Unit 8: Fitness Testing for Sport and Exercise

Unit code: A/502/5630

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

The aim of this unit is to enable learners to gain an understanding of fitness testing and the importance of health screening and health monitoring tests.

Unit introduction

In today's society, we can easily fall into the trap of developing a sedentary lifestyle; we use the car rather than walk to the local shops, we take the lift rather than the stairs, and our hectic lifestyle doesn't seem to allow us the time to engage in regular physical activity. Establishing and maintaining a desirable level of fitness is more important than ever; it's paramount to the future health of the nation.

The overall relationship between fitness and health affects performance in our everyday lives, whether it be sport- or work-related. Fitness is vital to achieving success in sport, and fitness testing plays a valuable role in the development of personal fitness levels. Sports performers regularly participate in fitness tests to determine their baseline measures. Fitness testing results are then used to identify strengths and areas for improvement. Fitness testing results are also used to predict future performance and provide feedback on the effectiveness of a training programme.

Fitness testing can be carried out in a health club setting. Health clubs screen clients for contraindications to exercise, and fitness testing enables the instructor to determine baseline measures, using the results as a basis for exercise programme design.

This unit is particularly relevant for those who aspire to work in sports coaching, fitness instruction and elite sport.

The first part of the unit looks at a range of laboratory and field-based fitness tests. Learners will explore the different tests available and the benefits and drawbacks of laboratory and field-based fitness tests. Learners will also be introduced to the practice of health screening and how to carry out health monitoring tests.

The second part of the unit will develop the skills and knowledge to be able to follow fitness test protocol, taking into account test validity and reliability. Learners will develop skills to be able to administer fitness tests in a safe and effective manner, interpreting results against recommended values, providing feedback to an individual regarding how fitness levels can be improved.

Learning outcomes

On completion of this unit a learner should:

1 Know a range of laboratory-based and field-based fitness tests

2 Be able to use health screening techniques

3 Be able to administer appropriate fitness tests

4 Be able to interpret the results of fitness tests and provide feedback.

Unit content

1 Know a range of laboratory-based and field-based fitness tests

Fitness tests: flexibility, eg sit and reach; strength, eg 1RM, grip dynamometer; aerobic endurance, eg multi-stage fitness test, step test, maximal treadmill protocol; speed, eg sprint tests; power, eg vertical jump, wingate test; muscular endurance, eg one-minute press up, one-minute sit up; body composition, eg skinfold calipers, bioelectrical impedance analysis, hydrodensitometry

Advantages and disadvantages of different tests: eg cost, time, equipment requirement, facility requirements, skill level of person carrying out test, issues with test validity, issues with test reliability

2 Be able to use health screening techniques

Health screening procedures: health screening questionnaires; client consultation, eg questioning, listening, non-verbal communication, client confidentiality; informed consent; coronary heart disease risk factors; medical referral

Health monitoring tests: eg heart rate, blood pressure, lung function, waist-to-hip ratio, body mass index

3 Be able to administer appropriate fitness tests

Fitness tests: eg multi-stage fitness test, step test, maximal treadmill protocol, 1RM, grip dynamometer, vertical jump, wingate test, sprint tests, one-minute press up, one-minute sit up, skinfold calipers, bioelectrical impedance analysis, hydrodensitometry; preparation for tests, eg selection of tests, reliability, validity and practicality of tests; purpose, eg identify components of fitness which need to be improved, give a benchmark from which to measure improvement, allow a more specific programme to be written, play a role in educating individuals about health and fitness

Administer: pre-test procedures; test sequence; test protocols; health and safety; recording test results; reasons to terminate a fitness test

4 Be able to interpret the results of fitness tests and provide feedback

Interpret results against normative data: compare and make judgements against, eg population norms, norms for sports performers, norms for elite athletes, accepted health ranges

Feedback: feedback, eg verbal, written; tests carried out; test results; levels of fitness; strengths and areas for improvement; recommendations

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 describe one test for each component of physical fitness, including advantages and disadvantages	**M1** explain the advantages and disadvantages of one fitness test for each component of physical fitness	
P2 prepare an appropriate health screening questionnaire [IE1, CT1, CT2]		
P3 devise and use appropriate health screening procedures for two contrasting individuals [IE1, CT1, CT2]		
P4 safely administer and interpret the results of four different health monitoring tests for two contrasting individuals [IE4, IE5, IE6, TW3, TW4, TW5, TW6]	**M2** describe the strengths and areas for improvement for two contrasting individuals using information from health screening questionnaires and health monitoring tests	**D1** evaluate the health screening questionnaires and health monitoring test results and provide recommendations for lifestyle improvement
P5 select and safely administer six different fitness tests for a selected individual recording the findings [IE1, IE2]	**M3** justify the selection of fitness tests commenting on suitability, reliability, validity and practicality	
P6 give feedback to a selected individual, following fitness testing, describing the test results and interpreting their levels of fitness against normative data. [IE4, IE6, TW3, TW4, TW5, RL1]	**M4** compare the fitness test results to normative data and identify strengths and areas for improvement.	**D2** analyse the fitness test results and provide recommendations for appropriate future activities or training.

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Tutors should introduce the unit by identifying a range of laboratory-based and field-based fitness tests. These should be practically demonstrated wherever possible, although it is recognised that most centres will not have access to laboratory-based fitness testing equipment. In this case tests should be covered theoretically. There may be a university or high-performance centre in the area that carries out laboratory-based tests, and this would offer a useful course visit. Reliability, validity and practicality of tests should be discussed, as well as the advantages and disadvantages of laboratory-based and field-based fitness tests. Health and safety should be emphasised at all times.

Learners need to prepare and use appropriate health screening questionnaires and informed consent forms for two contrasting individuals. For this, learners could select a peer as one of their individuals and invite a parent/guardian into the centre as their other contrasting individual. Alternatively, learners could select two of their peers, where a sufficient contrast exists in terms of their choice of sport or perhaps sporting level. Tutors should discuss the selection of individuals with learners and ensure that the individuals selected are contrasting. Tutors should provide a range of examples of health screening questionnaires and informed consent forms for learners to review. These can be obtained from local health clubs and leisure centres; examples are also provided in a number of textbooks. Learners will then have a knowledge base to use when they devise their own questionnaires. Learners can complete the questionnaires and practise giving feedback to their peers. Tutors should cover communication skills. Learners can practise these skills when working with peers in a role-play situation.

Learners need to know how to conduct health monitoring tests including blood pressure, lung function, waist-to-hip ratio and body mass index. These should be demonstrated, then learners should be given the opportunity to practise in small groups. It is important that learners are able to identify when an individual needs medical referral.

Learners need to select and safely administer fitness tests then give verbal feedback to the individual being tested. Case study information can develop skills in selecting appropriate tests. Learners can work in groups and give feedback to the rest of the class afterwards. In order to develop a breadth of knowledge, the case studies should cover a range of individuals from different sports and different levels of ability.

Test validity, practicality and reliability need to be considered. Learners should be encouraged to carry out fitness tests on others in order to develop their skills in conducting tests and giving verbal feedback. For this, it is best for learners to work in groups with one acting as the client, one as the instructor and one as the observer. The observer can give feedback. Learners need to be able to analyse the results of fitness tests and provide feedback to an individual. Learners will need to be aware of normative data for interpretation of test results. This is available in a number of textbooks and on the internet.

Learners could be shown examples of computer software that can generate fitness assessment reports. Skills in analysing fitness test results and providing recommendations for future activities can be developed using case studies.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit.
Assignment 1: Exploring Laboratory-based and Field-based Fitness Tests (P1, M1). Tutor introduces the assignment brief.
Types of fitness tests – group practical exercises exploring the types of fitness tests, purpose, test protocol and test considerations (advantages and disadvantages).
The role and purpose of health screening techniques, including group discussion and review of exemplar health screening questionnaires.
Types of health screening questionnaire available: research in pairs and feedback to the group. Learners to individually design their own questionnaire.
Health monitoring tests – purpose, administration, norms.
Assignment 2: Health Screening (P2, P3, P4, M2, D1). Tutor introduces the assignment brief.
How to provide effective feedback using a number of practical scenarios – discussion of methods, techniques, dealing with issues, role play.
Health monitoring tests – group practical activities to practise test administration.
Health monitoring tests – learner practical observations.
Conducting fitness tests – group practical exercises to practise test administration and interpretation of results.
Assignment 3: How Fit Are You? (P5, M3, P6, M4, D2). Tutor introduces the assignment brief.
Administering fitness tests – group practical exercises providing opportunity for learners to administer fitness tests and interpret results against normative data/practical observations.
Administering fitness tests – learner practical observations.
Review of reflective practice of unit and assessment.

Assessment

For P1, learners need to describe one fitness test for each component of physical fitness. Advantages and disadvantages of fitness tests are best explored through practical participation in order to highlight variables in test methodology that could affect validity and reliability. Tests for flexibility, strength, aerobic endurance, speed, power, muscular endurance and body composition need to be covered. Evidence could be in the form of a practical assessment supported by an information booklet designed for coaches.

For P2, learners need to prepare an appropriate health screening questionnaire and, for P3, conduct health screening procedures for two contrasting individuals. A copy of the completed questionnaires and an observation checklist would provide suitable evidence together with a record of the health monitoring (P4) test results. The observation checklist should cover the safe administration and interpretation of four health monitoring tests selected for each individual, eg blood pressure, body mass index, lung function and waist-to-hip ratio.

For P5, learners need to select and safely administer six different fitness tests for a selected individual and record the findings. They then need to give verbal feedback (P6) to the individual, describing their test results and levels of fitness and interpreting results against normative data. Evidence for these assessment criteria is best provided in the form of an observation checklist. This checklist should assess whether the correct pre-test procedures were carried out, whether tests were carried out in the correct sequence and according to standard protocols, whether health and safety was taken into account at all times, whether the results were accurately recorded and whether test results were correctly interpreted for the individual. Learners must be aware of, and adhere to, reasons for test termination.

For M1, which builds on P1, learners must explain the advantages and disadvantages of one fitness test for each component of physical fitness. Learners should consider factors related to test validity and reliability and how these factors could affect data results. Learners need to describe the strengths and areas for improvement of the two contrasting individuals (M2) for whom the health screening questionnaire and health monitoring tests were completed. In doing this the test results should be compared to accepted health ranges.

For M3, which links to P5, learners need to justify the fitness tests selected, commenting on suitability, reliability, validity and practicality. In the fitness testing feedback they give to the individual (M4), learners need to compare the fitness test results to normative data and identify strengths and areas for improvement.

For D1, which builds on M2, learners need to evaluate the health screening questionnaires and the health monitoring test results of the two contrasting individuals. They then need to provide recommendations for lifestyle improvement. Value judgements about the strengths and areas for improvement should be made and, where areas for improvement are identified, recommendations put forward for lifestyle changes.

For D2, learners need to analyse the results and provide recommendations for appropriate future activities. Learners need to look beyond the basic facts and make appropriate comments. They then need to make recommendations on the frequency, intensity, time and type of activity that should be carried out to facilitate improvements for the individual selected.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, M1	Exploring Laboratory-based and Field-based Fitness Tests	As a Health Fitness Instructor, one of your main roles and responsibilities is to conduct health and fitness assessments with clients. Practically explore the physical fitness components through fitness testing.	Practical observation and assessment. Written report.
P2, P3, P4, M2, D1	Health Screening	Implement health screening and health monitoring tests for two contrasting individuals.	Practical observation and assessment. Written report.
P5, M3, P6, M4, D2	How Fit Are You?	Administer fitness tests for an individual and interpret test results.	Practical observation and assessment. Written report.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Sport sector suite and the BTEC Sport and Exercise Sciences sector suite. This unit has particular links with the following unit titles in the BTEC Sport suite and the BTEC Sport and Exercise Sciences suite:

Level 2 Sport	Level 3 Sport	Level 3 Sport and Exercise Sciences
Fitness Testing and Training	Principles of Anatomy and Physiology in Sport	Anatomy for Sport and Exercise
Development of Personal Fitness	Fitness Training and Programming	Sport and Exercise Physiology
Effects of Exercise on the Body Systems	Sports Coaching	Exercise, Health and Lifestyle
	Exercise, Health and Lifestyle	Fitness Training and Programming
	Instructing Physical Activity and Exercise	Instructing Physical Activity and Exercise
	Research Investigation in Sport and Exercise Sciences	Applied Sport and Exercise Physiology
	Laboratory and Experimental Methods in Sport and Exercise Sciences	Sports Coaching
	The Physiology of Fitness	Research Investigation in Sport and Exercise Sciences
		Laboratory and Experimental Methods in Sport and Exercise Sciences

This unit links with the National Occupational Standards (NOS) for:

- Achieving Excellence in Sports Performance at Level 3
- Coaching, Teaching and Instructing at Level 3
- Instructing Physical Activity and Exercise at Level 3.

Essential resources

Effective delivery of this unit will require a range of field fitness testing and health screening equipment and normative data for interpretation of test results.

Employer engagement and vocational contexts

This unit focuses specifically on the practical aspects of health and fitness assessment and will provide learners with the background knowledge and skills needed to work in a fitness suite, leisure club or gym. Centres are encouraged to develop links with local health education professionals and health fitness instructors. This could be via talks, fitness assessment demonstrations, health screening workshops, or visits to health and fitness centres.

Indicative reading for learners

Textbooks

Adams G M – *Exercise Physiology Laboratory Manual: Health and Human Performance* (McGraw Hill Higher Education, 2001) ISBN 9780072489125

Allen M B – *Sports Exercise and Fitness: A Guide to Reference and Information Sources* (Libraries Unlimited Inc, 2005) ISBN 9781563088193

American College of Sports Medicine – *ACSM's Guidelines for Exercise Testing and Prescription, 7th edition* (Lippincott Williams and Wilkins, 2005) ISBN 9780781745901

American College of Sports Medicine – *ACSM's Health-Related Physical Fitness Assessment Manual* (Lippincott Williams and Wilkins, 2007) ISBN 9780781775496

Coulson M – *The Fitness Instructor's Handbook: A Complete Guide to Health and Fitness – Fitness Professionals* (A&C Black, 2007) ISBN 9780713682250

Franks B D and Howley E T – *Fitness Leader's Handbook* (Human Kinetics Europe, 1998) ISBN 9780880116541

Hazeldine R – *Fitness for Sport* (The Crowood Press, 2000) ISBN 9781861263360

Heyward V H – *Advanced Fitness Assessment and Exercise Prescription* (Human Kinetics, 2006) ISBN 9780736057325

Howley E T and Franks B D – *Health Fitness Instructor's Handbook* (Human Kinetics Europe, 2003) ISBN 9780736042109

National Coaching Foundation – *Physiology and Performance – NCF Coaching Handbook No3* (Coachwise Ltd, 1987) ISBN 9780947850241

Powers S K and Howley E T – *Exercise Physiology: Theory and Application to Fitness and Performance* (McGraw Hill Higher Education, 2006) ISBN 9780071107266

Sharkey B J – *Physiology of Fitness, 3rd edition* (Human Kinetics, 1990) ISBN 9780873222679

Sharkey B J and Gaskill S E – *Fitness and Health* (Human Kinetics, 2006) ISBN 9780736056144

Skinner J – *Exercise Testing and Exercise Prescription for Special Cases: Theoretical and Clinical Applications* (Lippincott Williams and Wilkins, 2005) ISBN 9780781741132

Watson A W S – *Physical Fitness and Athletic Performance: A Guide for Students, Athletes and Coaches* (Longman, 1996) ISBN 9780582091108

Journals

American College of Sport Medicine's Health and Fitness Journal

British Journal of Sports Medicine

Exercise and Sport Sciences Reviews

International Journal of Sports Science and Coaching

Medicine and Science in Sports and Exercise

Research Quarterly for Exercise and Sport

Websites

American College of Sports Medicine	www.acsm.org
British Association of Sport and Exercise Sciences	www.bases.org.uk
Coachwise	www.1st4sport.com
Human Kinetics	www.humankinetics.com
Sport Science	www.sportsci.org
Sports Coach UK	www.sportscoachuk.org
Top End Sports	www.topendsports.com

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Independent enquirers	preparing an appropriate health screening questionnaire devising and using health screening procedures for two contrasting individuals safely administering and interpreting the results of four different health monitoring tests for two contrasting individuals selecting and safely administering six different fitness tests for a selected individual recording the findings giving feedback to a selected individual, following fitness testing, describing the test results and interpreting their levels of fitness against normative data
Creative thinkers	preparing an appropriate health screening questionnaire devising and using health screening procedures for two contrasting individuals
Reflective learners	giving feedback to a selected individual, following fitness testing, describing the test results and interpreting their levels of fitness against normative data
Team workers	safely administering and interpreting the results of four different health monitoring tests for two contrasting individuals giving feedback to a selected individual, following fitness testing, describing the test results and interpreting their levels of fitness against normative data.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	researching health screening questionnaires and informed consent forms
Reflective learners	practising health screening procedures and fitness test administration with their peers
Team workers	practising health screening procedures and fitness test administration with their peers
Self-managers	following health screening procedures and administering health monitoring tests for two contrasting individuals administering fitness tests for an individual and providing feedback.

Functional Skills – Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	researching health screening questionnaires, informed consent and normative fitness data/norms for elite sports performers
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	preparing a health screening questionnaire preparing an informed consent form recording fitness test results
Manage information storage to enable efficient retrieval	recording fitness test data
Follow and understand the need for safety and security practices	recording and interpreting client data
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	researching health screening questionnaires, informed consent and normative fitness data/norms for elite sports performers
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	preparing fitness test interpretation data
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	preparing a health screening questionnaire preparing an informed consent form recording fitness test results
Bring together information to suit content and purpose	interpreting health monitoring test results for two contrasting individuals interpreting fitness test results for an individual
Present information in ways that are fit for purpose and audience	designing a health screening questionnaire designing an informed consent form recording and interpreting results of health monitoring tests and fitness tests
Evaluate the selection and use of ICT tools and facilities used to present information	interpreting fitness test results
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	accurately recording test data results

Skill	When learners are ...
Mathematics	
Identify the situation or problem and the mathematical methods needed to tackle it	interpreting test data results
Select and apply a range of skills to find solutions	interpreting health monitoring tests and fitness test data
Draw conclusions and provide mathematical justifications	interpreting test data results
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	discussing how to test each component of physical fitness interpreting results of health monitoring tests and fitness tests using normative data
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	interpreting results of health monitoring tests and fitness tests using normative data
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	accurately recording results of fitness tests and production of a laboratory report.