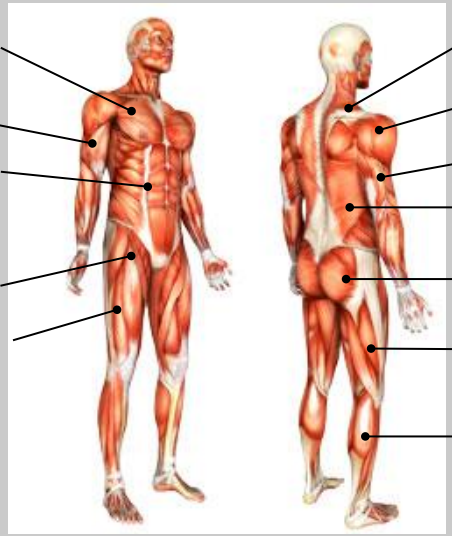
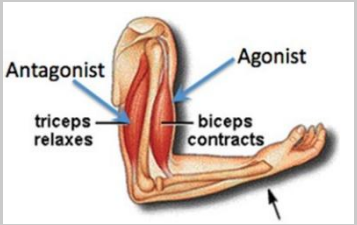
GCSE Physical Education – The structure and functions of the muscular system

Structure of the muscular system



Antagonistic pairs - Muscles are arranged in antagonistic pairs.
As one muscle contracts (shortens) its partner relaxes (lengthens) *i.e. Biceps and Triceps.*

Flexion

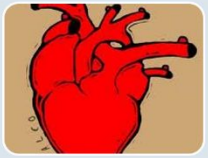


Extension

Agonist = the muscle that contracts to produce movement.
Antagonist = the muscle that relaxes to allow the movement to occur.
Fixator = the muscle that works to stabilise the origin of the prime mover (agonist)

Examples in the body:
- Biceps & Triceps
- Quadriceps & Hamstring
- Hip Flexor & Gluteus Maximus

Types of muscle



Voluntary muscles enable movement throughout the body.

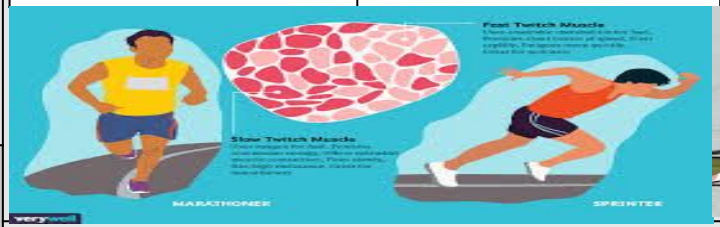
Involuntary muscles are essential in maintaining healthy body systems.

Cardiac muscle is vital in sport because it makes the heart pump. Fitness training will strengthen cardiac muscle making the heart more efficient at pumping blood around the body.

The **short term effects** of exercise on the muscles:
1. Working muscles produce heat
2. Increased muscle fatigue due to lactic acid accumulation
3. Blood is re-distributed to working muscles (blood shunting)
4. Increase in cross sectional size

Muscle fibre types

Slow twitch muscle fibres (Type I)	Fast twitch muscle fibres (Type II)	Lactic Acid v Oxygen Debt
1. Smaller in size. 2. Work aerobically with high fatigue resistance. 3. Have a good oxygen supply = deep red in colour. 4. They contract slowly, but can work for long periods. **Marathon runner**	1. Larger in size 2. Work anaerobically & linked to high intensity activities. 3. Are paler (white) in colour and have limited oxygen supply. 4. They contract quickly and powerfully, but tire easily **100/200m runner**	1. Lactic acid is built up through lack of oxygen in working muscles and so they fatigue. This causes muscle pain reduces performance. Also linked to DOMS (delayed onset muscle soreness) 2. Oxygen debt has to be 'repayed' when anaerobic work has finished



Link of the muscular and skeletal system – both systems work together to produce movement. *i.e. a contracting muscle pulls on a bone which changes the angle at a joint.*

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Term	Definition/notes/concept

Keywords: