INTRODUCTION TO ANATOMY AND SKELETAL SYSTEM

OBJECTIVES

By the end of the lecture, you should be able to:

- Define the word “Anatomy”.
- Enumerate the different anatomical fields.
- Describe the anatomical position.
- Describe different anatomical terms of position & movements as well different anatomical planes.
- Classify bones according to shape, structure & development.
- Enumerate different bones of both axial & appendicular skeleton.

WHAT IS ANATOMY?

The word anatome is of Greek origin meaning cutting up (ana= up; tome= cutting).

- **Gross (macroscopic) anatomy: Study of human body with naked eye.**
- **Microscopic anatomy; (Histology): Study of fine structure (cells & tissues) of the human body with the help of microscope.**
- **Developmental anatomy; (Embryology).**
- **Radiological anatomy.**
- **Applied anatomy.**
- **Surface anatomy.**
- **Surgical anatomy.**

ANATOMICAL POSITION

- It is **the standard position** in which the body assume to describe its parts.

Body is erect

Arms hanging by the side

Palm facing forward

Feet are parallel

ANATOMICAL TERMINOLOGY

- **Superior (cranial):** near to head.

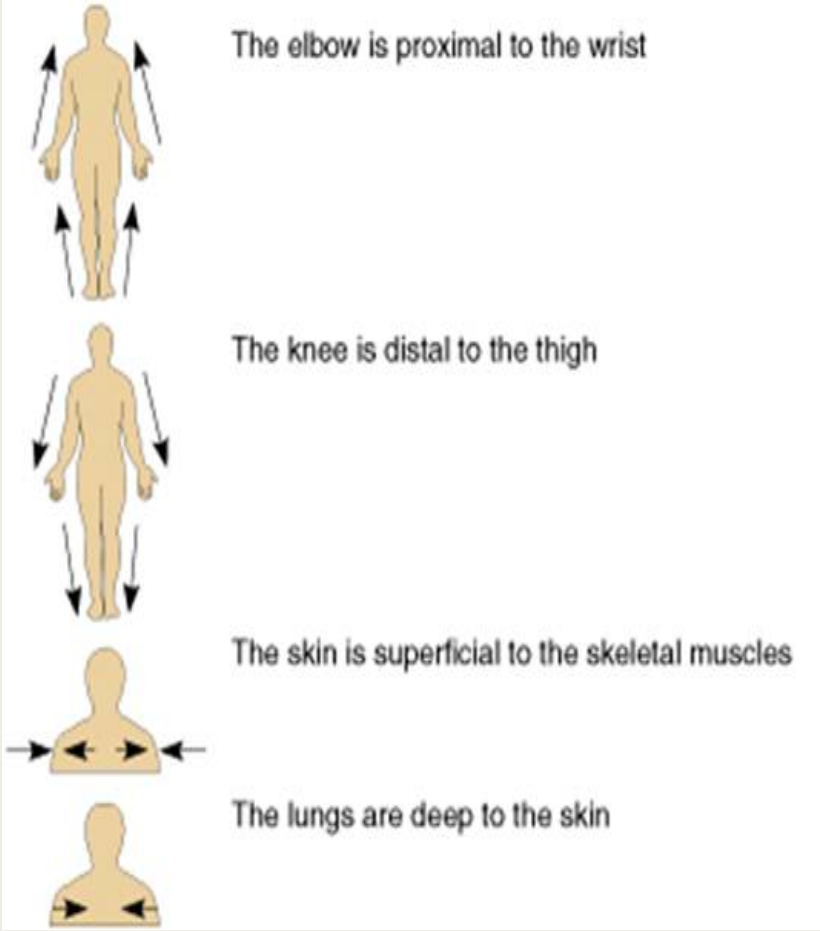
  X Inferior (caudal): away from head.
- **Anterior (ventral):** near to front.

  X Posterior (dorsal): near to back.
- **Medial:** near to median plane.

  X Lateral: away from median plane
- **Proximal:** near to trunk.

  X Distal: away from trunk.
- **Superficial:** near to skin (surface).

  X Deep: away from skin.



ANATOMICAL TERMINOLOGY

- TERMS OF GENERAL MOVEMENTS

- **Flexion:** approximation of 2 parts (decreasing the angle between 2 parts).

  X Extension: straightening (increasing the angle between 2 parts).

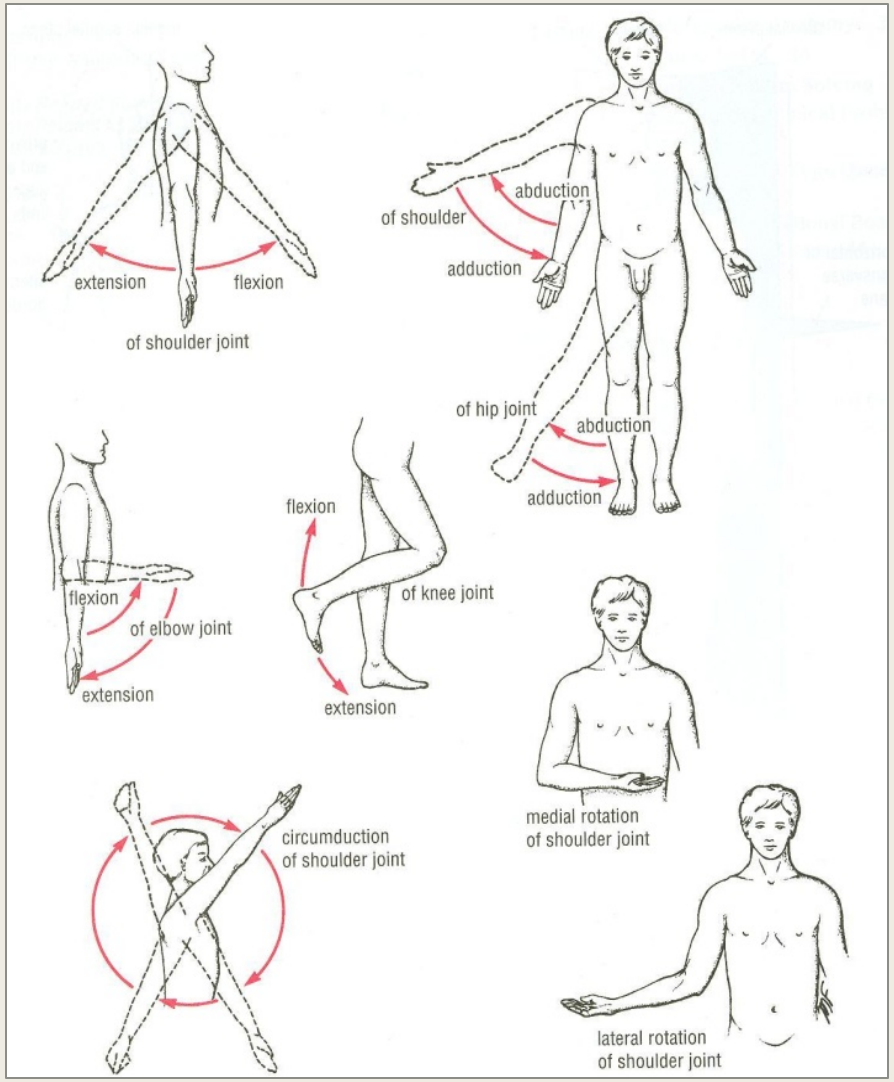
- **Abduction:** away from median plane.

  X Adduction: toward median plane.

- **Lateral rotation:** rotation away from median plane.

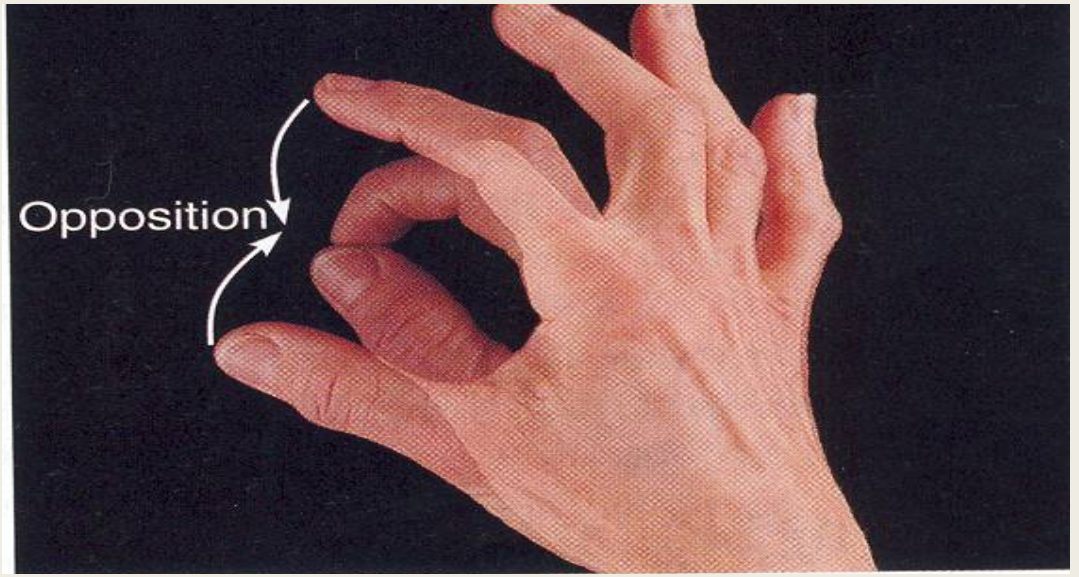
  X Medial rotation: rotation toward median plane.

- **Circumduction:** combined movements of flexion, extension, abduction & adduction.



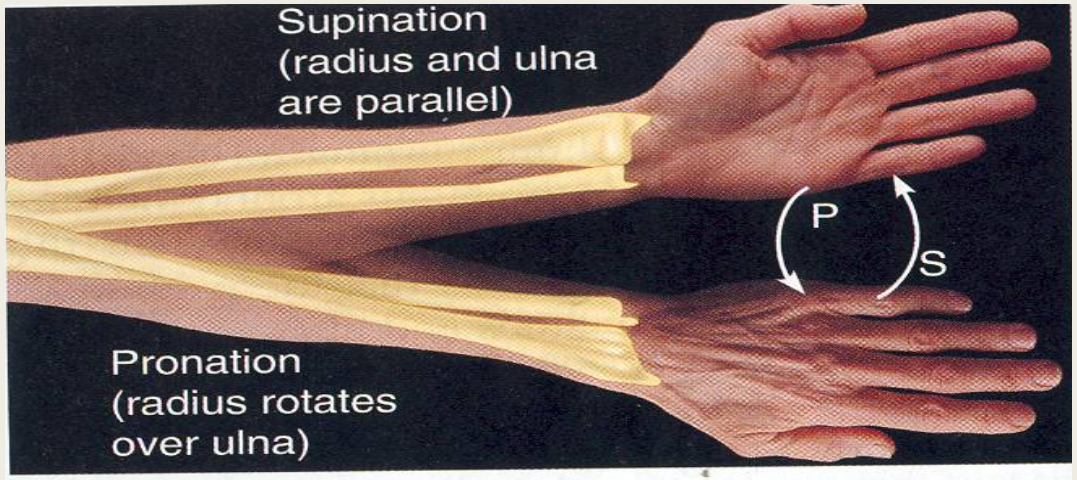
Special Movements Of Upper Limb

- **Opposition: bringing tips of fingers and thumb together as in picking something up**



Special Movements Of Upper Limb

- ***Supination:***
- *Lateral rotation of the forearm.*
- *The palm faces Anteriorly.*
- *The radius and ulna are Parallel.*
- ***Pronation:***
- *Medial rotation of the forearm.*
- *The palm faces Posteriorly*
- *The radius Crosses the ulna and the two bones form an X.*

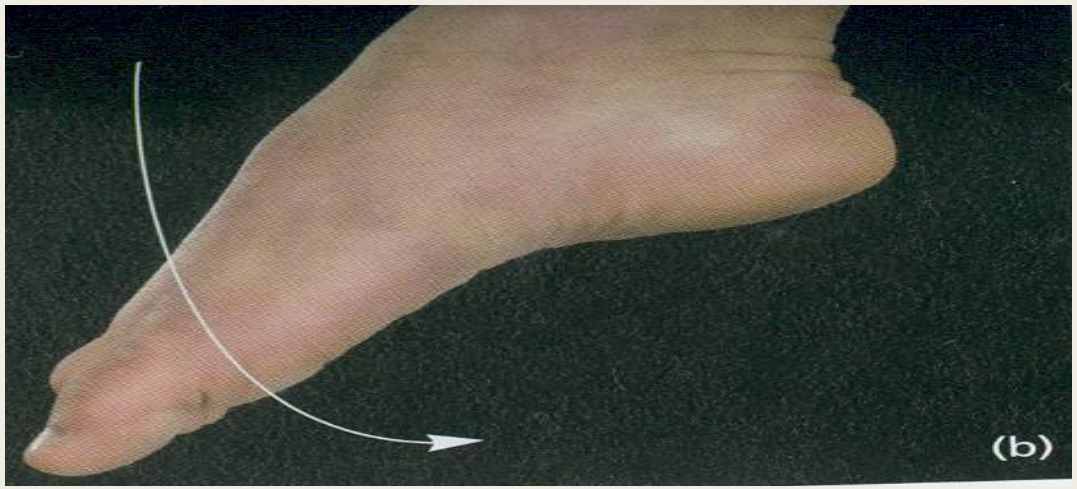


(g) Supination (S) and pronation (P)

Special Movements Of Lower Limb

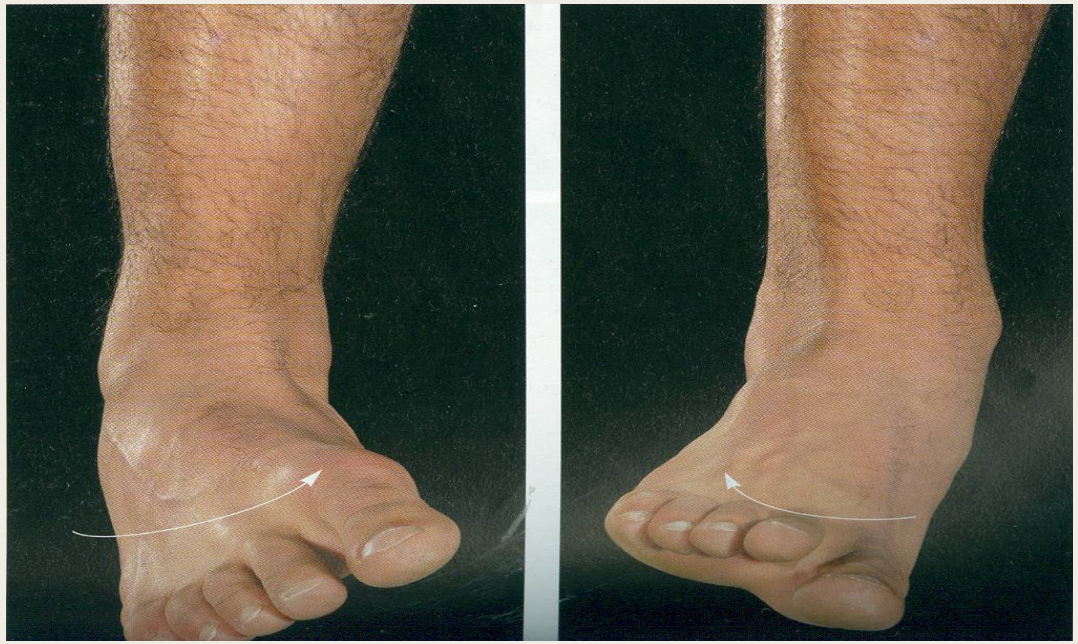
- *Dorsiflexion*
- *Up movement of the foot*
- *(Standing on the heels)*

- *Planter Flexion:*
- *Depressing the foot (down).*
- *Movement with pointing the toes.*



Special Movements Of Lower Limb

- ***Inversion :***
- *The sole faces in a Medial direction.*
- ***Eversion :***
- *The sole faces in a Lateral direction*



ANATOMICAL PLANES & SECTIONS

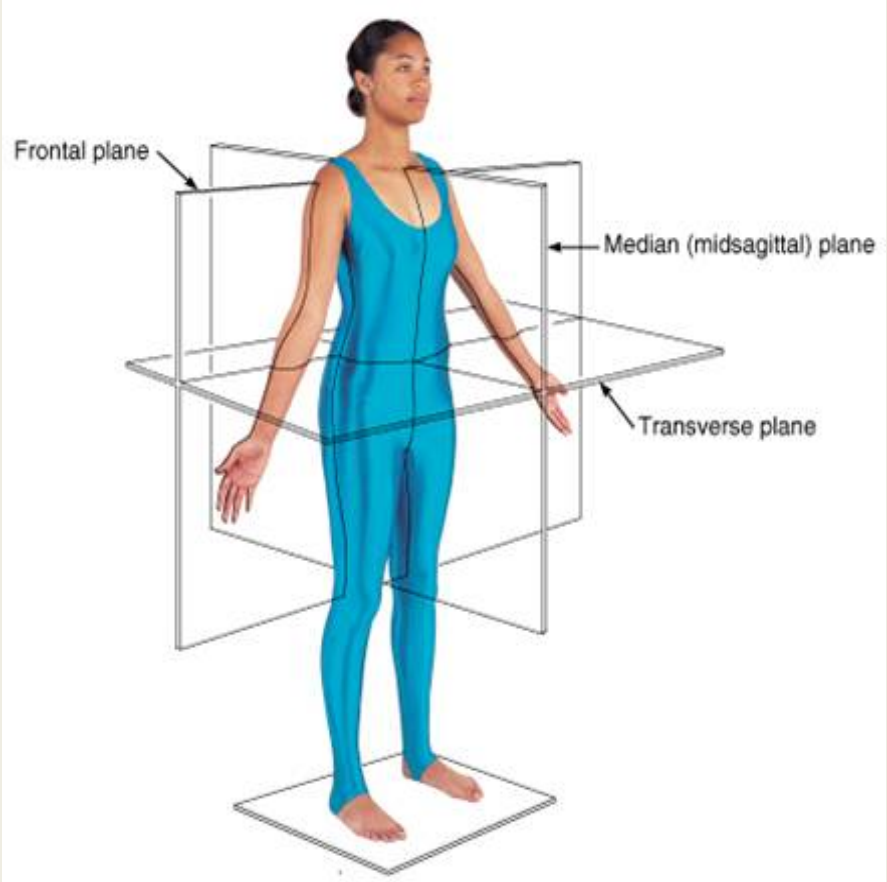
- **Sagittal (median):** divides the body into 2 equal halves (right & left).
- **Parasagittal (paramedian):**

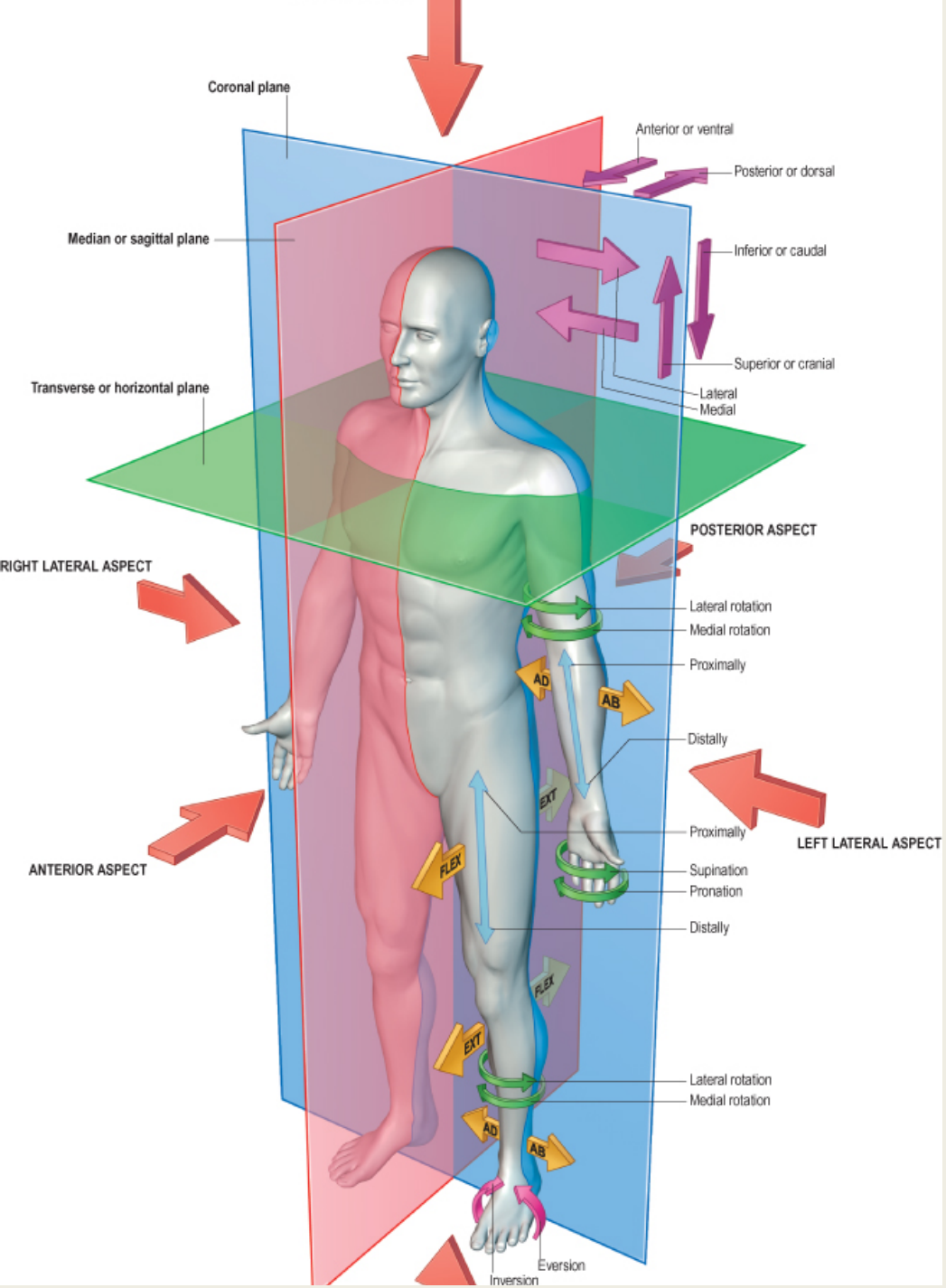
divides the body into 2 unequal parts (right & left).

- **Frontal (coronal):**

divides the body into anterior & posterior parts.

- **Transverse (cross):** divides the body into superior & inferior .parts





PLANES, TERMS OF POSITION & TERMS OF MOVEMENT

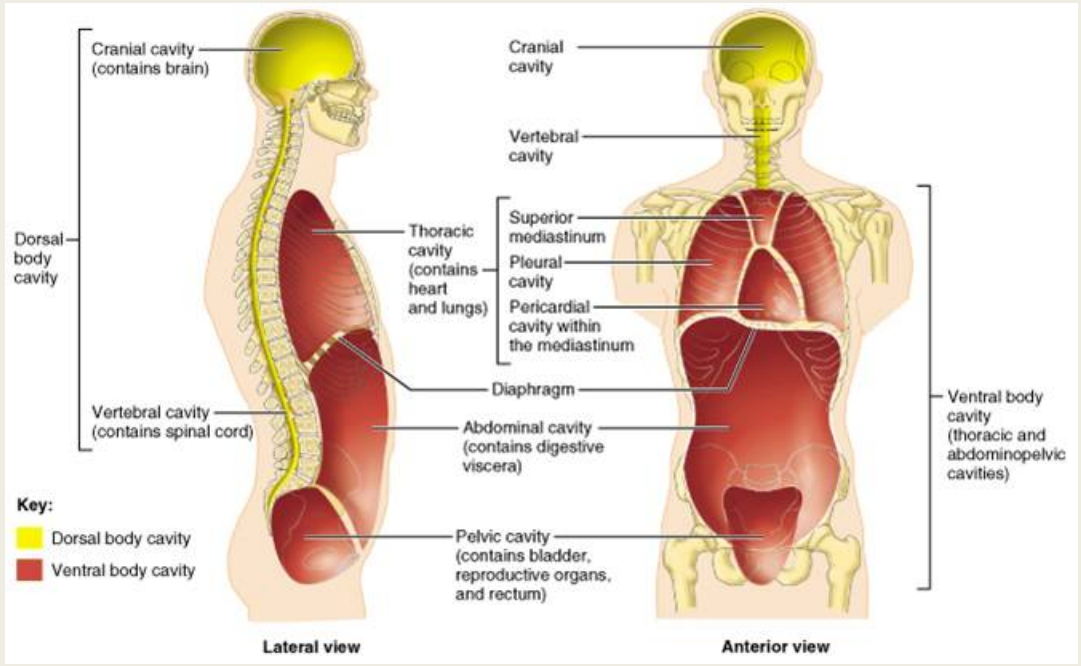
BODY CAVITIES

- **Ventral body cavity:** divided by diaphragm into:

1. **Thoracic cavity:** <u>superior</u> to diaphragm, contains heart & lungs.
2. **Abdominal cavity:** <u>inferior</u> to diaphragm, contains stomach, intestine, liver, urinary bladder, etc…

- **Dorsal body cavity:** divided into 2 parts <u>continuous</u> with each other:

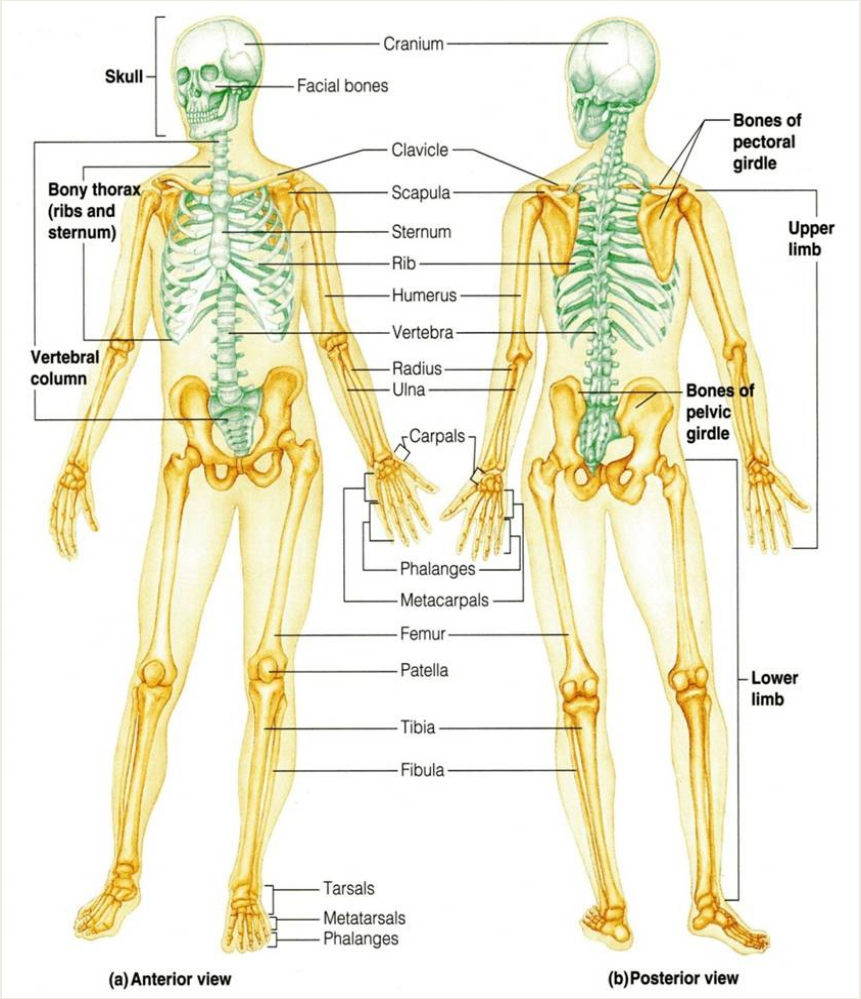
1. **Cranial cavity:** space inside skull, contains brain
2. **Spinal cavity:** space inside vertebral column, contains spinal cord



SKELETAL SYSTEM

Includes:

- **Bones**
- **Joints: articulations between bones**



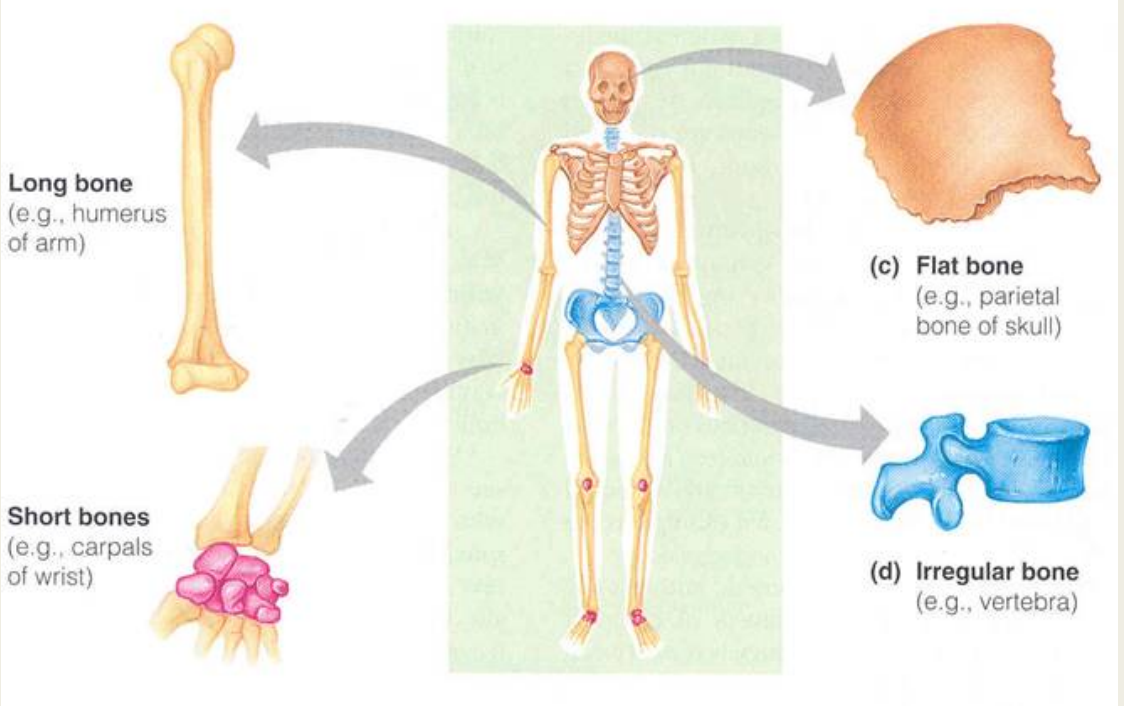
FUNCTIONS OF BONE

1. **Support:** of the body.
2. **Storage:** of fat and minerals e.g. calcium and phosphorus.
3. **Protection:** of soft body organs.
4. **Attachment:** of muscles.
5. **Movement:** of the body as a whole, or of the body parts.
6. **Blood cell formation.**

CLASSIFICATION OF BONE

Bones are classified on the bases of their:

- **Shape:**
- Long,
- Short,
- Flat,
- Irregular.
- **Structure:**
- Compact,
- Spongy.
- **Development:**
- Membrane,
- Cartilage.



THE SKELETON

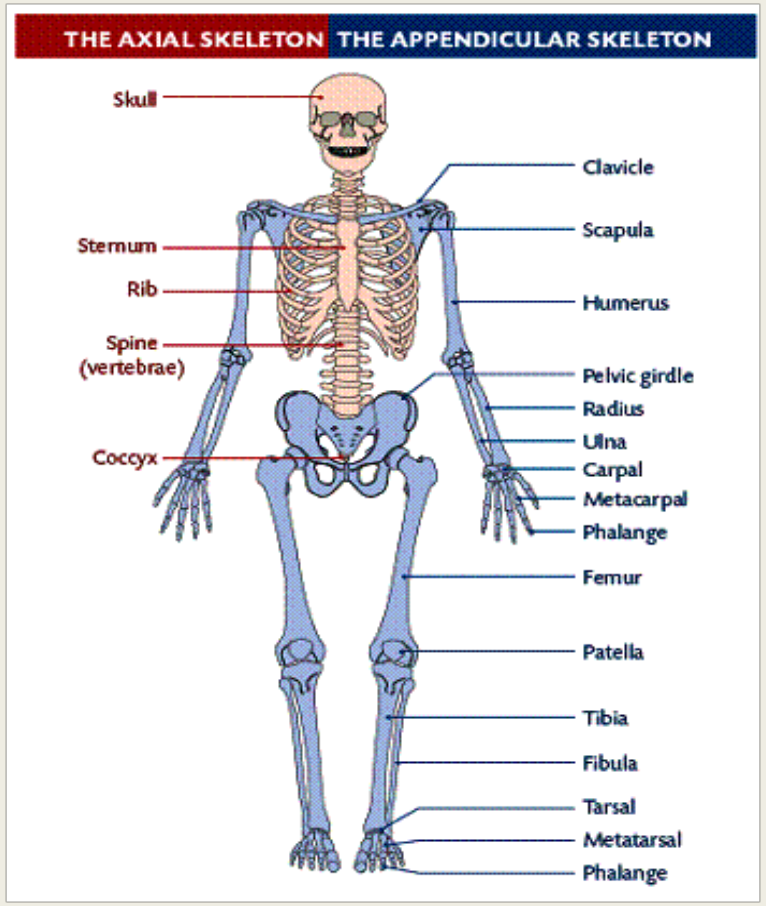
- Formed of 206 bones.
- Divided into:

1. Axial skeleton:

Bones forming the trunk (longitudinal axis) of body.

2. Appendicular skeleton:

Bones forming the girdles & limbs.



BONES OF AXIAL SKELETON

SKULL

- **Consists of:**
- **Cranium:**

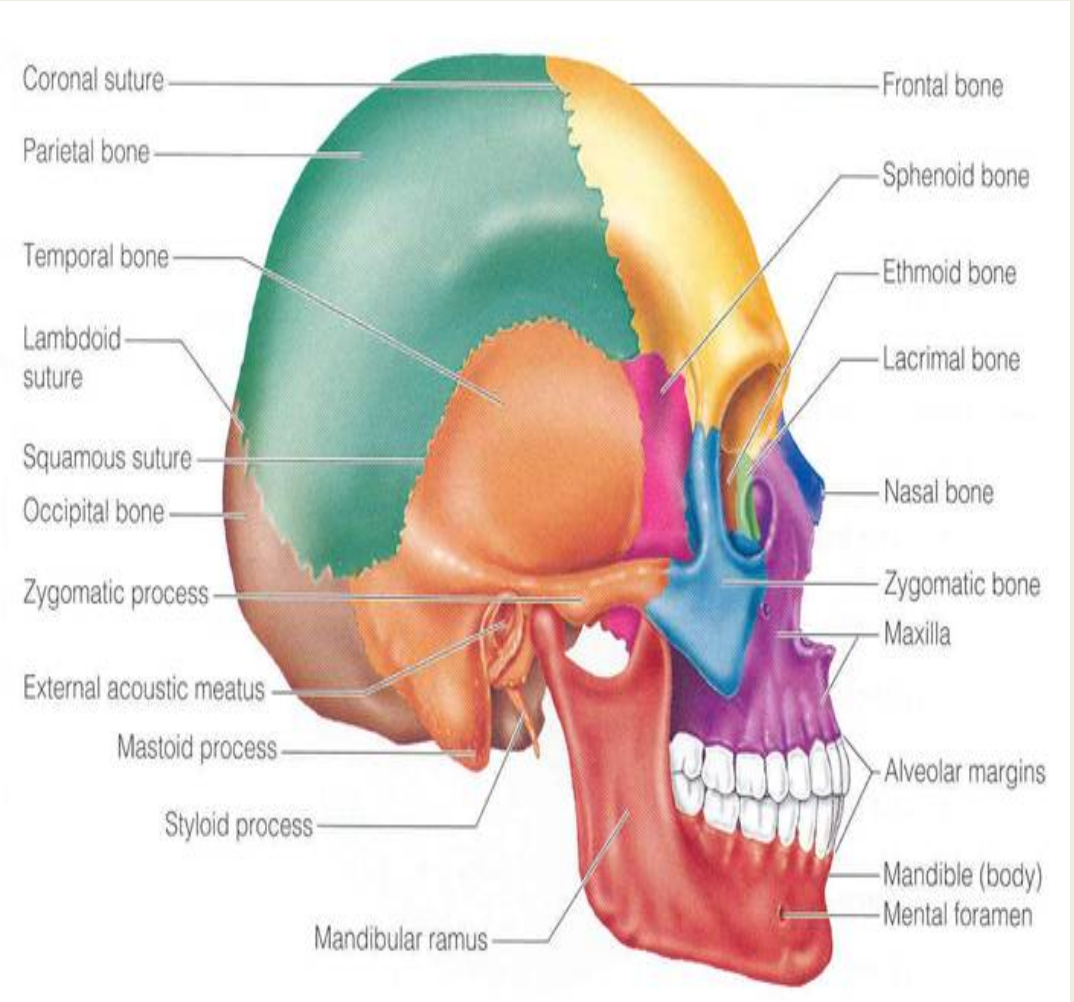
bones enclosing brain:

- Frontal
- Occipital
- Parietal
- Temporal

- **Facial bones:**

bones of face:

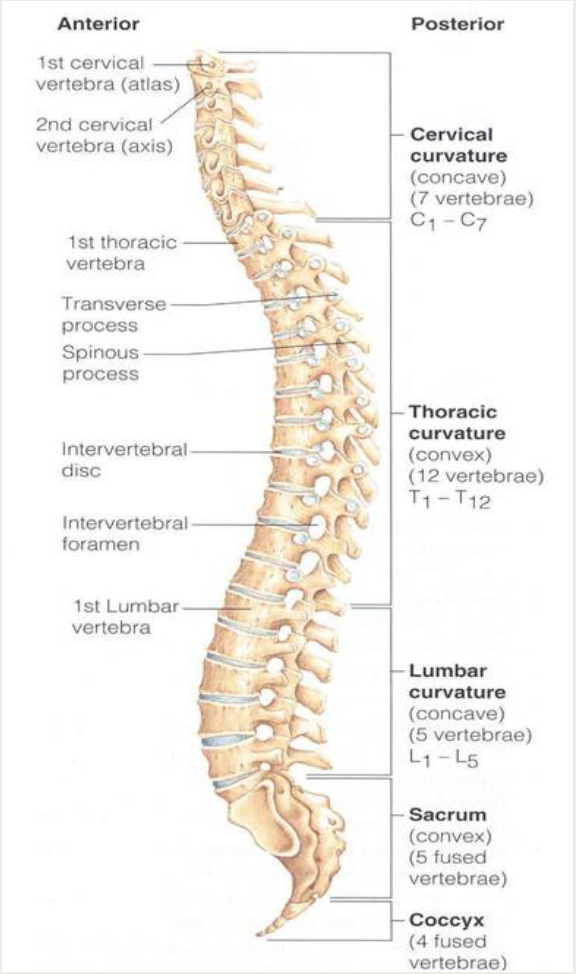
- **Maxilla**
- **Nasal**
- **Zygomatic**
- **Mandible.**



BONES OF AXIAL SKELETON

VERTEBRAL COLUMN

- **Number:** 33 vertebrae.
- **Functions:** protects spinal cord and supports the body.
- **Formed of:**
- 7 cervical vertebrae.
- 12 thoracic vertebrae.
- 5 lumbar vertebrae.
- 5 sacral vertebrae fused to form **sacrum.**
- 4 coccygeal vertebrae fused to form **coccyx.**



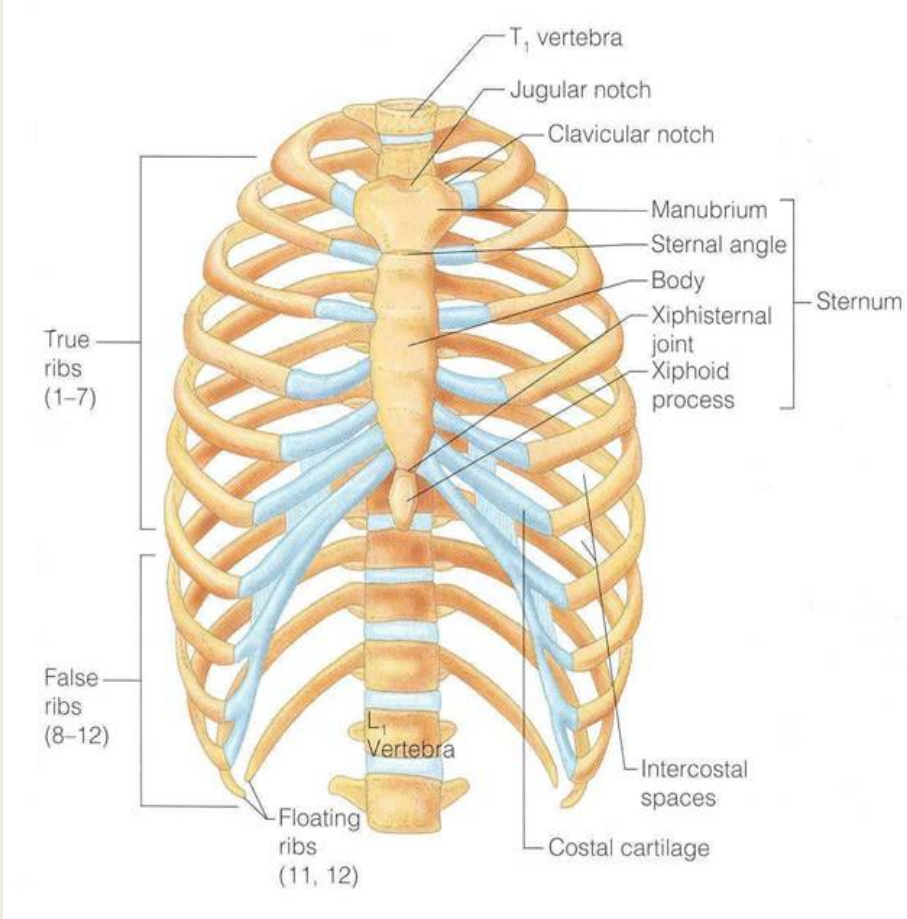
BONES OF AXIAL SKELETON

STERNUM

- **Has 3 parts:**
- Manubrium,
- Body &
- Xiphoid process.

RIBS

- **12 pairs:**
- All ribs articulate with vertebrae.
- Only upper 7 pairs articulate with sternum, (true ribs).
- 8^{th} ,9^{th} & 10^{th} ribs are false ribs.
- 11^{th} & 12^{th} ribs are floating ribs.



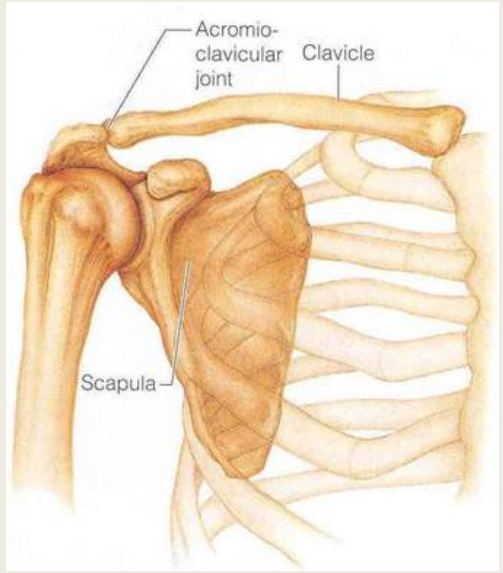
BONES OF APPENDICULAR SKELETON

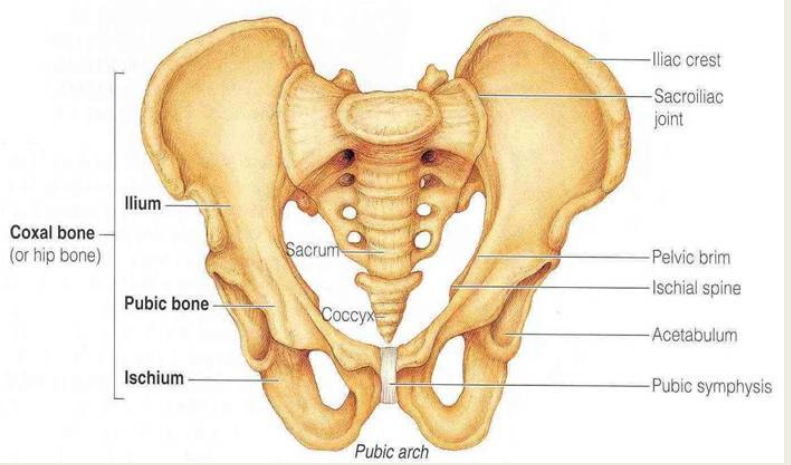
PECTORAL GIRDLE

- Connects upper limb with axial skeleton.
- **Formed of:**
- **Clavicle &**
- **Scapula.**
- **(2 bones on each side)**

PELVIC GIRDLE

- Connects lower limb with axial skeleton.
- **Formed of:**
- **Hip bone,**
- **(one only on each side).**

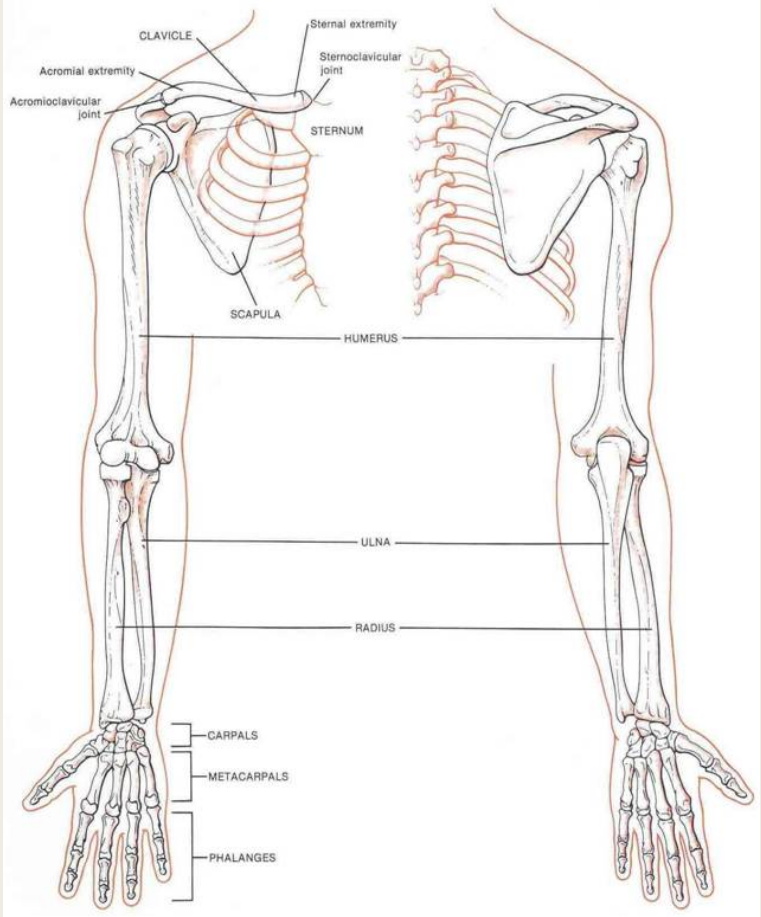




BONES OF APPENDICULAR SKELETON

UPPER LIMB

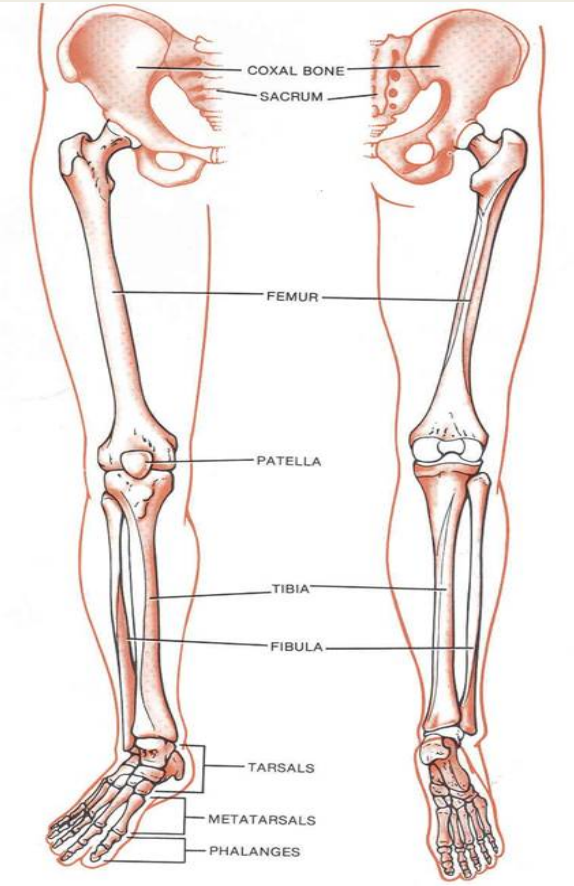
- **Bone of arm:**
- Humerus.
- **Bones of forearm:**
- **Radius (lateral) &**
- **ulna (medial).**
- **Bones of the hand:**
- 8 carpal bones.
- 5 metacarpal bones.
- 14 phalanges:
- 2 for thumb &
- 3 for each of medial **4 fingers.**



BONES OF APPENDICULAR SKELETON

LOWER LIMB

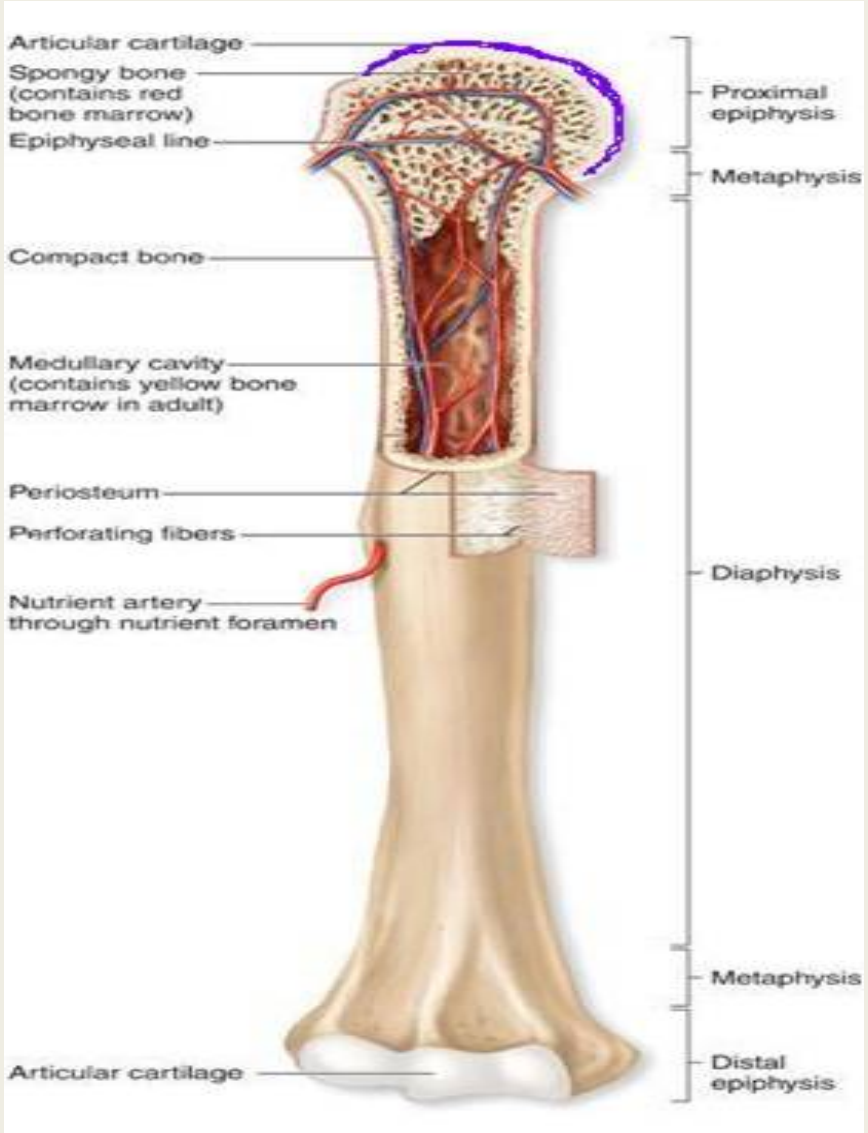
- **Bone of thigh:**
- Femur.
- **Bones of leg:**
- Fibula (lateral) &
- Tibia (medial).
- **Patella.**
- **Bones of foot:**
- **7 tarsal bones.**
- **5 metatarsal bones.**
- **14 phalanges:**
- **2 for big toe & 3 for each of lateral 4 toes.**



LONG BONES

Formed of:

- **A shaft (diaphysis):** composed of compact bone.
- **Two ends (epiphysis):** composed of spongy bone.
- **Metaphysis:** This is the region of contact between epiphysis & diaphysis.
- **The metaphysis** contains *epiphyseal plate of cartilage* responsible for ***linear bone growth***.



TEST YOURSELF!

- **Which one of the following bones is a bone of the axial skeleton?**

1. **Femur.**
2. **Humerus.**
3. **Scapula.**
4. **Sternum.**

- **Which one of the following bones is an example of an irregular bone?**

1. **Femur.**
2. **Vertebra.**
3. **Scapula.**
4. **Sternum.**

- **Which one of the following planes divides the body into superior & inferior parts?**

1. **Frontal (coronal) plane.**
2. **Sagittal (median) plane.**
3. **Parasagittal (Paramedian) plane**
4. **Transverse (cross) plane.**

GOOD LUCK