

BTEC Tech Award in Sport Revision Booklet

Learning Outcome A: The Importance of Fitness for Sports Performance

Name: _____



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Introduction

This revision work-booklet includes topic overview sheets and exam questions.

The topic overview sheets include a range of key information, images and diagrams in order to help you revise each topic. There are lots of gaps within these sheets which you will need to fill in. Lets look at an example.

As you can see, there are gaps in the description of gross and fine skills shown below.

Types of Rewards

Tangible		_____ rewards
Intangible		_____, often _____, rewards

You simply need to fill in the gaps in order to complete the definition.

Types of Rewards

Tangible		<u>Tangible</u> rewards
Intangible		<u>Non-tangible</u> , often <u>verbal</u> , rewards

The example below shows that you need to complete the bullet points covering the FITT principle

The FITT Principle is used to identify the basic principles of training

- ➡ How often training takes place
- ➡ How 'hard' training is
- ➡ How long training lasts
- ➡ What type of training is used



After filling in the answers, the bullet points will look like this:

The FITT Principle is used to identify the basic principles of training

Frequency	➡	How often training takes place
Intensity	➡	How 'hard' training is
Time	➡	How long training lasts
Type	➡	What type of training is used



You will also be required to answer a number of exam questions throughout the booklet. Read each question carefully and pay close attention to the amount of marks available.



Components of Physical Fitness

The range of movement possible at a joint



Ability of heart and lungs to supply oxygen to the working muscles



The percentage of body weight that is muscle, fat or bone



The ability of a muscle or muscle group to undergo repeated contractions avoiding fatigue

The rate at which an athlete can perform a movement or cover a distance



The ability to overcome a resistance



A1 COMPONENTS OF FITNESS

The ability to use two or more body parts together at the same time



The ability to undertake strength performances quickly
 $\text{Power} = \text{Strength} \times \text{Speed}$



The ability to move and change direction quickly whilst maintaining control



The time taken to initiate a response to a stimulus



Maintenance of the centre of mass over the base of support



1.Match the component of physical fitness to the description

2.Identify the component of fitness from the sporting examples

Aerobic Endurance

Relative ratio of fat mass to fat free mass in the body allowing variation in body composition dependent on the body.

Muscular Endurance

The ability of the muscular system to continue to contract at a light to moderate intensity to allow repetitive movements through a long event or game.

Muscular Strength

Range of motion possible at a joint to allow improvements or a body part in an event or game.

Speed

The ability of the cardiorespiratory system to supply oxygen and nutrients to the muscles to sustain low to medium intensity work to delay fatigue.

Flexibility

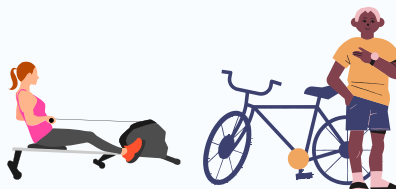
Maximum force that can be generated by a muscle or muscle group to improve forceful movements within an activity.

Body Composition

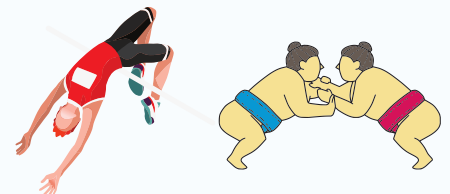
Distance / Time to reduce time taken to move the body or body part in an event or game.



_____ is a key component of performance sports/events longer than 30 minutes



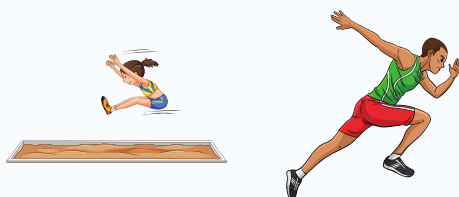
_____ is a key component of performance sports/events longer than 30 minutes



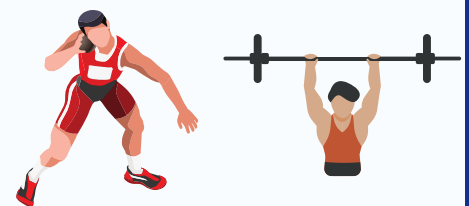
_____ depends on the sport. Sports like gymnastic benefit from low body part and sprinters high muscle mass



_____ is a key component of activities requiring wide range of movement around a joint



_____ is a key component of activities requiring fast movements



_____ is a key component of activities requiring force.



1. Match the component of skill-related fitness to the description
2. Identify the component of fitness from the sporting examples

Power

The ability to move two or more body parts at the same time smoothly and efficiently to allow effective application of technique.

Agility

Ability to maintain centre of mass over a base of support, useful to maintain positions in performance sports (static) or on the move in any other sporting situation (dynamic balance)

Reaction Time

The product of speed and strength to allow for explosive movements in sport.

Balance

The ability to change direction quickly to allow performers to outmanoeuvre an opponent

Coordination

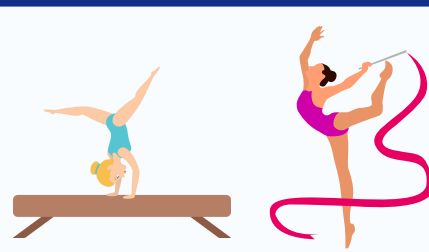
Time taken between a stimulus and the start of a response.



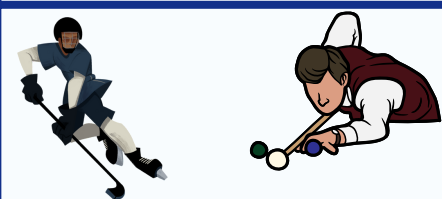
_____ is a key component of performance in activities requiring quick changes in direction



_____ is a key component of performance in activities where a quick response or decision to stimuli is needed



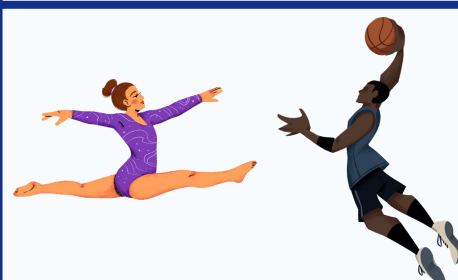
_____ is a key component of performance sports where you need to maintain positions



_____ is a key component of activities requiring independent movement of body parts or use of sporting equipment



_____ is a key component of sports where you are constantly on the move



_____ is a key component of activities requiring explosive movements

1 Marker

1. Which two components of fitness are required to do well in a triathlon? (1 mark)

- a. Speed and Flexibility**
- b. Balance and Coordination**
- c. Muscular Endurance and Aerobic Endurance**
- d. Muscular Strength and Power**



2. Which two components of fitness are required to do well in the 100m sprint? (1 mark)

- a. Power and Speed**
- b. Power and Muscular Endurance**
- c. Speed and Flexibility**
- d. Balance and Reaction Time**



3. Define coordination (1 mark)

2 Markers

4. Explain the different between muscular strength and muscular endurance (2 marks)





5. Name two sports or activities that require high levels of hand-eye coordination. (2 marks)

3 Markers

6. Explain the significant of reaction time in sports. Provide an example of a sport or activity where having a quick reaction time is essential for success. (3 marks)



7. Describe the relationship between agility and balance in sports performance. Give two examples of sports where both agility and balance are important and complement each other. (3 marks)

6 Marker

8. Assess the importance of high levels of aerobic endurance and agility when participating in a game of tennis. (6 marks)

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



The **FITT** Principle is used to identify the basic principles of training

- _____ → How often training takes place
- _____ → How 'hard' training is
- _____ → How long training lasts
- _____ → What type of training is used



Additional Principles of Training

- 1. Progressive Overload
- 2. Specificity
- 3. Individual Differences
- 4. Adaptation
- 5. Reversibility
- 6. Variation
- 7. Rest & Recovery

→ This means gradually losing fitness and occurs to anybody who stops training

Reasons for Reversibility:

- Injury
- Demotivation
- Off-Season
- Illness
- Fatigue

A2 PRINCIPLES OF TRAINING

→ This means gradually increasing the amount of overload during training in order to improve fitness but without injury

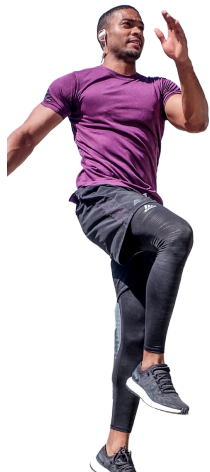
→ If you increase the intensity of your workouts gradually you will make steady improvements



→ This is about how your body changes due to increased training loads.



- This means matching training to the requirements of an activity
- Different sports and different positions require athletes to use different training methods in order to reach their potential



→ The needs of an individual could alter due to their fitness level, weight, gender or previous injuries

→ You can avoid boredom and maintain motivation to train by altering the types of training.

→ This is very important during an exercise programme and without adequate rest, injury or burnout become likely



Complete the table by recommending how many training sessions a beginner should do a week to build their fitness

Week	1	2	3	4	5	6	7	8
No. of Training Sessions								

How many training sessions per week would you recommend to someone looking to target the following components of fitness?

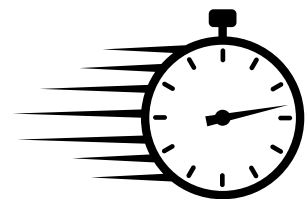
Muscular Strength - _____
Aerobic Endurance - _____
Speed - _____
Power - _____
Flexibility - _____
Muscular Endurance - _____

Weekly	
-	
-	
-	
-	
-	
-	

How long should the following training sessions for the described goals last?

HIIT training for developing cardiovascular fitness (aerobic and anaerobic) • _____
 • _____

Continuous/Fartlek Training for developing cardiovascular fitness (aerobic) • _____



Weight training to lose fat and increase overall fitness • _____



Identify the principle of training from the example

Principle	Example
_____	A cross country runner could take part in trial running to develop aerobic endurance. They could also train at home or the gym on a treadmill.
_____	A sprinter who trains anaerobically too many times a week will be at a greater risk of injuries such as shin splints as the body isn't recovered.
_____	If a weight lifter is injured and doesn't train for a few months, the body muscle size will decrease towards its pre-exercise state.
_____	A beginner who has signed up to a long distance cycling event in 3 months' time can gradually increase the time they spend training by increasing the length and distance of training sessions.
_____	A swimmer can do one to two sessions of land training, such as weights, per week to reduce the chance of becoming bored by just training in the pool.
_____	A young person may need more games-based training compared to older people in order to enjoy it, feel motivated and develop skills' by learning from teammates and coaches.
_____	A beginner starting to strength train have muscular changes including an increase in muscle size
_____	If an individual has undergo an intense spin session, they need to consume more carbohydrates in order to replenish glycogen stores to have the energy available to perform at a high intensity again.



1 Markers

1. Muha is a taekwondo performer who is looking to improve their flexibility. How often should Muha take part in flexibility training? (1 mark)



2. Leslie is about to start training for a half marathon race. How many days a week should Leslie train to improve their aerobic endurance? (1 mark)



3. Define reversibility. (1 mark)

2 Markers

4. Kane is a cyclist. Describe two ways in which Kane could use the principle of specificity to improve his cyclist performance. (2 marks)

5. Explain the importance of having at least one rest day per week. (2 marks)

6. Fiona is training for a marathon. For the last two months she has ran the same route around her local park. Suggest two ways in which Fiona could apply the variation principle into her training to avoid boredom. (2 marks)



3 Marker

7. Max is a 16 year old college student and plays cricket. His nearest cricket team is 8 miles away. Using the information provided, describe three individual factors that may affect his accessibility to cricket training (3 marks).

4 Markers

8. Using sporting examples, outline what is meant by the principles of adaptation and reversibility (4 marks)

9. Identify what the letters F and I stand for in FITT principles and give an example of how each can be applied to a weekly training programme. (4 marks)



Training Thresholds are based on **Heart Rate** and are set to make sure that people train at an effective but safe level.

Aerobic Training Threshold → _____ % of Max HR

Anaerobic Training Threshold → _____ % of Max HR

Maximum Heart Rate = _____

% of Max HR can be used to achieve progressive overload



Aerobic Training Example

Max HR: $220 - 25 = 195$
Beats per Min.

Aerobic training zone =
60-80% of Max HR

60% of 195 = _____ bpm

80% of 195 = _____ bpm

Working out the aerobic training threshold of a 25 year old runner

Therefore Aerobic Training Threshold = _____ Beats per Min

Weight Training - Calculating Repetition Maximums

→ _____ (RM) = the heaviest amount you can lift in one repetition.

→ Should train at 80% intensity

→ _____ (RM) = the heaviest amount you can lift and repeat 15 times.

→ Should train below 70% intensity

1 RM is for strength
15 RM is for muscular endurance

A3 DETERMINING EXERCISE INTENSITY



1. Training Threshold (percentage max HR)

2. Borg Rating of Perceived Exertion

The Borg Rating of Perceived Exertion Scale

Perceived exertion is how _____ you feel like your body is working.

Rating of Perceived Exertion Borg RPE Scale

6	Very, very light	How you feel when lying in bed or sitting in a chair relaxed. Little or no effort.
7		
8	Very light	
9		
10	Fairly light	
11		Target range: how you should feel with exercise or activity
12	Somewhat hard	
13		
14	Hard	
15		
16		How you felt with the hardest work you have ever done. Don't work this hard!
17	Very hard	
18		
19	Very, extremely hard	
20	Maximum exertion	

Manually taking pulse rate



Heart Rate _____

Pulse Points

Count the number of heart beats for 30 seconds and multiply by 2.

Radial pulse - _____

Carotid pulse - _____



Measuring Exercise Intensity

Smart _____

Apps



RPE can be used to estimate heart rate (HR), using the equation:
 $RPE \times \text{_____} = HR$



1 Markers

1. Steve is 15 years old and wants to improve his aerobic endurance. To do this, he plans three training sessions a week working at an intensity of 60-80% Max HR



a) Calculate Steve's Max HR. (1 mark)

b) Calculate 80% of Steve's Max HR. (1 mark)

2. Jessica is has just taken part in a 45 minute dance session. Her RPE is 14. Estimate her heart rate. (1 mark)

2 Marker

3. Identify two ways to estimate heart rate. (2 marks)

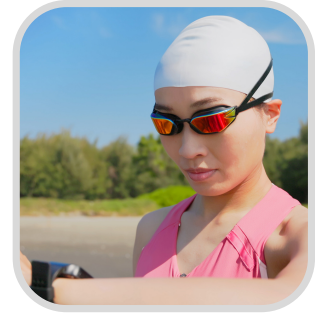
4. Give two benefits of using technology to measure exercise intensity. (2 marks)



3 Markers

5. Christine is a 22 year old triathlete. It is important that she trains at the correct intensity.

Describe how Catherine would work out her aerobic training zone. (3 marks)



6. Describe how a runner could use three different technologies to measure the intensity of their running. (3 marks)



7. Paul is 25 years old and is training for an open meet where he wants to achieve a 50m freestyle PB. Using the simplified Karvonen formula, work out Paul's anaerobic training zone. (3 marks)





UNIT CHECKLIST

The Importance of Fitness for Successful Participation in Sport

Types of sports requiring specific components of fitness



- Aerobic endurance ☐
- Muscular endurance ☐
- Muscular strength ☐
- Speed ☐
- Flexibility ☐
- Body composition ☐
- Power ☐
- Agility ☐
- Reaction time ☐
- Balance ☐
- Coordination ☐

UNIT CHECKLIST

Fitness Training Principles

The Basic Principles of Training (FITT)

- Frequency ☐
- Intensity ☐
- Time ☐
- Type ☐

Additional Principles of Training

- Progressive overload ☐
- Specificity ☐
- Individual Differences ☐
- Adaptation ☐
- Reversibility ☐
- Variation ☐
- Rest and Recovery ☐



UNIT CHECKLIST

Exercise Intensity and How it can be Determined



Intensity

- Measure heart rate (HR)
- HR intensity to fitness training methods

☐
☐

Target zones and training thresholds

- Calculate training zones
- Apply HR max to training
- Aerobic training zone
- Anaerobic training zone

☐
☐
☐
☐

The Borg (6-20) Rating of Perceived Exertion Scale

- $RPE \times 10 = \text{Heart Rate (HR)}$

☐

The relationship between RPE and heart rate

- $RPE \times 10 = \text{HR (bpm)}$

☐

Calculate 1RM for strength and 15RM for muscular endurance

☐

Technology to measure exercise intensity

- Heart rate monitors
- Smart watches
- Apps

☐
☐
☐



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