Skeletal System

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Human Anatomy

Fall Semester

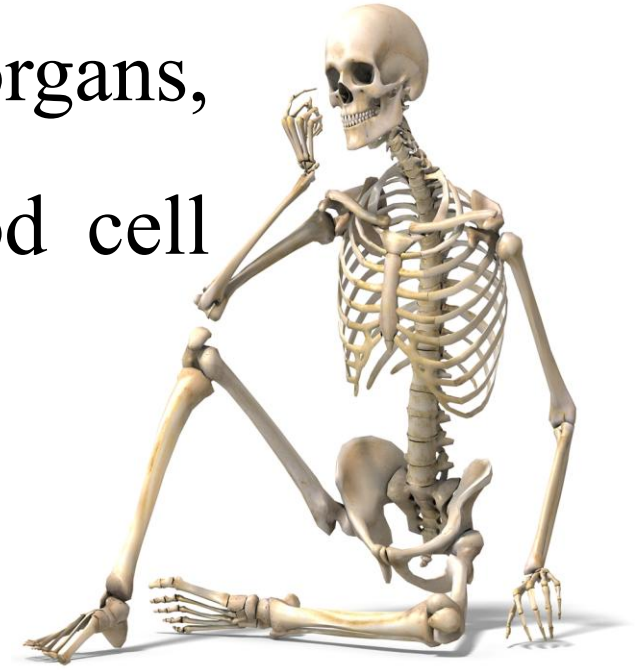
Week 3

Outlines

- **Definitions**
- **Functions**
- **Types of Bone**
- **Divisions of Skeletal system**

Skeletal System

The **skeletal system** is the complex structure composed of bones, cartilage, ligaments, and tendons that provides support and shape to the body, protects vital organs, enables movement, and serves as a site for blood cell production and mineral storage.



Skeletal System

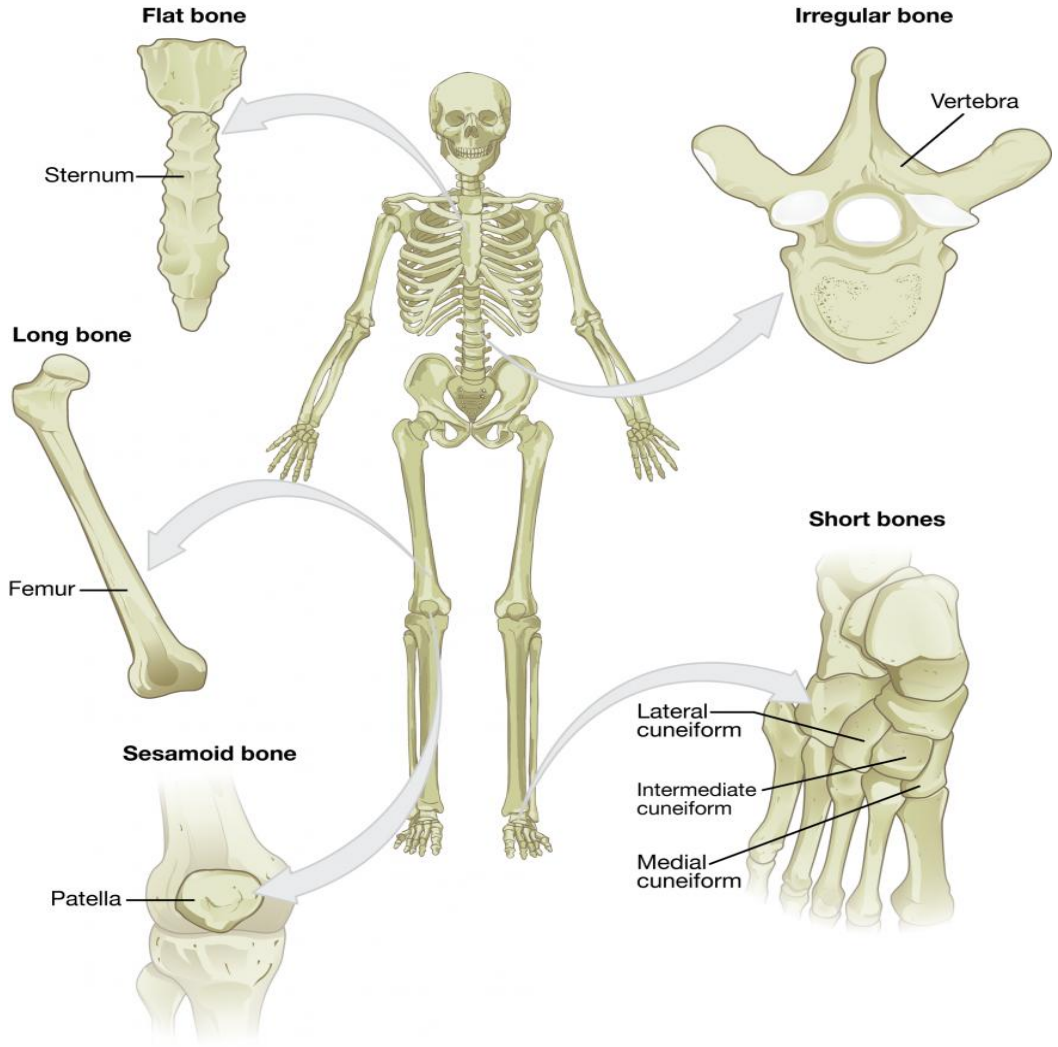
The **skeletal system** in adults typically consists of **206 bones**, though this number can vary slightly due to variations such as additional small bones called sesamoid bones or variations in the number of certain vertebrae.

Functions of Skeletal System

1. **Support**: Provides a rigid structure for the body.
2. **Protection**: Shields vital organs (e.g., the skull protects the brain).
3. **Movement**: Bones act as levers; muscles attach to bones to facilitate movement.
4. **Mineral Storage**: Stores minerals like calcium and phosphorus, which are essential for various bodily functions.
5. **Blood Cell Production**: Bone marrow produces red blood cells, white blood cells, and platelets.

Types of Bones

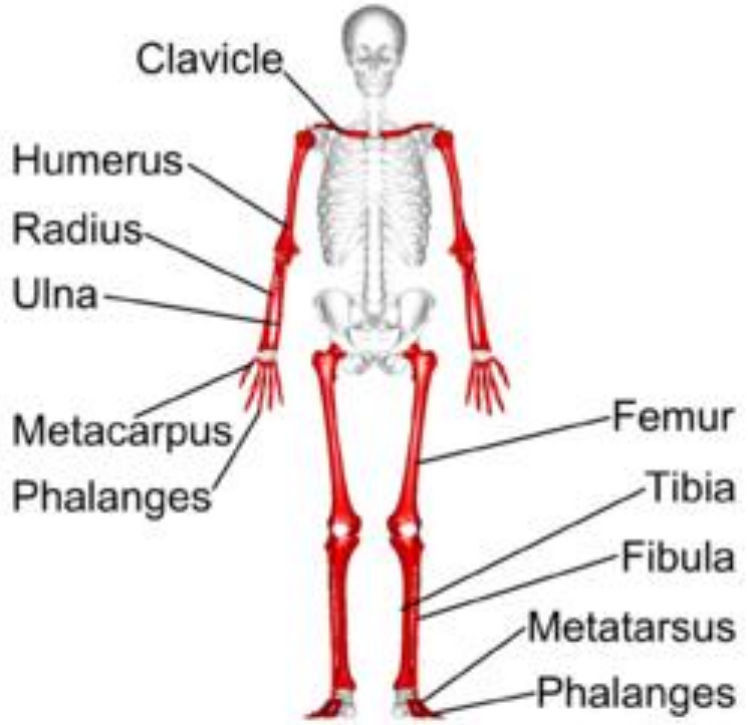
1. Long bone
2. Short bone
3. Flat bone
4. Irregular bone
5. Sesamoid bone



Types of Bones 1. Long Bones

Long bones are one of the major types of bones in the skeletal system, characterized by their elongated shape and essential role in supporting weight and facilitating movement.

- Found in the limbs
- Each bone is made of a body (diaphysis) and two extremities (epiphyses)
- Wall consists of dense tissue
- Central canal called **medullary canal** is filled with **marrow**



Types of Bones 2. Short Bones

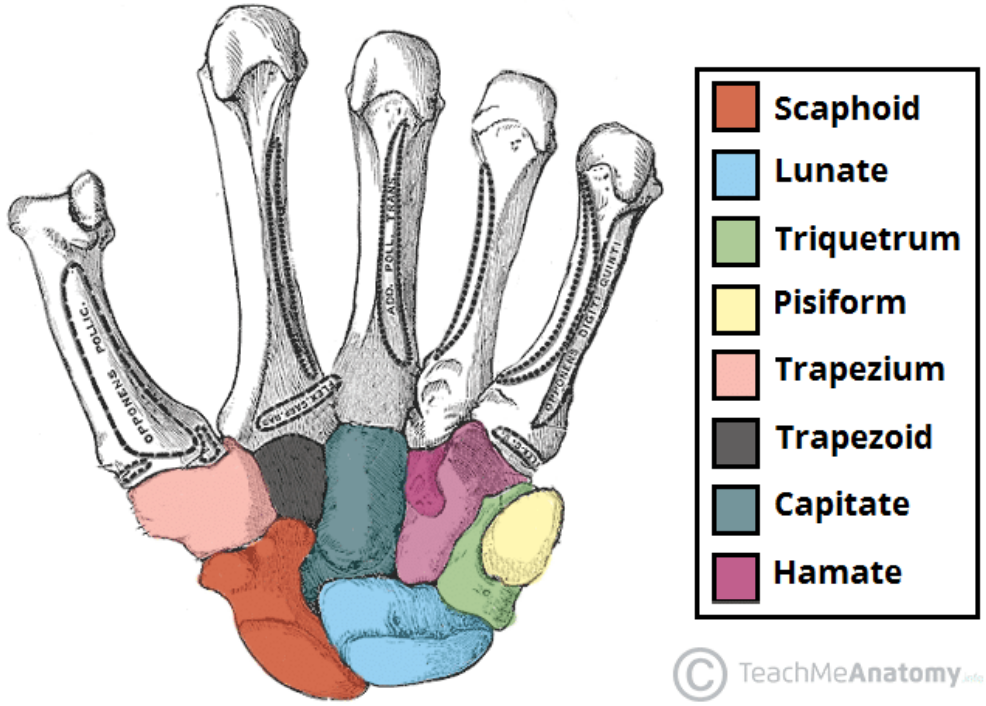
Short bones are a type of bone characterized by their roughly cube-like shape, being as wide as they are long. They provide **stability and support** while allowing for some **flexibility and movement**

- Found in skeleton where strength, compactness, and limited movement are desired
- 2 main examples
  - Tarsus
  - Carpus

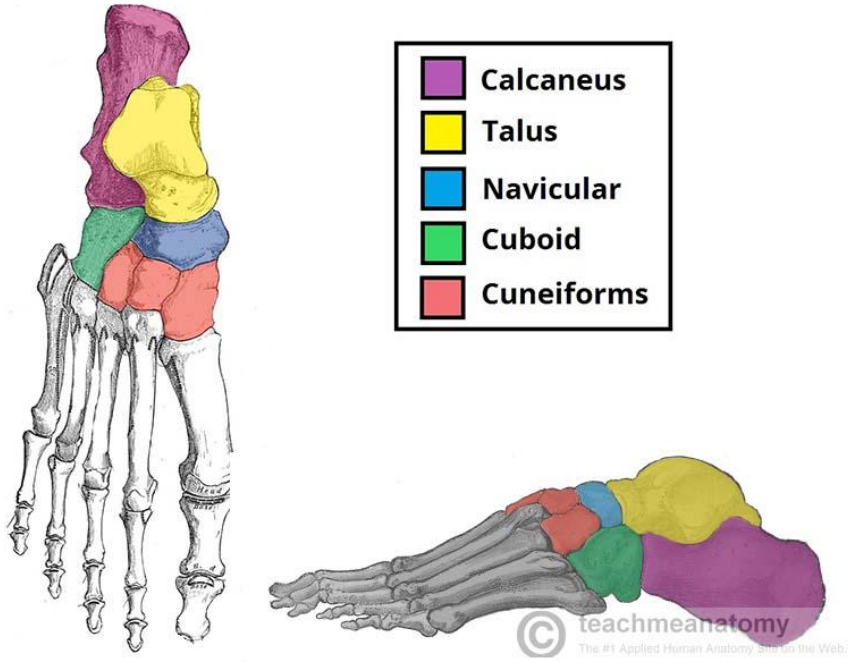
Types of Bones 2.Short Bones

Examples of Short Bones:

1.Carpals: The eight bones of the wrist



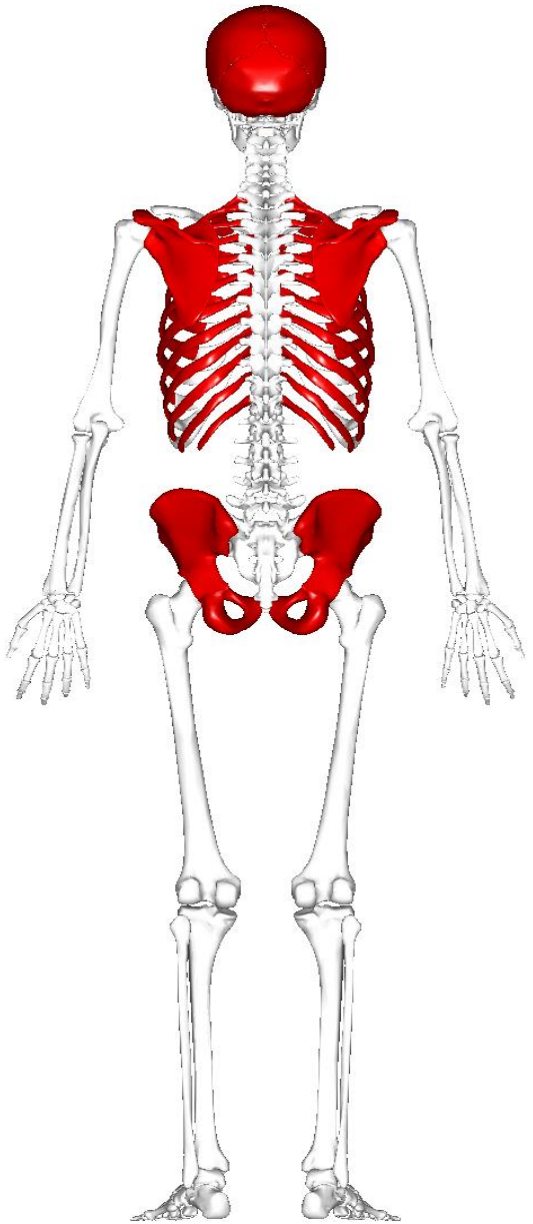
2. Tarsals: The seven bones of the ankle.



Types of Bones 3. Flat Bones

- **Flat bones** are a type of bone characterized by their thin, flattened shape, which provides protection and a broad surface area for muscle attachment.

- **Used in spots where protection or muscular attachment is desired**



Types of Bones 3. Flat Bones

In the human body, there are **approximately 30 flat bones**.

1. Skull (22 bones):

A.Cranial Bones (8):

1.Frontal (1)

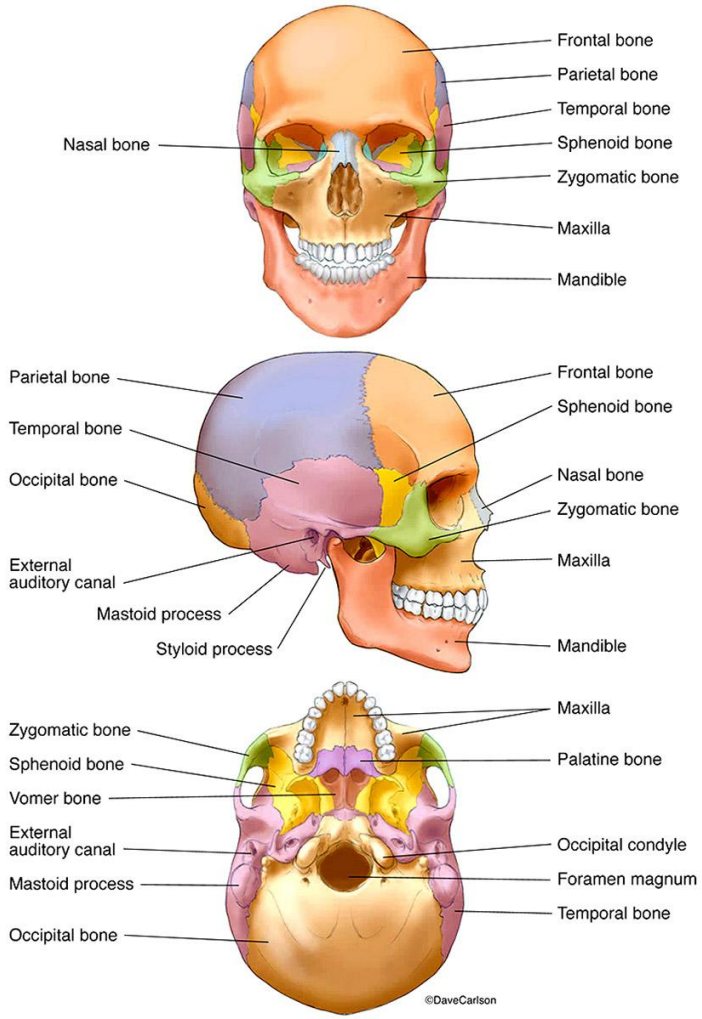
2.Parietal (2)

3.Occipital (1)

4.Temporal (2)

5.Sphenoid (1)

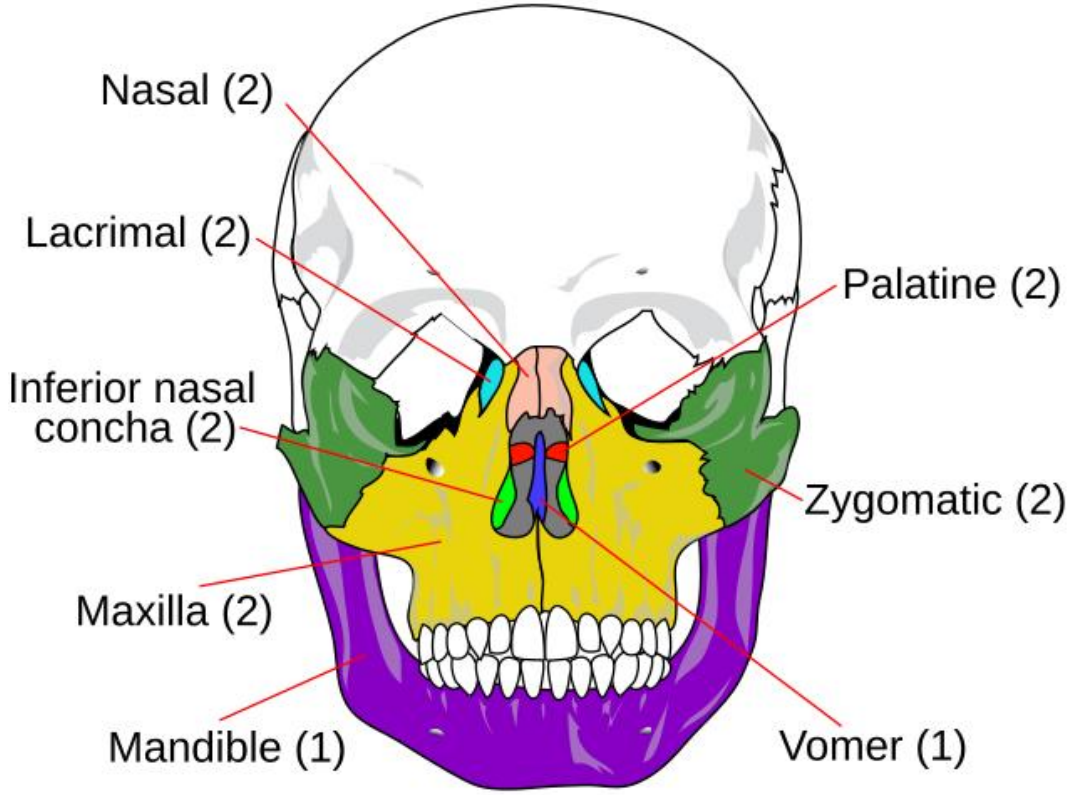
6.Ethmoid (1)



Types of Bones 3. Flat Bones

B. Facial Bones (14):

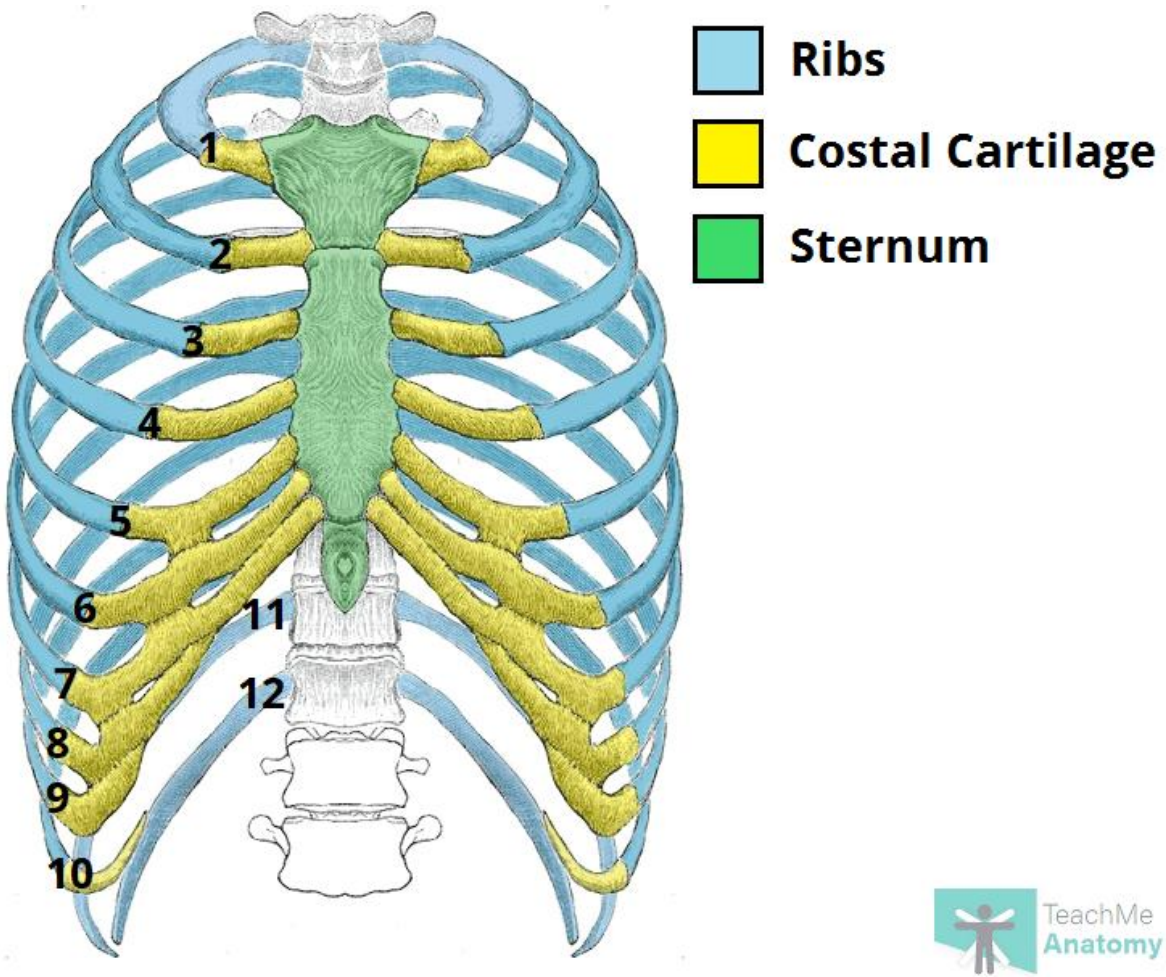
1. Nasal (2)
2. Maxilla (2)
3. Zygomatic (2)
4. Palatine (2)
5. Lacrimal (2)
6. Nasal concha (2)
7. Vomer (1)
8. Mandible (1) (though it is technically classified as a movable bone, it is often included in discussions of flat bones due to its flat structure)



Types of Bones 3. Flat Bones

2. Ribs (24 bones): Each rib is flat and plays a protective role.

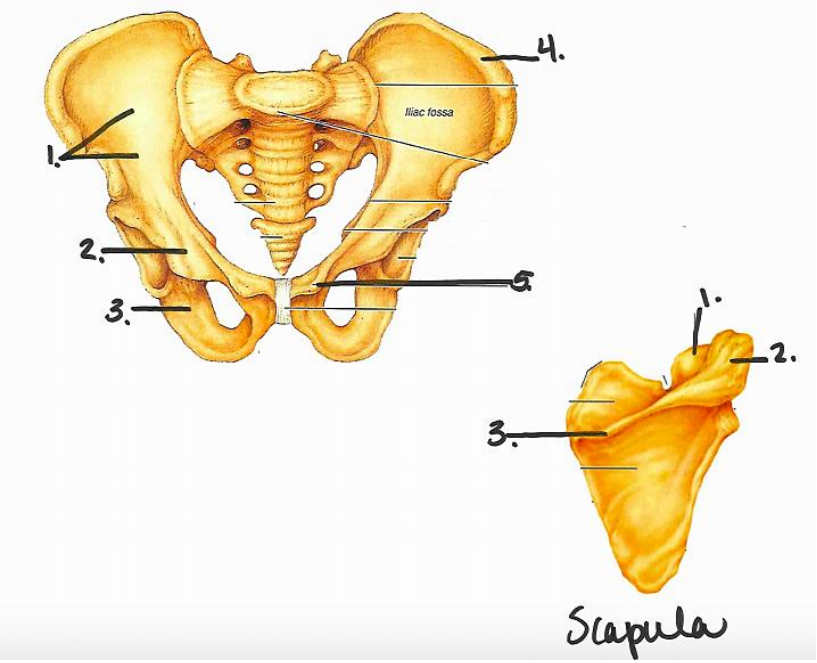
3. Sternum (1 bone): The breastbone, which is flat and protects the heart and lungs.



Types of Bones 3. Flat Bones

4. Scapulae (2 bones): The shoulder blades, which are also flat**.**

5. Pelvic Bones (2 hip bones): Each hip bone is made up of three fused bones (ilium, ischium, pubis) that form the flat structure of the pelvis.



Types of Bones 4. Irregular Bones

Irregular bones are a category of bones characterized by their complex shapes that do not fit into the other bone classifications (such as long, short, or flat bones).

Irregular bones often have unique features that enable them to perform specific functions in the body.

Types of Bones 4. Irregular Bones

The number of irregular bones in the body can vary, but there are typically **about 30 irregular bones**, mainly consisting of the vertebrae and bones in the pelvis.

1.Vertebrae: The bones that make up the spinal column. Each vertebra has a unique shape that allows for flexibility and protection of the spinal cord.

2.Sacrum: A triangular bone at the base of the spine formed by the fusion of five vertebrae.

Types of Bones 4. Irregular Bones

3.Coccyx: Also known as the tailbone, formed by the fusion of four small vertebrae.

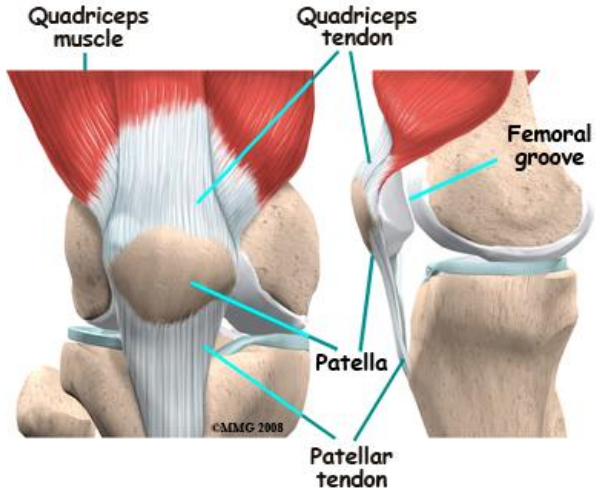
4.Pelvic Bones: The ilium, ischium, and pubis that form the hip bone, each having a unique shape and structure.

5.Certain Facial Bones: Such as the mandible (lower jaw) and some bones in the nasal cavity.

Types of Bones 5. Sesamoid (Round) Bones

Sesamoid bones are small, round bones that are embedded within tendons, typically found in locations where a tendon passes over a joint. They serve to protect the tendon and improve its mechanical advantage, allowing for more effective movement and force transmission.

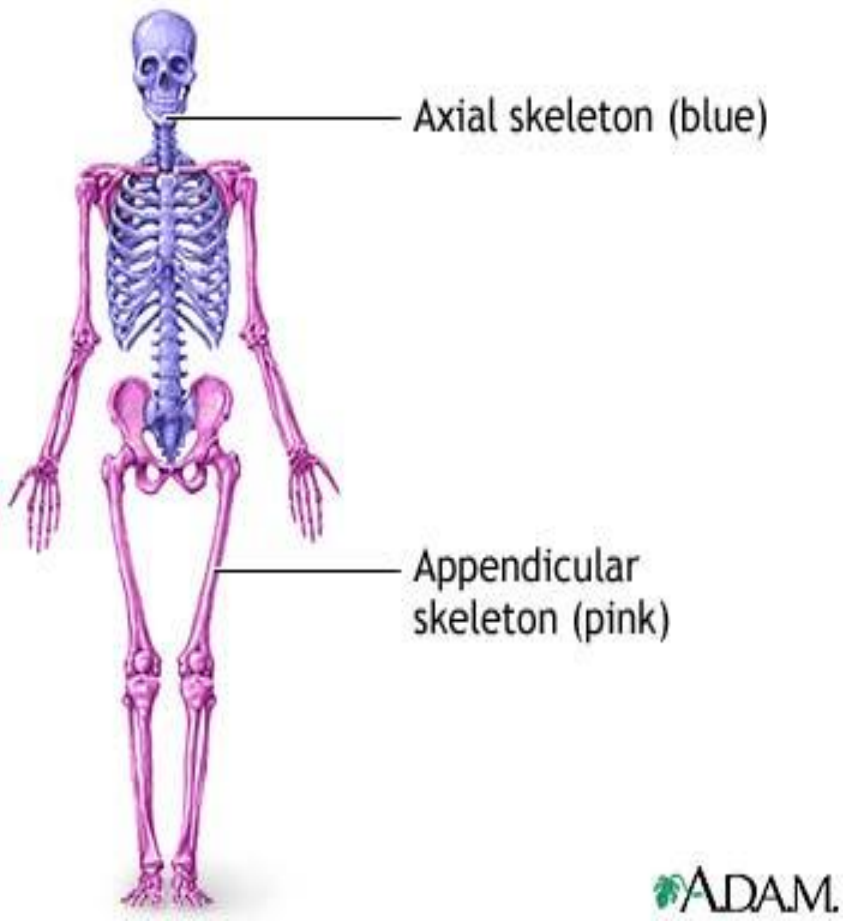
- Usually small and round.
- Embedded within tendons adjacent to joints.
- Example: patella (knee cap)



Divisions of the Skeletal System

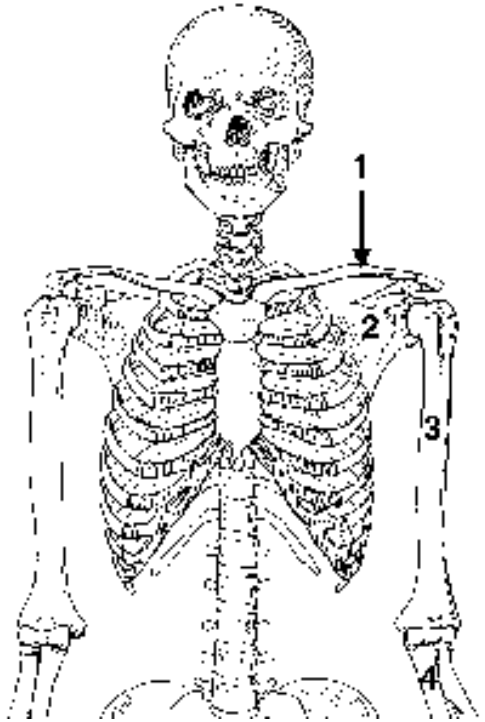
Skeletal system is divided into two main division

1. **Axial** – central skeleton that protects and supports vital organs
2. **Appendicular** – skeleton of the extremities



Axial Skeleton

- Composed of skull and vertabrae
- Mainly flat and irregular bones
- Serve to protect organs such as brain, heart, and lungs
- Also helps to support body along central axis (backbone)



Parts of the axial skeleton

1. **Skull** – protects brain

2. **Vertebrae** – protect spinal chord ;also serves to keep skeleton upright

3. **Ribs** – protect lungs and heart ; gives intercostal muscles a hard surface to move against for breathing

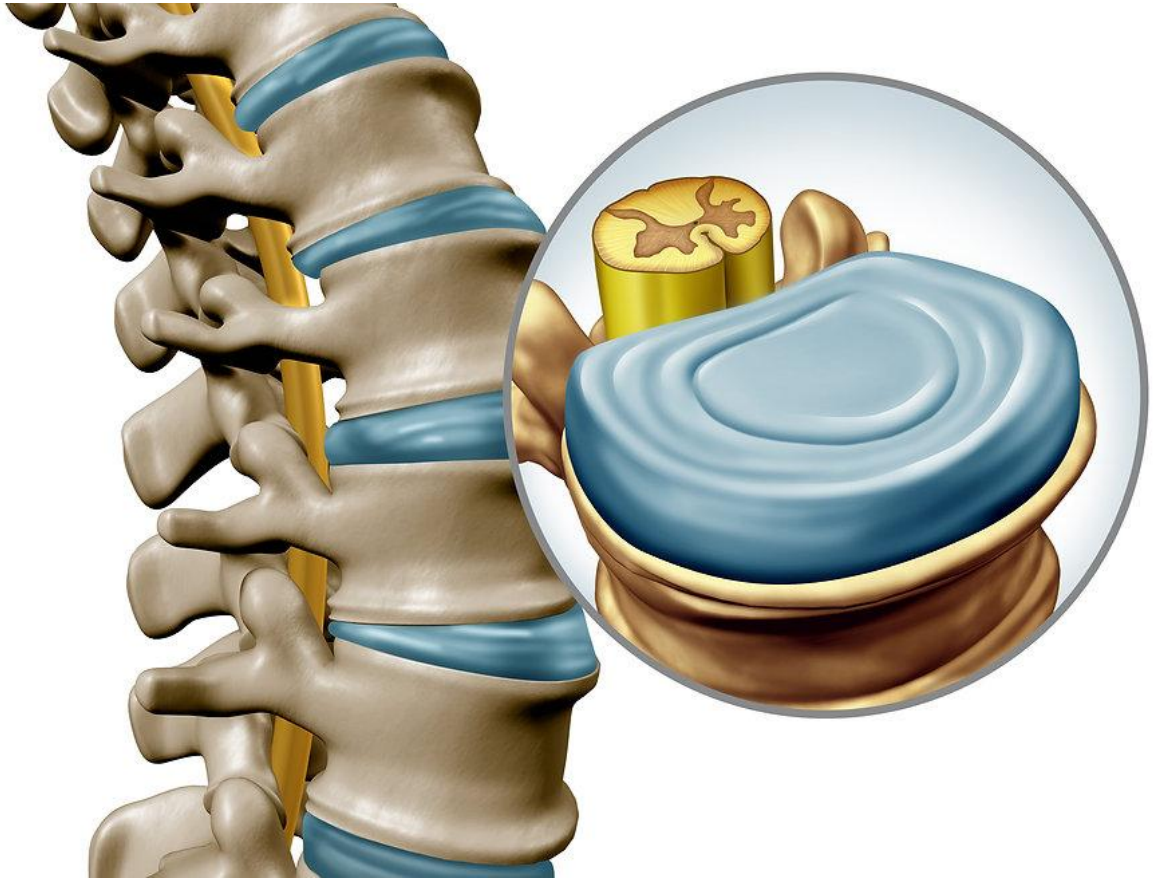
Divisions of the skull

- **Skull is divided into 2 sets of bones**
  - **Cranium – collection of 8 bones which hold and protect brain**
  - **Facial bones – 14 bones that make up the face; all but 2 are paired**

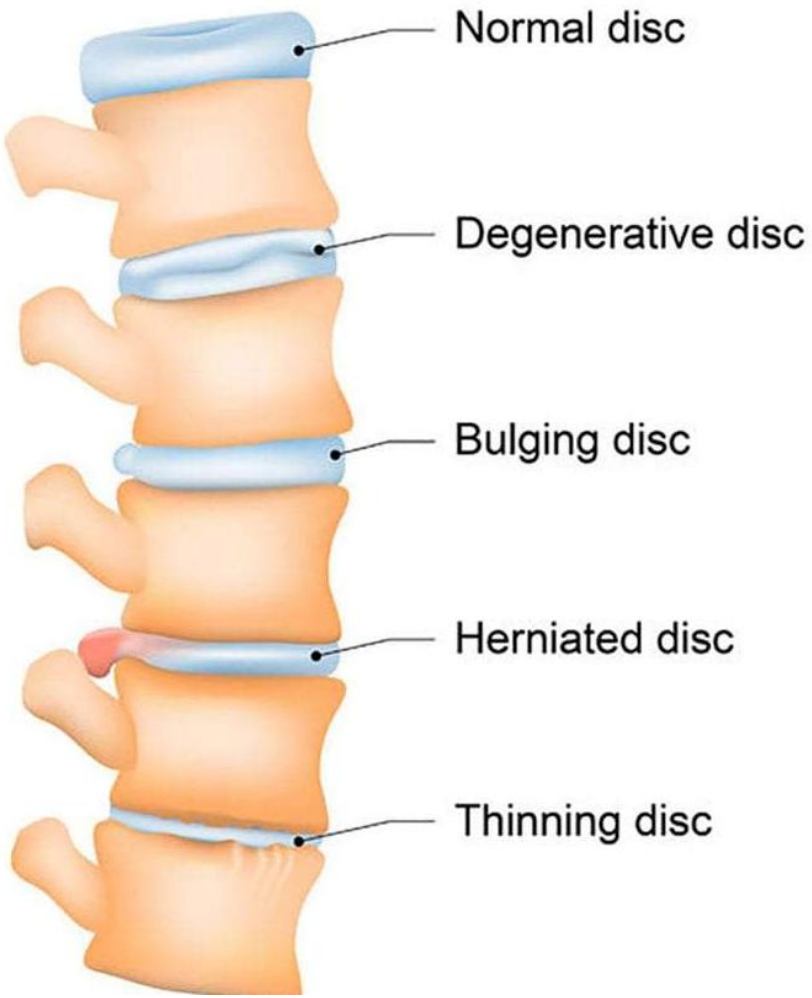
Intervertebral Discs

Intervertebral discs are soft, flexible structures that sit between the bones (vertebrae) of your spine.

They act like **shock absorbers** and help your spine move smoothly.

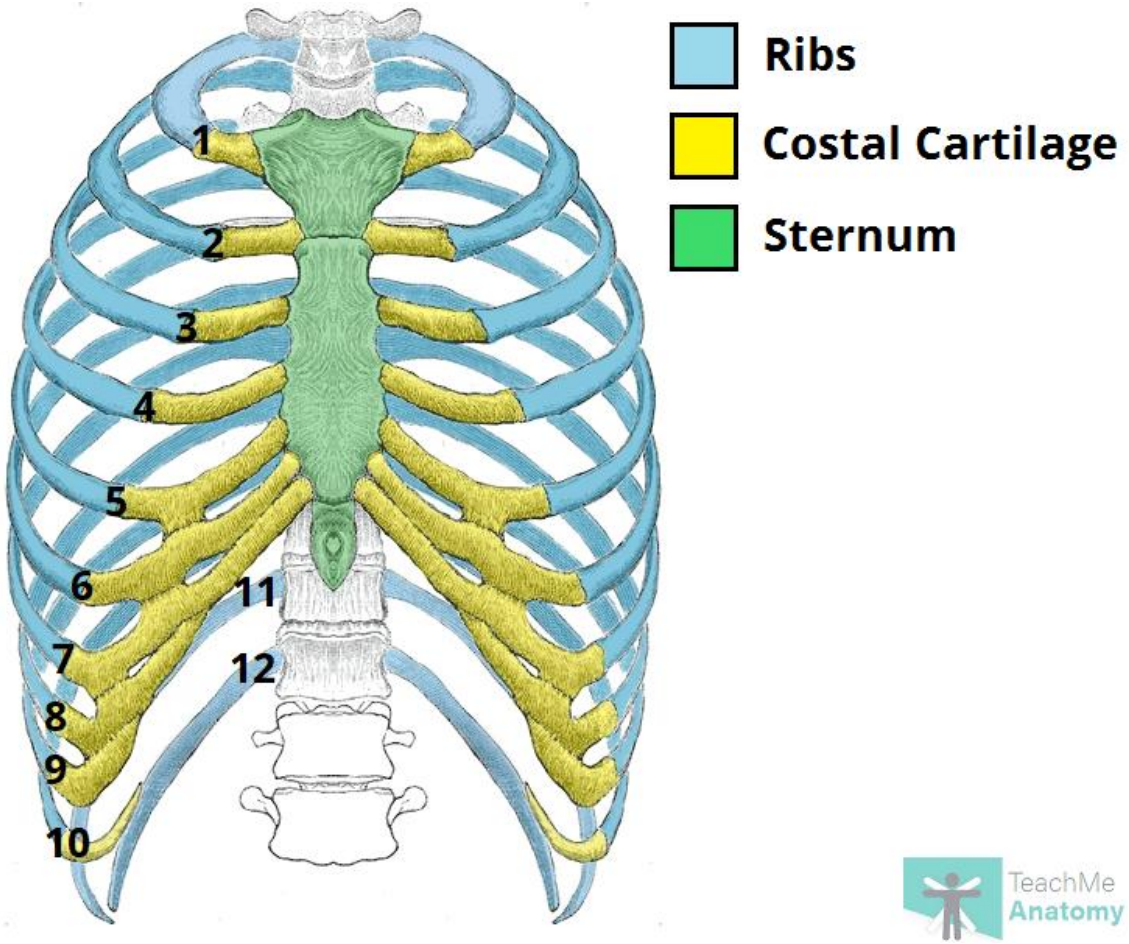


Intervertebral Discs



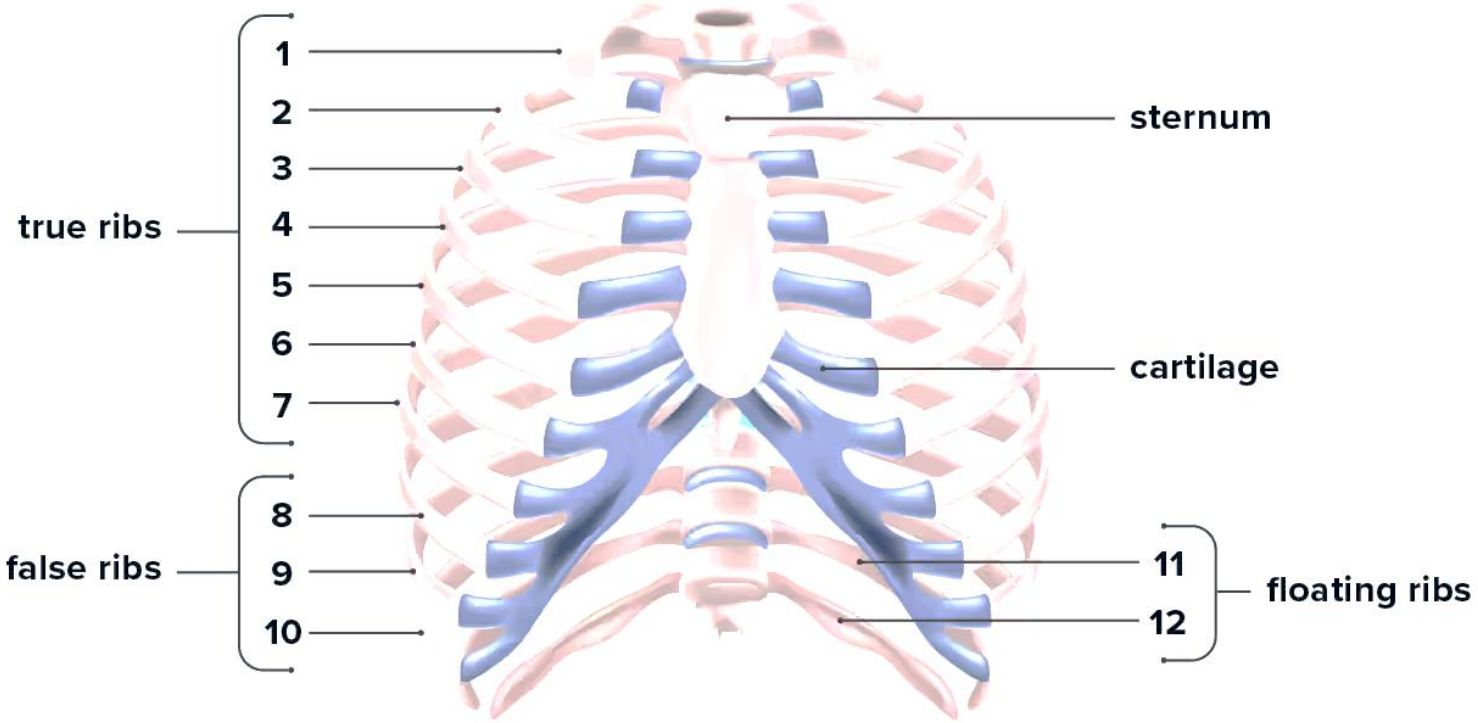
Bony Thorax

The **Bony Thorax** is the skeletal framework of the chest, formed by the **sternum**, **ribs**, **costal cartilages**, and thoracic vertebrae, which protects the heart and lungs and assists in breathing.



Ribs

- 12 pairs of ribs, each connects to a thoracic vertebrae
- First 7 pairs = true ribs; attac directly to sternum
- Last 5 pairs = false ribs; indirect or no attachment; las two are floating (no sternal attachment)



Sternum

The sternum can be divided into three parts:

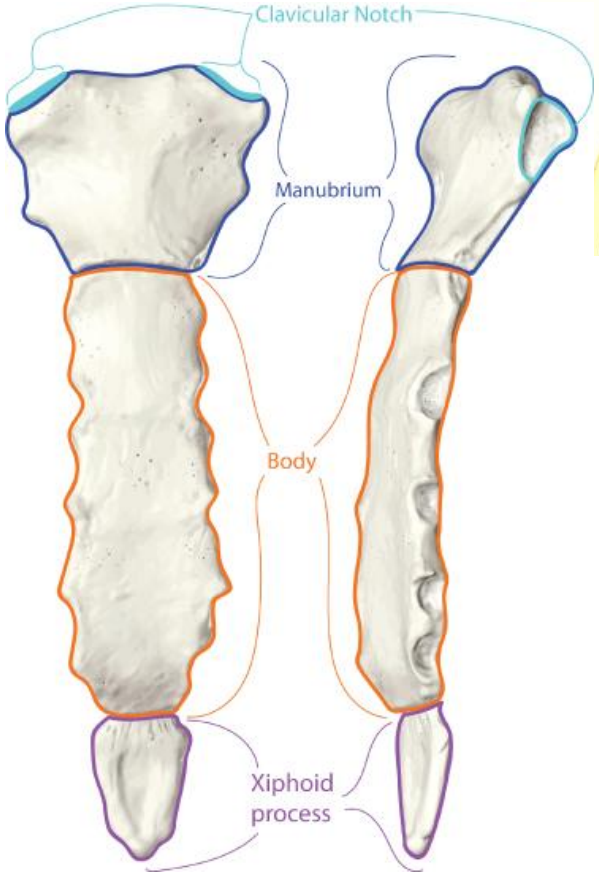
1) **Manubrium (top)**

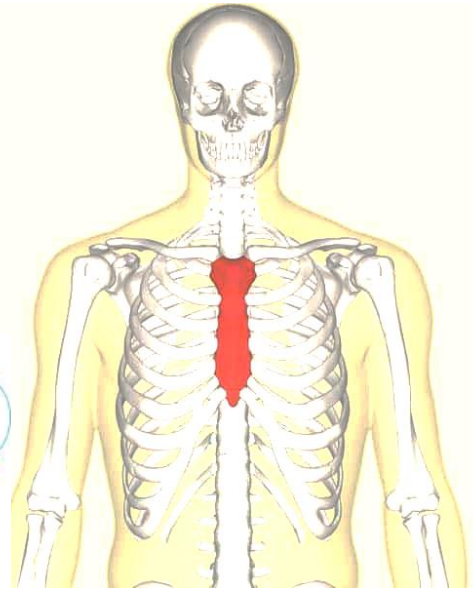
2) **Body (middle)**

3) **Xiphoid Process (bottom)**

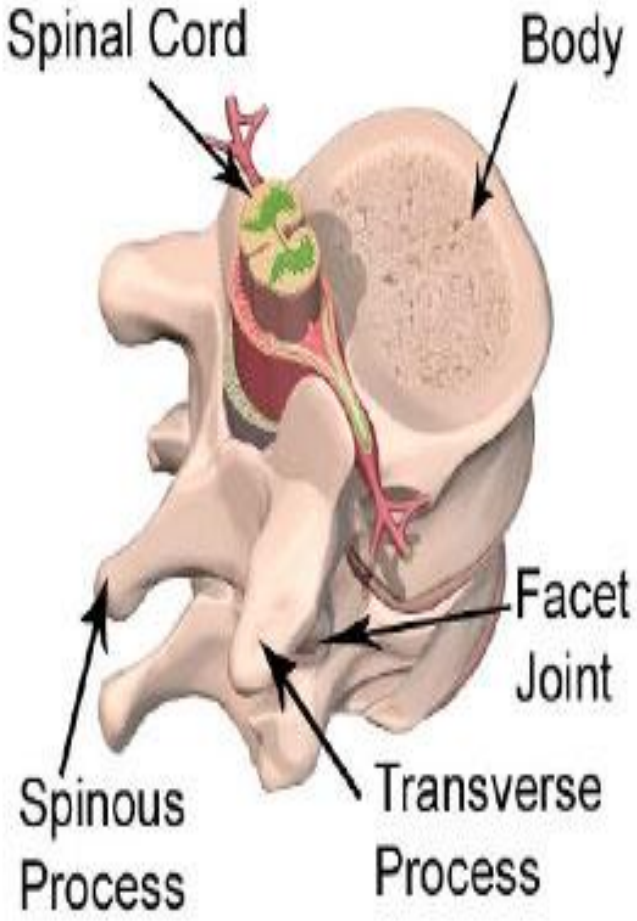
Location for rib attachment

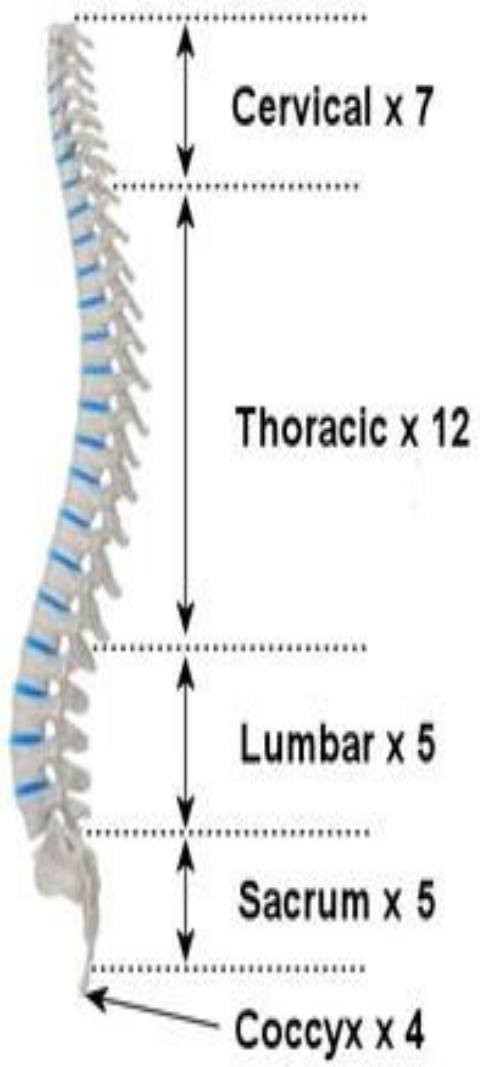
Surrounded by costal cartilage





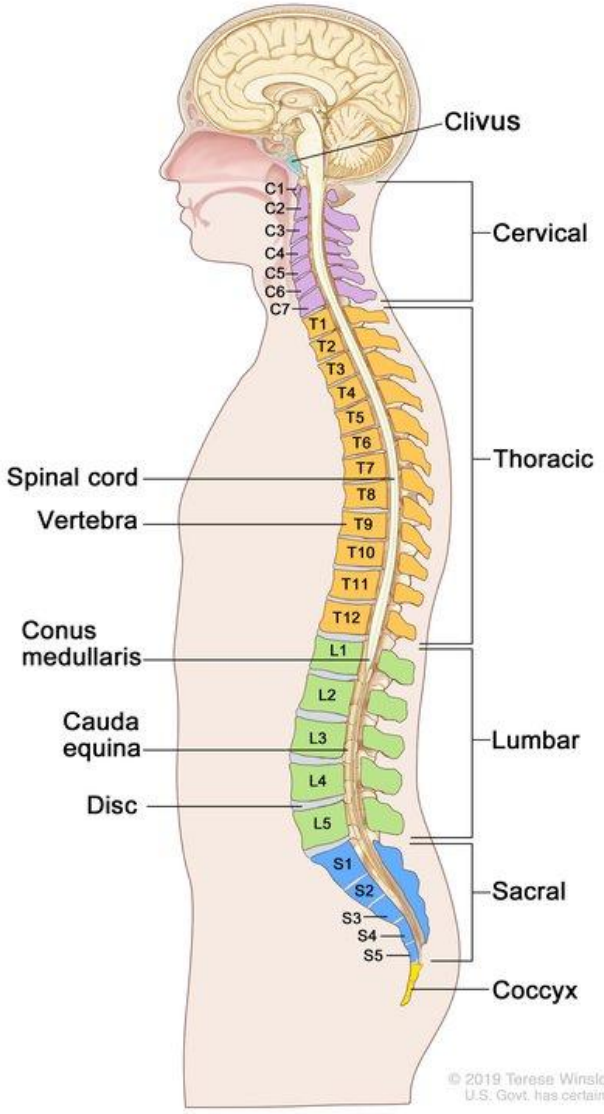
The Spinal Column



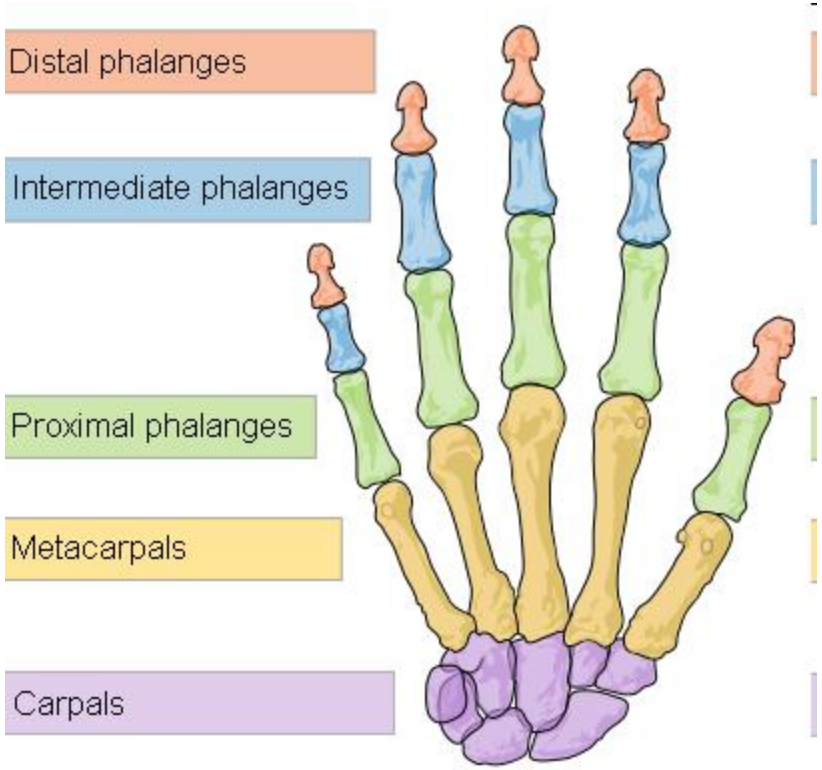


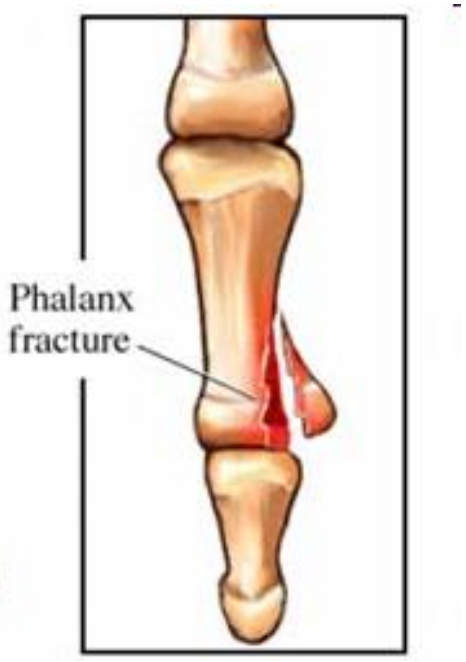
The Spinal Column

- Supports body
- Connects skull to pelvis
- Sends weight down to pelvis, where it is transmitted through the legs
- Surrounds and protects spinal cord
- 26 total bones



Hands and Feet





In general

- Male skeleton is larger, with thicker bones
- Female bones maintain many characteristics of prepubescent skeleton
- Male features change at puberty (usually at points of muscular attachment)


QUESTIONS?
COMMENTS?
CONCERNS?