L3 Cambridge Technicals – Unit 1
Body systems and the effects of physical activity

Any queries with this task – contact Mr Graffagnino

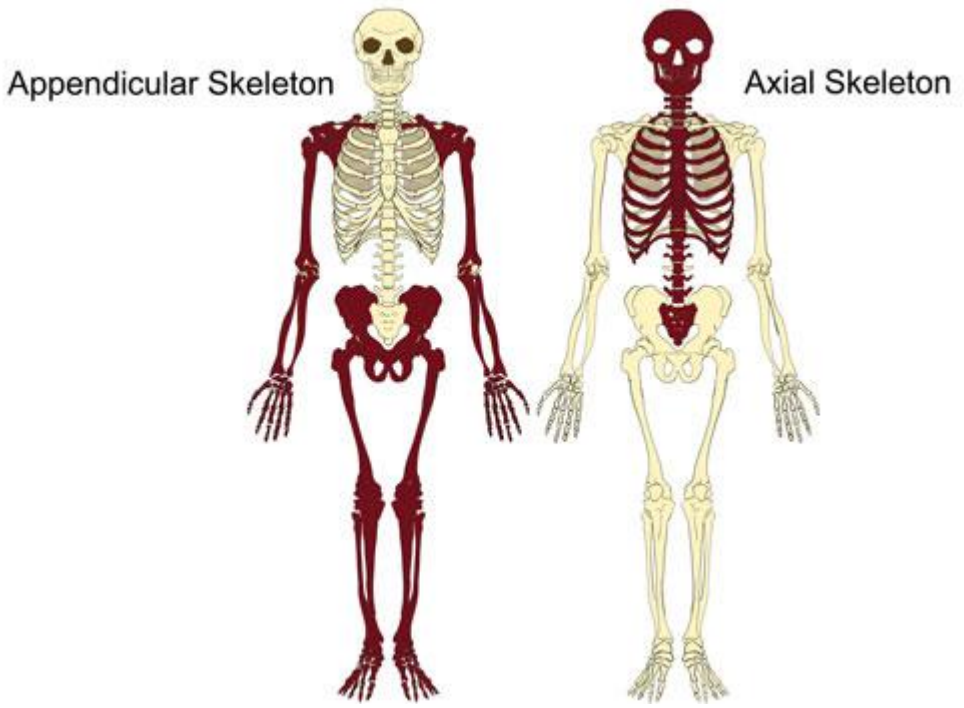
LO1 – Understand the skeletal system in relation to physical activity

Content	Notes
Understand the skeletal system in relation to exercise and physical activity	The axial and appendicular skeletons Axial – • Cranium, sternum, ribs, vertebral column (cervical, throracic, lumbar, sacrum, coccyx) Appendicular – • Scapula, clavicle, humerus, radius, ulna, carpals, metacarpals, phalanges, ilium, ischium, pubis, femur, patella, tibia, fibula, tarsals, talus, metatarsals
Functions of the skeleton	Functions of the skeleton • Support • Protection – types of bones that provide this • Movement – fine and gross movement and different types of joints • Shape and points of attachment for muscles • Mineral storage • Blood cell production Apply to practical examples
Types of bone	Long, short, flat, irregular, sesamoid
Introduction to joints	Classification of joints • Fixed/fused • Slightly movable / cartilaginous • Freely movable / synovial
Types of synovial joints	Hinge, ball and socket, pivot, condyloid, saddle, gliding
Structure of a synovial joint	Structure of a synovial joint • Synovial membrane • Synovial fluid • Joint capsule • Bursae • Hyaline cartilage • Ligaments • Menisci • Pads of fat How these relate to practical situations Functions • Stability • mobility
Joint movements	• flexion and extension • lateral flexion • abduction and adduction • horizontal abduction and adduction • medial and lateral rotation • circumduction • pronation and supination • dorsi flexion and plantar flexion
Vertebral column	Structure and function
Impact of physical activity	Impact of training, activity and lifestyle on the skeletal system • short term effects • long term effects • effects of warm up and cool downs

The skeleton

The skeleton is a crucial part of how the body moves, grows and develops. It has a number of functions which allow us to carry out our everyday tasks.

The skeleton is classified into one of two sections. The **axial skeleton** and the **appendicular skeleton**.



From the diagram above, identify which bones make up the axial and the appendicular skeleton.

Axial _____

Appendicular _____

The job of the axial skeleton is **protection**. The job of the appendicular skeleton is **movement**.

What are the functions of the skeleton?

1. Support

- _____

2. Shape

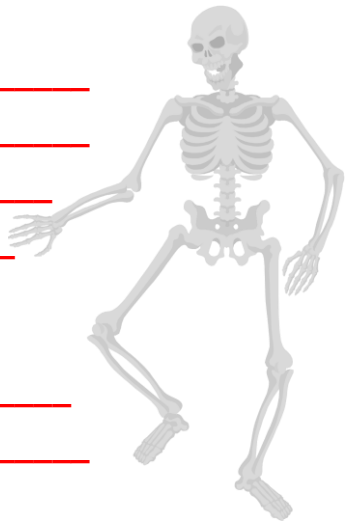
- _____
- _____

3. Movement

- _____
- _____

4. Protection

- _____
- _____
- _____
- _____



5. Blood cell production

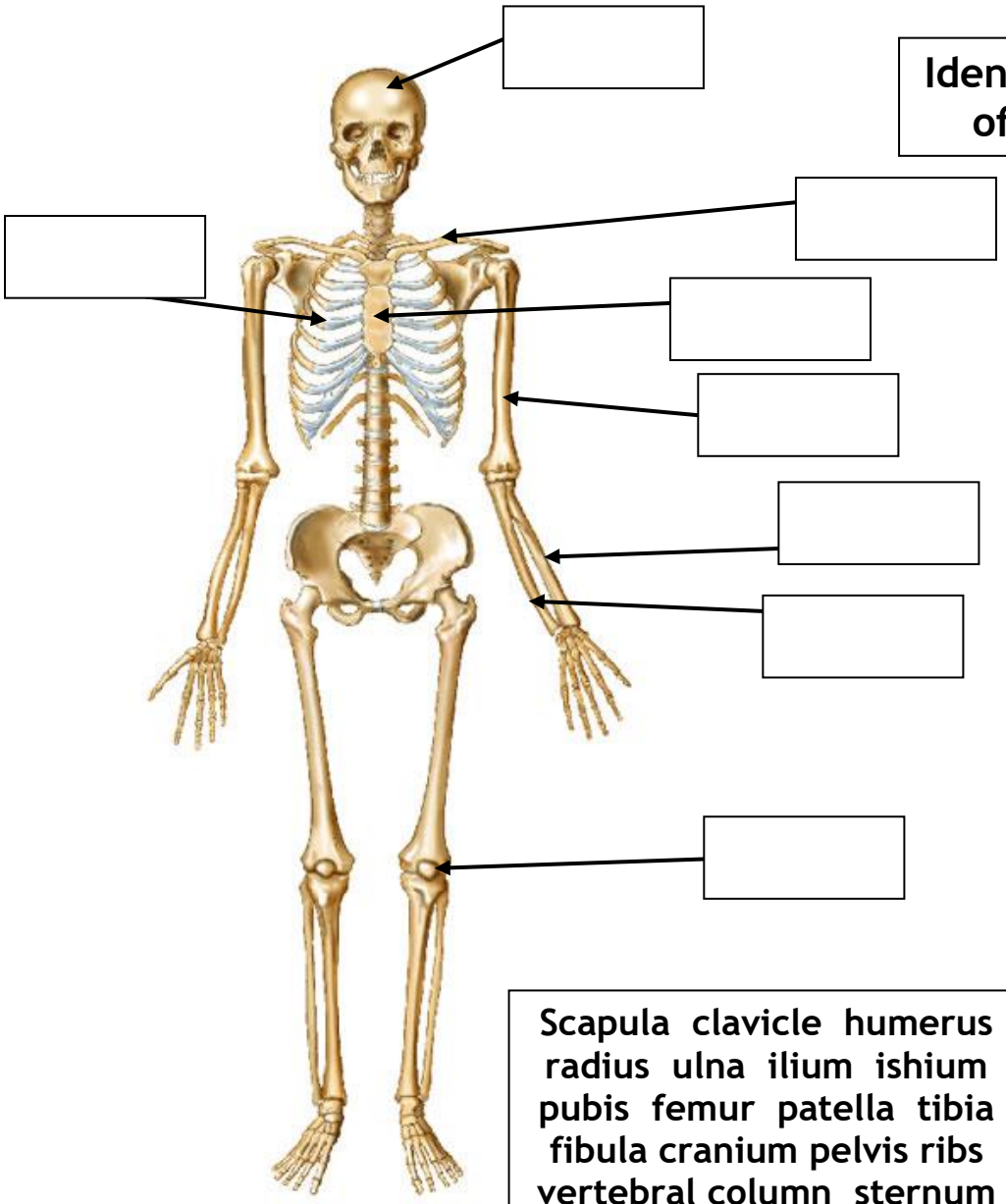
- _____
- _____

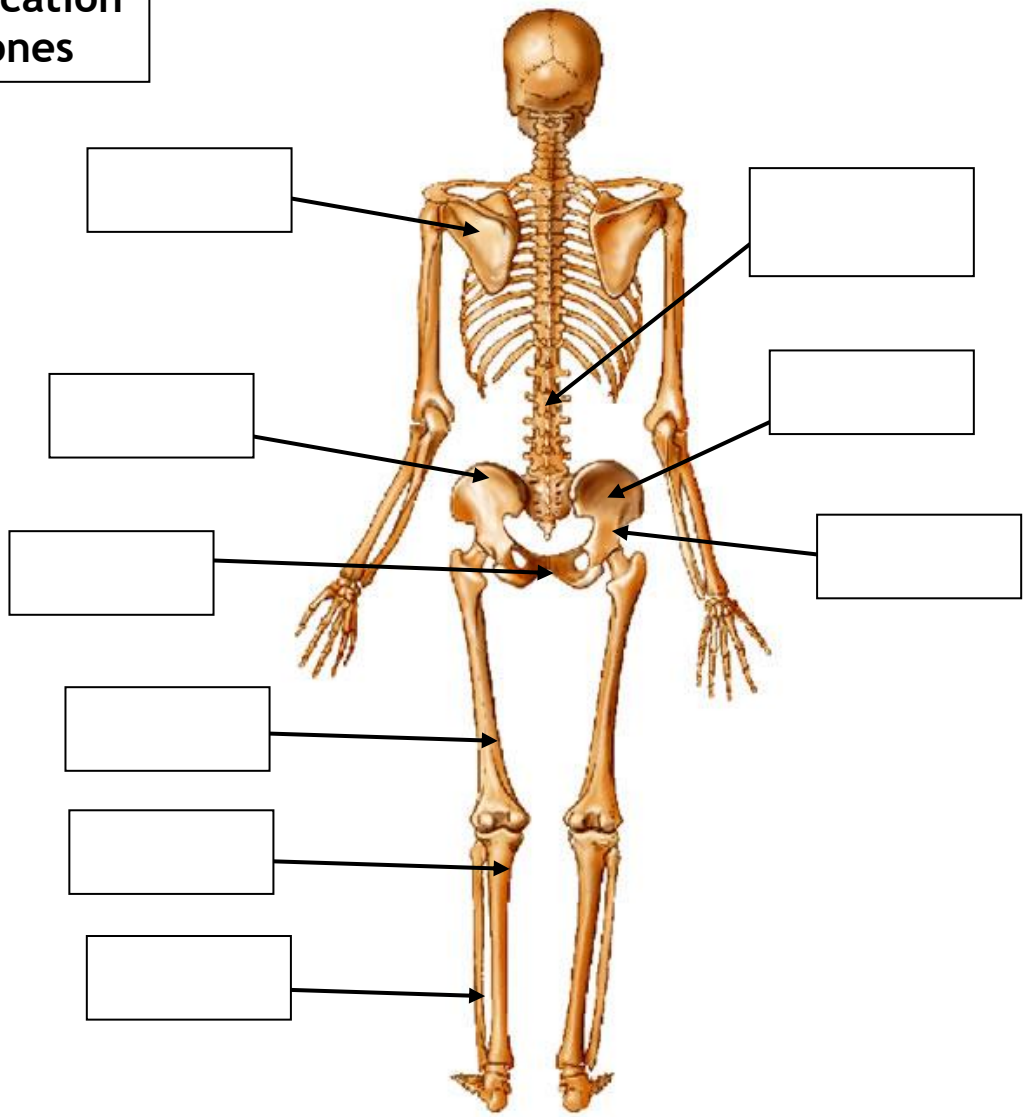
6. Mineral storage

- Bones store calcium and phosphorous which are used for nerve transmission and metabolism

L3 Cambridge Technicals – Unit 1
Body systems and the effects of physical activity

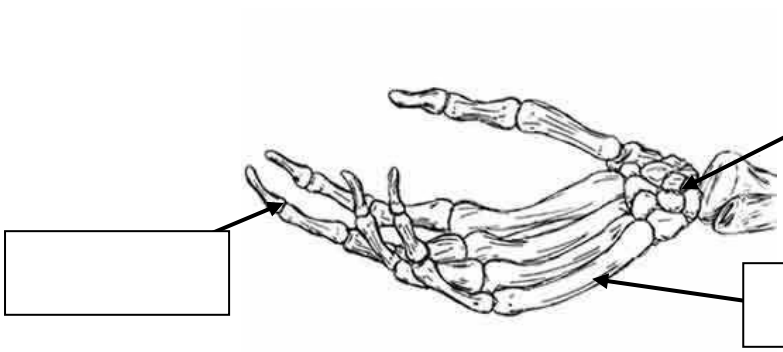
Identification of bones



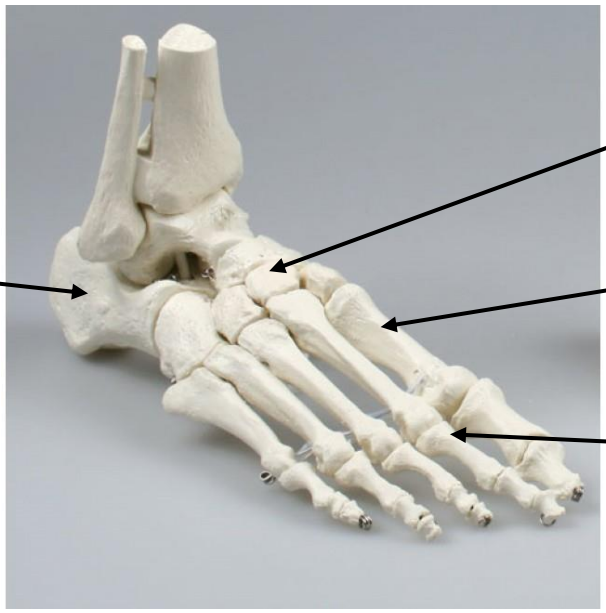


Scapula clavicle humerus radius ulna ilium ishium pubis femur patella tibia fibula cranium pelvis ribs vertebral column sternum

L3 Cambridge Technicals – Unit 1
Body systems and the effects of physical activity

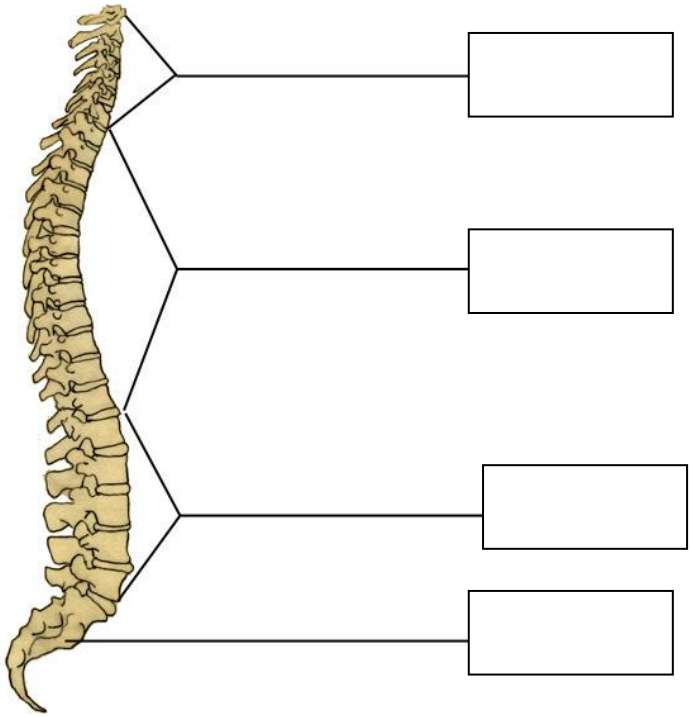


Carpals metacarpals phalanges



Tarsals metatarsals phalanges talus

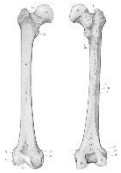
Name the Bones of the Vertebral Column



Thoracic cervical sacrum lumbar

Types of bones

Bones can be classified according to the 'shape':



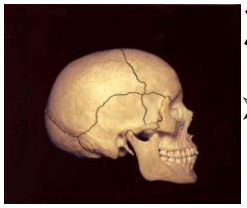
1. Long bones

- _____
- _____

2. Short bones

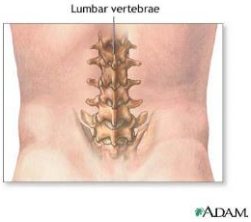
- _____

_____



3. Flat bones

- _____



4. Irregular bones

- _____

_____

5. Sesamoid bones

- _____

L3 Cambridge Technicals – Unit 1
Body systems and the effects of physical activity

CRANIUM	FIBULA	TARSALS	PELVIS
CLAVICLE	TIBIA	METATARSALS	CARPALS
FEMUR	SCAPULA	STERNUM	RIB
HUMERUS	VERTEBRAE	METACARPALS	ULNA
RADIUS	PATELLA	PHALANGES	

TYPE OF BONE- WHAT TYPE OF BONES ARE THE BONES IN THE TABLE?

LONG	SHORT	FLAT	IRREGULAR	SESAMOID

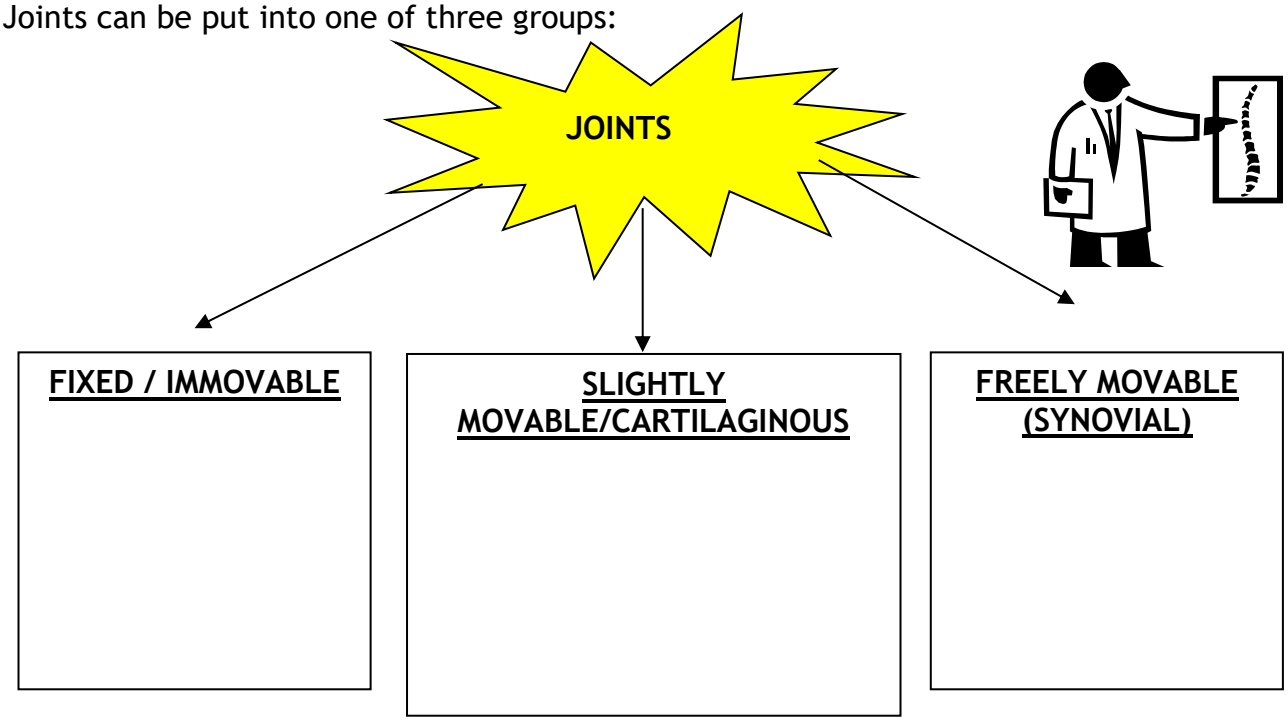
Classification of joints

One of the functions of the skeleton is movement. The skeleton has many joints which allows this movement. These allow our muscles to move our bones and let the whole body move. We have over 100 different joints in our bodies.

But what is a joint?

Can you think of a place in the body where movement between joints could be fatal?!!

Joints can be put into one of three groups:



Our different joints work smoothly together when we make skilled sporting movements. They must be capable of a full range of movement. The muscles and **ligaments** surrounding each joint must be strong enough to give stability.

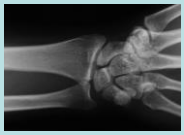
Sport puts stress on our joints. We must make sure we **warm-up thoroughly** before activity to reduce the risk of injury.

Types of freely movable joint

REMEMBER – joints can be put into one of three groups – **FIXED, SLIGHTLY MOVABLE AND FREELY MOVABLE.**

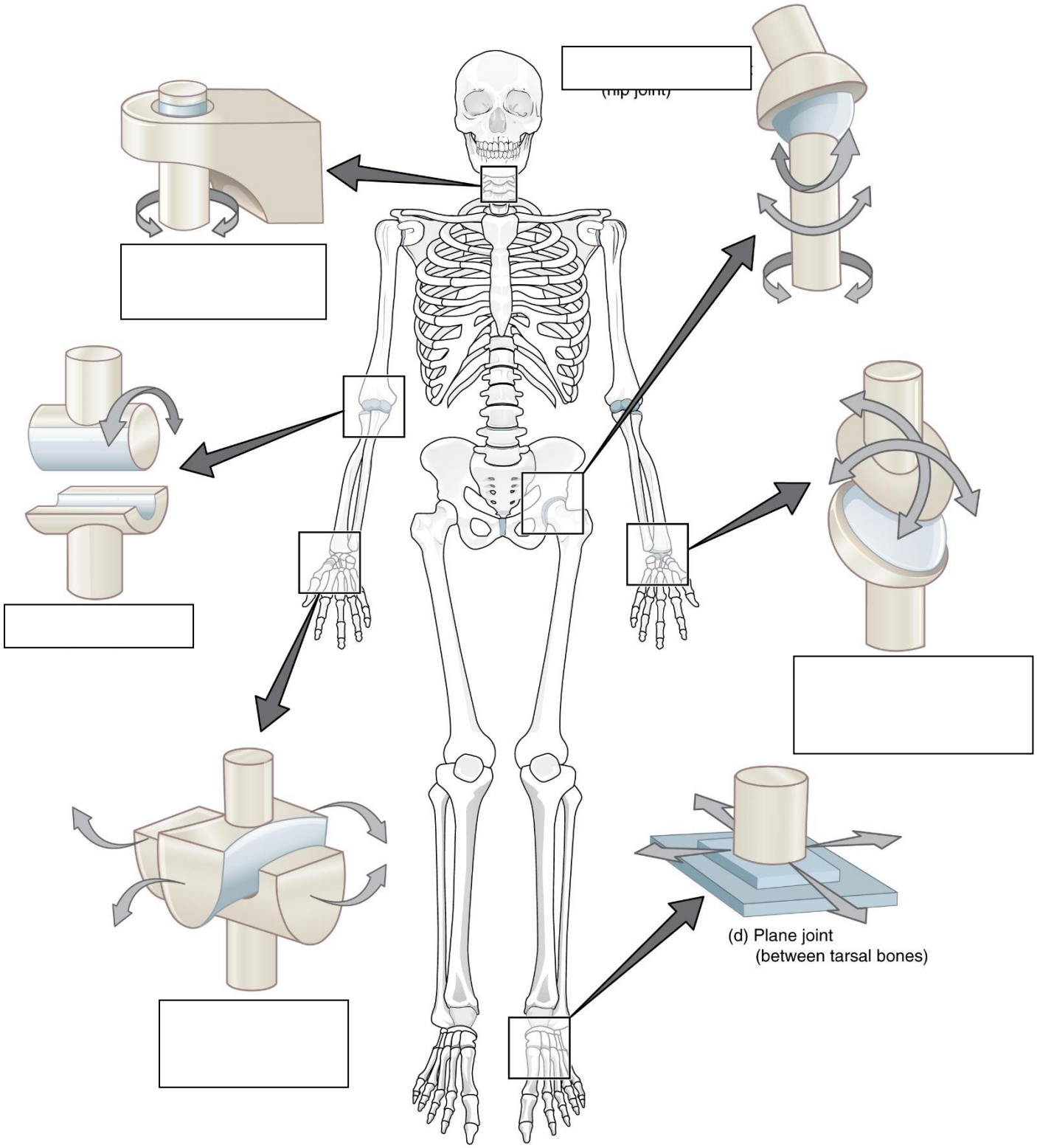
There are different types of freely movable joint. This depends on what type of movement they are capable of.

TYPES OF SYNOVIAL JOINTS

BALL AND SOCKET	HINGE	PIVOT	SADDLE	CONDYLOID	GLIDING
					
EXAMPLE	EXAMPLE	EXAMPLE	EXAMPLE	EXAMPLE	EXAMPLE

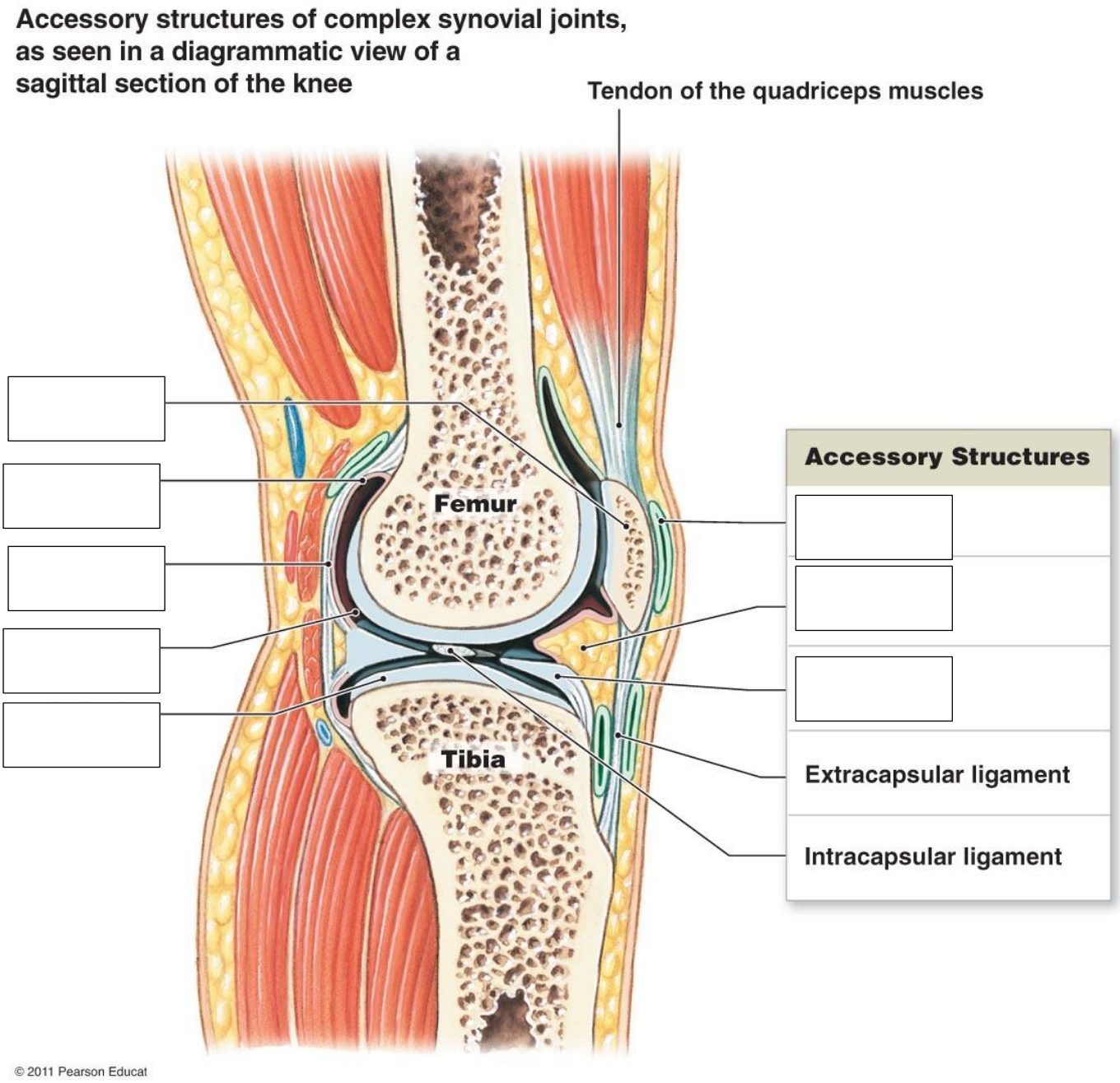
L3 Cambridge Technicals – Unit 1
Body systems and the effects of physical activity

Identify the type of synovial joint indicated below



Structure of a synovial joint

Identify the structures of the synovial joint below.



articular/hyaline cartilage ligament
synovial membrane synovial fluid meniscus
fat pad bursa joint capsule

Articular /hyaline cartilage

Ligaments

Synovial membrane

Synovial fluid

Mensici

Pads of fat

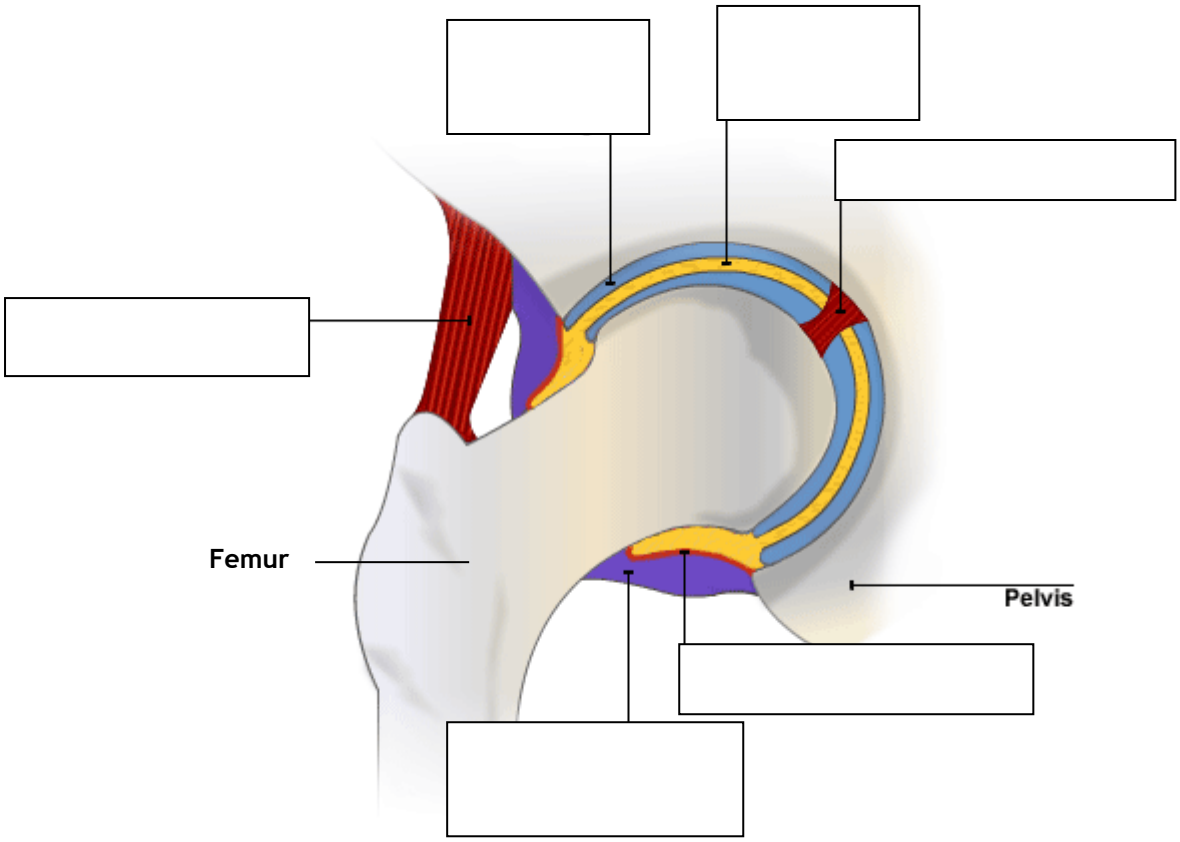
Bursae

Joint capsules

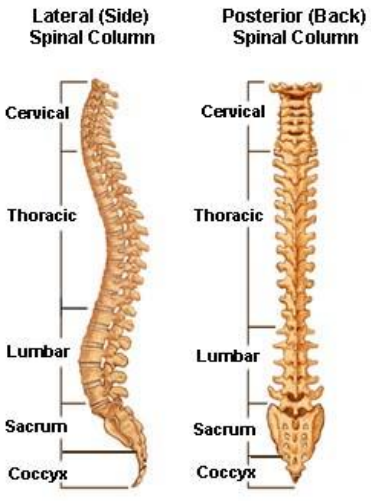
L3 Cambridge Technicals – Unit 1
Body systems and the effects of physical activity

Can you identify the following structures in the hip joint?

hyaline cartilage synovial fluid synovial membrane ligament joint capsule



The vertebral column



The vertebral column incorporates all three types of joint – fixed (sacrum), cartilaginous (thoracic) and synovial (pivot and gliding). The vertebral column helps us with movement by providing attachment for muscles and it is very important to the way we walk.

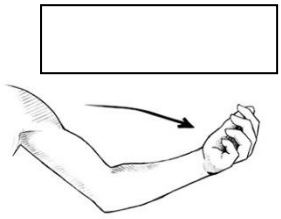
Types of movement at synovial joints

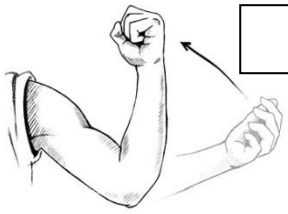
The type of movement at a joint will depend on a number of factors, largely the structure of the joint.

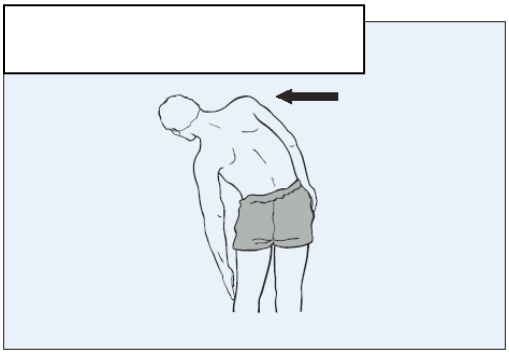
Flexion	Extension	Abduction	Adduction
Circumduction	Lateral flexion	Horizontal abduction	Horizontal adduction
Medial rotation	Lateral rotation	Pronation	Supination
	Plantar flexion	Dorsi flexion	

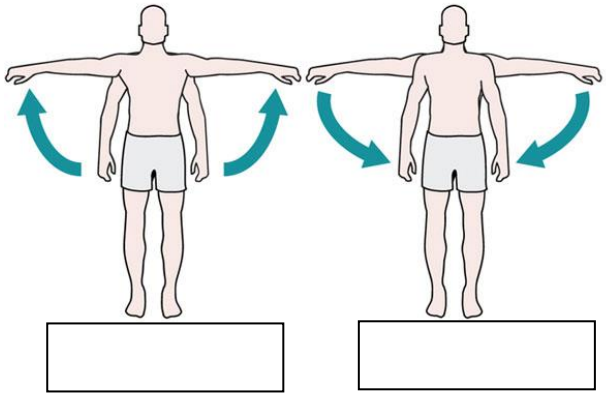
L3 Cambridge Technicals – Unit 1
Body systems and the effects of physical activity

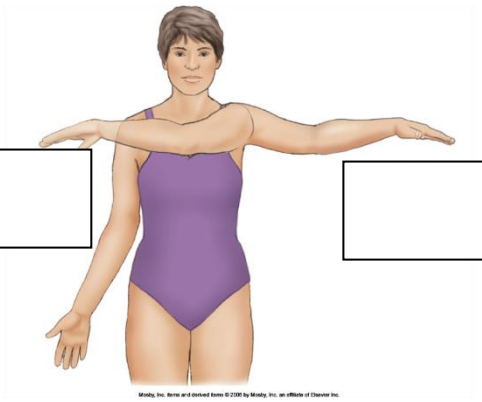
Identify the following anatomical movements from the pictures below.

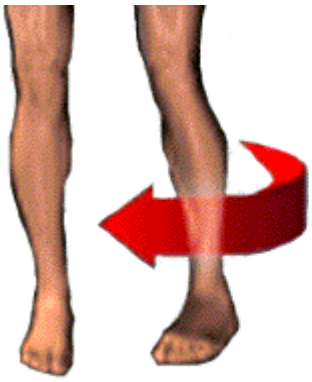


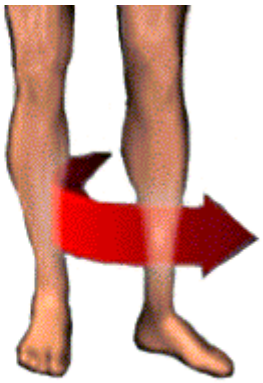


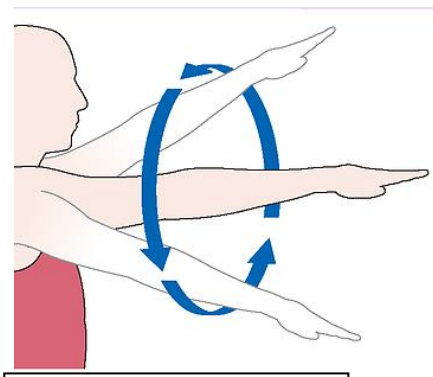


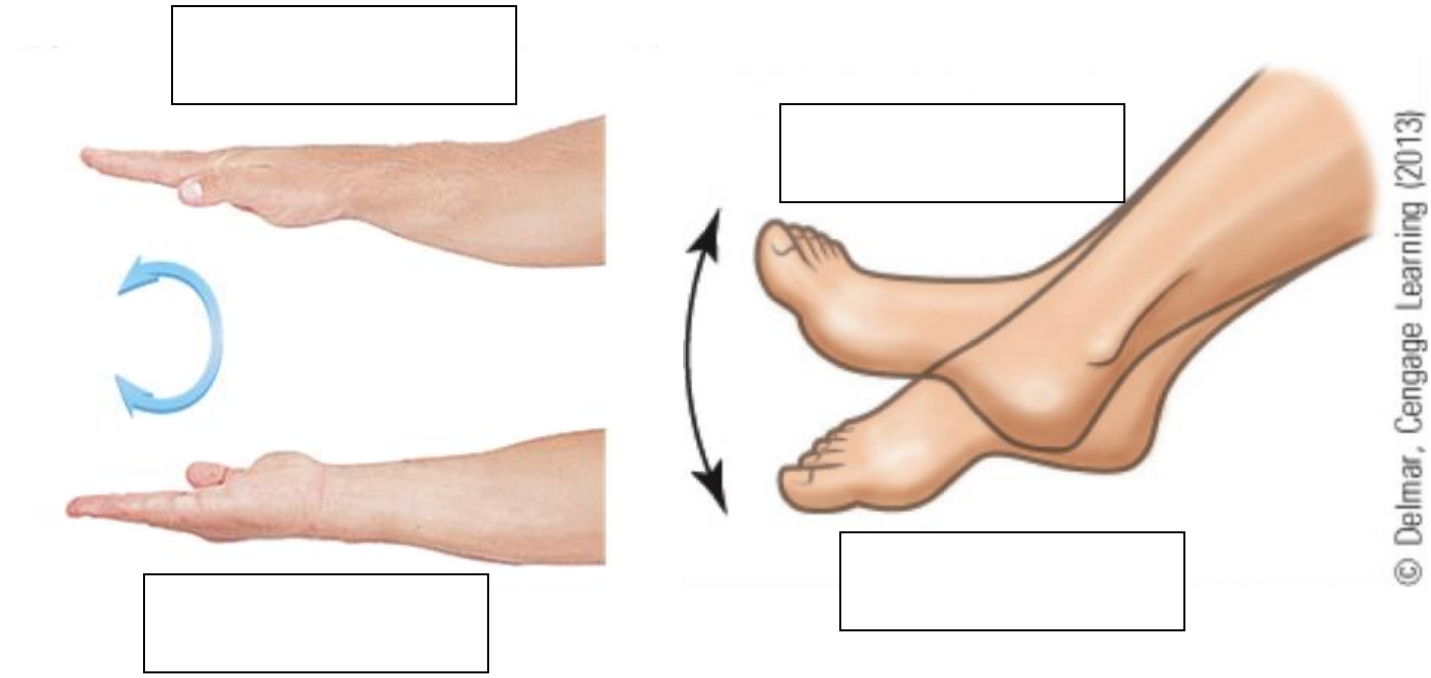












Stability and flexibility of joints

The depth of each joint plays an important part in its stability and flexibility.

Compare the hip joint and the shoulder joint. They are both ball and socket joints, but how do they differ in terms of stability and flexibility?

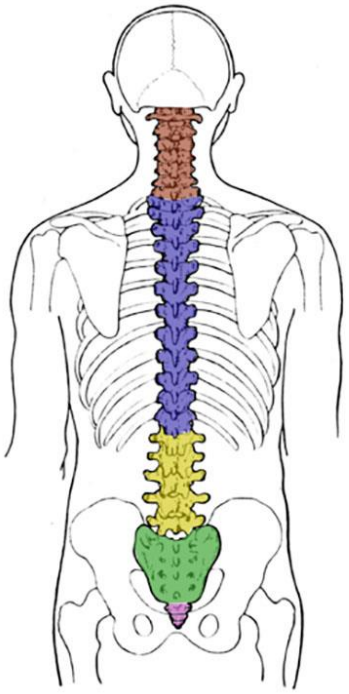
_____

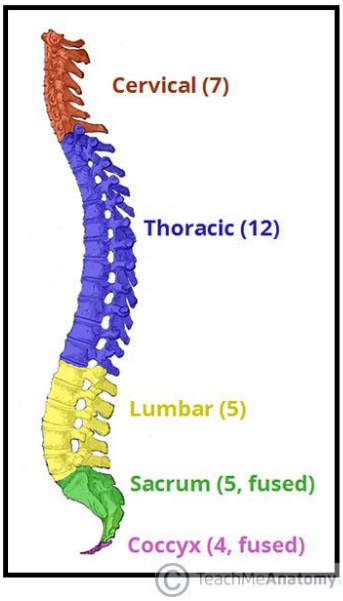
_____

_____

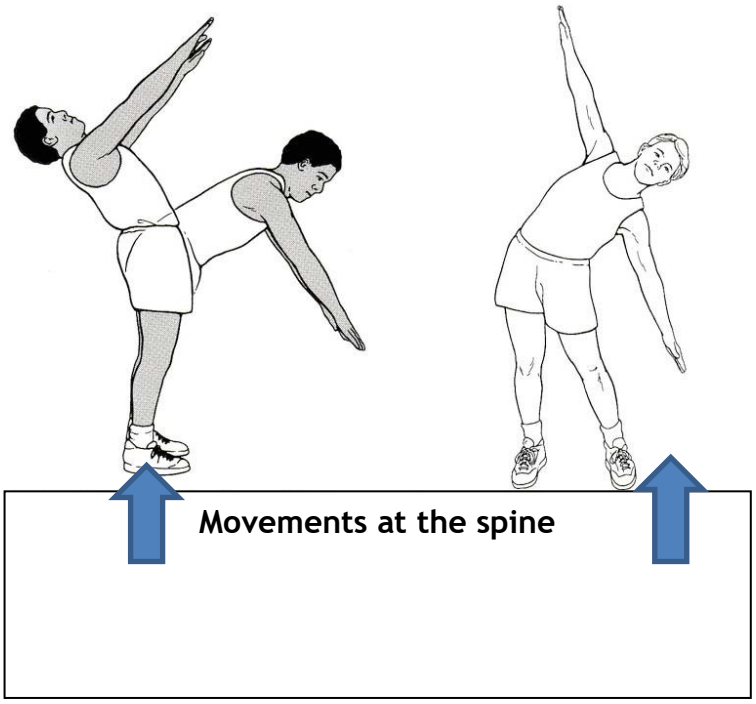
_____

Structure and function of the vertebral column





The **Vertebral column,** also called spinal column, is the flexible column extending from neck to tail, made of a series of bones, the vertebrae. The major function of the vertebral column is **protection of the spinal cord**; it also provides **stiffening** for the body and **attachment** for the pectoral and pelvic girdles and many muscles. An additional function is to **transmit body weight** in walking and standing.



Impact of physical activity, training and lifestyle on the skeletal system

Short term effects

POSITIVE	NEGATIVE

Long term effects

POSITIVE	NEGATIVE

Effects of warm up and cool down

- _____
- _____
- _____