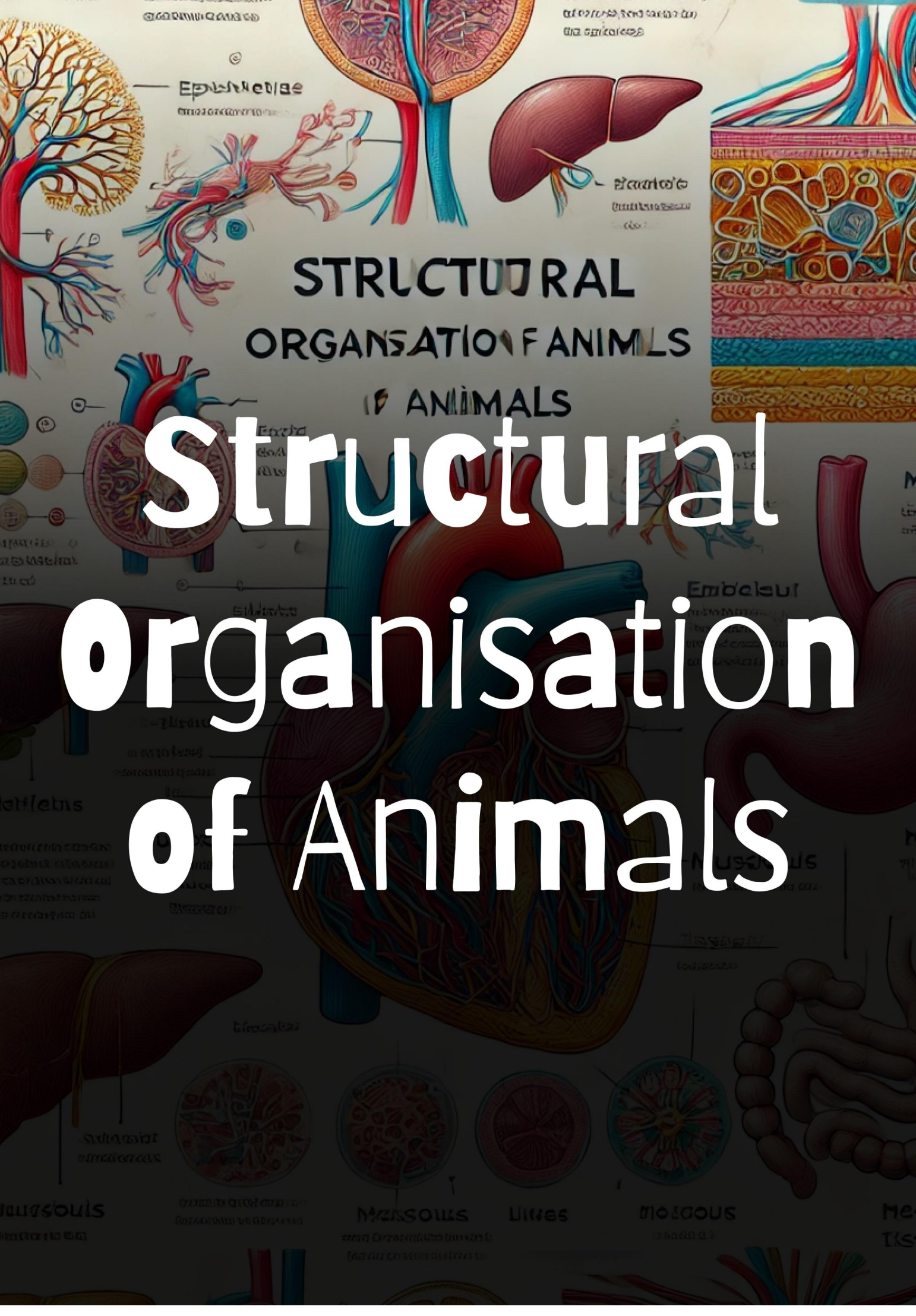


Structural organisation of Animals

Periplaneta

- Kingdom → Animalia
- Phyllum → Arthropoda
  - Jointed appendages
  - chitinous Exoskeleton.
- Class → Insecta
  - 3 pair jointed legs
  - 2 pair of wings.
- Order - Dictyoptera
  - Dissimilar lungs.
- Family - Blattidae
  - Pronotum
  - Roughly oval shape
- Genus - Periplaneta
- Species - Americana

Periplaneta Americana (American cockroach)
stiff cockroach (3.5 - 5.5) cm.

Blatta orientallis (Indian cockroach) Male → wing present, female → Absent/Rudimentary

Blatta germanica (German cockroach)

Warm, Humid, moist, food Availability, hiding spaces (Kitchen).

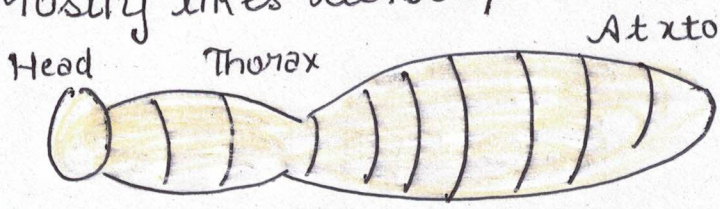
Nocturnal → More active at Night.

Cursorial → fast runner.

Cannabolism → feed on their felloeos occassionally (Dead bodies)

Omnivorous → paper, wood, leather, fibres, waste food, Excreata, chitinous Exoskeleton.

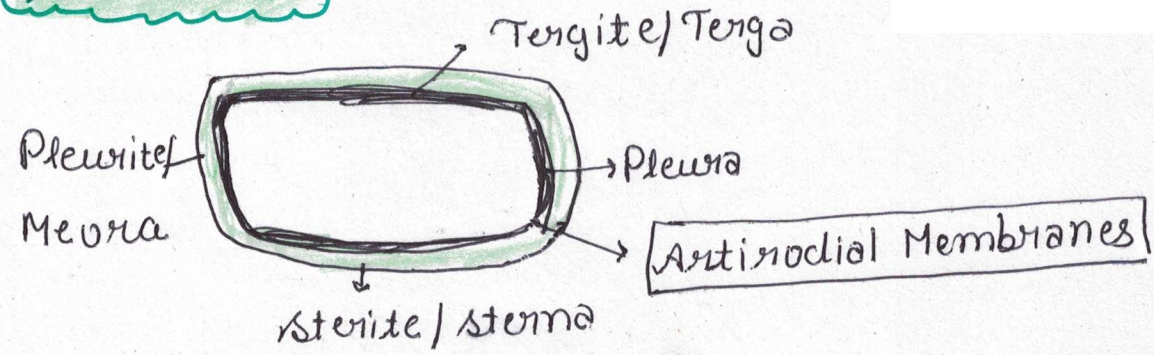
- Mostly likes carbohydrates rich food.



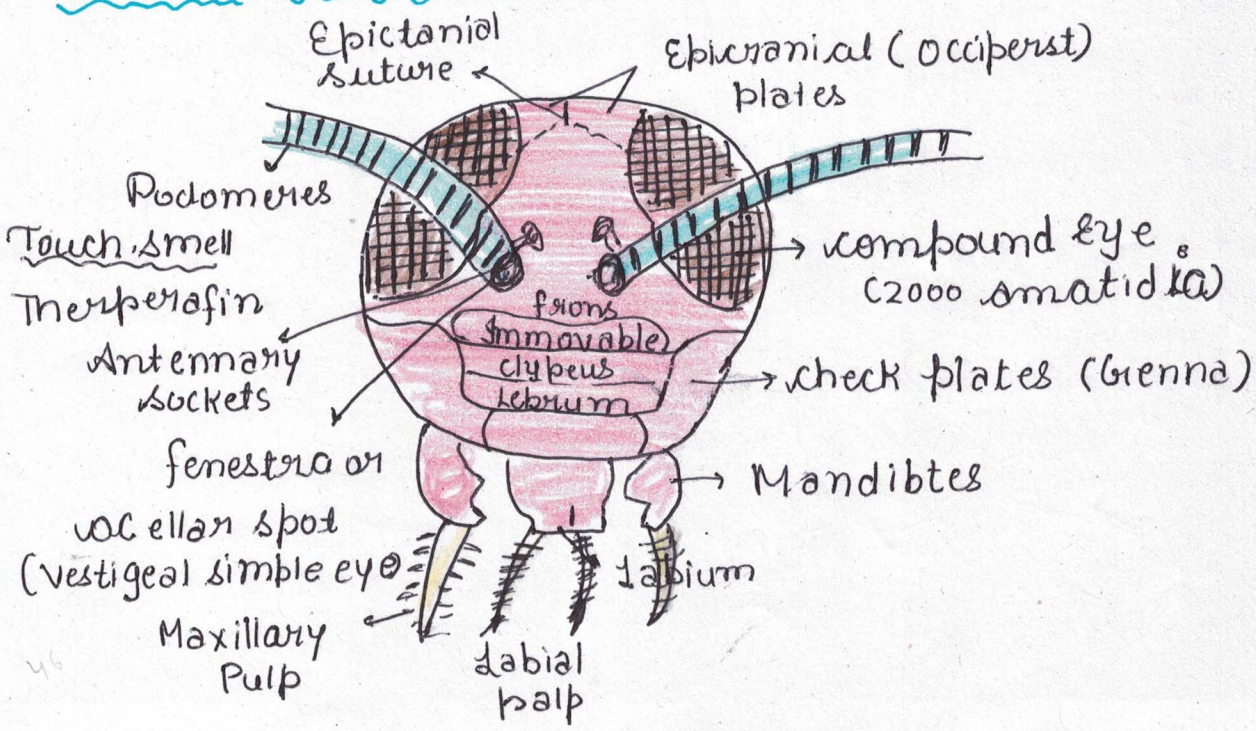
Embryo - 6 + 3 + 11 = 20

Adult - 1 + 3 + 10 = 14

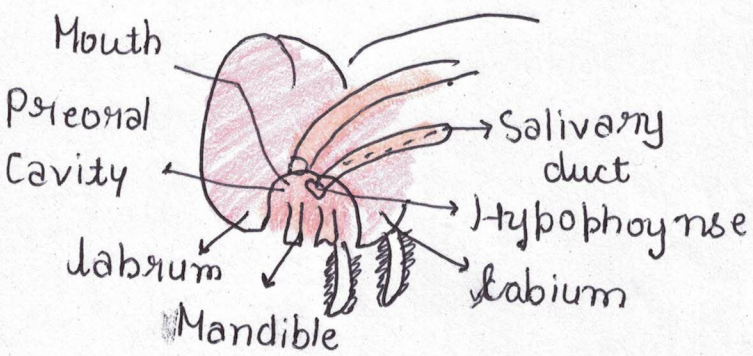
Sclerites

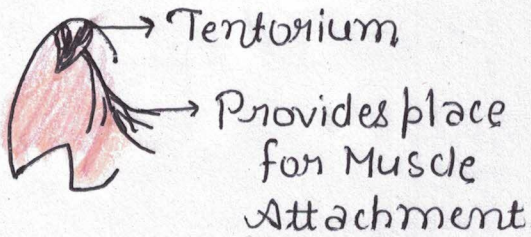


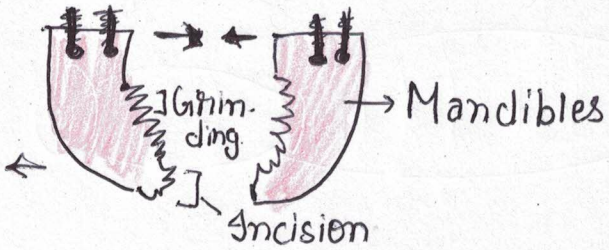
Head (Hypognathus Head)

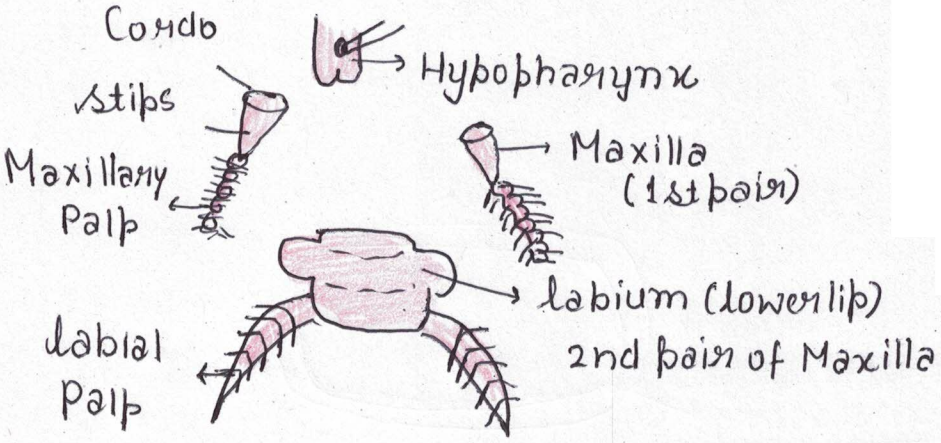


Mouth parts :-

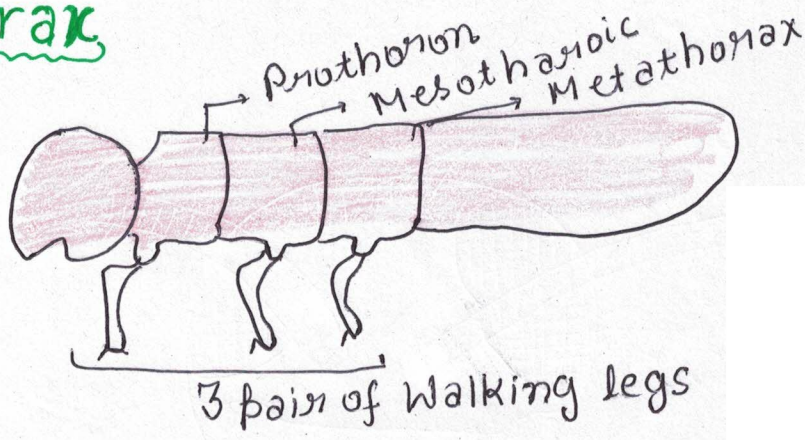




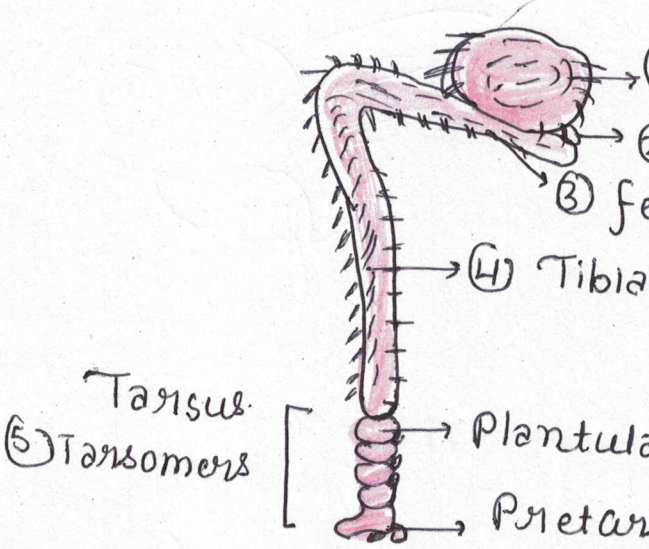


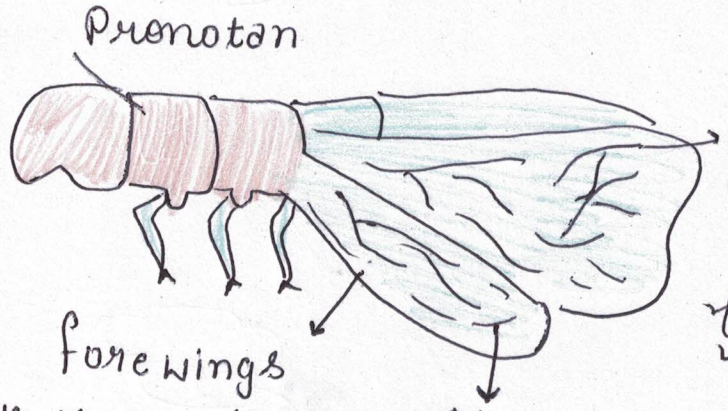


Thorax



Legs:



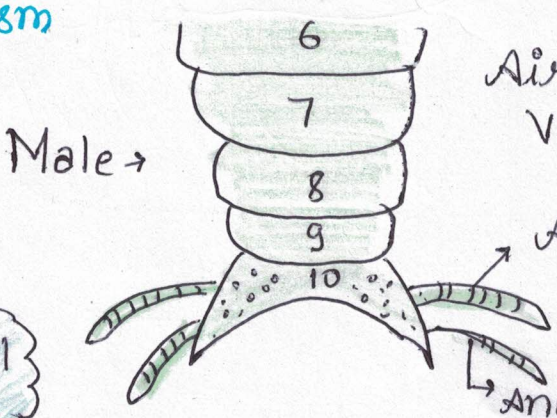


True wing
↓
Helps in flying

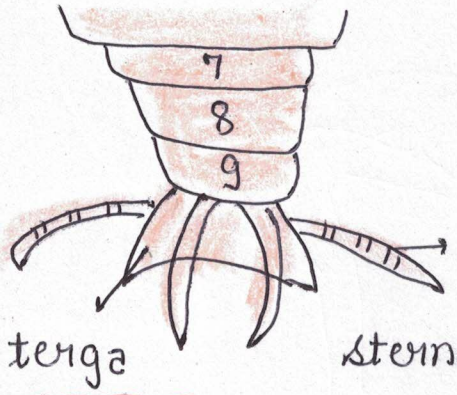
↓
Elytra/ Tegmina (No role in flight)

Abdomen

Sexual dimorphism
Both sexes
Terga - 10
Sterna - 9

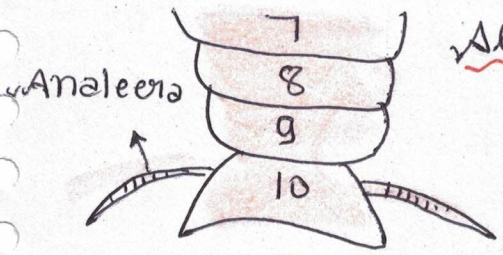


Dorsal
Via



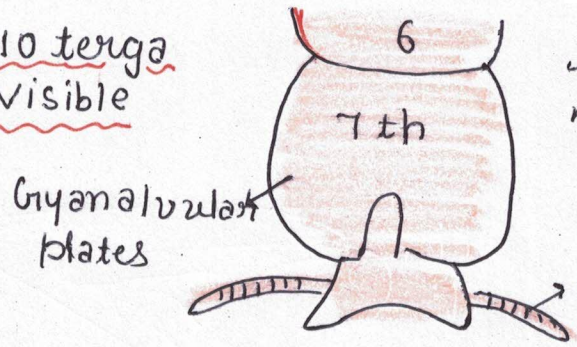
All 9 sterna Visible.

female



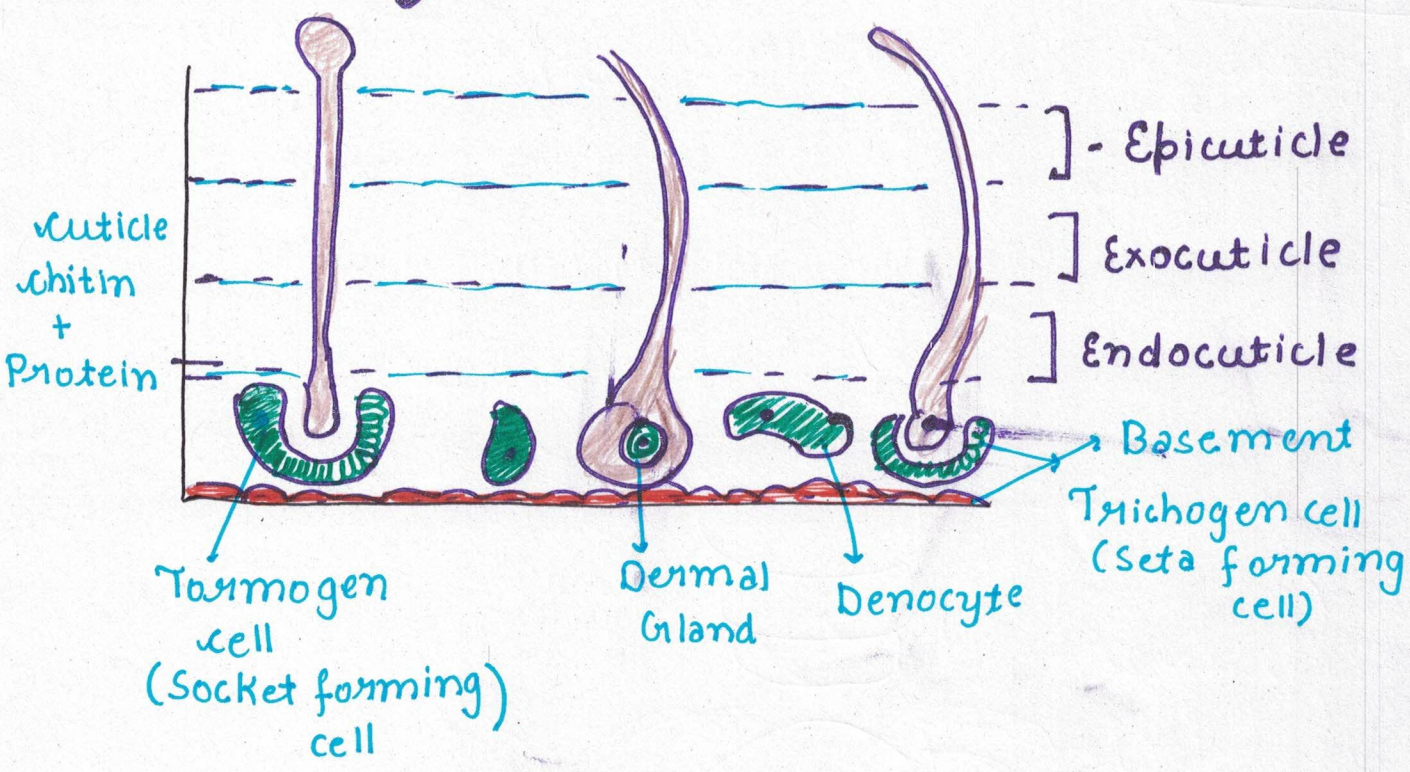
All 10 terga Visible

Dorsal



Only 7th Sterna Visible

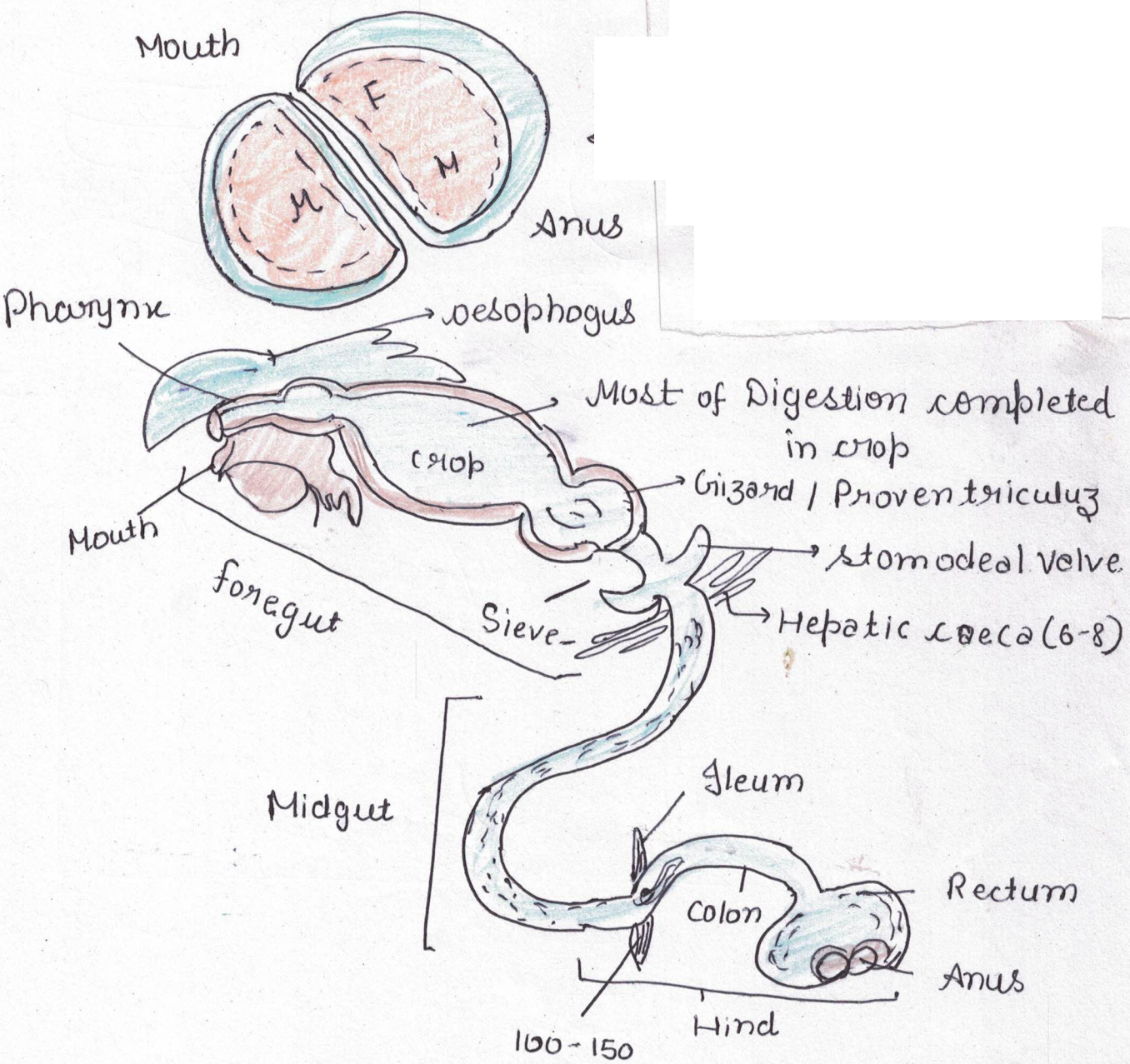
Body Wall

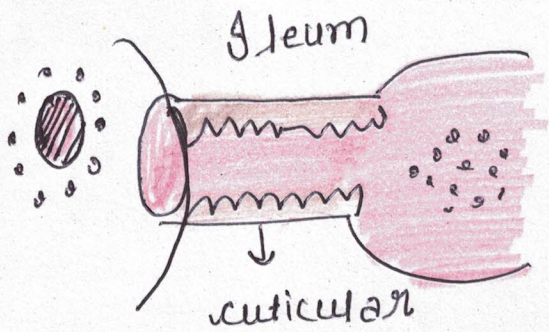


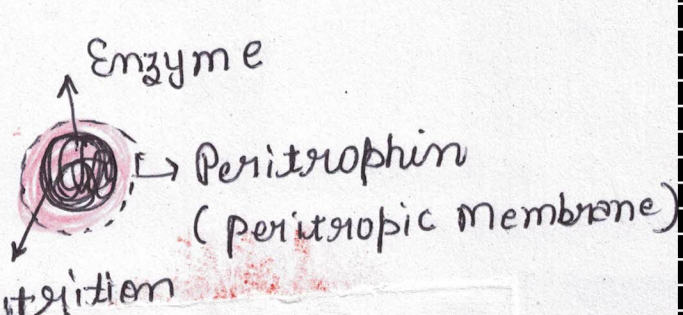
Digestive System - complete

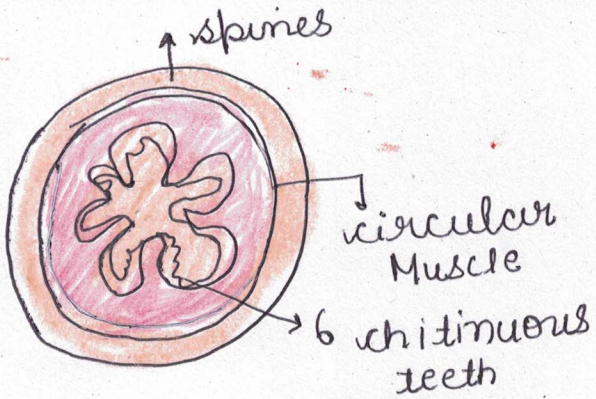
(i) Alimentary canal
- → Foregut / Stomodaeum → Ectoderm → cuticle
- → Midgut / Masenteron → Endoderm → Muscular wall
- → hindgut / proctodaeum → Ectoderm

(ii) **Digestive glands** → (i) Salivary gland
(ii) Hepatic caeca

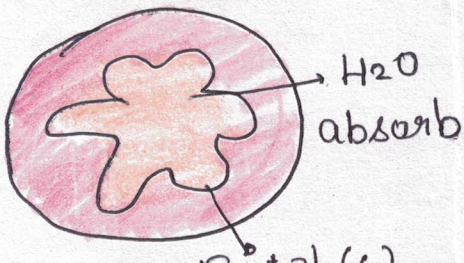




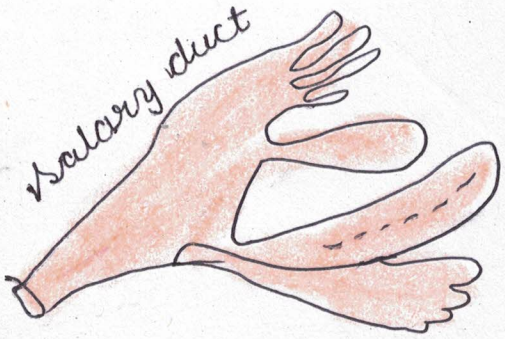




Rectum



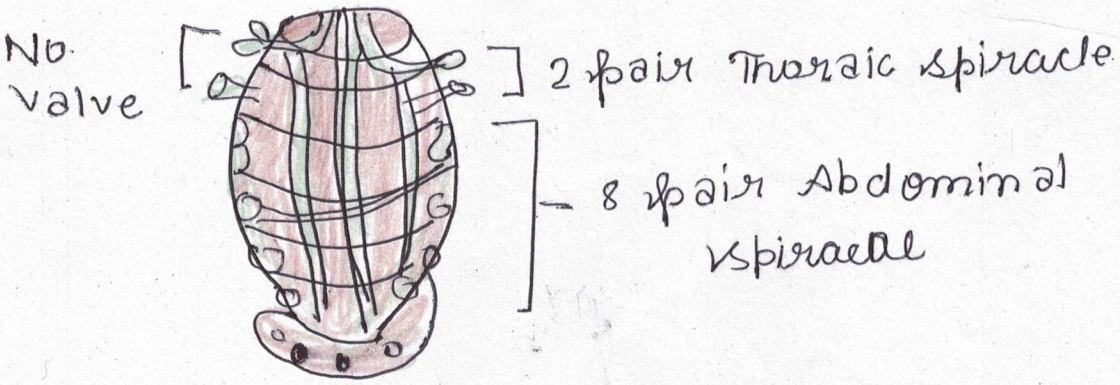
Crizzard

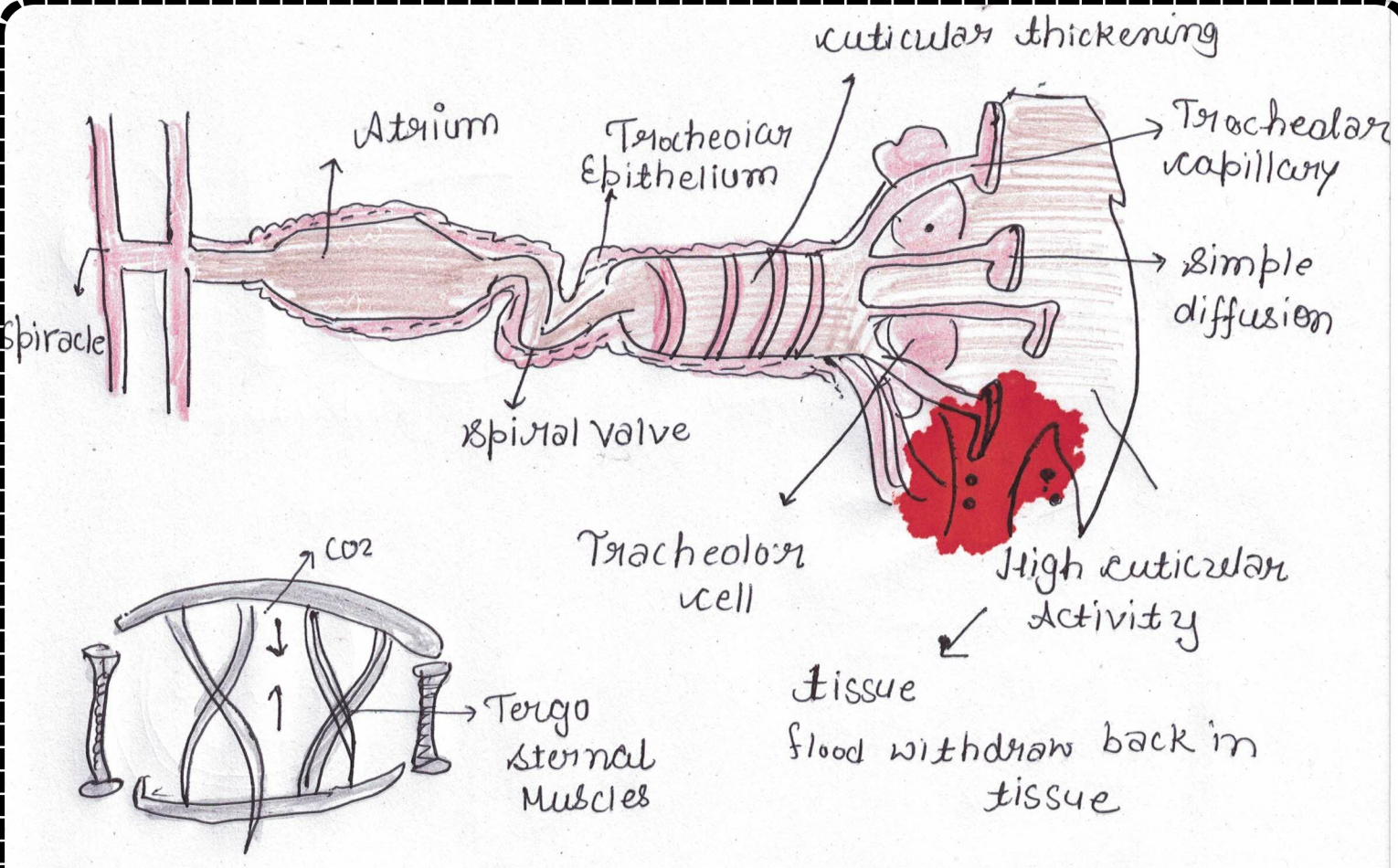


saliva
→ chitinase
→ cellulose
→ Amylase

Hepatic caeca → complete digestive juice protein + carbohydrate + lipid

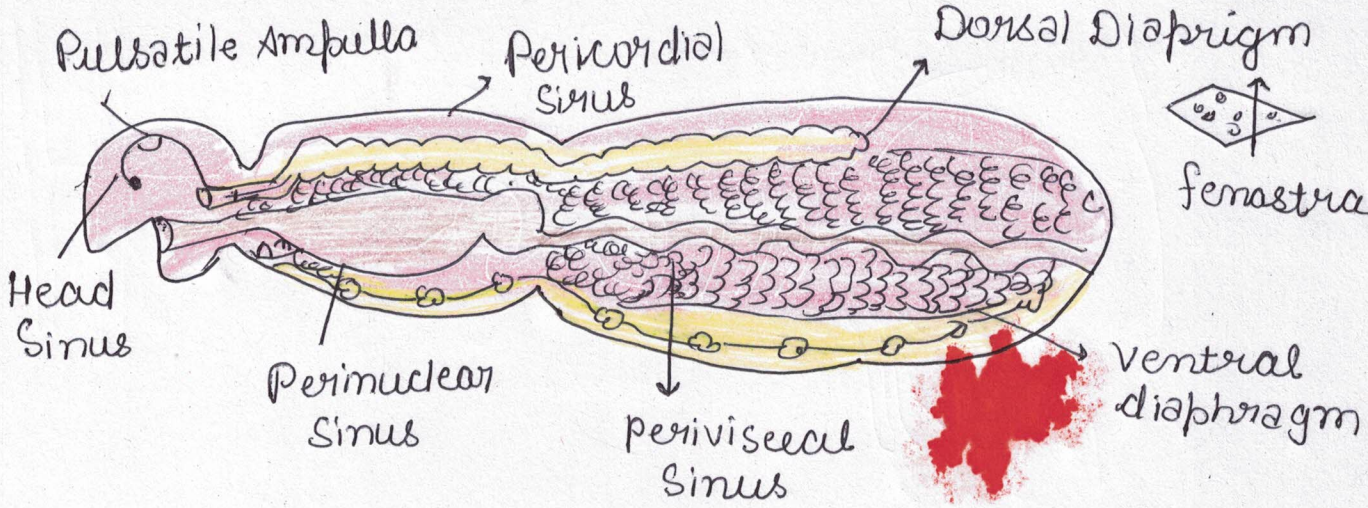
Respiration System → Tracheal

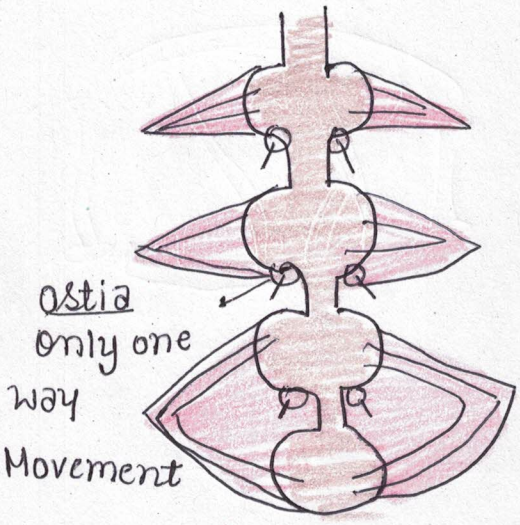




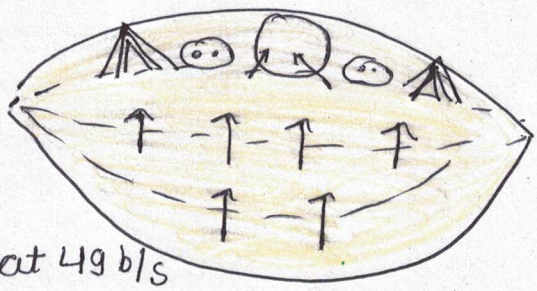
Circulatory System

- open type / lacunar type
- Blood / haemolymph (colourless)
  - Plasma
  - Haematocytes
    - Coagulocytes → Blood clotting
    - Pinocytes → Protection





13 chamber
12 pair of Ostia
12 pair of alary Muscle



Nephrocytes
↓
Regulate Heart beat 49 b/s

Excreatory System

Uricotelic → uric acid

Cell → uric acid → K-urate (Haemolymph)

(i) Malpighian tubules :→ Enteronephric

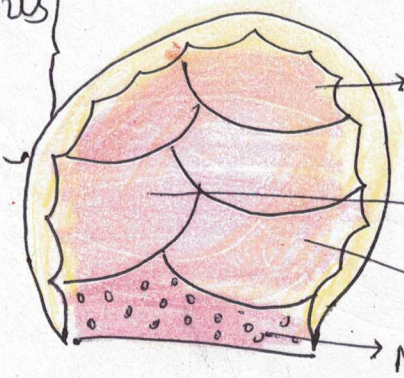
(ii) Nephrocytes → Store uric acid (throught life)

(iii) urate cells → Store uric acid

(iv) Body Wall → Store uric acid

(v) uricose gland → Secrete uric acid in spermatophore only in Male.

Analogous to liver



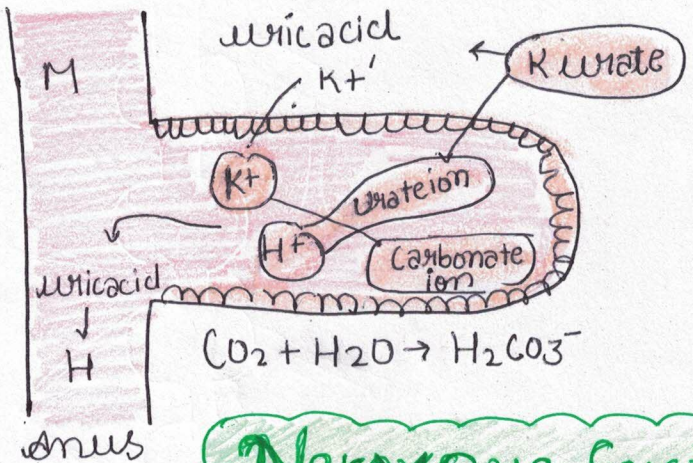
→ Trophocyte - food and glycogen + fat

→ Oenocyte - wax metabolism

→ Urate cells - store uric acid

→ Mycetocytes, Symbiotic bacteria

fat bodies :-

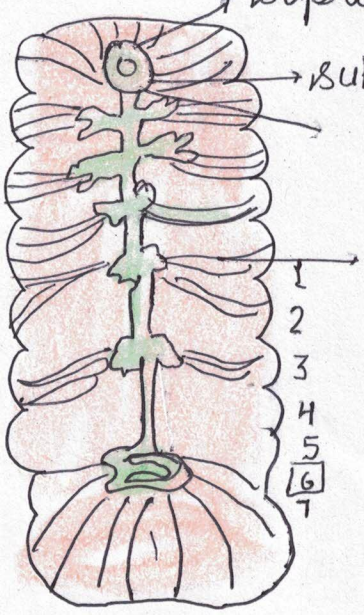


Nervous System

Double, ventral, solid, segmentally ganglionated.

(i) CNS (ii) PNS (iii) KANS

CNS + PNS



→ Supra-oesophageal ganglia — 3 pair of ganglia fused in embryonic life to form it

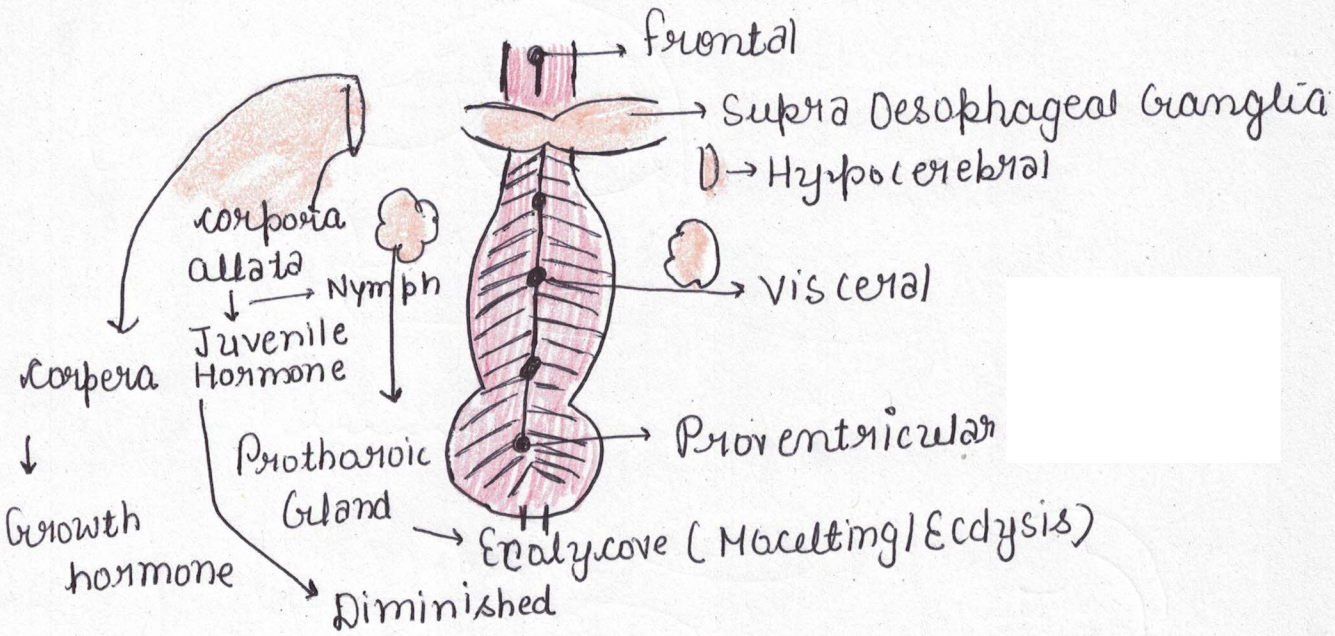
→ Sub oesophageal ganglia (3 pair of ganglia fused to form it in Embryonic life)

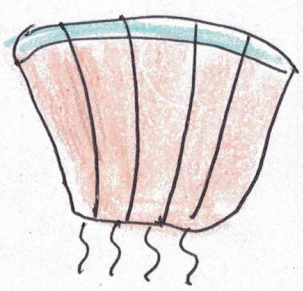
Thoracic 3 ganglia

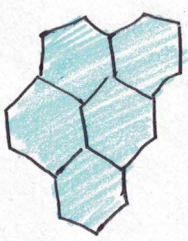
6 Abdominal Ganglia present in 7 segment

→ PNS → Nervous (All are mixed)

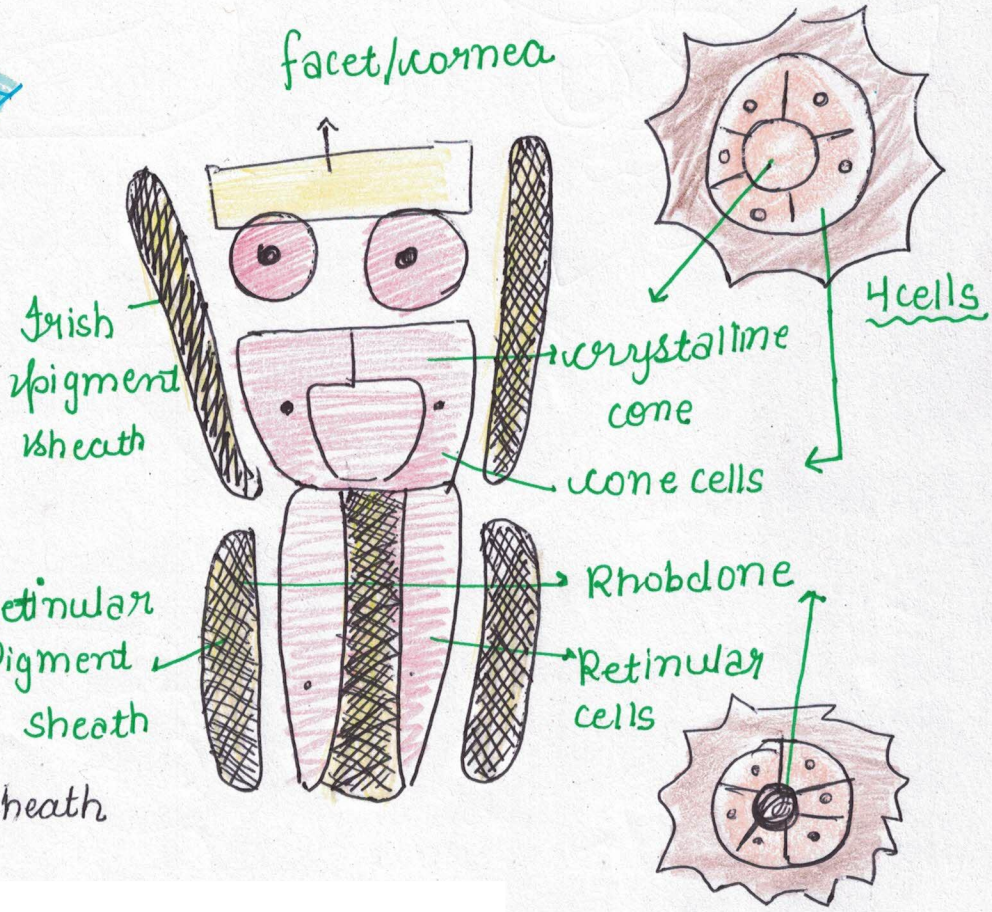
1 2 3 4 5 6 7





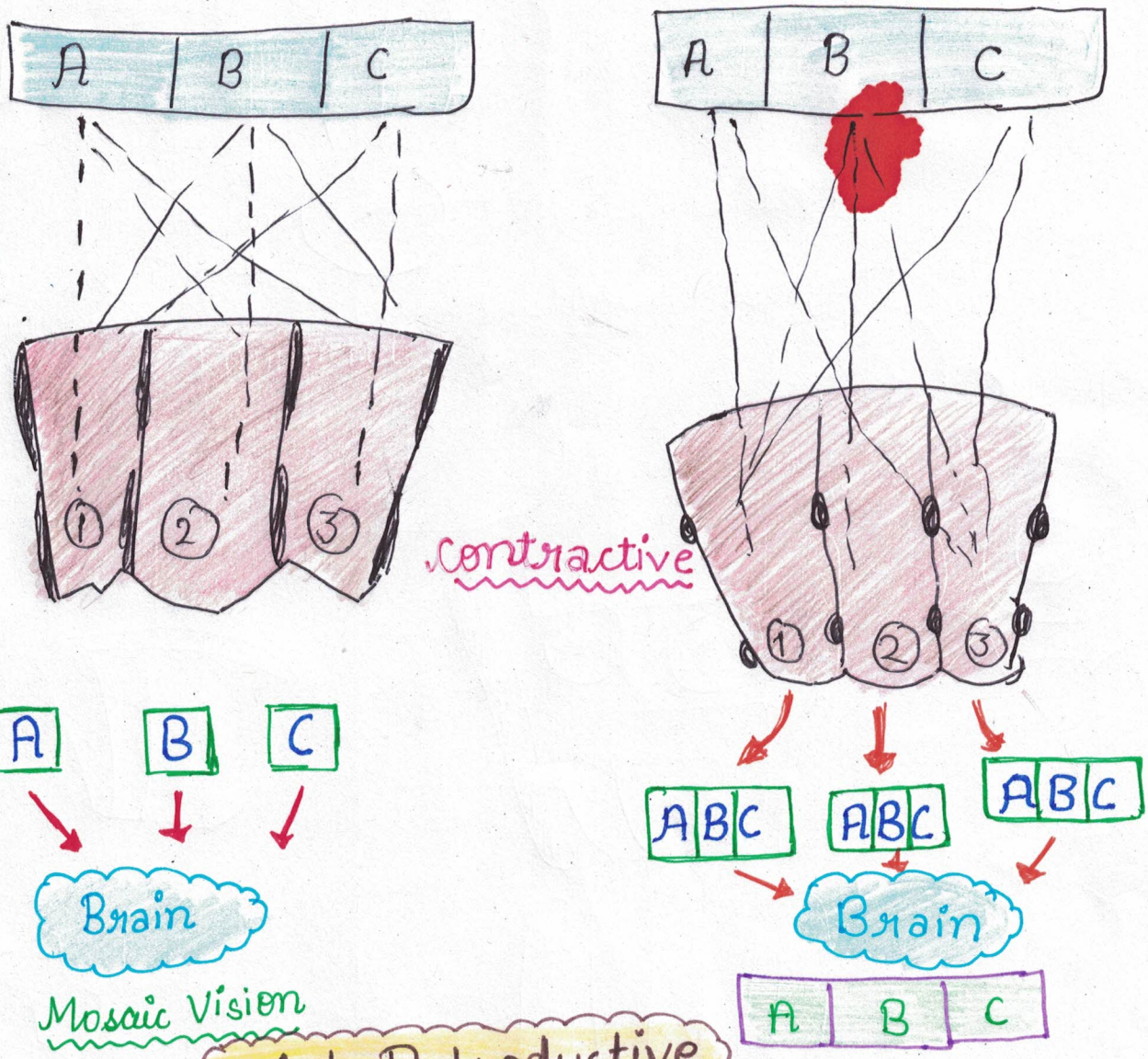


Irish Pigment Sheath

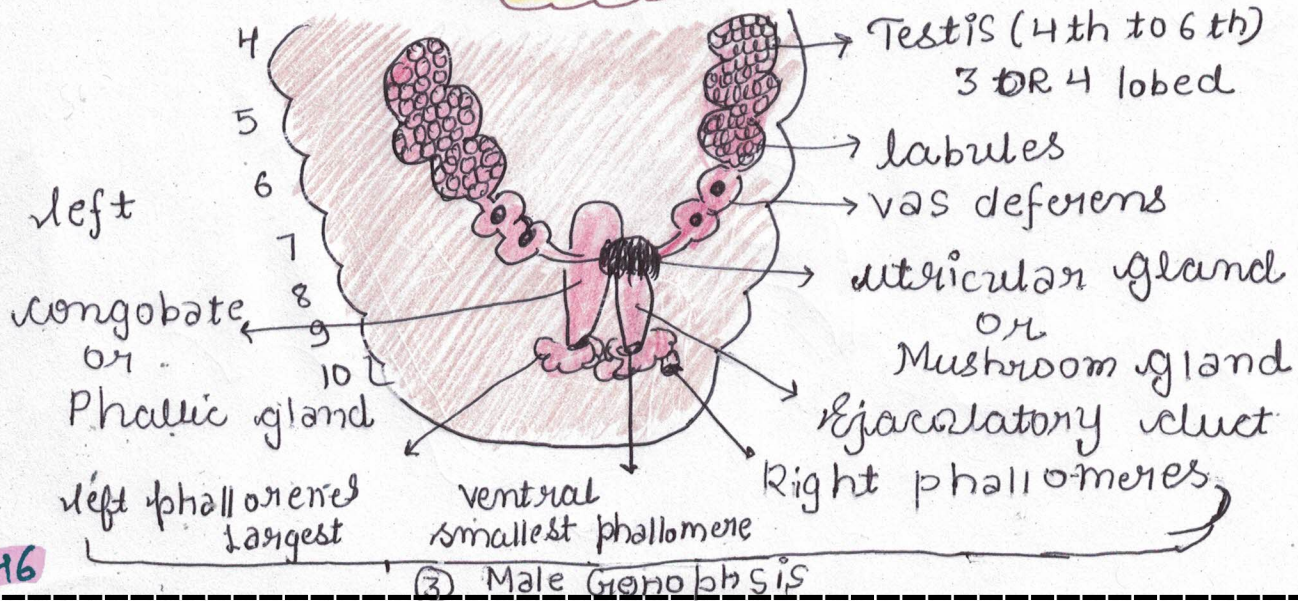


Apposition Image | Superposition Image

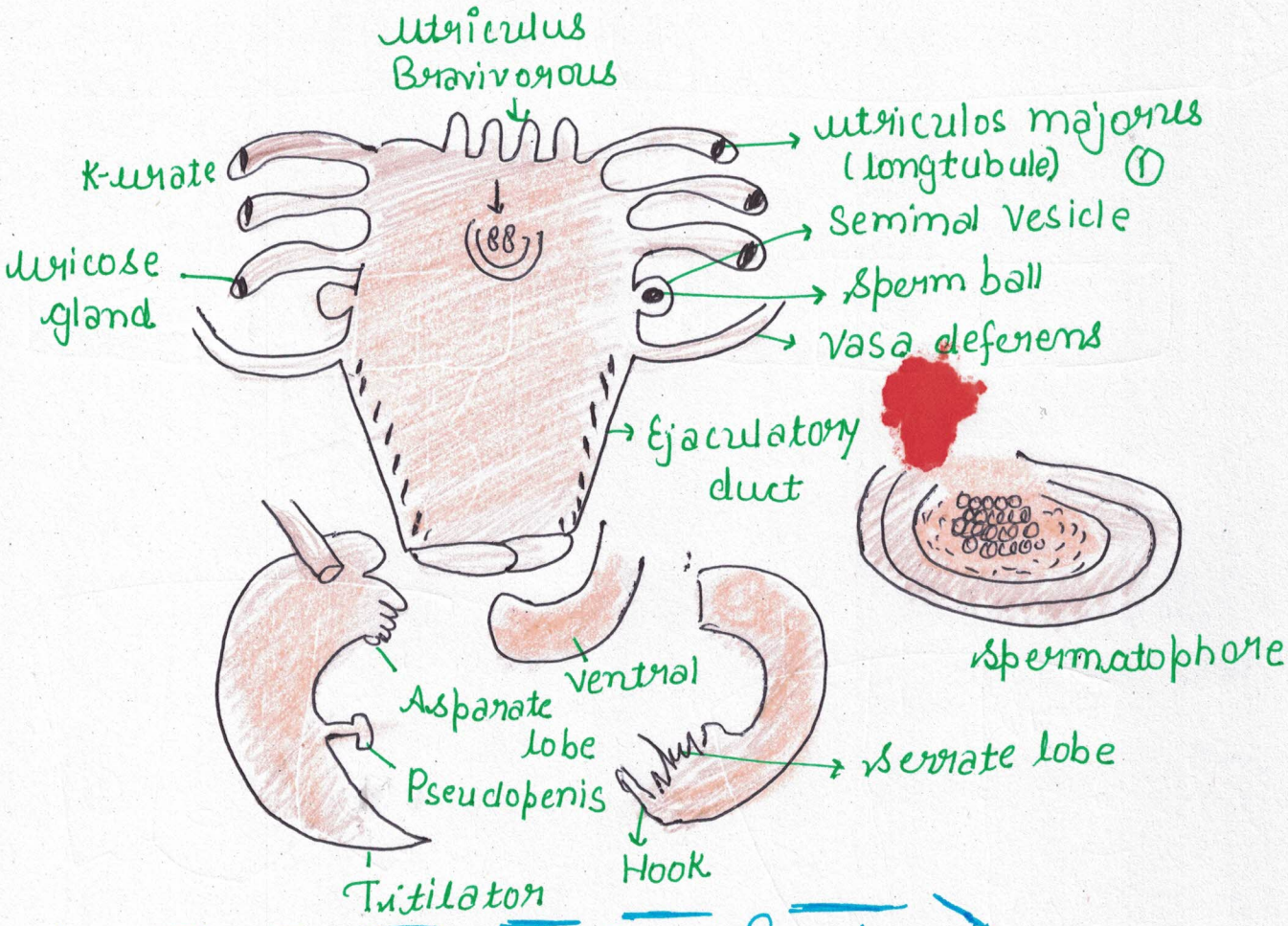
- Bright day light
- Dim light



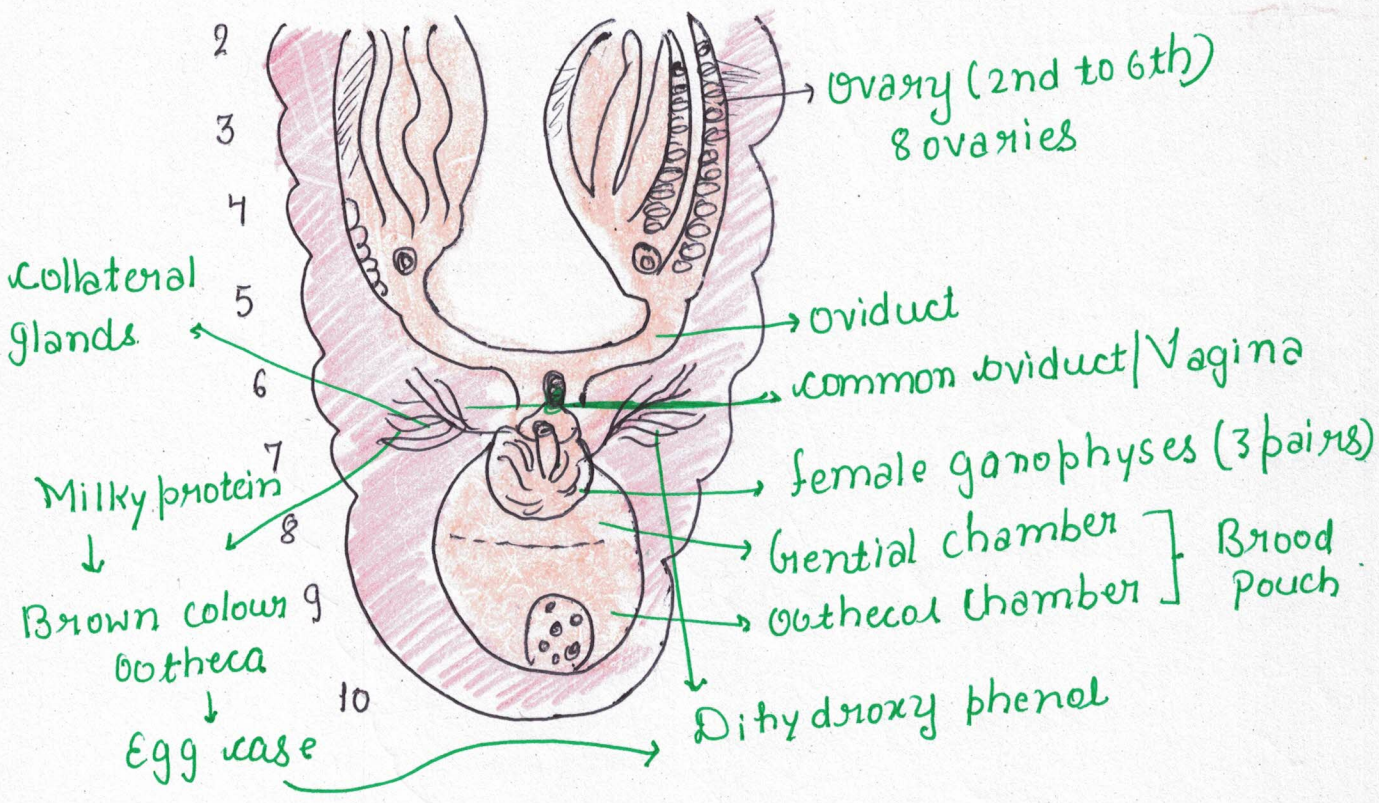
Male Reproductive System

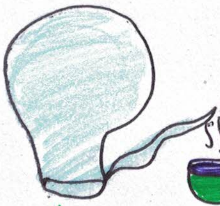


③ Male Genobasis



Female Reproductive System



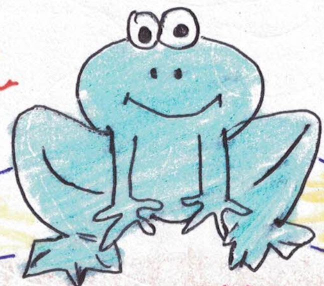


Nymph → Adult

Nymph
- smaller in size
- No wings
- Reproductive organs not Mature
- Transparent body

Adult
- Larger in size
- wings present
- Mature reproductive organ.
- Brown Body

Frog :-



classification

- Kingdom → Animalia
- Phyllum → chordata- ~~Vertebral colum~~ Notochord Present.
- Supphylum → Vertebrata - Vertebral column present
- Superclass → Tetrapoda → 2 pair of limbs.
- class- Amphibia → Dual Mode of life.
- Order → Anura → Tail Absent
- Genus →
- Species →
- Indian species of frog → Rana Tigrina (Indian bull frog)
- Toad → Bufo melanostictus
- study of frog- Batrachology

Rana tigrina

- Diurnal
- Large size
- Bifid Tongue
- 3 lobes in liver
- Slippery Nature

Bufo Melanastictus

- Nocturnal
- Small Size

Character

- frogs are anamneots
- Dicondylic skull
- fertilisation External (No external copulatory organ in it)
- frog Never drink water
  - ↓
  - Absorb through skin (by diffusion)
- Occur Near water (to absorb vapour)
- Rana tigrina → Skin → Moist, Slippery] Mucous gland present
- Bufo m. → Skin → Rough → Poisonous gland present (Modified part of parotid salivary gland)
- cold blodded / Poikilothermous
- Extreme condition → very hot, very cold
  - Aestivation → During Summer
  - Hibernation → During winter
- Ability to change body colours of frog- camoflage.

Protective colouration is called mimicry

capacity to change the body colour of frog - Metachrosis

Morphology

Body consist of 2 part
(i) Head (ii) Trunk

Neck and tail Absent
↓
absent → help in jumping

Size → length → 18 to 20 cm
width → 5 to 8 cm

colour :- Dorsal side → olive green with dark irregular spot (Dermal plicaea / Dermal fold)

Ventral side → uniformly pale yellow colour

Head Region

Triangular in shape

upper jaw having teeth only

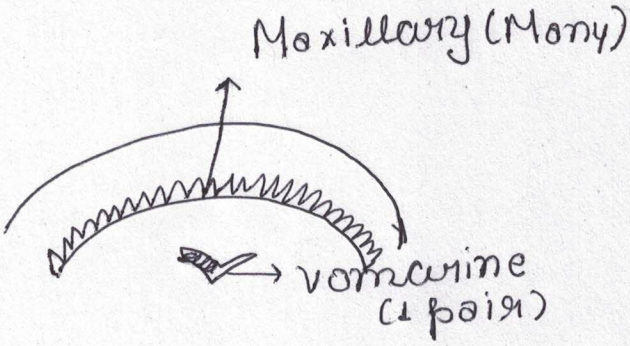
Law jaw teeth absent

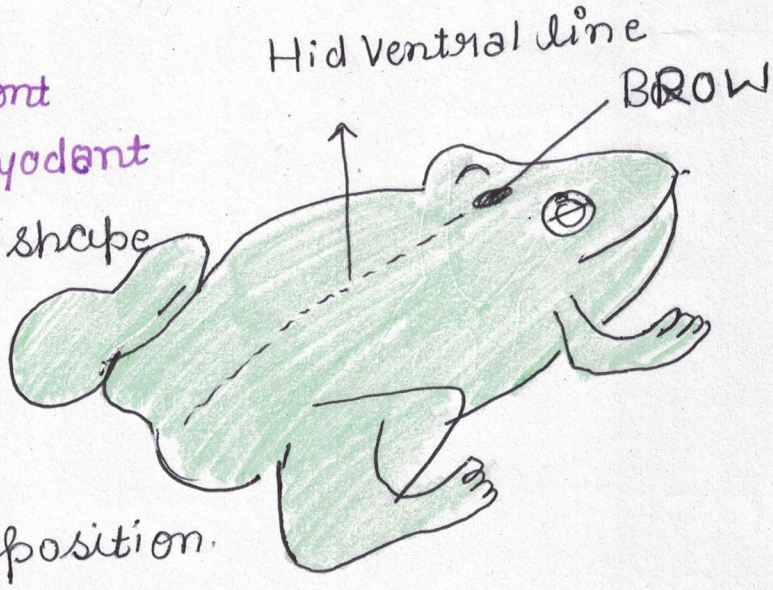
Teeth are → acrodont
→ polyphyodont

Snout is conical in shape

No lips present

Eye - 1 pair
Dorsolateral in position



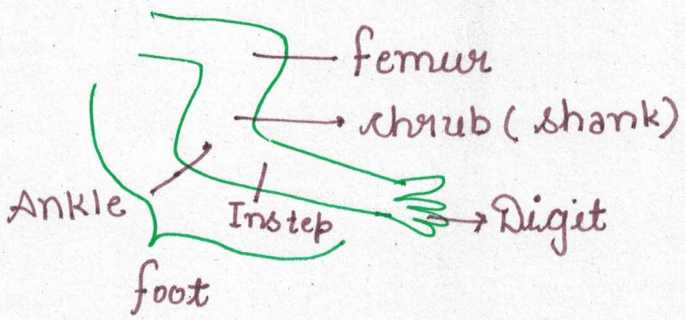


- Help in vision → myopic (short sighting) → in land
  Monocular (single Eye see single object) (in water)

- Bow spot/Pineal Eye/3rd Vestigeal Eye.
  ↓
  Present between both Eye.

- Eyelid → upper → Immovable
  - lower → slightly movable and semitransport
  - Nictating Membrane → (3rd Eyelid) → Movable and transparent

- Hind limb is strongest
- Thumb is absent in forelimb
- fore limbs → 0, 2, 2, 3, 3 (web absent)
- Hind limbs → 2, 2, 3, 4, 3 (web present)
- Swimming, jumping or leaping and burowing, walking.
- Hind limb 'Z' shape → Absorbs shocks and helps in jumping.



Ear :-
- External Ear Absent
- Middle and Internal Ear present
- covered by tympanum

help in - Balancing.
- Hearing

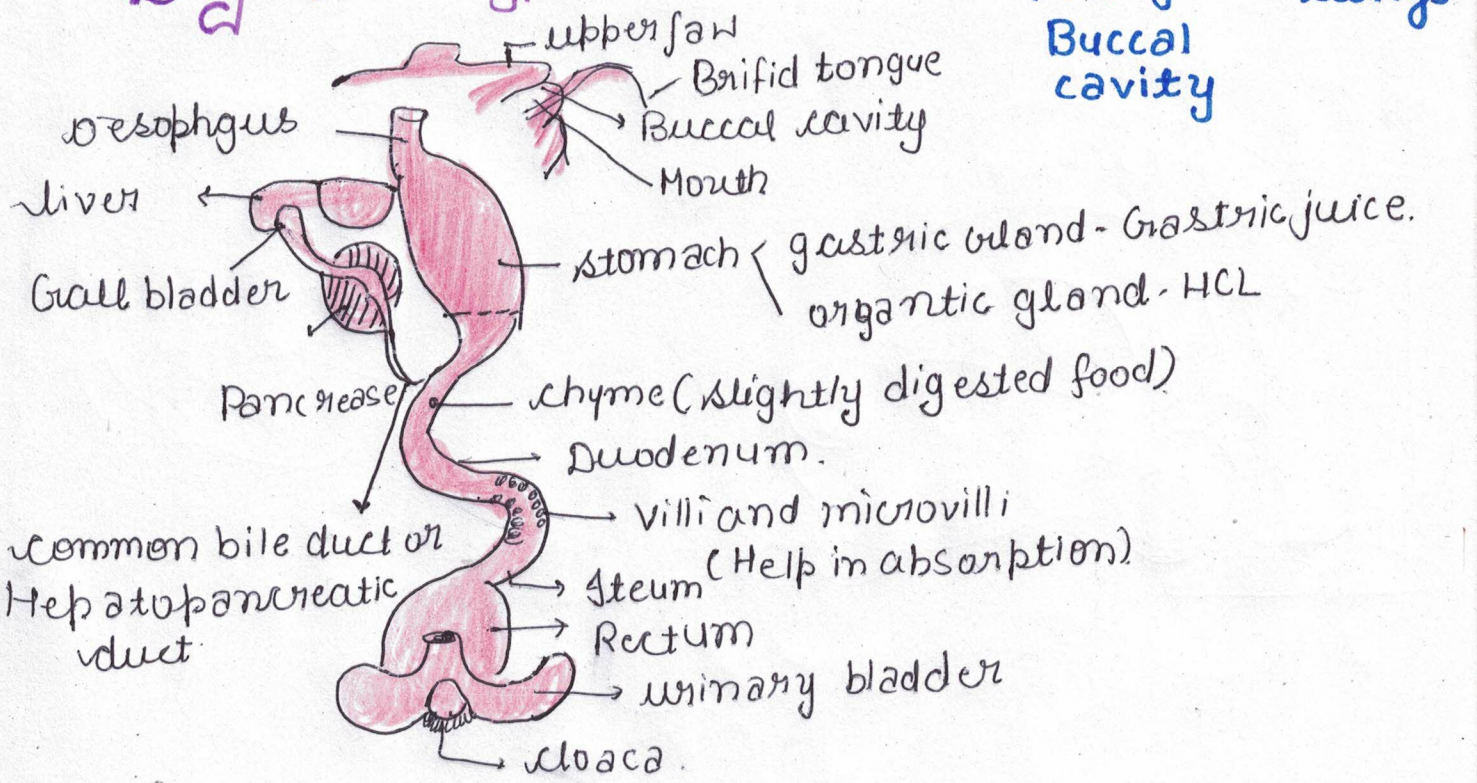
- only single ear ossicle
  ↓
  columella auris (Stapes) present.

- In male → copulatory pad/Nuptial pad/Amplexusary pad present (Modified 1st digits of forelimb)
  → Vocal sac → for Sound.

Respiratory System

- In water → only cutaneous respiration or Through Skin → 35%
- On soil → cutaneous Respiration → 9% → Through Buccal cavity
  - Buccopharyngeal respiration
  - Pulmonary Respiration → 56% → Through lungs

Digestive System



Tadpole

- Respire through Gills
- Tail present
- Limbs absent
- Ammonetellic
- Herbivorus
- Intestine long
- Alimentary canal long

Frog

- Respire → Skin
  through → Buccal cavity
  ↘ lungs
- Tail Absent
- Limbs present
- uniotelic
- carnivorus
- Intestine short
- Alimentary canal short

Circulatory System

Blood Vascular system (closed, double and Incomplete)

Lymphatic system (open type)

↓ consist of

- Heart → Mygenic (Muscles present)
  Autoexitable (Pace Maker)
- Blood vessels (different diameter) → Artery - Distribute blood from heart
  ↳ Vein - collect blood toward heart from body part.
- Blood → Plasma (55%)
  formed Element (45%)

RBC / Erythrocyte
↑
Nucleated 100days
oval or
biconcave

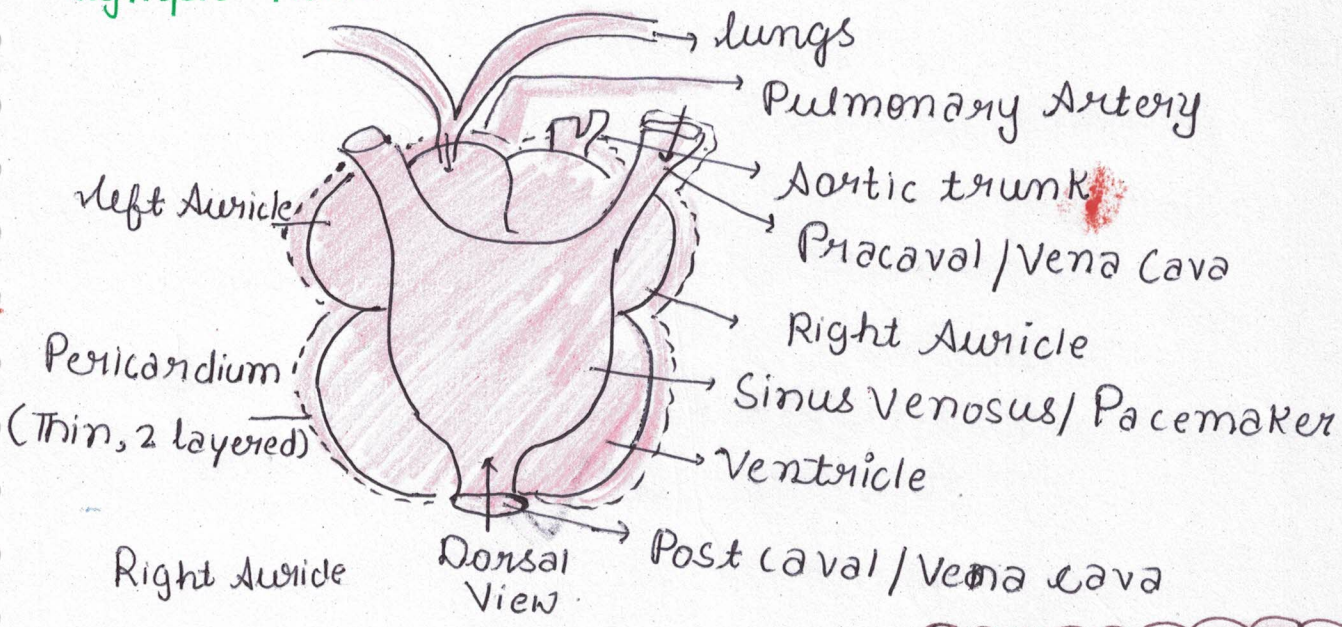
WBC / Leucocyte
Help in Improve
Immunity

Platelets / Thromboytes
(Spongin fibre)
help in clotting.

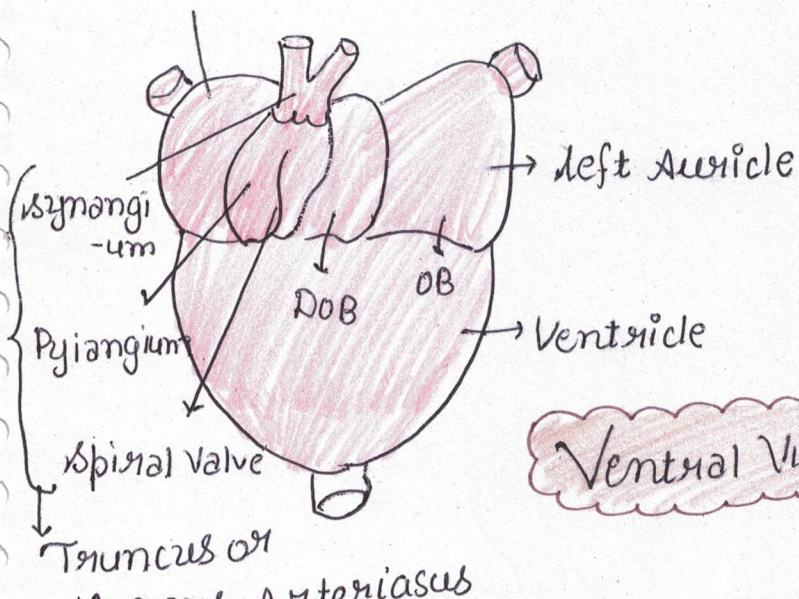
Lymph [Blood - RBC + few plasma protein]

Lymph channels

Lymph node



Heart beat Rate
64 times/min



Ventral View

2 special Venous system present in frog.

Hepetic portal system :- Between liver and Intestine

Example → All Vertebrates.

Renal portal system :- Between kidney and lower part of body.

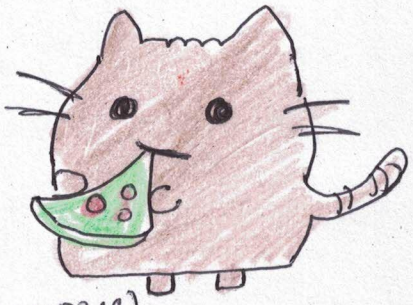
Example → only Amphibia (Absent in Mammals)

Excreatory System

→ consist of three part :-

- kidney
- ureter
- urinary bladder

→ **Kidney** :- Mesonephric



- 1 pair, bean shape
- Present in abdominal cavity.
- Each kidney consist of 2000 (Numerous) uriniferous tubules / Nephrons (unit of kidney)
- Not divided into
  - → cortex
  - → Medulla
  - → Pyramid.
- consist of Bladder canal only.

★ **Excreatory product** :- Ammonia in tadpole (Ammonotic)
- urea in Adult (ureotelic)

★ **function** :- Osmoregulation
Excreation
Haemopoisis in larva (formation of blood)

★ **Ureter** :- In the form of urinogenital

In Male frog → carry → Sperm
→ Urine

In female - In form of ureter → collect → urine.

Nervous System

- CNS
- PNS
- ANS

CNS
- Brain
  - covered by brain box/ cranium
    - Forebrain
      - Olfactory lobe (1 pair)
    - Mid Brain
      - Optic loble (1 pair)
    - Hind Brain
      - Cerebrum (Single)
      - Medulla oblongata (Single)
- Spinal Cord
  - Medulla oblongata open into spinal cord through foromen Megnum
  - 10 vertebrae present in frog.

→ Cerebrum or Cerebrumhemisphare (1 pair)
→ Diencephlon (Single)

PNS

Cranial Nerve

★ In frog → 10 pair - CN
10 pair - SN

★ In human → 12 pair - CN
31 pair - SN

★ In Rat → 12 pair - CN
33 pair - SN

Spinal Nerve

★ In RANA tigrina → 10 pair - CN
9 pair SN

ANS

- Regulate Autonomous or Involuntary organ
  Heart, lungs, Intestime