OBJECTIVES:

By the end of this lecture, student should:

- understand the knowledge and information regarding Skeletal System of human body
- The two major divisions of skeletal system (the axial skeleton and the appendicular skeleton)

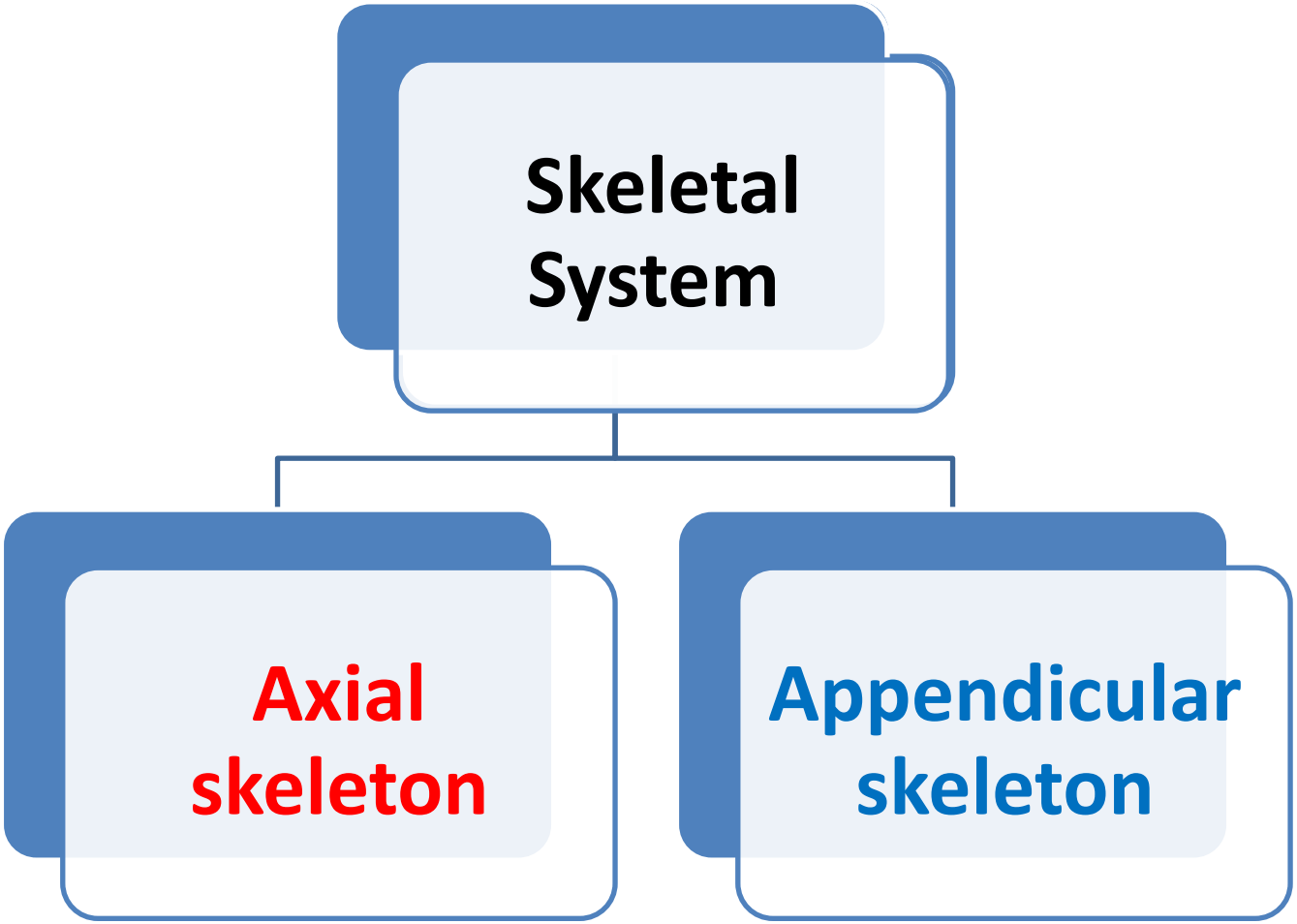
The Skeletal System

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

Skeletal System Anatomy

- 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.**

Skeletal System Anatomy



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

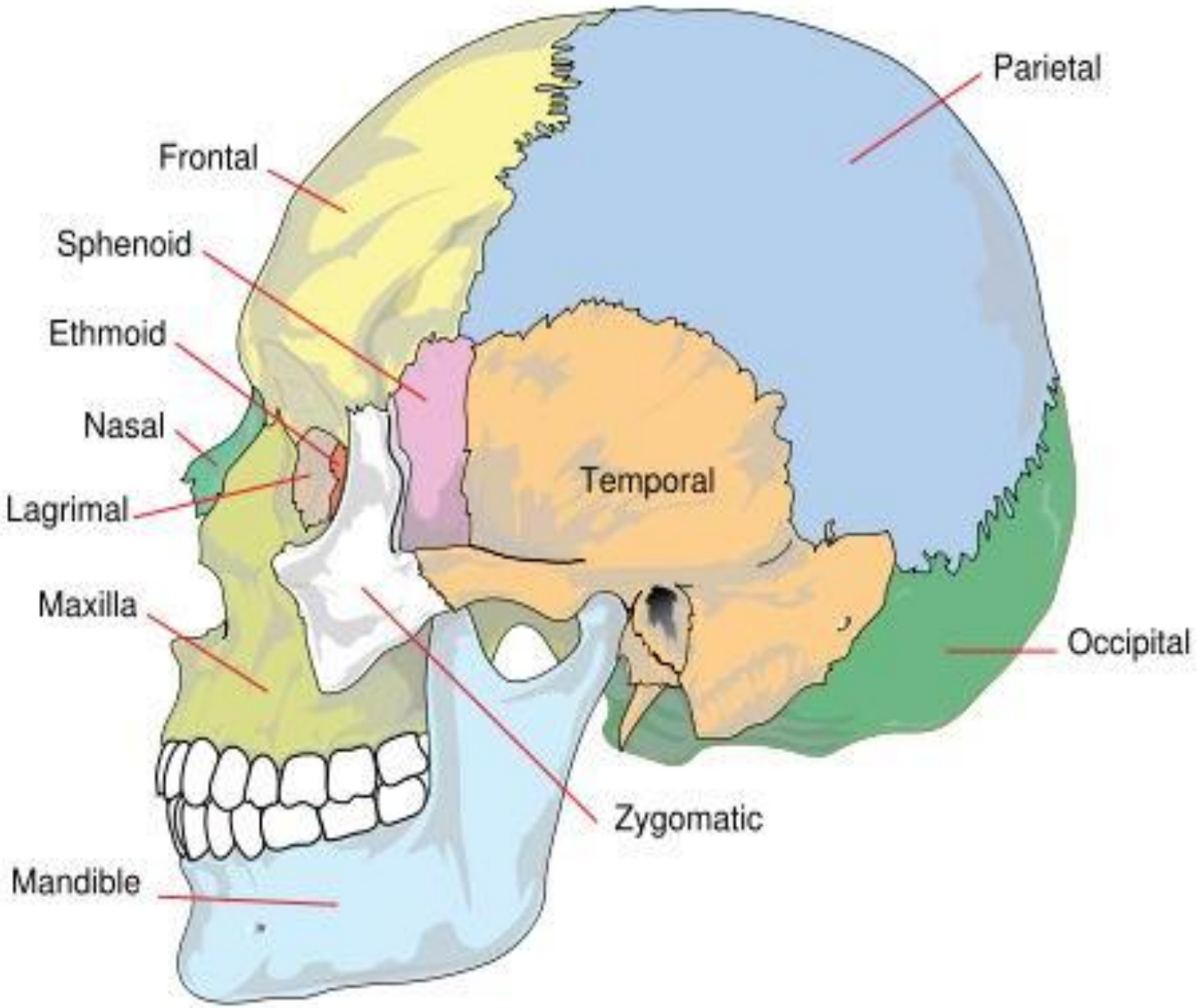
The **appendicular skeleton** is made up of **126** bones in the following regions:

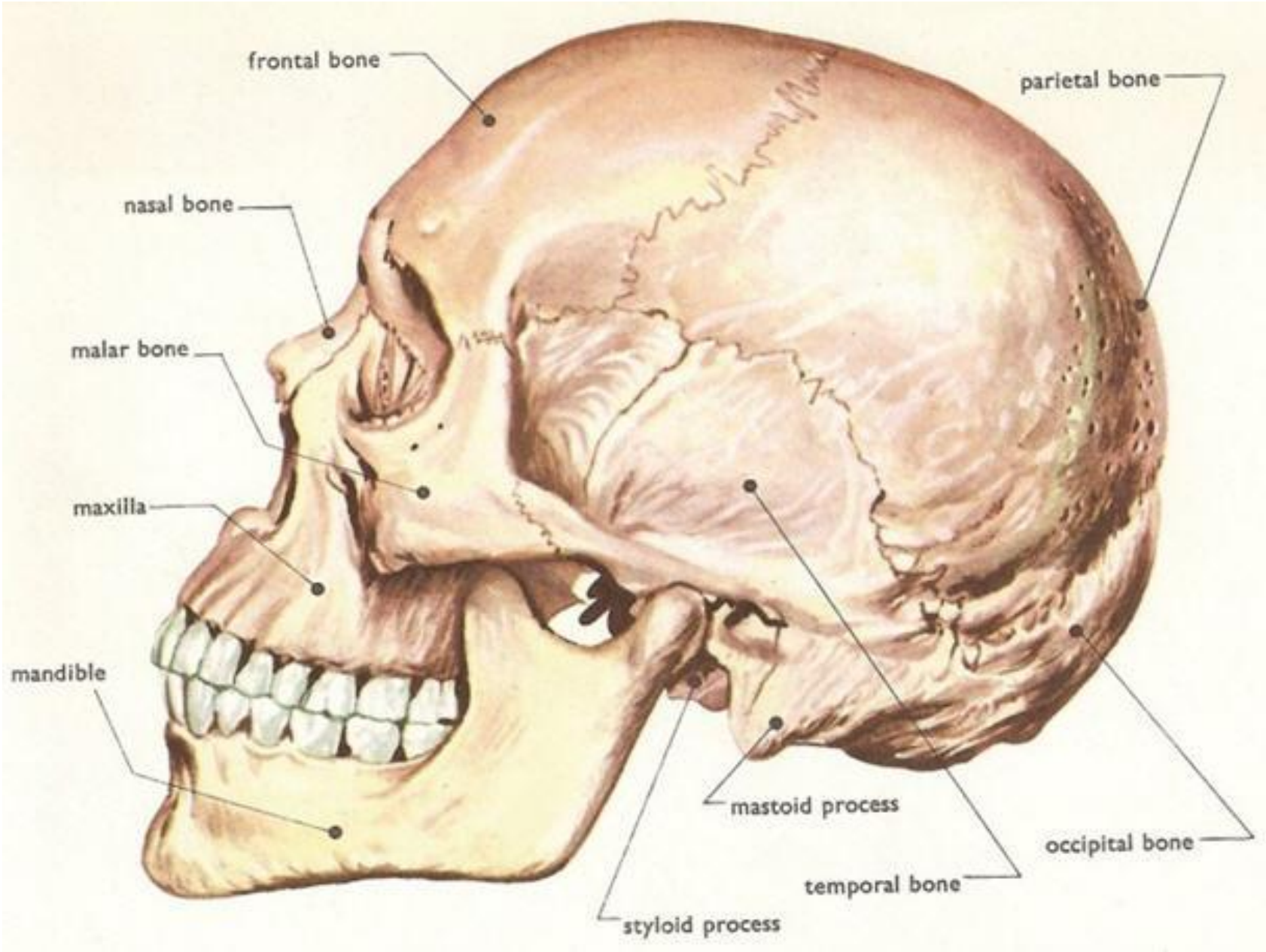
- Upper limbs
- Lower limbs
- Pelvic girdle
- Pectoral (shoulder) girdle

The axial skeleton

The skull:

- The **skull** is composed of **22** bones that are fused together except for the **mandible**.
- These **21** fused bones are separate in children to allow the skull and brain to grow, but fuse to give added strength and protection as an adult.
- The **mandible** forms the only movable joint in the skull.

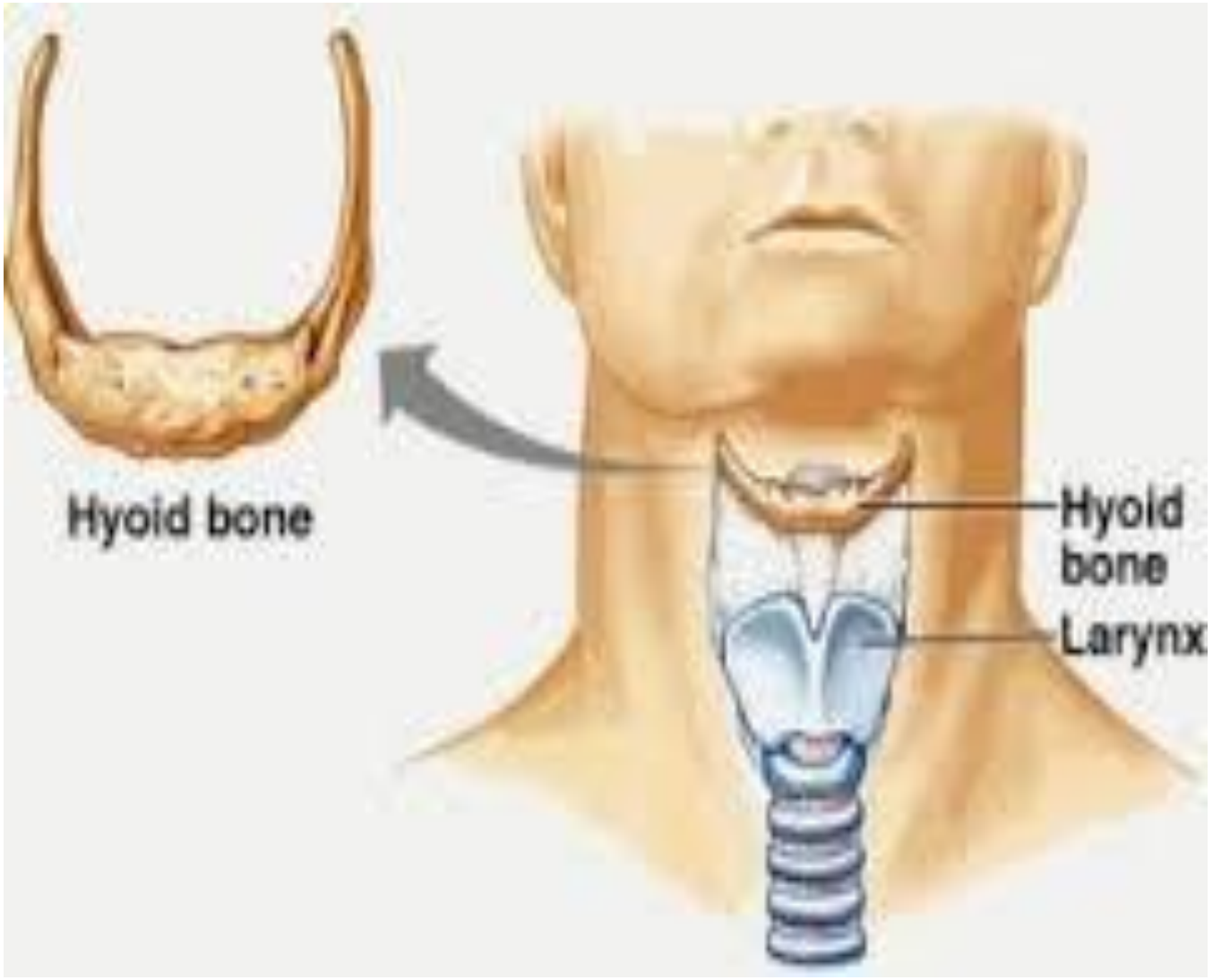

Parietal
Frontal
Sphenoid
Ethmoid
Nasal
Lagrimal
Temporal
Maxilla
Occipital
Zygomatic
Mandible


frontal bone
parietal bone
nasal bone
malar bone
maxilla
mandible
mastoid process
occipital bone
temporal bone
styloid process

- 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.

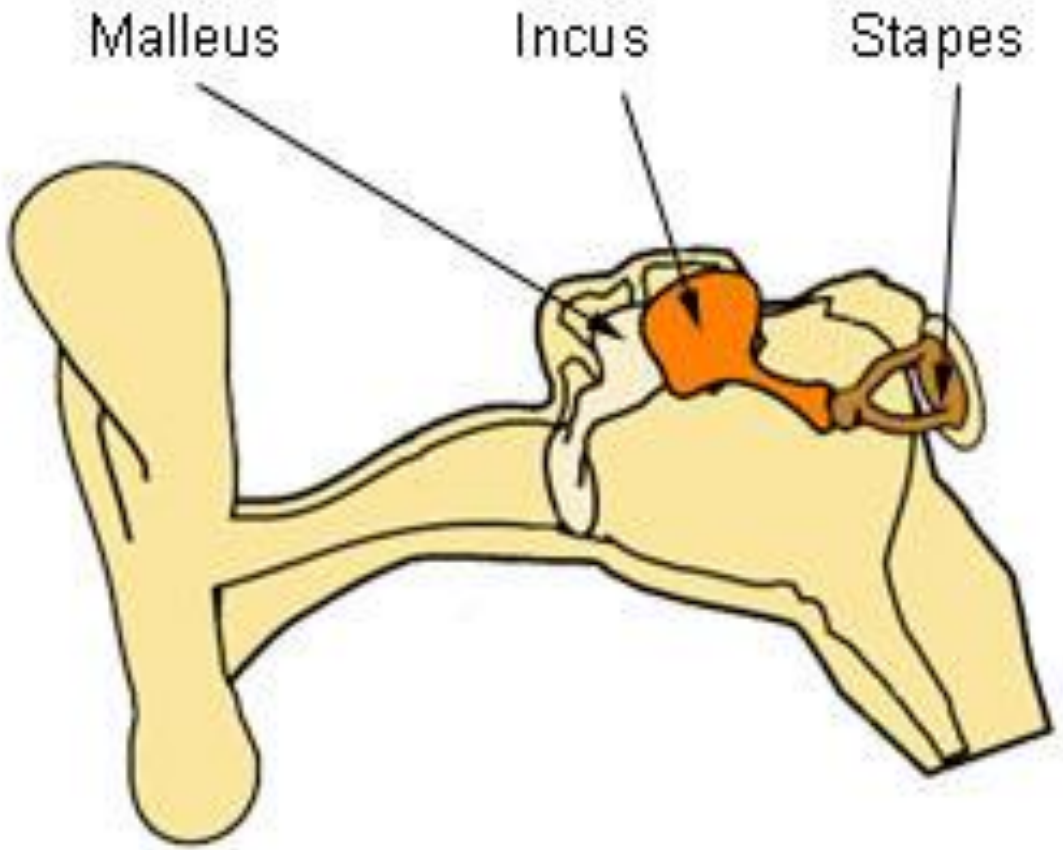
Hyoid:

- 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**.
- The hyoid's function is to help hold the trachea open and to form a bony connection for the tongue muscles.

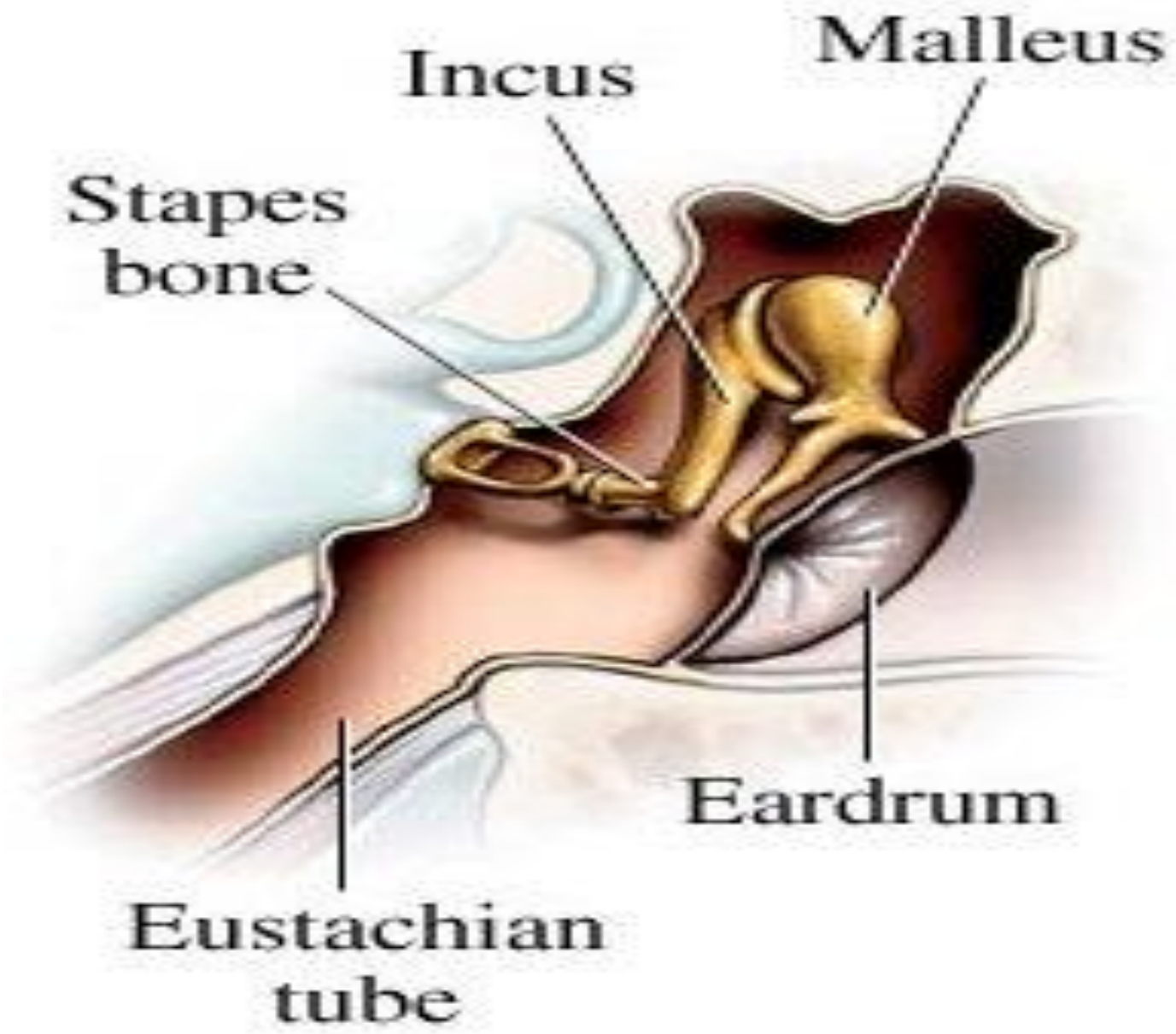

Hyoid bone
Hyoid bone
Larynx

The auditory ossicles:

- 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.

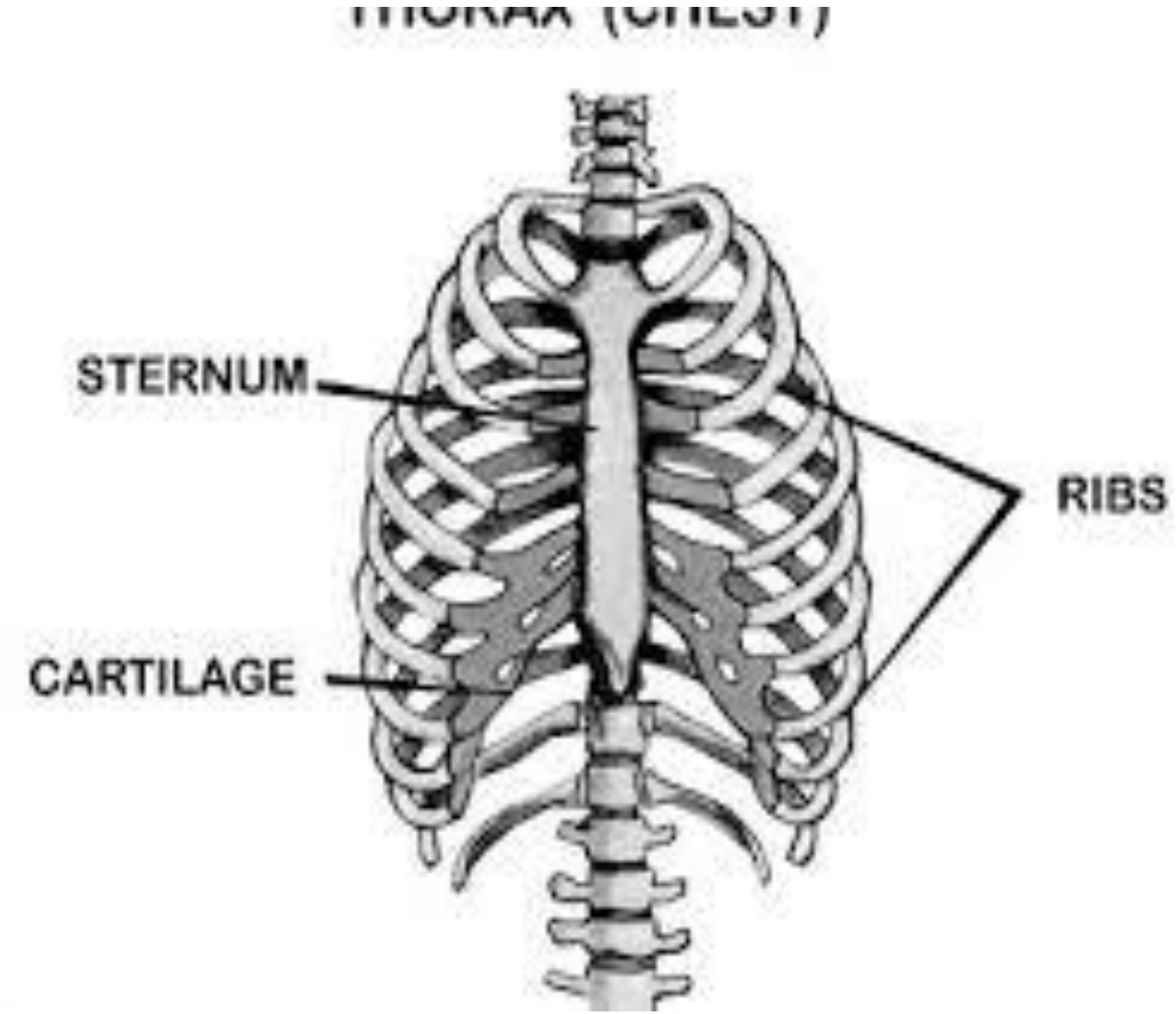


Cranial Bones


Malleus
Incus
Stapes bone
Eardrum
Eustachian tube

The sternum:

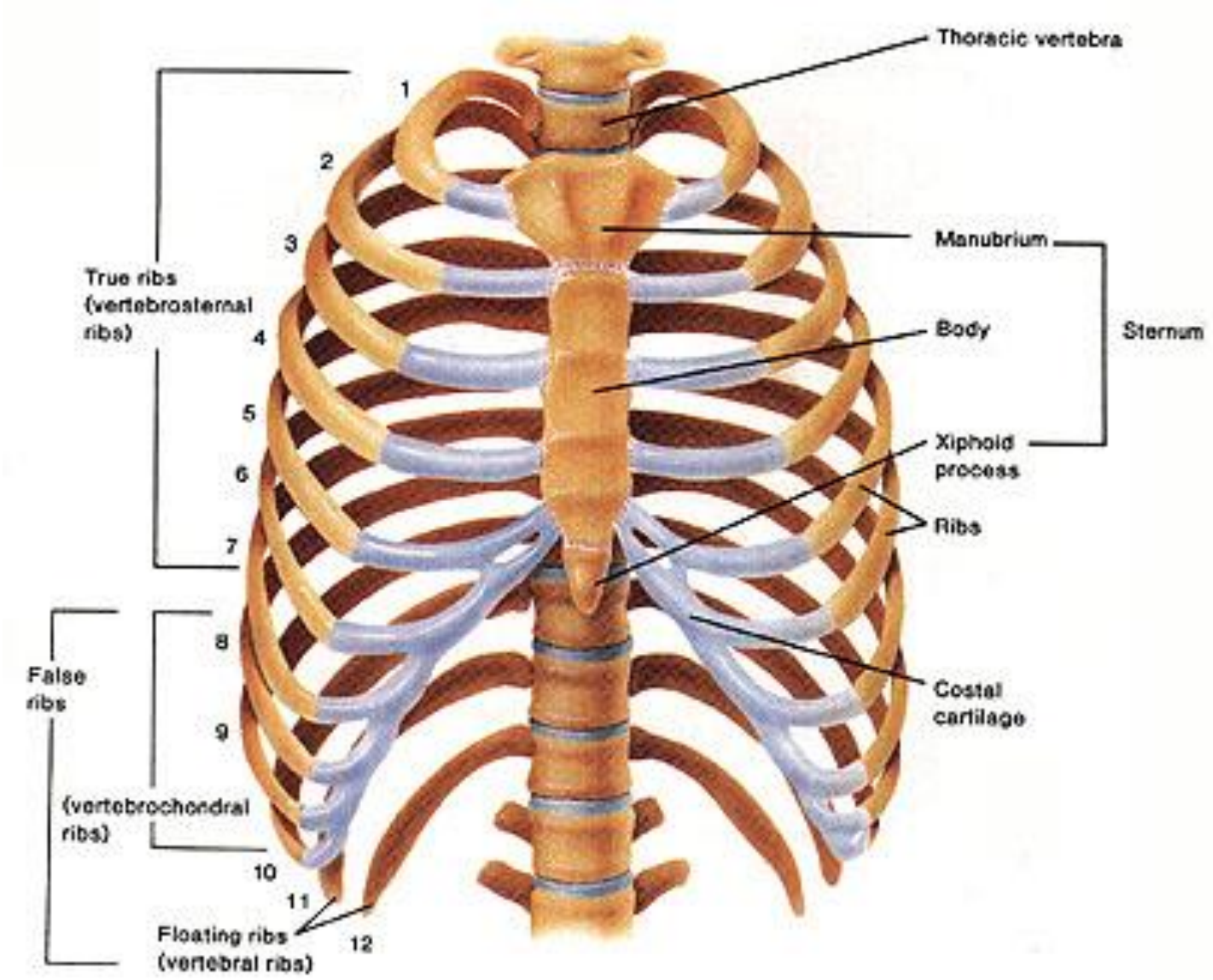
- The sternum, is a thin, **knife-shaped** bone located along the midline of the anterior side of the thoracic region of the skeleton.
- The sternum connects to the ribs by thin bands of cartilage called the **costal** cartilage.


STERNUM
RIBS
CARTILAGE

The ribs:

- There are **12** pairs of ribs.
- The **first seven ribs** are known as "**true ribs**" because they connect the thoracic vertebrae **directly** to the sternum.

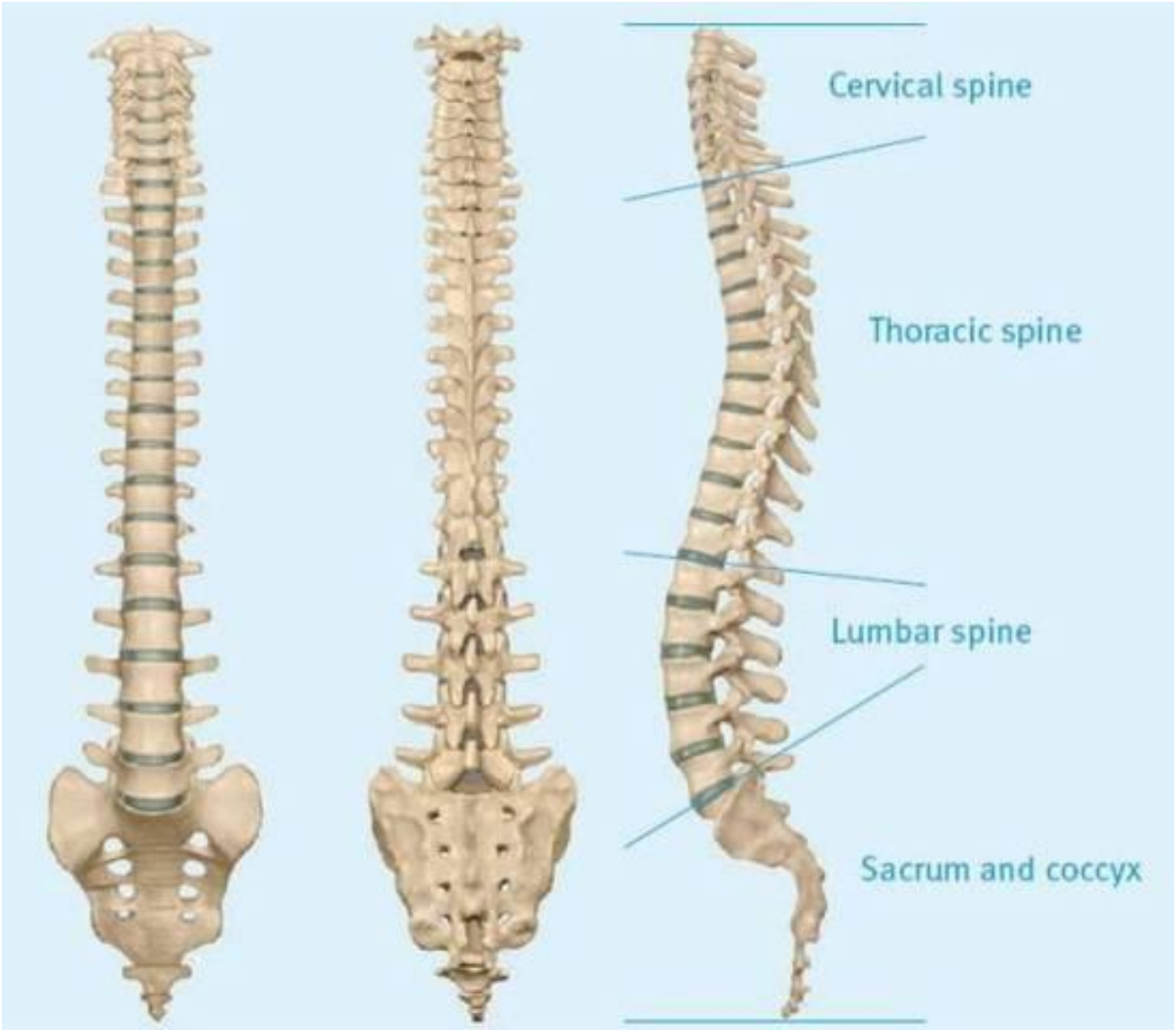
- Ribs 8, 9, and 10 all connect to the sternum through cartilage that is connected to the cartilage of the **seventh rib**, so we consider these to be "**false ribs.**"
- Ribs 11 and 12 are also false ribs, but are also considered to be "floating ribs" because they do not have any cartilage attachment to the sternum at all.


Thoracic vertebra
1
2
3
Manubrium
Sternum
True ribs
(vertebrosternal
ribs)
4
Body
5
6
Xiphoid
process
Ribs
7
8
False
ribs
Costal
cartilage
9
(vertebrochondral
ribs)
10
11
Floating ribs
(vertebral ribs)
12

Vertebrae:

- **Twenty-six** vertebrae form the vertebral column of the human body. They are named by region:

- Cervical (neck) - **7** vertebrae
- Thoracic (chest) - **12** vertebrae
- Lumbar (lower back) - **5** vertebrae
- Sacrum - **1** vertebra
- Coccyx (tailbone) - **1** vertebra


Cervical spine
Thoracic spine
Lumbar spine
Sacrum and coccyx

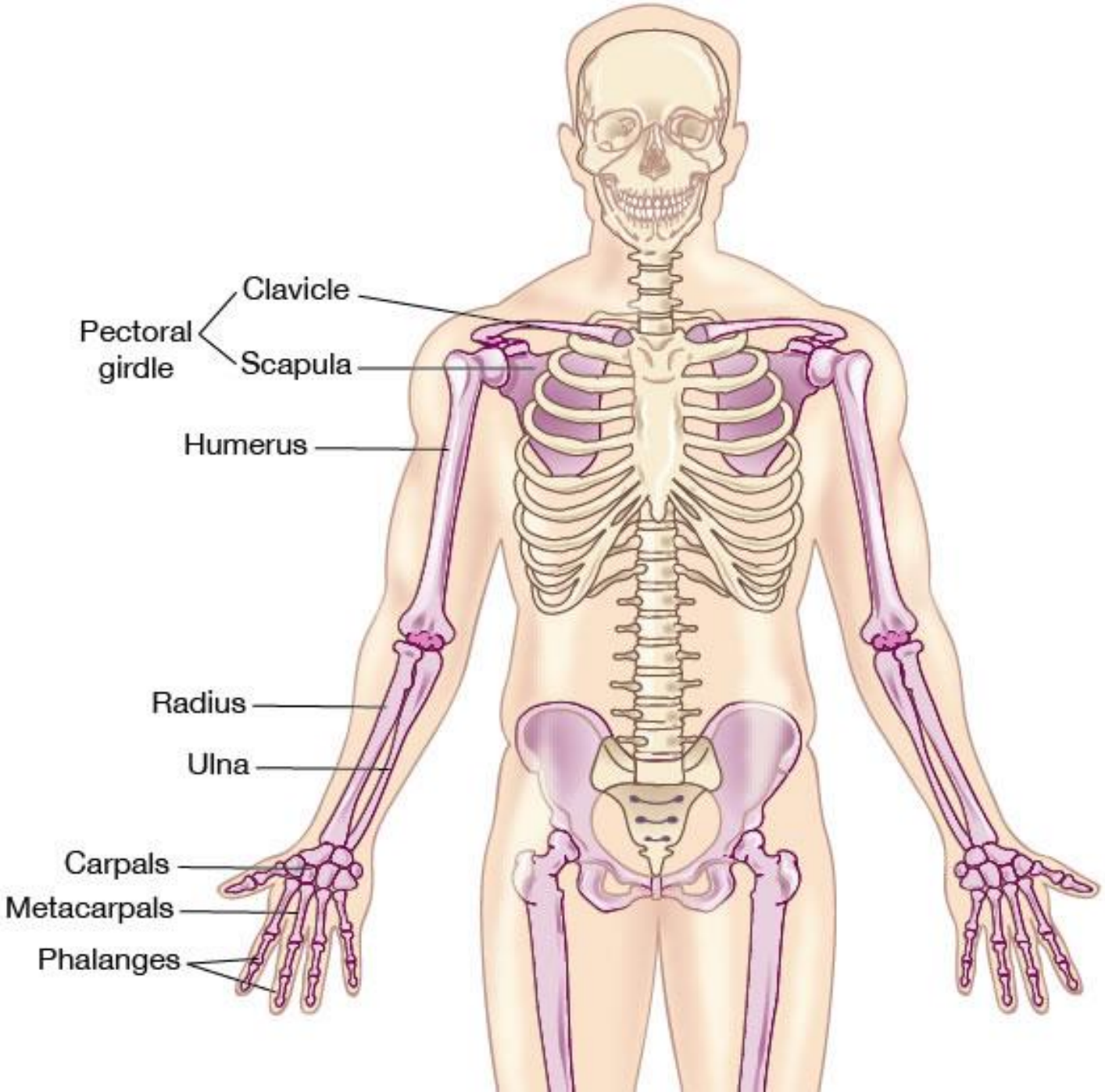
The appendicular skeleton

Pectoral Girdle

- The pectoral girdle connects the upper limb (arm) bones to the axial skeleton and consists of the left and right **clavicles** and left and right **scapulae**.

The upper Limb:

- The **humerus** is the bone of the upper arm. It forms the ball and socket joint of the shoulder with the scapula and forms the elbow joint with the lower arm bones.
- The radius and ulna are the two bones of the forearm.


Clavicle
Pectoral girdle
Scapula
Humerus
Radius
Ulna
Carpals
Metacarpals
Phalanges

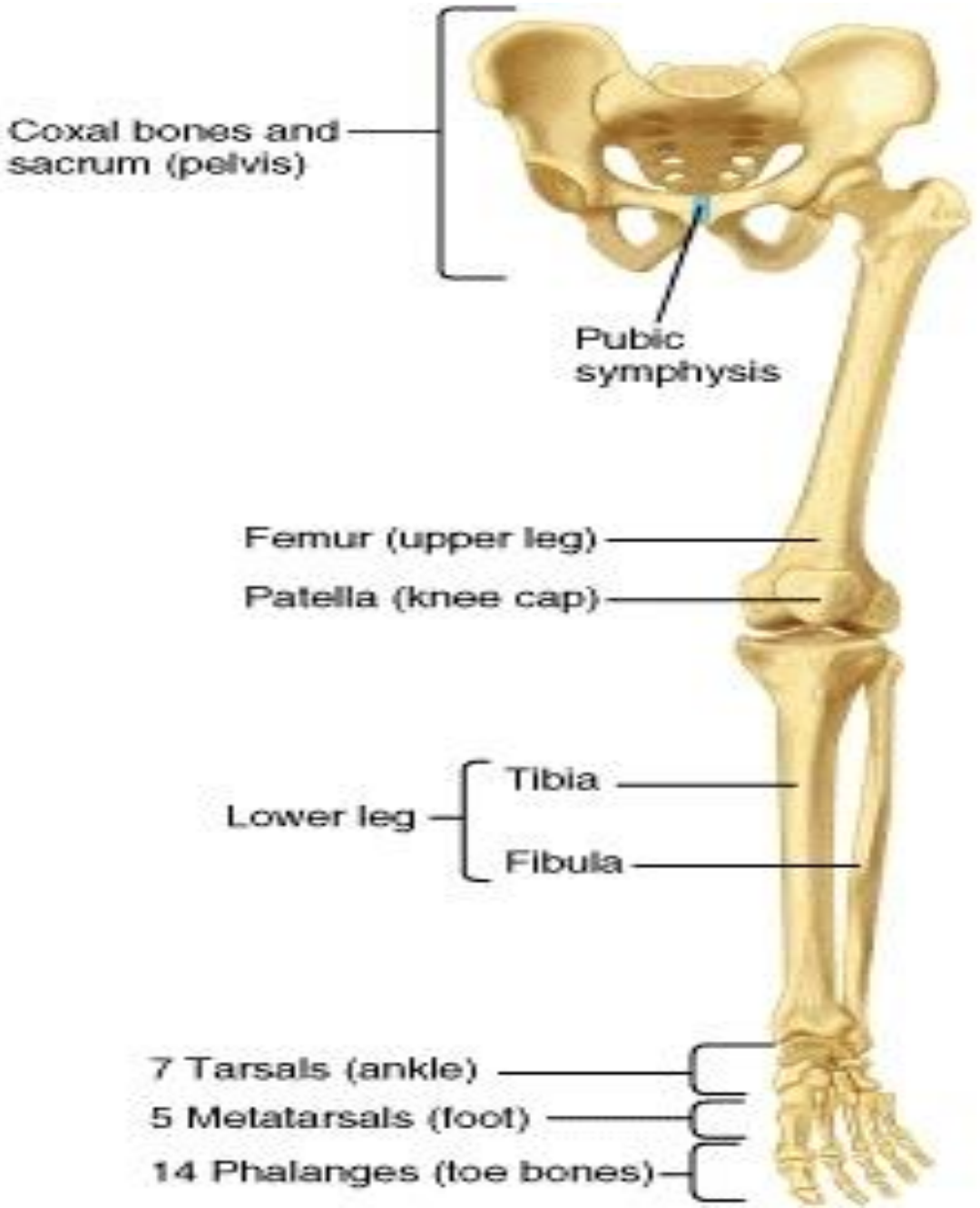
- The lower arm bones form the wrist joint with the **carpals**, a group of eight small bones that give added flexibility to the wrist.
- The carpals are connected to the five **metacarpals** that form the bones of the hand and connect to each of the fingers.
- Each finger has three bones known as **phalanges,** except for the thumb, which only has two phalanges.

Pelvic Girdle :

- Formed by the left and right **hip bones**, the pelvic girdle connects the lower limb (leg) bones to the axial skeleton.

The Lower Limb:

- The **femur** is the largest bone in the body.


Coxal bones and sacrum (pelvis)
Pubic symphysis
Femur (upper leg)
Patella (knee cap)
Lower leg
Tibia
Fibula
7 Tarsals (ankle)
5 Metatarsals (foot)
14 Phalanges (toe bones)

- The femur forms the ball and socket hip joint with the hip bone and forms the knee joint with the tibia.

- The tarsals are a group of seven small bones that form the posterior end of the foot and heel.
- The tarsals form joints with the five long metatarsals of the foot.
- Then each of the metatarsals forms a joint with one of the set of phalanges in the toes.
- Each toe has three phalanges, except for the big toe, which only has two phalanges.

Thank you