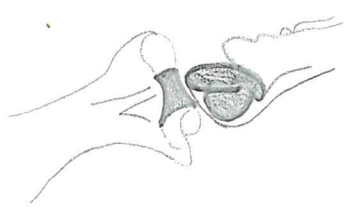
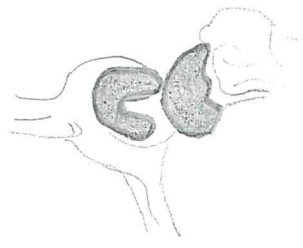


Identify the type of synovial joint

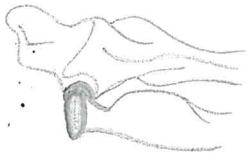
Type of synovial joints	Examples	Description	Mobility
Ball & Socket	Shoulder Hip	Ball shaped head of one bone articulates with a cup like socket of an adjacent bone.	Movement can occur in 3 planes. This joint allows the greatest range of movement.
Condylar	Elbow Knee Ankle	A cylindrical protrusion of one bone articulates with a trough-shaped depression of an adjacent bone.	Movement is restricted to one plane. This joint allows bending & straightening only.
Pivot	Radio-ulnar Spine	Rounded/pointed structure of one bone articulates with a ring-shaped structure of an adjacent bone.	Movement restricted to one plane. Joint allows rotation about its longitudinal axis only
Ellipsoid	Wrist	Similar to ball & socket but with much flatter articulating surfaces forming a much shallower joint.	Movement can occur in 2 planes. This joint allows the greatest range of movement.
Gliding	Spine	Articulating surfaces are almost flat & of a similar size	Gliding allows movement in 3 planes, but is severely limited.



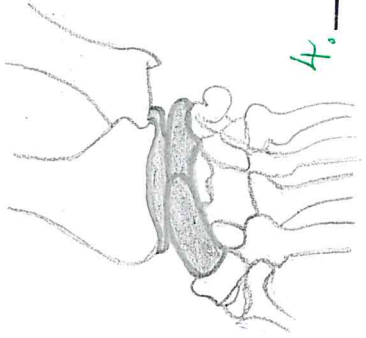
1. \_\_\_\_\_



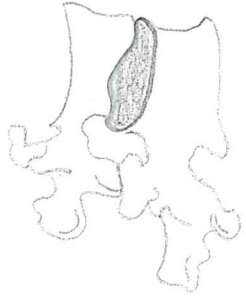
2. \_\_\_\_\_



3. \_\_\_\_\_



4. \_\_\_\_\_



5. \_\_\_\_\_

# Movement in Synovial Joints

Flexion - The bending of a limb

Extension - The straightening of a limb

Pronation - Palm of your hand is pointing downwards

Supination - Palm of your hand is pointing upwards  
(‘sup’ = carry a bowl of soup)

Adduction - The movement of a limb towards the centre line of your body

Abduction - The movement of a limb away from the centre line of your body

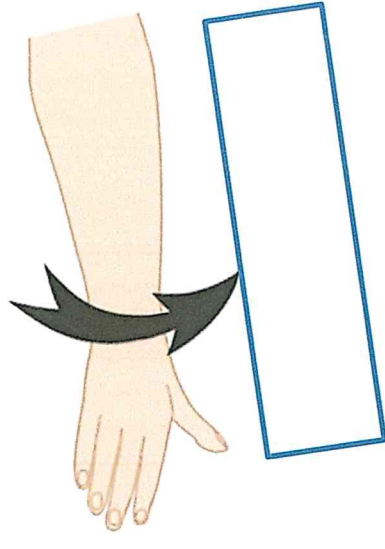
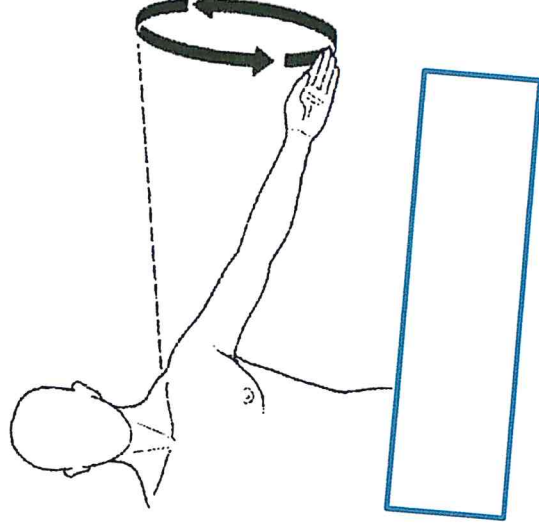
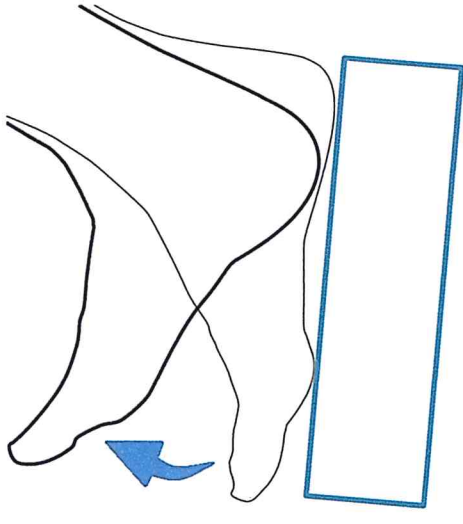
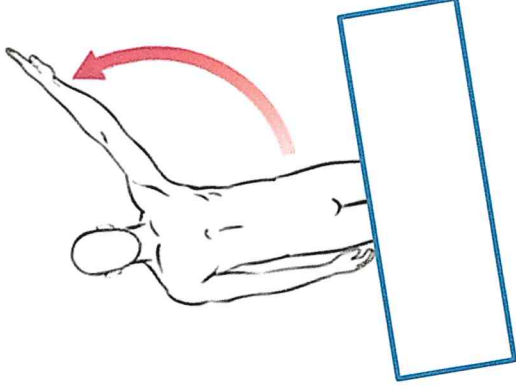
Rotation - A body part which turns about its long axis from the anatomical position

Circumduction - Joint stays still whilst the furthest end from the body makes a circular shape

Dorsi Flexion - The bending of your feet towards the air

Plantar Flexion - The pointing of your feet towards the ground so the front of the foot is straightened

## Name the Movement



# Anatomy and physiology: JOINTS

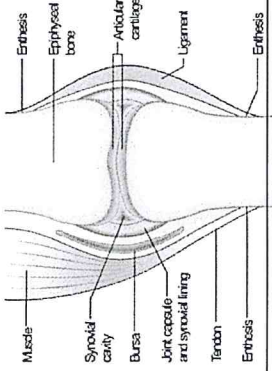
## Components of a joint:

JOINT FEATURE	Structure	Function
Joint capsule	Fibrous tissue encasing the joint	Forms around joint for stability
Articular discs of cartilage/articular cartilage	C-shaped rims of fibro cartilage/cover articulating bone surfaces	Shock absorbers/ Prevents friction between bone ends
Synovial fluid	Fluid that fills capsule	Nourishes and lubricates articular cartilage
Synovial membrane	Lined capsule	Secretes synovial fluid
Bursa	Sac filled with synovial fluid in-between tendon, ligaments and bone	Reduce friction between these 3 components
Ligaments	White fibrous connective tissue bone to bone	Add joint stability
Pads of fat	Fatty tissue located between fibrous capsule and bone/muscle	Provides cushion between capsule and bone/muscle

### Joint movements:

Movement	Short Definition	Examples of Types of Synovial Joints permitting this movement
<u>Flexion</u>	A movement <u>decreasing the angle between articulating bones</u> . (Some texts express this as "decreasing the inner angle of the joint".)	1. Ball and socket 2. Condyloid 3. Hinge 4. Pivot 5. Saddle
<u>Extension</u>	A movement <u>increasing the angle between articulating bones</u> . Another way to express this is " <u>increasing the inner angle of the joint</u> ".	1. Ball and socket 2. Condyloid 3. Hinge 4. Pivot 5. Saddle
<u>Abduction</u>	A movement <u>away from the mid-line of the body</u> .	1. Ball and socket 2. Condyloid 3. Saddle
<u>Adduction</u>	A movement <u>towards the mid-line of the body</u> - also applies to movements <u>inwards and across the body</u> .	1. Ball and socket 2. Condyloid 3. Saddle
<u>Circumduction</u>	A conical movement of a limb extending from the joint (e.g. shoulder or hip) at which the movement is controlled. True circumduction allows for 360° of movement.	1. Ball and socket e.g. shoulder and hip

Movement	Short Definition	Examples of Types of Synovial Joints permitting this movement
<u>Rotation</u>	A movement in which something, e.g. a bone or a whole limb, <u>pivots</u> or <u>revolves</u> around a single long axis.	1. Ball and socket 2. Pivot
<u>Dorsiflexion</u>	<u>Backward flexion</u> (bending), as of the hand or foot. This can also be described as <u>bending in the direction of the dorsum</u> (dorsum = upper surface = "superior" surface, i.e. the surface of the foot or hand that includes the toe nails or finger nails).	• Bending the foot as when standing on ones heels (see <a href="#">video</a> <u>ELABORATION</u> ).
<u>Plantarflexion</u>	<u>Forwards flexion</u> or bending, as of the hand or foot. For example, flexion of the foot/ankle means rotating the toes downwards (away from the leg to which the ankle and foot is attached).	• Bending the foot as when standing on ones toes (see <a href="#">video</a> <u>ELABORATION</u> ).
<u>Pronation</u>	A movement that can be performed by the lower-arm/wrist and also by the ankle/foot. The action of pronation can be described for each: <ul style="list-style-type: none"> <li>• <b>pronation of the forearm</b> is rotation of the forearm turning the palm of the hand <u>inwards</u> towards the body, i.e. turning the palm inferiorly or posteriorly (the opposite of <u>supination</u> of the forearm).</li> <li>• <b>pronation of the foot</b> is one of the normal movements made by the foot to absorb its impact onto the ground when walking or running.</li> </ul>	• Movement of a forearm to turn the palm of the attached hand backwards or downwards (depending on the position of the rest of the arm at the time). See <a href="#">video of pronation of the forearm</a> . <ul style="list-style-type: none"> <li>• Movement of a forearm to turn the palm of the attached hand forwards or upwards (depending on the position of the rest of the arm at the time). See <a href="#">video of supination of the forearm</a>.</li> </ul>
<u>Supination</u>	A movement that can occur (in different ways) at the lower-arm and wrist and also the foot/ankle. Supination can be described for each case: <ul style="list-style-type: none"> <li>• <b>supination of the forearm</b> = rotation of the forearm turning the palm of the hand <u>outwards</u> so that it faces away from the body, i.e. turning the palm superiorly (= upwards) or anteriorly (= forwards).</li> <li>• <b>supination of the foot</b> is an excessive <u>outward</u> rolling motion of the foot and ankle when walking or running.</li> </ul>	• Movement of a forearm to turn the palm of the attached hand forwards or upwards (depending on the position of the rest of the arm at the time). See <a href="#">video of supination of the forearm</a> .



JOINT WORDSEARCH

E	E	A	T	A	N	O	R	P
L	X	D	I	S	O	A	P	
U	T	T	N	F	E	S	F	
T	M	E	I	H	G	R	L	
S	I	P	N	O	D	U	E	
R	K	B	A	C	S	B	X	
S	C	I	D	I	G	I	I	
P	R	W	A	I	O	R	O	
N	O	T	A	O	R	N	N	
V	N	I	T	C	U	D	B	A

Flexion

Extension

Abduction

Rotation

Pronation

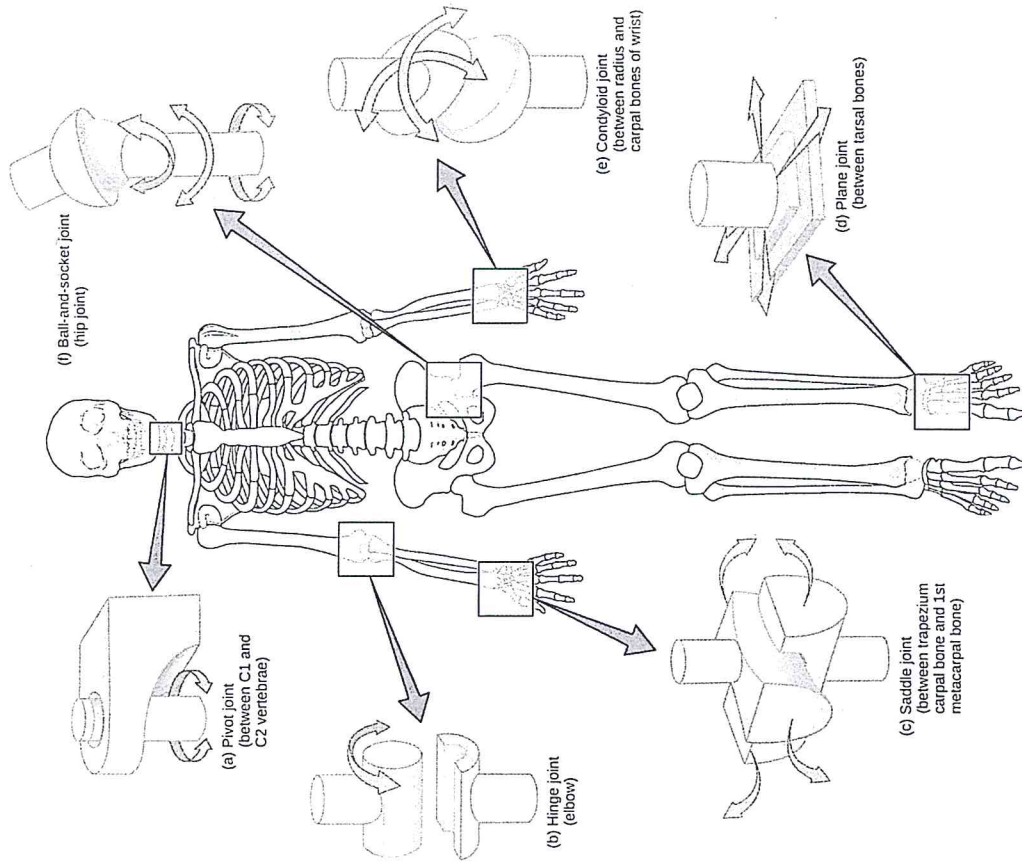
Bursa

~~Cartilage~~

DISCS

Exam style:

① Describe and explain the make-up of a synovial joint ~~while~~ giving the functions of each component [6]



Muscular system	Spinal cord	Condylloid
Skeletal/voluntary muscle	Sternum	Saddle
Smooth/involuntary muscle	Cervical vertebrae	Hinge
Cardiac muscle	Long bones	Ball and Socket
Antagonistic muscles	Short bones	Pivot
Agonist	Flat bones	Gliding
Antagonist	Irregular bones	Types of cartilage
Prime mover	Sesamoid bones	Synovial joint structure
Flexion	Cartilage	Fibrocartilage
Concentric	Compact bone	Elastic cartilage
Eccentric	Marrow	Joint capsule
Isometric	Epiphyses	Synovial membrane
Collagen	Articular/hyaline cartilage	Synovial fluid
Tendon	Thoracic vertebrae	Bursa
Fibrous tissue	Lumbar vertebrae	Flexion
Myofibrils	Sacral vertebrae	Extension
Muscle fibres	Coccyx	Adduction
Type I – Slow Twitch Oxidative	Structure of the vertebral column	Abduction
Type IIa – Fast Twitch Oxidative	Structure of the rib cage	Rotation
Type IIb – Fast Twitch Glycolytic	Functions of the skeleton	Circumduction
Muscle fibre recruitment	Protection	Plantarflexion
Skeletal system	Movement	Dorsiflexion
Cancellous bone	Support	Elevation
Axial skeleton	Shape	Depression
Appendicular skeleton	Blood production	Cardiorespiratory system
True ribs	Mineral storage	Nervous system
False ribs	Joint classification	Exercise intensity
Costal cartilage	Fixed joint	Energy systems
Floating ribs	Cartilaginous joint	Injury prevention
Vertebral column	Synovial joint	

# Anatomy and physiology: MUSCULAR SYSTEM

JOINT	JOINT MOVEMENT	MUSCLE RESPONSIBLE	LOCATION
Wrist	Flexion	Wrist flexors	Anterior forearm
Wrist	Extension	Wrist extensors	Posterior forearm
Radio-ulnar	Pronation	Pronator teres	Superior anterior forearm
Radio-ulnar	Supination	Supinator	Lateral anterior forearm
Elbow	Flexion	Biceps brachii	Anterior upper arm
Elbow	Extension	Triceps brachii	Posterior upper arm
Shoulder	Anterior: flexion Middle: Abduction Posterior: Extension	Deltoid	Covers shoulder joint
Shoulder	Adduction	Latissimus dorsi	Posterior trunk
Shoulder	Horizontal flexion	Pectoralis major	Top of chest
Shoulder	Horizontal extension	Trapezius	Posterior trunk
Shoulder	Lateral rotation	Teres minor and infraspinatus	Attaches back of scapula to humerus
Shoulder	Medial rotation	Teres major and subscapularis	Attaches side and front of scapula to humerus
Spine	Flexion	Rectus abdominus	Middle of abdomen
Spine	Extension	Erector spinae group	Covers length of spine
Spine	Lateral flexion&rotation	External obliques	Lateral abdomen
Spine	Lateral flexion&rotation	Internal obliques	Lateral abdomen beneath external obliques
Hip	Flexion	Iliopsoas	Anterior pelvis
Hip	Extension	Gluteus maximus	Posterior pelvis
Hip	Abduction	Gluteus medius&minimus	Lateral hip
Hip	Adduction	Adductor group (Longus, brevis)	Medial thigh
Knee	Flexion	Biceps femoris, semitendinosus, semimembranosus(hamstrings)	Posterior thigh
Knee	Extension	Rectus femoris, vastus lateralis, vastus medialis, vastus intermedius (quads)	Anterior thigh
Ankle	Dorsi flexion	Tibialis anterior	Cover anterior tibia
Ankle	Plantar flexion	Gastrocnemius&soleus	Calf muscles

## Shoulder Girdle

- Trapezius / Levator Scapulae / Rhomboids / Pectoralis Minor / Serratus Anterior / Sternocleidomastoid

## Shoulder joint including Chest Muscles

- Pectoralis Major / Latissimus Dorsi / Deltoid / Supraspinatus / Infraspinatus / Teres Minor / Subscapularis / Teres Major

## Elbow joint muscles / Arm Muscles

- Biceps Brachii / Brachialis / Brachioradialis / Triceps Brachii / Anconeus / Supinator / Pronator Teres / Pronator Quadratus

## Wrist and hand

- Flexor Carpi Radialis / Flexor Carpi Ulnaris / Extensor Carpi Radialis Brevis / Extensor Carpi Radialis Longus / Extensor Carpi Ulnaris / Extensor Digitorum Communis / Flexor Digitorum Superficialis / Extensor Pollicis Longus / Flexor Pollicis Longus

## Knee joint

- Vastus Lateralis / Vastus Intermedius / Vastus Medialis / Popliteus

## Hip and pelvis

- Iliopsoas / Gluteus Medius / Gluteus Minimus / Gluteus Maximus / Piriformis / Pectineus / Sartorius / Rectus Femoris / Tensor Fasciae Latae / Biceps Femoris / Semitendinosus / Semimembranosus / Adductor Brevis / Adductor Longus / Adductor Magnus / Gracilis

## Lower Leg muscles

- Gastrocnemius / Soleus / Tibialis Posterior / Flexor Digitorum Longus / Flexor Hallucis Longus / Peroneus Longus / Peroneal Brevis / Tibialis Anterior / Extensor Digitorum Longus

## Neck and back muscles

- Erector Spinae / Multifidus / Rectus Abdominus / Transversus Abdominus / Internal Obliques / External Obliques / Splenius / Quadratus Lumborum
-

1.

The skeleton protects:

- vital organs
- muscles
- joints

2.

The floating bone at the knee is called the:

- femur
- patona
- patella

3.

The large flat bones at the top of the back are called:

- scaphoids
- clavicles
- scapulas

4.

The vertebrae which the ribs are attached to are called:

- thoracic
- lumbar
- cervical

5.

Vertebrae which allow some side movement are called:

- lumbar
- thoracic

- cervical

6.

The synovial hip joint is an example of a:

- hinge joint
- pivot joint
- ball and socket joint

7.

Synovial fluid:

- strengthens the joint
- lubricates the joint
- aids tendons

8.

The bones of embryos are made largely of:

- cartilage
- tissue
- membrane

9.

To create bone the process of ossification uses:

- sodium
- nitrates
- calcium

10.

The humerus is a:

- irregular bone



Joint	Joint Type	Articulating Bones	Movements Possible	Sporting Example	Key Terms
Wrist	_____	Radius Ulna Carpals	Flexion Extension	_____ of throwing a dart. Execution of throwing a dart.	<b>Agonist:</b> Prime moving muscle. <b>Antagonist:</b> Secondary moving muscle. _____: A band of strong, fibrous tissue, connecting bone to bone. <b>Synovial Fluid:</b> A slippery fluid in the joint cavity, reducing _____ between bones.
Radio-Ulnar	Pivot	_____ Ulna	Pronation _____	Execution of a tennis throw. Execution of a bicep curl.	<b>_____ cartilage:</b> Glassy-smooth cartilage which is spongy, this absorbs shock and prevents friction between the ends of the bones in the joints. <b>Joint capsule:</b> A tough fibrous tissue that has two layers, this helps to strengthen the joint while the synovial membrane lines the joint & secretes synovial fluid.
Elbow	_____	Humerus Ulna	Flexion Extension	Preparation of a basketball shot. Execution of a butterfly stroke.	<b>Tendons:</b> Attach muscles to _____. <b>Origin:</b> The end of the muscle attached to a relatively fixed point during contraction.
Shoulder	Ball & Socket	Humerus _____	Flexion Extension Horizontal Flexion Horizontal Extension Abduction Adduction _____	Recovery of a bench press. Execution of a pull up. Recovery of a pull up. Execution of a Frisbee throw. Execution of a cricket bowl.	<b>Insertion:</b> The muscle attachment that moves towards the origin. <b>Isotonic muscular contraction:</b> Contraction of a muscle _____ movement. <b>Isometric Muscular Contraction:</b> Muscle contraction without movement. _____: Caused while the muscle shortens. <b>Eccentric:</b> Produced while the muscle lengthens
_____	Gliding	Vertebrae	Flexion Extension	_____ of a hamstring fold. Recovery of a hamstring fold. Execution of a crunch twist.	
Hip	_____	_____ Pelvis	Flexion Extension _____	Execution of high knees. Recovery of high knees. Execution of a star jump.	
Knee	Hinge	Femur Tibia	Adduction Rotation Flexion Extension	Execution of 'open the gate' Preparation of kicking a ball. Execution of kicking a ball.	
_____	Hinge	Tibia _____ Talus	_____ Flexion Plantar Flexion	Holding a ball on your foot. _____	

Muscles and Movement

S T R A I G H T E N S Y R Z U  
L C U V I B N C P E J H E F B  
Q O O S E I O E X D U U T U R  
Q F C N P N O A B K P C R F G  
K N D O T E L X D I I F O X P  
S S S R M E C D A T C O H H C  
G T A G R O Y I S P S E S B K  
I C D W B M T I R T K A P Z L  
T Z Y S X L N E J T E K D S V  
F B Q O M O P Y S E L C S U M  
O H Q L G V L L U P E P Z U W  
R T K A J O I N T S T I W W W  
C O T Q M Q Y S R S A S N F Q  
E N T N H H O B X D L Z X J W  
A M O D V I K R B M N U Q F F

ANTAGONISTIC	MUSCLES
PULL	LOCOMOTE
BICEPS	SHORTER
SKELETAL	CONTRACT
FORCE	STRAIGHTENS
JOINTS	TRICEPS
BENDS	RELAXES

Muscles and Movement

S T R A I G H T E N S Y R Z U  
L C U V I B N C P E J H E F B  
Q O O S E I O E X D U U T U R  
Q F C N P N O A B K P C R F G  
K N D O T E L X D I I F O X P  
S S S R M E C D A T C O H H C  
G T A G R O Y I S P S E S B K  
I C D W B M T I R T K A P Z L  
T Z Y S X L N E J T E K D S V  
F B Q O M O P Y S E L C S U M  
O H Q L G V L L U P E P Z U W  
R T K A J O I N T S T I W W W  
C O T Q M Q Y S R S A S N F Q  
E N T N H H O B X D L Z X J W  
A M O D V I K R B M N U Q F F

ANTAGONISTIC	MUSCLES
PULL	LOCOMOTE
BICEPS	SHORTER
SKELETAL	CONTRACT
FORCE	STRAIGHTENS
JOINTS	TRICEPS
BENDS	RELAXES