



Accredited

# OCR LEVEL 2 CAMBRIDGE TECHNICAL CERTIFICATE/DIPLOMA IN SPORT

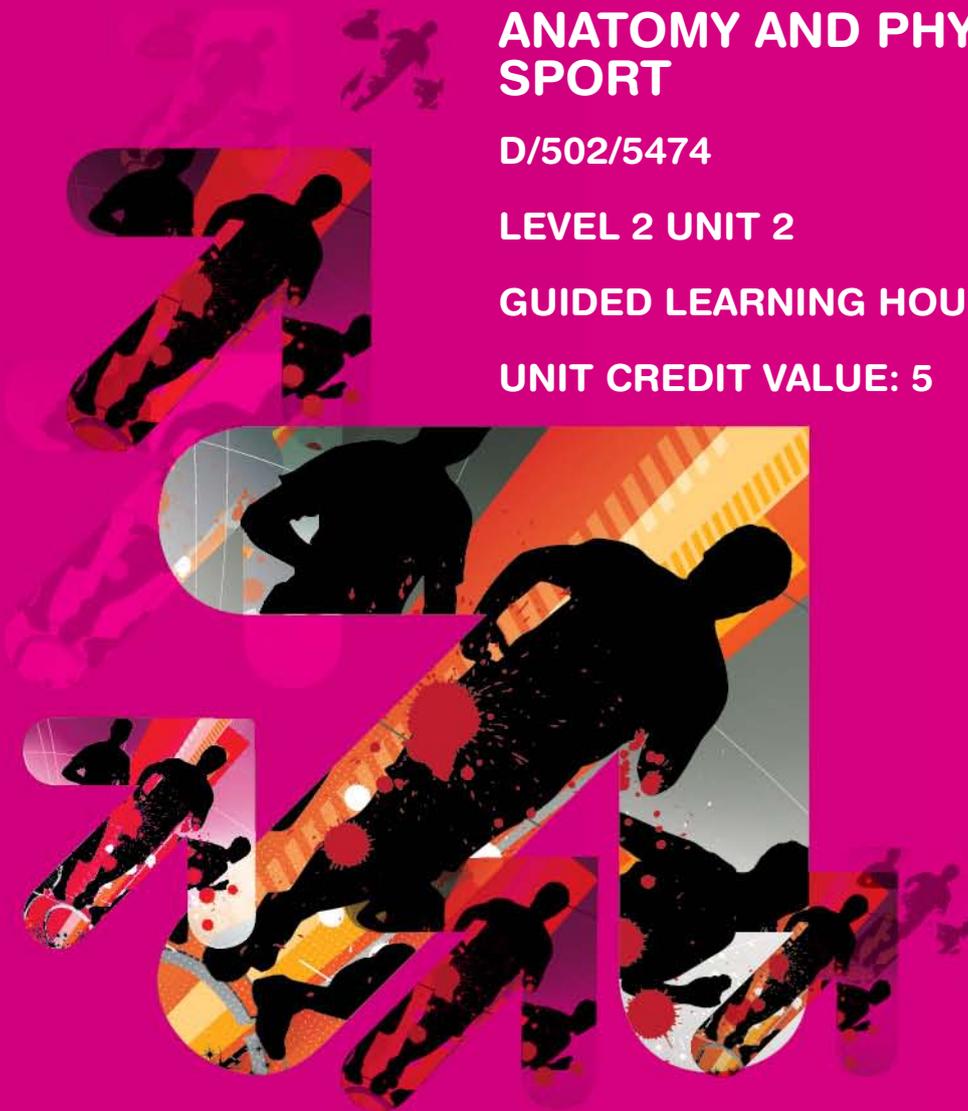
## ANATOMY AND PHYSIOLOGY FOR SPORT

D/502/5474

LEVEL 2 UNIT 2

GUIDED LEARNING HOURS: 30

UNIT CREDIT VALUE: 5



# ANATOMY AND PHYSIOLOGY FOR SPORT

D/502/5474

LEVEL 2

## AIM OF THE UNIT

Understanding anatomy and physiology and how body systems interact together are the basic building blocks to help improve an athletic performance. The aim of this unit is to give learners a basic underpinning knowledge of the function and structure of the basic systems in the human body, linking to exercise and sporting activities. The learner will be able to utilise this knowledge in other units.

## PURPOSE OF THE UNIT

There are many reasons why you will need to have anatomy and physiology knowledge. You may be a sportsman, sportswoman or looking to develop your skills to become a coach interested in improving individual and team performance, you may even be aiming to become a healthcare professional concerned with the fitness, health and rehabilitation of general or specific populations. This unit will give you a basic knowledge of how the body systems work which you can then use in any of areas highlighted.

## ASSESSMENT AND GRADING CRITERIA

<b>Learning Outcome (LO)</b>		<b>Pass</b>	<b>Merit</b>	<b>Distinction</b>
The learner will:		The assessment criteria are the pass requirements for this unit.		To achieve a merit the evidence must show that, in addition to the pass criteria, the learner is able to:
		The learner can:		To achieve a distinction the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
1	Know the structure and function of the skeletal system	P1 describe the structure and function of the skeletal system	M1 locate joints and muscles used in a range of sporting actions	D1 describe movements of joints and muscles used in a complete sporting action
		P2 describe the different types of joint and the movements allowed at each		
2	Know the structure and function of the muscular system	P3 identify the major muscles of the body	M2 outline the transportation of oxygen through the respiratory and cardiovascular systems	D2 describe the relationship between the cardiovascular and respiratory systems during exercise
		P4 describe the different types of muscle and muscle movements		
3	Know the structure and function of the cardiovascular system	P5 describe the structure and function of the cardiovascular system		
4	Know the structure and function of the respiratory system	P6 describe the structure and function of the respiratory system		

## TEACHING CONTENT

The unit content describes what has to be taught to ensure that learners are able to access the highest grade.

Anything which follows an i.e. details what must be taught as part of that area of content.

Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples to their work though these do not need to be the same ones specified in the unit content.

### LO1 Know the structure and function of the skeletal system

*Structure of the skeletal system:* i.e. cranium, sternum, ribs, vertebral column, scapula, clavicle, humerus, radius, ulna, pelvis, femur, tibia, fibula, patella, tarsals, metatarsals, carpals, metacarpals

*Function of the skeletal system:* i.e. protection, movement, shape, support, blood production

*Joints:* i.e. types of joints (e.g. hinge, ball & socket, condyloid), joint structure (e.g. synovial fluid, synovial membrane, cartilage, ligaments)

*Movement:* i.e. flexion, extension, adduction, abduction, rotation, examples from a range, i.e. more than 2, of sporting actions, a sporting action using only one or two joints (e.g. bicep curl, press up), examples of complete sporting actions, a complete sporting action using more than two joints (e.g. a javelin throw, striking a football)

### LO2 Know the structure and function of the muscular system

*Types of muscles:* i.e. skeletal, smooth, cardiac, structure, function

*Major muscles:* i.e. location of major muscles (e.g. triceps, biceps, quadriceps, hamstrings), examples used in complete sporting actions (e.g. deltoids, gluteus maximus, gastrocnemius, abdominals, obliques, pectorals, trapezius, erector spinae)

*Muscle movements:* i.e. antagonistic pairs

### LO3 Know the structure and function of the cardiovascular system

*Structure of the cardiac system:* i.e. atria; ventricles, septum, tricuspid valve, bicuspid valve, semi-lunar valves

*Structure of the vascular system:* i.e. aorta, pulmonary vein, pulmonary artery and vena cavae, blood vessels (e.g. structure and function), arteries, capillaries and veins

*Function of the cardiac system:* i.e. blood flow through the heart

*Function of the vascular system:* i.e. blood flow to the body and lungs, taking up oxygen, removal of carbon dioxide, thermoregulation (e.g. vasodilatation and vasoconstriction of vessels)

*Changes during exercise:* (e.g. heart rate, temperature change)

### LO4 Know the structure and function of the respiratory system

*Structure of the respiratory system:* i.e. lungs (e.g. large surface areas, alveoli, bronchioles, alveolus) associated structures (e.g. nasal passage, larynx, trachea, epiglottis, pharynx)

*Function of the respiratory system:* i.e. mechanics of breathing – inspiration i.e. diaphragm, intercostals muscles, rib cage movement; expiration i.e. breathing out, diaphragm, rib cage movement; gaseous exchange i.e. movement of carbon dioxide out of the blood into the lungs, diffusion of oxygen into the blood

*Changes during exercise:* (e.g. breathing rate)

## DELIVERY GUIDANCE

This unit is centre-assessed and externally moderated. In order to achieve this unit the learner must produce a portfolio of evidence showing that they can meet all of the assessment objectives.

Portfolios of work must be produced independently.

Learners should underpin theoretical knowledge with practical activity in order to be able to identify situations where key components are in action.

The required anatomical and physiological information relating to this unit can be studied within textbooks, DVD's, and various websites as well as by undertaking specific practical exercises

**LO1 and LO2:** This unit needs to begin with an overview of the skeleton and muscles. Learners will need to name and identify the major bones, joints, muscles and types of muscles in the body, and know the function of the skeletal system. Learners could easily identify these components by annotating a poster of the skeleton and muscles, as well as a report on the different types of muscles i.e. skeletal, smooth and cardiac, indicating the structure and function. With this underpinning knowledge learners can link this information to practical scenarios where they can look at joint movements. Learners will need to be made aware of simple joint actions such as flexion, extension, abduction, and adduction. The antagonistic muscle pairings responsible for specific joint actions can then be identified (e.g. the action is elbow flexion, the agonist is the biceps and the antagonist is the triceps). Tutors should emphasise this systematic approach to identifying and understanding the role of the musculo-skeletal system in producing movement in sport. Learners could look at video footage or photographs of key sporting individuals identifying joint movements (e.g. flexion, extension, adduction, abduction) during sporting movements. Movement analysis could also be based on a skill already included in practical sessions from other units. This analysis should be basic and need only cover musculoskeletal systems directly related to a specific joint (merit). To obtain a distinction they need to look at a complete sporting action (using more than two joints) commenting on the movement of joint and muscles within that sporting action. For the merit criteria a range is more than two.

**LO3 and LO4:** Learners are required to identify the structure and function of both the cardiovascular and respiratory

system. Learners should be made aware of the difference between structure i.e. how it is made up, and function i.e. how it works, so that they are able to differentiate between these when providing their information. Learners should be encouraged to include diagrams (particularly with reference to structure) as part of their evidence within their portfolio.

Learners are required to describe the relationship between the cardiovascular and respiratory systems during exercise (distinction). They could observe or take part in a range of tests and/or activities. They could keep a record of pre and post activity results in order to be able to identify changes. Factors which should be considered are:

- Heart rate
- Breathing rate
- Body temperature
- Muscle fatigue

Learners will need to review the changes observed and give specific explanations.

Evidence for this task could be provided by a spreadsheet showing pre and post activity data and a written review to explain changes. Learners should be encouraged to experience these changes within a range of different practical sessions.

## GUIDANCE ON ASSESSING THE SUGGESTED TASKS

The table below shows suggested scenarios that cover the pass, merit and distinction criteria in the assessment and grading grid.

You have been offered an assistant personal trainer position in a local gym. As part of your role you have been asked to prepare information for the members at the gym that demonstrates your ability and informs the clients to recognise and identify key components of the musculo-skeletal and cardio-respiratory systems. You also need to describe the roles they play in movement and physical activity.

Criteria	Assignment title	Scenario	Assessment
P1, P2, P3 and P4	Structure and function of the skeletal and muscular system.	You have been asked to put together two posters to put up in the gym demonstrating the structure and function of the skeletal and muscular system.	On the first poster you need to include function of skeletal system and label all major bones and the different types of joints. On the second poster you need to identify all the major muscles by labelling, and include different types of muscles and movements.
M1 and D1	Movements and joint actions in sporting movements.	You have been asked to demonstrate to the members of the gym about sporting actions. You watch sporting movements taking place in a variety of sports, you can either use photographs or videos to explain these movements.	For learners to obtain a merit they will have to explain a variety of sporting actions (two joints). For a distinction criteria learner have to describe a variety of complete sporting movements (more than two joints).
P5 and P6	Structure and function of the cardiovascular and respiratory system.	You have been asked to put together a leaflet for the gym members explaining the structure and function of the cardiovascular and respiratory systems. You have been asked by the manager of the gym to include lots of different visual aids.	In the leaflet you need to include the structure and function of the cardiovascular and respiratory systems.
M2	Outline the transportation of oxygen through the respiratory and cardiovascular systems.	The local running club have expressed an interest in how oxygen is transported through the body and have asked you to put together a presentation explaining the outline of these processes to them.	The presentation needs to outline the transport of oxygen through the two systems.

D2	Describe the relationship between the cardiovascular and respiratory systems during exercise	<p>You have been asked to take part in a range of tests and/or activities.</p> <p>You need to take pre and post measurements</p> <p>You need to take pre and post measurements.</p> <p>Factors which should be considered are:</p> <ul style="list-style-type: none"> <li>• Heart rate</li> <li>• Breathing rate</li> <li>• Body temperature</li> <li>• Muscle fatigue</li> </ul> <p>You will need to review the changes observed and give specific descriptions of the relationship between the two systems.</p>	<p>Learners will need to review the changes observed and give specific descriptions of the relationship between the two systems.</p> <p>Evidence for this task could be provided by a spreadsheet showing pre and post activity data and a written review to describe changes. Learners should be encouraged to experience these changes within a range of different practical sessions.</p>
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## RESOURCES

### Books

- Baggaley, A. (2001). *Human Body. An Illustrated Guide to Every part of the Human Body and How it Works*. Dorling Kindersley, London.
- Caplan, G., Smith, P. (2005) *Sport OCR National Level 2* Heinemann
- Hill, M., Honeybourne, J. and Wyse, J. (1998) *PE for you* Nelson Thornes
- Hodgson, B. (2001) *Sport and PE: A complete guide to GCSE* Hodder & Stoughton
- Mullan, N. (1998) *The Working Body (Aspects of PE)* Heinemann
- Ross and Wilson (2010). *Anatomy and Physiology Colouring and Workbook*. Churchill Livingstone

### Websites

- BBC. <http://www.bbc.co.uk/science/humanbody>  
Science and Nature: Human Body and Mind page of the BBC's website.
- Human Anatomy Online. <http://www.innerbody.com>  
Online resource for studying the anatomy of the human body.
- Sports Coach UK. <http://www.sportscoachuk.org>  
Links for coaching contact information/fact sheets and resources for coaches.

## MAPPING WITHIN THE QUALIFICATION TO THE OTHER UNITS

- Unit 3:** Fitness Testing and Training
- Unit 5:** Development of Personal Fitness
- Unit 6:** Lifestyle and the Performer
- Unit 7:** Effects of Exercise on the Body Systems
- Unit 8:** Injury in Sport



## **CONTACT US**

Staff at the OCR Customer Contact Centre are available to take your call between 8am and 5.30pm, Monday to Friday.

We're always delighted to answer questions and give advice.

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