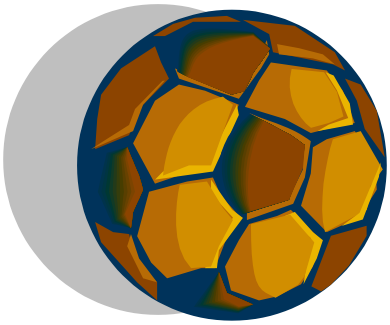
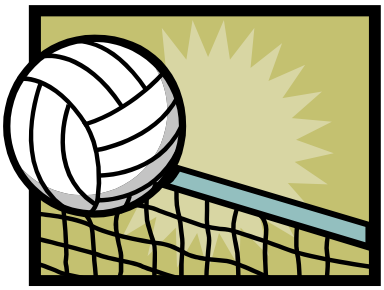
Level 2 BTEC in Sport





Revision Booklet 2022

Fitness Components

Physical Fitness Components

1. **Aerobic Endurance –** *also known as Cardiorespiratory Fitness, Cardiorespiratory Endurance or Aerobic Fitness.*

   Definition: "the ability of the cardiorespiratory system to work efficiently, supplying nutrients and oxygen to working muscles during sustained physical activity."

Cardiorespiratory System = Cardiovascular System + Respiratory System
(Heart, blood and blood vessels) (Lungs and airways)

2. **Muscular Strength**

   Definition: "the maximum force (in kg or N) that can be generated by a muscle or muscle group."

3. **Muscular Endurance**

   Definition: "the ability of the muscular system to work efficiently, where a muscle can continue contracting over a period of time against a light to moderate fixed resistance load."

4. **Flexibility**

   Definition: "having an adequate range of motion in all joints of the body; the ability to move a joint fluidly through its complete range of movement."

   Static stretching – passive active & assisted (PNF)
   Dynamic stretching - ballistic

5. **Body Composition**

   Definition: "the relative ratio of fat mass to fat-free mass (vital organs, muscle, bone) in the body."

6. **Speed**

   Definition: "distance divided by time taken. Speed is measured in metres per second (m/s). The faster an Athlete runs over a given distance, the greater their speed"

3 Types of Speed - accelerative, pure speed and speed endurance.

Skill Related Fitness Components

1. **Agility**

   Definition: "the ability to quickly and precisely move or change direction without losing balance or time."

2. **Balance**

   Definition: "the ability to maintain centre of mass over a base of support."

   Two types of Balance: Static (headstand) Dynamic (Cartwheel)

3. **Co-ordination**

   Definition: "the smooth flow of movement needed to perform a motor task efficiently and accurately."

4. **Power**

   Definition: "the product of strength and speed."

5. **Reaction Time**

   Definition: "the time taken to respond to a stimulus and the initiation of response."

Fitness Tests

Aerobic Endurance:

- Multi-Stage Fitness Test (Bleep Test)
- 12 Minute Cooper Run
- Forestry Step Test
- Definition of VO_2 max: the maximum amount of oxygen uptake. Measured in ml of Oxygen per kg of body mass per minute.

Muscular Strength:

- Dynamometer (Grip) & (Hand/Back) (KgW) or (N)
- 1 Rep Max (kgs)

Flexibility:

- Sit and Reach Test (cm or inches)

Agility

- Illinois agility run test (secs)

Anaerobic Power

- Vertical jump test (cm)

Speed

- 35m sprint (secs)

Muscular Endurance

- One minute press-up, One minute sit-up (reps in a minute)

Body Composition

- Body Mass Index (BMI) (usually measured in kg/m_2)
- Bioelectrical Impedance Analysis (BIA), used for prediction of % body fat
- Skinfold testing via the Jackson-Pollock nomogram method for prediction of percent body fat.
    1) Sites for males – chest, abdominal and thigh.
    2) Sites for females – triceps, suprailiac and thigh.

Why Fitness test?

- Gives baseline data for monitoring/improving performance
- Helps to design training programmes and see if working
- Results can give performer something to aim for – goal setting.

Requirements for Fitness Testing

- Pre-Test – informed consent and calibration of equipment
- Knowledge of standard test methods
- Accurate measurement and recording
- Safely select appropriate test

- Reliability – fitness test results should be consistent.
- Validity – are results are true reflection of what you are measuring.
- Practicality – is about how easy it is to carry out the test (cost).

Exercise Intensity

- Intensity: be able to measure heart rate (HR) and apply HR intensity to fitness training methods.
- Target Zones and Training Thresholds:
- HR Max = 220 – Age
- 60-85% HR Max is training zone for Aerobic Endurance
- Borg's Rating of Perceived Exertion (RPE) 6-20
- RPE x 10 = HR (bpm)
- Application of FITT Principles to Training Methods

Calculating Training Zone (60-85%)

Max HR x 0.6 = ? (60%)
Max HR x 0.85) = ? (85%)

Principles of Training

The **BASIC** principle of training is **FITT**.

- Frequency – number of sessions over a period of time.
- Intensity – how hard an individual will train.
- Time – how long an individual will train.
- Type – how an individual will train by selecting a training method to improve a specific component of fitness.

There are seven **ADDITIONAL** principles of training.

- Progressive Overload - training needs to be demanding enough to cause the body to adapt.
- Specificity – training should be specific to the needs of the sport/position.

- Individual Needs/Differences – the programme should be designed to meet individual training goals and needs.
- Adaptation – how the body reacts to training loads by increasing its ability to cope with these loads.
- Reversibility – if training stops, or the intensity of training is not sufficient to cause adaptation, training effects are reversed.
- Variation – vary the training regime to avoid boredom.
- Rest and Recovery – are required so that the body can recover from the training and allow adaptation to occur.

Fitness Training Methods

Flexibility Training:

- Static – Active and Passive stretching.
- Ballistic – the performer makes fast jerky movements through complete range of motion.
- Proprioceptive Neuromuscular Facilitation (PNF) – performed with the help of a partner. Muscle is stretched to upper limit of its range of movement and then held there with partners help. Inhibits stretch reflex.

Circuit Training:

- Different stations/exercises are used to develop strength, muscular endurance and power.
- Use different muscle groups to avoid fatigue.

Weight Training

- Use of Barbells and Dumb-bells
- Strength = (low reps and high loads)
- Endurance = (high reps and low loads)
- To judge intensity you must know % 1 Repetition Maximum (1 RM)
- Strength Endurance (50-60% of 1RM and 20 reps)
- Elastic Strength (75% of 1RM and 12 reps)
- Maximum Strength (90% of 1RM and 6 reps)

Plyometric Training

- Develops sport-specific explosive power
- Exercises include: lunging, bounding, hopping and jumping.
- Used by sprinters, hurdlers and basketball players.

Continuous Training

- Improves Aerobic Endurance
- Steady pace at moderate intensity
- Minimum 30 minutes

Fartlek Training

- Improves Aerobic Endurance
- Intensity is varied by running at different speeds or over different terrain.
- Training is continuous with no rest period.

Interval Training

- Periods of work followed by periods of rest.
- Can improve Aerobic Endurance or Speed.
- Depending on intensity and rest time – can be changed.

Speed Training

- Hollow Sprints – a series of sprints separated by a "hollow" period of jogging or walking.
- Acceleration Sprints – pace is gradually increased from a standing or rolling start to jogging then striding then maximum pace.

Linking Examples

Sport	Component of Fitness	Method of Training	Fitness Test
Marathon running	Aerobic endurance	Continuous training	Multi stage fitness test
Weight lifter	Muscular strength	Weight training	Leg/back dynamometer
100 metres	Speed	Interval training	35 metre sprint
Football (centre mid)	Muscular endurance	Circuit training	1 min press up test
Gymnastics	Flexibility	Flexibility training	Sit & reach
High jump	Power	Plyometric training	Vertical jump