

Name .....

Paper 1

Target Grade:

# GCSE PE

## *Chapter Support:*

### *A&P – Musculoskeletal System*



A simple booklet designed to support you  
chapter by chapter through GCSE PE

# Glossary

## ***Skeletal System:***

*Joint* – A point in the skeletal system where two or more bones meet

*Articulating Bones* – The bones that meet at a particular joint

*Tendons* – Join muscle to bone

*Ligaments* – Join bone to bone

*Cartilage* – Acts as a shock absorber at the end of bones

## ***Movement:***

*Flexion* – The decreasing of the angle at the joint

*Extension* - The increasing of an angle at joint

*Abduction* - The movement of a bone or limb away from the midline of the body

*Adduction* – The movement of a bone or limb towards the midline of the body

*Rotation* – A movement in a circular motion around an axis

*Planter Flexion* – The pointing of the toes increasing the angle at the ankle

*Dorsi Flexion* – The upwards movement of the foot decreasing the angle at the ankle

## ***Muscular System:***

*Agonist/Prime Mover* – the muscles that contracts and shortens in movement

*Antagonist* – The muscles that relaxes and lengthens in movement

*Isometric Contraction* – Contraction with no change in muscle length

*Isotonic Contraction* – Contraction with a change in muscle length

*Concentric Contraction* – Contraction in which the muscle shortens

*Eccentric Contraction* - Contraction in which the muscle lengthens

# Worksheet 3: Functions of the skeleton

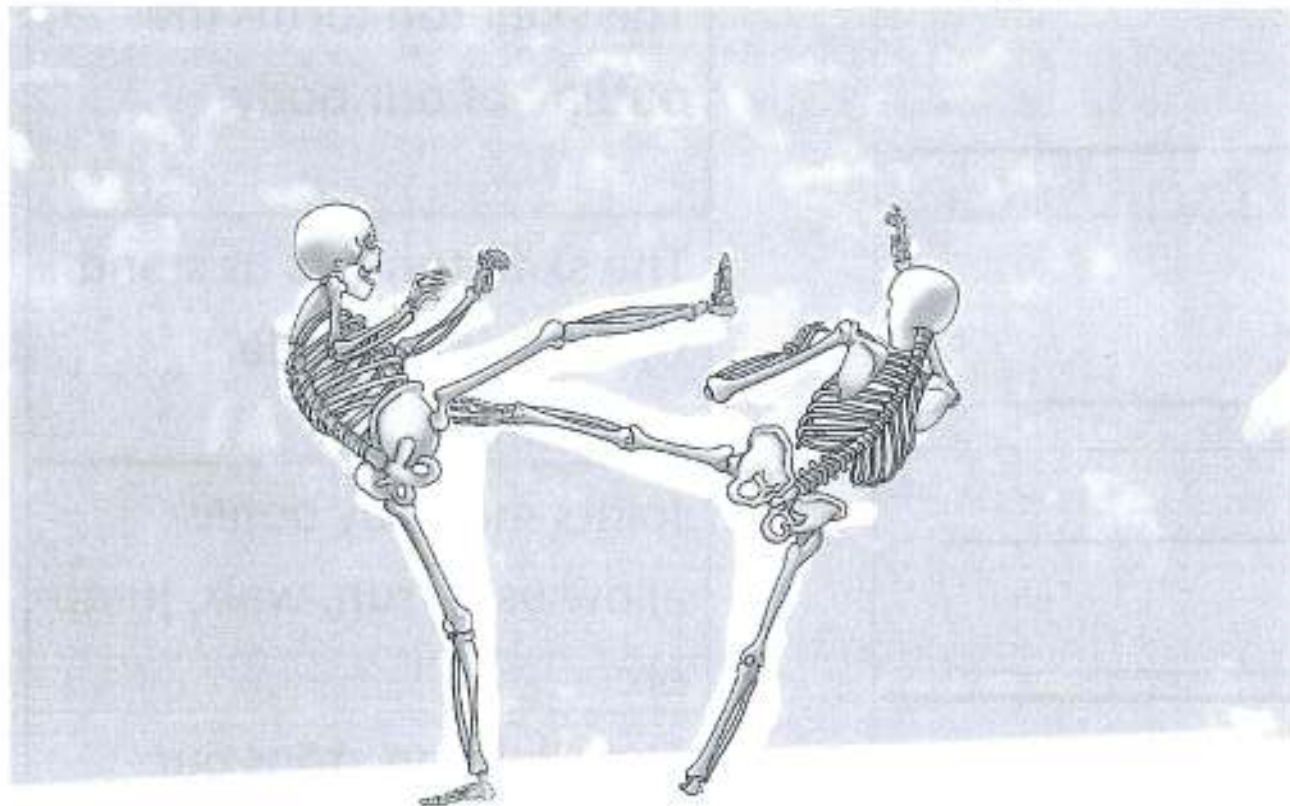
Level B

Student's Book pages 79

## Task

Insert the correct words to complete the sentences below on the functions of the skeleton. Use words from the word bank to help you. More words are provided than you need, so you will have to choose carefully. Write out the complete sentences in your workbook.

Writing out the sentences in your workbook will help you to remember the information at a later date.



- a) Some people choose a particular sport because of their \_\_\_\_\_ due to their skeleton size.
- b) The skeleton provides the \_\_\_\_\_ on which the muscles hang.
- c) We need our skeleton to work with the muscles to allow different \_\_\_\_\_.
- d) When a player heads a ball, their brain is \_\_\_\_\_ by part of their skeleton called the cranium.
- e) Red blood cells are frequently being \_\_\_\_\_ in the long bones of the skeleton.

### Word bank

- |                     |              |               |            |
|---------------------|--------------|---------------|------------|
| • white blood cells | • movements  | • holding bay | • elements |
| • shape             | • protected  | • skeleton    | • support  |
| • muscles           | • long bones | • produced    |            |



## Functions of the Skeleton

Identify the functions and then link it to its description

M \_\_\_\_\_

S \_\_\_\_\_

M \_\_\_\_\_

S \_\_\_\_\_

S \_\_\_\_\_

P \_\_\_\_\_

B \_\_\_\_\_

P \_\_\_\_\_

The skeleton forms the outline of our body.

The skeleton lets us stand by allowing muscle attachment

Joints made by bones allow us to run, walk, jump etc

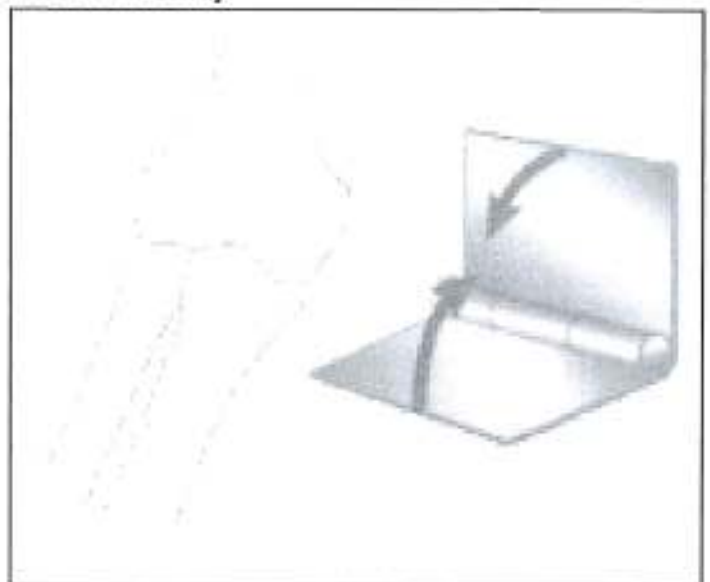
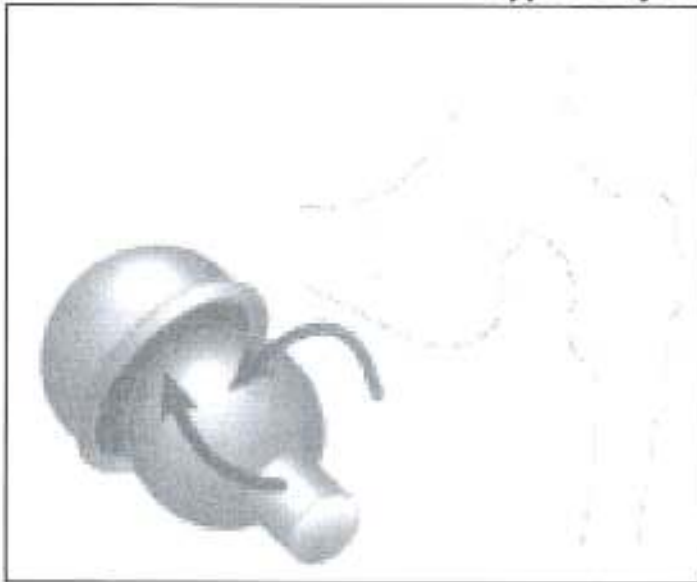
The skeleton stops our vital organs from being damaged

Long bones replace blood cells that we have lost

Bones store these as they are important for our development e.g. Calcium



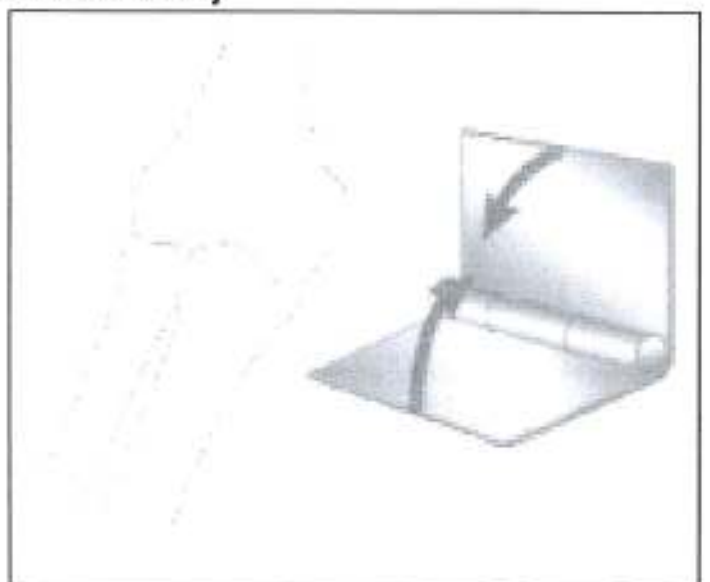
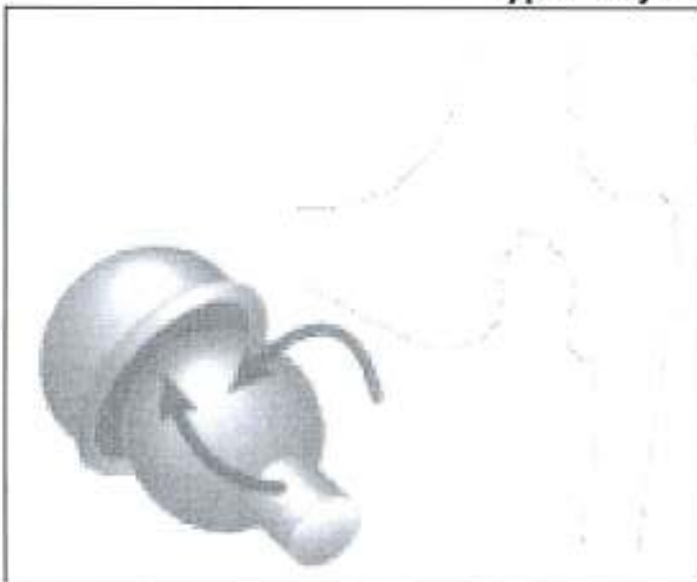
## Types of joints in the body



Name of joint?	BALL AND SOCKET
Found where in the body?	SHOULDER AND HIP
Type of movement?	
Sporting example	

Name of joint?	
Found where in the body?	
Type of movement?	
Sporting example	

## Types of joints in the body

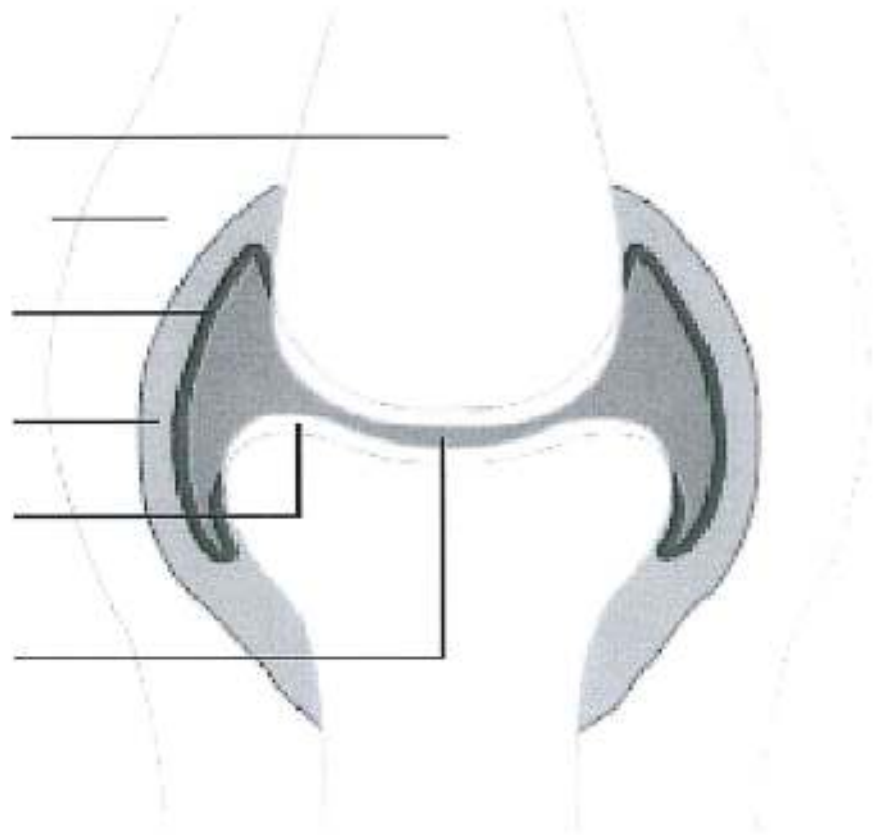


Name of joint?	
Found where in the body?	
Type of movement?	
Sporting example	

Name of joint?	
Found where in the body?	
Type of movement?	
Sporting example	

## Label the Synovial Joint

### SYNOVIAL JOINT



#### Word Bank:

Cartilage

Synovial Fluid

Joint Capsule

Synovial Membrane

Bone

Soft Tissue

#### Task...

Can you add the bursae, a muscle, tendons and ligaments?

Think about what each does.

# Worksheet 7: Types of movement at a joint

Level B

Student's Book pages 80-81

## Tasks

1 — Number the following joints from the greatest amount of movement to the least, with 1 being the greatest and 5 being the least. Write your answers in the spaces provided. Two have been completed to help you.

- a) Hip
- b) Shoulder
- c) Knee
- d) Elbow
- e) Neck



2 — Think of your own sporting example for each of these joints.

- a) Hip \_\_\_\_\_
- b) Shoulder \_\_\_\_\_
- c) Knee \_\_\_\_\_
- d) Elbow \_\_\_\_\_
- e) Neck \_\_\_\_\_

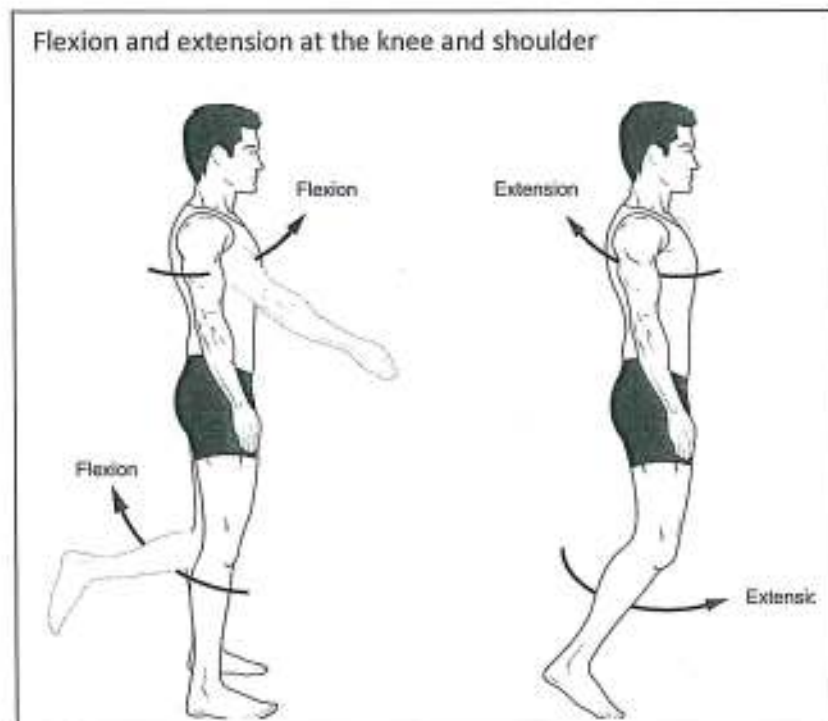
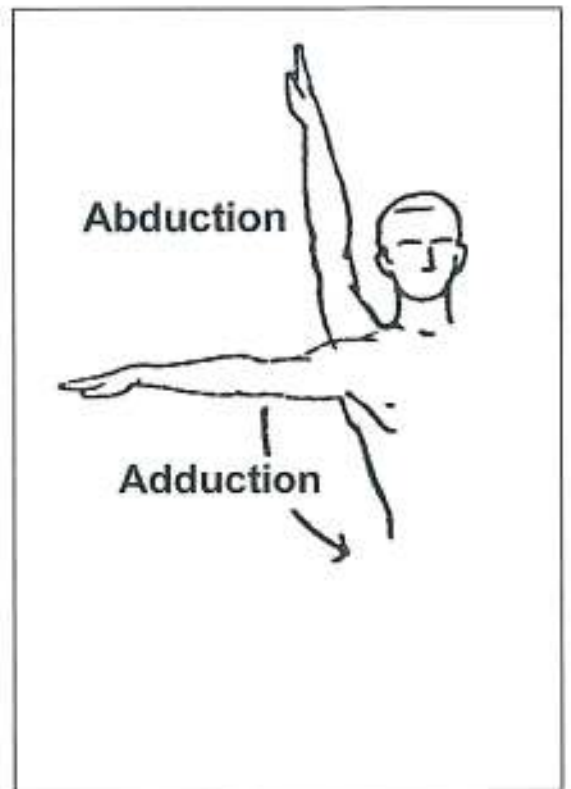
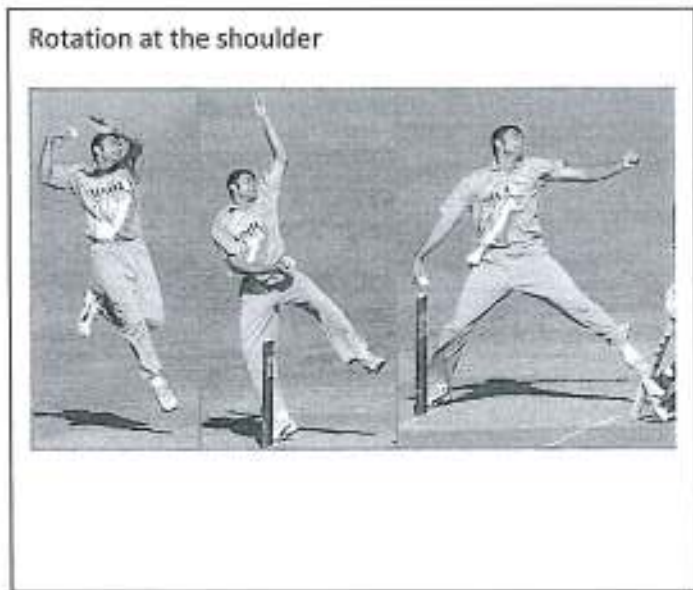
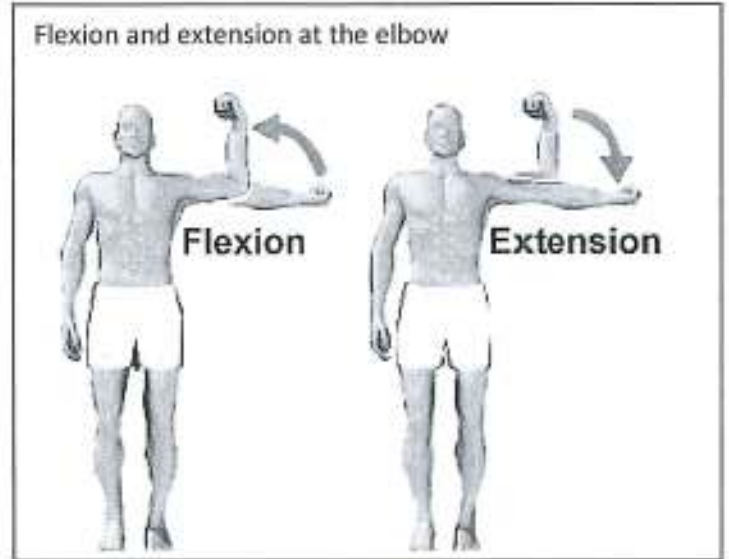
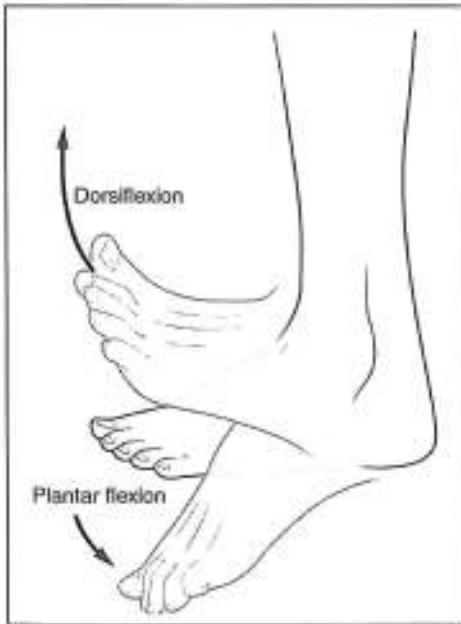
3 — Give the correct type of joint for each of the following. Use the word bank to help you.

- a) Hip \_\_\_\_\_
- b) Shoulder \_\_\_\_\_
- c) Knee \_\_\_\_\_
- d) Elbow \_\_\_\_\_
- e) Neck \_\_\_\_\_

<b>Word bank</b>		
• Ball and socket	• Hinge	• Pivot
• Hinge	• Ball and socket	



Types of movements at a joint





# Muscles Starter

Use the word bank at the bottom of sheet two to match the muscle and their location.



This muscle stabilises any movement of the shoulder and has four small muscles in its group.



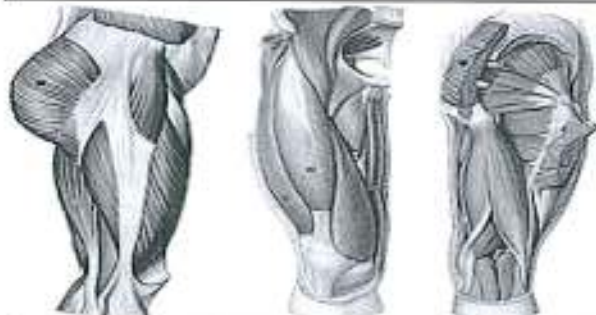
These muscles are situated across the front of the chest



This muscle runs along the front of the upper arm. This muscle has two tendons of origin.



This muscle is found at the rear of the upper arm. This muscle has three tendons of origin



This muscle produces the inverted triangle shape of the upper body. It is often referred to as the 'pulling muscle'



A large group of muscles found at the front of the abdomen. These muscles play a major role in activities such as sit ups



This muscle is located at the front of the lower leg and assists in flexing the ankle.



This muscle group is made up of four separate muscles found at the front of the thigh



This muscle group is made up of three muscles and is found at the back of the upper leg.



The anatomical name for the calf muscle, which is situated at the rear of the lower leg



The muscle that lies to the front and rear of the shoulder


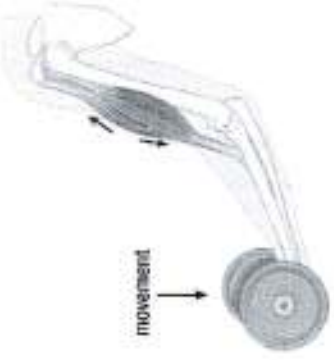



### WORD BANK

**BICEPS, HAMSTRING GROUP,  
GASTROCNEMIUS,  
ROTATOR CUFF, ABDOMINALS,  
PECTORALS,  
TIBIALIS ANTERIOR, DELTOIDS,  
QUADRICEP GROUP,  
LATISSIMUS DORSI, TRICEPS,**



In the boxes below, describe the type of contraction taking place...

Isotonic Contraction		Isometric Contraction
Concentric Contraction	Eccentric Contraction	
		

## Task - The Muscular and Skeletal System



Look at the picture of a football tackle. Referring ONLY to what is happening inside the red circle answer the below questions.

4. Type of movement – extension or flexion?

.....

5. What muscle is the prime mover/Agonist?

.....

6. What muscle is the antagonist?

.....

Look at the photo of the volleyball player.

2. Name the muscles that can be found in the red circle?

.....

.....

3. What type of muscle contraction is happening in the red circle? Justify your answer.

.....

.....

.....

1. What is meant by Isometric contraction? Give an example in a sport where this type of muscle contraction takes place.

.....

.....

.....

.....



7. Identify as many muscles in this picture as you can. (only ones learnt in the lesson!)





Muscles work in \_\_\_\_\_. The antagonistic muscle relaxes and \_\_\_\_\_. Whilst the agonist muscles \_\_\_\_\_ and shorten. The fixator muscles stop any unwanted movement by \_\_\_\_\_ the joints involved. The \_\_\_\_\_ muscles are muscles that work together to enable the agonist to operate more effectively. The biceps and \_\_\_\_\_ are an example of antagonistic pair. When the arm bends, the biceps are the \_\_\_\_\_ because the muscle contracts and shortens. Therefore, the triceps are the \_\_\_\_\_ because the muscle is relaxing is lengthening. During this movement the \_\_\_\_\_ muscle is the trapezius as it helps to stabilise the joint throughout the movement. The synergist muscles are the brachialis and brachioradialis as they work together to help the biceps operate more \_\_\_\_\_.



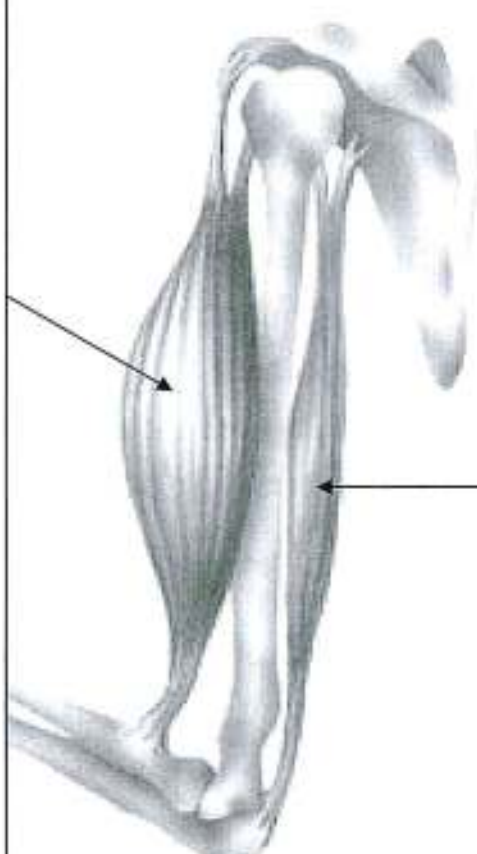
**Use these key words to fill in the gaps.**

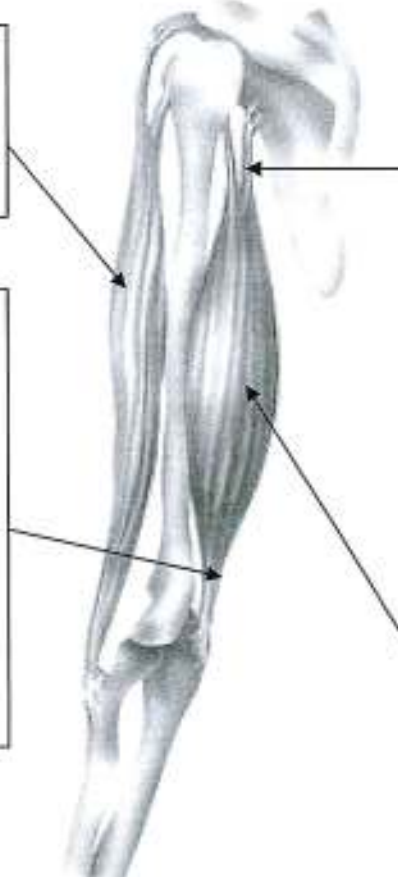
- effectively
- agonist
- synergist
- lengthens
- contract
- stabilising
- triceps
- agonist
- antagonist
- pairs
- fixator





## Muscle Movements - Antagonistic Pairs

<p><b>Agonist (Prime Mover):</b></p> <p>The muscle that is</p> <hr style="width: 80%; margin-left: 0;"/>  <p><b>Muscle example in this diagram:</b></p>  <p><b>Sporting Example:</b></p>		<p><b>Antagonist:</b></p> <p>The muscle that is</p> <hr style="width: 80%; margin-left: 0;"/>  <p><b>Muscle example in this diagram:</b></p>
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<p><b>Muscle:</b></p>  		<p><b>Origin:</b></p> <p>Muscles _____</p> <p>to the bone that</p> <hr style="width: 80%; margin-left: 0;"/> <p>move during movement.</p>
<p><b>Insertion:</b></p> <p>Muscles _____</p> <p>to bones that are</p> <hr style="width: 80%; margin-left: 0;"/>		<p><b>Muscle:</b></p>

**Q1.**

Which **one** of these causes plantar flexion at the ankle?

**A** Gastrocnemius

**B** Hamstrings

**C** Quadriceps

**D** Tibialis anterior

**(Total 1 mark)**

**Q2.**

Which bones are found at the shoulder joint?

**A** Femur and tibia

**B** Humerus and radius

**C** Scapula and humerus

**D** Tibia and fibula

**(Total 1 mark)**

**Q3.**

The image shows a young athlete running. The running action involves the use of many joints within the body.



(a) Identify the type of synovial joint working at the shoulder.

\_\_\_\_\_

(1)

(b) Outline how **two** of the features of the shoulder joint aim to prevent injury occurring.

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

\_\_\_\_\_

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

\_\_\_\_\_

(2)

(c) Identify the plane **and** the axis about which the running action takes place.

\_\_\_\_\_

\_\_\_\_\_

(2)

(Total 5 marks)

**Q4.** Movement is one of the functions of the skeleton.

(i) Name **three** other functions.

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

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

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

(3)

(ii) Explain the function of cartilage in relation to movement.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2)

(Total 5 marks)

**Q5.** Movement is brought about by the muscular and skeletal systems working together.

Using an example, explain how muscles and bones work together to produce movement.

Example \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Total 4 marks)

**Q6.** Movement occurs through the combination of the skeletal system and the muscular system.

(i) **State one bone, one joint and one muscle** which would be involved when the arm is moved.

Named bone \_\_\_\_\_

Named joint \_\_\_\_\_

Named muscle \_\_\_\_\_

(3)

(ii) **Explain** what is meant by abduction.

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(2)  
(Total 5 marks)



M1. A [1]

M2. C [1]

M3. (a) Award **one** mark for each of the following points up to a maximum of one mark.  
• Ball and socket (1) 1

(b) Award **one** mark for each of the following points up to a maximum of two marks.  
• Shape of the articular surface / bones – allows bones to fit together (1)  
• Ligaments – attach bone to bone / restrict movement (1)  
• Joint capsule / fibrous capsule – lined with synovial membrane / encloses / supports / joints (1)  
• Synovial membrane – secretes synovial fluid (1)  
• Synovial fluid – provides lubrication (1)  
• Cartilage (hyaline / articular) – prevents friction / stops bones rubbing together (1)  
• Bursae (sacks of fluid) – to reduce friction (1)

Accept any other suitable explanation of features of the shoulder joint that prevent injury occurring.

Answers must refer to the shoulder joint.

2

(c) Award **one** mark for each of the following points up to a maximum of two marks.  
• Sagittal (plane) (1)  
• Transverse (axis) (1)

2

[5]

M4. (i) Award **one** mark for **each** correct function of the skeleton other than movement.

- Support
- Protection
- Shape
- Blood production
- Mineral storage.

3

(ii) Award up to **two** marks for a correct explanation.

- Cushions between bones
- To stop rubbing during movement
- Acts as a shock absorber
- Stabilises joints
- Prevents excess movement
- Allows easier movement

Accept the above or any other acceptable answer.

2

[5]

**M5.** Award **one** mark for identifying a relevant example.

Award a further **three** marks for an explanation of how muscles and bones work together to produce movement.

- Muscles are attached to bones via tendons.
- The origin is attached to the bone that doesn't move / the insertion is attached to the bone that moves
- Muscles can only pull / and are arranged in pairs (antagonistic)
- One contracts (shortens or flexes or agonist or prime mover) / and one relaxes (lengthens or antagonist)
- Ligaments keep the joint stable
- Movement can only occur at a joint.

[4]

**M6.** (i) Award **one** mark for correctly stating a **bone** in the arm, **one** mark for correctly stating a **joint** and **one** further mark for correctly stating a **muscle**.

- bones – humerus, ulna, radius, carpals, metacarpals, phalanges
- joints – shoulder, elbow, wrist (possible hinge in fingers)
- muscles – biceps, triceps

3

(ii) Award up to **two** marks for correctly **explaining** abduction

- the movement of a bone or limb / away from the body

2

[5]