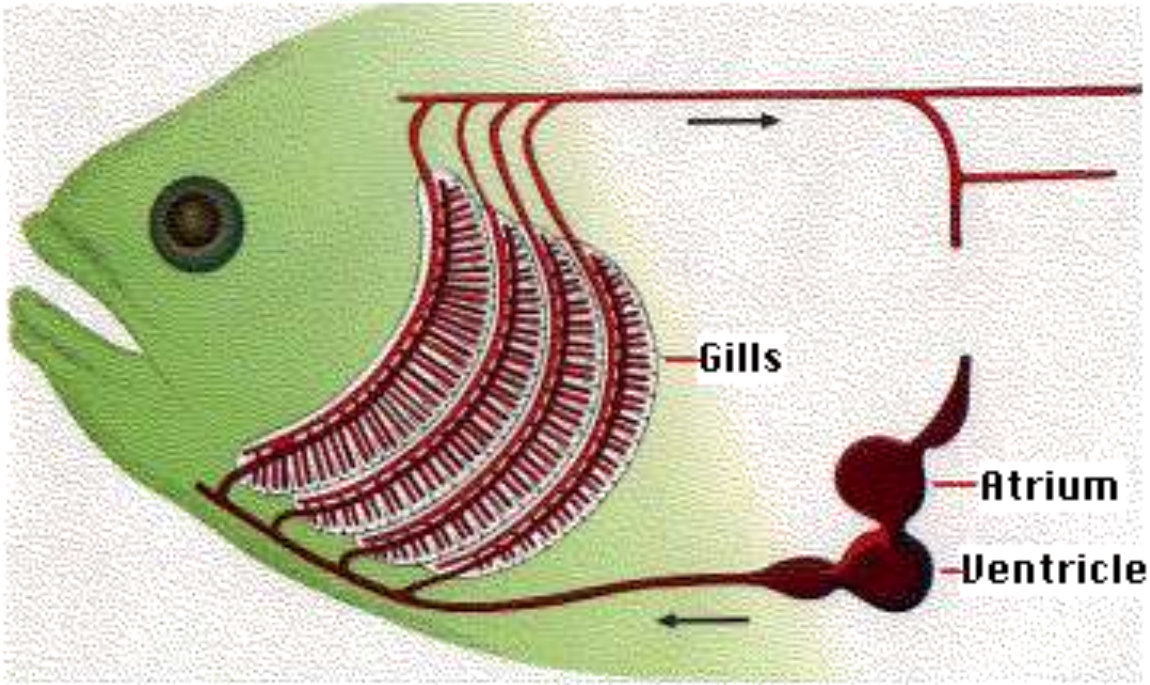
Evolution of Blood Circulation



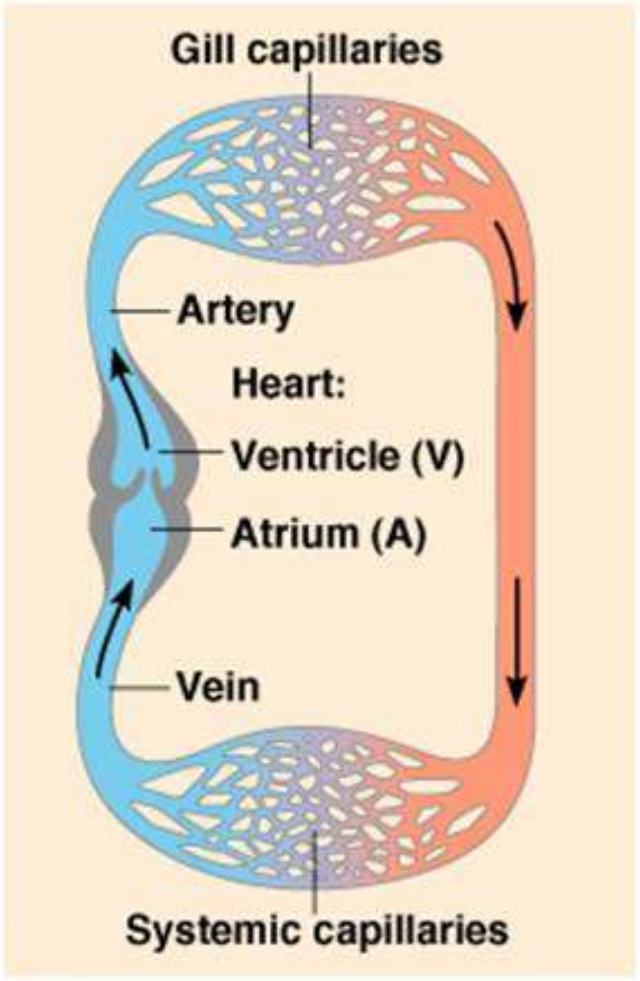
Primitive Chordate



Fish
Two Chambered Heart

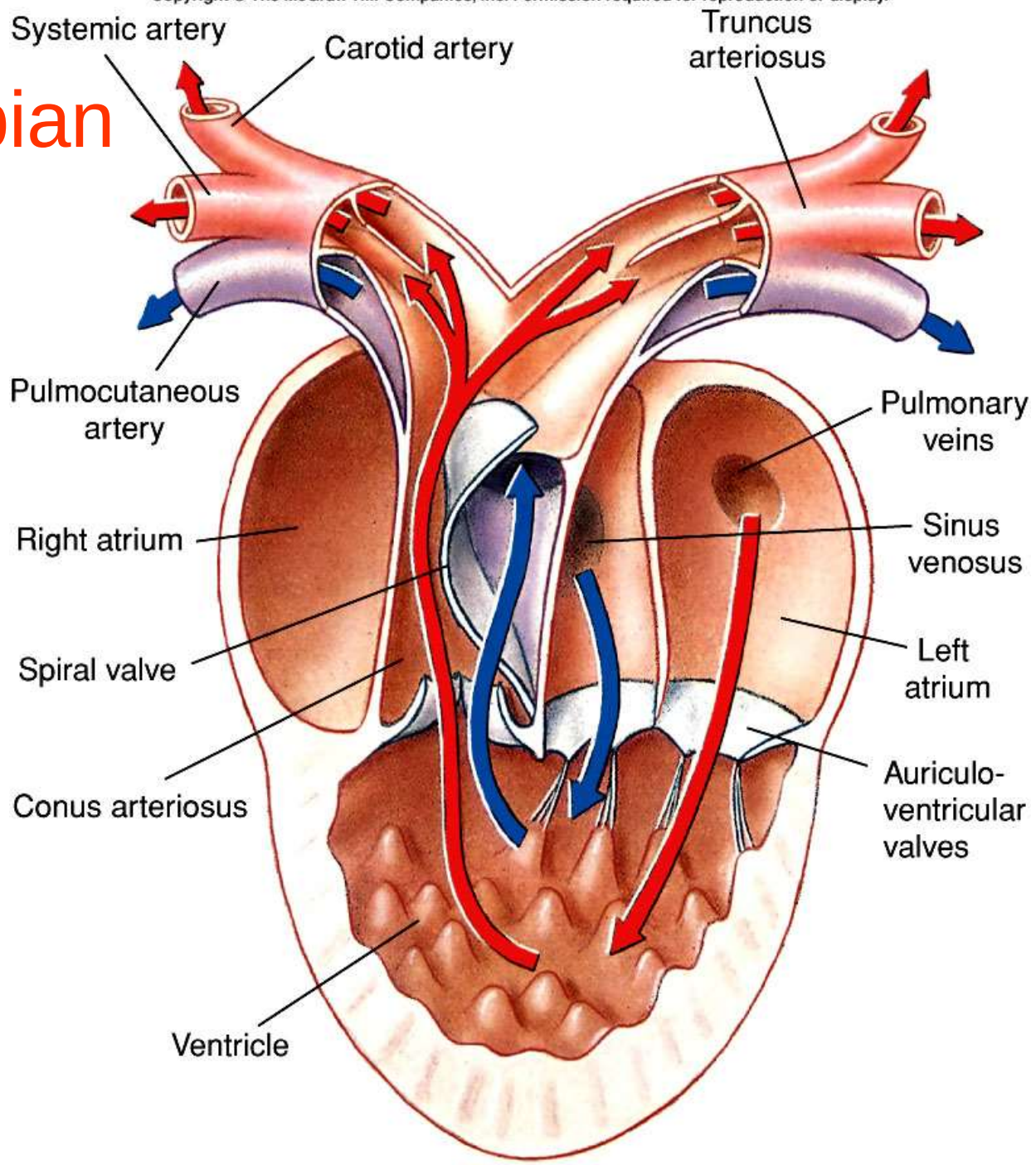


Fish Circulation

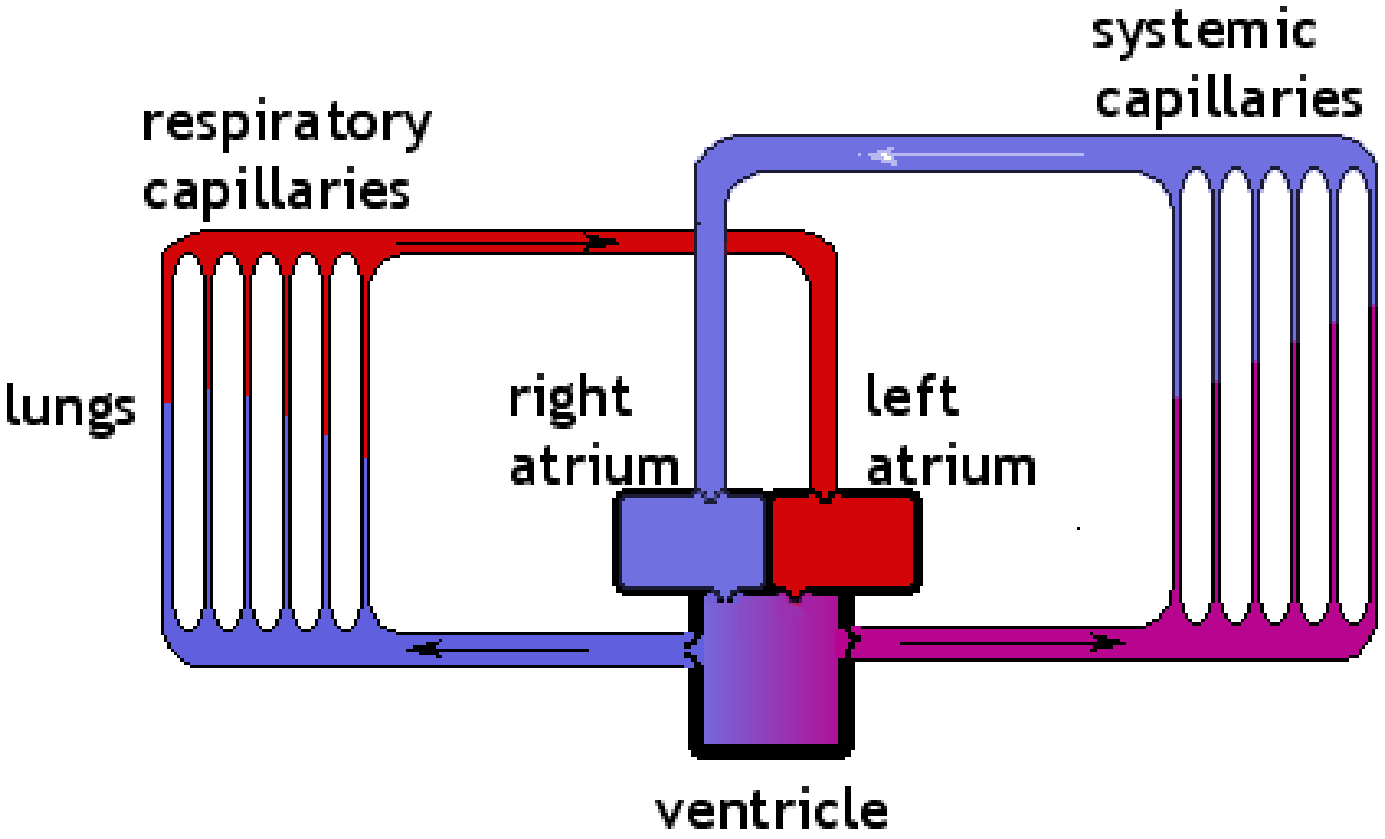


(a) Fish

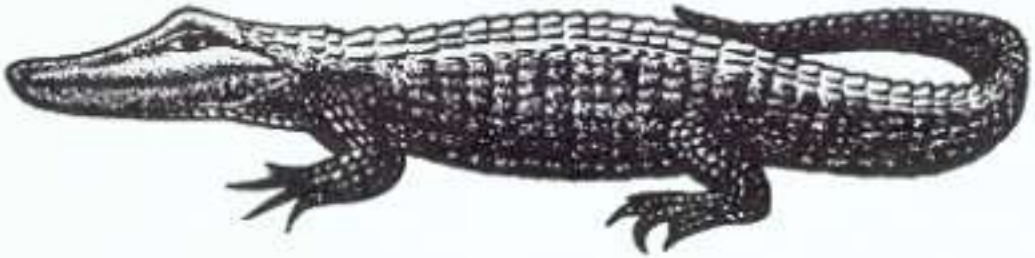
Amphibian Heart

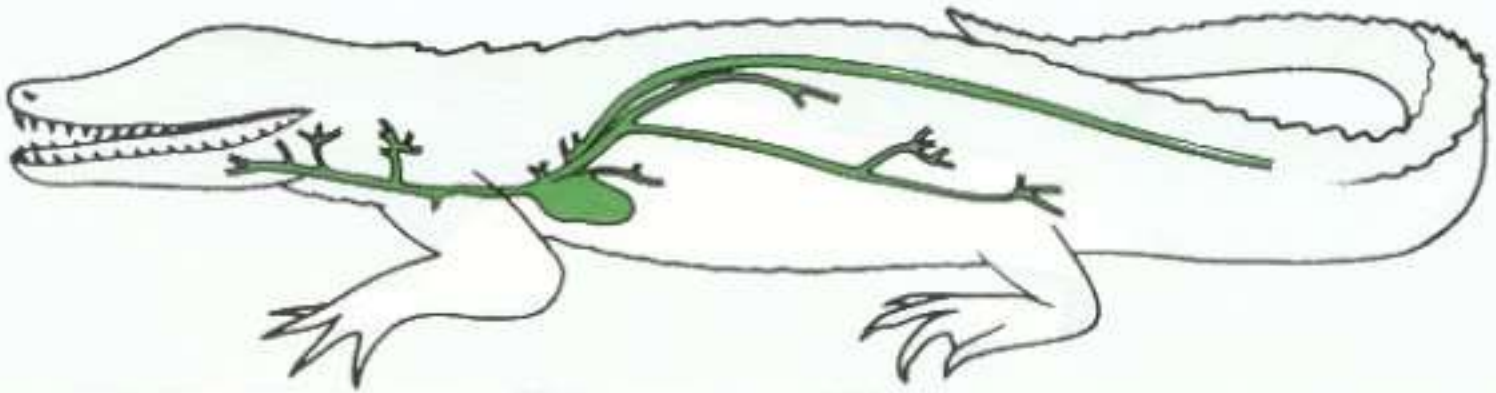


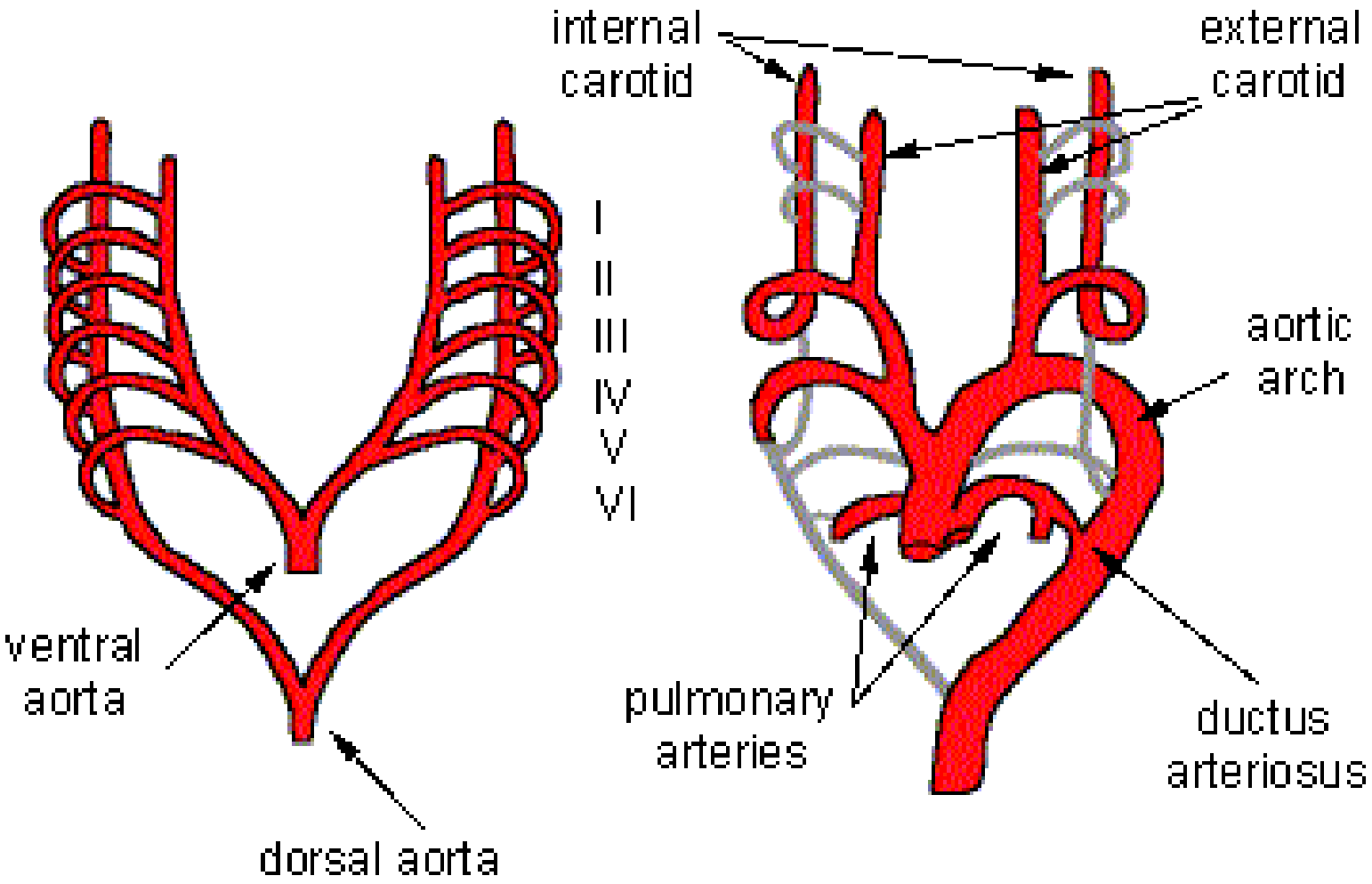
Amphibian Circulation

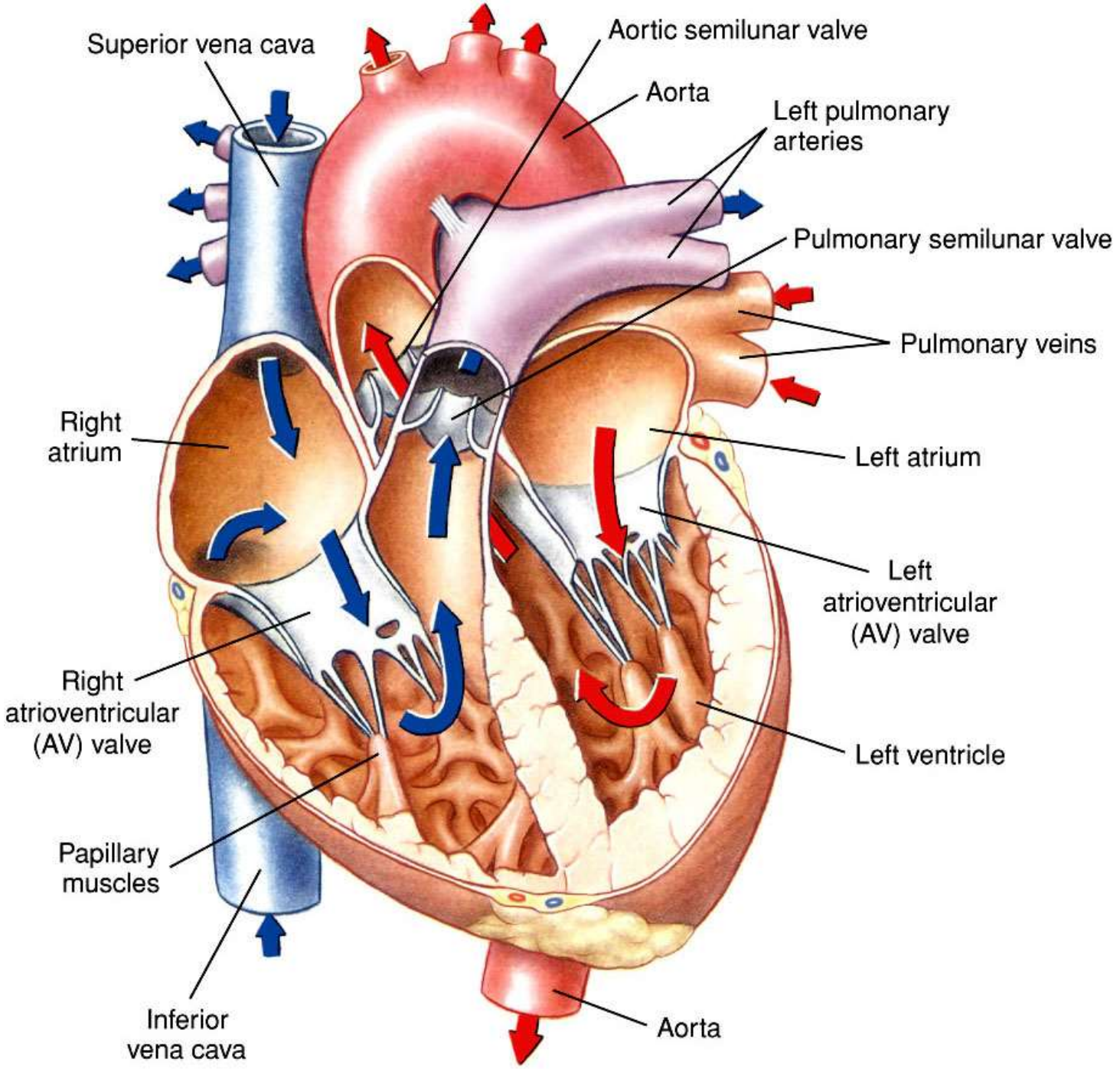


The reptile — 4-chambered heart incompletely separated

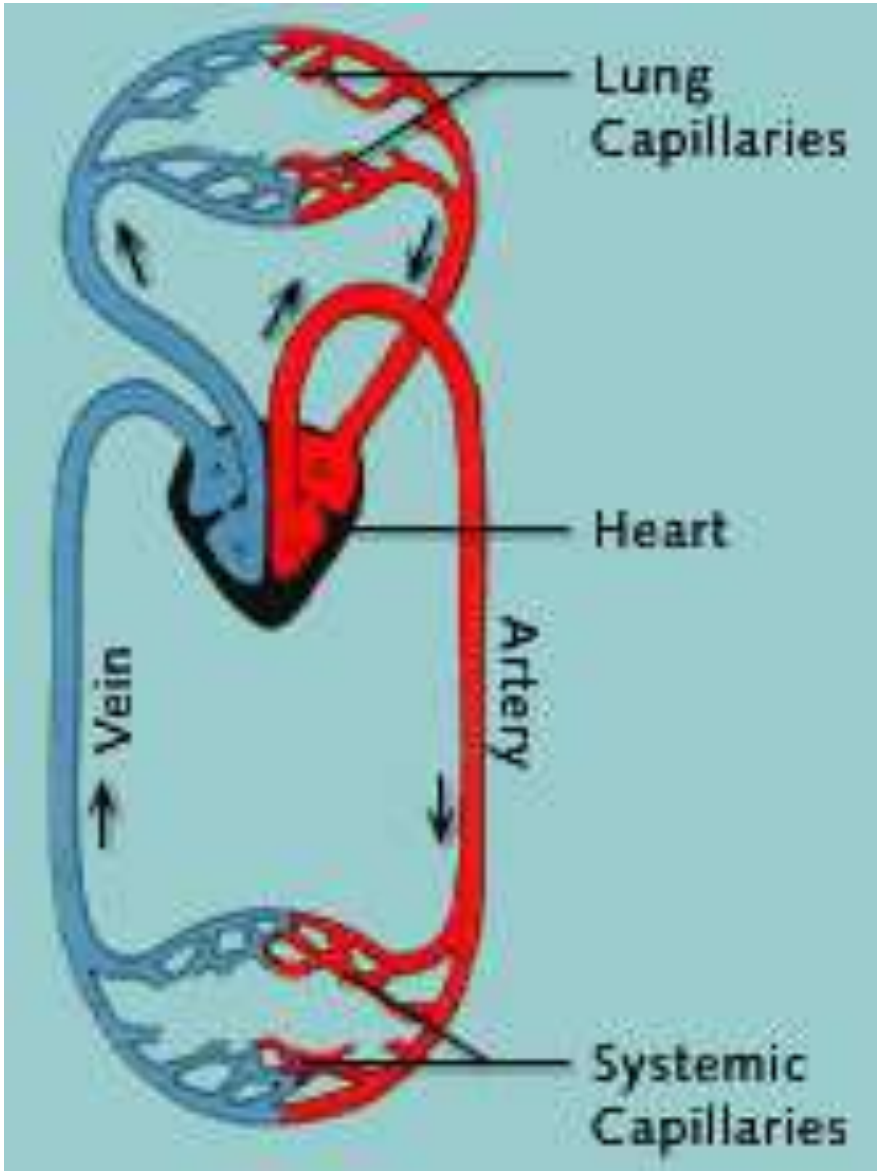








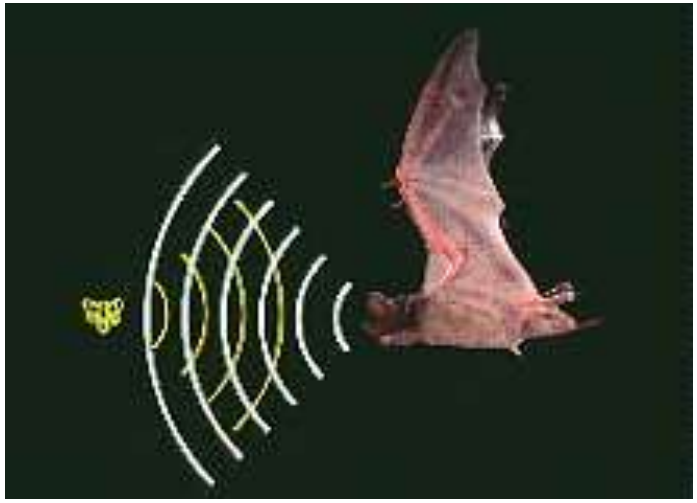
Mammal Circulation



Bats

- Only flying mammal
- Seed dispersal
- Pollination
- Control insects

Echolocation

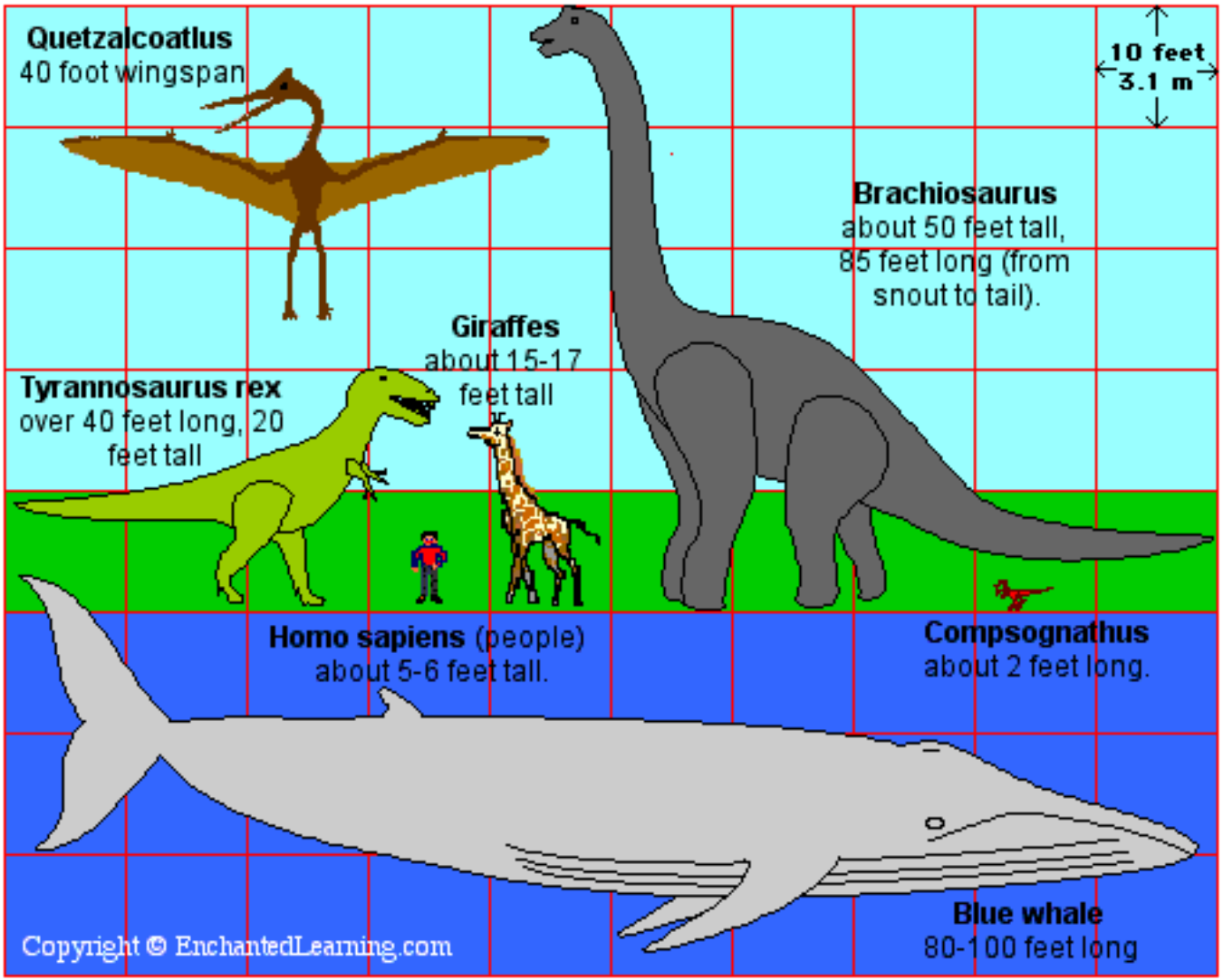


Smallest Mammal

- Kitti's hog-nosed Bat
- Bumble size
- 1.5 grams

Whales

- Blue whale
- 100 feet long, 120 tons
  - 9 story building
- Loudest animal– 188 dB
- Sound travels 100’s of miles

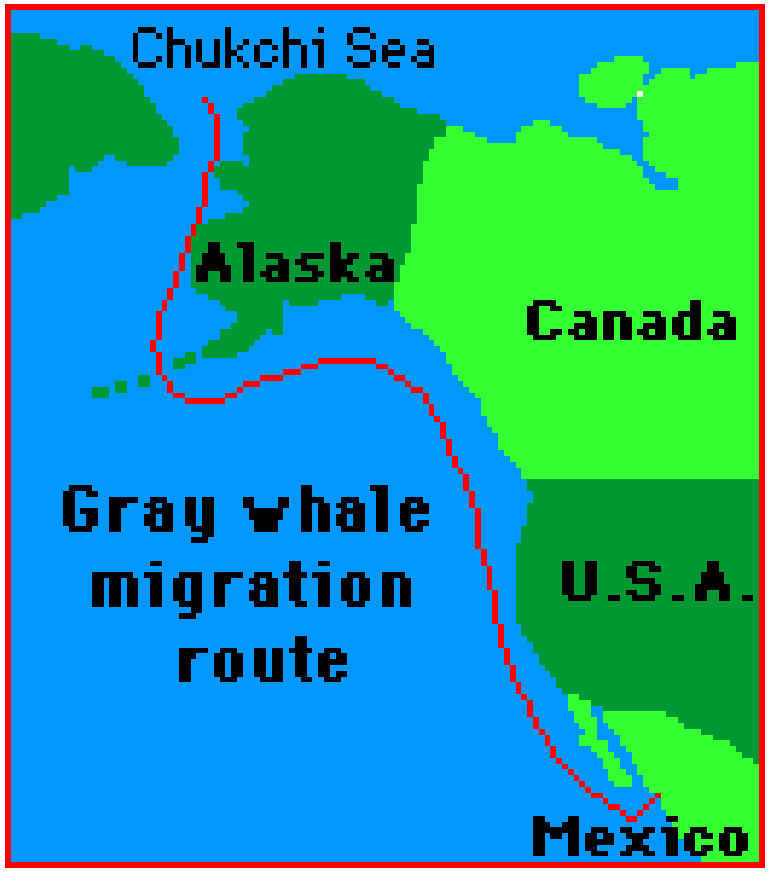


Blue Whale

- Baleen whale
- Eats krill
  - Tiny crustaceans
  - 400 pounds/day
- Heart weighs 1000 pounds
  - Size of a Volkswagen
- Endangered species

Grey Whale

Migrates 12,500 miles



Grey Whale

- 50 feet long
- 35 tons
- Baleen whale
  - Sift mud
- Endangered species

Killer Whale

Breaching

Killer Whale

- 12,000 pounds
- Eat fish, squid, seals and whales
  - 200 pounds/day
- Swim 30 mph

Humpback Whale

Three Types of Mammals

(a)

(b)

(c)

Monotremes

- Lay eggs
- Incubate 12 days
- Lick milk from mothers fur
- Transitional species

Marsupials

- Pouched mammals
- Birth to tiny embryo
- Embryo attaches to mother's nipple to complete development

Placental Mammals

- Placenta nourishes embryo
- Long gestation period
  - 22 months for elephant
- Most successful group of mammals

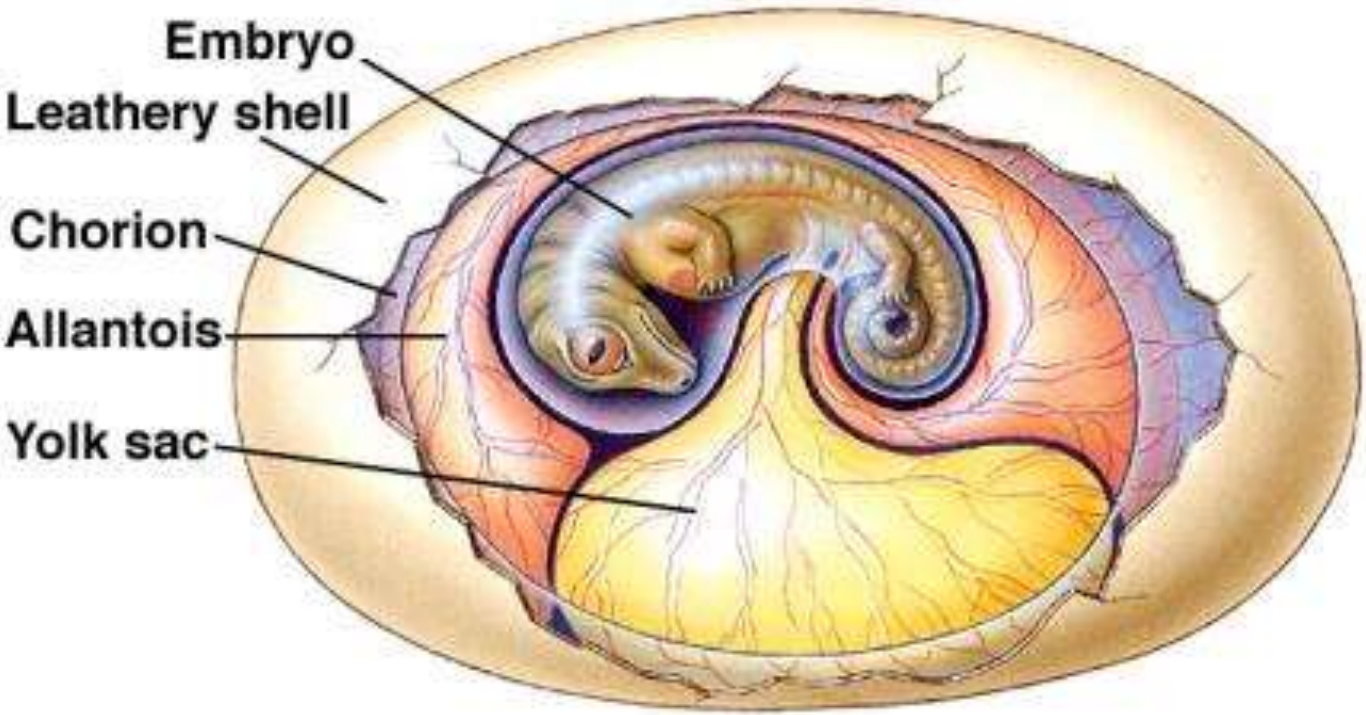
Placental Mammals

- Competitive advantage over monotremes and marsupials
  - Better nutrition from placenta
  - Less vulnerable to predators
    - More advanced at birth

Marsupials and Monotremes in Australia

- Triassic Period
  - Mammals evolved
  - Pangea
- Jurassic Period
  - Monotremes and marsupials migrated to southern pangea
- Cretaceous Period
  - Pangea breaks up

Amniotic egg



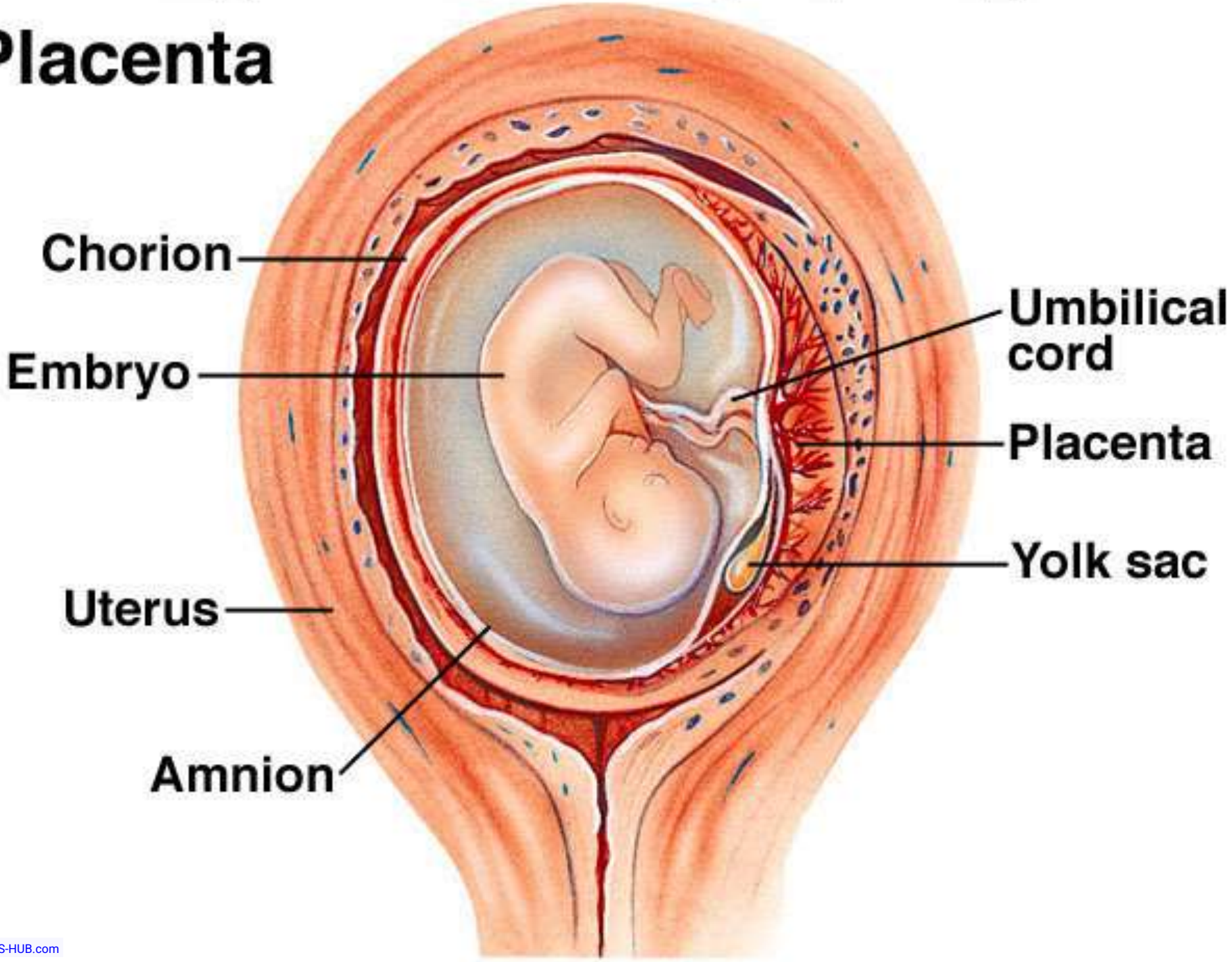
Evolution of Placenta from Amniotic Egg

Reptile

- Chorion
  - Oxygen from air
- Amnion
  - Provides private pond
- Yolk Sac
  - Food for embryo
- Allantois
  - Store urinary waste

- **Mammal**
- Chorion
  - Form placenta to get oxygen & food from mothers blood
- Amnion
  - Provides private pond
- Yolk sac
  - Temporarily make RBCs
- Allantois
  - Form umbilical cord

Placenta



Mammal Classification

- 14 major orders
- Over 4,000 species
- About half are rodents

Order Monotremata

- Lays eggs
- Young lick milk from mothers fur

Order Marsupiallia

- Pouch

Order Insectivora

- Sharp-snout
- Small
- Burrow underground
- Eat insects

Order Chiroptera

- Flying mammals
- Elongated fingers
- Echolocation

Order Xenarthra

- Toothless or peg like teeth

Order Carnivora

- Large canine teeth
- Teeth adapted to shear flesh

Order Rodentia

- Chisel-like incisor teeth

Order Lagomorpha

- Four upper incisors
- Hind legs adapted for jumping

Order Cetacea

- Front limbs modified into flippers
- No hind limbs
- Marine

Order Pinnipedia

- Limbs modified for swimming
- Marine carnivores

Order Proboscidea

- Tusks
- Largest living land mammal

Order Artiodactyla

- Two or four toes

Order Perissodactyla

- One or three toes

Order Primates

- Opposable thumb
- Binocular vision
- Fingernails usually
- Mammary glands reduced to one thoracic pair

The End