GORDON'S SCHOOL

BTEC Level 3 National Diploma in Sport

Summer Work

Revision, questions and answers

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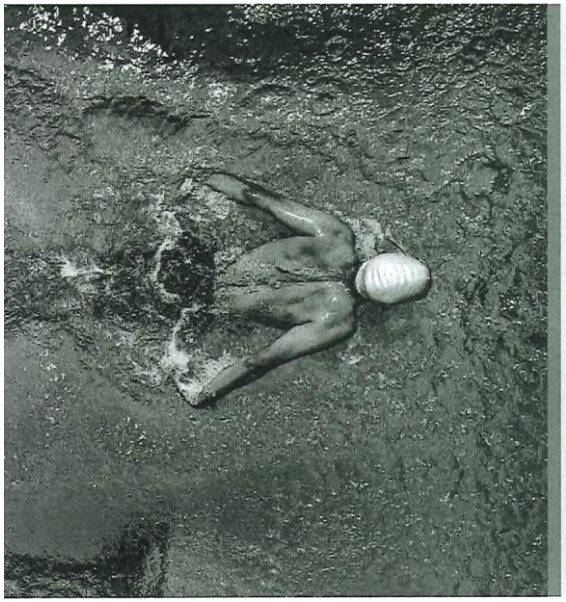


BTEC Sport

UNIT 1: FITNESS FOR SPORT AND EXERCISE

Unit 1: Fitness for Sport and Exercise

LEARNING OBJECTIVES

- Know about the components of fitness and the principles of training.
- Explore different fitness training methods.
- Investigate fitness testing to determine fitness levels.

Components of fitness

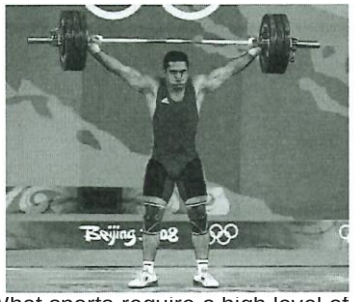
Components of fitness can be used separately or in combination with each other.

PAUSE: THINK – PAIR

What components of fitness are required to canoe? Are some more important than others?

Muscular Strength

Definition - The ability to exert a large amount of force in a single maximum effort

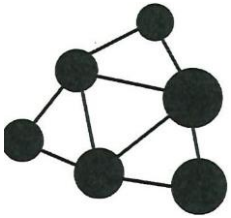


What sports require a high level of muscular strength?

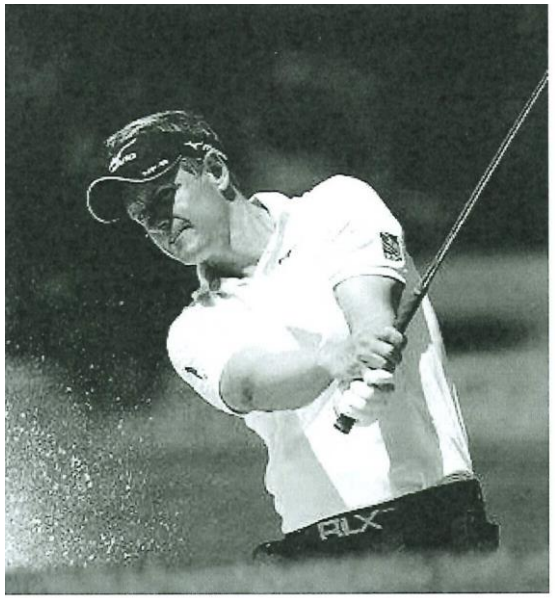
Body Composition

Definition - The proportion of body weight that is fat, muscle and bone.

Some body shapes are better suited to certain sports than others.



1< 1- Describe the ideal body composition for 3 different sports.



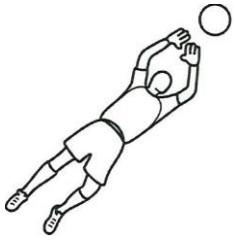
Components of Skill Related Fitness

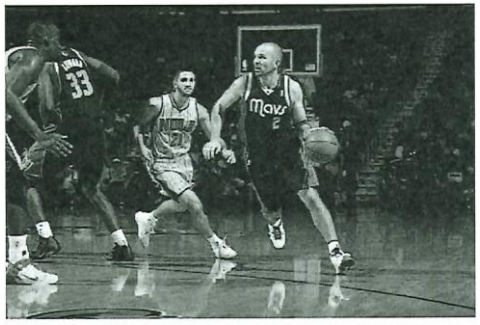
Everyone's fitness level will differ depending on the particular sports they play. Each activity has it own set of fitness requirements that the individual must meet in order to compete with others.

Agility

Definition - this is the ability to change direction quickly.

Athletes with good **agility** keep their entire body under control throughout.





Agility is especially important in sports that require a sharp movement or turn.
i.e. goal keeper

Balance

Definition - is the ability of the performer to retain their centre of mass over their base of support without falling.

Balance can be:

Static - This is a still action.

Dynamic- Keeping your balance on a board.

Fitness Components & Sports performers

Successful performances in any sport are dependant on having:

1. The right skill-related fitness components
2. The ability to meeting the demands of the environment

You might also consider the persons position within the event.

i.e. A rugby forward will have different requirements to that of a back.

Exercise intensities

Heart rate: The number of beats per minute.

Measuring Heart rate:

Use the pulse in your neck **(carotid pulse)** or on your wrist **(radial pulse).** Use your index and middle finger only.

PAUSE: TRY THIS

Count for 15 seconds x 4 = ____ Beats per minute

Calculating working intensities - Heart rate

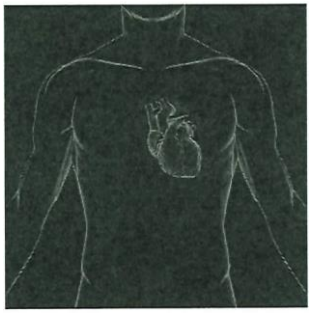
An estimate of **maximum heart rate** is calculated as:

Maximum Heart Rate (MHR) = 220 - age

Worked example:

A 25 year-old would have a maximum heart rate of:

220 - 25 = 195bpm



Exercise Intensity

To improve fitness from regular exercise you must push your heart rate above a certain level, known as the training thresholds.

There are two training thresholds:

60-85 % of the maximum heart rate

85% + of the maximum heart rate

Intensity - How hard we train

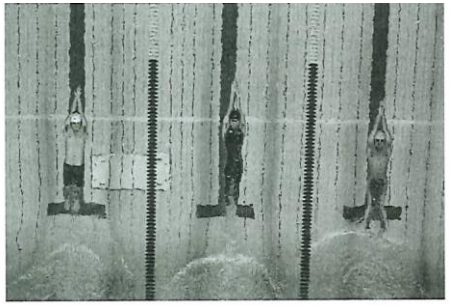
Fitness gains are only achieved if the body systems work hard enough.

Athletes must start at the right intensity, depending on our current fitness. An understanding of training thresholds also help.

Time - How long we train

Each session must last at least 20 minutes to get any benefits.

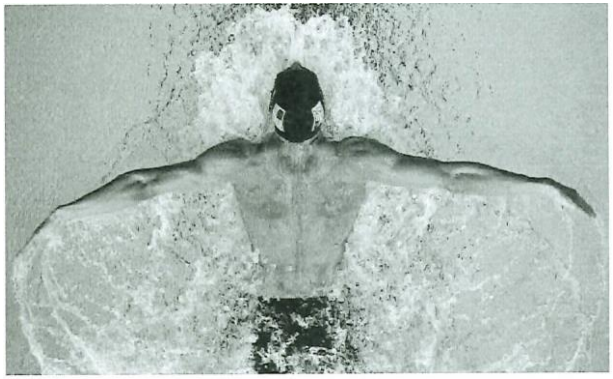
To improve aerobic fitness training sessions should last longer and working heart rate should rise between 60-80% of maximum.



Type - What type of training used

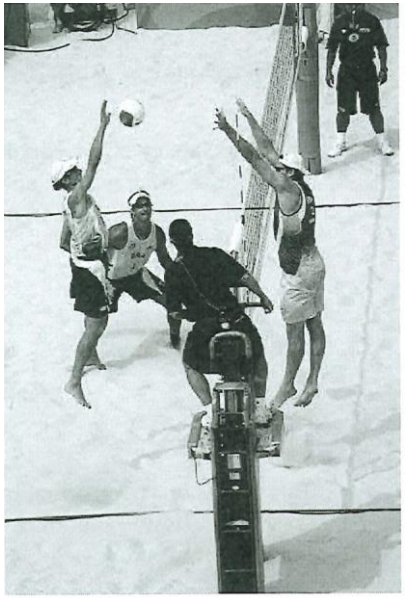
Athletes should analyse our particular sport to know the fitness and skills they need.

The training programme should include types of activity to develop these skills and fitness.



Principles of training

There are certain principles of training which should be followed to improve performance.



Individual difference/needs

Everybody's fitness level differ and should therefore tailor training to their specific needs.

Understanding an individuals needs will mean training is set at their level and accounts for their strengths and weaknesses.

Adaptation

This is how the body reacts to training loads placed on it. The more the body is pushed the better its ability to cope.

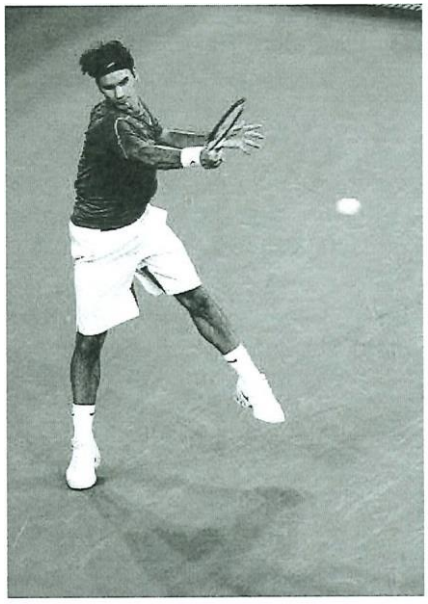
Adaptations occur during recover periods between training sessions.

Reversibility

Reversibility is process of an athletes body losing fitness levels.

It the opposite of progressive overload and can occur if training has stopped due to illness or injury.

This simply means that unless you keep training, any fitness gains will be lost.



Reversibility

This means that instead of progressing or remaining at the same level, the athlete loses fitness. It only takes 3 or 4 weeks to get out of condition.

This has implications does for an elite performer who's season has just finished and may become out of shape.

Reversibility may also take place after an injury or illness as normal training can become difficult.

Exam Questions

2. Which one of the following performers relies most heavily on a high level of cardiovascular fitness for success? (1)

A 200m runner
B 400m runner
C 800m runner
D 1500m runner

READ THE QUESTION

UNDERLINE KEYWORDS

THINK-AOI, AO2, A03

Exam Questions

3. Briefly explain how the gymnast has used power and coordination to achieve the position shown in Figure 3.

(i) Strength (2)

(ii) Coordination (2)

READ THE QUESTION

UNDERLINE KEYWORDS

THINK-AOI, AO2, AO3

Exam Questions

Marks Scheme:

1. (a) Agility is the ability of a sports performer to quickly and precisely move or change direction (1) without losing balance or time (1)

(b) Agility can be used:

• so that a player can quickly get up from the ground after a tackle/ goalkeeper makes a save (1)

• so that a player can dodge to get away from an opponent/ maintain possession of the football (1) Accept any other appropriate answer.

2. D

Exam Questions

Marks Scheme:

3.

i) Strength is the ability to exert a force against a resistance (1) / Strength is require to hold the body off the horse and enable gymnastics movement/sequence (1)

ii) Two or more body parts moved together to achieve the position/shape shown/both legs need to be moved together/ (1) Coordination is used to execute the technique correctly/perform the move well/perform with control/make position aesthetically pleasing (1)

Flexibility Training

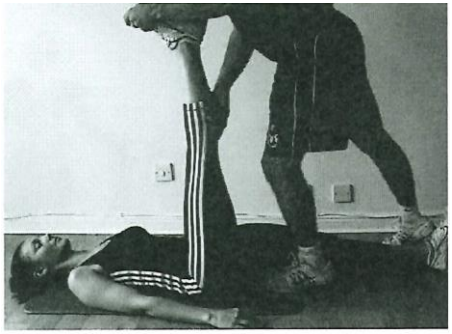
Advantage	
Easy to do - no equipment required.	Must be undertaken with care as it can cause muscle soreness/strains.

Flexibility Training

PNF (proprioceptive neuromuscular facilitation) is where the muscle is contracted isometrically for a period of at least 10 seconds. It is then relaxed and stretched again, usually going further the second time.

PNF stretching is often used in rehabilitation programmes.

It must be performed by trained individuals or injury can occur.



Strength, Endurance & Power Training

Plyometrics is one method of strength training that can be used to improve power or muscular strength.

Good for long jumpers, 100 m sprinters or basketball players

Plyometrics exercises cause the muscle to lengthen (eccentric action) before a maximal muscle shortening (concentric action)

Bounding, hopping, jumping.

Strength, Endurance & Power Training

Strength gains through plyometrics usually takes about 8-10 weeks.

Plyometrics must be performed carefully because it can be physically stressful on the body.

Weight Training

1 Repetition Maximum {IRM) -This is the maximum weight an individual can lift in a given exercise.

75

Working at 75% of an individual's IRM intensity will improve **elastic strength.** This is used by gymnasts.

90

Working at 90% of an individual's IRM intensity will improve **muscular strength.** This is used by shot putters.

Weight Training

Working at 50-60% of an individual's IRM intensity will improve strength endurance. This is used by swimmers

50-60

Aerobic Endurance Training

Continuous Training:
This type of training involves a steady but regular pace at a moderate intensity which should last for at least 30 minutes.

Activities can includes running, walking, swimming, rowing or cycling.

Aerobic Endurance Training

Fartlek Training: This means **Speed Play.**

It is a combination of different intensities. i.e. 1 lap at 50% max, 1 lap walking, 1 lap at 80%

Works on both aerobic and anaerobic fitness due to the varying intensities.

What athletes use this method of training?

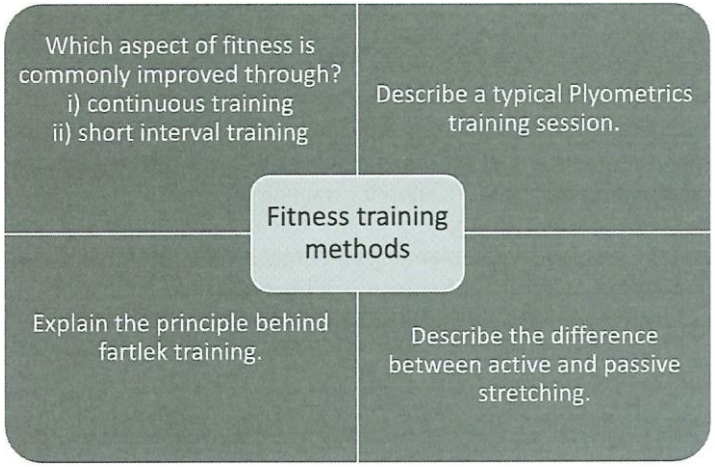
Speed Training

Acceleration Sprints: This is where the pace is gradually increased from a standing or rolling start. Progressively the athlete will build up to a maximum sprint or intensity.

Speed Training

For speed training the intervals between work will be shorter and more intense. *i.e. 40 metre sprint+ 15 seconds rest.*

Retrieval Practice



Exam Questions

1. The photo shows athletes training on a treadmill. They have been running at a steady pace and a moderate intensity for 60 minutes.

(a) Which method of training are they undertaking? (1)

(b) The athletes decide to alter their running intensity by changing their running speed without any rest. What is this method of training called? (1)

READ THE QUESTION

UNDERLINE KEYWORDS

THINK-AOI, AO2, AO3

Fitness Testing

Fitness testing is vital for athletes to monitor and assess improvements in performance. This is important for goal setting and motivation.

The results should be used to design a specific training programme that works on the performers area of weakness.

Fitness Testing

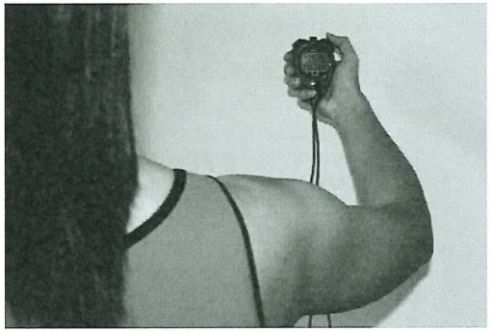
A coach should consider the following points when setting up and carrying out fitness tests on a athlete:

Consent
Calibration of equipment
Accurate recording of the results
The purpose of the test.
Does it measure what you what to find out?

Fitness Testing

Once results are collected they will need interpreting against a set of published standardised readings.

Evaluating the testing procedure is also important.



1- What do the following terms mean; Reliability, Validity and Practicality?

Fitness Testing

Validity relates to whether the test actually measures what it sets out to measure.

Reliability is a question of whether the test is accurate. It is important to ensure that the procedure is correctly maintained for all individuals.

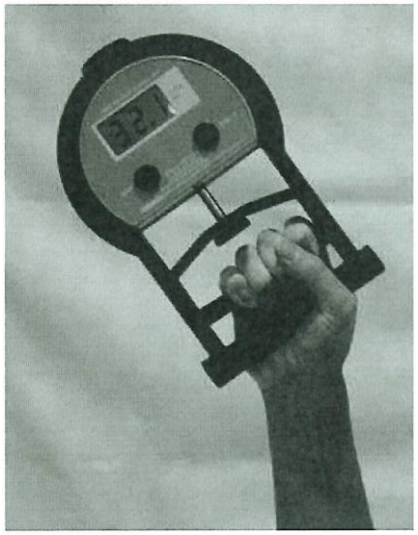
How might you improve validity and reliability?

Fitness Testing

Strength - Hand Grip Dynamometer

Measures the strength of the performer hand grip strength in one action.

Rules:
- No swinging your hand
- Start with your hand up and bring down to side while pulling in handle



Fitness Testing

Here is a table of the published data:

	Excellent	Good	Average	Fair	Poor
Male	>56	51-56	45-50	39-44	<39
Female	>36	31-36	25-30	19-24	<19

Strength - Hand Grip Dynamometer

Consider the advantages and disadvantage of this test.

Advantage

This is a simple and commonly u·sed test of general strength level, well researched and many norms are available.

Disadvantage

The dynamometer must be adjusted for hand size, how successfully this is done will affect the accuracy of the measurement.

Fitness Testing

Methods of evaluating stamina or aerobic endurance (cardio-respiratory endurance) include:
- The multi-stage fitness test

  Forestry step test

The Multi Stage Fitness Test:

The athlete performs a 20m progressive shuttle run in time with a beep, to the point of exhaustion. The level reached depends on the number of shuttle runs completed and is ascertained from a standard results table.

Forestry Step Test

Protocol:
1 minute after exercise= take pulse
2 minute after exercise= take pulse
3 minute after exercise= take pulse

$$\frac{30{,}000}{\text{3 pulse score added together}}$$

Add 3 scores together and use the following formula:

Here is a table of the published data:

Gender	Excellent	Above Average	Average	Below Average	Poor
Male	>90	80-90	65-79	55-64	<55
Female	>86	76-86	61-75	50-60	<50

Aerobic Endurance - Forestry Step Test

Consider the advantages and disadvantages of this test.

Advantage	Disadvantage
This simple test requires minimal equipment and costs, can be performed indoors or out. It is possible to self-administer this test.	Some subjects may not have the fitness or coordination to maintain the required stepping rate.

Speed testing

Speed - 35m Sprint Test

Performers to cover a straight 35 m from a standing start. The time taken should be accurately recorded.

Speed testing

Here is a table of the published data:

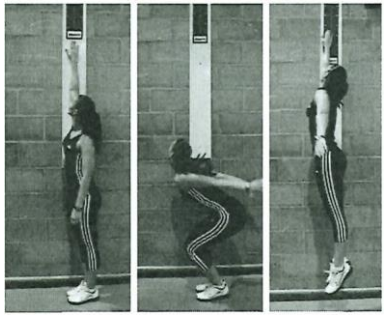
Time to run 35 meters (in seconds)		
Rating	**Men**	**Women**
Very good	< 4.80	< 5.30
Good	4.80 - 5.09	5.30 - 5.59
Average	5.10 - 5.29	5.60 - 5.89
Fair	5.30 - 5.60	5.90 - 6.20
Poor	> 5.60	> 6.20

Speed & Agility testing

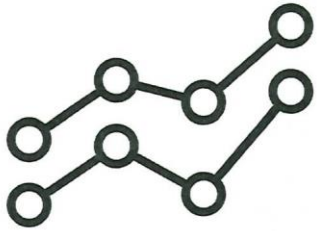
Power - Vertical Jump Test

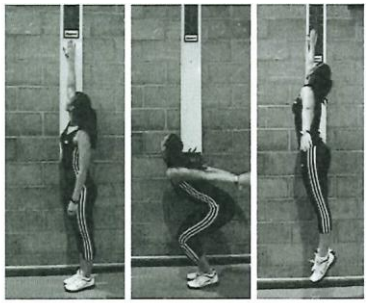
Performers to reach up to highest point without going onto tiptoes. They then jump vertically and touch highest point on the wall/board.

The score is the difference between the 2 measurements



Power - Vertical Jump Test





Here is a table of the published data:

Gender	Excellent	Above average	Average	Below average	Poor
Male	>65cm	50 - 65cm	40 - 49cm	30 - 39cm	<30cm
Female	>58cm	47 - 58cm	36 - 46cm	26 - 35cm	<26cm

Power - Vertical Jump Test

Consider the advantages and disadvantages of this test.

Advantage

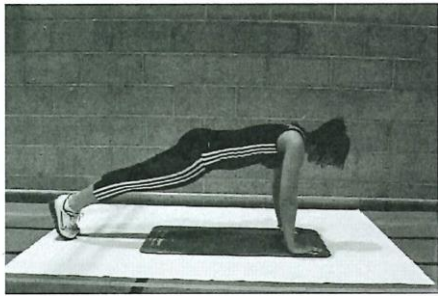
This test is simple and quick to perform.

Technique plays a part in maximising your score, as the subject must time the jump so that the wall is marked at the peak of the jump.

Muscular Endurance

The sit-up or press up test assesses muscular endurance of the abdominals.

The athlete performs sit ups or press ups to the point of exhaustion. The level of fitness reached depends on the number of repetitions completed.



Muscular Endurance - Sit up/Press up Test

Consider the advantages and disadvantages of this test.

Advantage

This test is simple and quick to perform.

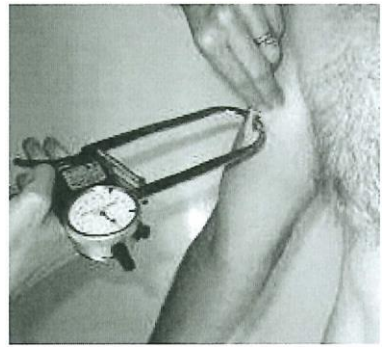
Technique plays a part in maximising your score.

Poorly performed sit up or press ups may be counted especially towards the later part of the test due to fatigue.

Body Composition

To assess suitability for as particular sport you can measuring the ratio of the body.
Fat levels vary depending on age and gender.
Measuring fat levels can be done with skin fold calipers.

Measuring fat during a skin fold test should be done at the chest, abdominals & thigh.



Body Composition

Here is a table of the published data:

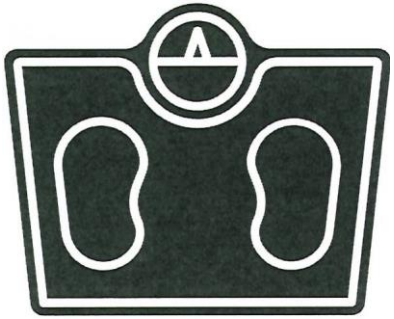
		Excellent	Good	Average	Below average	Poor
Normal	Male	60-80	81-90	91-110	111-150	150+
	Female	70-90	91-100	101-120	121-150	150+
Athletic	Male	40-60	61-80	81-100	101-130	130+
	Female	50-70	71-85	86-110	111-130	130+

Body Composition - Body mass index (BMI)

BMI is a general way of working out whether a person is the right weight for their height.

Use the following formula:

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m)} \times \text{Height (m)}}$$



Calculate your BMI =

Exam Questions

1. A basketball team take part in a multi-stage fitness test. Explain two factors which could affect the reliability of the test results. (4)

READ THE QUESTION

UNDERLINE KEYWORDS

THINK-AOI, AO2, AO3

Exam Questions

2. Malcolm is 17 years old, his height is 1.74m and weight is 82 kg.

(a) Calculate Malcolm's Body Mass Index (BMI) (3)

(b) Using the information in the table below, interpret Malcolm's BMI result. (1)

Rating	BMI
Underweight	≤19
Desirable	20-25
Overweight	26-30
Obese	31+

READ THE QUESTION

UNDERLINE KEYWORDS

THINK-AOI, AO2, AO3

Exam Questions

4. Fitness tests are used to determine baseline fitness levels and set realistic goals for improvement. The step test is a popular fitness test used by coaches and performers. Discuss the use of the step test in determining the level of fitness of a performer. (9)

READ THE QUESTION

UNDERLINE KEYWORDS

THINK-AOI, AO2, AO3

Exam Questions

Marks Scheme:

1. If the lines are further than 20 metres apart (1) the players run further than they should making the test more difficult resulting in a lower VO2 max result (1)

If players fail to turn in-time with the bleeps (1) this will give them more time to complete the shuttle resulting in a higher VO2 max result (1)

UNIT 2

Scan QR code and make notes on revision flash cards

If players drop out before they reach their maximal exertion (1) their VO2 max result will be incorrect (1)

2. (a) BMI = W / H^2 (1) H^2 = (1.74 x 1.74) = 3.0276 W / 3.0276 (1) = 27.08 (1)

(b) (Malcolm's result suggests he is) overweight.