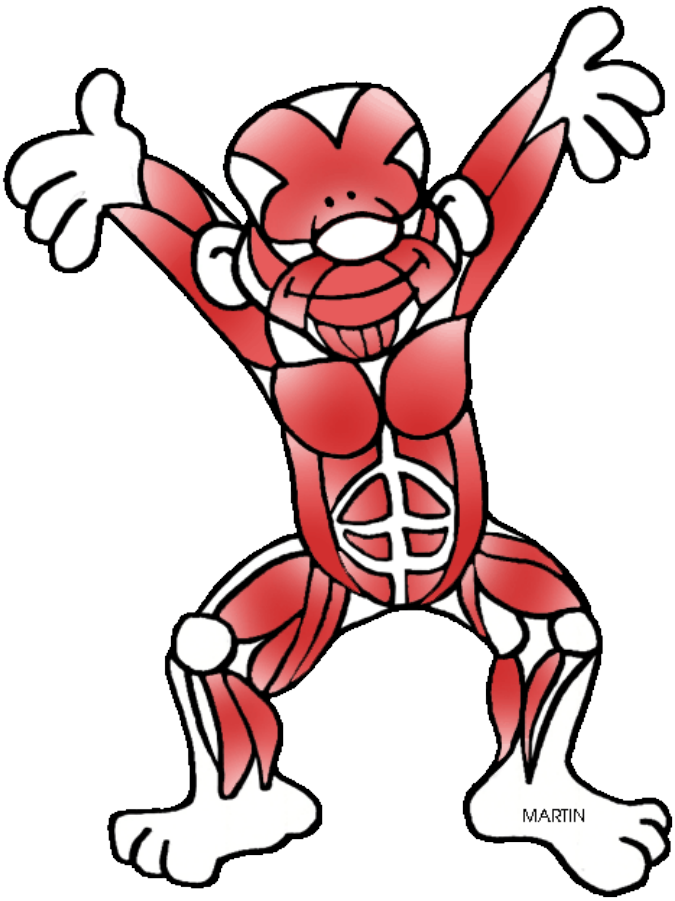
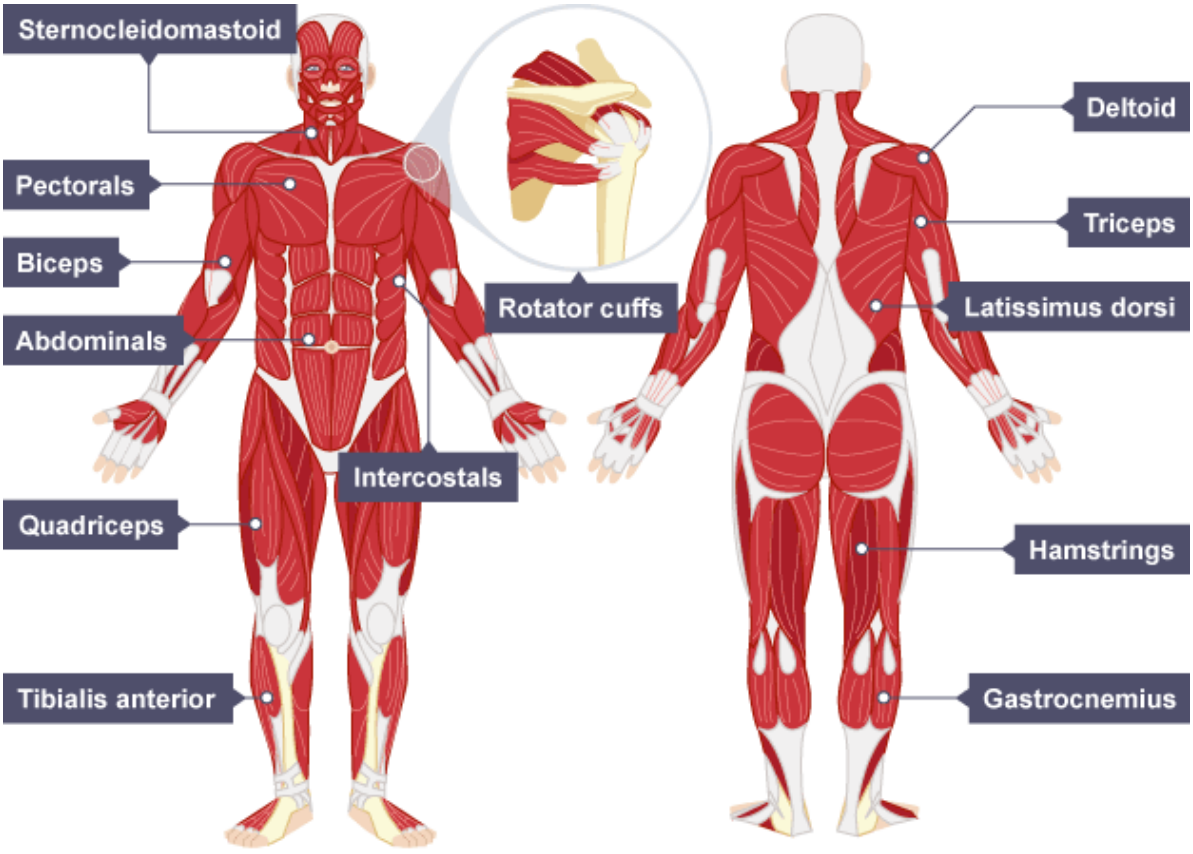
Muscular System Revision Guide



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 shoo in netball.

Tibialis Anterior	Dorsiflexion of the ankle.	Foot making contact with a football when passing.

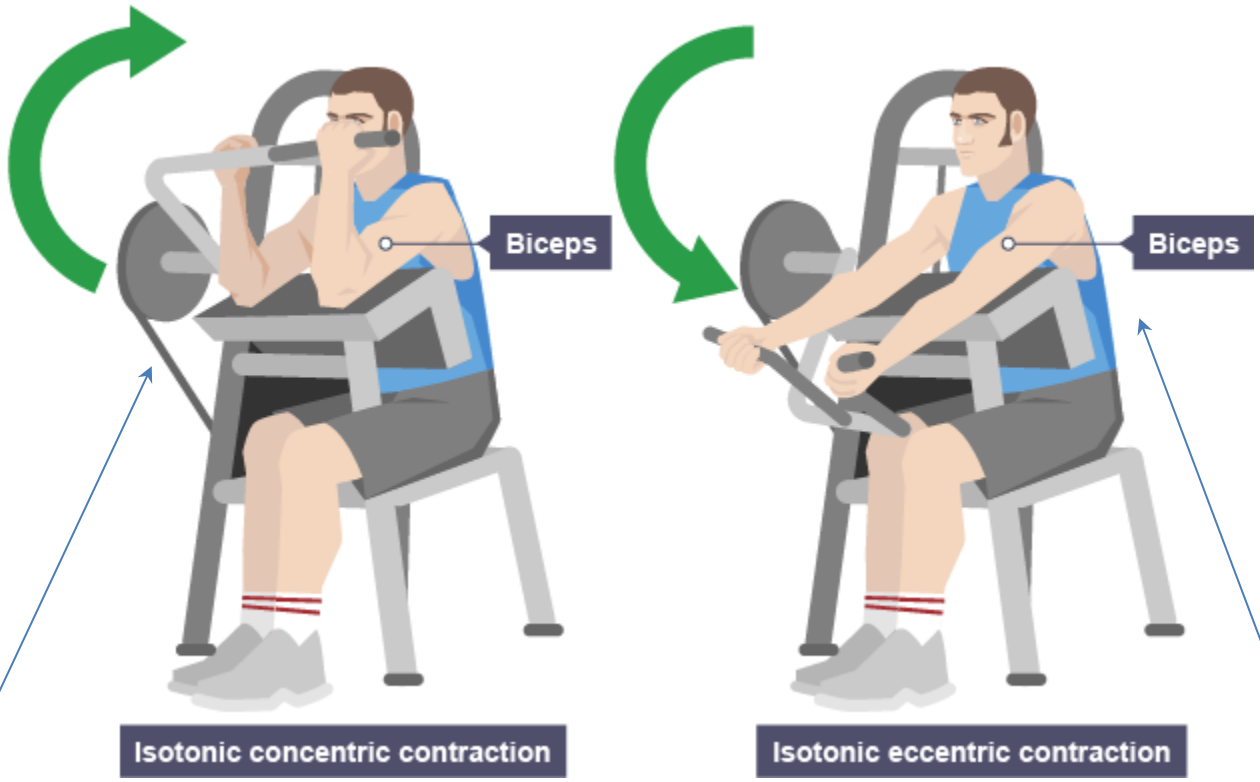
Muscle Movement

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

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.

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

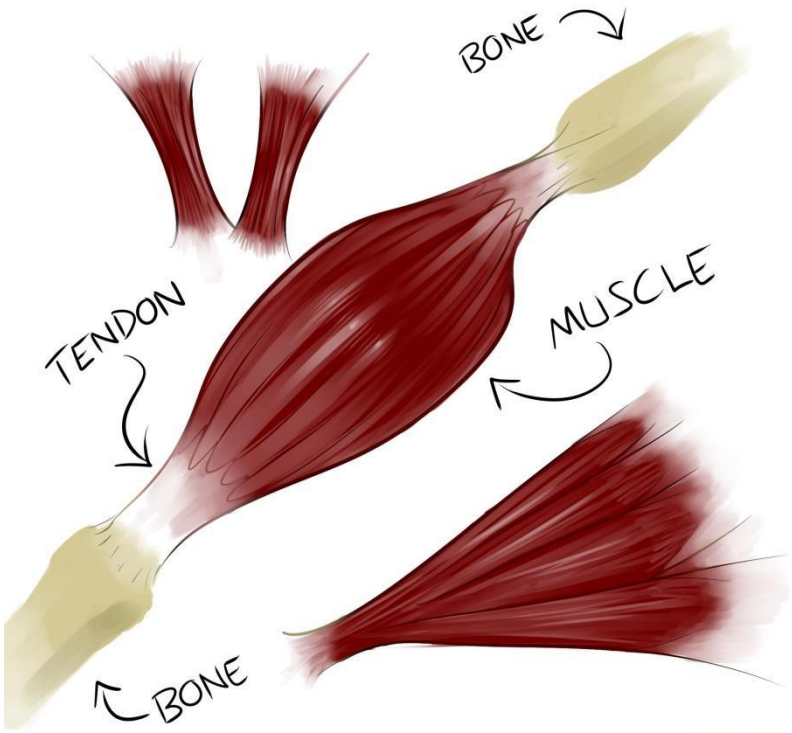


Left: **Concentric contraction** - the biceps are contracting concentrically to move the weights upwards.

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



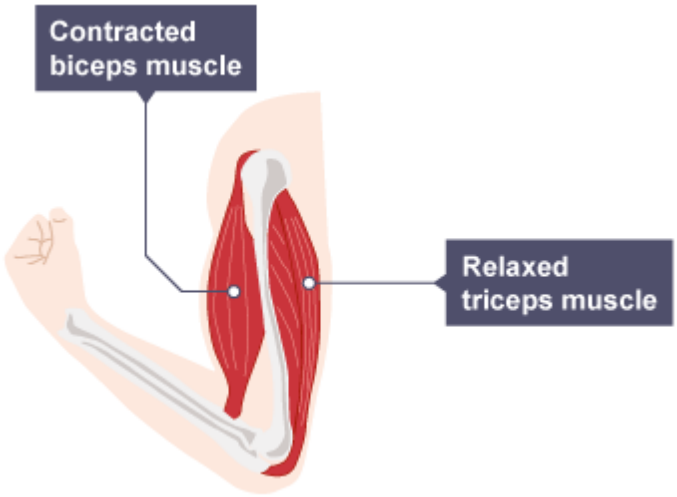
Muscles transfer force to bones through tendons. They move our bones and associated body parts by pulling on them – this process is called muscle contraction.

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.

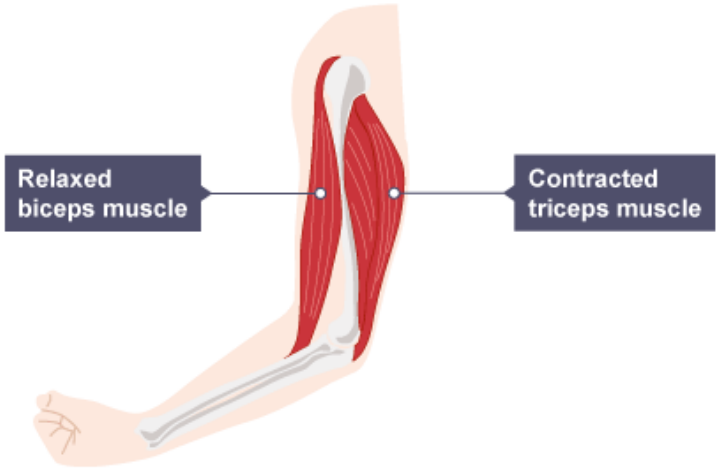
Muscle Pairs

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.

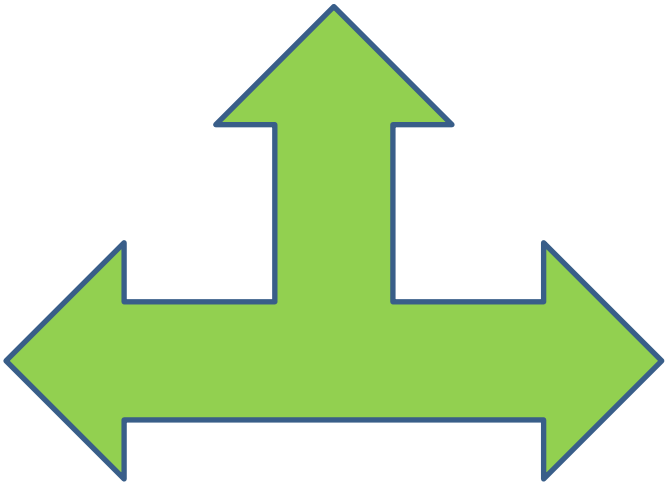


Muscle Pairs

The Following groups of muscles are antagonistic pairs.

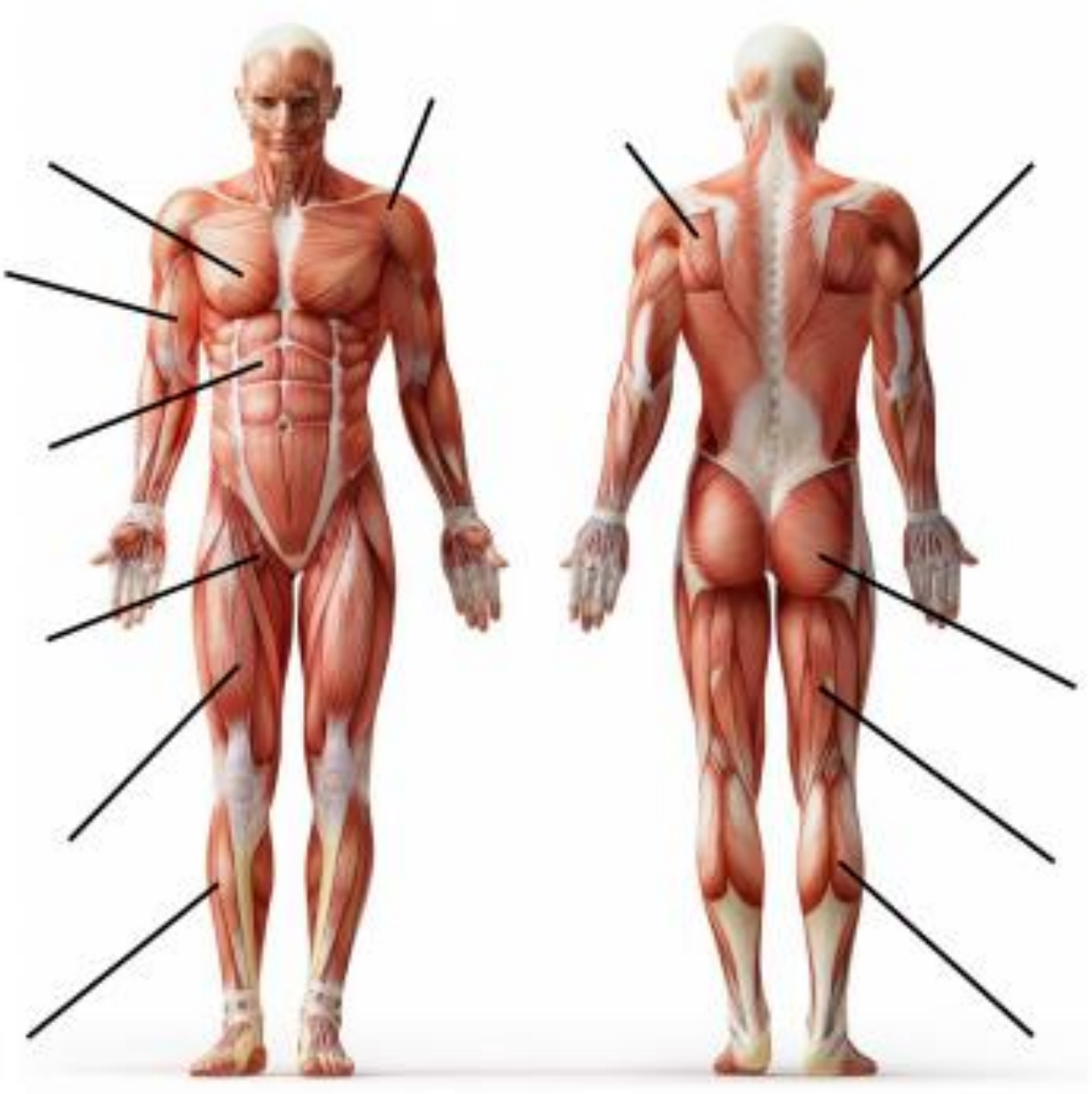
BICEPS	TRICEPS
HAMSTRINGS	QUADRICPES
GLUTEALS	HIP FLEXORS
GASTROCNEMIUS	TIBIALIS ANTERIOR
PECTORALIS MAJOR	LATISSIMUS DORSI

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.

Label the muscles on the body using the words below

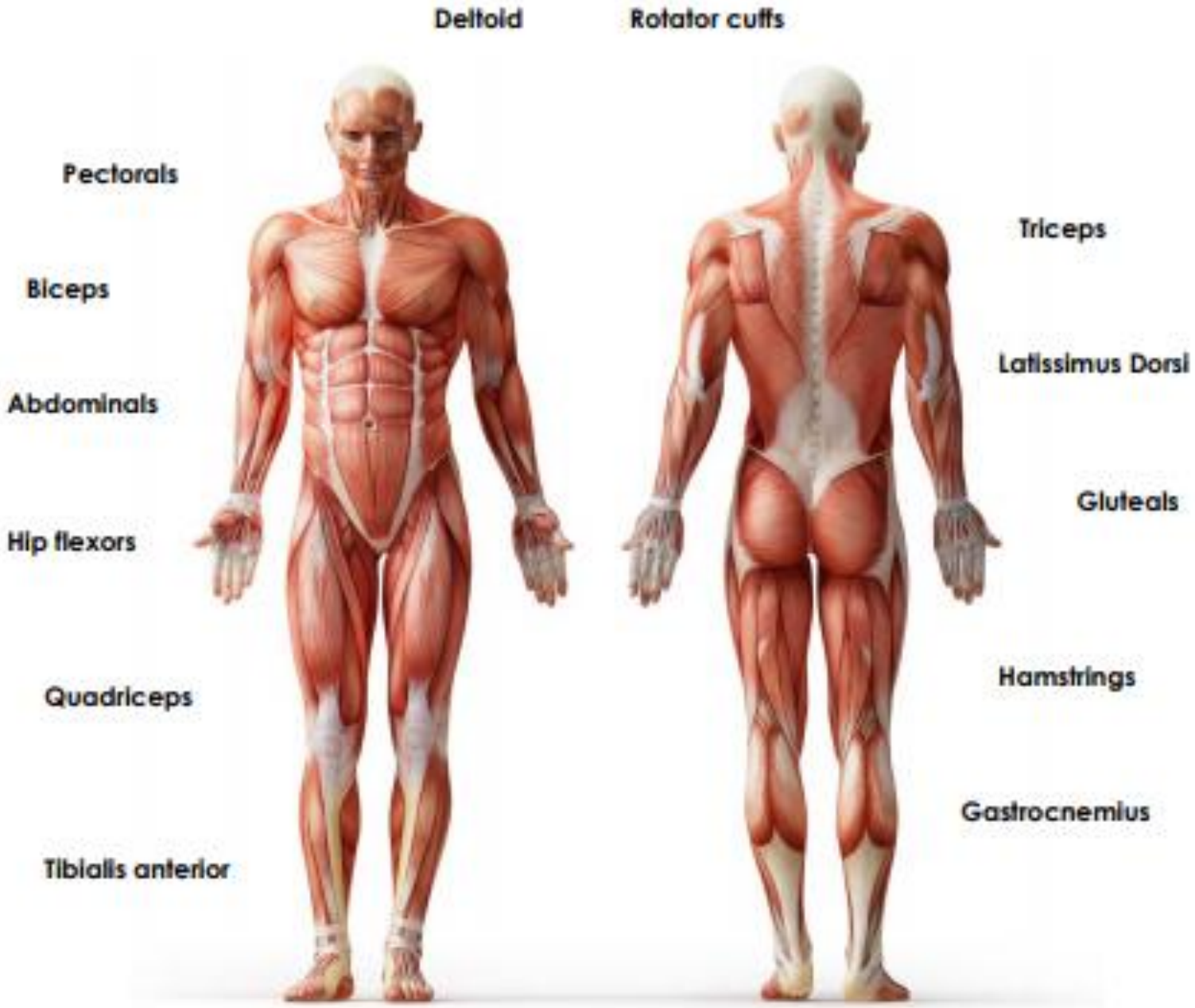


Deltoid Quadriceps Hip flexors Hamstrings Gluteals

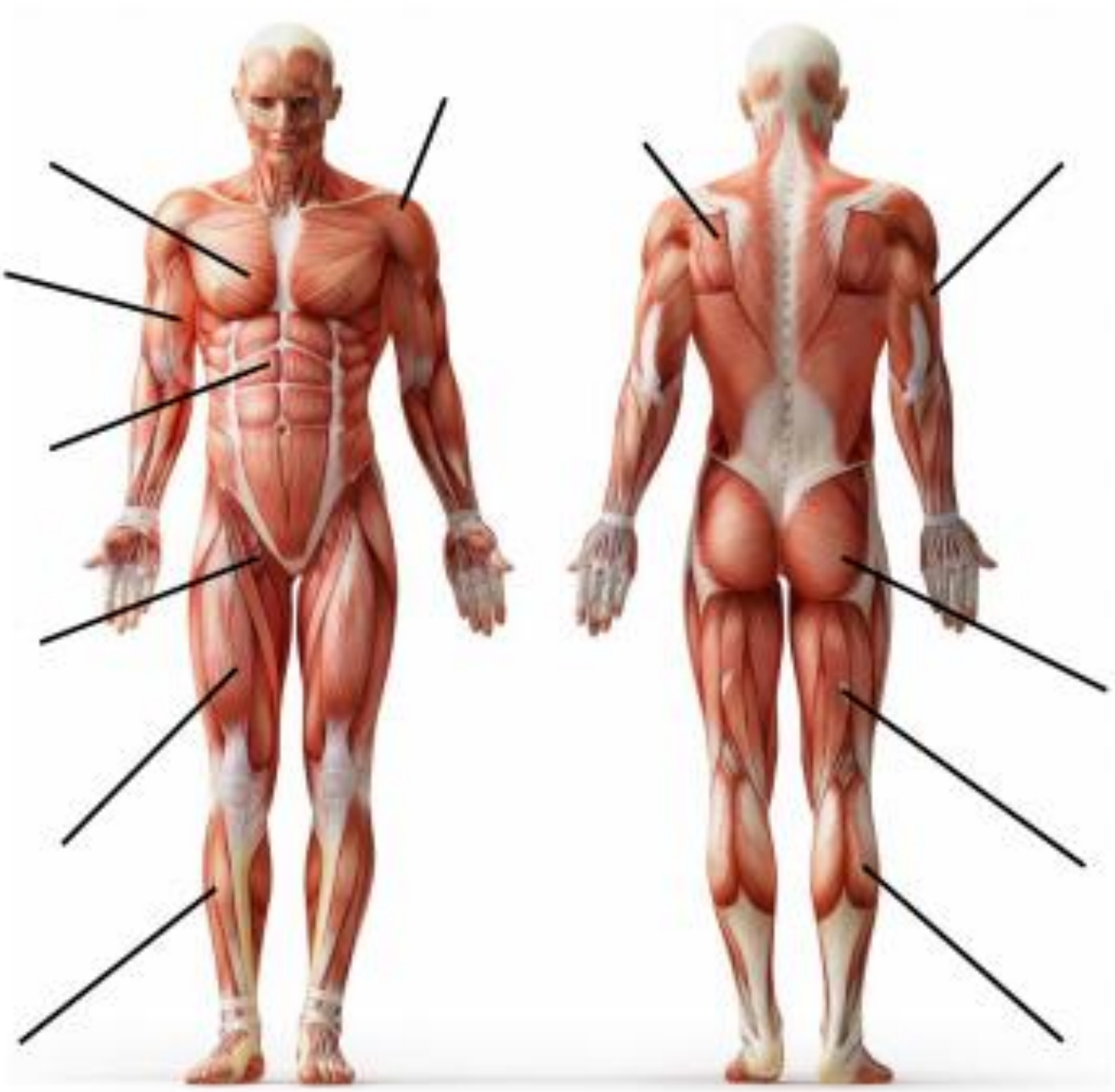
Abdominals Triceps Gastrocnemius Biceps Pectorals

Tibialis anterior Latissimus Dorsi Rotator cuffs

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



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?

Biceps
Triceps
Deltoid Rotator cuff

During movement what action is being taken by the antagonist?

Shortening
Lengthening
Staying the same length

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

Deltoid
Abdominals
Sternocleidomastoid

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

Pectorals
Deltoid
Latissimus Dorsi

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

Quadriceps
Gluteus Maximus
Hamstrings

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

Dorsiflexion
Plantar Flexion
Extension

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

Isometric
Concentric
Eccentric

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

A gymnast landing after a vault
A sprinter in the "set" position
A netballer jumping to catch

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

Gluteus Maximus
Hamstrings
Quadriceps

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

Ligament
Cartilage
Tendon

Answers

Deltoid Rotator Cuff
Lengthening
Sternocleidomastoid
Pectorals
Hamstrings
Plantar Flexion
Concentric
Contraction
A sprinter in the ”set” position
Gluteus Maximus
Tendon