

FIRST LECTURE



Introduction to Anatomy

ANATOMICAL TERMS AND SKELETAL SYSTEM

ANATOMY

TEAM 436

هذا العمل لا يعني عن المصادر المطلوبة

SKELETAL SYSTEM:BONE

■ Objectives:

1. Define the word “ANATOMY”
2. Enumerate the different anatomical fields
3. Describe the anatomical position
4. Describe different anatomical terms of position and movements as well different anatomical planes
5. Classify bones according to shape , structure and development
6. Enumerate different bones of both axial and appendicular skeleton

What is Anatomy?

It's the Study that deals with the structure and shape of the Body parts & their relationships to one another.

ANATOMICAL SCIENCES

1. Gross Anatomy : The study of human body with a naked eyes
2. Microscopic Anatomy (Histology) : Study of fine structure (cell and tissue) of the human body with the help of microscope
3. Developmental Anatomy (Embryology)
4. Radiological Anatomy : Study of bodily structure using radiograph and other imaging methods
5. Applied Anatomy: The practical application knowledge to diagnosis and treatment
6. Surgical Anatomy: Study of anatomical structure in reference to the surgical diagnosis and treatment
7. Cross sectional Anatomy: Studying the humane body through a transverse cut through a structure or tissue

Skeletal System

Includes:

- 1.Bones
- 2.Joints(Articulations between bones)

Anatomical Terminology :

“To prevent misunderstanding a special set of terms are used to describe identification and location of body structures”.

Anatomical position :

The standard position in which the body assume to describe its parts .

■ This position has 4 features :

- 1- Body is erect
- 2- Feet parallel
- 3- Palm facing forward
- 4- Arms hanging by the side



Terms of Position:

- **Superior** (cranial ,rostral): near to head

Inferior (Caudal): away from head.

- **Anterior** (ventral): near to front .

Posterior (dorsal) : near to back.

- **Medial** : near to median plane

Lateral : away from median plane

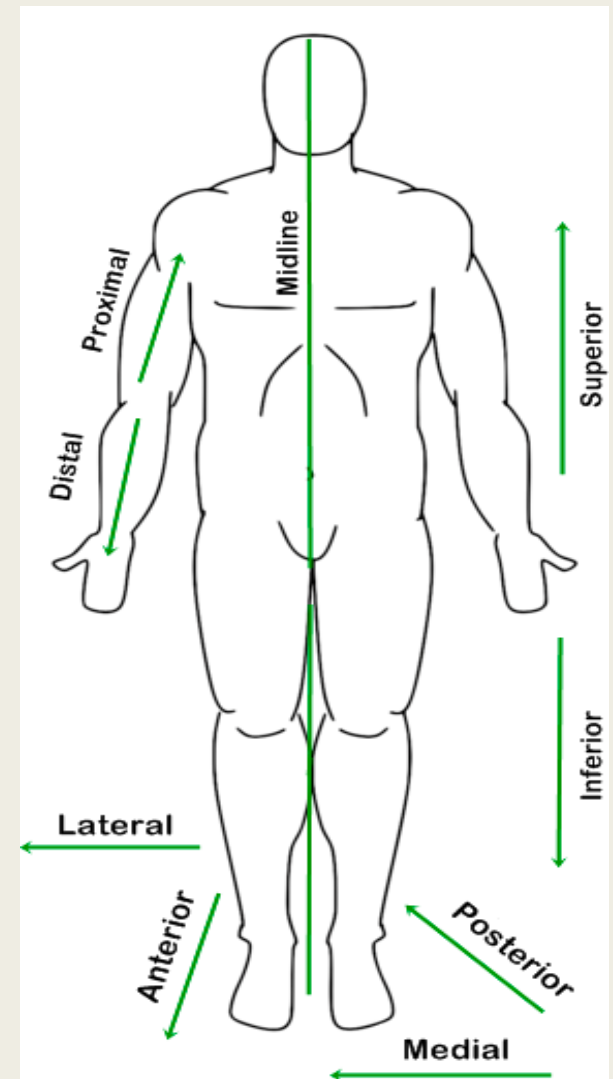
- **Proximal** : near to trunk

Distal : away from trunk

- **Superficial** : near to skin (surface)

Deep : away from skin

***Intermediate**: the relative location of an anatomical structure lying between two other structures:



ANATOMICAL PLANES & SECTIONS

■ Sagittal (median):

- A cut made along a **longitudinal** plane dividing the body into 2 **equal** halves (right & left).
- The plane passing through the midline of the body, cutting the body into the right and left equal halves is called a **midsagittal** or **median plane**.

■ Parasagittal (paramedian):

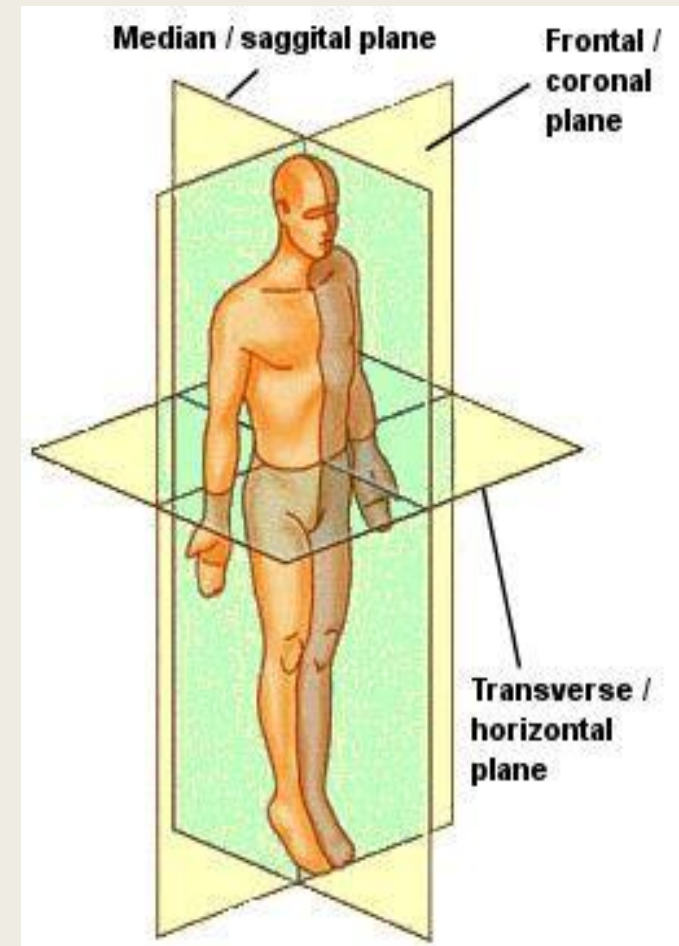
- divides the body into 2 **unequal** parts (right & left).

■ Frontal (coronal):

- A cut made along a **longitudinal** plane.
- divides the body into **anterior** & **posterior** parts

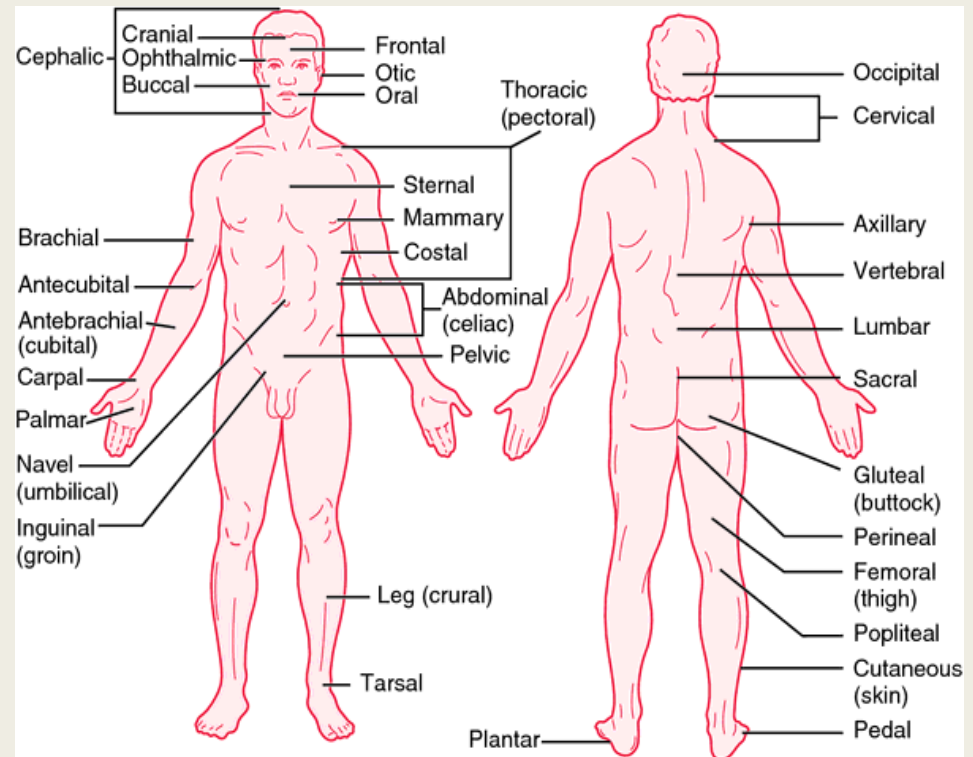
■ Transverse (cross):

- A cut made along a **horizontal** plane.
- divides the body into **superior** & **inferior** parts.



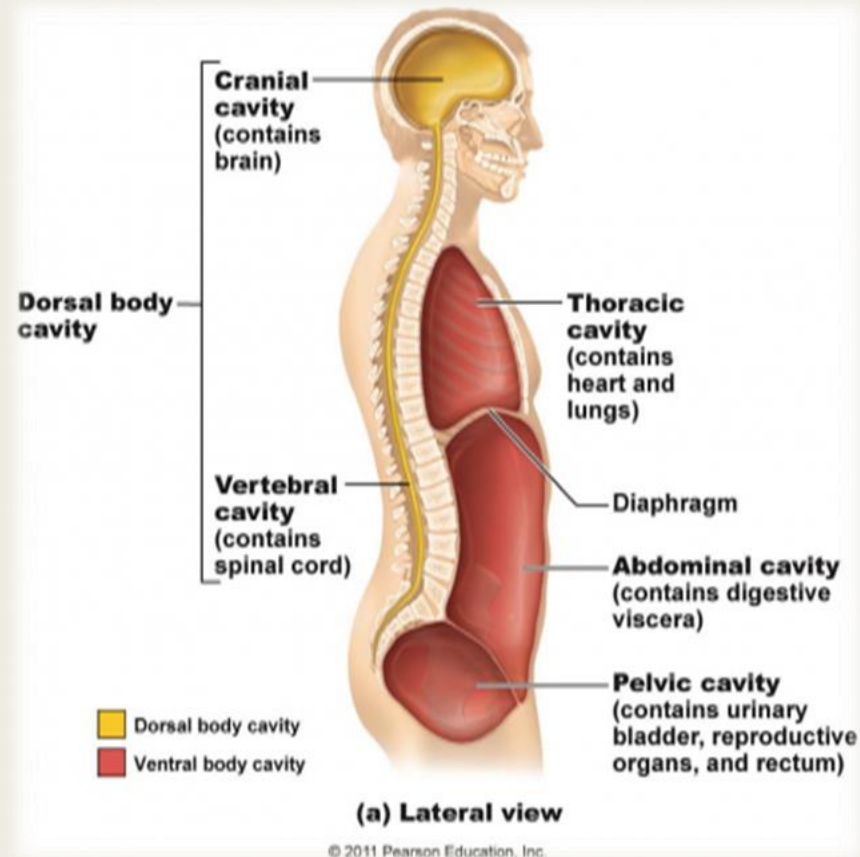
Terms of Regions:

- ❖ Cranial (cephalic)
- ❖ Cervical
- ❖ Thoracic
- ❖ Abdominal
- ❖ Pelvic
- ❖ Plantar
- ❖ Palmar



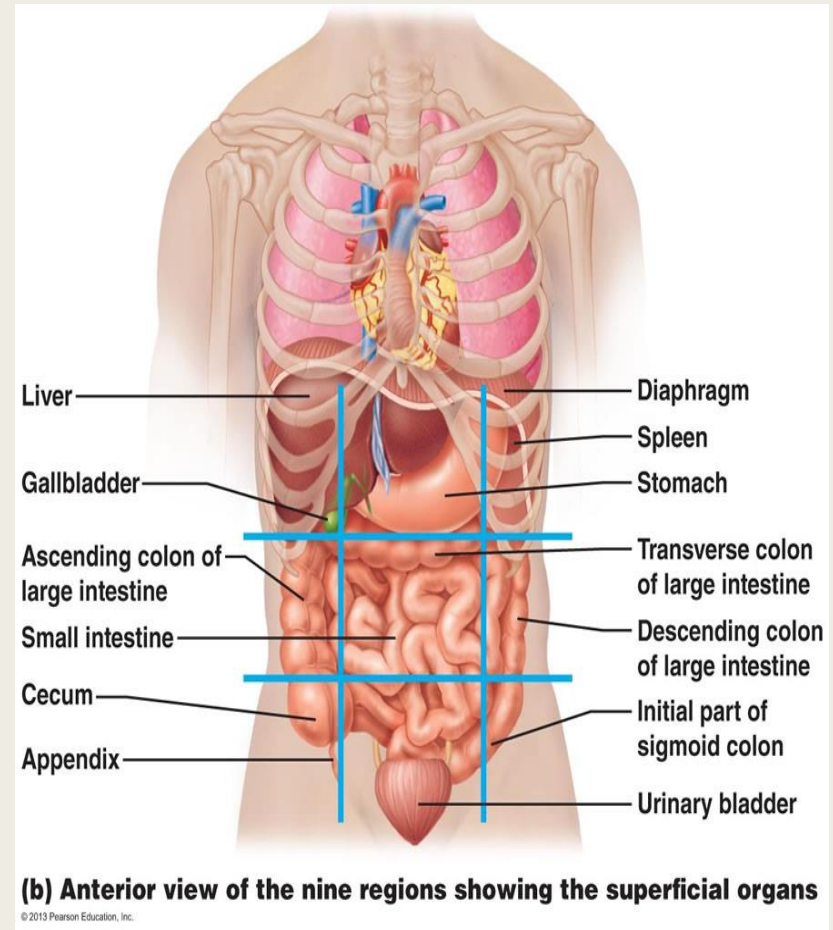
Body Cavities

- There is two sets of internal cavities which are **ventral** and **dorsal**.
- Ventral Body Cavity: **divided by the diaphragm** into:
 1. Thoracic Cavity: **superior to diaphragm** (above the diaphragm), contains heart & lungs.
 2. Abdominal cavity: **inferior to diaphragm** (below the diaphragm) contains stomach, intestine, liver, urinary bladder, etc...
- Dorsal body cavity: **divided into 2 parts continuous** with each other:
 1. Cranial cavity: **space inside skull**, contains brain.
 2. Spinal cavity: **space inside vertebral column**, contains spinal cord.

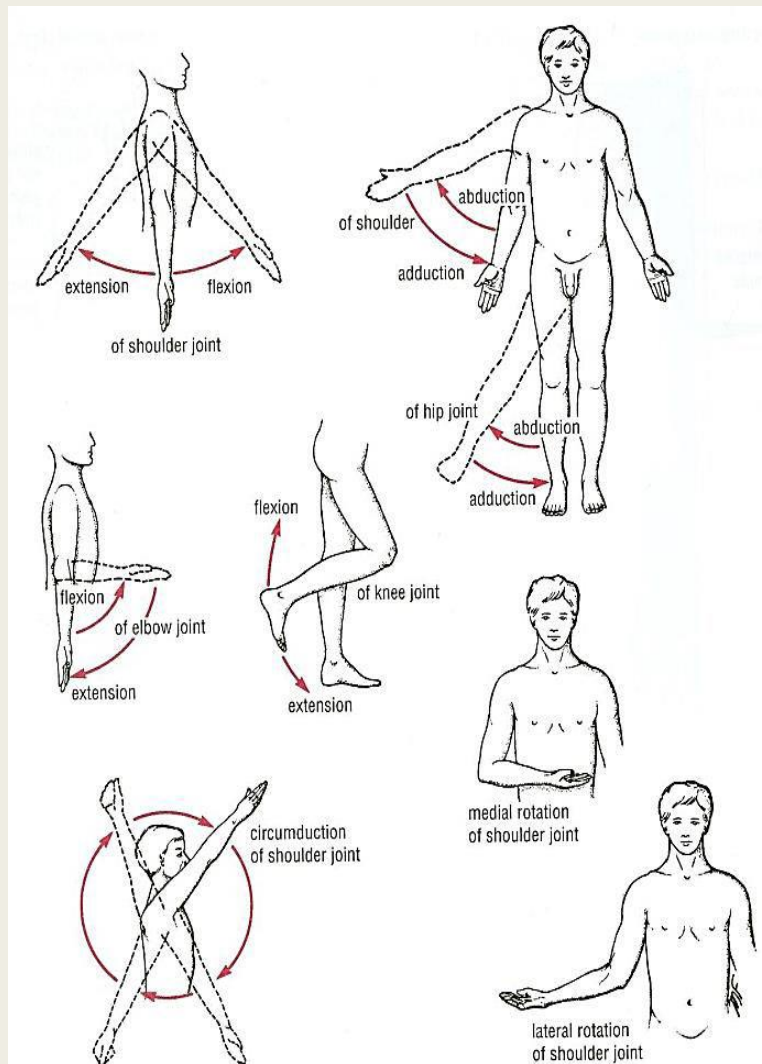


Abdominopelvic Regions

- The **Abdominopelvic** area is divided into 9 regions by 2 vertical & 2 horizontal lines or planes.
- **Objective:** To locate the different organs in each region.

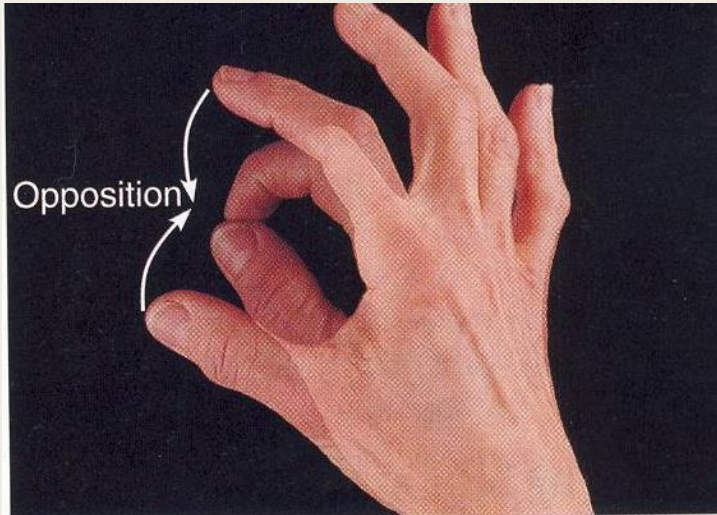


TERMS OF MOVEMENT 1-3



- ❖ Flexion: approximation of 2 parts (decreasing the angle between 2 parts)
- ❖ Extension: straightening (increasing the angle between 2 parts)
- ❖ Abduction: away from median plane
- ❖ Adduction: towards median plane
- ❖ Lateral rotation: rotation away from median plane
- ❖ Medial rotation: rotation toward median plane
- ❖ Circumduction: combined movements of flexion, extension, abduction &

TERMS OF MOVEMENT 2-3



-Opposition:

bringing tips of fingers and thumb together as in picking something up

-Supination:

- Lateral rotation of the forearm.

- The palm faces Anteriorly.

- The radius and ulna are Parallel.

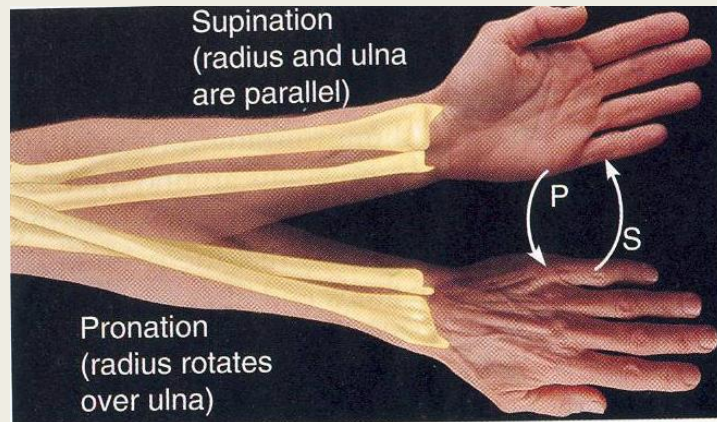
- Pronation:

- Medial rotation of the forearm.

- The palm faces Posteriorly

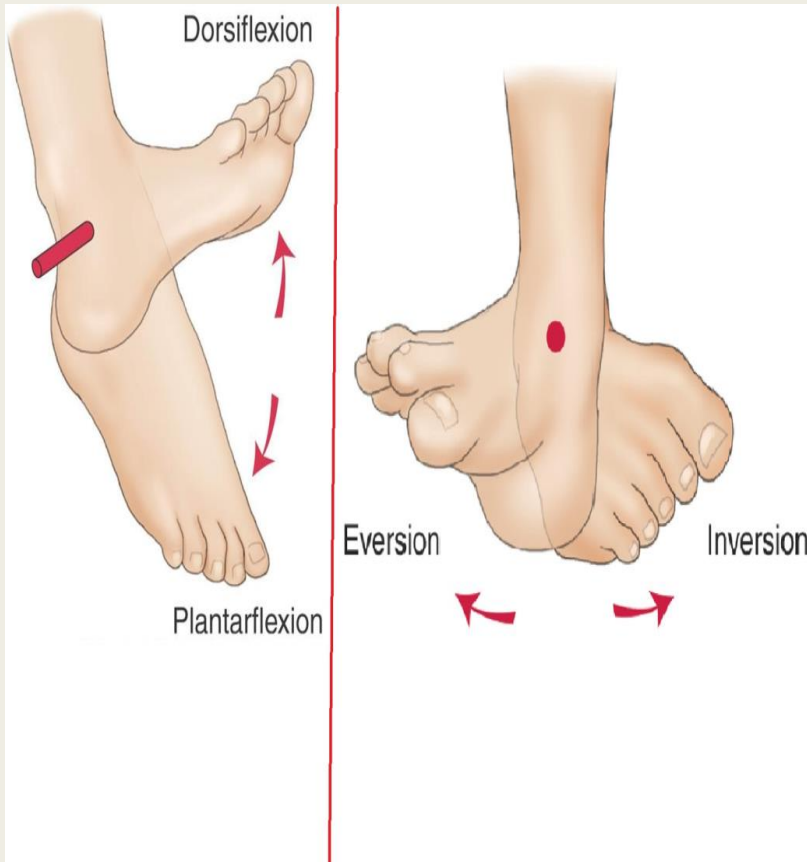
- The radius Crosses the ulna and the two

bones form an X.



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

TERMS OF MOVEMENT 3-3



<https://youtu.be/5YcNAPzDxDg>

Plantarflexion:

- Depressing the foot (down).
- Movement with pointing the toes.

Dorsiflexion:

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

Inversion:

The sole faces in a Medial direction.

Eversion:

The sole faces in a Lateral direction.

Functions of bone

support

protection

attachment
to muscles

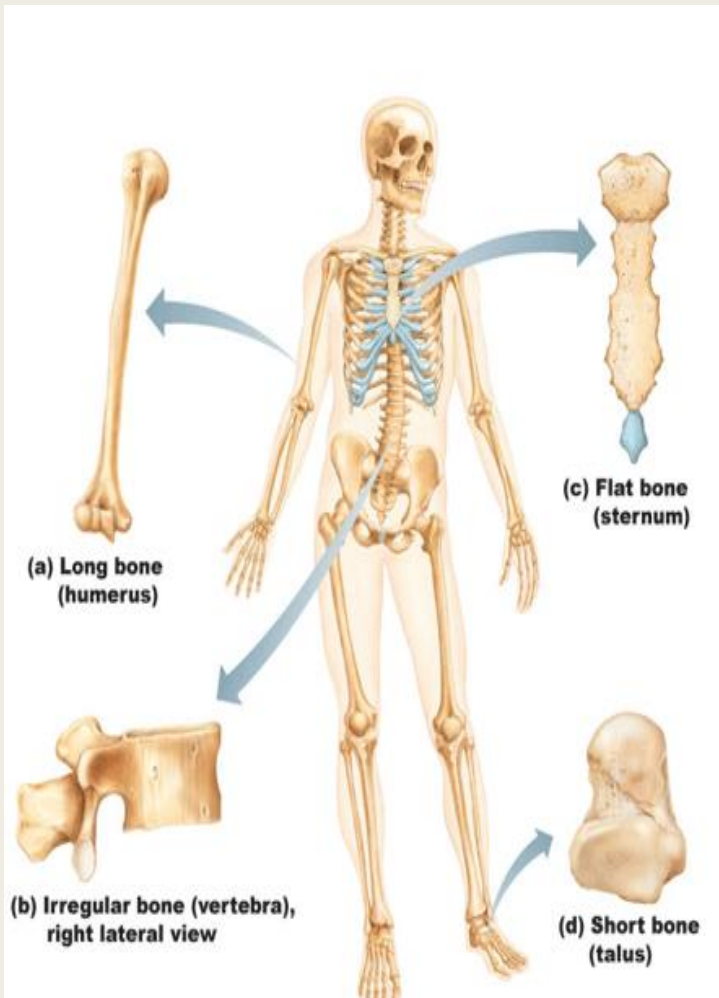
movement

storage of fat
and minerals

Blood cell
formation

e.g.: Calcium and
phosphorus

Classification on bone



■ *Bones are classified based on three things:*

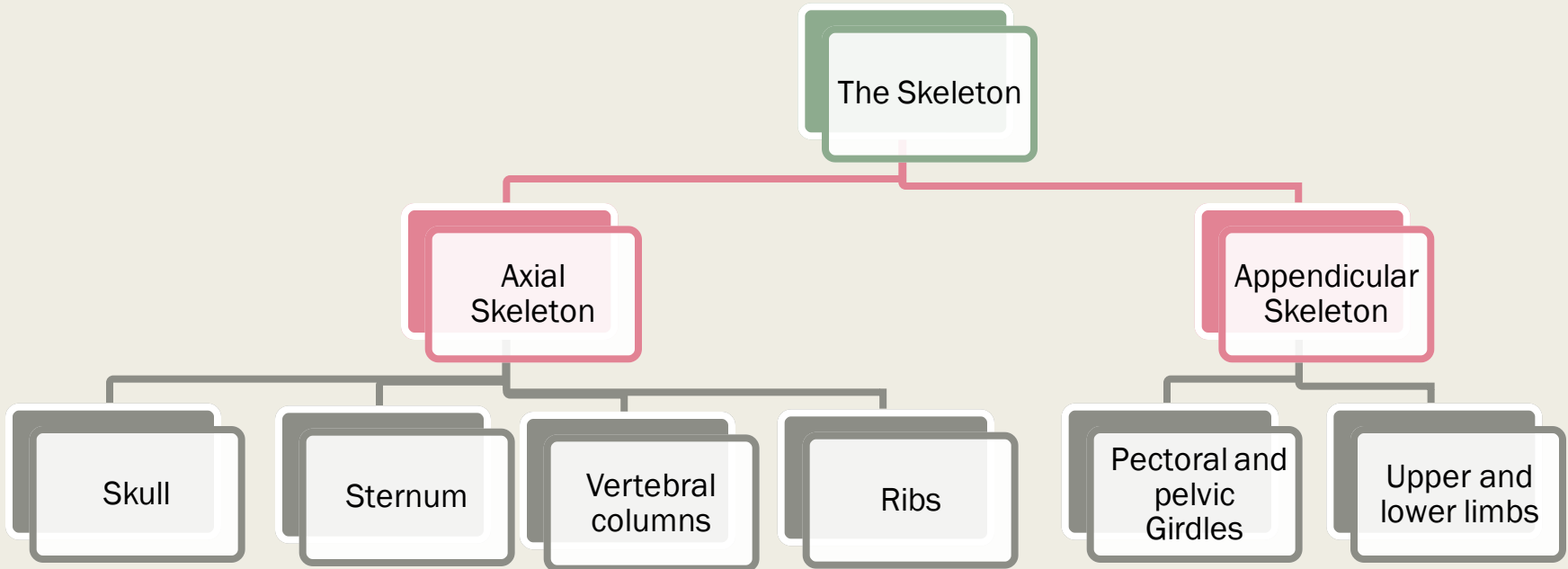
1- **Shape:** Long, Short, Irregular , flat

2- **Structure:** Compact, Spongy

3- **Development:** Membrane, Cartilage

The Skeleton

The skeleton is formed from 206 Bones

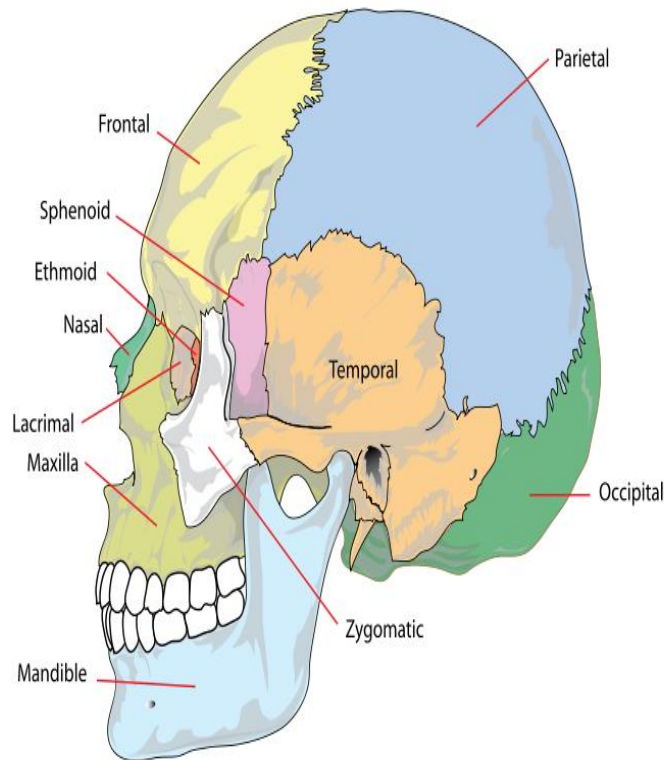


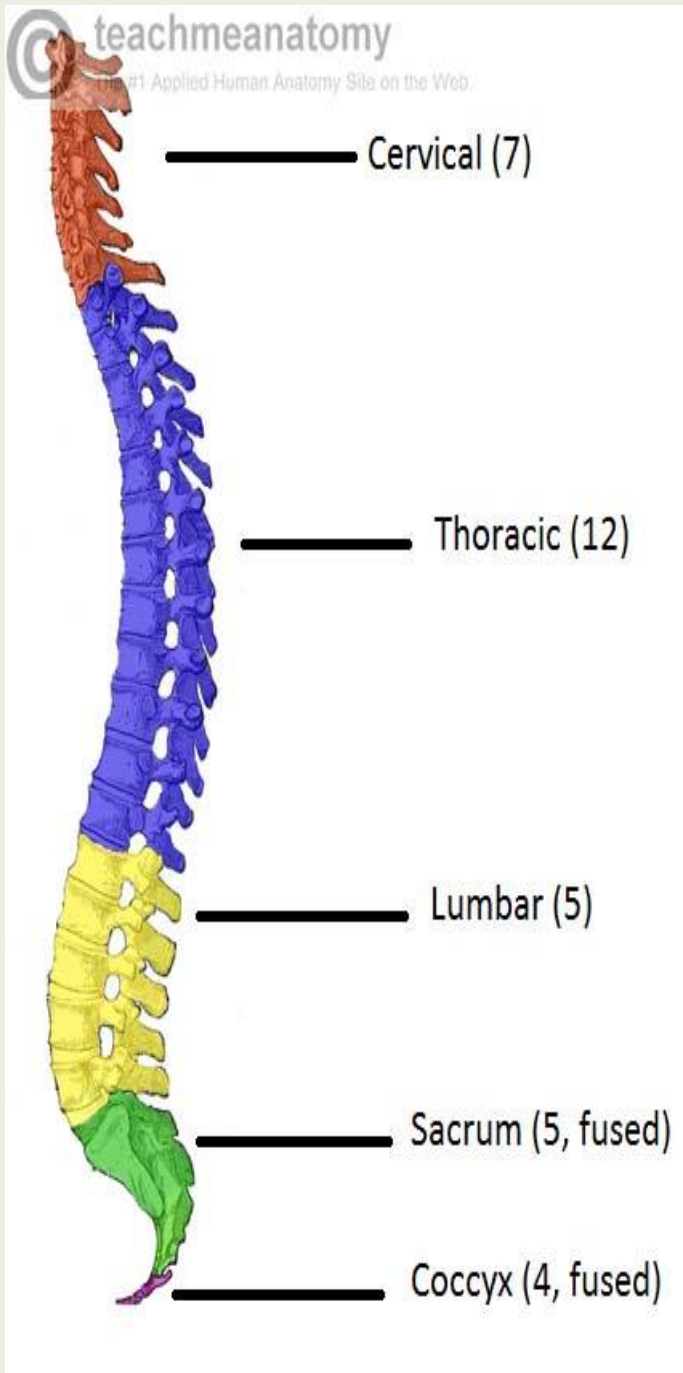
Bones of the axial skeleton

The Skull

Formed from two sets of bones:

- 1. Cranium (bones enclosing and covering the brain): **Frontal, Temporal, Occipital, Parietal, Sphenoid**
- 2. Facial bones (bones that form the skeleton of the face): **Maxilla, Nasal, Zygomatic, Mandible**

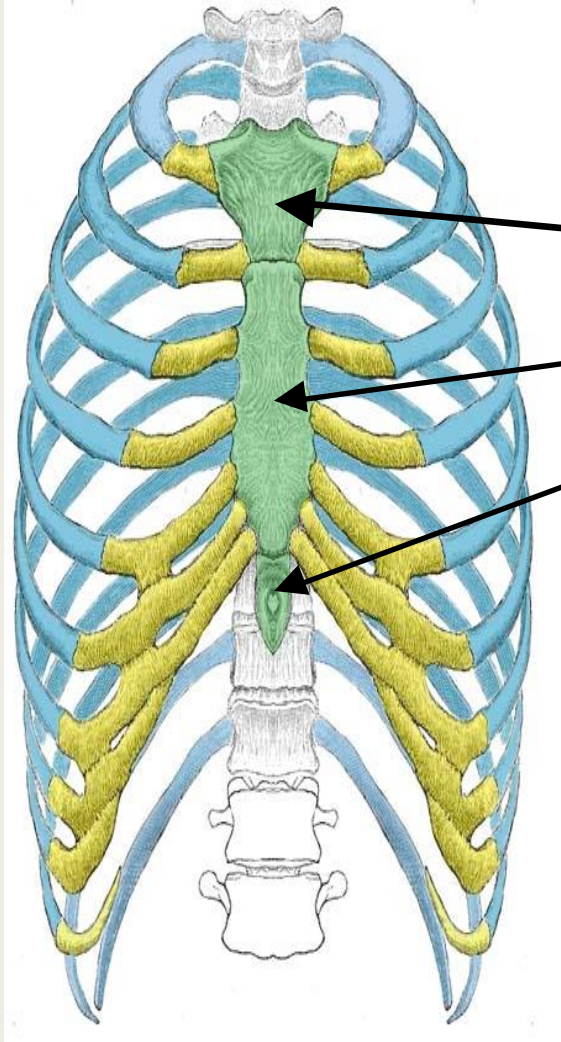




VERTEBRAL COLUMN

- ❖ It is a flexible curved structure formed of **33** vertebrae (irregular bones)
- ❖ Running through its cavity is the spinal cord
- ❖ Formed of :
 - 1) Cervical vertebrae **7**
 - 2) Thoracic vertebrae **12**
 - 3) Lumbar vertebrae **5**
 - 4) Sacral vertebrae fused to form sacrum (triangular bone) **5**
 - 5) coccygeal vertebrae fused to form coccyx (small bone) **4**

Sternum (Flat bone) :



Has 3 parts :

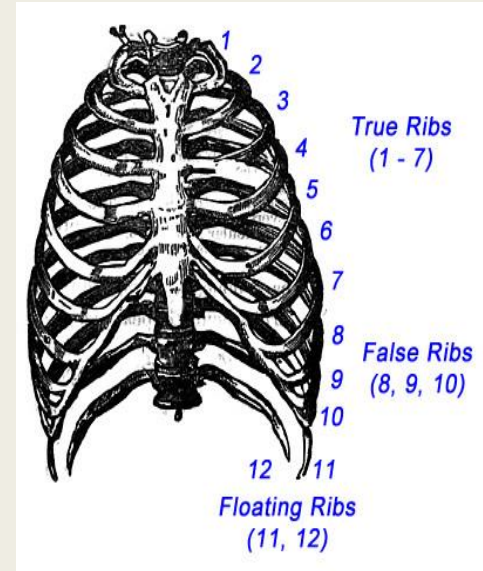
1. Manubrium

2. Body

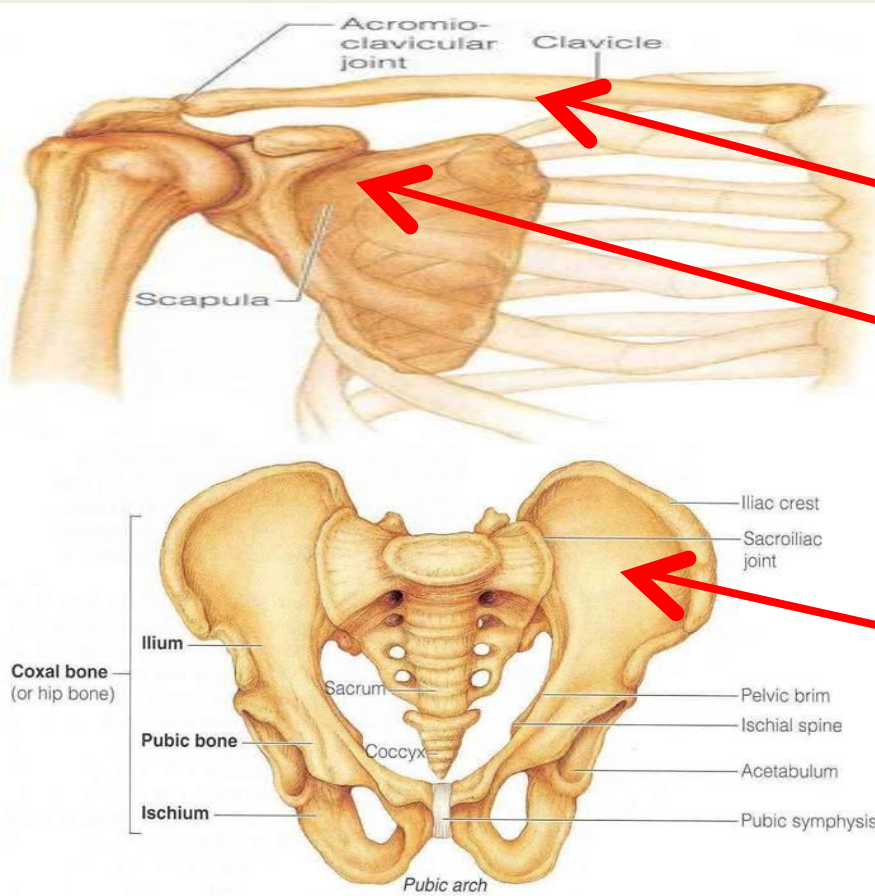
3. xiphoid process

Ribs :

- Number: vertebrae **12 pairs**
- All ribs articulate with vertebrae
- Only upper **7 pairs** articulate with sternum
- The first **7** are called **true ribs**
- The ribs **8,9** and **10** are called **False ribs**
- The ribs **11** and **12** are called **Floating ribs**



BONES OF APPENDICULAR SKELETON



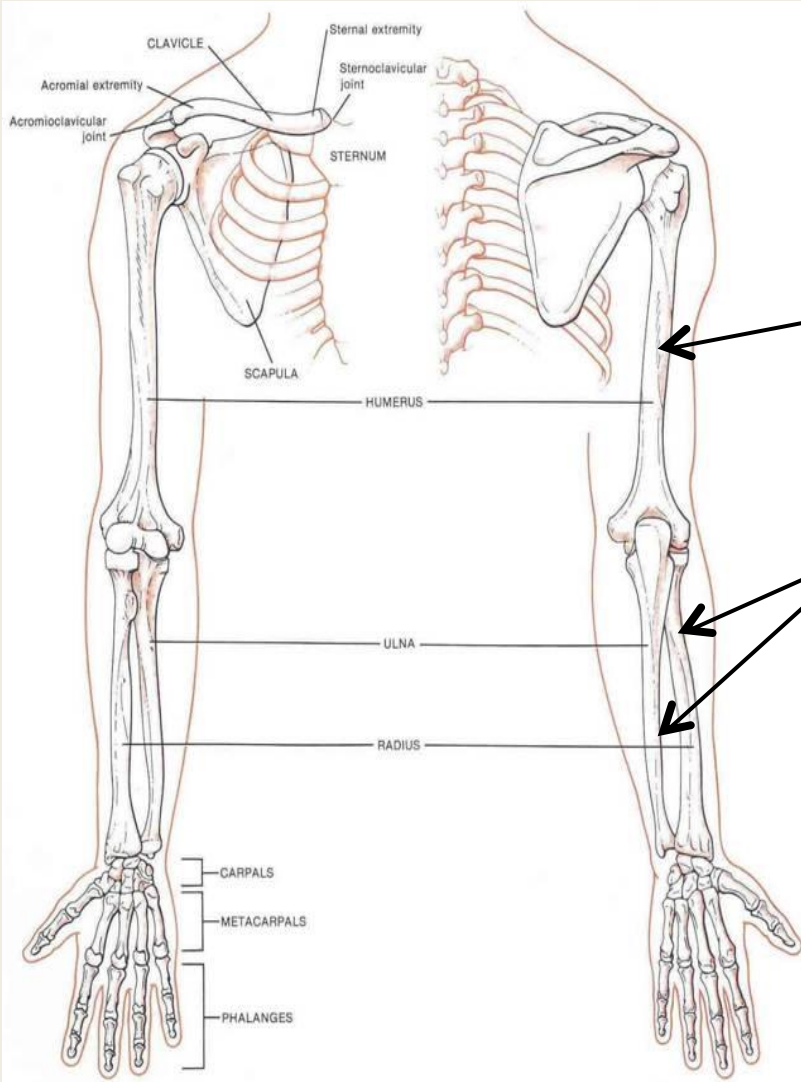
PECTORAL GIRDLE

- ❑ Connects upper limb with axial skeleton
- ❑ Formed of: **clavicle & scapula** (2 bones on each side)

PELVIC GIRDLE

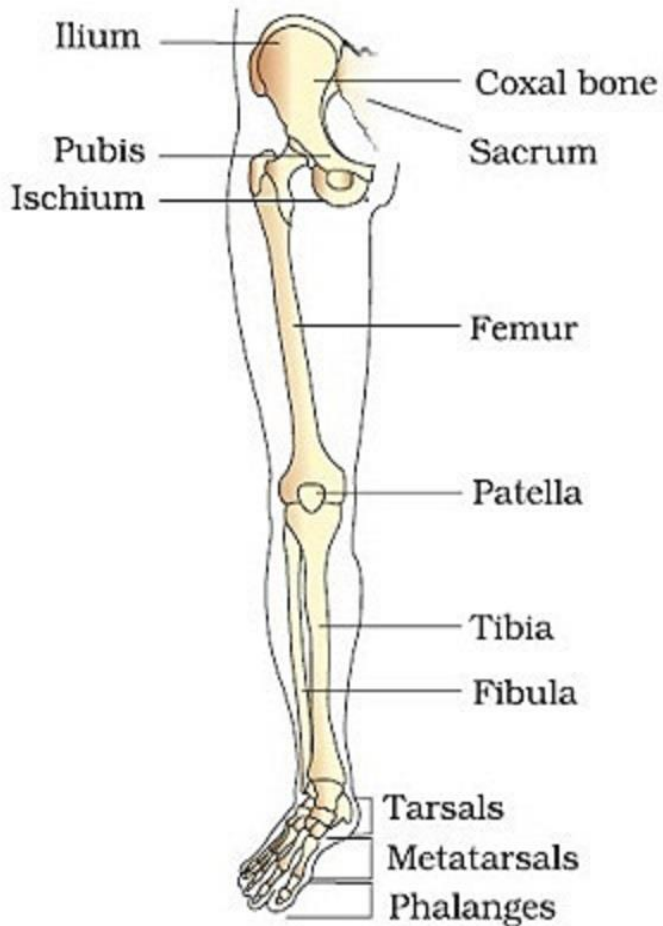
- ❑ Connects lower limb with axial skeleton
- ❑ Formed of: **hip bone** (one bone on each side)

BONES OF APPENDICULAR SKELETON



UPPER LIMB

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



BONES OF APPENDICULAR SKELETON

Lower limb

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

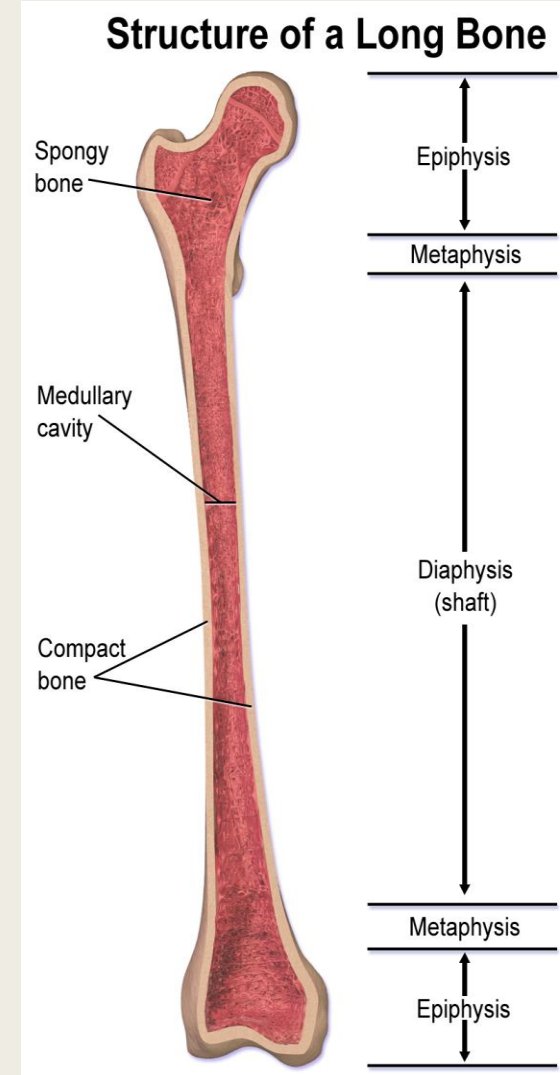
LONG BONES

Diaphysis (shaft)

- long & cylindrical
- Compact bone
- Covered on its external surface by a fibrous connective tissue membrane called the **periosteum**.
- Has a cavity called the **marrow cavity** In adults, the marrow cavity is a storage area for **fat** and contains **yellow marrow**. In infants, it contains **red marrow** and is the site of **blood cells formation**

metaphysis (The region between diaphysis and epiphysis)

contains thin plate of cartilage called the **epiphyseal plate** that is responsible for the lengthwise growth of the long bones.



Periosteum

■ Role of Periosteum:

- Protects the bone
- Gives attachment to muscles
- Carries blood vessels and nerves to bone
- Deposits new bone on the surface thus increases the girth of bone

LONG BONES

Epiphysis (The two ends)

- Spongy Bone
- lined by a thin layer of compact bone
- Its external surface is covered by a layer of **hyaline cartilage** called the **articular cartilage** (provides smooth slippery surface that decreases friction at joint surfaces)

***Growth of bone**

Increase in length:
epiphyseal plates

Increase in girth:
periosteum*

Some links to learn more:

Videos:

- <https://www.youtube.com/watch?v=rDGqkMHPDqE&feature=youtu.be>
- <https://www.youtube.com/watch?v=uBGI2BujkPQ>
- <https://www.khanacademy.org/science/health-and-medicine/human-anatomy-and-physiology/skeletal-system/v/skeletal-structure-and-function>
- <https://www.youtube.com/watch?v=TnY6I9hMOew&feature=youtu.be>

Online quiz:

- <https://www.onlineexambuilder.com/anatomical-terminology-skeletal-system/exam-35333>
- <https://www.onlinequizcreator.com/anatomical-terms-and-skeletal-system/quiz-208453>

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