

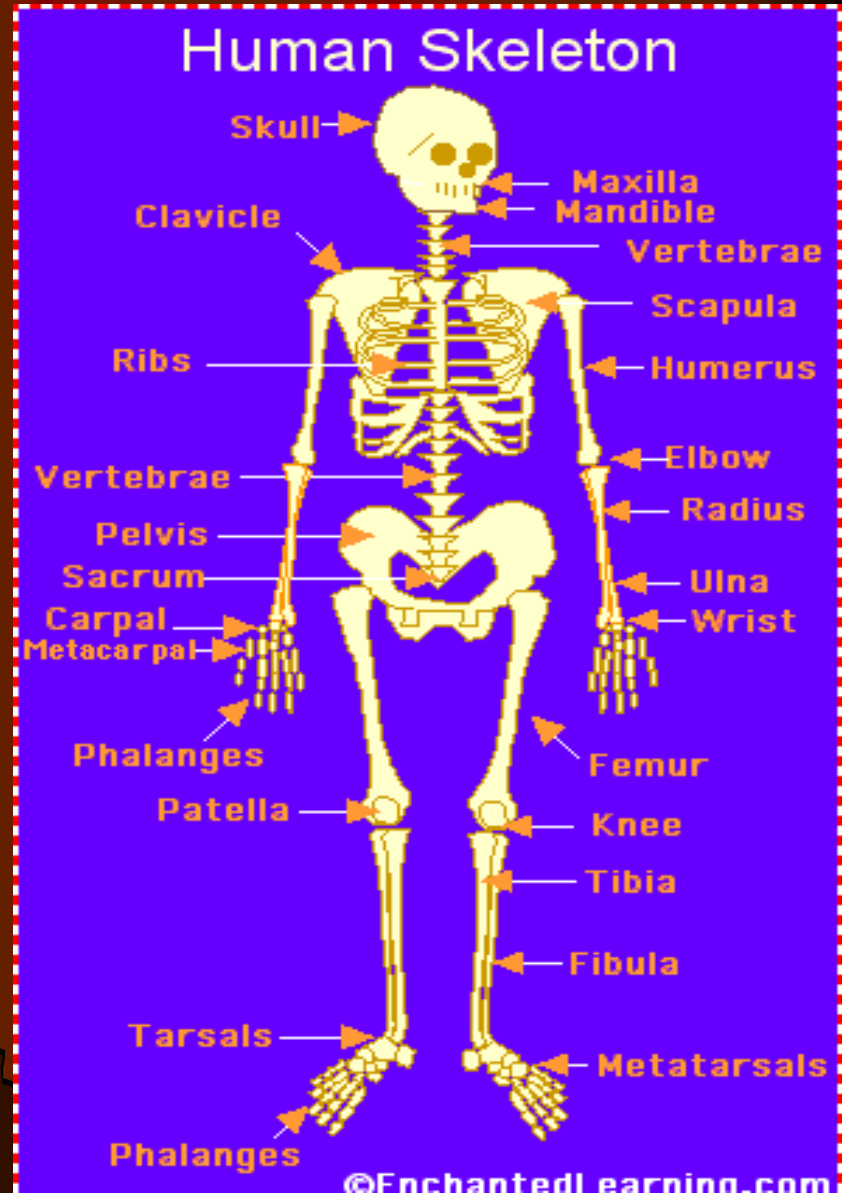
The Skeletal System

Learning Objectives

- Define the Skeletal system
- State the function of the skeletal system
- Describe the structure and workings of the skeletal system
- Name the major bones
- Identify the different types of joints found in the human body
- Describe the effects of physical activity on the skeletal system

What makes up the Skeletal System?

- It is made up of all the bones in the body.
- These include:
 - Cranium(Skull)
 - Mandible(lower jaw bone)
 - Clavicle(collarbone)
 - Scapula(shoulder blade)
 - Humerus(upper arm bone)
 - Sternum(breastbone)
 - Ribs
 - Vertebral column(backbone)
 - Radius and Ulna(forearm bones)
 - Pelvis(hip bone)
 - Carpals(wrist bones)
 - Metacarpals(hand bones)
 - Phalanges(fingers and toes)
 - Femur(thigh)
 - Patella(knee cap)
 - Tibia(shin bone)
 - Fibula
 - Tarsals(ankle bones)
 - Metatarsals(foot bones)
 - Phalanges(toes)



What are the functions of the Skeletal System?

- To protect our internal organs
- To manufacture blood cells
- To support and give shape to the body
- To facilitate movement with the help of muscles
- To store minerals such as calcium and phosphorus

How many bones are there in the human skeleton?

Parts of the Skeleton	Number of Bones
Skull and upper jaw	21
Each ear has 3 tiny bones	6
Lower jaw	1
Front neck bone(hyoid)	1
Backbone or spine	26
Ribs(12 pairs)	24
Breastbone	1
Each upper limb has 3 bones:2 in shoulder,3 in arm,8 in wrist,19 in hand an fingers	64
Each lower limb has 31 bones:1 in hip, 4 in leg,7 in ankle,19 in foot and toes	62
Total	206 bones

What are the different types of bones in the human skeleton?

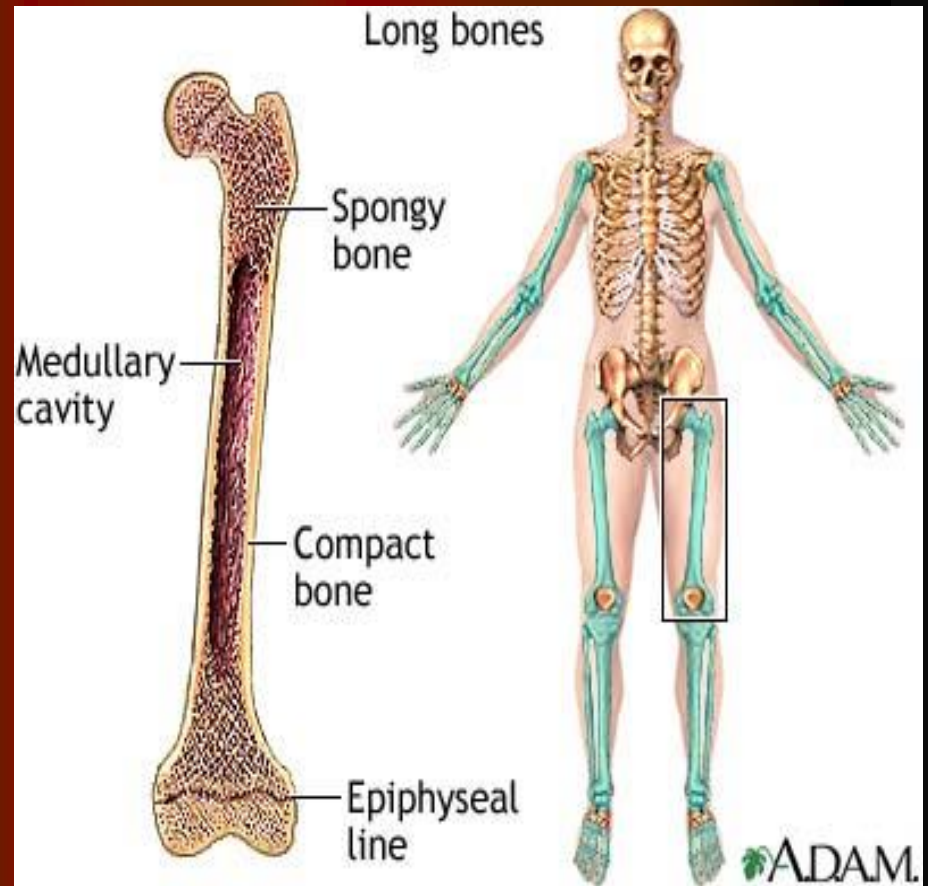
There are four (4) different types of bones found in the human skeleton.

These are:

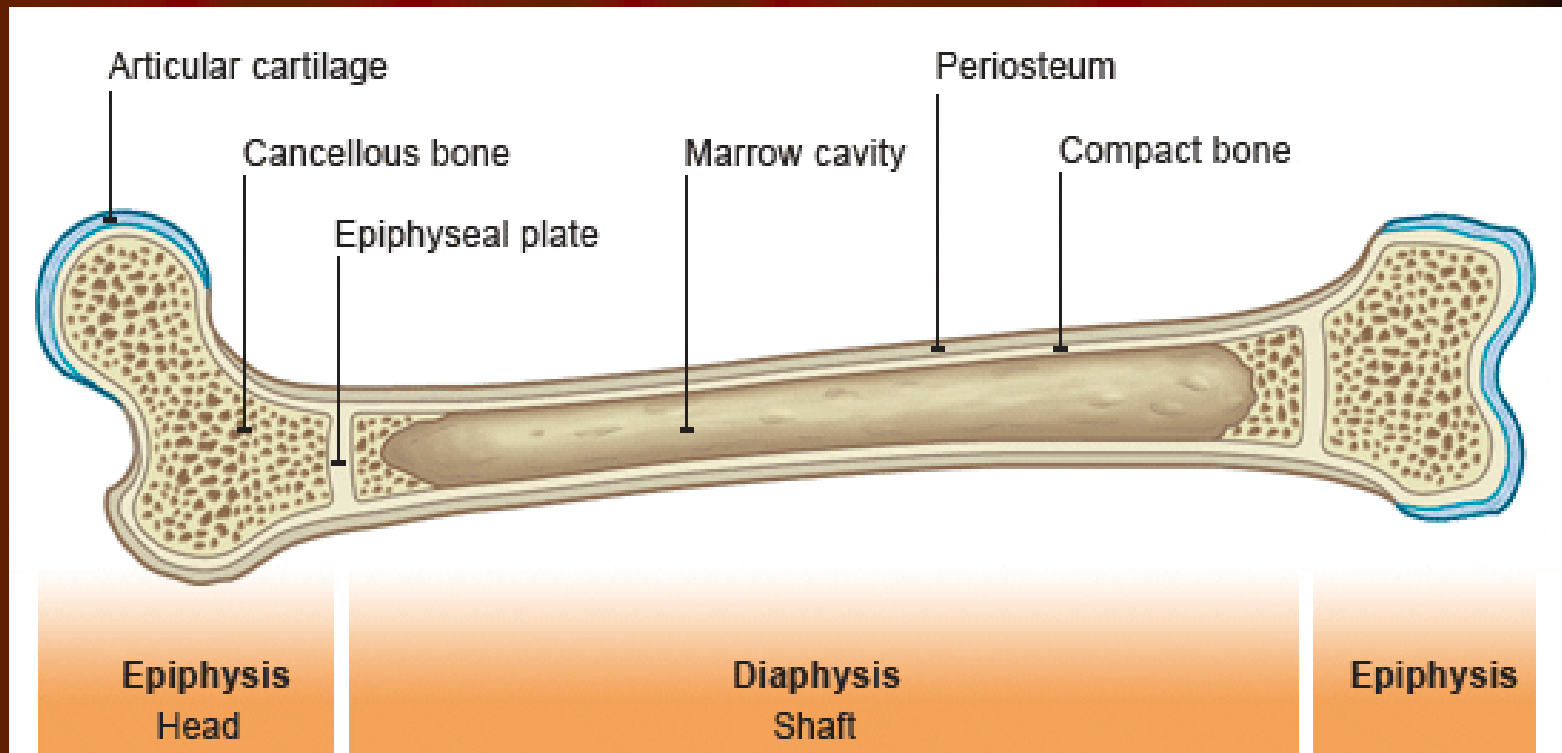
- Long bones
- Short bones
- Flat bones
- Irregular-shaped bones

LONG BONES

- Long bones have a thick outside layer of compact bone.
- Inside the shaft is the marrow cavity with bone marrow.
- The bone marrow manufactures blood cells.
- The ends of long bones are made up of spongy bone.



LONG BONES



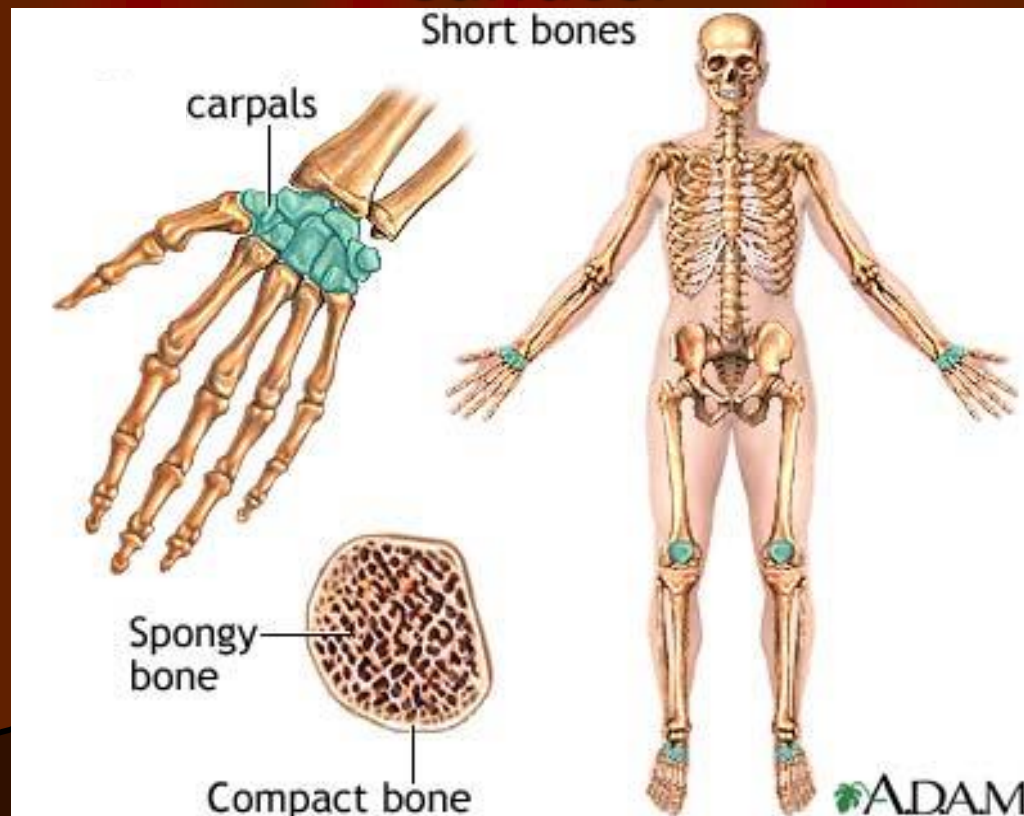
LONG BONES

The arms and legs consist of mostly long bones. The long bones are:

- Clavicle
- Radius
- Metacarpals
- Femur
- Fibula
- Humerus
- Ulna
- Phalanges
- Tibia
- Metatarsals

SHORT BONES

- Short bones contain mostly spongy bone with a thin layer of compact bone on the outer surface.

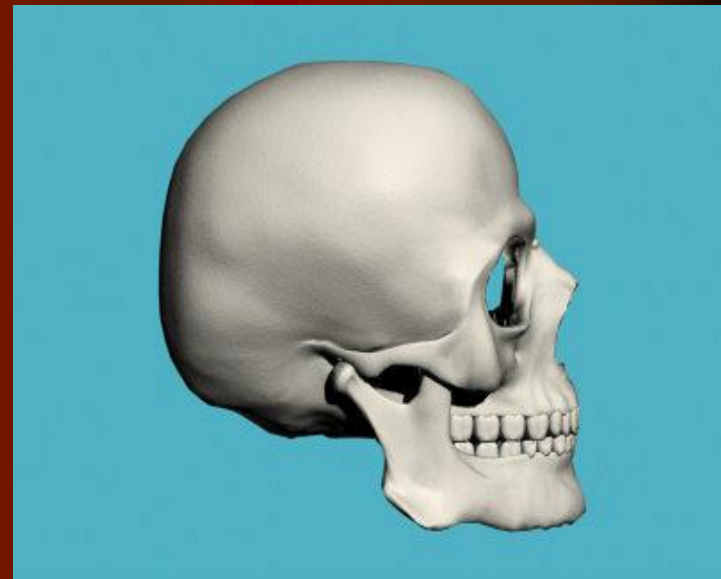


Which bones are short bones?

- Short bones are the:
 - Tarsals
 - Carpals
 - Patellas

FLAT BONES

- Flat bones are made up of a layer of spongy bone between two thin layers of compact bone.
- Flat bones are thin and have broad surfaces



Which bones are flat bones?

The flat bones found in the body are:

- Cranium
- Sternum
- Ribs
- Pelvis
- Scapula

IRREGULAR-SHAPED BONES

- These bones have several projections making an uncommon shape.
- All bones in the spinal column are irregular bones.



The Spine

The spine consists of lots of small **irregular bones** called vertebrae. Their function is to allow movement at the spine, provide an attachment for muscles and also to protect the spinal cord which runs through their centres. The spine is split into 5 sections:

Cervical

The cervical spine is the neck part of the spine and consists of 7 vertebrae

Thoracic

The thoracic spine is the upper back and consists of 12 vertebrae

Lumbar

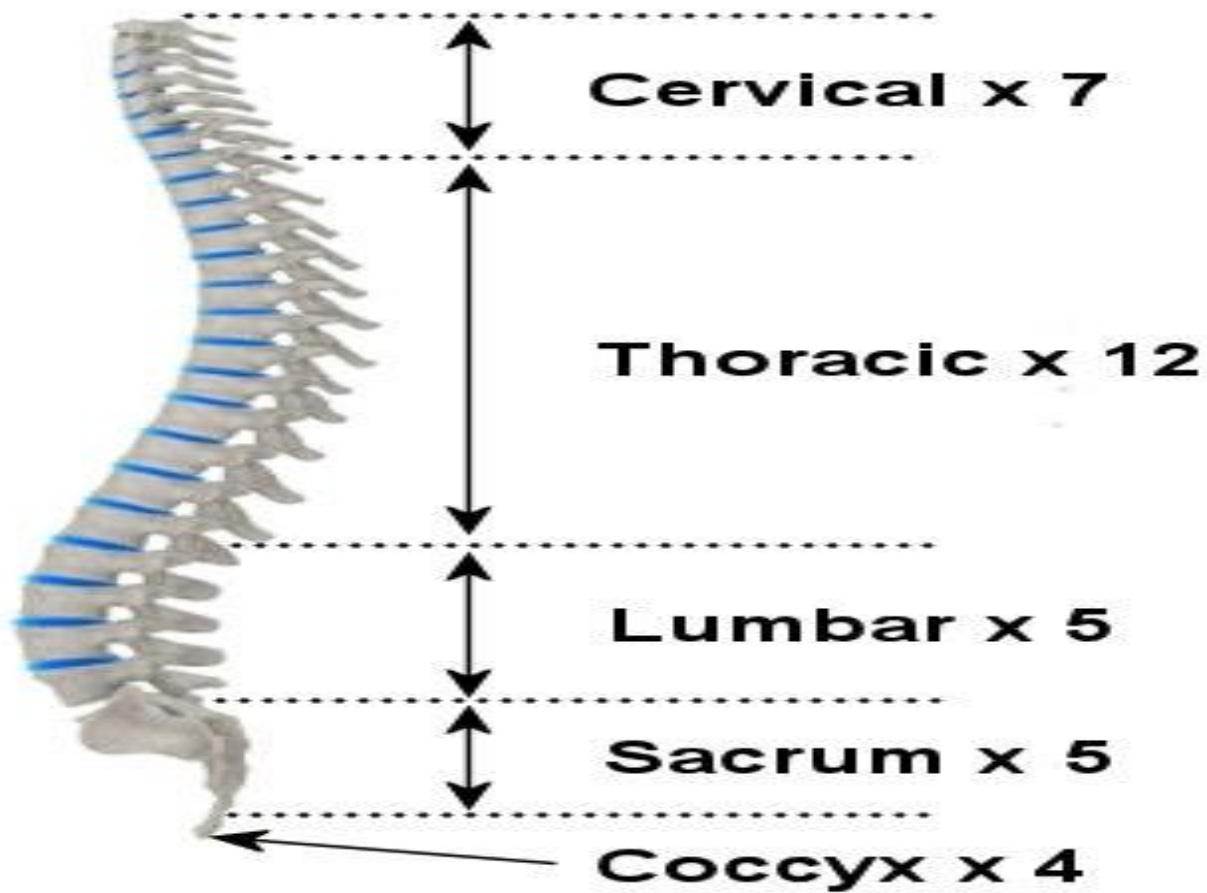
The lumbar vertebrae forms the lower back and includes 5 vertebrae

Sacrum

The sacrum is the buttocks part of the spine and consists of 5 vertebrae, however they are fused and appear as a triangular bone, in between the two hip bones (ilium)

Coccyx

The coccyx is the very end of the spine and used to be our tail bones, although it now doesn't have a function.



The bones of the human skeleton are divided into two groups. The axial skeleton includes all the bones (that form bony structures) along the body's long axis. The bones of the appendicular skeleton make up the rest of the skeleton, and are so called because they are appendages of the axial skeleton.



SKULL

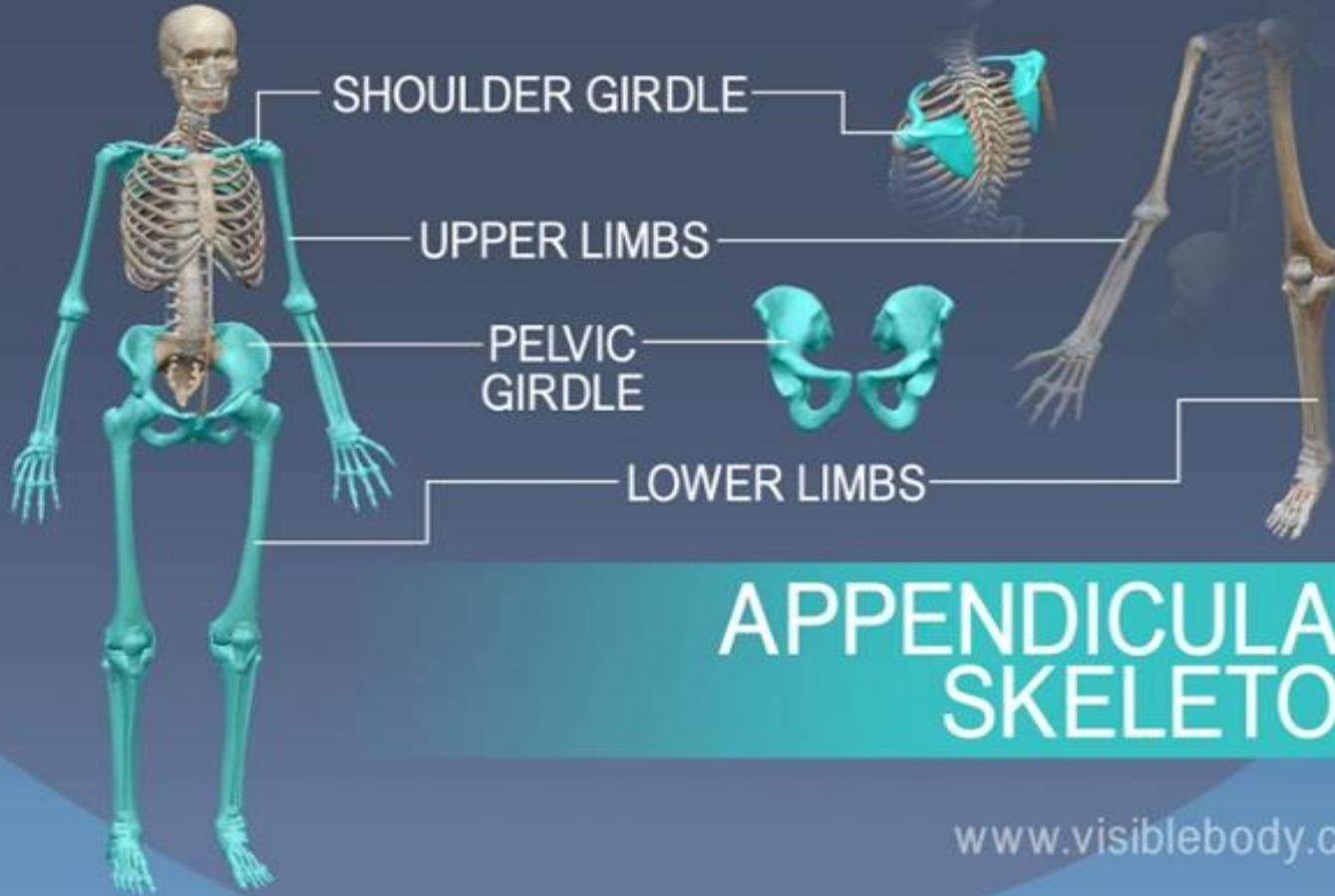
LARYNGEAL
SKELETON

VERTEBRAL
COLUMN

THORACIC
CAGE

AXIAL SKELETON

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SHOULDER GIRDLE

UPPER LIMBS

PELVIC GIRDLE

LOWER LIMBS

APPENDICULAR SKELETON

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What are JOINTS?

Joints are the areas where bones meet.

What are the different types of joints?

There are three different types of joints:

- Fixed joints
- Slightly moveable joints
- Synovial or freely moveable joints

Fixed Joints

- A fix joint is where one bone is connected directly to another bone.
- These joints do not allow movement.

Where are fixed joints found?

Fixed joints can be found in the:

- Skull and
- Pelvis

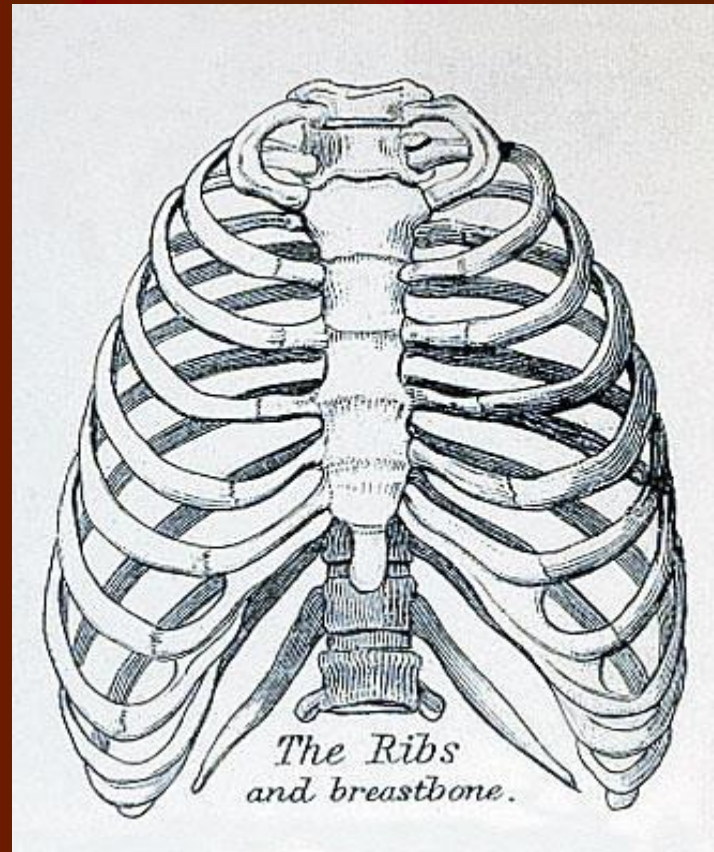


Slightly-moveable Joints

- The bones of these joints are separated by a layer of cartilage.
- These joints allow limited movement.

Where are these joints found?

- This type of joint is found in the :
 - Spine
 - Ribs



Synovial or freely moveable joints

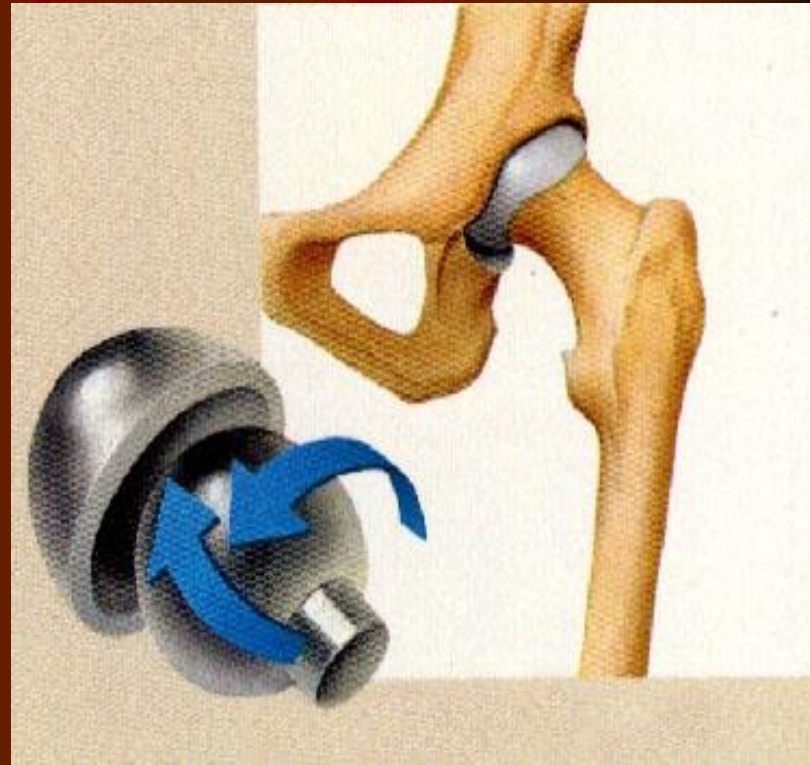
- The area between the bones of a synovial joint is filled with synovial fluid.
- Synovial fluid helps to lubricate and protect the cartilage-covered ends of the bones.
- These bones are held together by ligaments(stretchy bands of fibrous tissue).

Types of synovial joints

- There are 6 types of freely moveable joints:
 - Ball and socket
 - Hinge
 - Gliding
 - Pivot
 - Saddle
 - Condylloid

Ball and Socket Joints

- These joints allow movement in almost any direction.
- Examples:
 - hips and
 - Shoulders



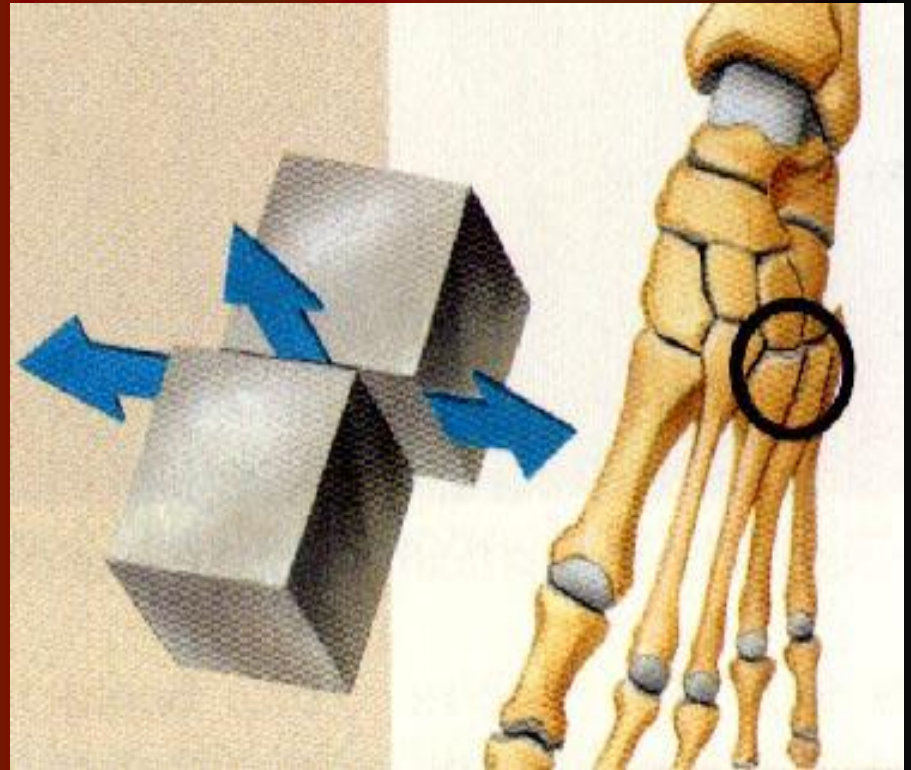
Hinge Joints

- These joints allow extension and flexion.
- Examples:
 - Elbows
 - Knees



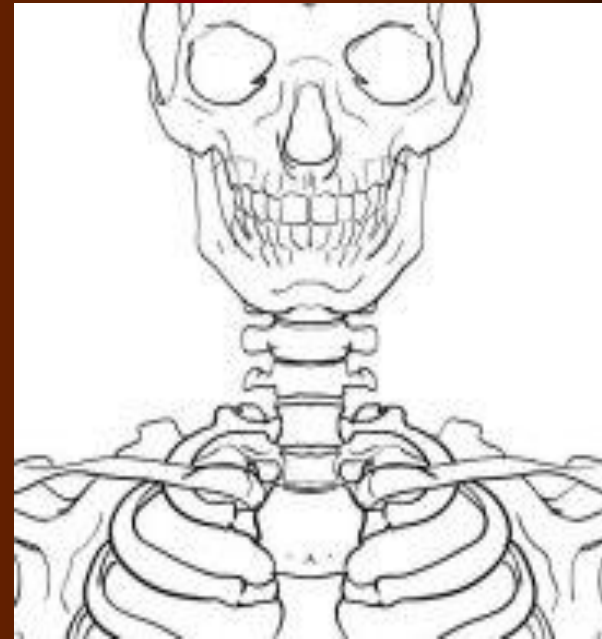
Gliding joints

- In a gliding joint, bones slide past each other.
- Examples:
 - Carpal(wrist)
 - Tarsal(ankle)



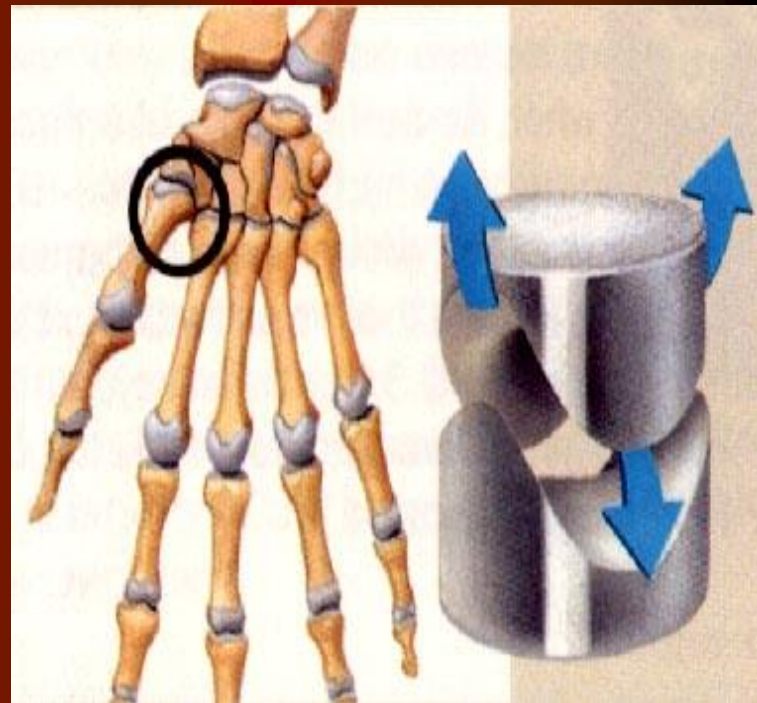
Pivot Joints

- This joint has the Rotation of one bone around another.
- Examples
 - Top of the neck (atlas and axis bones)



Saddle Joints

- These allow movement back and forth and up and down but does not allow rotation like a ball and socket.
- Example:
 - The thumb



Condyloid Joints

- These allow up and down movement and side to side movement.
- Example:
 - Wrist joint



Diseases and disorders of the Skeletal System

- The most common include:
 - Sprains
 - Fractures
 - Scoliosis
 - Kyphosis

Sprains

- Definition:
 - This is an injury to a ligament or to a tissue that covers a joint.
- Cause:
 - The forceful twisting of the bones of a joint in any direction in which they would not normally move or further than they should move

Sprains

- Signs:
 - Pain
 - Swelling
 - Discolouration
- Treatment:
 - The RICE method can be done to treat sprains.



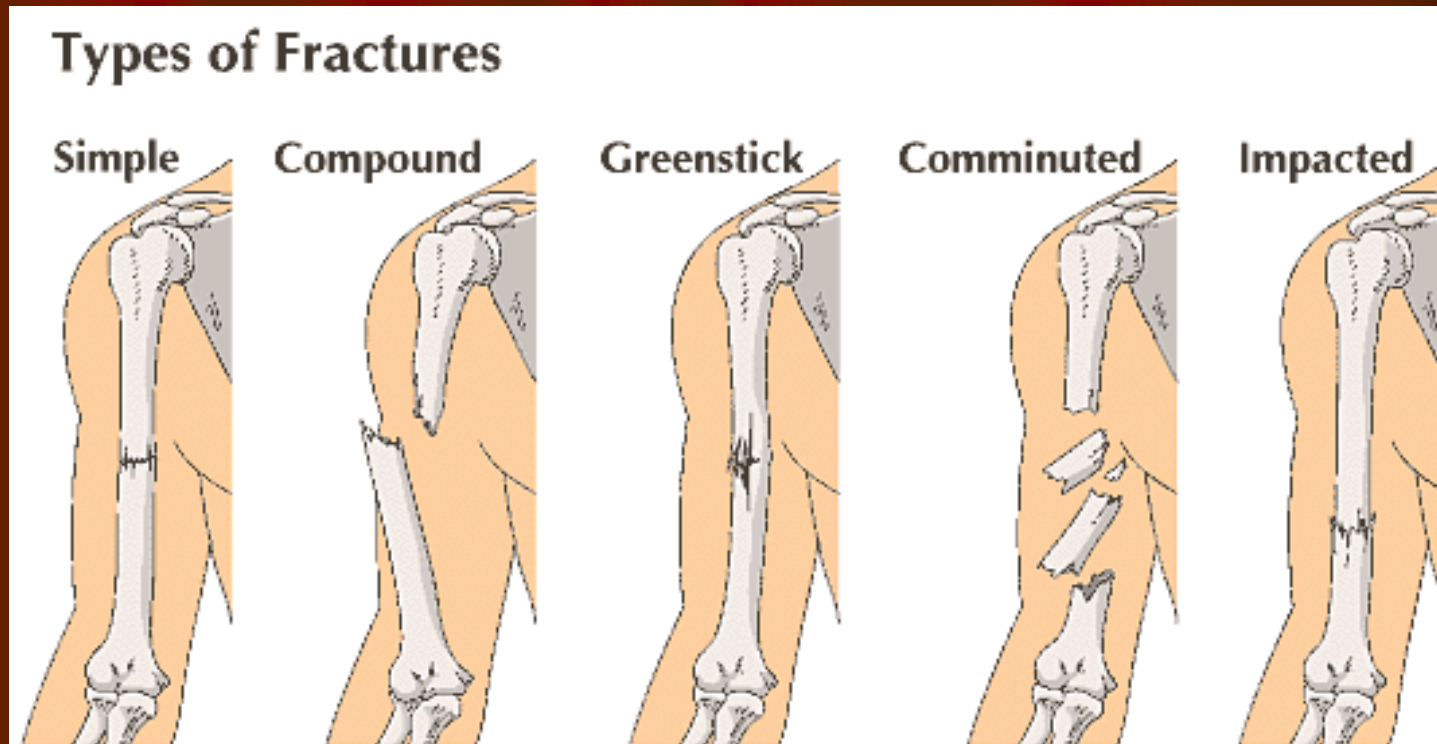
The R.I.C.E. method

- R-Rest the affected joint. Do not move the affected joint around and limit its use.
- I-Ice the affected joint. This should be done as soon as possible after the sprain. This helps reduce swelling
- C-Compress the area as this helps to reduce swelling and gives support to the joint. This can be done by wrapping the joint with a bandage.
- E-Elevate the affected joint. This allows blood to flow back to the heart instead of pooling at the affected areas which would worsen the swelling.

Fractures

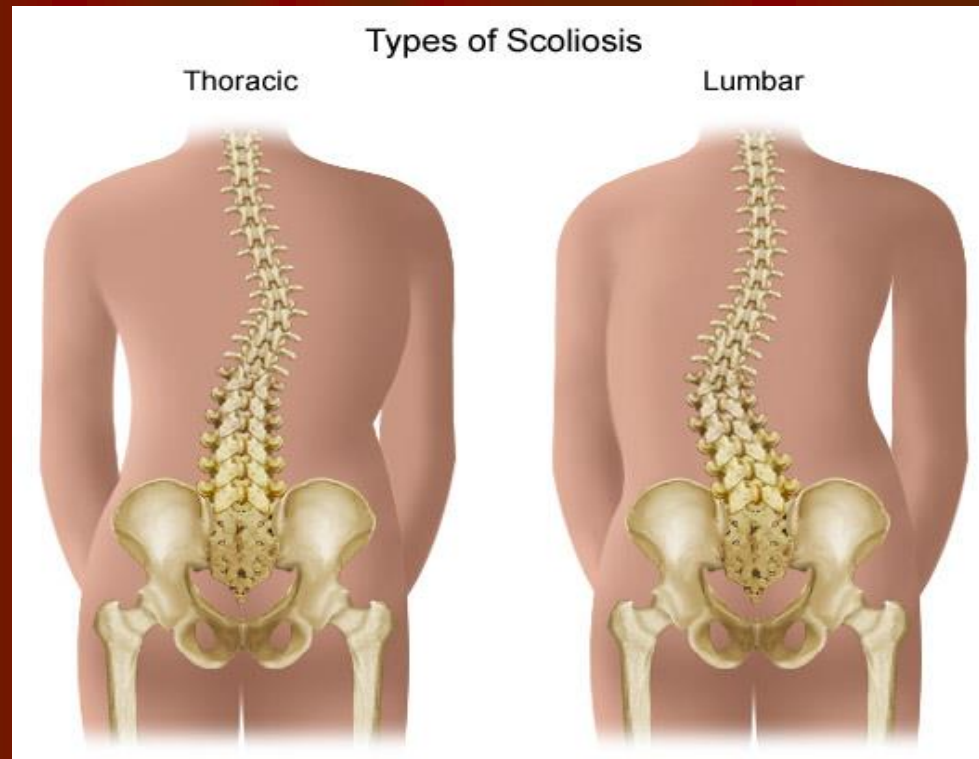
- A fracture is a broken bone.
- The common kinds are :
 - Closed
 - Open
 - Multiple
 - Comminuted
 - Greenstick
 - Spiral

Some Common types of Fractures



Scoliosis

- This is the sideward curve of the spine.



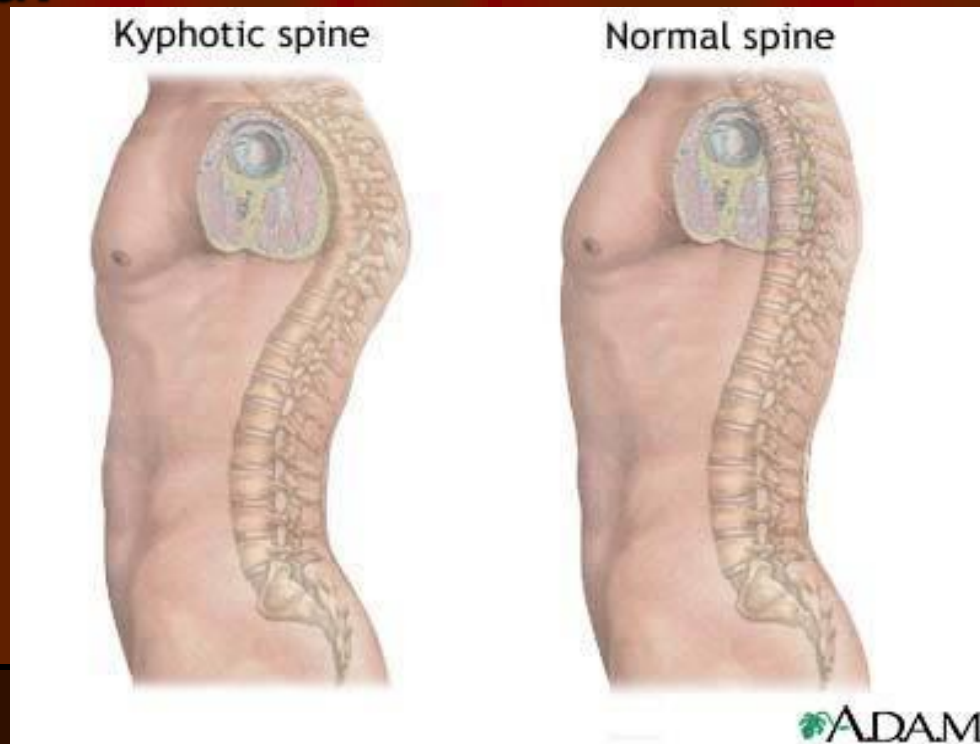
Scoliosis

This condition causes the patient to experience discomfort and pain when standing straight.



Kyphosis

- This is the forward bending of the spine so that the patient appears to be leaning forward.



What are the effects of exercise on the Skeletal System?

- Bones become stronger in order to deal with the stress placed on them from exercise.
- The cartilage at the ends of bones becomes thicker and are better at absorbing shock.
- Tendons become thicker and more capable of withstanding greater force.
- Ligaments will stretch slightly to enable greater flexibility at the joint.

● THE END