

Subject: BTEC Sport
Topic: Components of Fitness

Knowledge Sequence

Aerobic endurance
Muscular endurance
Flexibility
Speed
Muscular strength
Body composition
Agility
Balance
Co-ordination
Power
Reaction time

Key Assessments

Core Texts
GCSE PE Textbook

Components of Fitness

Components of 'Physical fitness'	Sporting Example
Aerobic endurance - <i>The ability of the cardiorespiratory system to work efficiently, supplying nutrients and oxygen to working muscles during sustained physical activity.</i>	A marathon runner would need aerobic endurance to be able to run continuously for a long period of time.
Muscular endurance - <i>The ability of the muscular system to work efficiently, in which muscles can repeatedly contract over a period of time against a light to moderate fixed-resistance load.</i>	A swimmer requires muscular endurance for their arms and legs to move over a long period of time.
Flexibility - <i>The range of motion possible at a joint.</i>	A hurdler requires flexibility in the hips and knees to ensure they are able to bend their torso and straighten their leg to avoid knocking the hurdles over.
Speed - <i>Distance divided by the time taken. There are 3 types:</i> <i>Accelerative Speed: sprints up to 30m</i> <i>Pure Speed: sprints up to 60m</i> <i>Speed Endurance: sprints with a short recovery in-between</i>	A long jumper would need accelerative speed. A 100m sprinter would need pure speed. A basketball player would need speed endurance.
Muscular strength - <i>The maximum force that a muscle or muscle group can produce.</i>	A shot put thrower requires muscular strength in order to throw the shot the furthest distance.
Body composition - <i>The relative ratio of fat mass to fat free mass (vital organs, muscle, bone) in the body.</i>	A sumo wrestler would need a higher level of fat to fat free mass than a marathon runner.
Components of 'Skill-related fitness'	
Agility - <i>The ability to move quickly and precisely or change direction without losing balance or time.</i>	A football player would need agility to be able to dribble around a tight space
Balance - <i>The ability to maintain your centre of mass over a base of support. There are two types:</i> <i>Static Balance: balancing while staying still</i> <i>Dynamic Balance: balancing while moving</i>	If a gymnast was unable to use balance then they would not be able to hold a skill still. They would use static balance to keep a handstand still and use dynamic balance to stay on the pommel horse while rotating.
Co-ordination - <i>The ability of parts of the body to work together to move smoothly and accurately.</i>	Co-ordination is required by a cricket player to catch the ball as a fielder and to hit the ball as a batter.
Power - <i>Force (kg) x Distance (m) ÷ Time (min or secs)</i>	A tennis player would require power when making a serve. More power will mean a harder serve meaning he is more likely to get an ace and win the point.
Reaction time - <i>The time taken for a sports performer to respond to a stimulus</i>	A sprinter would need reaction time to be able to start the race as quickly as possible when the starting gun goes off.

Principles of Training

There are two types of 'principles of training'. BASIC and ADDITIONAL.

Subject: BTEC SPORT
Topic: Principles of Training

Topic: Unit 1

Knowledge Sequence

FITT principles
 Progressive overload
 Specificity
 Individual needs
 Adaptation
 Reversibility
 Variation
 Rest and recovery

Key Assessments

Core Texts

GCSE PE Revision text book

Basic 'Principles of Training'	Sporting Example
Frequency – the number of training sessions you complete over a period of time.	An athlete might train twice or three times a week.
Intensity – How hard you train. You can use HR, RPE,% or reps.	An athlete might complete a run at 60% intensity or complete a 2 sets of 5 reps at 5kg.
Time – how long you train for each session.	An athlete's training session might last 30 minutes or an hour.
Type – How you train. Circuit, free weights, fartlek, Interval.	An athlete might decide to complete a session using weights or a running based session.

Additional 'Principles of Training'	Sporting Example
Progressive overload – in order to improve you need to gradually increase your training workload. Increasing the workload too quickly can cause injury or illness. This will have a negative impact on training.	An athlete might train with 5kg in week 1 and 7kg in week 2. They would not go from 5kg to 100kg.
Specificity – training should be specific to your sport/needs/goals.	If you're a marathon runner you would train to improve aerobic endurance. You would not train to improve your reaction time.
Individual differences/needs – your training needs to be designed to meet your training goals.	A novice runner would not start their training with a 10 mile jog but instead a 1 mile jog as this is more appropriate for their needs.
Adaptation – this occurs during the recovery period after a training session. Adaptation is how your body changes to cope with training demands.	When an athlete trains appropriately with free weights they will improve their muscle mass to cope with the weights being used.
Reversibility – if you stop training, or you don't train as hard then the initial training effects are reversed.	If an athlete was to train hard and then gain a score of 14 on the MSFT and then did not train for the subsequent next few weeks their next score on the MSFT would be lower than 14.
Variation – being able to change your programme keeps it from becoming boring and in turn helps you to maintain your training.	An athlete might train their aerobic endurance by switching between a treadmill, road running and x-country.
Rest and recovery – allows the body to repair and adapt for the renewal of body tissue. If your body doesn't get a chance to recover then the rate of progression can be reduced.	An athlete would need to rest between sets or between training sessions. This might mean day 1 – train, day 2 – rest, day 3 – train.

Subject: BTEC
Topic: Unit 1

Topic: Training Methods

Knowledge Sequence

Interval training
Continuous training
Fartlek training
Static stretching
Ballistic stretching
PNF stretching
Circuit training
Free weight training
Plyometric training
Sprint training

Key Assessments

Core Texts
BTEC sport First Award – Pearson text
Revise BTEC sport – Revision Guide
Revise BTEC sport – Revision Workbook

Interval training
Component of fitness: *Aerobic endurance & Speed*

The individual alternates work periods with rest/recovery periods. Working parts usually consist of around 60% intensity and can range from 30 seconds to 5 minutes. Recovery can include a walk, jog or a complete rest.

Continuous training
Component of fitness: *Aerobic endurance*

Long, slow distance training. Performers train at a steady and moderate pace for longer than 30 minutes. A good training type for beginners that have low fitness levels.

Fartlek training
Component of fitness : *Aerobic endurance*

Training is continuous (no rest) however the intensity of the session varies throughout. You may increase the intensity through speed or terrain.

Training Methods

Static Stretching
Component of fitness: *Flexibility*

Stretching a muscle to its limit. Stretches are held still for 10-20 seconds.

Active – Performed by themselves
Passive – requires the help of another person or objects i.e. a chair or wall

Ballistic Stretching
Component of fitness: *Flexibility*

Involves making fast, jerky movements such as bouncing. Takes the muscle past its normal range of movement. Can lead to injury if not performed correctly.

Proprioceptive Neuromuscular Facilitation (PNF) Stretching
Component of fitness: *Flexibility*

Inhibits the stretch reflex to allow a greater range of movement and take the muscle past its normal range of movement. Can lead to injury if not performed properly.

Circuit training
Component of fitness: *Any*

A series of stations designed to work different muscle groups. Can be tailored to develop all aspects of fitness.

Free-Weights training
Component of fitness: *Strength, muscular endurance & power*

Used to perform a range of constant resistance exercises e.g. Bicep/Tricep curls, lateral raises, bench press.

High weight – Low rep = Increase muscle mass
High rep – Low weight = Increase muscular endurance

Plyometric training
Component of fitness: *Strength & power*

Involves exercises where the muscles are quickly and repeatedly stretched then lengthened and then contracted and shortened. Must be undertaken with care as this training can cause injury if not performed correctly.

Examples include: variations of jumping and bounding

Sprint training
Component of fitness : *Speed*

Hollow Sprints – performer completes a series of sprints followed by a ‘hollow’ period of jogging or walking.
Acceleration Sprints – intensity gradually increases until a maximum sprint is reached.

Subject: BTEC
Topic: Unit 1Topic:

Knowledge Sequence

Why fitness test
Pre-test procedures
Max and sub-max fitness tests
Reliability, validity and practicality

Key Assessments

Core Texts

BTEC sport First Award – Pearson text
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What is fitness testing?

Fitness testing is used in sport to gain information about the athletes physical and skill related ability.

Pre-test procedures

Informed consent – Evidence to show that the performer has been given all the information to safely complete the test.

Calibration of equipment – Checking the accuracy of the testing equipment. For example has the distance of the 35m sprint been checked that it is in fact 35m.

Why fitness test?

Provides the coach with baseline data. This can be compared against other data to draw conclusions of overall fitness levels.

Gives a starting point of which to create a training programme. Can also be used throughout a programme to see if improvements have been made.

Can give an athlete clear goals and targets to aim for. Improvements can then be made according to your routine depending on your results.

Reliability	Validity	Practicality
The test should be able to be repeated over and over again with the same method.	The accuracy of the fitness test results. Does the test actually measure what it should?	How easy is it for the test to actually be carried out? Expensive? Specialist equipment? Big group or individuals?
Examples		
The BIA test will not always be reliable as the person being tested must be properly hydrated. If the person is even slightly dehydrated it could distort the results.	BMI is not always an accurate measurement of body composition because it does not take into account muscle mass. Muscle is heavier than fat and therefore it might say that an athlete like a body builder who has very little body fat is categorised as obese when actually they are in peak physical condition.	If you have a big group of individuals would you wanted to test aerobic endurance would you use the MSFT where by you can have lots taking part at once or the Forestry step test where only one can do the test at a time?

Maximal fitness tests

A test that pushes you to the limit of what it is trying to test. E.g. the multi stage fitness test

Submaximal fitness tests

Works you to your maximum but not to your limit. E.g. the vertical jump test

Subject: BTEC

Topic: Unit 1

Topic: Fitness Testing

Knowledge Sequence

1 minute sit up test
 1 minute press up test
 35m sprint test
 Sit and reach test
 Illinois agility run test
 BIA
 Multistage fitness test
 Forestry step test
 Vertical jump test
 Grip dynamometer test
 BMI
 Skin fold testing

Key Assessments

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Fitness testing part 2

1 minute sit up test

Component of fitness tested: *muscular endurance*
Equipment required: *Exercise mat, Stopwatch*

Used to assess the endurance and development of the abdominal muscles.

1 minute press up test

Component of fitness tested: *muscular endurance*
Equipment required: *Exercise mat, stopwatch*

Used to assess the endurance and development of the upper body.

35m sprint test

Component of fitness tested: *speed*
Equipment required: *Stopwatch, cones, measuring tape*

Used to measure and interpret an individual's speed.

Sit and reach test

Component of fitness tested: *flexibility*
Equipment required: *Sit and reach box*

Used to measure hamstring, hip and lower back range of motion.

Illinois agility run test

Component of fitness tested: *speed, agility*
Equipment required: *Stopwatch, Cones, Measuring tape*

Used to measure an individuals ability to move quickly and change direction without losing balance.

Bioelectrical impedance analysis (BIA)

Component of fitness tested: *body composition*
Equipment required: *BIA machine*

Used to measure an individuals body fat by putting an electrical current through the body.

Multistage fitness test (MSFT)

Component of fitness tested: *aerobic endurance*
Equipment required: *Cones, Test audiotape (CD), Measuring tape*

Used to predict an individuals maximum oxygen uptake.

Forestry step test

Component of fitness tested: *aerobic endurance*
Equipment required: *bench, Stopwatch, metronome*

Used to predict an individuals maximum oxygen uptake.

Vertical jump test

Component of fitness tested: *power*
Equipment required: *Vertical Jump Board, Gymnasts' Chalk*

Used to predict the power of the quadriceps muscle group.

Grip dynamometer test

Component of fitness tested: *muscular strength*
Equipment required: *Grip dynamometer*

Used to measure static strength of the grip squeezing muscles.

Body mass index (BMI)

Component of fitness tested: *Body composition*
Equipment required: *Measuring tape, scales*

A simple way of measuring body fat and checking if an individual is overweight. Does not take into account muscle mass.

Skin fold testing

Component of fitness tested: *Body composition*
Equipment required: *Skin fold calliper*

Used to predict a persons body fat percentage. The results are then interpreted using the Jackson Pollock nomogram.