

---

# INTRODUCTION TO ANATOMY

## SKELETAL SYSTEM: BONE

---

Foundation block - Anatomy - Lecture 1

---



# Objective

- **At the end of the lecture, students 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

## Color guide :

Only in boys slides in **Green**

Only in girls slides in **Purple**

important and doctors note in **Red**

Extra information in **Blue**

# ANATOMY & its Sciences.

THE WORD ANATOMY is of **GREEK** origin meaning **cutting up**(ana=up,tomy=cutting).



Girls slides

**DEFINITION OF ANATOMY:** the science which deals with the study of,  
The structure & shape of the body parts & their relationships to one another.



Boys slides

## ANATOMICAL SCIENCES:

1. **Gross Anatomy:** study of the human body with **NAKED EYES**
2. **Microscopic Anatomy(Histology):** Study of **FINE STRUCTURE** (cells & tissues) of the human body with the help of Microscope.
3. **Developmental Anatomy (Embryology)**
4. **Radiologist Anatomy** (study of the structure and morphology of the tissues and organs of the body based on their x-ray visualization).
5. **Surgical Anatomy** (practical)
6. **Cross-sectional Anatomy** (study of the relationship of the structures of the body by the examination of cross sections of the tissue or organ)
7. **Applied Anatomy** (study of the structure of the organs of the body as it relates to the diagnosis and treatment of disease)
8. **Surface Anatomy** (superficial, without dissection)



Extra informations

# Anatomical position

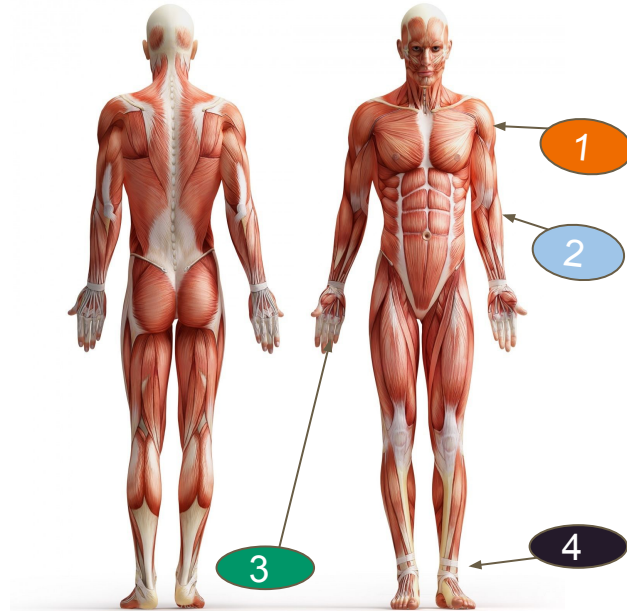
Its the standard position in which the body assume to describe its parts

1-Body is erect

2-Arms hanging by the side

3-Palm facing forward

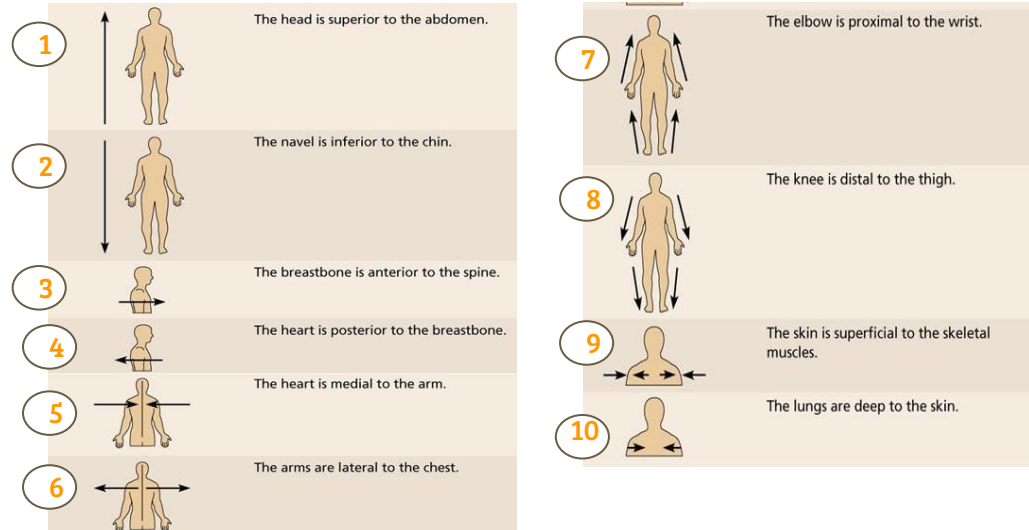
4-Feet are parallel



# Anatomical terminology #Position

- 1-Superior (cranial): near to head
- 2-Inferior (caudal): away from head
- 3-Anterior (ventral): near to front
- 4-Posterior (dorsal): near to back
- 5-Medial: near to median plane
- 6-Lateral: away from median plane
- 7-Proximal: near to trunk
- 8-Distal: away from trunk
- 9-Superficial: near to skin (surface)
- 10-Deep: away from skin

## Examples



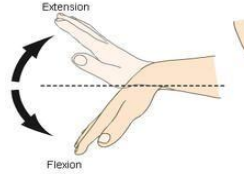
إذا ما فهمت :

<https://youtu.be/KqgTERrYbQ4>

# Anatomical terminology #Movement

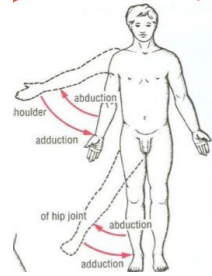
**Flexion:** approximation of 2 parts (decreasing the angle between 2 parts)

**Extension:** straightening (increasing the angle between 2 parts)



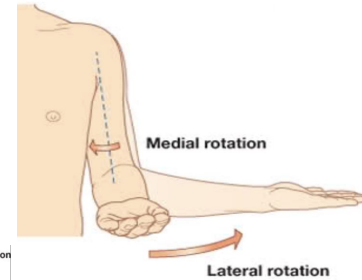
**Abduction:** away from median plane

**Adduction:** toward median plane

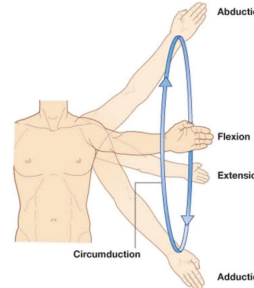


**Lateral rotation:** rotation away from median plane

**Medial rotation:** rotation toward median plane



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



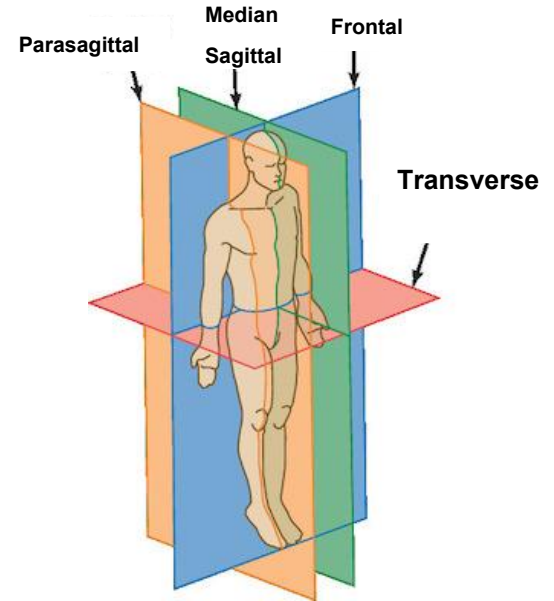
# Anatomical planes & sections

**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 (Horizontal) (cross):** divides the body into superior & inferior parts



# Body Cavities:

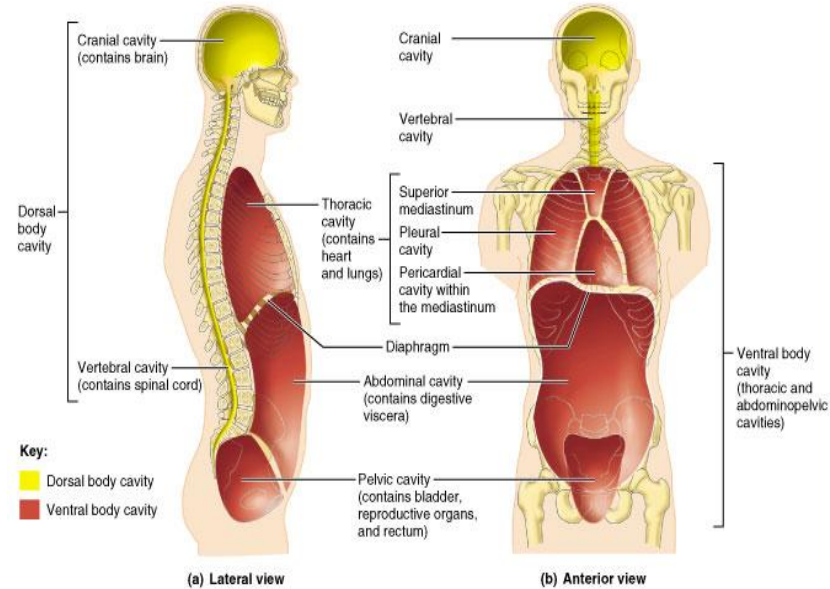
There are two body cavities in the human body:

**1- Ventral (anterior) body cavity:** divided by **diaphragm** into:

- **Thoracic cavity:** superior to diaphragm, contains heart & lungs.
- **Abdominal cavity:** inferior to diaphragm, contains stomach, intestine, liver urinary bladder, etc.....

**2- Dorsal (posterior) body cavity:** divided into two parts that are **continuous** (متصلة) with each other:

- **Cranial cavity:** space inside skull, contains brain
- **Spinal cavity:** space inside vertebral column, contains spinal cord



**Note:**

**diaphragm** (الحجاب الحاجز)

**Thoracic cavity** (تجويف صدري)

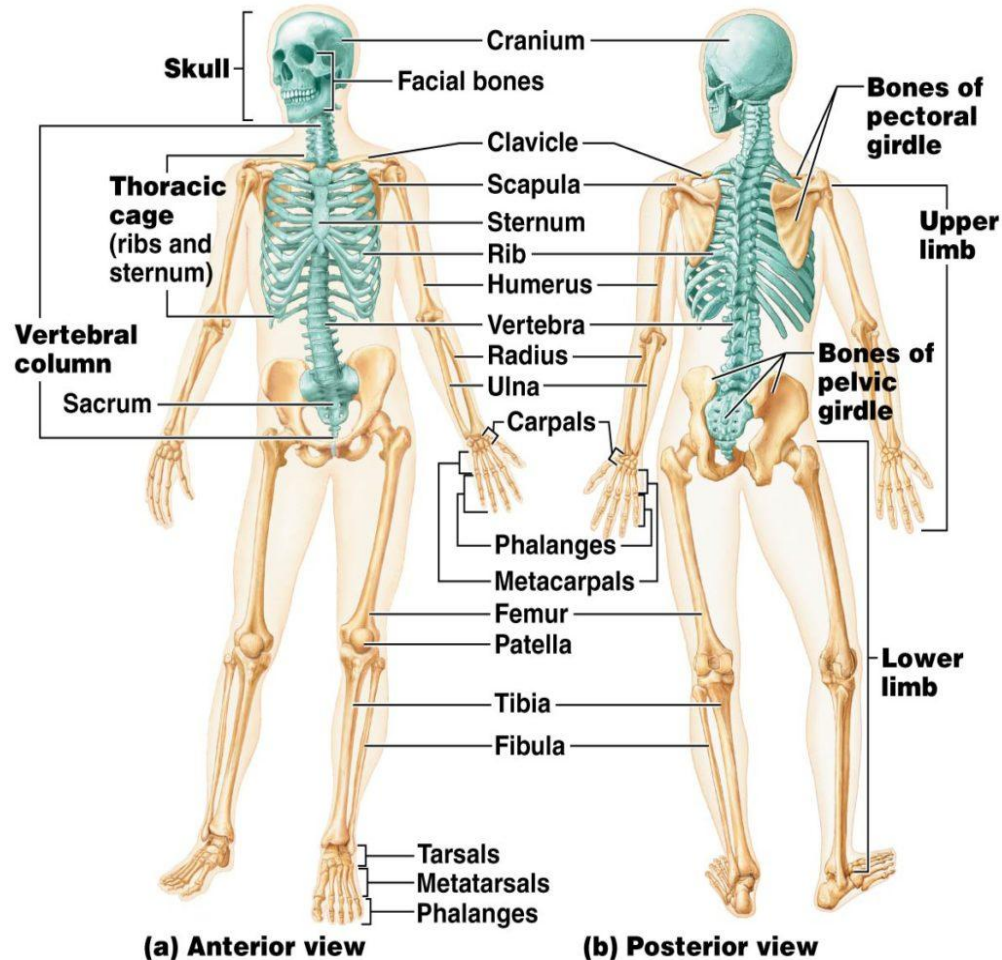
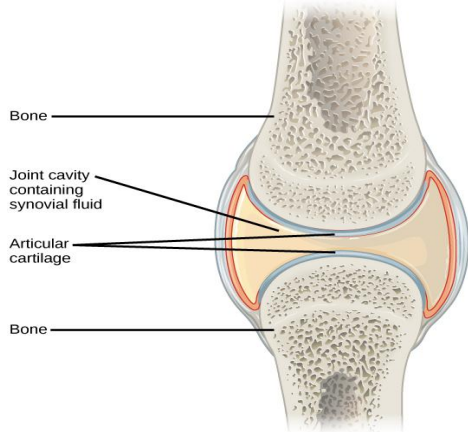
**Cranial cavity** (تجويف الجمجمة)



# Skeletal System

The skeletal system includes:

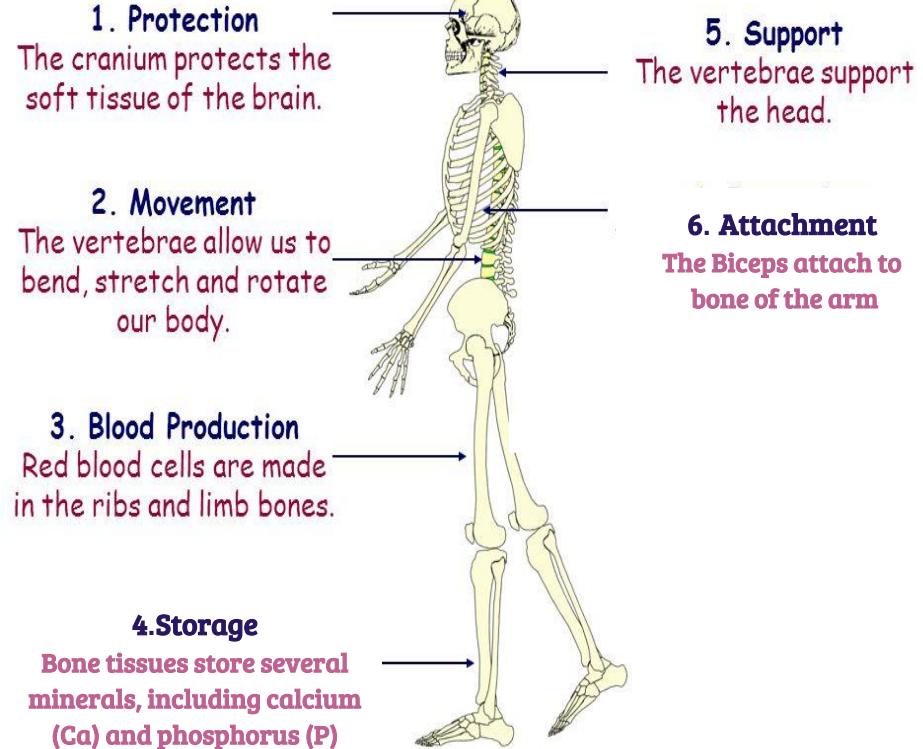
- **Bones**
- **Joints**: which are articulations between bones (المفاصل بين العظام)



# Functions of bone

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

Functions of the Skeleton - Summary

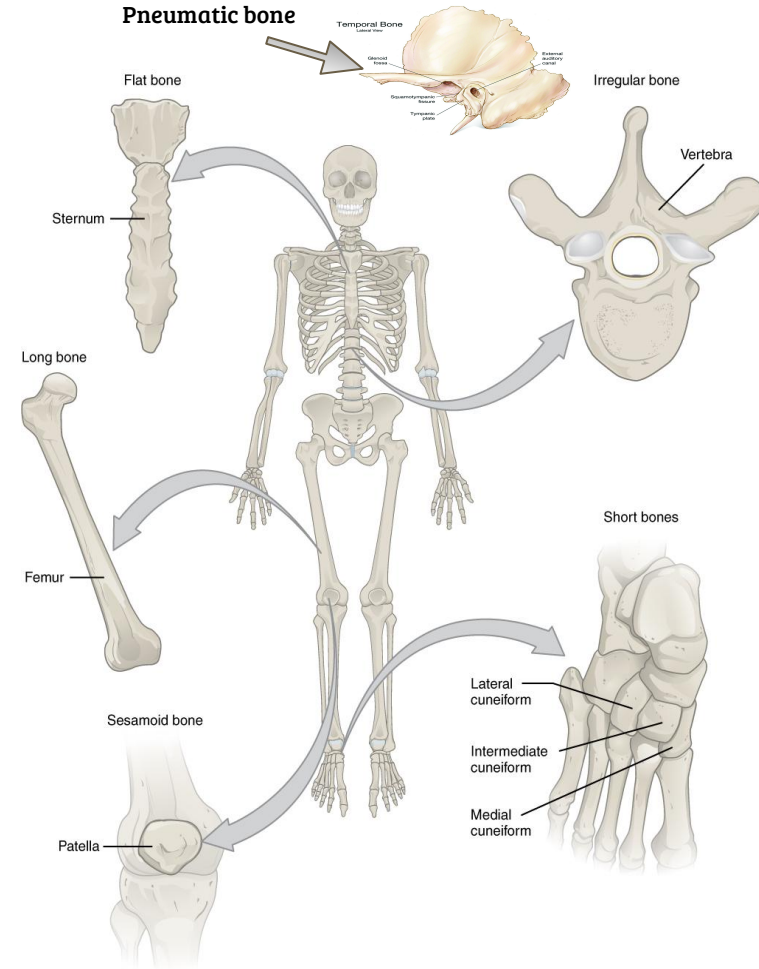


# Classification of Bones

Bones are classified on the bases of their:

## 1. Shape:

- **Long bone** — femur, tibia, fibula
- **Short bone** — carpal & tarsal bones
- **Irregular bone** — vertebrae, sacrum
- **Flat bone** — sternum, parietal & frontal bones of the skull, hip bone
- **Sesamoid bone** (العظم السمسمائي) — patella
- **Pneumatic bone** (العظم الهوائي) — sphenoid bone, temporal bone, paranasal sinuses



# Classification of Bones

## 2. Structure:

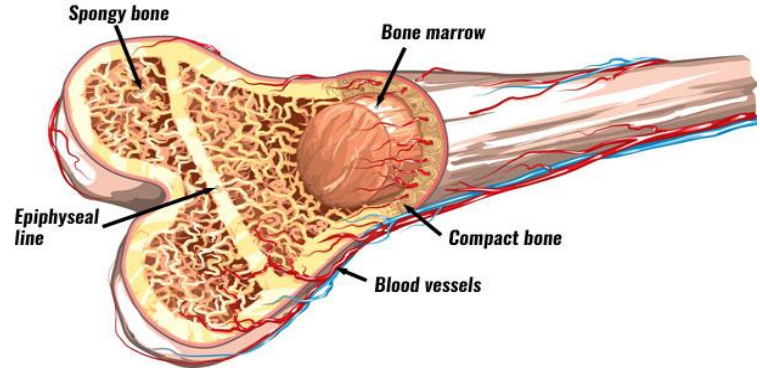
- **Compact bone** ( غير مجوف او المكتنز )
- **Spongy bone** ( العظم الإسفنجي )

## 3. Development:

- **Membrane** or **membranous bones** ( عظم غشائي ): these bones ossify in membrane
- **Cartilage** or **cartilaginous bones** ( عظم غضروفي ): these bones ossify in cartilage, for example, **nose and ear**

Note:

Ossify = turn to bone, يتحول إلى عظم

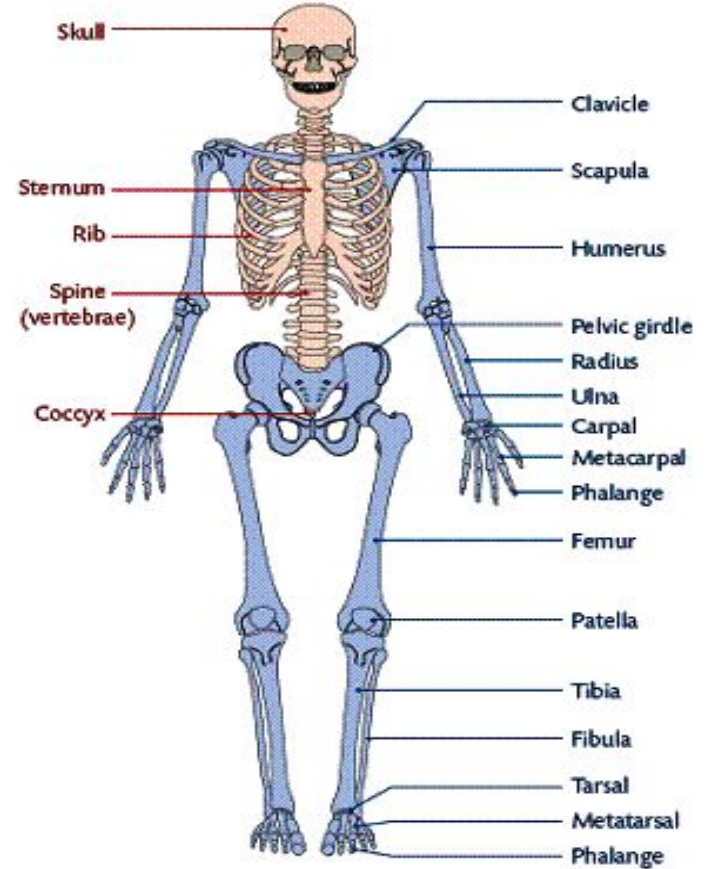


# The Skeleton

The skeleton, which is formed of 206 bones is divided into:

1. **Axial skeleton** (الهيكل المحوري): bones forming the **trunk** (الجذع) (longitudinal axis) of the body
2. **Appendicular skeleton** (الهيكل الطرفي): bones forming the **girdles** (الأحزمة) & **limbs** (الأطراف)

## THE AXIAL SKELETON THE APPENDICULAR SKELETON

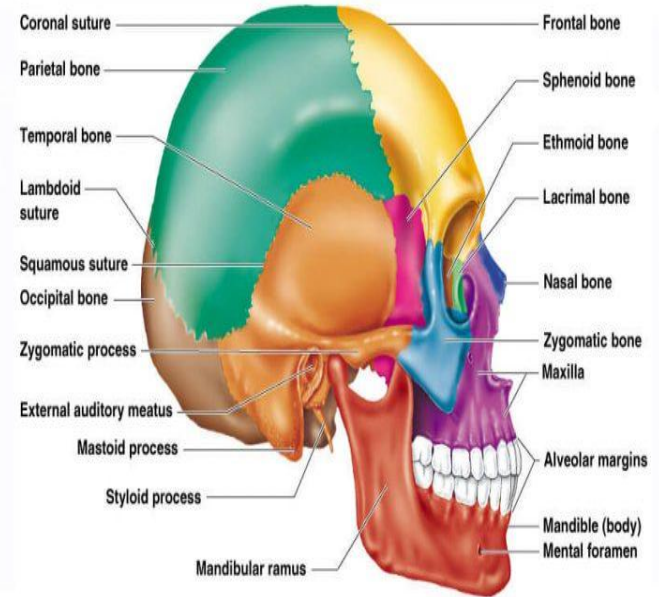


# Bones of the Axial Skeleton (Skull)

The skull consists of:

- **Cranium bones:** these bones enclose the brain; frontal, occipital, parietal (**pair**), temporal (**pair**)
- **Facial bones:** these bones are the bones of the face; maxilla (**pair**), nasal (**pair**), zygomatic (**pair**), mandible (**the only movable bone in the face**)

**Note:** there are 22 bones in the skull 8 of which are paired



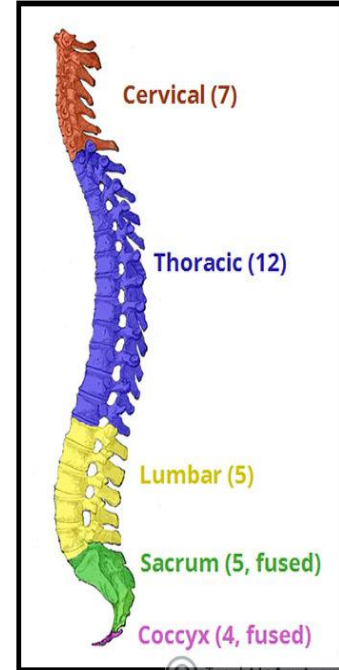
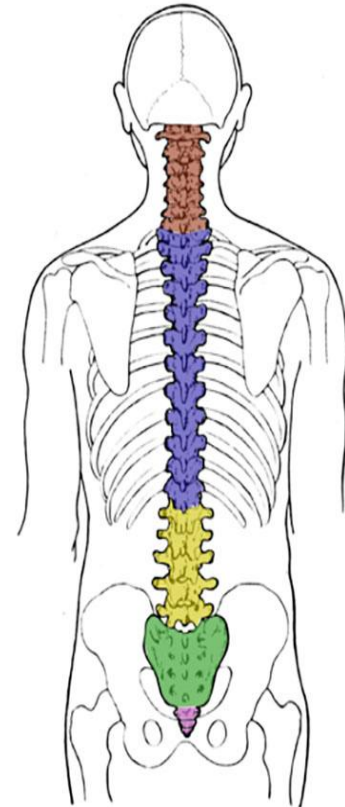
HUMAN SKULL ANATOMY

# Bones of the Axial Skeleton (Vertebral Column)

The vertebral column consists of **33** bones (vertebrae), its functions are to protect the spinal cord and support the body

The vertebral column is formed of:

- **7** cervical vertebrae (الفقرات العنقية)
- **12** thoracic vertebrae (الفقرات الصدرية)
- **5** lumbar vertebrae (الفقرات القطنية او البطنية)
- **5** sacral vertebrae **fused** to form **sacrum** (العَجْز)
- **4** coccygeal vertebrae **fused** to form **coccyx** (العصعص)



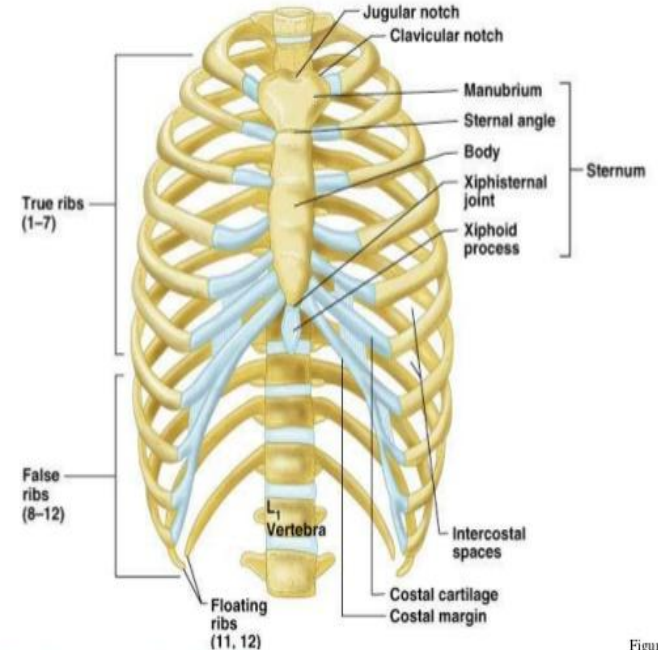
# Bones of Axial Skeleton (Sternum & Ribs)

The sternum (عظم القص) consists of 3 parts:

- Manubrium, body, & xiphoid process

The ribs (الأضلاع):

- There are 12 pairs of ribs
- All ribs articulate with **vertebrae**
- Only the upper 7 pairs articulate with the **sternum**
- **True ribs** (الأضلاع الحقيقية) are 1-7 and they articulate with the sternum
- **False ribs** (الأضلاع الكاذبة) are 8-10 and they do not articulate with the sternum directly but they connect with the 7th rib by cartilage
- **Floating ribs** (الأضلاع العائمة) are 11 & 12 and they are not connected to the sternum





# Bones of the Appendicular skeleton

## 1- Pectoral Girdle (حزام الصدر):

Connects the upper limb with the axial skeleton.

### Formed of:

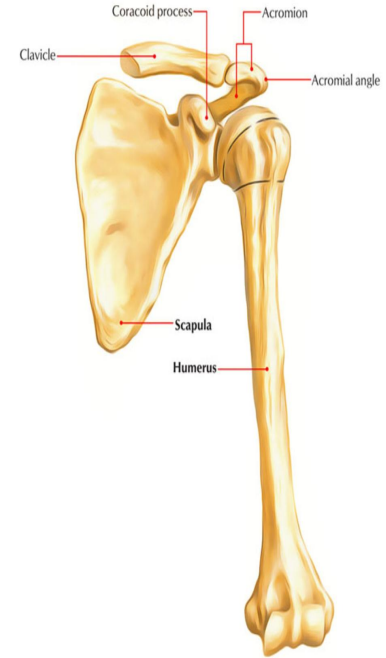
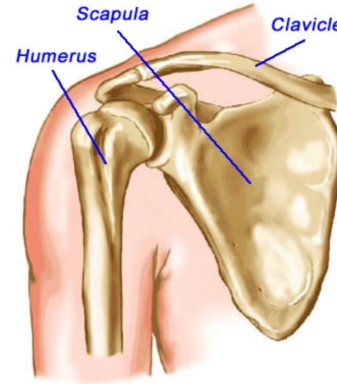
- Clavicle
- Scapula

(2 bones on each side)

Note : pectoral girdle also known as (shoulder girdle)

The girdles connect the appendicular skeleton to the axial skeleton.

Pectoral: Upper limb —> axial



# Bones of the Appendicular skeleton

## 2- Pelvic girdle(حزام الحوض):

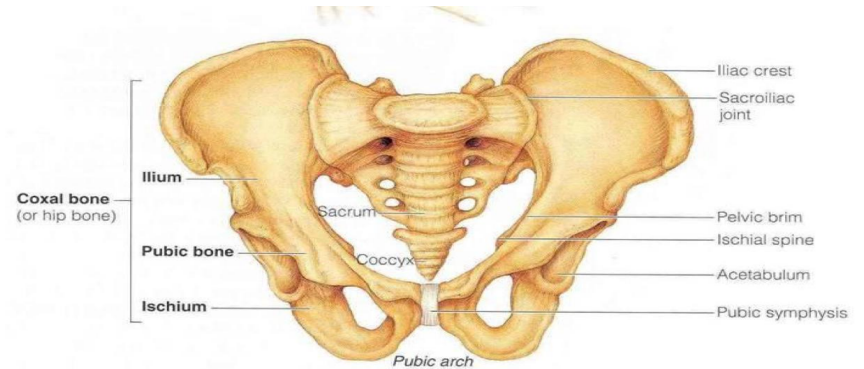
Connects the lower limb with the axial skeleton.

Formed of: Hip Bone.

There are 2 hip bones (One bone on each side)

Note: The girdles connect the appendicular skeleton to the axial skeleton.

Pelvic: Lower limb → axial



# Bones of Appendicular skeleton

## Upper limb

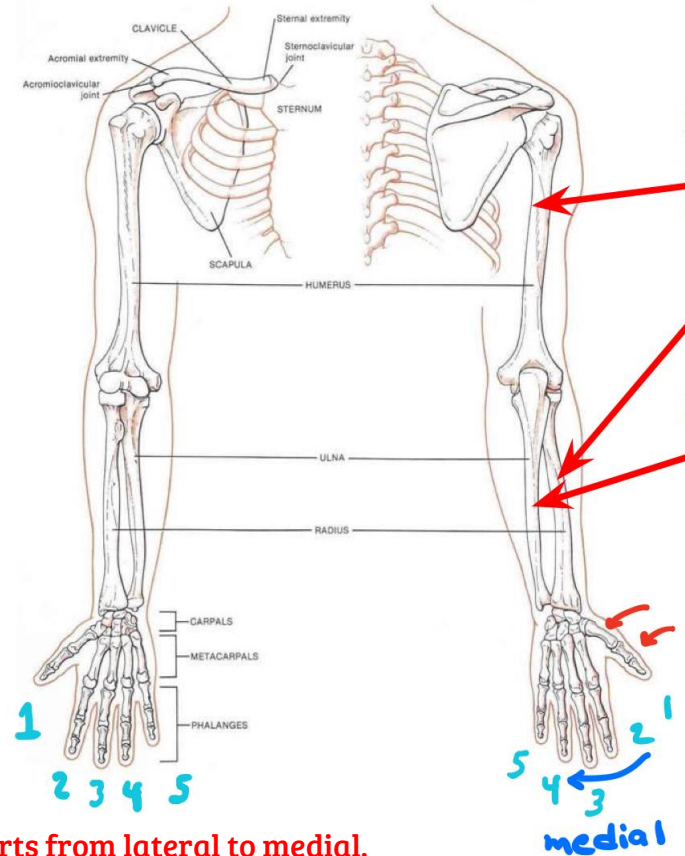
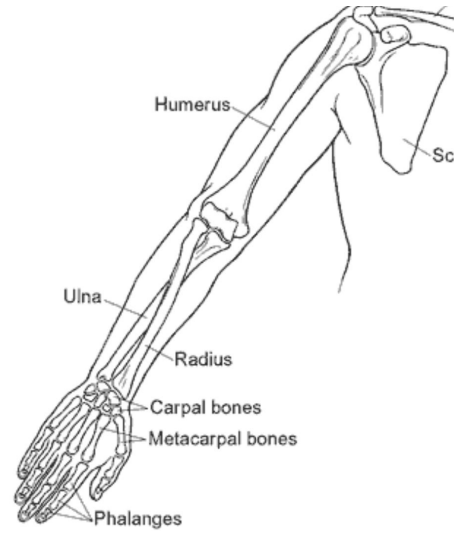
### Bone of Arm: Humerus

### Bones of Forearm:

- Radius (Lateral)
- Ulna (Medial)

### Bones of Hand:

- 8 Carpals
- 5 Metacarpals
- 14 Phalanges (2 for thumb and 3 for each of the 4 medial fingers)



Counting starts from lateral to medial.

# Bones of Appendicular skeleton

## Lower limb:

Bone of Thigh: Femur

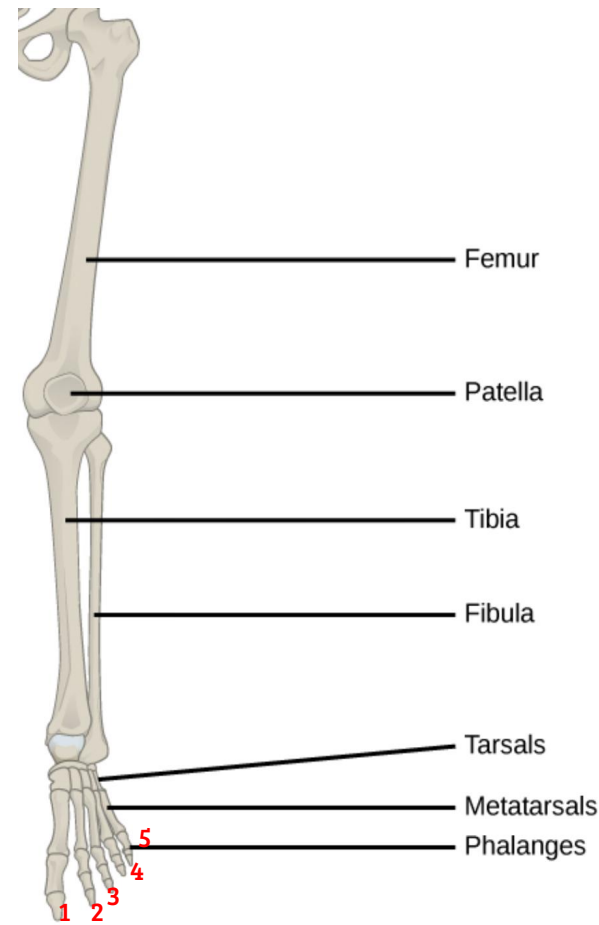
## Bones of Leg:

- Fibula (Lateral)
- Tibia (Medial)

Patella (kneecap) (sesamoid bone).

## Bones of foot:

- 7 Tarsal bones
- 5 Metatarsal bones
- 14 Phalanges ( 2 for the big toe and 3 for each of the 4 lateral toes)



Counting starts from medial to lateral

# Long Bones

## Formed of:

- A Shaft (diaphysis):

Composed of Compact bones

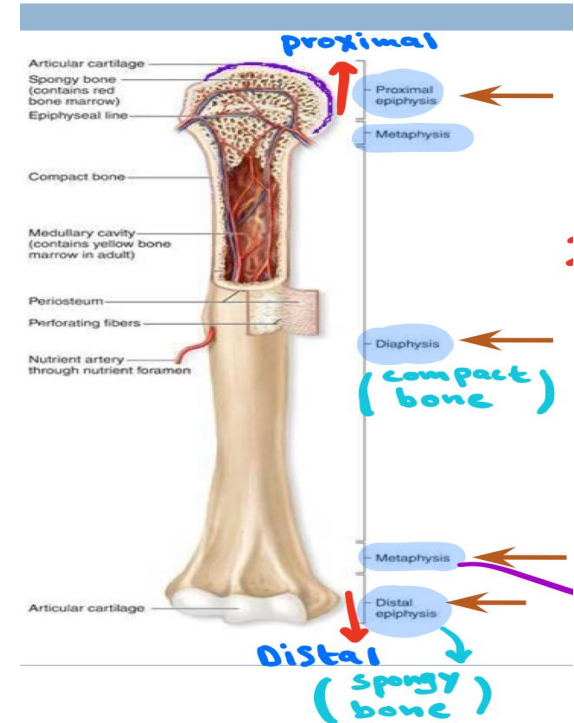
- 2 ends (epiphysis):

Composed of spongy bones.

- The Metaphysis:

The region of contact between epiphysis and diaphysis.

It contains epiphyseal plate of cartilage (responsible for linear bone growth).



# MCQs

**Question 1:** Gross Anatomy is the study of human body with

- A. Light Microscope
- B. Naked Eye
- C. Electron Microscope
- D. radiation

**Question 2:** Which answer describes the "Anatomical Position"?

- A. Standing erect, arms at side, palms facing to your side, Feet are parallel
- B. Standing erect,, arms at side, palms facing forward, Feet are anti-parallel
- C. Standing erect, arms at side, palms facing forward, Feet are parallel
- D. Standing erect,, arms at side, palms facing outward.

**Question 3:** What does (cranial) means?

- A. Inferior
- B. Anterior
- C. Posterior
- D. Superior

**Question 4:** Name of chest bone in axial skeleton of human body is:

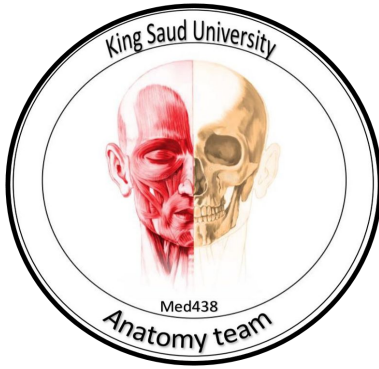
- A. vertebrae
- B. Sternum
- C. ulna
- D. Clavicle

**Question 5:** Cross plane divides the body into?

- A. superior & inferior
- B. anterior & posterior
- C. superior & posterior
- D. left & right

**Question 6:** Sternum bone is classified in terms of shape :

- A. Irregular
- B. Flat
- C. Long
- D. Short



**Good luck to you all**

## Team members

### Boys team:

- Khalid AL-Dossari
- Naif Al-Dossari
- Faisal Alqifari
- Salman Alagla
- Ziyad Al-jofan
- Suhail Basuhail
- Ali Aldawood
- Khalid Nagshabandi

### Girls team :

- Ajeed AlRashoud
- Taif Alotaibi
- Noura Alturki
- Amirah Al-zahrani
- Alhanouf Al-haluli
- Sara Al-Abdulkarim
- Rawan Alzayed
- Reema Almasoud
- Renad Alhaqbani
- Nouf Alhumaidhi
- Fay AlBuqami
- Jude Alkhalifah
- Nouf Alhussaini

### Team leaders

- Abdulrahman Shadid
- Ateen Almutairi

---

Contact us: Twitter : @Anatomy438