Human Organ systems

- Organ systems are formed by the association of organs which are organized from tissues.
- A group of organs that work together to perform a particular function is known as an **organ system**.
- Eight major organ systems.
- Skeletal System
- Muscular System
- Digestive System
- Respiratory System
- Circulatory System
- Nervous System
- Endocrine System
- Excretory System

Skeletal System

- The skeletal system consists of bones, cartilages and joints.
- Help in movements walking, running, chewing and dancing etc.
- The adult human skeletal system consists of 206 bones and few cartilages, ligaments and tendons.
- Ligaments help in connecting bone to bone.
- Tendons connect bone to muscle.
- Axial skeleton and Appendicular skeleton.
- Axial skeleton forms the upright axis of the body
- Skull
- Vertebral column
- Rib cage

- ❖ Appendicular skeleton consist of the bones of the limbs along with their pectoral and pelvic girdles.

Skull

- ❖ The skull is made up of cranial bones and facial bones.
- ❖ Protects the brain and the structures of the face.
- ❖ The hyoid bone present at the base of the buccal cavity and the auditory ossicles (Malleus, Incus and Stapes)
- ❖ Lower jaw bone is the largest and strongest bone in the human face.

Vertebral Column

- ❖ Vertebral column extends from the base of the skull.
- ❖ It protects the spinal cord.
- ❖ It is formed by a number of serially arranged small bones called **vertebrae**

Rib cage

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Rib cage

- ❖ The rib cage is made up of 12 pairs of curved, flat rib bones.
- ❖ It protects the delicate vital organs such as heart and lungs.

Limbs

- ❖ Man has two pairs of limbs namely upper limbs (fore limbs) and lower limbs (hind limbs). Fore limbs are used for holding, writing etc.
- ❖ Hind limbs are used for walking, sitting etc.

Girdles

- ❖ The fore limbs and hind limbs are attached to the axial skeleton with the help of pectoral and pelvic girdle respectively.

- ❖ The smallest bone in our body is present inside the ear.
- ❖ It is called **Stapes.**
- ❖ It is only 2.8 millimeters long (average length). The longest bone in the body is the thigh bone. (Femur)
- ❖ 2. A new born baby has more than 300 bones.
- ❖ As the baby grow, some bones are joined together, hence the skeleton of an adult has 206 bones.

Muscular System

- ❖ Muscles can contract and therefore, help in moving other parts of the body.
- ❖ Maintains the posture and body position.
- ❖ There are three types of muscles namely.
- ❖ Skeletal muscle
- ❖ Smooth muscle
- ❖ Cardiac muscle
- ❖ Muscles of the body can only pull and they cannot push. Two muscles are required to move a bone at a joint.
- ❖ When one muscle contracts, the other muscle relaxes.
- ❖ For example, to move 'the lower arm up and down two type of muscles called biceps and triceps are required.

Skeletal Muscles

- ❖ Skeletal muscles of our body are attached to the bones.
- ❖ **Voluntary muscles** can be controlled by our will.
- ❖ Example: Muscles of arm.

Smooth muscles

- ❖ Found in the walls of the digestive tract, urinary bladder, arteries and other internal organs.
- ❖ **'Involuntary muscles'** not controlled by our will.

Cardiac muscles

- ❖ The walls of the heart

- ❖ They are capable of rhythmic, contraction continuously and involuntary in nature.

Digestive System

- ❖ Consists of the alimentary canal and associated glands.
- ❖ The digestive glands associated with the alimentary canal are salivary glands, liver, and pancreas.
- ❖ They secrete enzymes
- ❖ The alimentary canal is about 9 meters long.
- ❖ Absorption of digested food occurs in the small intestine.

S.No	Parts of Alimentary canal
1.	Mouth
2.	Buccal cavity
3.	Pharynx
4.	Oesophagus or Food pipe
5.	Stomach
6.	Small Intestine
7.	Large Intestine
8.	Anus

S.No	Associated glands for digestion
1.	Salivary glands
2.	Gastric glands
3.	Liver
4.	Pancreas
5.	Intestinal glands

Respiratory System

- ❖ Exchange of respiratory gases to breathe.
- ❖ Consists of nostrils, nasal cavity, pharynx, larynx, trachea, bronchi and lungs.
- ❖ Exchange of O_2 and CO_2 occurs between air in the lung and blood. Entry of food into the wind pipe is prevented by a flap like structure called **Epiglottis.**
- ❖ Lungs are the main respiratory organ.
- ❖ The trachea, commonly called windpipe, supported by cartilaginous rings that connects the pharynx and larynx to the lungs, trachea divides into right and left bronchi small air sacs called alveoli.
- ❖ Lungs are covered by a double layered **pleura.**

- ❖ Diffusion of gases (O_2 and CO_2) occurs across the alveolar membrane.
- ❖ **External Respiration:** Intake of O_2 from the air and releasing of CO_2 from the lungs occurs through nostrils.
- ❖ **Internal Respiration:** Taking in of oxygen and giving out CO_2.
- ❖ The circulatory system transports O_2 and CO_2 to and from all parts of the body.
- ❖ Hemoglobin in the red blood cells (RBCs) transport O_2 and CO_2.
- ❖ Cellular Respiration: Cells take in O_2 and release CO_2
- ❖ Each lung has about 300 million air sacs or alveoli. Yawning helps us to take in more amount of O_2 and to give out CO_2.

Circulatory system

- ❖ Consisting of heart, blood vessels and blood.
- ❖ Transports respiratory gases, nutrients, hormones and waste materials within the body.
- ❖ Protects the body from harmful pathogens and also regulates the body temperature.

Heart

- ❖ Located in the thoracic cavity between the two lungs.

- ❖ Heart is fourc hambered and is surrounded by a double layered membrane called pericardium.

Blood vessels

- ❖ Three types of blood vessels are present in the body.
- ❖ They are arteries, veins and capillaries.

Blood

- ❖ Fluid connective tissue of red colour containing plasma and blood cells.
- ❖ Red blood corpuscles (RBCs), White Blood corpuscles (WBCs) and Blood Platelets.
- ❖ RBCs are produced in the bone marrow.

Nervous System

- ❖ Well developed in human and is composed of neurons or nerve cells.
- ❖ Includes brain, spinal cord, sensory organs and nerves.
- ❖ Two important functions of the nervous system along with the endocrine syste are conduction and co- ordination.

Brain

- ❖ The brain is a complex organ which is placed inside the cranium.
- ❖ Protected by a three layered tissue coverings called meninges.
- ❖ Brain has three regions namely fore brain, mid brain and hind brain.
- ❖ Controlling centre

Spinal cord

- ❖ The extension of medulla oblongata of the hind brain and is enclosed within the vertebral column.
- ❖ Connects the brain to different part of the body through nerves.

The Functions of the Nervous System:-

Sensory Input

- ❖ Conduction of signals

Integration

- ❖ Interpretation of the sensory signals and the formulation of responses.

Motor output

- ❖ The conduction of signals from the brain and spinal cord to effectors, such as muscle and gland cells.
- ❖ Brain is said to store as many as 100 million bits of information in a life time.

Sense organs

- ❖ Five sense organs in our body such as eyes, ears, nose, tongue and skin.
- ❖ Make us aware of our surroundings.

Eyes

- ❖ Eyes help us to see things The eyelids and eyelashes keep the eyes safe.
- ❖ Three main parts namely cornea, iris and pupil.

Ears

- ❖ Ears help to hear maintaining the balance of the body when we are walking, running or climbing.
- ❖ The outer ear, the middle ear and the inner ear.
- ❖ Outer ear in human beings is made up of an external flap called pinna.

Skin

- ❖ Skin is the largest sense organ as it covers the whole body.
- ❖ Helps to feel the things around us by touching,
- ❖ Skin covers the body and protects it from germs.
- ❖ Keeps the body moist and regulates the body temperature.

Functions of the skin

- ❖ Effective barrier against infection by microbes and pathogens.

❖ Skin helps us to synthesize vitamin Dusing sunlight.

Endocrine System

❖ Endocrine system regulates various functions of the body and maintains the internal environment.
❖ Produce chemical substances called hormones.

Glands	Location
Pituitary gland	At the base
Pineal Gland	At the base of brain
Thyroid Gland	Neck
Thymus Gland	Chest
Pancreas (Islets of Langerhans	Abdomen
Adrenal Gland	Above the kidney
Gonads	Pelvic cavity

❖ The nitrogenous wastes are removed from the body by the excretory system.
❖ Kidneys, ureters, urinary bladder and urethra.

Kidneys:

❖ Bean shaped structures present in the abdominal cavity. functional units **Nephrons** which filter the blood and form the urine.
❖ Our body contains about 70% water.
❖ Some parts have more water like the grey matter of the brain (about 85%) and some less, like fat cell (about 15%).
❖ We normally consume 1.5 to 3.5 litres of water every day in the form of food and water.