EXPERIMENT NO.: 5 **DATE:**

AIM: TO STUDY AND INTRODUCTION OF AXIAL BONES.

INTRODUCTION:

Skeletal System

The skeletal system includes all of the bones and joints in the body. Each bone is a complex living organ that is made up of many cells, protein fibers, and minerals.

Components of Human Skeleton:

- Bones: Bone is a tough and rigid form of connective tissue. It is the weight bearing organ of human body and it is responsible for almost all strength of human skeleton.
- Cartilages: Cartilage is also a form of connective tissue but is not as tough and rigid as bone. The main difference in the cartilage and bone is the mineralization factor. Bones are highly mineralized with calcium salts while cartilages are not.
- Joints: Joints are important components of human skeleton because they make the human skeleton mobile. A joint occurs between "two or more bones", "bone and cartilage" and "cartilage and cartilage".

Divisions of human skeleton:

Axial skeleton - The axial skeleton (80 bones) is formed by the vertebral column (32–34 bones; the number of the vertebrae differs from human to human as the lower 2 parts, sacral and coccygeal bone may vary in length), a part of the rib cage (12 pairs of ribs and the sternum), and the skull (22 bones and 7 associated bones).

Appendicular skeleton - The appendicular skeleton (126 bones) is formed by the pectoral girdles, the upper limbs, the pelvic girdle or pelvis, and the lower limbs. Their functions are to make locomotion possible and to protect the major organs of digestion, excretion and reproduction.

Functions of bone and skeletal system

1. Support: The skeletal system is the structural framework of the body as well as for muscles and skin.

2. Protection: The skeletons protect the internal organs from any kind of external injury.

3. Movement: The skeletal system along with the muscular system and central nervous system helps the locomotion of the body as well as the purposeful movement of the body parts.

4. Blood cell formation: The blood cells are formed in the red bone marrow (connective tissue) within certain bones from the pluripotent stem cells.

5. Triglyceride storage: Triglycerides are stored as chemical energy reserve in the yellow bone marrow, present in the bone.

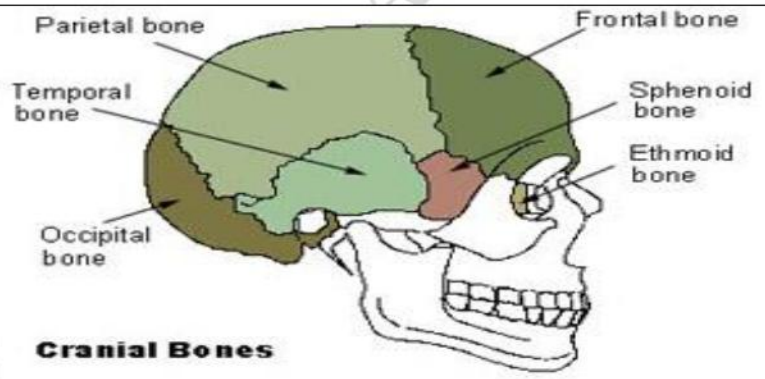
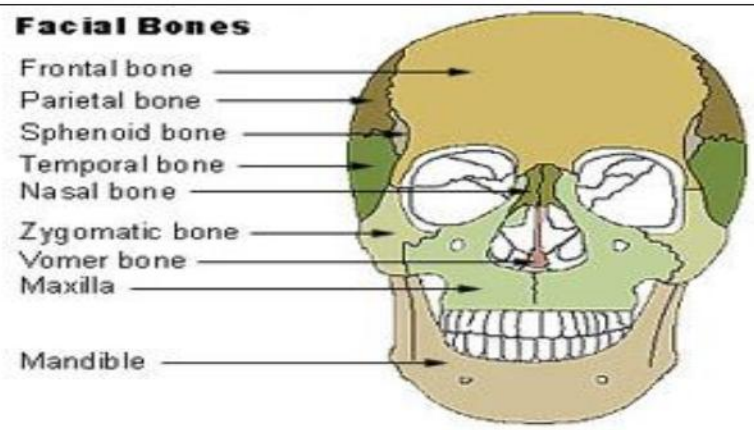
6. Bones provide attachment points to the muscles for smooth performing their activities like movements, contraction and relaxation of muscles.

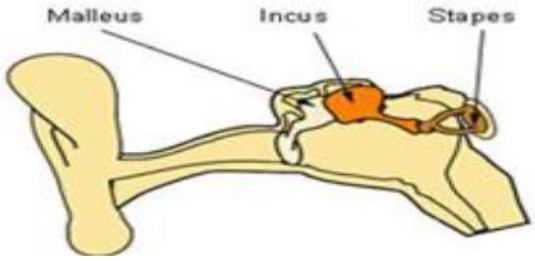
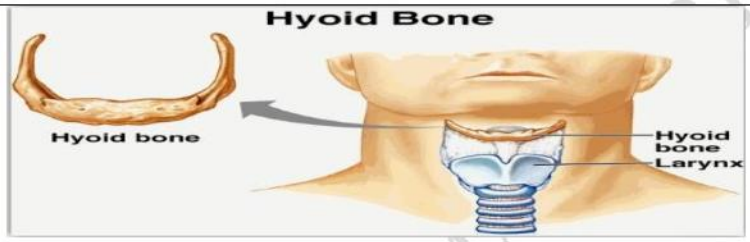
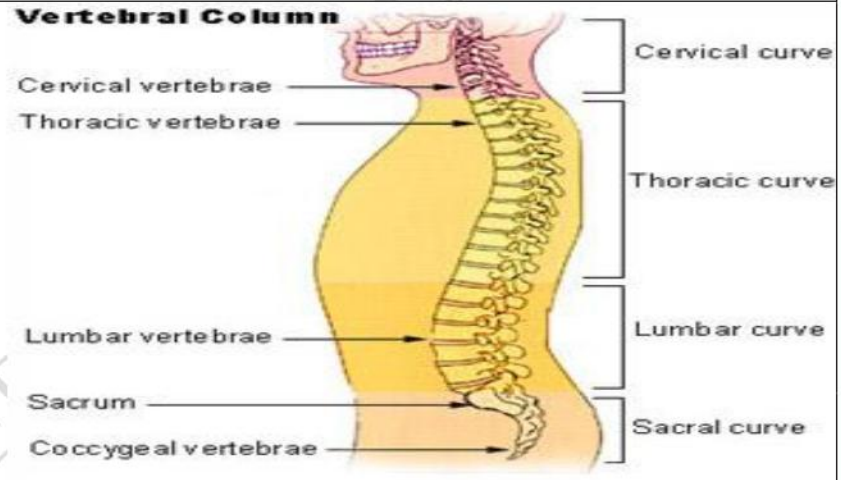
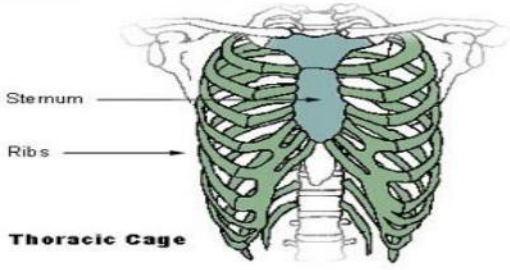
7. Axial skeleton of thorax assists in breathing.

8. Teeth help to disintegrate the foods.

9. Mineral homeostasis: Bone is the reservoir of calcium (Ca++). 99% of body calcium is stored in the bone and released in the plasma when required.

AXIAL SKELETON (80 BONES)

SR. NO	BONES	NUMBERS	DAIGRAM
	CRANIAL BONES (8)		
1	Parietal	2	
2	Temporal	2	
3	Frontal	1	
4	Occipital	1	
5	Ethmoid	1	
6	Sphenoid	1	
	FACIAL BONES (14)		
1	Maxilla	2	
2	Zygomatic	2	
3	Mandible	1	
4	Nasal	2	
5	Platine	2	
6	Inferior nasal concha	2	
7	Lacrimal	2	
8	Vomer	1	
	AUDITORY OSSICLES (6)		
1	Malleus	2	
2	Incus	2	

3	Stapes	2	
HYOID (1)			
1	Hyoid	1	
VERTEBRAL COLUMN (26)			
1	Cervical vertebrae	7	
2	Thoracic vertebrae	12	
3	Lumbar vertebrae	5	
4	Sacrum	1	
5	Coccyx	1	
THORACIC CAGE (25)			
1	Sternum	1	
2	Ribs	24	
Total axial bones		80	

The table below lists the location and function of the major bones of the axial skeleton:

Bone(s)	Location	Function	Major grouping of axial skeleton
Cranium	Head	Supports facial structures, encloses and protects the brain, provides muscle attachments for chewing and moving the head	Skull
Mandible	Lower jaw	Permits chewing	Skull
Vertebrae	Spine	Permit mechanical stability for the body and protect the spinal cord	Vertebral column
Ribs	Chest wall	Provide protection for the organs of the upper body	Thoracic cage
Sternum	Center of the chest	Provides attachment for many (not all) ribs	Thoracic cage

The skeletal system in an adult body is made up of 206 individual bones. These bones are arranged into two major divisions: the *axial skeleton* and the *appendicular skeleton*. The axial skeleton runs along the body's midline axis and is made up of 80 bones in the following regions: Skull, Hyoid, Auditory ossicles. Ribs, Sternum, Vertebral column

❖ SKULL

- The skull is composed of 22 bones that are fused together except for the mandible.
- The bones of the superior portion of the skull are known as the cranium and protect the brain from damage.
- The bones of the inferior and anterior portion of the skull are known as facial bones and support the eyes, nose, and mouth.

❖ HYOID AND AUDITORY OSSICLES

- The hyoid is a small, U-shaped bone found just inferior to the mandible. The hyoid is the only bone in the body that does not form a joint with any other bone—it is a floating bone.
- The hyoid's function is to help hold the trachea open and to form a bony connection for the tongue muscles.
- The malleus, incus, and stapes—known collectively as the auditory ossicles—are the smallest bones in the body.
- Found in a small cavity inside of the temporal bone, they serve to transmit and amplify sound from the eardrum to the inner ear.

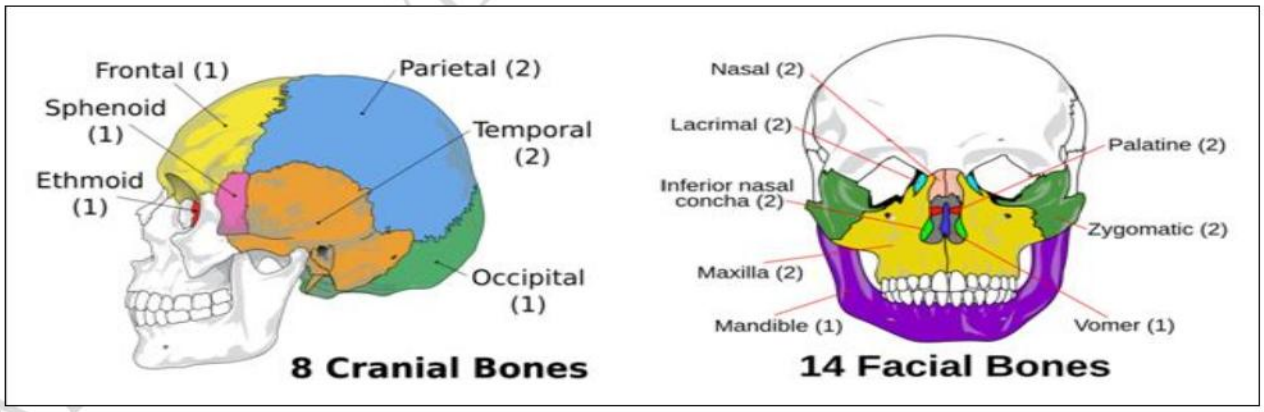
VERTEBRAE

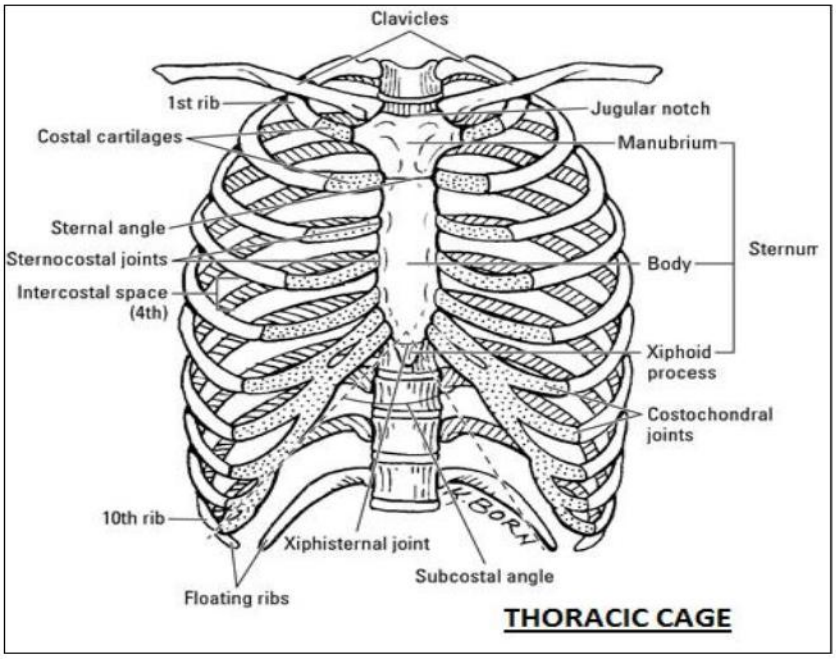
Twenty-six vertebrae form the vertebral column of the human body.

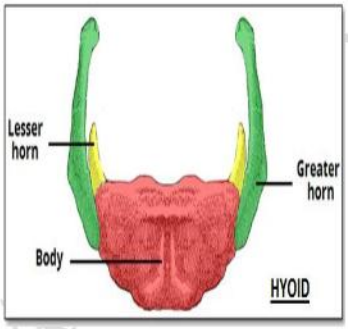
- Cervical (neck) - 7 vertebrae
- Thoracic (chest) - 12 vertebrae
- Lumbar (lower back) - 5 vertebrae
- Sacrum - 1 vertebra
- Coccyx (tailbone) - 1 vertebra
- With the exception of the singular sacrum and coccyx, each vertebra is named for the first letter of its region and its position along the superior-inferior axis.

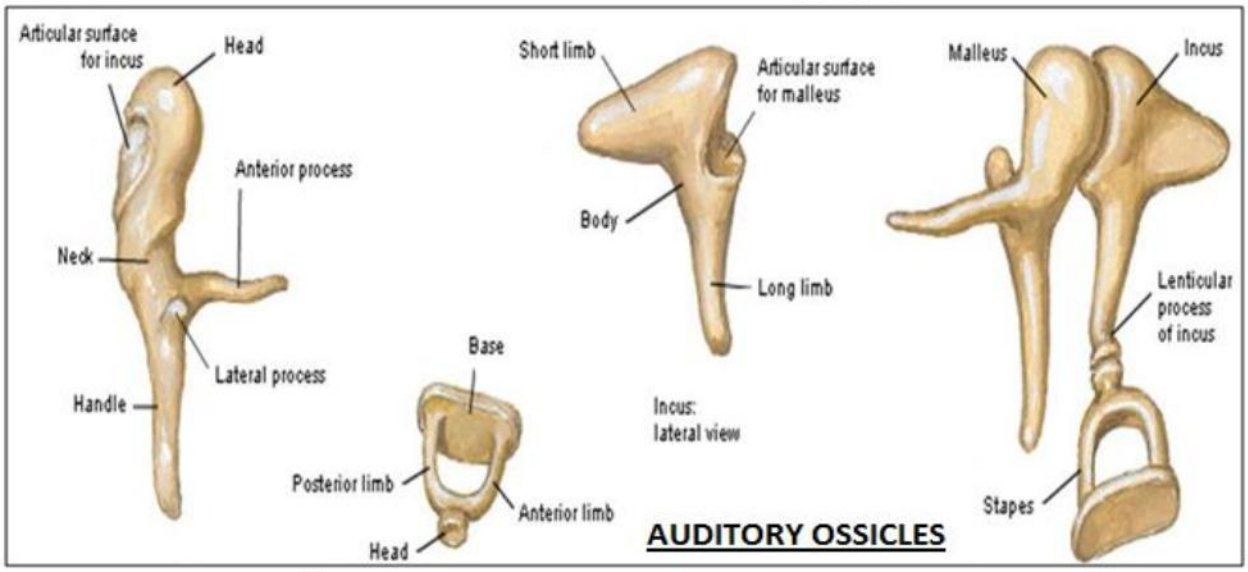
RIBS AND STERNUM

- The sternum, or breastbone, is a thin, knife-shaped bone located along the midline of the anterior side of the thoracic region of the skeleton. The sternum connects to the ribs by thin bands of cartilage called the costal cartilage.
- There are 12 pairs of ribs that together with the sternum form the ribcage of the thoracic region. The first seven ribs are known as "true ribs" because they connect the thoracic vertebrae directly to the sternum through their own band of costal cartilage. Ribs 8, 9, and 10 all connect to the sternum through cartilage that is connected to the cartilage of the seventh rib, so we consider these to be "false ribs." Ribs 11 and 12 are also false ribs, but are also considered to be "floating ribs" because they do not have any cartilage attachment to the sternum at all.




Clavicles
1st rib
Jugular notch
Costal cartilages
Manubrium
Sternal angle
Sternocostal joints
Body
Sternum
Intercostal space (4th)
Xiphoid process
Costochondral joints
10th rib
Xiphisternal joint
Subcostal angle
Floating ribs
THORACIC CAGE


Lesser horn
Greater horn
Body
HYOID


Articular surface for incus
Head
Anterior process
Neck
Lateral process
Handle
Base
Posterior limb
Anterior limb
Head
Short limb
Articular surface for malleus
Body
Long limb
Incus: lateral view
Malleus
Incus
Lenticular process of incus
Stapes
AUDITORY OSSICLES

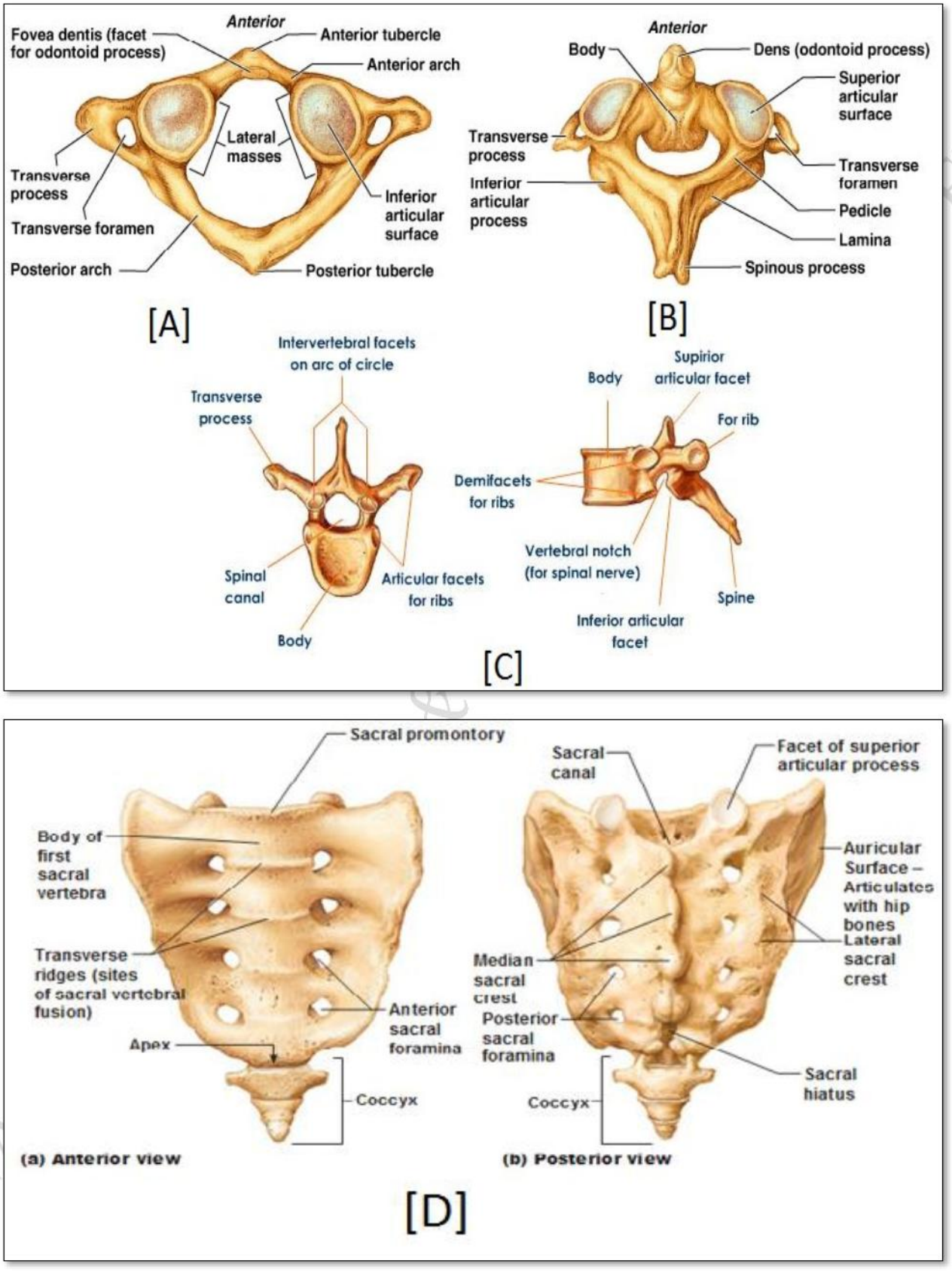


Fig: A) ATLAS B) AXIS C)THORACIC D) SACRUM

SIGNATURE OF TEACHER