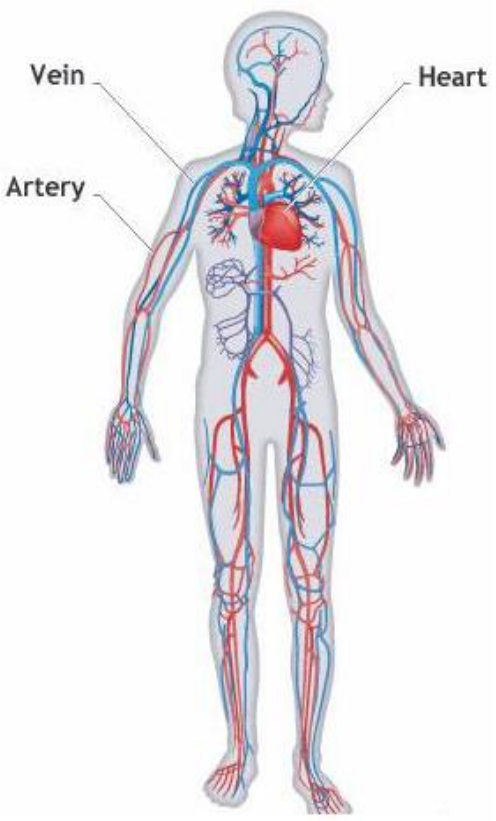
Chapter – 7: Transportation in Animals and Plants

- All organisms – need food, water, oxygen – need to be transported – various parts of body
- Transport waste – remove from body
- Heart and blood vessels – transport all these – circulatory system

Circulatory System

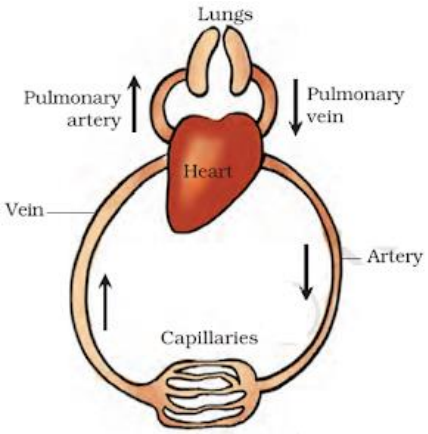
Blood

- When you get a cut – blood flows out
- Blood – fluid – inside blood vessels
- Transport –
    - Digested food – intestine to all parts
    - Oxygen – lungs to all cells
    - Waste – removal from body
- Blood – composed of fluid – plasma – different typed of cells
    - Red blood cells (RBCs) –
        - Contain red pigment – **haemoglobin**
        - Haemoglobin – binds with oxygen – transport to all parts and cells
        - Presence of haemoglobin – blood looks red
    - White blood cells (WBCs) –
        - Fight germs
        - Protects our body
    - Platelets –
        - When you get a cut – blood clots (solidifies) after some time
        - Presence of platelets – clotting happens



Blood vessels

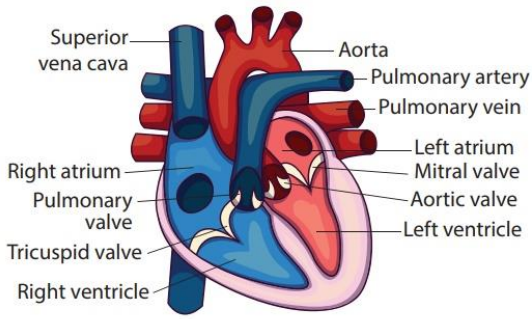
- Different types of blood vessels
- Inhalation – fresh oxygen fill up lungs – oxygen transported to all parts
- Blood – picks up waste including carbon dioxide – taken to lungs – removal of carbon dioxide
- 2 main types of blood vessels –
    - Arteries –
        - Carry oxygen-rich blood – heart to all parts
        - Blood flow – rapid, high pressure – thick elastic walls
    - Veins –
        - Carry carbon dioxide-rich blood – all parts to heart
        - Thin walls and valves – allow single direction flow
- Another type –
    - Capillaries –
        - Arteries divide into thin tubes – capillaries – reach smaller areas within tissue
        - Capillaries then join together to form veins



- Place middle and index finger – inner side of left wrist – observe throbbing – **pulse**
- Count the beats – number of beats per minute – **pulse rate**
- Normal rate – 72-80 beats per minute

Heart

- Organ – beats continuously – act as pump – transport of blood
- Works non-stop – all our life
- Located in chest cavity – lower tip – tilted towards left
- Make a fist with your – that's size of your heart
- Avoid mixing of bloods – heart has 4 chambers
    - 2 upper chambers – **atria** (atrium)
    - 2 lower chambers – ventricles



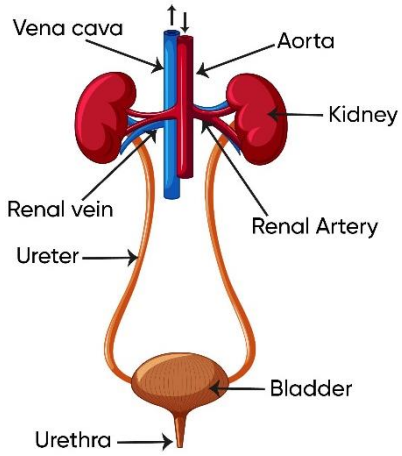
- Partition between chambers – avoid mixing of bloods
- Circulation path –
    - Lungs to heart – pulmonary artery – oxygen rich blood
    - Heart to all parts – arteries – oxygen rich blood
    - All parts to heart – veins – carbon dioxide rich blood
    - Heart to lungs – pulmonary vein – carbon dioxide rich blood

Heartbeat

- Walls of heart chambers – made of muscles
- Muscles – contract and relax – with rhythm
- Contraction and relaxation – together make a heartbeat
- Place hand on left side of chest – feel heartbeat
- Doctor feels it with stethoscope – amplify – sound of heart
- Consists – chest piece (sensitive diaphragm), 2 ear pieces, tube joining them
- Doctor – studies heart condition – listening through stethoscope
- Take a small funnel – tie a rubber sheet on bigger end – attach a pipe on smaller end – homemade stethoscope
- Record – heart beat and pulse rate – both are same
- On beat generates – one pulse
- Rhythmic beating of heart chambers – maintain blood circulation
- Some organisms – sponges and *hydra* – no circulatory system – exchange of materials – through skin

Excretion in Animals

- Carbon dioxide – removed as waste
- Undigested food – removed during egestion
- Cells perform function – waste products obtained
- These are toxic (poisonous) – necessary to remove
- This process – **excretion**
- Parts involved – together – **excretory system**



Excretory system in humans

- Waste – present in blood – has to be removed
- Mechanism for blood filtration – required
- Done by blood capillaries in **kidneys**

- Blood reaches kidneys – contain both useful and harmful things
- Useful things – absorbed back by blood – harmful things – dissolved in water – removed as **urine**
- From kidneys – urine goes to urinary **bladder** through tubes **- ureters**
- Stored in bladder – passed out through **urethra**
- All these organs – together – excretory system
- Adult human – 1-1.8 L urine per 24 hours
- Urine consists – 95 % water, 2.5 % urea, 2.5 % other waste products
- We sweat on hot summer days
- Sweat – contain water and salts
- Earthen pot (*matka*) – water evaporates from pores or the pot – causes cooling
- Sweat works the same way – cools our body

Transport of Substances in Plants

- Plants – take water and mineral – from soil – through roots – transport to leaves
- Leaves – prepare food – using water and carbon dioxide – photosynthesis
- This food – source of energy – every cell – need to be transported

Transport of water and minerals

- Plants – absorb mineral and water through root – root hairs
- Root hair – increase surface area – more absorption
- What kind of transport system?
- Plants – pipe-like vessels – transport water and nutrients
- Vessels – made of special cells which make up – **vascular tissue** – group of similar cells working together
- This vascular tissue – transport water and minerals – **xylem**
- Xylem – continuous network – connect roots to other parts – transport water
- Leaves synthesize food – transported to all parts
- Done by vascular tissue – **phloem**
- Take a herb – along with stick – cut the base of herb – dip in coloured water – leaves and flowers – turn to colour of water
- Cut the stem – observe the insides – red colour visible

Transpiration

- Plants release – lots of water – this way
- All the water absorbed – not used
- Unused water – evaporates through stomata
- Evaporation of water – create a suction pull – pulls water to great heights
- Also cools down the plant