Rewarding Learning

AS LEVEL

FACT FILE

Sports Science

Subject content link:

AS Unit 1 : Fitness and Training for Sport

- **Fitness Testing**

sports science

and the active leisure industry

FACT FILE

sports science
and the active leisure industry

AS Unit 1: Fitness and Training for Sport

Learning Outcomes

Students should be able to:

- Examine the importance of fitness testing, correct protocol, validity and reliability.
- Select, perform and evaluate a range of recognised sport specific fitness assessment methods:
  - discuss maximal v sub-maximal, the use of technology, advantages and disadvantages of different tests;
  - consider and select tests for components of fitness; and
  - supervise, record and evaluate fitness testing sessions.

Course Content

A fitness test is any method of gathering information about the health and physical capability of an individual. The measurement and evaluation of the different components of fitness allows the planning of effective training sessions and programmes for individuals performers or individuals within groups, squads and teams.

Methods of testing range from subjective estimates of the Rate of Perceived Exertion through a range of commonly used 'field' tests and the use of heart rate monitors to highly scientific analysis of performance and laboratory testing.

Talk Test - a method to measure how hard you are working. If you can talk whilst exercising it is an aerobic or moderate intensity work rate. If you can only say a few words or are gasping for breath, it is an anaerobic or very hard work rate.

Subjective: Talk Test

Digital Vision / Thinkstock.com

Field Test: 20m Shuttle Run

Monkey Business / Thinkstock.com

Laboratory Test: Aerobic Capacity

Reasons for Fitness Testing

- As a measure of general health.
- The analysis of the importance of different components of fitness to an activity and to measure individual strengths and weaknesses in that activity.
- To set realistic training goals and provide feedback on the effectiveness of a training programme.
- Provides a means of talent identification, comparison of performance / performers and preparation for competition.
- To motivate the athlete / performer.

Issues Related to Fitness Testing

- Reliance on Technology and Facts and Figures: Today's athlete has access to myriad facts and figures about performance; from the number of tackles or

distance covered in a rugby match to measurements of power and heart rate in cycling or rowing races. These measurements provide vital information about strengths and weaknesses in fitness related and skill related performance. These can be used to plan individualised training programmes to improve performance in both these areas.

However, there are disadvantages attached to the amount

iStock / Thinkstock.com

of information available to a coach or performer. Four time Ironman Triathlon World Champion Chrissie Wellington points out:

> *"There is a temptation for many athletes to surround themselves with all the latest gadgets and to base their routines on what their heart rate monitor or their stopwatch is telling them. The danger then is that you start to judge your limits by these devices rather than by the one that matters – the one inside you."*
>
> Ref:'A Life Without Limits' Wellington, C. Constable and Robinson Ltd 2012

She goes on to suggest athletes may train too hard when not feeling well or carrying an injury in order to 'reach predetermined levels for a session' and that 'obsessing over numbers' can affect the enjoyment of training or just taking part.

- **Specificity, Reliability and Validity:**

  Specificity: the fitness tests selected should be as specific as possible to the individual and the activity. Should the aerobic endurance of a middle distance runner be measured using a cycle based test, a progressive 20m shuttle run test or the Cooper 12minute Run test? A Standing Long Jump test could be used to measure the leg power of a high jumper, but would a Vertical Jump test be a better measure? The correct test must be selected to measure the appropriate aspect of fitness.

  Validity and Reliability: the selected fitness test must produce accurate results that measure the component of fitness they are designed to measure. The variables that could affect the results must be minimised so that the test can be repeated and the results compared for the individual or between groups. Test protocols aim to ensure that tests are carried out in the same way and that the results are therefore valid and reliable.
  Factors that can affect the results of fitness tests can be internal (motivation) or external (wind, temperature, time of day).

- **Maximal v Sub-maximal Tests:** maximal fitness tests are where the performer works to exhaustion, whereas in sub-maximal tests the performer works below their maximum effort. Both types of test produce valid and reliable results, however maximal tests require the performer to be sufficiently motivated to make the maximum effort required and there are dangers of injury and over exertion if the test is not monitored correctly. Equally, sub-maximal tests are just that, sub-maximal, and require estimated values of maximum possible performance. Small errors in sub-maximal test measurements can result in large inaccuracies in estimated maximal values.

Recognised Tests for Different Components of Fitness

Aerobic Endurance	**Maximal:** Cooper 12minute Run Test 20m Multistage Fitness Test 2km Rowing Ergo Test **Sub-maximal:** Harvard Step Test Queen's College Step Test
Anaerobic Endurance	6 x 35m Running-based Anaerobic Sprint Test (RAST) 10 x 30m Sprint Fatigue Test
Agility	Illinois Agility Run Test Hexagonal Obstacle Agility Test 10 x 5m Shuttle Run Test 'T' Drill Test
Balance	Standing Stork Balance (Eyes open or Blind versions)
Body Composition	Body Fat Percentages Body Mass Index (BMI)
Coordination	Ball Wall Toss and Catch Test

Flexibility	Sit and Reach Test Ankle Flexibility Test Trunk Flexion Test
Reaction Time	Ruler Drop Test Online Click Reaction Tests
Strength	**Maximal:** 1- Repetition Max Tests Grip Strength Test **Power:** Standing Long Jump Test Standing Vertical Jump Test Overhead Medicine ball throw **Endurance:** NCF Abdominal Curl Conditioning Test 10 or 20 Repetition Max Tests Maximum Press Up Test Core Muscle Strength and Stability Test
Speed	30m, 35m or 60m Sprint Tests Flying 30m Sprint Test

References: www.topendsports.com/testing/index.htm
www.teachpe.com/fitness/testing.php
www.brianmac.co.uk/eval.htm
sportsmedicine.about.com/od/fitnessevalandassessment/a/FitnessTest.htm

Activities

Additional Work

1. Select a fitness test for each of the most important components of fitness for a particular sport.
2. Research the test protocols for the selected tests, including the reliability and validity of each test, and discuss the advantages / disadvantages of each of the tests.
3. Perform and evaluate each of the selected tests.
4. Research norms for the results of each test (general population norms and sport specific norms) and compare these to your test results.
5. Assess the importance of safety and risk assessment during fitness testing.

sports science
and the active leisure industry

COUNCIL FOR THE **CURRICULUM EXAMINATIONS** AND **ASSESSMENT** 29 Clarendon Road, Clarendon Dock, Belfast BT1 3BG
✆ +44 (0)28 9026 1200 +44 (0)28 9026 1234 +44 (0)28 9024 2063 info@ccea.org.uk www.ccea.org.uk
Rewarding Learning