Topic 2:
Physical and Psychological Demands of Performance

A. Physical, health-related and performance-related fitness

Health-related fitness components

Key Terms:

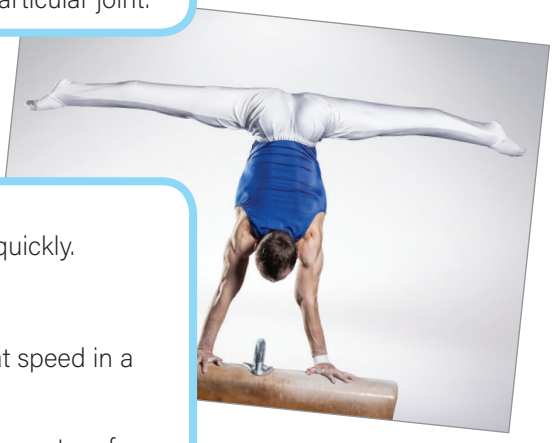
Cardiovascular (or cardiorespiratory endurance) is the level at which your heart and lungs and muscles work together when performing exercise for an extended period.

Muscular strength is how much force muscles can exert.

Muscular endurance is the ability of the muscles to repeat activity without fatiguing.

Body composition is a measure of the muscle, bone, fat and tissue that is found in the body.

Flexibility is the range of motion a person has at a particular joint.



Performance-related fitness components

Key Terms:

Power is the ability to perform strength movements quickly.

Speed is the ability to perform a task quickly.

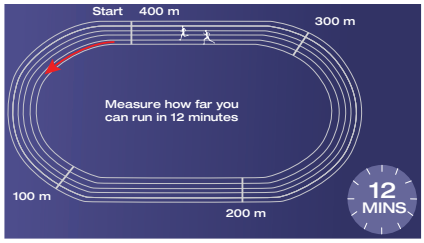
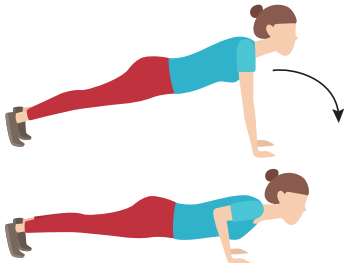
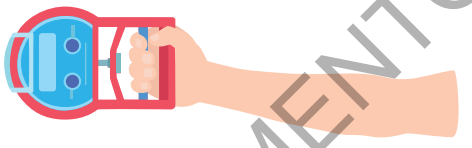
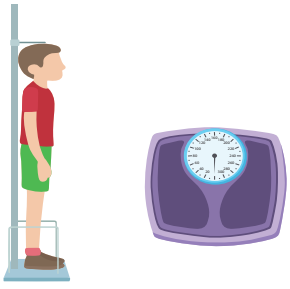
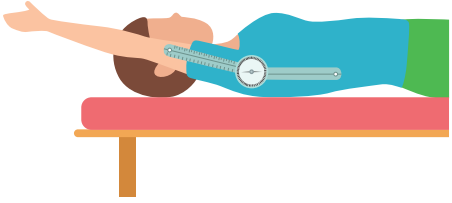
Agility is the ability to change direction of the body at speed in a controlled way.

Balance is the ability of the performer to maintain the center of gravity above the base of support.

Co-ordination is the ability to use different body parts at the same time, for example, hand-eye co-ordination.

Reaction time is the time taken to respond to a stimulus.

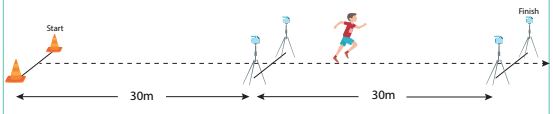
Fitness test revision tables

Health-related fitness tests	
 Cardio respiratory test: Cooper 12-minute run	 Upper body muscular endurance: the 1-minute press-up test
 Lower body muscular endurance: the single leg wall sit/squat hold	 Lower body muscular strength: the standing broad jump
 Upper body muscular strength: the hand grip dynamometer test	 Flexibility: the back saver sit-and-reach test
 Body composition: calculating body mass index (BMI)	 Upper body flexibility: the shoulder flexion test

Performance-related fitness tests

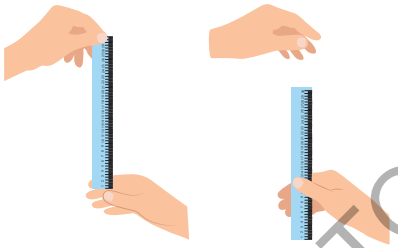
Lower body power: the vertical jump test

Overall body power: over-head medicine ball throw

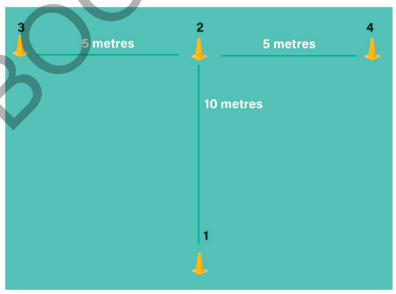


Speed: flying 30 meter speed test

Speed: 0-10 metres speed test

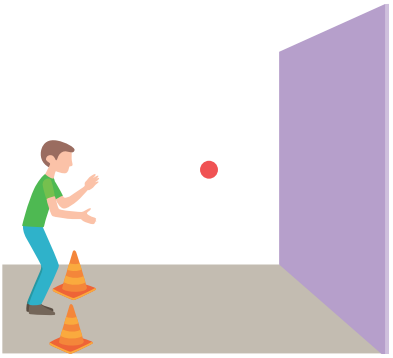


Reaction time: ruler drop test



Agility: agility T test

Balance: the standing stork test



Co-ordination: the wall toss test

Health-related and performance-related components and their fitness test

Health-related fitness	
Component	**Fitness test**
Cardiorespiratory endurance	Cooper test/beep test/Harvard step test
Muscular strength	Hand grip test/standing broad jump
Muscular endurance	Press-up test/single leg squat hold/sit-up test
Flexibility	Back saver sit-and-reach test
Body composition	BMI calculation/skin fold test
Performance-related fitness	
Component	**Fitness test**
Power	Vertical jump (lower body), over-head medicine ball throw (whole body)
Speed	0-10 metre sprint, flying 30 metre sprint
Reaction time	Ruler drop test
Agility	Agility T test
Balance	Standing stork test
Co-ordination	Wall toss

Key Terms:

Fitness baseline data is the initial collection of fitness test data. This will allow you to compare fitness levels before and after training.

Test protocol is the procedure used to carry out a fitness test.

Normative data table (norms) is a table of other people's scores on a fitness test that can be used to compare your own results.

A fitness test battery is a collection of fitness tests usually performed in close proximity to each other that measure the demands of a particular sport or activity.

Things to consider before fitness testing

It is important to understand the factors that may influence and sometimes distort the results. These are:

- The temperature and noise level in the testing area.
- The quality and quantity of sleep the athlete had before testing.
- The athlete's emotions.
- The medication the athlete may be taking.
- The athlete's level of caffeine intake.
- The time since the athlete's last meal.
- The time of day.
- The surface on which the test was carried out (track, grass, road, gym).

- The athlete's prior test knowledge and experience of the test.
- The accuracy of measurements.
- Whether the athlete is applying maximum effort in maximal tests.
- Inappropriate warm-up.
- Being observed by others.
- The personality, knowledge and skill of the tester.
- Athlete's clothing and shoes.
- Environmental conditions – wind, rain, humidity, etc.

Why complete fitness tests?

- To provide motivation.
- To discover if your current level of fitness is where you expected it to be.
- To compare your results against the age group/national averages.
- To discover what your strengths and areas for improvement are.
- To discover if your strengths match the areas that are necessary for that particular sport.
- To be well informed before planning out your training block.
- To compare your future results.

In what order should my fitness tests be in?

To ensure that you can perform to your optimal level, the suggested sequence order of the fitness tests is outlined below:

- Non-fatiguing tests (resting heart rate, height and weight measurements, BMI or body fat testing, vertical and broad jumps).
- Agility tests.
- Maximal strength and power tests.
- Sprint/speed tests.
- Muscular endurance tests.
- Cardiorespiratory tests.

B. What are the principles of training?

You can remember the principles of training by using the mnemonic SPORT-OR.
Specificity, Progressive Overload, Reversibility, Tedium, Overtraining, Recovery and adaption.

Specificity
The training that the athlete undertakes must be specific to their sport or to their fitness goals.

Progressive overload
Progressive overload involves stressing the body beyond its usual physiological levels. This should be done on a gradual basis. For more on how to progress overload in physical training look at the FITT formula on the next page.

Reversibility
Reversibility refers to how any adaptation that occurs as a result of training will be reversed if training stops.

Tedium
Tedium refers to how an athlete can become bored of their training routine. This can come from a repetitive schedule, lack of enjoyment and lack of variety or challenge.

Overtraining
Overtraining can occur quite regularly. If an athlete is not able to rest and recover in their training plan, they are very likely to over-train.

Recovery and adaptation
Rest in any training plan is an essential ingredient. Most physiological adaptations will occur when the body is not being stressed. Athletes and their coaches must allow for adequate rest between exercise periods to allow for these adaptations to take place.

Applying the F.I.T.T. formula to each component of fitness

Key Terms:

Training plateaus are sudden decreases in noticeable results from physical training.

The **FITT formula** can be used to gradually increase aspects of a training plan in order to see progressions. The FITT formula is composed of four different elements. These are: frequency, intensity, time and type.

F- Frequency: If an athlete reaches a training plateau, they may look at how often they are training in their weekly schedule. This could be an area that could be increased. For example, if a runner trains twice a week, they may decide to supplement this with an extra running session bringing their total training sessions per week to three.

I- Intensity: Over time, an athlete's body may become used to their training routine. As a consequence, their results will not be where they want them to be. In order to progress, the athlete may make the decision to gradually vary the intensity of their workouts. A good way to measure your training intensity level is by measuring your workouts by using a rate of perceived exertion chart. (See page 43.)

T-Time: This refers to the amount of time that the athlete spends training. A runner training to improve their 5k time can alter their run times from 15 fast minutes to an hour at a slower pace.

T-Type: This refers to the type of exercise being performed. There is a huge variety of ways to train physical fitness including: circuit training, continuous training, fartlek, resistance training and much more.

C. Designing a fitness plan

It is important to learn about the different training options that can be incorporated into a fitness plan. Below are some types of training that could be included. The FITT formula can be used to gradually increase aspects of a training plan in order to see progressions.

Circuit training
This involves performing a series of exercises at stations which are broken up by a period of rest. Circuit training can be designed to improve any component of fitness. It is frequently performed to music.

Continuous training
Athletes work constantly for a minimum of 20 minutes. Intensity is usually up to 80% of MHR (maximum heart rate). Good for improving aerobic endurance.

Fartlek training
The word fartlek is Swedish and means 'speed play'. This is a continuous form of training which involves changes in speed, terrain and incline. Landmarks like telephone poles or trees can be used to signal an increase in speed.

Interval training
Work at a high intensity followed by a period of rest. Useful in developing speed, strength and endurance.

HIIT
HITT (High Intensity Interval Training) involves training at a high intensity for a short time with the rest periods being active, although at a much lower intensity.

Weight training
There are three main weight training categories: body weight training, machine weight training and free weights. Weight training is used to develop muscular strength and endurance.

Plyometrics
A series of high-intensity exercises which involves explosive movements. Jumps and variations of jumps are used a lot in plyometrics. This type of training is very effective for developing speed and power.

Cross training
Using forms of activity that an athlete usually wouldn't do as part of their normal training plan in order to enhance areas that the athlete may be weak in. For example, a GAA player using rowing to develop their cardiorespiratory endurance.

Rate of perceived exertion

RPE SCALE	RATE OF PERCEIVED EXERTION
10 /	**Max Effort Activity** Feels almost impossible to keep going. Completely out of breath, unable to talk. Cannot maintain for more than a very short time.
9 /	**Very Hard Activity** Very difficult to maintain exercise intensity. Can barely breathe and speak only a few words.
7-8 /	**Vigorous Activity** Borderline uncomfortable. Short of breath, can speak a sentence.
4-6 /	**Moderate Activity** Breathing heavily, can hold a short converstaion. Still somewhat comfortable, but becoming noticeably more challenging.
2-3 /	**Light Activity** Feels like you can maintain for hours. Easy to breathe and carry a conversation.
1 /	**Very Light Activity** Hardly any exertion, but more than sleeping, watching TV, etc.

Recovery methods

Here are some examples of how an athlete could recover adequately after activity:

- Adequate sleep
- Hydration
- Good nutrition
- Compression garments
- Cold therapy
- Active recovery

Note: Knowledge of why athletes use these recovery methods is important to understand. For example, an athlete uses cold therapy such as ice baths to cause their muscles to contract. This contraction followed by the relaxation that occurs when an athlete gets out of an ice bath and warms up again causes the lactic acid to flush out and away from the muscles. This allows the athlete to recover in time for the next training session or match.

Periodisation

Key Terms:

Periodisation: The division of a training year (macrocycles) into smaller and more manageable intervals (mesocycles and microcycles) with the goal of managing all aspects of training to bring an athlete to peak performance for their most important competition.

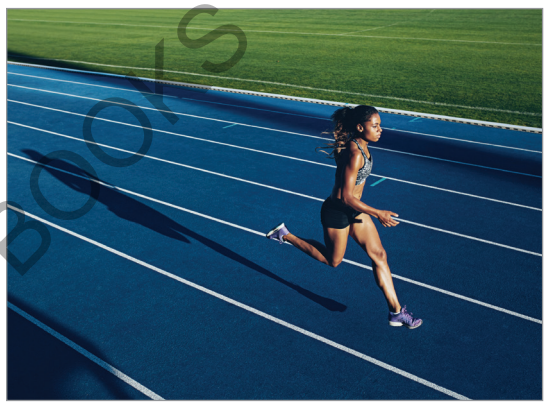
Macrocycle: The whole season of training and competing.

Mesocycle: A training block with a particular focus within the season.

Microcycle: A weekly training plan.

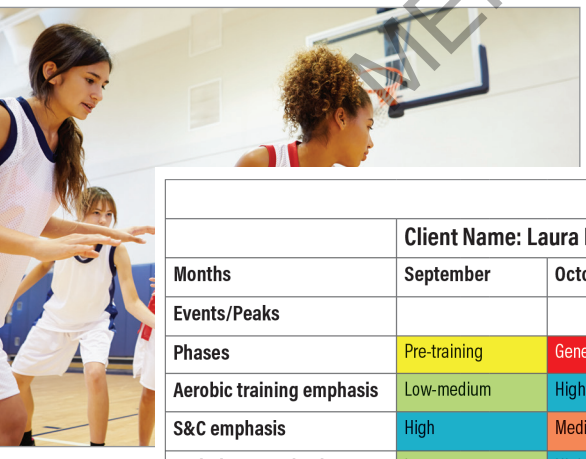
Advantages of periodisation

- Preventing overload
- Ensuring a balanced approach to training
- Variety
- Develop weaker areas
- Prevent injuries



General areas present in periodisation

- Pre-training/training introduction
- General preparation phase
- Pre-specific preparation phase
- Specific preparation phase
- Competition phase
- End of season recovery



Periodisation Plan							
	Client Name: Laura Reynolds						
Months	**September**	**October**	**November**	**December**	**January**	**February**	**March**
Events/Peaks							
Phases	Pre-training	General preparation phase 1		Pre specific phase		Specific prep phase 1	
Aerobic training emphasis	Low-medium	High		Medium			
S&C emphasis	High	Medium to High 2 p/w				Low	
Technique emphasis	Low	High		Low		High	
Anaerobic emphasis	Low		Medium			High	
Training volume 1–10	Level 2-3	Gradual increase 4-6		Increase 7-9		High volume and intensity	
Review							
Notes:							

D. Psychological preparation

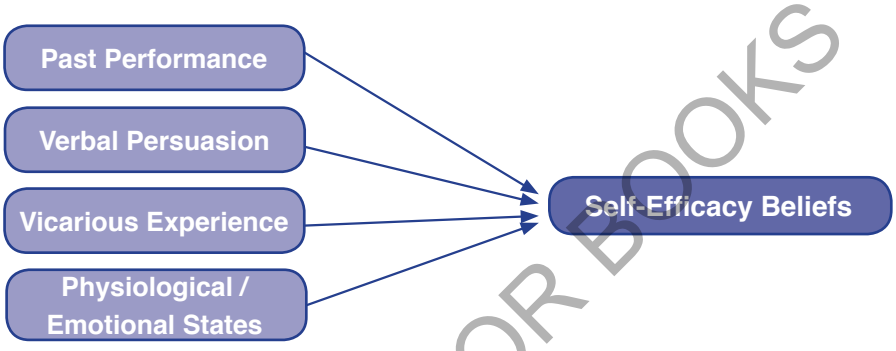
Key Terms:

Sports psychology is the use of mental strategies in order to improve performance.

Confidence is described as believing in yourself and your ability to complete a certain task.

Self-efficacy, according to the psychologist Albert Bandura, is a specific type of self-confidence that relates to a person's perceived level of ability in relation to activities and situations. People with high self-efficacy seek out challenges and do not give up on tasks until they are complete.

Bandura's Model of Self-efficacy



Past performances: Athletes often remind themselves of a previous successful performance giving them the confidence to reproduce it.
Verbal persuasion: This involves positive self-talk and affirmations.
Vicarious experience: This relates to a person who loses confidence in themselves while watching others of similar ability perform.
Physiological/emotional states: Worry, stress and anxiety can be temporary states that can negatively influence a performance.

Periodisation Plan — **Event: 20 km race walk**

Year: 2011/12

April	May	June	July	August
Peak 1			Peak 2	Recovery phase
Competition phase	General prep phase 2		Specific prep phase 2	
High	Comp	Recover / High	Med / 5k / Comp	
Medium		Recover / High	Low / race	
		Recover / Medium		
Work if needed		Recover / Medium / High		
Medium 5		Recover / High / Taper 10 days out		Rest

Anxiety

Anxiety can be described as psychological and physical feelings that can be brought about by a perceived threat or by apprehension. There are two kinds of anxiety: state anxiety and trait anxiety.

State anxiety

This is a temporary reaction or state. A person can perceive a threat which can cause the athlete to experience either cognitive anxiety (being worried or nervous) or somatic anxiety (getting butterflies in the stomach or sweating).

Trait anxiety

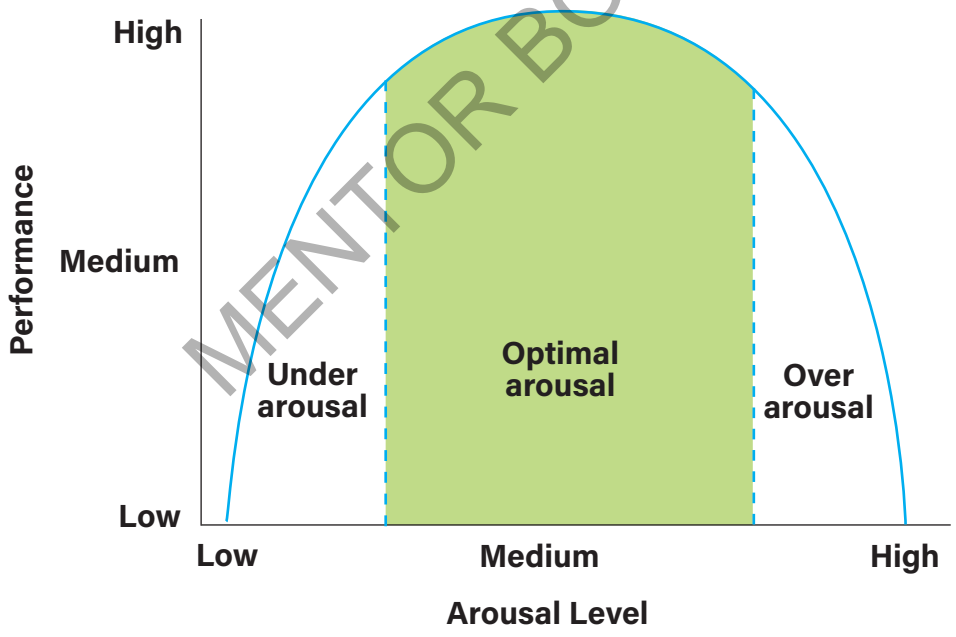
Trait anxiety is a more constant and prevalent trait and is connected to the person's personality. The person tends to experience this type of feeling over a number of difference situations.

Arousal

Arousal is a state of mental alertness both physically and mentally.

Inverted U theory

Psychologists Yerkes and Dodson (1908) designed a graph to illustrate their 'inverted U theory'. They stated that increased arousal leads to an increase in performance up to a certain point. Too much arousal can lead to a decrease in performance.



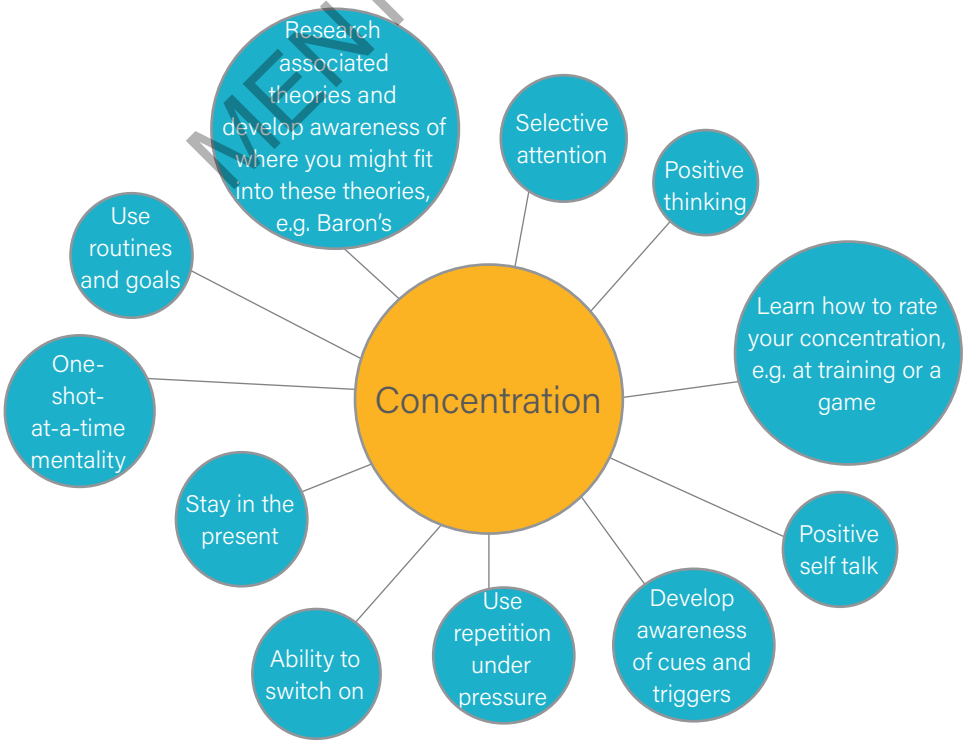
Motivation

Key Terms:

Intrinsic motivation can be described as a person's inner drive to complete a task.

Extrinsic motivation usually comes from others. Coaches, teammates and even spectators can have a positive impact on the athlete during a performance.

E. Strategies to improve confidence, concentration and motivation



Evaluating strategies that can be used to enhance confidence, motivation and concentration

Visualisation

This involves an athlete seeing themselves during a successful performance. They remind themselves of past performances that have been successful or visualise themselves successfully completing a new performance.

Mental rehearsal

This is a common technique used by many athletes. It usually is seen when athletes find somewhere quiet and sometimes close their eyes to rehearse what a successful performance looks like. Some athletes go a step further and use their senses to make it more vivid. For example, what smells will be present.

Positive self-talk

Positive self-talk is a form of verbal persuasion that the athlete themselves can use to increase self-efficacy. This method of boosting confidence and belief is very common in sport. Often without realising it, athletes will use positive self-talk to encourage themselves and to motivate themselves to perform better. Mantras or phrases can be used a lot by athletes. Some examples of positive self-talk are: 'I am a great player! When I get the ball, good things happen for my team'.

Sport Competition Anxiety Test (SCAT)

The SCAT test measures psychological preparedness for sport. The athletes answers 15 questions. 10 of the questions measure symptoms associated with nervousness and anxiousness.