Cambridge TECHNICALS

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OCR LEVEL 3 CAMBRIDGE TECHNICALS IN SPORT

LEVEL 3 UNIT 4

THE PHYSIOLOGY OF FITNESS

DELIVERY GUIDE

VERSION 1 SEPTEMBER 2013

OCR

CONTENTS

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INTRODUCTION

This Delivery Guide and Plan has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons. The Plan offers one way to deliver this unit, with suggestions on how many lessons to spend on a particular topic and the resources you could use.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic. The Guide is structured by learning outcome so you can see how each activity helps you cover the specification.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resourcesfeedback@ocr.org.uk.

PLEASE NOTE

The activities suggested in this Delivery Guide MUST NOT be used for assessment purposes. (This includes the Consolidation suggested activities).

The timings for the suggested activities in this Delivery Guide DO NOT relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk.

The latest version of this Delivery Guide can be downloaded from the OCR website.

OPPORTUNITIES FOR ENGLISH AND MATHS DEVELOPMENT

The Wolf Review of Vocational Education recommended that all learners studying post-16 qualifications have the opportunity to further develop their English and maths skills, with the aims of:

- achieving a GCSE in English and/or maths at grade A*-C if they have not already done so or
- making significant progress towards GCSE entry and success if this is some way off for the individual.

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.

OPPORTUNITIES FOR WORK EXPERIENCE

The Wolf Report also recommended that learners have the opportunity to apply their skills and extend their learning outside the classroom through work experience, part time jobs, work shadowing and work placements. There are lots of opportunities within these qualifications to take some of the teaching and learning outside of the classroom and into a work environment. We are working to provide you with resources to support you in achieving this, please visit www.ocr.org.uk shortly for more information.

KEY

English

Maths


Work experience

UNIT 4 – THE PHYSIOLOGY OF FITNESS

Guided learning hours: 30

Credit value: 5

PURPOSE OF THE UNIT

The purpose of this unit is for learners to further become familiar with the anatomy and physiology of the human body and learn the effects of exercise on the various body systems both in the long term and short term as well as being able to scientifically test and prove the adaptations. Learners could also look at how exercise routines differ as the body adapts over time and how an elite performer's exercise routine and body adaptations are significantly different to that of the average learner/performer.

Learning Outcome - The learner will:	Assessment Criteria - The learner can:	Merit	Distinction
1 Know the body's response to acute exercise	P1 Describe the musculoskeletal and energy systems response to acute exercise		
	P2 Describe the cardiovascular and respiratory systems responses to acute exercise		
2 Know the long-term effects of exercise on the body systems	P3 Describe the long-term effects of exercise on the musculoskeletal system and energy systems	M1 Outline the adaptations to cardiovascular, respiratory, musculoskeletal and energy systems, brought about by regular exercise	D1 Compare the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer against an elite performer
	P4 Describe the long-term effects of exercise on the cardiovascular and respiratory systems		
3 Be able to investigate the physiological effects of exercise on the body systems	P5 Collect physiological data to investigate the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems, with tutor support	M2 Explain the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer	
	P6 Review physiological data collected, describing the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems		

P = Pass, M = Merit, D = Distinction

LEARNING OUTCOME 1 - KNOW THE BODY'S RESPONSE TO ACUTE EXERCISE

Learning Outcome - The learner will:	Assessment Criteria - The learner can:	Merit	Distinction
1 Know the body's response to acute exercise	P1 Describe the musculoskeletal and energy systems response to acute exercise		
	P2 Describe the cardiovascular and respiratory systems responses to acute exercise		

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
1 Investigation into the body's response to acute exercise 	To introduce this topic the teacher could split the group into pairs and lead them through a practical activity session. Each pair could conduct and compare pre and post exercise readings and tests to give them the knowledge of the body's response to acute exercise. Using the table on Lesson Element 'Acute Exercise Readings' learners could test each other before and after any practical activity lasting between 5-20 minutes. (This could even be classroom based with the learners performing star jumps or a step test.) The data collected within this activity could be used as part of the investigation in Learning Outcome 3.	1 hour	P1: Describe the musculoskeletal and energy systems response to acute exercise P2: Describe the cardiovascular and respiratory systems responses to acute exercise
2 Data presentation 	The teacher could ask the learners to present the data from the practical investigations from the previous activity in a series of graphs and charts. This could include a line graph to demonstrate the increase in heart rate and/or breathing rate during exercise, a pie chart to show percentages of each energy system used, or a bar chart to map changes in hamstring flexibility. The data could be presented to the class, put on a poster, included within wall displays etc.	2 hours	P1: Describe the musculoskeletal and energy systems response to acute exercise P2: Describe the cardiovascular and respiratory systems responses to acute exercise
3 Energy system changes	The teacher could recap the energy systems studied in Unit 1 Principles of anatomy and physiology in sport. The teacher could show learners video clips of athletes performing a variety of sports and then lead a discussion on the requirements of each sport. The learners could identify the main energy system used in each example. To demonstrate understanding of the energy system changes during exercise learners could produce a 'timeline' for their athlete showing the stages at which changes occur. An example may be a 400m runner, which could be presented on an image of a track with learners marking the approximate distance of each change for an elite runner or themselves.	1 hour	P1: Describe the musculoskeletal and energy systems response to acute exercise P2: Describe the cardiovascular and respiratory systems responses to acute exercise

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
4 Extension task/further research 	The teacher could use Lesson Element 'Physiological changes during acute exercise' to facilitate further learning and understanding of the physiological responses to acute exercise. Learners should read the case study carefully then analyse the energy demands and the physiological changes that will occur. The task allows comparison and investigation skills needed for learner to attempt M2 and D1.	30 minutes	M2: explain the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer D1: Compare the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer against an elite performer

LEARNING OUTCOME 2 - KNOW THE LONG TERM EFFECTS OF EXERCISE ON THE BODY SYSTEMS

Learning Outcome - The learner will:	Assessment Criteria - The learner can:	Merit	Distinction
2 Know the long-term effects of exercise on the body systems	P3 Describe the long-term effects of exercise on the musculoskeletal system and energy systems P4 Describe the long-term effects of exercise on the cardiovascular and respiratory systems	M1 Outline the adaptations to cardiovascular, respiratory, musculoskeletal and energy systems, brought about by regular exercise	D1 Compare the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer against an elite performer

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
1 Long term effects on the musucular system and energy system	The teacher could split the class into groups and ask them to research the 'long term effects on the muscular system' (for example: hypertrophy, tendon strength, increased mitochondria, increased muscle strength, increased lactic acid tolerance) and the 'long term effects on the energy systems' (for example: threshold changes, enzyme changes, fuel used). The teacher should give each group one or two of the modifications from each component that occur after long term exercise. The teacher could ask each group of learners what change happens, and how and why the adaptations occur. The groups could present their findings to the rest of the class in a presentation using a poster, PowerPoint or other visual aids.	2 hours	P3: Describe the long-term effects of exercise on the musculoskeletal system and energy systems P4: Describe the long-term effects of exercise on the cardiovascular and respiratory systems M1: Outline the adaptations to cardiovascular, respiratory, musculoskeletal and energy systems, brought about by regular exercise
2 Long term effects on the respiratory system and cardiovascular system	The teacher could split the class into groups and ask them to research 'long term effects on the respiratory system' (for example: increase in oxygen diffusion, increase in minute ventilation, increased strength of respiratory muscles) and the 'long term effects on the cardiovascular system' (for example: cardiac hypertrophy, increase in blood volume, capilarisation). The teacher should give each group one or two of the modifications from each component that occur after long term exercise. The teacher could ask each group of learners what change happens, and how and why do the adaptations occur. The groups could present their findings to the rest of the class in a presentation using a poster, PowerPoint or other visual aids.	2 hours	P3: Describe the long-term effects of exercise on the musculoskeletal system and energy systems P4: Describe the long-term effects of exercise on the cardiovascular and respiratory systems M1: Outline the adaptations to cardiovascular, respiratory, musculoskeletal and energy systems, brought about by regular exercise

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
3 Long term experiment 	The teacher could set the learners a task to design a six week fitness program for a client (another learner) using a variety of cardiovascular, resistance and flexibility exercises. The programs should be kept basic (an optional template is available in Lesson Element 'Fitness Plan'), with the aim being to create an environment where learners see the long term effects of exercise on the body systems over the six weeks. Learners should take basic measurements at the beginning of each session (minimum once a week) to create a set of data over the six weeks, recording changes that might/should occur. Once the data is collected at the end of the six weeks learners could present their findings in the form of a graph or charts on a poster or PowerPoint. The teacher could get learners to do detailed programs and map this across to Unit 23 Fitness training and programming if appropriate.	8 hours	P3: Describe the long-term effects of exercise on the musculoskeletal system and energy systems P4: Describe the long-term effects of exercise on the cardiovascular and respiratory systems P5: Collect physiological data to investigate the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems, with tutor support M1: Outline the adaptations to cardiovascular, respiratory, musculoskeletal and energy systems, brought about by regular exercise M2: Explain the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer D1: Compare the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer against an elite performer
4 Puzzle Book	Learners could produce a book containing fun games and puzzles to help GCSE students at a local high school revise long term effects of exercise. Word searches could provide a low level game to assist with learning terminology, while crosswords and quizzes (including multiple choice, true/false, and essay style questions) would allow the GCSE students a chance to recap or increase knowledge on the long term effects in all areas. Teachers should encourage learners to be creative and include visual aids. The task allows the learner to revise and recap their own knowledge.	3 hours	P3: Describe the long-term effects of exercise on the musculoskeletal system and energy systems P4: Describe the long-term effects of exercise on the cardiovascular and respiratory systems M1: Outline the adaptations to cardiovascular, respiratory, musculoskeletal and energy systems, brought about by regular exercise

LEARNING OUTCOME 3 - BE ABLE TO INVESTIGATE THE PHYSIOLOGICAL EFFECTS OF EXERCISE ON THE BODY SYSTEMS

Learning Outcome - The learner will:	Assessment Criteria - The learner can:	Merit	Distinction
3 Be able to investigate the physiological effects of exercise on the body systems	P5 Collect physiological data to investigate the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems, with tutor support P6 Review physiological data collected, describing the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems	M2 Explain the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer	D1 Compare the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems for a selected performer against an elite performer

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
1 Fitness testing protocol	To introduce this topic, learners could produce a leaflet explaining a variety of fitness tests. They should select at least one suitable test for each component of physical fitness (for example: aerobic fitness, muscular endurance, muscular strength, flexibility, speed, and power) and provide a detailed explanation and pictures to ensure the reader could carry out valid and reliable testing.	3 hours	P5: Collect physiological data to investigate the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems, with tutor support
2 Validity and reliability	The teacher could lead a group discussion on validity and reliability. The discussion should include a clear definition of each, what the differences are between the two, and specific examples to outline the differences between validity and reliability. The teacher should then get the learners into pairs and ask them to create and write down their own example of validity and reliability. Learners should then present these to the class who will discuss whether the example demonstrates validity and reliability. The learners could then complete the scenarios on the worksheet (Lesson Element 'Validity and Reliability') to demonstrate knowledge and understanding of validity and reliability and their importance in fitness testing.	1 hour	P5: Collect physiological data to investigate the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems, with tutor support

Suggested content	Suggested Activities	Suggested timings	Links to Assessment Criteria
3 Fitness testing practical 	Teachers could set up a practical session to allow learners to perform the fitness tests researched and produced in the fitness test protocol leaflet. In pairs learners could carry out tests according to the protocol detailed in a leaflet produced by another pair. Carrying out the tests and recording the results will allow the learners to experience first-hand the advantages and disadvantages of each test, learn the protocol, and practice administering tests to gain accurate results that are valid and reliable. Tests may include multi stage fitness test, step test, sit and reach, vertical jump, dynamometer test, cooper run, sit up test, press up test, or the walk test. Learners could design a data recording sheet similar to the one in Lesson Element 'Fitness Tests'. The tests will also allow the learners to a further opportunity to view the physiological effects of exercise, observing pre and post test readings such as heart rate and breathing rate (similar to the investigation performed in LO1).	3 hours	P5: Collect physiological data to investigate the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems, with tutor support
4 Advantages/ disadvantages poster	Learners could analyse the different fitness tests completed in the fitness test practical for each component of fitness and compare the strengths and weaknesses of the tests. Learners could produce a poster using a versus theme similar to a sporting contest. Using bullet points to give a summary of their findings and 'the winner'. An example of the poster can be found on Lesson Element 'Fitness Tests Advantages/Disadvantages'. This task could also be completed as a card game in a 'top trumps' style.	2 hours	P6: Review physiological data collected, describing the effects of exercise on the musculoskeletal, cardiovascular, respiratory and energy systems

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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