

CONTENT AREA 1.2 – MUSCULAR SYSTEM

Big Picture: To Develop a Broad Understanding of the Structure and Function of the Body Systems

Types of Muscle

Learners will know and understand the **types of muscle**, where they are located, their characteristics and functions. This includes:

Cardiac

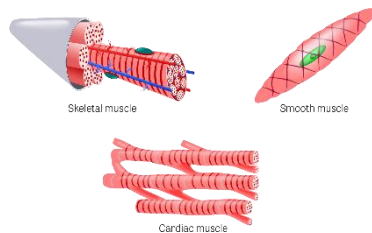
- found in the heart
- oxygen dependent, involuntary
- aids blood flow through the heart.

Smooth

- found in multiple locations including digestive tract, blood vessels, and lungs, contracts in all directions
- can work without oxygen, involuntary
- aids digestion, helps the distribution of blood.

Skeletal

- found around the body
- can work with or without oxygen, works voluntarily
- aids with movement.



Structure

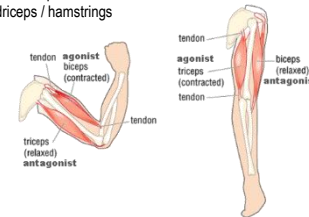
The learner will understand the **structure of the muscular system** by locating the main muscles of the muscular system and understanding their relation to joint actions:

- **deltoid** – allows adduction of the upper arm away from the body, stabilises the shoulder joint
- **trapezius** – allows movement of the head and shoulder blades
- **latissimus dorsi** – allows movement of shoulder joints, allows adduction of the arm towards the body
- **pectorals** – allows rotation of the humerus bone, allows adduction of the arm
- **biceps** – allows flexion of the elbow
- **triceps** – controls the extension of the forearm at the elbow joint
- **abdominals** – allows flexion of the trunk and rotation of the spine, allows flexion of the hips
- **obliques** – allows adduction of the upper body
- **quadriceps** – allows the extension of the leg at the knee joint
- **hamstrings** – allows movement of the hip joint and knee joint while walking or running
- **gastrocnemius** – allows flexion of the ankle joint known as plantar flexion
- **gluteals** – extends the hip joint allowing the whole leg to move backwards
- **hip flexors** – allows flexion of the hip to bring the whole leg forwards
- **tibialis anterior** – allows dorsiflexion to raise to toes towards the shin, allows plantarflexion to point toes away from the shin

Muscle Movement

The learner will understand how muscles work in **antagonistic pairs** to produce movement at a joint and how to apply this principle to specific actions in health and fitness:

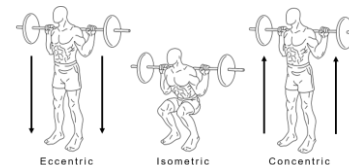
- **agonist (prime mover)**
 - **antagonist**
 - **origin/insertion:**
- biceps / triceps
 - quadriceps / hamstrings



Muscle Contractions

Learners will know and understand the types of **muscle contractions** and be able to apply these to specific actions and muscles. This includes:

- **Isotonic** – concentric, eccentric
- **Isometric** – static contraction



Muscle Fibre Types

The learner will understand the different **muscle fibre types** and their characteristics, including colour, contraction speed and fatigue speed and which muscle fibre types are suited to different types of health and fitness activities:

Type 1 (slow twitch fibres):

Characteristics:

- dark red in colour
- slow contraction speed
- slow fatigue speed
- can provide their own source of energy and sustain force for an extended time but cannot generate a significant amount of force

Best suited to the following health and fitness activities:

- long-distance running
- cycling
- swimming

Type 2 (fast twitch fibres), to include type 2A and type 2B:

Characteristics:

- white in colour
- fast contraction speed
- fast fatigue speed
- can provide bigger and more powerful forces but over a shorter period of time

Best suited to the following health and fitness activities:

- sprinting
- jumping
- weightlifting

KEY STAGE 4 – NCFE LEVEL 1/2 TECHNICAL AWARD IN HEALTH & FITNESS – YEAR 10

HOMEWORK / SUPPORT / UNDERSTANDING

The key questions, key vocabulary & assessment level guidance below can all be used for Homework/Home learning on this topic

Key Questions

State three types of muscle, their location, and explain how each type helps an individual doing health and fitness activities.

The alternative name for the abdominals is?

The deltoid muscle cause what movements of the shoulder?

Explain how muscles work in antagonistic pairs.

Define the term 'agonist'.

Muscles have an origin or anchor point and an insertion where movement occurs. Correctly identify the origin and insertion during flexion at the elbow.

What are the two types of muscle contraction?

When do isotonic contractions occur?

Describe concentric muscle contraction.

Describe eccentric muscle contraction.

Muscle fibres that are dark red in colour because of their rich supply of oxygen, are resistant to fatigue and can produce repeated slow contractions are known as which type?

Muscle fibres that are white in colour due to their low level of oxygen, capable of producing fast contractions and bursts of power, but result in rapid fatigue are known as which type?

Performance is improved in type 1 slow twitch fibres by undertaking what type of training?

Performance is improved in type 2 fast twitch fibres by undertaking what type of training?

Key Vocabulary

Abduction – Moving a part away from the midline.

Adduction – Moving a part toward the midline.

Antagonist muscle – Relaxes; Opposes the action of a prime mover.

Endurance training – Also known as Aerobic training.

Fatigue – Reduced strength of muscle contraction due to continuous stimulation of muscle without periods of rest.

Flexion – Movement that makes the angle between two bones smaller.

Hypertrophy – Increase in muscle size.

Insertion – Attachment to more movable bones.

Isometric contraction – Muscle contractions that do not produce movement.

Isotonic contraction – Produce movement at a joint.

Muscle fibres – Elongated contractile cells of muscle tissue.

Origin – Attachment to more stationary bones.

Prime mover – Responsible for producing a particular movement.

Rotation – Movement along a longitudinal axis.

Synergist muscles – Helps the prime mover in producing movement.

Synovial fluid – Slippery lubricating fluid that fills the bursa and secreted by the synovial membrane.

Tendons – Attach muscle to bones.

Assessment Method

Written Examination - 40% of the technical award

Written examination:

- 80 marks.
- 1 hour 30 minutes.
- a mixture of multiple-choice, short-answer and extended-response questions.

The written examination is a terminal assessment and will assess the learner's knowledge and understanding of all content areas.

The examination is set and marked by NCFE. The assessment assesses learners' knowledge and understanding of the content areas of this qualification.

A variety of assessment questions will be used, including multiple-choice, short-answer and extended response questions. This will enable learners to demonstrate their breadth of knowledge and understanding of the subject and ensure achievement at the appropriate level, including stretch and challenge. Questions will be written in plain English and in a way that is supportive and accessible to learners of all abilities.

The examination date is expected to take place in May/June every year. Please refer to the external assessment timetable available on the NCFE website.

(Remaining 60% is the internal assessment is at school)