

Know your body

AMAZING LIVING MACHINE

HEALTH GALLERY

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&
Science Guides of Health Gallery

INTRODUCTION

- Human body is an amazing living machine. Different systems of the body work 24x7 to keep it going. In this gallery one learns about the functioning of various systems of the body and also about various disorders.
- In this gallery one will also learn about various advanced techniques/technologies to detect the diseases and defects and their possible cure.
- Lets start a voyage to the marvelous creation of God, 'The Human Body'.

FOLLOW YOUR FOOD

- The exhibit explains about the role played by digestive system in human body in digesting the food.
- You will also learn about the role of various organs that take part in the process of Digestion.
- This is an Interactive exhibit.



EXPLANATION OF THE EXHIBIT (General Information)

- The exhibit explains about the passage that is followed by food starting from mouth to anus.

Organs involved and their function in digestion are:-

1. Mouth: Teeth in mouth chew the food & salivary glands pour the saliva on to the food.
2. Oesophagus: It is also known as food pipe. Food enters into the stomach after passing through oesophagus.
3. Stomach: In the stomach the process of digestion is enhanced by secretion of Hydrochloric acid & pepsin enzymes.
4. Liver: Largest gland which helps to detoxify harmful components present in food and produces bile for digestion of fats.
5. Gall Bladder: Gall bladder stores bile.



EXPLANATION OF THE EXHIBIT (General Information)

6. Pancreas: helps in balancing the sugar level in the body and releases pancreatic juice contains enzymes that aid in the digestion of proteins, carbohydrates and fats.
7. Small Intestine: Largest & longest part of the digestive system (6 m long). Digested food gets absorbed here in to the blood stream.
8. Large Intestine : It is about 1.5 m long which absorbs the water and undigested food moves into the rectum from here.
9. Rectum: Receives and stores the undigested food from the large intestine.
10. Anus: Throws the undigested food out of the body.



EXPLANATION OF THE EXHIBIT (Additional Information)

- Digestion: is a process by which raw materials (vegetarian or non-vegetarian food) get converted into organic molecules and energy.
- It is performed to extract out the essential components from food.
- Salivary glands in mouth secrete saliva which helps to digest carbohydrates.
- Three main types of salivary glands are - parotid, sublingual, sub maxillary.
- In one day a person secretes 1.5 litres of saliva, process is involuntary.
- Special finger like projections in small intestine known as villi, increases the absorption area.



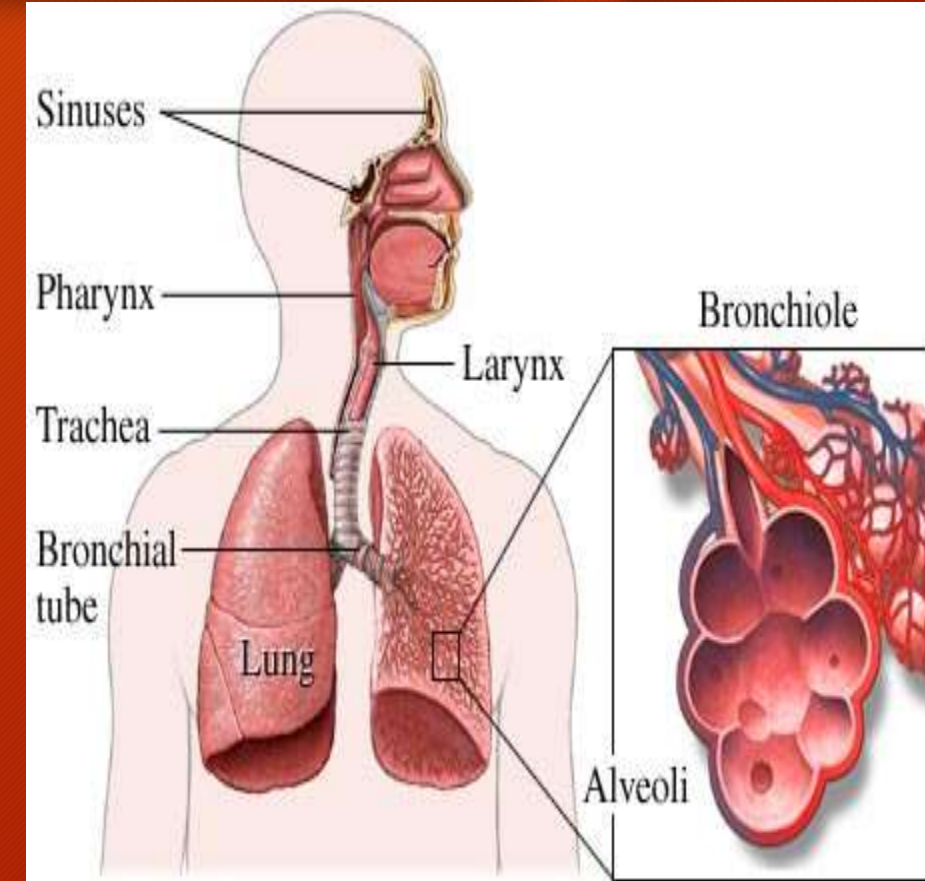
BREATHE IN BREATHE OUT

- The exhibit shows the working of Lungs (contraction & Expansion) during the process of Exhalation and Inhalation.
- This is a self explanatory exhibit. One can press the button to know about breathing rate in different conditions



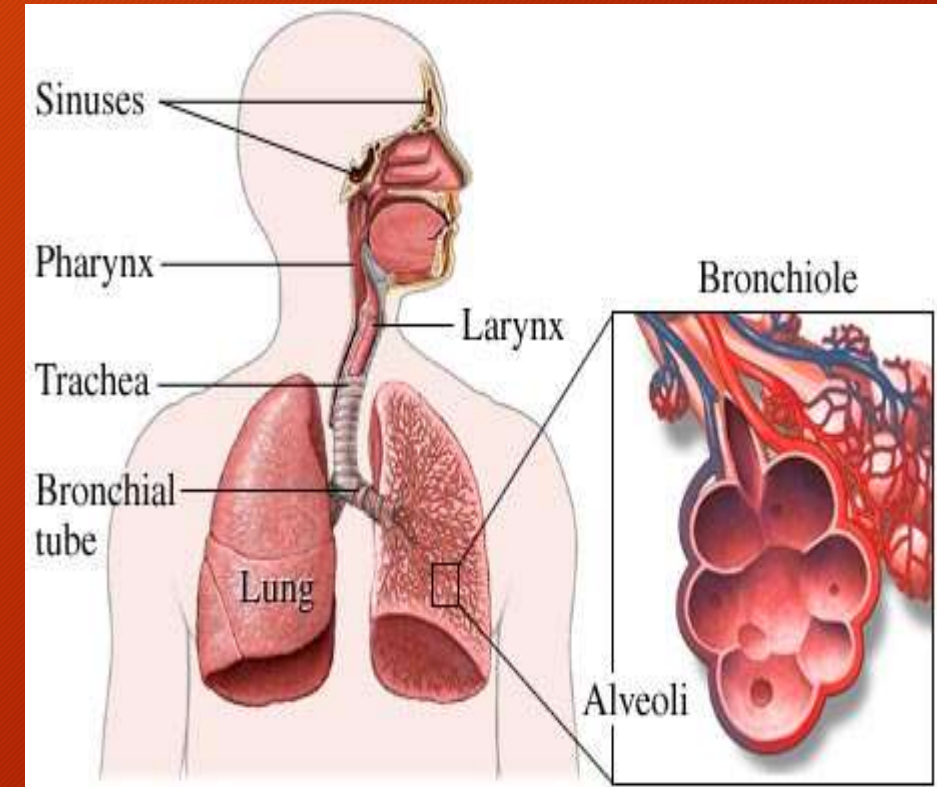
EXPLANATION OF THE EXHIBIT (General Information)

- The human body has a pair of lungs - Left & Right.
- The right lung is slightly bigger than the left lung.
- Exhibit shows the movement of lungs and Diaphragm during breathing activity. It shows normal breathing and breathing during exercise.
- Normal breathing rate is 12-16 times/min in contrast during exercise it will incline and reaches to 20-26 times/min.



Explanation about the exhibit (Additional Information)

- The exhibit shows the Respiratory Tract & respiratory organs.
- The lungs are situated in the thoracic cavity and are surrounded by a protective membrane known as Pleura (peritoneal layers)



HUMAN HEART

- The wall size human heart model is a walk through model. The exhibit explains about the structure of heart and various parts related to it.
- The panel based information related to the exhibit gives detailed information about the working of heart, heart problems and various techniques(Angioplasty, Angiography) & devices (implantable defibrillators & pacemakers) to normalise its functioning.



Working of the Exhibit

- The exhibit is a walk through model. When one enters into the heart the light falling on the sensors(placed at the entrance of the exhibit) cuts down and “Lub-Dub” sound of the heartbeat starts.
- The exhibit clearly shows the external(auricles, ventricles & blood vessels) and internal structure (bicuspid and tricuspid) of heart





Explanation about the exhibit (General Information)

- The human heart is located in the centre of the chest usually locating slightly left.
- The Human heart is roughly the size of a fist.
- Human Heart has 4 chambers
 - I. 2 Auricles
 - II. 2 Ventricles
- The blood vessels are known as :
 - I. Arteries(Carries Oxygenated blood)
 - II. Veins(Carries Deoxygenated blood)

(Arteries are indicated with red colour and Veins are indicated with blue colour)
- The human heart beats 72 times per minute.
- The heart pumps blood to the whole body.



Explanation about the exhibit (Additional Information)

- The only artery that carries deoxygenated blood is Pulmonary artery(from right ventricle to the lungs) and the only vein that carries oxygenated blood is pulmonary vein(from lungs to the left atrium heart)
- Aorta carries blood away from the heart to the rest of the body parts.

1

Oxygen poor blood flows from the body into the right atrium.

2

Blood flows through the right atrium into the right ventricle.

3

The right ventricle pumps the blood to the lungs, where releases waste gases and picks up oxygen.

4

The newly oxygen rich blood returns to the heart and enters the left atrium.

5

Blood flows through the left atrium into the left ventricle.

6

The left ventricle pumps oxygen rich blood to all parts of the body.

IDENTIFY YOUR BONES

- The exhibit explains about the skeleton system.
- When one presses the button he/she can see the location of the bone in the body.
- Name of the bone is also displayed on the exhibit



Explanation about the exhibit (General Information)

- The exhibit is self explanatory
- Exhibit shows the arrangement of bones in human skeleton while pressing the button.
- An adult human has 206 bones.
- Femur is the largest bone of human body and is also known as thigh bone.
- The smallest bone is located in the human ear and is known as stapes.



Explanation about the exhibit (Additional Information)

- New born babies have more than 300 bones. Gradually some small bones fuse together to form bigger bones and the number reduces to 206.
- The skeletal system provides a framework to support body.
- Parts of skeletal system :- bones, joints, cartilages, ligaments (bone to bone), tendons (bone to muscles.)
- In new born babies body is made up of cartilages which will convert to hard bones with the deposition of calcium phosphate.
- In human backbone/vertebral column there are 33 vertebrae. Some of the vertebrae fuse and final number reaches to 26.



SENSE ORGANS

- The exhibit demonstrates about different sense organs & their functions in detail.
- All 5 exhibits related to sense organs are interactive & self explanatory.



SMELL (NOSE)

- The exhibit is an interactive exhibit
 - Nose is one of our sense organs. The function of nose is olfaction i.e. to smell.
 - The exhibit has four different smells which are mild to strong.
 - These are Rose water, Kerosene oil, Dettol and Naphthalene.
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- Working of the Exhibit:
 1. Upon pressing the button one will experience some smell or fragrance coming out of the nozzle.
 2. Then he/she can verify the smell whether it is wrong or right by pressing the buttons simultaneously one present in the centre and the other he/she smelled.
 3. The RIGHT or WRONG indication will appear on the displays displayed on both sides.



SEEING (EYE)

- The exhibit demonstrates about the sense organ eye and its Working.
- When you rotate the knob in front of the exhibit, you will observe the change in the size of the aperture with the increase or decrease in the light intensity.



EXPLANATION ABOUT THE EXHIBIT

- The human eye is an organ that reacts with light and allows light perception, color vision and depth perception.
- Iris in the eye is responsible for **controlling** the diameter and size of the **pupil** and thus the amount of light reaching the retina.
- The eye is made up of a number of parts, including the iris, pupil, cornea, and retina.
- The eye works a lot like a camera, the pupil provides the focus, the iris controls the aperture size , the cornea resembles a lens. The way that the image is formed is much like the way a convex lens forms an image.

TOUCHING (SKIN)

- The skin is gateway to one of our sense organs.
- The exhibit describes about the different layers of the skin & its sensory functions.
- When you press the buttons you will observe the sites of different sensations like light touch, cold, movement of hair, Pain and heat.



EXPLANATION ABOUT THE EXHIBIT

- The skin is the largest organ of our body.
- It has three layers:
 - a. Epidermis: is the outermost layer; it is a waterproof barrier that gives skin its tone.
 - b. Dermis: makes sweat and oil, provides sensations and blood to the skin, grows hair.
 - c. Hypodermis: attaches dermis to the body, controls body temperature, stores fat.
- Skin have many nerve endings and it provides **sense**, touch and heat.

HEARING (EAR)

- The exhibit demonstrates about our sense organ responsible for hearing(Ear).
- The buttons from 1 to 10 indicate different frequencies of sound. When you press the button one by one, you learn about the audible range of the human beings.



EXPLANATION ABOUT THE EXHIBIT

- The human ear is one of the five sense organs.
- Humans have an audible range from 20 hertz to 20000 hertz.
- Humans cannot hear sounds below 20 hertz or above 20000 hertz.
- The sounds below 20hertz are known as Infrasonic sounds.
- The sounds above 20000 hertz are known as ultrasonic sounds.

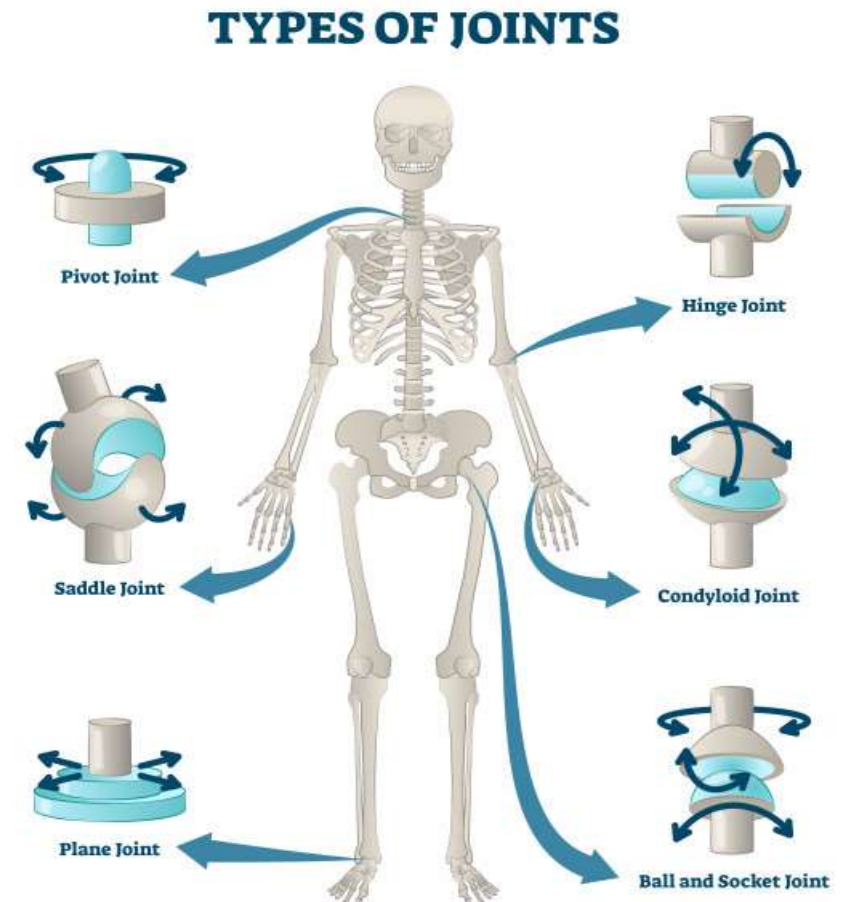
WATCH JOINT MOVEMENTS WHILE CYCLING

- The exhibit demonstrates about joint movement while cycling
- When you run the cycle placed in front of the exhibit you will observe the movement in the skeleton behind, showing movement in the joints in the lower portion of the human body(Hip joint, Knee Joint, Ankle Joint).



EXPLANATION ABOUT THE EXHIBIT

- Exhibit shows joint movement while cycling.
- The movement takes place in the lower part of the body having joints namely hip joint, knee joint and ankle joint.
- Different types of joints:
 1. Hinge joint
 2. Pivot joint
 3. Ball & Socket Joint
 4. Saddle joint
 5. Plane joint
 6. Condylod joint



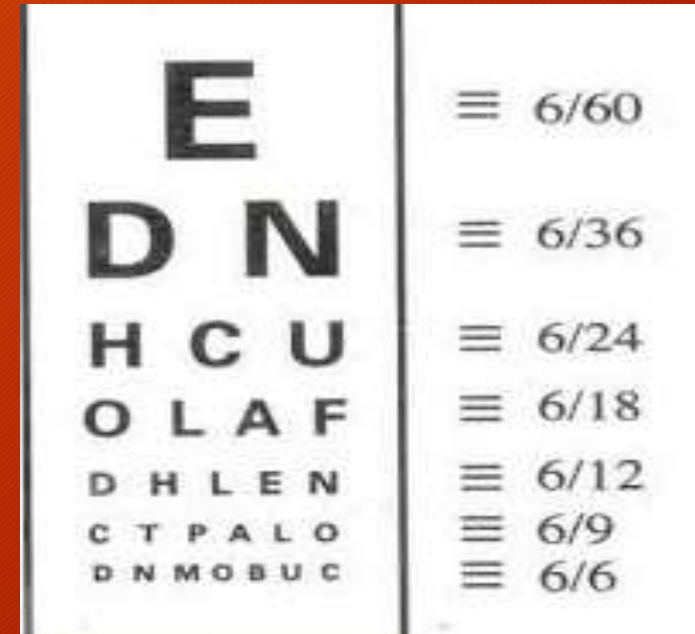
VISUAL ACUITY TEST

- The exhibit is a demonstration of Visual Acuity Test.
- The exhibit is used to check eye sight only to detect myopia (one who is unable to see objects which are distantly placed)
- When one presses the button indicating different alphabets, alphabets in different sizes appears on the display in front.
- Another LED display shows the accuracy of your vision(6/6 etc)



EXPLANATION ABOUT THE EXHIBIT (General Information)

- The exhibit is used to check eye sight of the person who is unable to see objects which are distantly placed.
- Normal vision is 6/6.
- One needs to wear glasses if the vision is not correct.





EXPLANATION ABOUT THE EXHIBIT (Additional Information)

- **Visual acuity (VA)** commonly refers to the clarity of vision.
- The exhibit is used to check eye sight only to detect myopia (one who is unable to see objects which are distantly placed).

- Defects of eye:

Myopia: (nearsightedness) This is a defect of vision in which far objects appear blurred but near objects are seen clearly. The image is focused in front of the retina rather than on it usually because the eyeball is too long or the refractive power of the eye's lens too strong.

Myopia can be corrected by wearing glasses/contacts with concave lenses these help to focus the image on the retina.

Hyperopia: (farsightedness) This is a defect of vision in which there is difficulty with near vision but far objects can be seen easily. The image is focused behind the retina rather than upon it. This occurs when the eyeball is too short or the refractive power of the lens is too weak.

Hyperopia can be corrected by wearing glasses/contacts that contain convex lenses.

CONTROL OF BODY FUNCTION

- The exhibit demonstrates about the control of locomotory functions by the brain.
- The model of brain in front of the skeleton has sensors that when pressed, show the various sites of control of legs, arms and neck.



EXPLANATION ABOUT THE EXHIBIT (General Information)

- Human brain controls all the functions of the body.
- Exhibit shows about control of locomotory motions.
- Brain has left and right hemisphere.
- Right brain controls the left side of the body.
- Left side controls the right side of the body.





EXPLANATION OF THE EXHIBIT (Additional Information)

- Brain is the centre of all thought, memory, judgement and emotions.
- Brain is responsible for controlling different body functions, such as temperature regulation and breathing.
- Cerebrum: is the largest part of the brain and is composed of right and left hemispheres. It performs higher functions like interpreting touch, vision and hearing, as well as speech, reasoning, emotions, learning, and fine control of movement.
- Cerebellum: is located under the cerebrum. Its function is to coordinate muscle movements, maintain posture, and balance. The cerebellum is the brain's locomotion control center.

OPERATION THEATER

- The exhibit demonstrates about the process of Laparoscopy.
- On pressing the button an animated video appears on the monitor followed by an original clip showing the surgery of gall bladder.



EXPLANATION ABOUT THE EXHIBIT (General Information)

- Laparoscopy is also known as key hole surgery/ minimal invasive/ minimal access surgery
- Exhibit shows removal of Gall bladder.
- Gall Bladder is part of digestive system(stores bile).
- When removed doctors advise to avoid oily & spicy food.



EXPLANATION OF THE EXHIBIT (Additional Information)

- Laparoscopy is also known as minimal invasive/ minimal access surgery.
- An endoscope is inserted through the abdominal wall in order to examine the abdominal organs or to perform mirror surgery.
- In the exhibit a video clip shows the removal of gall bladder
- It shows that an incision of up to half inch is made and plastic tubes known as ports are placed to perform further procedure.



CT SCANNER

- The exhibit is a demonstration of the procedure followed while doing CT SCAN.
- A set of Instruction is indicated below each button. By pressing the button a particular function is performed and at the end scanning report appears on the monitor placed along with the mannequin.



EXPLANATION ABOUT THE EXHIBIT (General Information)

- CT SCANNER means 'Computed Tomography Scanner'
- Tomography means 'to make slice'
- Used to check internal injuries or general check up of body.
- Modification of X-Ray
- Non-invasive
- Painless



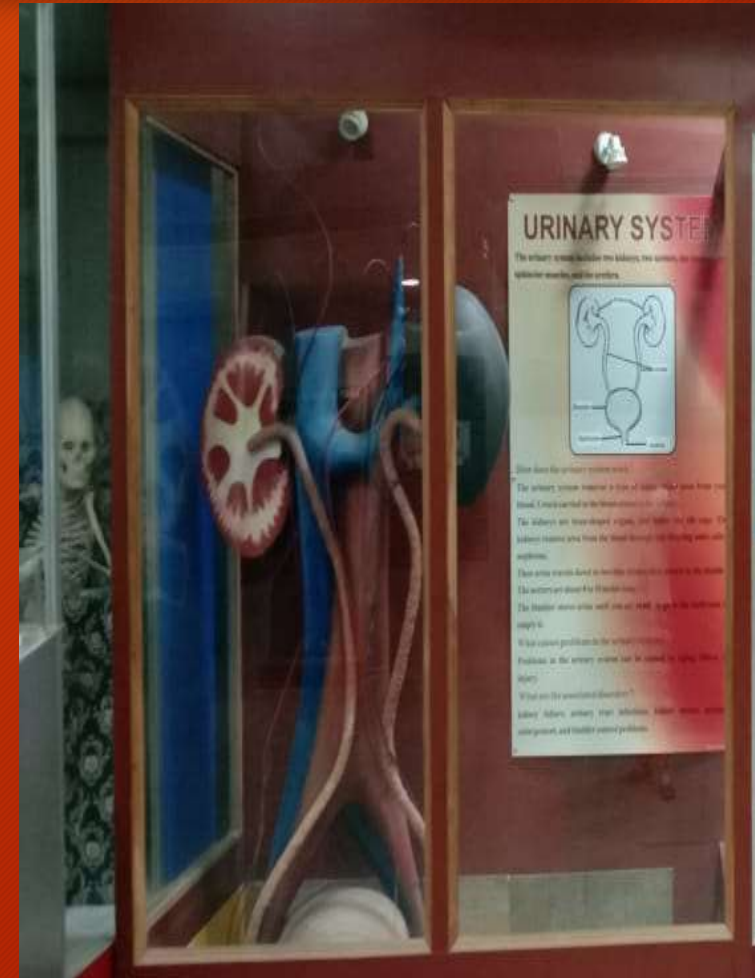


EXPLANATION ABOUT THE EXHIBIT (Additional Information)

- A computed tomography (CT or CAT) scan allows doctors to see inside the body. It uses a combination of X-rays and a computer to create pictures of the organs, bones, and other tissues. It shows more detail than a regular X-ray.
- **How Do CT Scans Work?**
- A narrow X-ray beam is used that circles around one part of the body. This provides a series of images from many different angles. A computer uses this information to create a cross-sectional picture. Like one piece in a loaf of bread, this two-dimensional (2D) scan shows a “slice” of the inside of your body.
- This process is repeated to produce a number of slices. The computer stacks these scans one on top of the other to create a detailed image of your organs, bones, or blood vessels. For example, a surgeon may use this type of scan to look at all sides of a tumor to prepare for an operation.

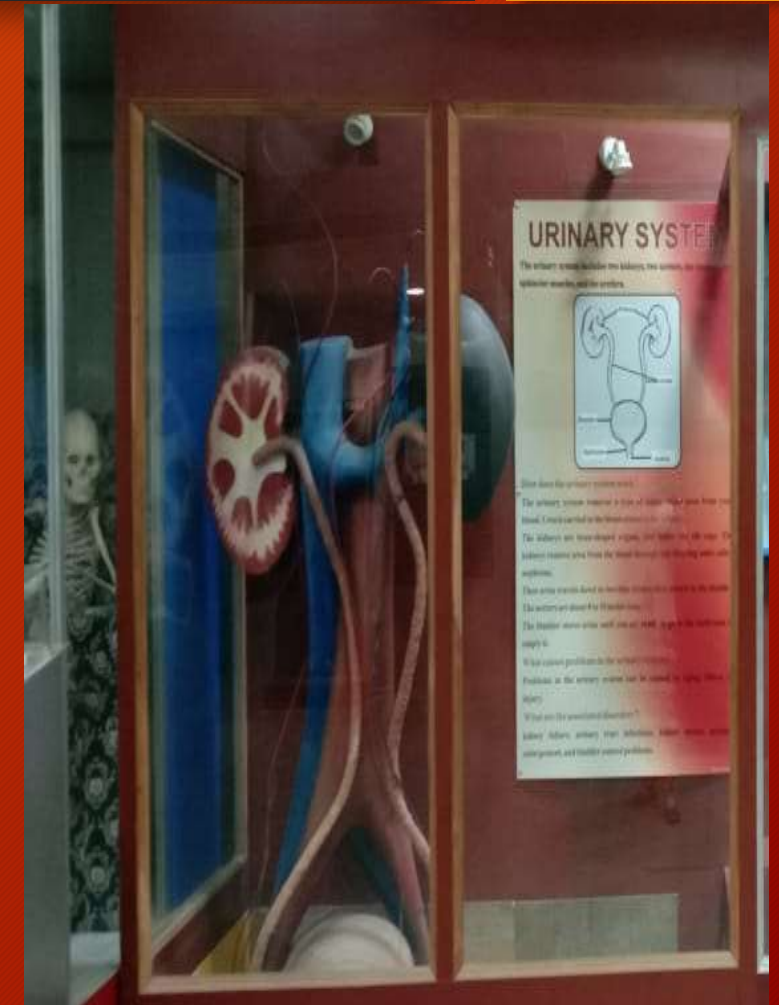
Urinary system (General Information)

- Main organs-kidneys.
- Number- 2 Kidneys
- Shape - bean Shaped
- Basic unit- Nephrons
- Associated Organs- urinary pipes
urinary bladder
- Problems- Kidney Failure
- Cure- Haemodialysis



EXPLANATION ABOUT THE EXHIBIT (Additional Information)

- Urinary system is also known as Renal System.
- Basic unit- Nephrons is basic structural and functional unit of the kidney.
- Function Removal of waste products from the blood and regulating the water fluid levels



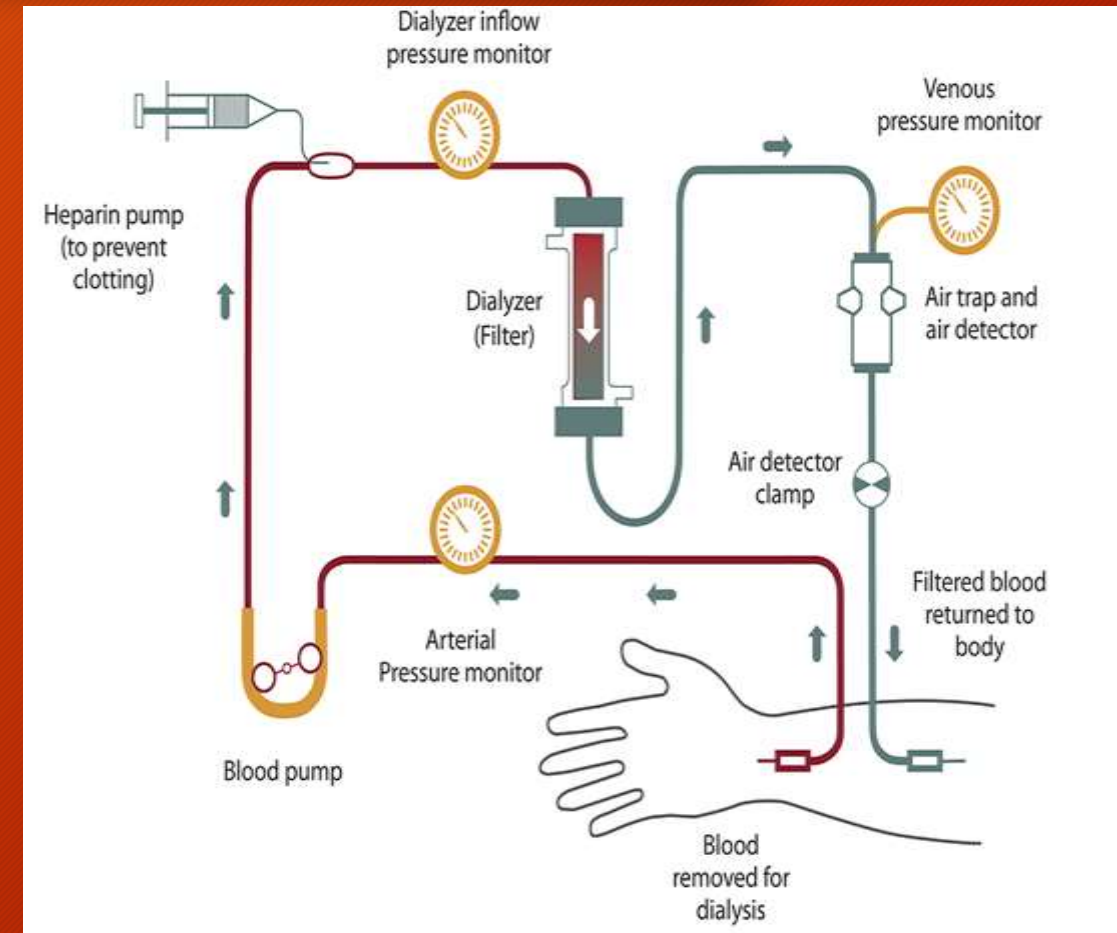
HAEMODIALYSIS SYSTEM (General Information)

- An Interactive exhibit
- Demonstrates about the procedure followed at the time of Haemodialysis.
- Haemodialysis-process of purifying the blood of a person whose kidneys are not working normally.
- Device used- Hemodialyzer
- Why it is done ?- In case of Kidney Failure
- How Frequently ?- Depends upon the current state of the kidneys



EXPLANATION ABOUT THE EXHIBIT (Additional Information)

- Associated Risks
 1. Low blood pressure
 2. Anemia, or not having enough red blood cells
 3. Muscle cramping
 4. Difficulty in sleep
 5. Itching
 6. High blood potassium levels



IDENTIFY YOUR TEETH (General Information)

- Interactive Exhibit
- When one presses the button one can find the particular kind of teeth in the model.
- Two Types of Teeth
 1. Primary teeth or temporary teeth or milk teeth
 2. Secondary teeth

Secondary teeth are further of 4 types :

1. Incisors
2. Canines
3. Premolars
4. Molars

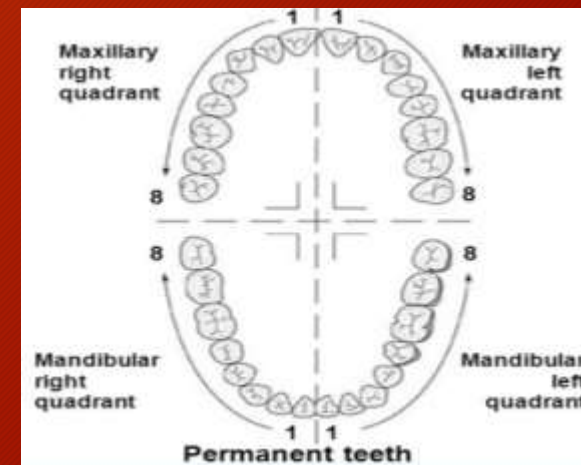
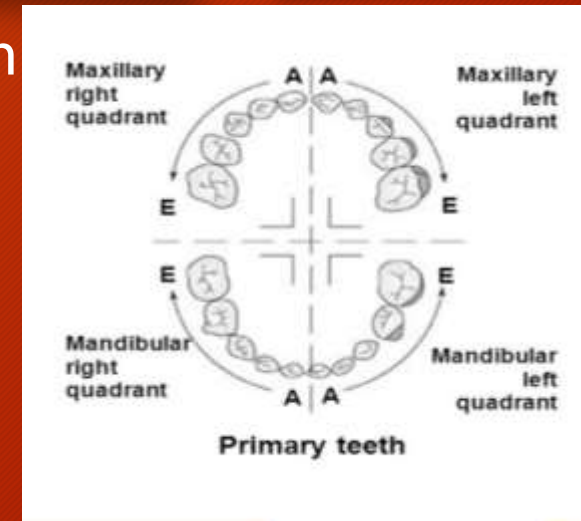


EXPLANATION ABOUT THE EXHIBIT (Additional Information)

1. Primary teeth also called temporary or milk teeth or Deciduous teeth
2. Secondary teeth also called permanent teeth
 1. Incisors: to cut the food.
 2. Canines: to tear the food.
 3. Premolars: to crush the food.
 4. Molars: to grind the food.

- Dental Formula-

Primary teeth-	$\frac{2 \times 1 \times 2}{2 \times 1 \times 2}$	=	20
Secondary teeth	$\frac{2 \times 1 \times 3 \times 2}{2 \times 1 \times 3 \times 2}$	=	32



EXPLORE TREATMENT (General Information)

- A Self explanatory exhibit
- Demonstrates about RCT (Root Canal Treatment)
- Used to repair and save a tooth that is badly decayed or becomes infected.
- Removes all infection from the root system of the tooth.



EXPLANATION ABOUT THE EXHIBIT (Additional Information)

Steps Involved in Root Canal Treatment

1. Route to the root
2. Removal of infected tissue
3. Filling the canals
4. Rebuilding the tooth
5. Extra support
6. Crowning Touch



THANKS