

## PE2 UNIT GUIDE

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### *Content Title: Fitness Testing*

#### **Key points**

- Why fitness test?
- Correct procedures for carrying out fitness testing
- How do we interpret and use the results?

### *Practical Application/Explanation*

#### **Why fitness test?**

- Identify strengths and weaknesses
- Monitor progress
- Set goals
- Talent identification.

#### **Identify Strengths and Weaknesses**

Identifying the strengths and weaknesses is one of the many benefits of fitness testing. This is done by comparing test results to other athletes in the same training group, the same sport, or to test results of large groups that are often published as **normative tables**.

#### **Monitor Progress**

The initial testing session can give the athlete an idea of where their fitness levels are at the start of a training programme, so that future testing can be compared to this and any changes can be noted. A baseline measurement of fitness is especially important if you are about to embark on a new training phase. Subsequent tests should be planned for the end and start of each new phase e.g. the beginning and the end of pre-season training.

By repeating tests at regular intervals, you can get an idea of the effectiveness of the training programme. The time between testing will vary between sports and athletes.

## Set Goals

The incentive to improve can often be provided by the 'goal' of a certain test score. By knowing that they will be tested again at a later date, the athlete can aim to improve in that area of fitness. (See goal setting for a more detailed explanation.)

## Talent Identification

Testing is primarily used for help in designing the most appropriate athletic training programme. A general non-sport specific testing battery can provide an idea of basic strengths and weaknesses, and from this, athletes may find they are better suited to another sport which makes better use of strengths e.g. a sprinter with high levels of leg power may choose to change from sprinting to long jump. Although testing has sometimes been used in this way for talent identification, it has generally not been very reliable in predicting the future success of juniors (mainly due to varying growth patterns) and in sports which rely heavily on other factors, such as technique, tactics and psychological factors.

### Correct procedures for carrying out fitness testing:

- Identify specific components of fitness relevant to activity
- Select appropriate tests
- Standardise testing protocols
- Make the tests as sport specific as possible
- Ensure reliability and validity.

## Identifying Components of Performance

The first step in designing a fitness testing programme is to identify the components of fitness that you wish to investigate. Each sport requires certain components of fitness and relies on some components more than others for successful performance e.g. a wing in hockey, football and rugby will require speed as a key fitness component. Similarly, you would not necessarily want to test a marathon runner on sprinting speed.

## Selecting Fitness Tests

The fitness tests must be as relevant and specific as possible to your sport e.g. a vertical jump would be more specific to a high jumper while a standing broad jump would be more specific to a long jumper.

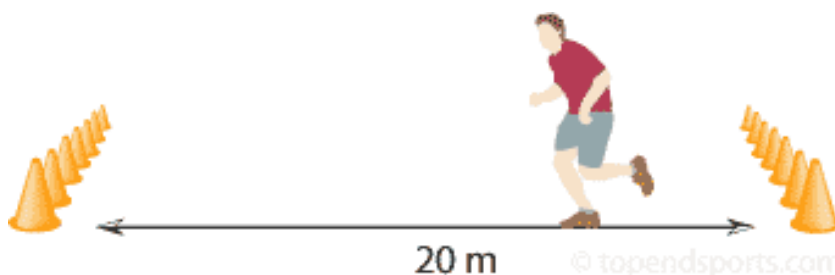
## Standardised Testing Protocols

The test protocols need to be standardised (the same each time you test) so that comparisons can be made between your test scores performed at different times and comparisons between athletes tested at different places. Athletes and coaches should be aware of the need to control factors which can affect the fitness results obtained. Such things that need to be controlled are: the warm up, order of tests, recovery periods, environmental conditions, and hydration and nutritional status of the athlete. If comparing test results to normative tables, the test must be conducted exactly the same as it was when the original test group was tested, for the comparison to be valid.

Also the tests have to be exactly the same in terms of measurements and timings and follow the same rules. An example of this is the Multi Stage Fitness Test.

### *Example of a Multi Stage Fitness Test (M.S.F.T)*

**Exact Distance = 20m**



Taken from Topendsports.com

### **Procedure**

This test involves continuous running between two lines 20 m apart in time to recorded beeps. For this reason the test is also called the 'beep' or 'bleep' test. The test subjects stand behind one of the lines facing the second line, and begin running when instructed by the cd or tape. The speed at the start is quite slow. The subject continues running between the two lines, turning when signaled by the recorded beeps. After about one minute, a sound indicates an increase in speed, and the beeps will be closer together. This continues each minute (level). If the line is not reached in time for each beep, the subject must run to the line turn and try to catch up with the pace within 2 more 'beeps'. Also, if the line is reached before the beep sounds, the subject must wait until the beep sounds. The test is stopped if the subject fails to reach the line (within 2 metres) for two consecutive ends.

## Specific to Your Sport

You need to select sport specific tests e.g. you could design your own football or netball test based on shooting and fatigue. As previously stated though, the test procedure/protocol must be conducted in exactly the same way for every participant every time it was used. This will ensure the results from the tests are reliable and valid. Furthermore, if you believe that the tests are relevant to the sport you play, you will be more inclined to put a maximal effort into the testing.

## Reliability

A test is considered reliable if the results are consistent and repeated over different occasions. You should be able to obtain the same or similar result on two separate trials. This is important as you are often looking for small changes in scores.

Some of the errors in recording tests results can come from not following the exact test protocols, equipment error, and variability in environmental conditions and/or surfaces. Reliability can be improved by greater control of these variables, and by using competent and well trained testers, although some variability is still expected. All the equipment used should be standardised (correct M.S.F.T. test CD) and regularly calibrated to the manufacturer's standards (calibrated skin fold calipers). If more than one test is being conducted at a time, the ordering of tests can affect results for each test (you would carry out a 30

m speed test immediately after an M.S.F.T.). Similarly, you would monitor the amount of training and subsequent fatigue of the athlete between test sessions. Also you must consider that some tests are more difficult in their protocols than others e.g. the Illinois Agility Run can be difficult to remember when carrying out for the first time. Therefore, if the athlete has to think about where they are going, this will slow them down. This is not then a fair reflection of their speed and agility and means the results are not as reliable as they could be. Hence to overcome this, the athlete could practise the route at a slow pace to familiarise themselves with it.

## Validity

Validity is whether the test actually measures what it set out to. Tests can be reliable but not valid (e.g. even though the hand grip dynamometer will produce reliable results, it is not a valid test of leg strength because it only measures grip). Validity is improved if the test is sport specific i.e. the test should resemble specific aspects of the sport, so that similar actions and therefore specific muscle groups and muscle fibre types actually used in the sport are being utilised.

## **How can results be used and interpreted**

If you don't know what the figures in the results mean, the tests are fairly useless. The results must have meaning so that they can be used to modify a training programme. In order to have an idea what these results mean, then we have to compare them to:

- a. Your own previous test scores.
- b. The results of other athletes within your group.
- c. Normative tables (tables that are derived from the results of hundreds or even thousands of other athletes).
- d. International or elite athletes.

### **Compare to previous test scores**

An athlete can continually monitor their fitness scores by comparing results from previous testing in a season or even from previous years.

### **Comparing results to other members of the team/group**

This can be useful to coaches when they want to group athletes together of similar levels of fitness in order to train together. This is often used in athletics. Similarly, players can compare their test results against other players in the same position as themselves.

### **Compare to Normative Tables**

Normative tables are fitness averages taken from the general population. If an individual's results are being compared to norms, then the same testing protocol, age group etc must be used. If these rules are not followed then the results will be deemed unreliable.

### **Compare results to elite or international athletes**

Such a comparison is particularly useful to young sportspeople who are able to see what is required in terms of level of fitness in order to reach the very top of their sports.

## Quick revision

Why fitness test?

- We predominantly fitness test to monitor our progress, often after a period of training. To identify strengths and weaknesses in fitness levels and to set goals.

Procedures for designing a programme of fitness tests for a specific sports person:

- Identify the essential components specific to that activity.
- Select appropriate tests that are as specific to the activity as possible.
- Standardise all the testing procedures, in order to produce the most accurate results possible.

The points above should ensure that the tests are as reliable and valid as possible.

How can we interpret the results?

- Results can be compared to your own previous scores, normative tables, elite athletes and other members within the same training or playing group.

### Top Tips:

You must be able to provide brief explanations of both laboratory and field-testing protocols. Many candidates in previous examinations have not provided enough detail in terms of how you can make the results as **reliable** and **valid** as possible. Standardising the test protocol will help reliability e.g. the measurements for the Illinois Agility Run are exactly the same every time and the floor surface and environment are also the same. Correct selection of test, making it as specific to your sport/activity as possible will help reliability. Finally, the athlete will carry out the test 3 times, with sufficient recovery between each run with the best time recorded.

It is also vital that you are able to provide information on how you have interpreted and used such test data e.g. you compared your own previous test results from the beginning of pre-season training to just before the start of the season.



## Exam Style Questions

1. *The Multi-Stage Fitness Test is a valid and reliable field test to measure an athlete's VO<sub>2</sub> Max.*

(a) Briefly describe each of the terms below. [3]

Validity;

Reliability;

VO<sub>2</sub> max.

(b) (i) Using a recognised test of VO<sub>2</sub> max, explain the procedures that should be followed to ensure the reliability and validity of the test results. [3]

(ii) Explain why a high VO<sub>2</sub> max could be beneficial to endurance athletes. [4]

2. *Power is an essential component of fitness in many sporting activities.*

(i) Define the term power and describe a recognised testing protocol that measures an individual's power. [3]

Answer 