



## Skeletal System

### Functions of the skeleton

The skeleton has 6 main functions: -

- Protection – of vital organs
- Movement – provides levers (joints) for movement
- Storage – of minerals such as calcium
- Production – of blood cells (in the bone marrow)
- Muscle attachment – muscles attach to the skeleton via tendons
- Shape/structure – the skeleton provides shape for the body

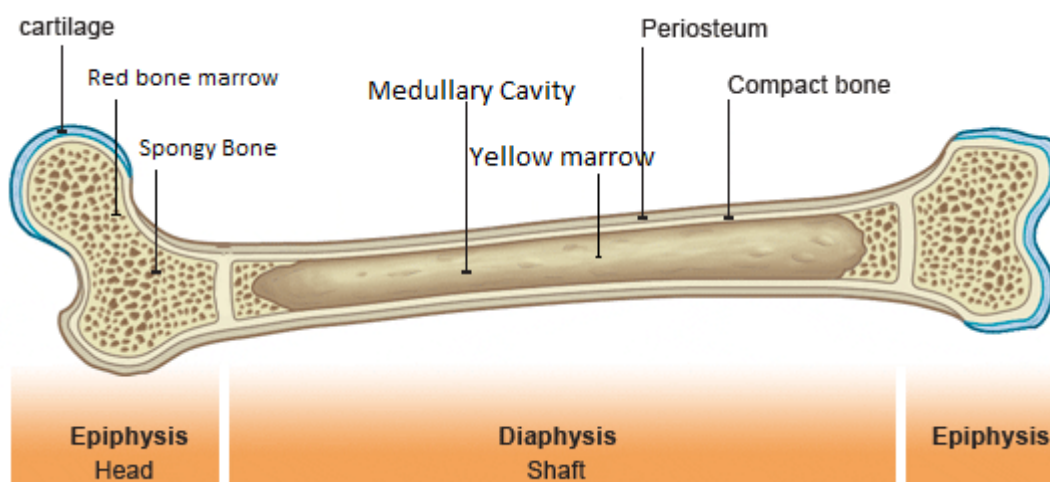
TIP – Try using the acronym  
**Pass My Shotgun Pass My  
Shotgun** to help remember  
the 6 functions!

### Classifications of bones

Bones are classified by shape, not size: -

Type of bone	Example
Long	Femur
Short	Carpals
Flat	Scapula
Sesamoid	Patella
Irregular	Vertebrae

### Anatomy of a long bone





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- **FACT:** Growth plate fractures commonly occur in boys aged 14-16 and girls aged 11-13.

### Structure of the Skeleton

The skeleton has two divisions: -

- Axial skeleton: Spine, ribs, sternum
- Appendicular skeleton: Upper and lower limbs, pelvic girdle and shoulder girdle

### Bone growth

The process of bone growth is called **ossification**. Ossification involves the action of two different types of cells: -

- Osteoblasts: responsible for building new bone (**B**lasts for **B**uilding!)
- Osteoclasts: responsible for the removal of old bone (**C**lasts for **C**leaning away old bone!)
- Bones adapt to the stresses placed upon them. For example, if you sit hunched over at a desk every day for long periods you will eventually start to develop kyphosis (rounded shoulders)

### Posture types

- Kyphosis: excessive curvature of the thoracic region of the spine – hunchback
- Lordosis: excessive curvature of the lumbar region of the spine – hollowback
- Scoliosis: s-shaped lateral deviation of spine

### Joints

There are 3 main classifications of bones in the body: -

- Fibrous (immovable joints) e.g. plates in the skull
- Cartilaginous (slightly moveable) e.g. intervertebral joints
- Synovial (freely moveable) There are 6 types: -
  - **Hinge** e.g. elbow, knee and ankle
  - **Ball and socket** e.g. shoulder and hip
  - **Gliding** e.g. between carpals and tarsals
  - **Condylloid** e.g. between metacarpal and phalanges
  - **Saddle** e.g. thumb
  - **Pivot** e.g. neck



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### Joint movements

Joint	Movements
Knee	Flexion, extension
Shoulder joint	Flexion, extension, adduction, abduction, horizontal flexion, horizontal extension, circumduction, rotation
Hip	Flexion, extension, adduction, abduction, horizontal flexion, horizontal extension, circumduction, rotation
Shoulder girdle	Elevation, depression, protraction, retraction
Ankle	Plantarflexion, dorsiflexion
Elbow	Flexion, extension

**TASK: Give the joint movements that occur at the following joints during these actions:**

- 1) The knee during the downwards phase of a squat
- 2) The elbow during the downwards phase of a bicep curl
- 3) The hip during the upwards phase of a squat
- 4) The shoulder joint during the downwards phase of a press up
- 5) The ankle when going on to tip toes



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### Answers to task

Task:

- 1) Flexion
- 2) Extension
- 3) Extension
- 4) Horizontal extension
- 5) Plantarflexion