



# The Skeletal System

## Introduction to the Skeletal System:

The skeletal system is a framework of bones, ligaments, tendons, cartilage, and other tissues.

### It provides:

- Support and shape to the body.
- Protection for internal organs.

Comprises 206 bones in an adult (newborns have 300 bones, which fuse over time).

70% of bone content consists of hard minerals like calcium and phosphorous, giving them strength.

## Joints and Muscles:

### i. Joints

Where two bones meet.

Make the skeleton flexible and allow movement.

### ii. Muscles

Elastic tissue masses that pull bones to create movement.

Together, bones and muscles form the musculoskeletal system.

## Bone Formation: Ossification:

Ossification: The process by which cartilage turns into bone.

Bones begin as cartilage in the womb and gradually harden over time.

Calcium is essential for strong bone growth.

## Parts of the Skeletal System:

### i. Axial Skeleton – Protects vital organs

#### Includes:

- **Skull:** Protects the brain.
- **Rib cage:** Protects the heart, lungs, and liver.
- **Vertebral column (backbone):** Protects the spinal cord.



## ii. Appendicular Skeleton – Enables movement

### Includes:

- Arms and legs.
- Shoulder and hip girdles, which connect limbs to the body.

### The Skull:

Protects the brain and forms the structure of the face.

### Comprises 22 bones:

- **8 cranial bones:** Form the top portion of the skull, protecting the brain.
- **14 facial bones:** Form the lower portion of the skull.

The stirrup bone (behind the eardrum) is the smallest bone in the human body (0.1 to 0.13 inches).

The lower jawbone (mandible) is the only movable bone in the skull, allowing chewing and talking.

### The Rib Cage:

Protects vital organs like the heart, lungs, and liver.

### Consists of 12 pairs of ribs (24 in total):

- **Upper 7 pairs:** Directly connect to the sternum (flat bone in the middle).
- **8th, 9th, and 10th pairs:** Indirectly connect to the sternum.
- **11th and 12th pairs:** Do not connect to the sternum → called floating ribs.

### The Vertebral Column (Backbone):

Also known as the spine or backbone.

Made of 33 vertebrae extending from the neck to the tailbone.

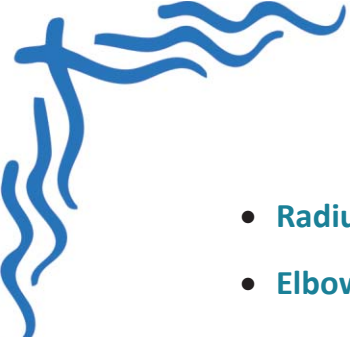
### Functions:

- Protects the spinal cord.
- Supports the body in an upright position.

### Arms:

The arm consists of three bones:

- **Humerus:** Upper arm bone.

- 
- **Radius and Ulna:** Lower arm bones.
  - **Elbow joint:** Connects the upper and lower arm.

### **Legs:**

Leg bones are large and strong to support the body's weight.

#### **The leg consists of:**

- **Femur:** Largest bone in the human body (upper leg).
- **Tibia and Fibula:** Lower leg bones.

### **Girdles:**

Ring-like bony structures that connect the limbs to the body.

Two types of girdles:

#### **Shoulder (Pectoral) girdle:**

- Supports the upper limbs and connects them to the body.

#### **Hip (Pelvic) girdle:**

- Supports the lower limbs and connects them to the body.