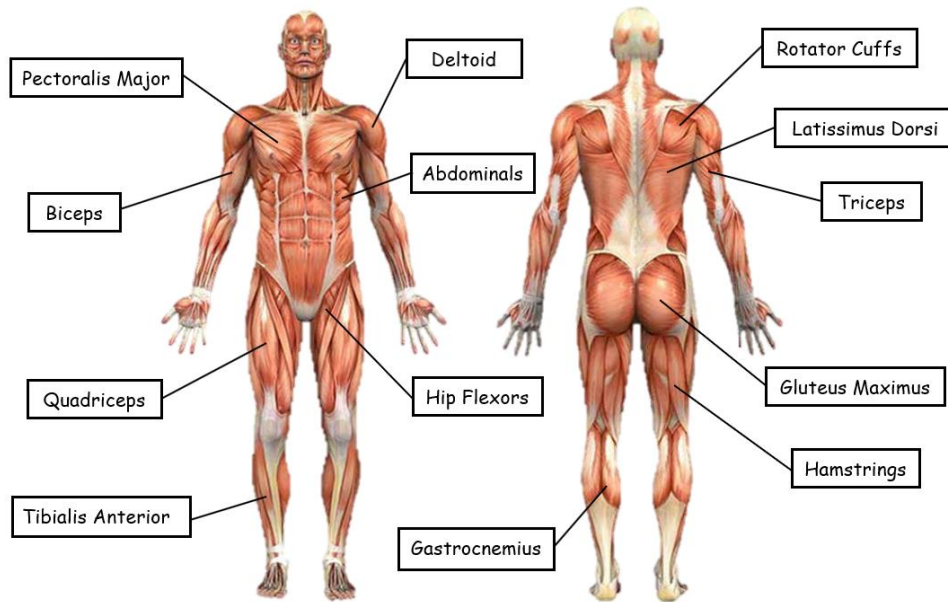















Paper 1: The structure and functions of the musculoskeletal system (part 2)


Voluntary muscles of the body:



Muscles and their function:

Muscle	Location	Function	Sporting Example
 Deltoid	muscle on the upper arm and top of shoulder	Move the upper arm (shoulder) in all directions	Serve in tennis Front Crawl Cricket Bowling
 Latissimus Dorsi	Back muscle from the lower spine to the upper arm.	Adducts and extends the arm at the shoulder	Butterfly stroke Pull ups Rowing stroke
 Rotator Cuff	On the scapula in the shoulder	Rotation of the shoulder	Bowling in cricket Swimming front crawl
 Pectoralis Major	Muscle covering the chest	Adducts the arm at the shoulder	Forehand shot Hand off in rugby Boxing hook
 Abdominals	Side of the abdomen	Pulls the chest downwards Flexion of spinal column	Crunches
 Biceps	Front of Upper Arm	Elbow flexion (bending)	Boxing Uppercut Preparing to Throw a javelin
 Triceps	Back of Upper Arm	Elbow extension (straightening)	Throwing a javelin Hand off in rugby Boxing Jab
 Gluteus Maximus	Form the buttocks	Adducts & extends the hips pulling the leg backwards	Pull leg back before kicking a ball
 Hip Flexors	Front of the hip	Flexes the hip, moves the hip upwards	Lifting knees when sprinting
 Quadriceps	Front of Upper Leg	Knee extension (straightening)	Kicking a ball Jumping upwards on a lay-up shot
 Hamstrings	Back of Upper Leg	Knee flexion (bending)	Bending knee before kicking a ball
 Gastrocnemius	Calf muscle, attached by the Achilles tendon	Plantar flexion, points the toes	Running Diving and gymnastics
 Tibialis Anterior	Muscle that runs down the shin	Dorsi flexion, pulls toes upwards	Ski jumping Hurdling


Antagonistic muscle pairs:



When we bend the elbow (flexion) the biceps contract and the triceps relax

Agonist = Biceps
Antagonist = Triceps

E.g. upward phase of a bicep curl



When we straighten the elbow (extension) the triceps contract and the biceps relax

Agonist = Triceps
Antagonist = Biceps

E.g. Straightening the arm to punch

Other antagonistic pairs include:

- Quadriceps & Hamstrings
- Hip flexors & Gluteus Maximus
- Gastrocnemius & Tibialis Anterior

Muscular contractions:

Isotonic muscle contractions are those that result in movement e.g. running and jumping

Isometric muscle contractions are when the muscle contracts but no movement e.g. holding a balance

Concentric & eccentric isotonic contractions:

Concentric muscle contraction is when the muscle shortens during the contraction (positive/upward phase)

Eccentric muscle contraction is when the muscle lengthens during the contraction (negative/downward phase)



Upward phase of a bicep curl
biceps are contracting concentrically



Downward phase of a bicep curl
biceps are contracting concentrically