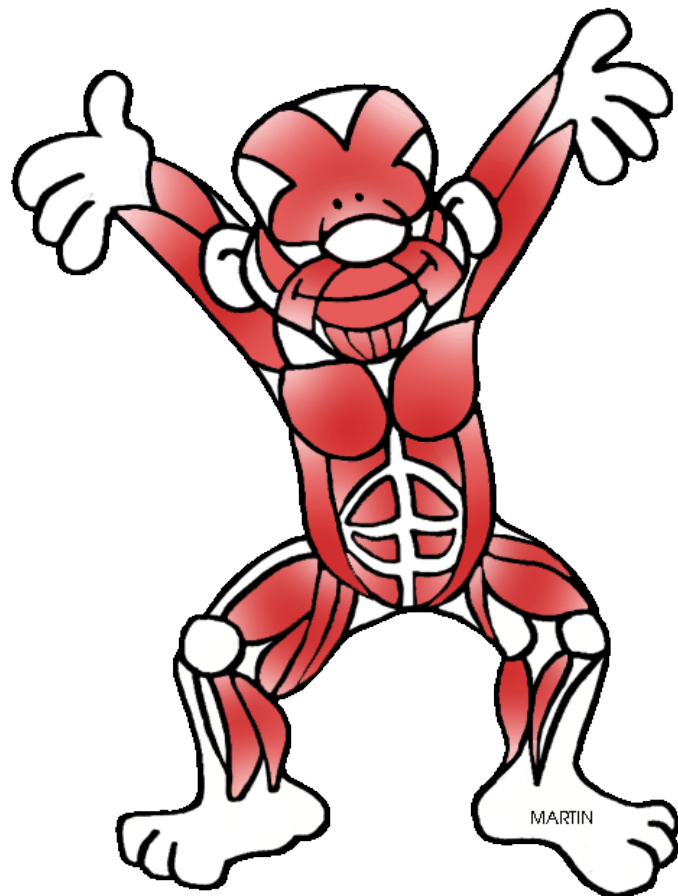


Muscular System

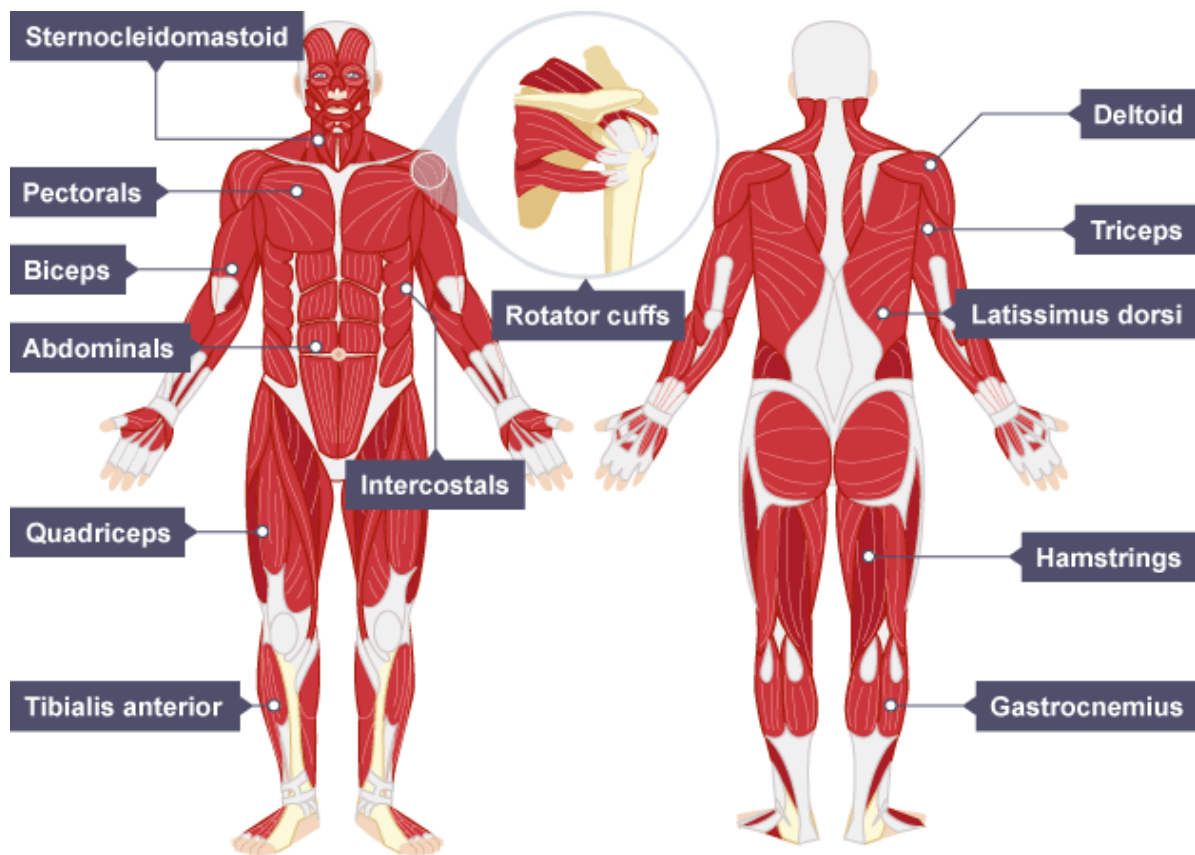
Revision Guide

St Mary's Catholic Academy

GCSE Physical Education



Voluntary Muscles



Muscle Name	Function	Sporting Examples
Sternocleidomastoid	Aid the breathing process .	All endurance events (1,500m).
Deltoid	Abduction of the shoulder .	Outward arm in a jumping jack.
Rotator Cuffs	Stabilises the shoulder preventing dislocation.	Throwing a javelin.
Pectorals	Adduction of the shoulder .	Upwards phases of a press up.
Intercostal	Assists with the breathing process .	All endurance events (1,500m).
Triceps	Extension of the elbow .	Shooting in netball.
Biceps	Flexion of the elbow .	Drawing a bow in archery.
Abdominals	Flexion of the trunk across the stomach (Sitting up).	Performing a sit up.
Latissimus Dorsi	Adduction of the shoulder .	Butterfly stroke in swimming.
Quadriceps	Extension of the knee .	Kicking a football.
Hamstrings	Flexion of the knee .	Performing a hamstring curl on a weight machine.
Gastrocnemius	Plantar flexion of the ankle .	Standing on tiptoes to mark a goal shoot in netball.
Tibialis Anterior	Dorsiflexion of the ankle .	Foot making contact with a football when passing.

Muscle Movement

There are **TWO** main types of muscle contraction. **ISOTONIC** and **ISOMETRIC** contractions.

1) ISOTONIC CONTRACTIONS – these occur when a muscle contracts and changes length. There are **TWO** types of these contractions.



ICC



1A) ISOTONIC CONCENTRIC CONTRACTION (ICC) – This involves the muscles shortening. The **ORIGIN** and **INSERTION** of the muscle move closer together and the muscle becomes **FATTER**.

IEC

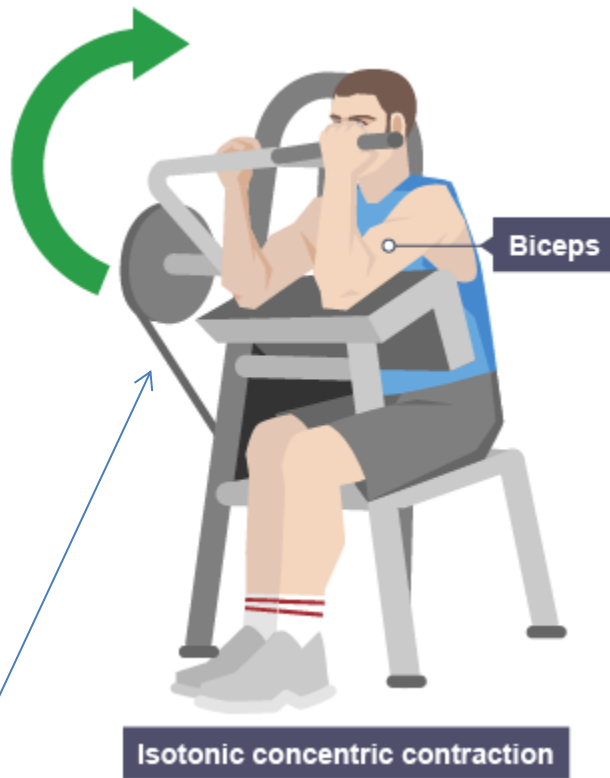


1B) ISOTONIC ECCENTRIC CONTRACTION (IEC) – This involves the muscle **LENGTHENING** whilst it is under tension. The **ORIGIN** and the **INSERTION** move further away from each other. An eccentric contraction provides the control of a movement on the downward phase and it works to resist the force of gravity.

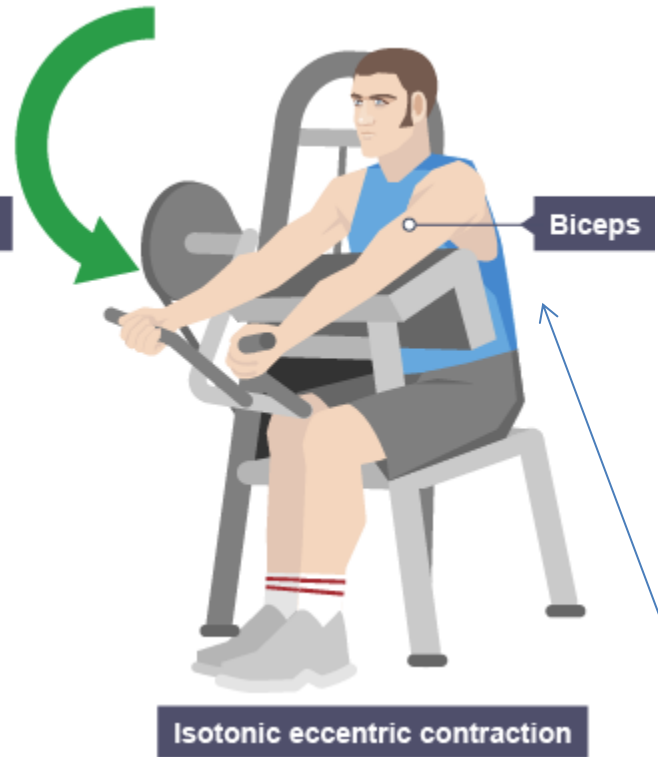
2) ISOMETRIC CONTRACTIONS - This involves a muscle producing tension but staying the same length. This occurs when the body is fixed in one position.



Muscle Movement



Left: **Concentric contraction** - the biceps are contracting concentrically to move the weights upwards.

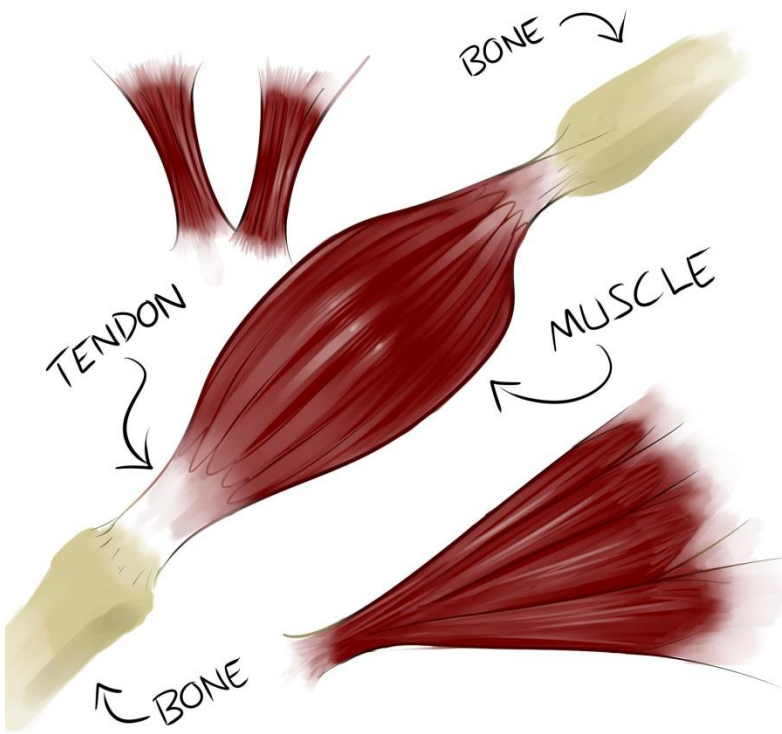


Right: **Eccentric contraction** - the biceps are contracting eccentrically to lower the weights against resistance



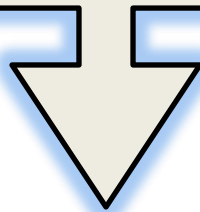
ISOMETRIC CONTRACTION - The muscles are contracting isometrically to hold this gymnast in the crucifix position and are not changing length. When the isometric contractions end, isotonic contraction will occur.

Muscle Pairs



Muscles transfer force to bones through tendons. They move our bones and associated body parts by pulling on them – this process is called muscle contraction.

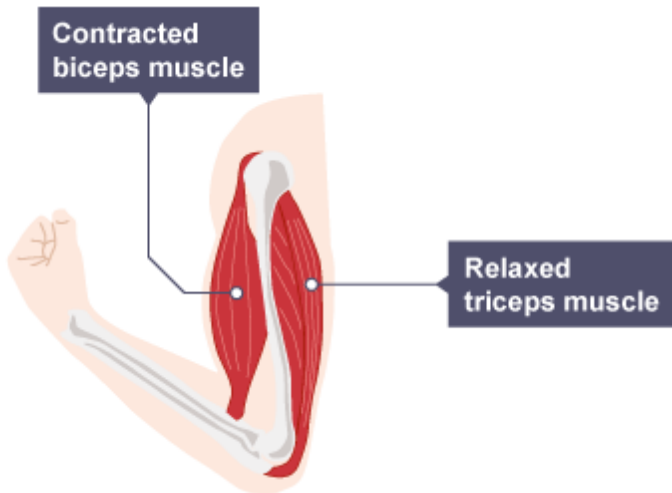
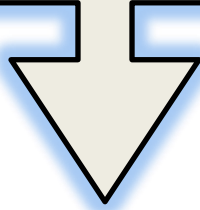
Muscles work in '**antagonistic muscle pairs**'. One muscle of the pair **contracts to move the body part**, the other muscle in the pair then **contracts to return the body part** back to the original position. Muscles that work like this are called antagonistic pairs.



In an antagonistic muscle pair as **one muscle contracts the other muscle relaxes or lengthens**. The muscle that is **contracting** is called the **agonist** and the muscle that is **relaxing** or lengthening is called the **antagonist**.

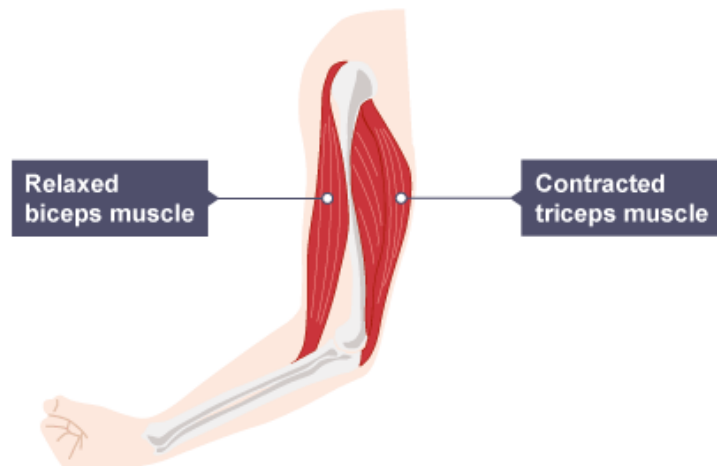
Muscle Pairs

When you perform a bicep curl, the **biceps** will be the **agonist** as it contracts to produce the movement, while the **triceps** will be the **antagonist** as it relaxes to allow the movement to occur.



The biceps contracts and raises the forearm as the triceps relaxes.

The triceps contracts and lowers the forearm as the biceps relaxes.



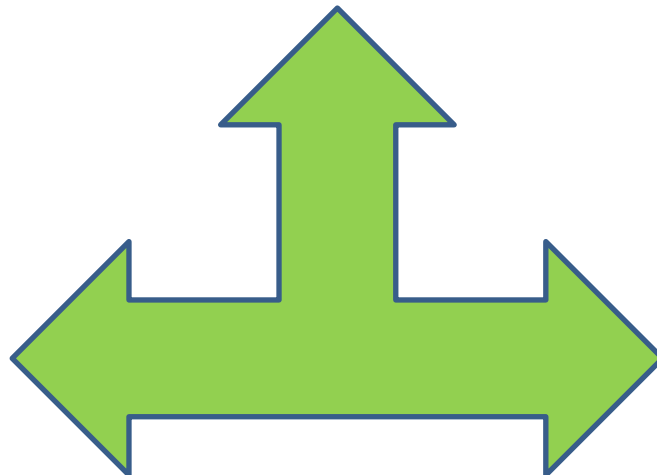
Muscle Pairs

The Following groups of muscles are antagonistic pairs.

BICEPS	TRICEPS
HAMSTRINGS	QUADRICEPS
GLUTEALS	HIP FLEXORS
GASTROCNEMIUS	TIBIALIS ANTERIOR
PECTORALIS MAJOR	LATISSIMUS DORSI



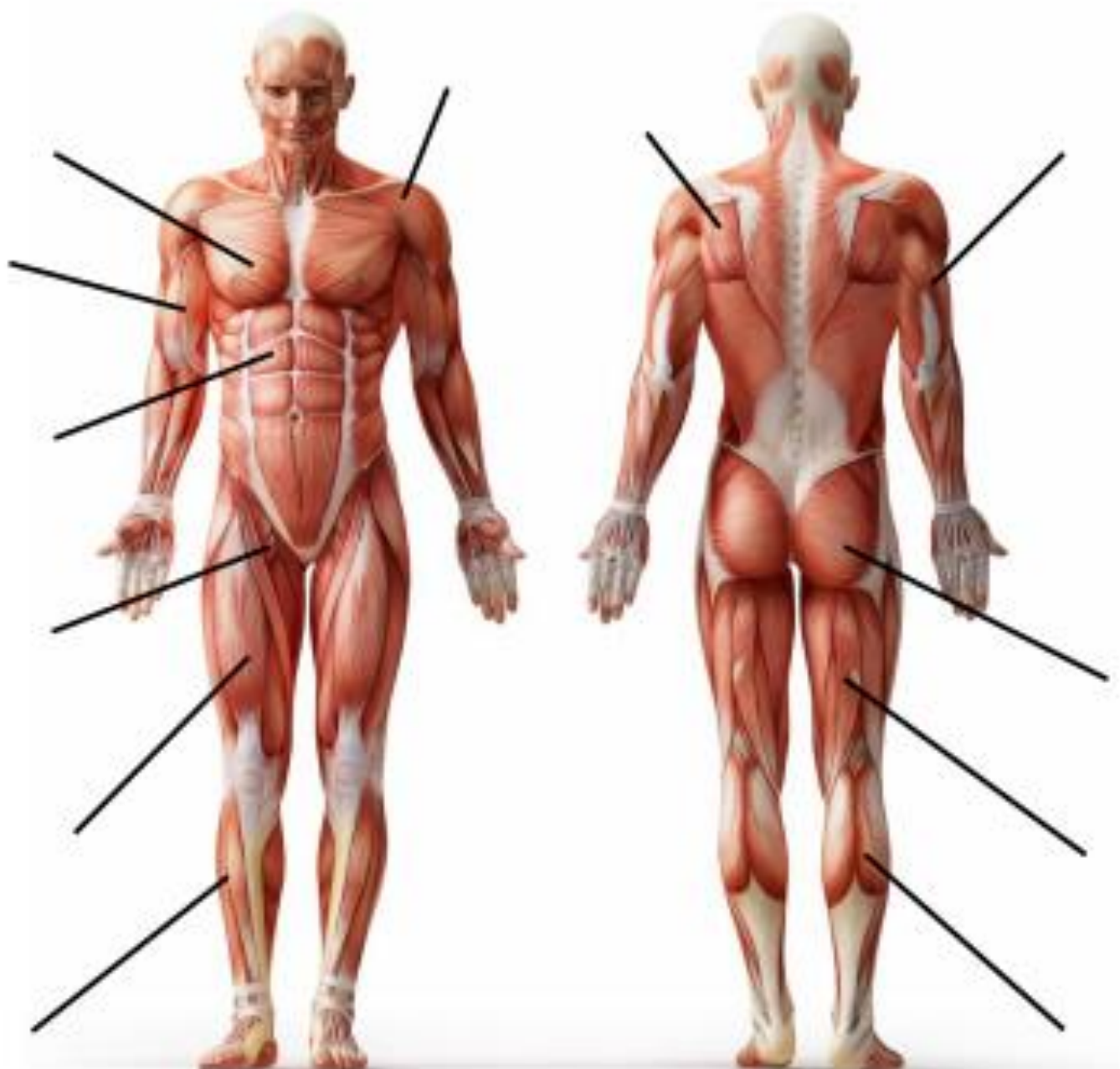
In the preparation phase, when a footballer prepares to kick a football, their hamstrings contract to flex the knee while the quadriceps lengthens to allow the movement. The hamstrings are the agonist and the quadriceps are the antagonist.



In the striking and recovery phase, the quadriceps contract to extend the knee while the hamstrings lengthen to allow the movement. The quadriceps are the agonist and the hamstrings are now the antagonist.

AQA GCSE – Muscles of the body

Label the muscles on the body using the words below



Deltoid

Quadriceps

Hip flexors

Hamstrings

Gluteals

Abdominals

Triceps

Gastrocnemius

Biceps

Pectorals

Tibialis anterior

Latissimus Dorsi

Rotator cuffs

AQA GCSE – Muscles of the body

Colour in the muscle the same colour as the label to match the correct label to the muscle

Deltoid

Rotator cuffs

Pectorals

Biceps

Abdominals

Hip flexors

Quadriceps

Tibialis anterior

Triceps

Latissimus Dorsi

Gluteals

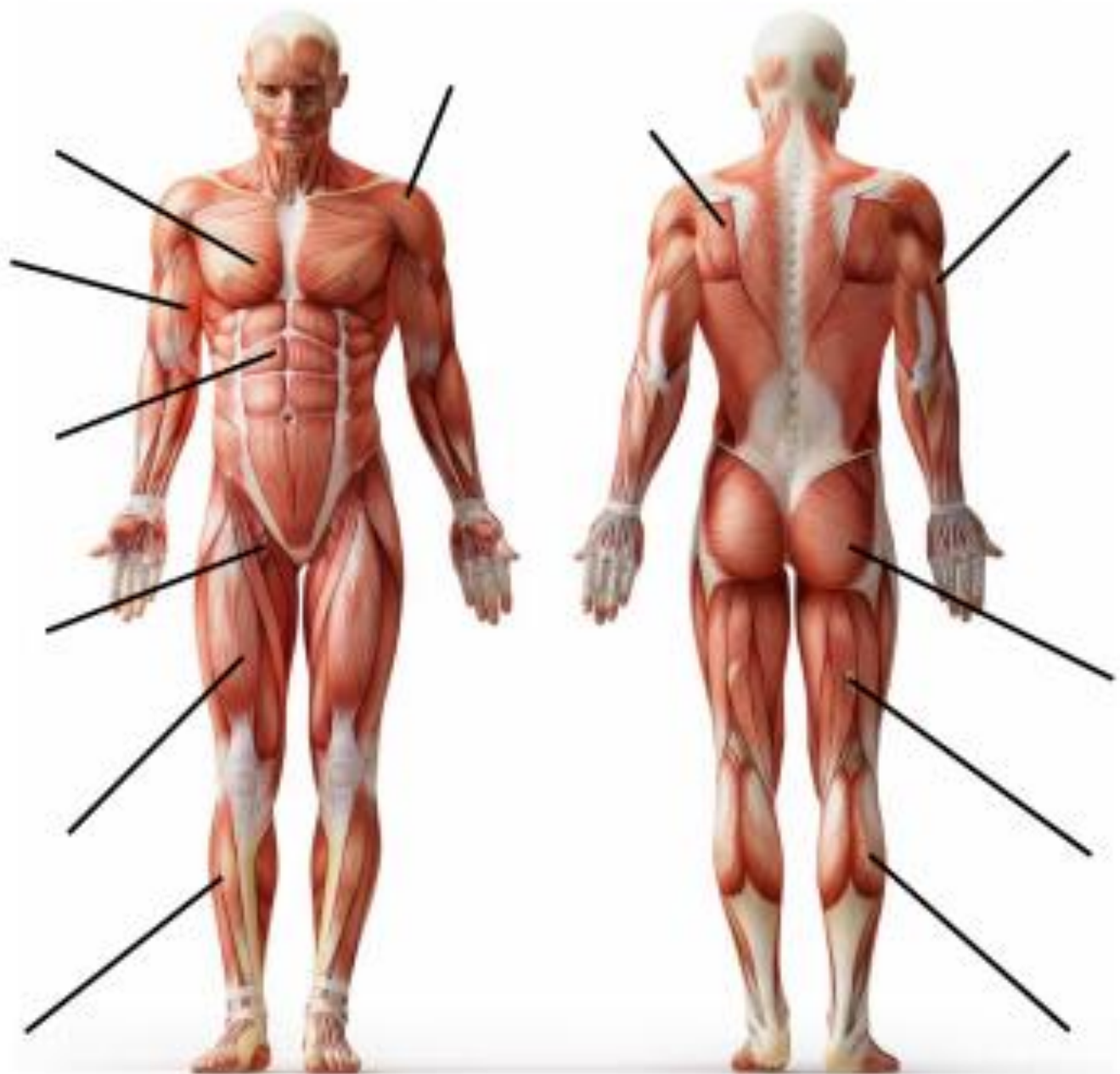
Hamstrings

Gastrocnemius



AQA GCSE – Muscles of the body

Label the muscles on the body from memory



Quick Questions

Which muscle group acts as a fixator at the shoulder to stabilize the joint during movement?

- 1) Biceps
- 2) Triceps
- 3) Rotator cuff

During movement what action is being taken by the antagonist?

- 1) Shortening
- 2) Lengthening
- 3) Staying the same length

Which of these muscles contracts to increase the capacity of the lungs during breathing in when exercising?

- 1) Deltoid
- 2) Abdominals
- 3) Sternocleidomastoid

Which muscle group contracts to cause horizontal flexion during a punch in boxing?

- 1) Pectorals
- 2) Deltoid
- 3) Latissimus Dorsi

Which muscle group is responsible for flexion at the knee when a footballer prepares to kick a football?

- 1) Quadriceps
- 2) Gluteus Maximus
- 3) Hamstrings

When a player shoots at the goal in netball, the gastrocnemius contracts to provide which movement at the ankle?

- 1) Dorsiflexion**
- 2) Plantar Flexion**
- 3) Extension**

Which type of muscle contraction is completed by the triceps during the upwards phase of a press up?

- 1) Isometric**
- 2) Concentric**
- 3) Eccentric**

Which of the following sporting examples would involve isometric contractions of the quadriceps?

- 1) A gymnast landing after a vault**
- 2) A sprinter in the “set” position**
- 3) A netballer jumping to catch**

Which muscle operates as the antagonistic pair in combination with the hip flexors?

- 1) Gluteus Maximus**
- 2) Hamstrings**
- 3) Quadriceps**

Which structure connects muscles to bones and allows force to be transmitted from the muscle to move the skeleton?

- 1) Ligament**
- 2) Cartilage**
- 3) Tendon**

Answers

- 1) Rotator Cuff
- 2) Lengthening
- 3) Sternocleidomastoid
- 4) Pectorals
- 5) Hamstrings
- 6) Plantar Flexion
- 7) Concentric Contraction
- 8) A sprinter in the "set" position
- 9) Gluteus Maximus
- 10) Tendon

