

The principles of training

Warm up and cool down

The principles of training: SPOR(T)

- Specificity
- Overload
- Progression
- Reversibility

Key principles of overload.

FITT: used to increase the amount of work the body does, in order to achieve **overload**  
 Frequency: how often you train  
 Intensity: how hard you train  
 Time: length of the training session  
 Type: specific method, used eg continuous training/fartlek/weight/plyometric etc..

Warming up should include:

- 1 - **gradual** pulse raising activity (eg low intensity jogging)
- 2 – **mobility** (increasing the range of movement at a joint eg arm swings/open and close the gate)
- 3 - **dynamic stretching** (stretching whilst moving eg lunges / squats)
- 4 – **Dynamic movement** (moving quickly whilst changing direction eg. Zig zag shuttles.)
- 5 – **skill rehearsal** (practicing a skill used in the game (eg. A goal keeper saving shots in football))
- mental preparation

**Specificity**

Making **training** specific to the sport being played / movements used / muscles used / energy system(s) used.

**Progression**

Gradual increase of the amount of overload so that fitness improves, but without potential for injury. Once adaptations have occurred make more demands of the body.

**Exam question**

Using a practical example explain how the SPOR principle can be used to plan a training plan. (4 marks)  
 Plyometric training is a “type” of training. Give **two** other practical examples of ‘type’ in personal exercise programme and assess **two** ways in which applying this principle might help someone who is carrying out this plan. (4 marks)

Cooling down should include:

- **Low intensity** exercises to **gradually** lower:
- breathing and heart rate, eg walk, jog
- gradual reduction in intensity
- **Static stretching**

**Overload**

Overload is the gradual increase of stress placed upon the body. Working the body harder than normal.

**Reversibility**

Losing fitness levels when you stop exercising. This could be due to receiving and injury.

Types of training

**Circuit training**

A series of “exercise stations” whereby periods of work are interspersed with periods of rest.

Who would use this training? This training method can be adapted to the needs of lots of different components of fitness and athletes. Eg. rugby.

**Continuous training**

Sustained exercise at a constant intensity (steady state) without rest, involving aerobic demand for a minimum of 20 minutes, eg running, swimming, rowing, cycling. It improves cardio-vascular fitness.

Who would use this training? A marathon runners.

**Fartlek training**

Swedish for ‘speed play’. Periods of fast work with intermittent periods of slower work. Varying speed, terrain and work: rest ratios. Often used in running; sprint, jog, walk, jog, sprint, etc.

Who would use this training? A cross country runner, footballer.

**High intensity interval training (HITT)**

Alternating periods of short intense anaerobic exercise followed by rest.

Who would use this type or training?  
A basketball player

The benefits of warming up:

- Gradual increase in muscle temperature
- range of movement at a joint increased
- psychological preparation
- practice of movement skills through the whole range of movement
- reduces the risk of injury.
- Increased blood flow and O2 to the muscles

**Weight training**

Weights to cause changes to muscles. Chose appropriate weight/exercise depending on fitness aim, eg strength/power training or muscular endurance

Muscular Strength = high weight, lower reps, lower number of sets.

Muscular Endurance = lower weights, higher reps, higher number of sets.

Key terms - **Repetition:**

The number of times an individual action is performed. A set is a group of repetitions. **Set:** a set number of repetitions completed in one go. Eg. 10 reps make a set.

**Plyometric training**

Use of plyometric exercises eg bounding, hopping, skipping and depth jumping, to increase power. It includes an eccentric contraction (lengthening of the muscle) followed by larger concentric contraction (shortening of the muscle).

Who would use this training?

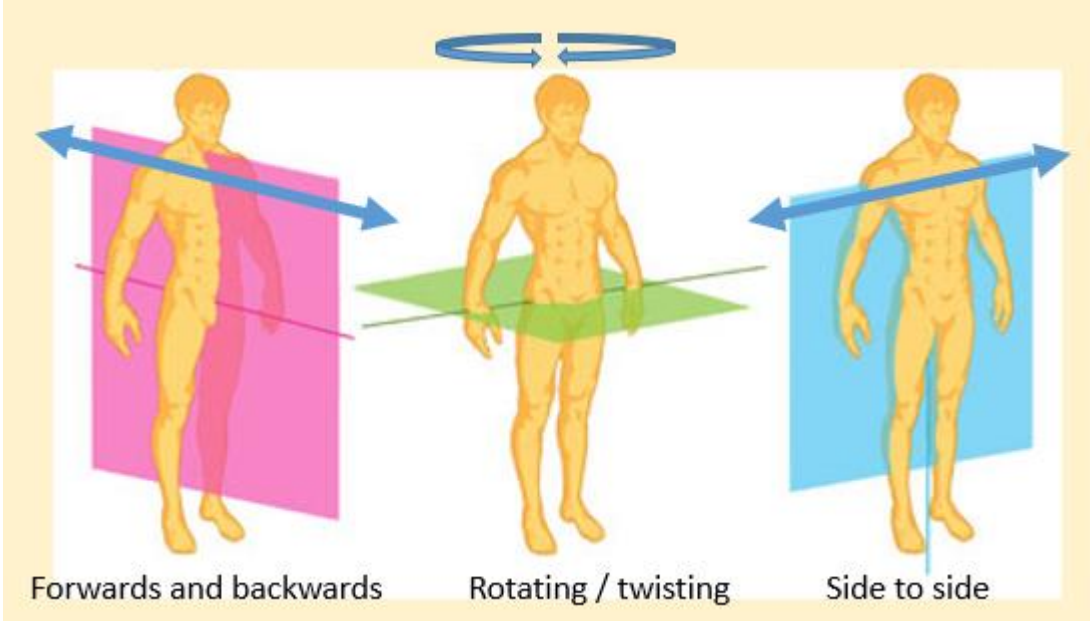
High jumper, 110m hurdler.

**Exam Questions:**

- Name 3 key words associated with plyometric training. (1 mark)
- Compare continuous and Fartlek training (2 marks)
- Describe circuit training (4 marks)
- Using one type of training, explain how it would be suitable for a rugby player. (3 marks)
- Describe how the FITT principle can be applied to weight training. (4 marks).
- Define (all components of fitness) (1 mark each)
- Using practical examples describe a 5 part warm up (5 marks)
- Explain the benefits of a warm up (5 marks)
- Explain the benefits of a cook down ( 2 marks)
- Name the fitness test for (all components of fitness) (1 mark each)
- Describe two features of (each fitness test) (2 marks each)
- Identify a suitable test for (each fitness test) and describe two things that need to be taken into account for the test to be valid. (2 marks each test).
- What type of movement occurs along the sagittal plane (1 mark)
- What type of movement occurs along the frontal plane (1 mark)
- What type of movement occurs along the Transverse plane (1 mark)
- Give a sporting examples of movement along the sagittal plane (1 mark)
- Give a sporting examples of movement along the Frontal plane (1 mark)

The benefits of cooling down:

- allowing the body to recover
- the removal of lactic acid/CO2/waste products
- Prevent delayed onset of muscle soreness (DOMS) - the pain felt in the muscles the day after exercise.
- Lowers heart rate
- Circulation of blood and O2
- Lowers body temperature
- Aids recovery by stretching muscles

Components of Fitness			Aerobic and anaerobic										
<p><b>Cardiovascular endurance</b> The ability to continue exertion while getting energy from the aerobic system used to supply the body with energy. Also referred to as stamina.</p> <p>Fitness tests: 12 min Cooper test the Multistage fitness (bleep) test.</p> <p><u>Which athletes is this component important for?</u> Marathon runner, long distance cyclist, long distance swimmer.</p>	<p><b>Muscular endurance</b> The ability to move your body and muscles repeatedly without fatiguing.</p> <p>Fitness tests: Press-up test and the sit-up test.</p> <p><u>Which athletes is this component important for?</u> Footballers, long distance rower, long distance cyclist.</p>	<p><b>Speed</b> The ability to move quickly across the ground or move limbs rapidly through movements.</p> <p>To be able to move from A to B as quickly as possible.</p> <p>Fitness tests: Tests include the 30,</p> <p><u>Which athletes is this component important for?</u> 100m sprinter, basketball player.</p>	<p><b>Aerobic</b> <u>With</u> oxygen. When exercise is not too intense, the heart <u>can</u> supply all the oxygen that the working muscles need.</p> <p>Summarised as: glucose + oxygen → energy + carbon dioxide + water.</p> <p>Sporting example: marathon runner</p>	<p><b>Anaerobic</b> <u>Without</u> oxygen. When exercise duration is short and at high intensity, the heart and lungs <u>cannot</u> supply blood and oxygen to muscles as fast as the respiring cells need them.</p> <p>Summarised as: glucose → energy + lactic acid.</p> <p>Sporting example: 100m sprinter.</p>									
<p><b>Strength</b> The maximum force a muscle/group of muscles can apply against a resistance</p> <p>Fitness Tests: Handgrip dynamometer test and the 1 rep max test.</p> <p><u>Which athletes is this component important for?</u> Olympic Weight lifter.</p>	<p><b>Power</b> The ability to exert a maximal force in as short a time as possible.</p> <p>Fitness tests: Standing vertical jump test and standing broad jump test.</p> <p><u>Which athletes is this component important for?</u> Long Jump, shot put, rugby.</p>	<p><b>Flexibility</b> Range of movement available around a joint.</p> <p>Fitness test: Tests include the sit and reach test.</p> <p><u>Which athletes is this component important for?</u> Gymnastics, dance.</p>	<p style="text-align: center;"><b>Planes of movement</b></p>  <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th style="color: magenta;">Sagittal plane</th> <th style="color: green;">Transverse plane</th> <th style="color: blue;">Frontal Plane</th> </tr> </thead> <tbody> <tr> <td>Flexion and extension</td> <td>Rotation</td> <td>Adduction and abduction</td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>• Bicep curl</li> <li>• Forward roll in gymnastics</li> <li>• Front summersault in trampolining.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• Golf swing</li> <li>• Pirouette in ballet</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• Star jump in gymnastics</li> <li>• Cartwheel in gymnastics</li> </ul> </td> </tr> </tbody> </table>		Sagittal plane	Transverse plane	Frontal Plane	Flexion and extension	Rotation	Adduction and abduction	<ul style="list-style-type: none"> <li>• Bicep curl</li> <li>• Forward roll in gymnastics</li> <li>• Front summersault in trampolining.</li> </ul>	<ul style="list-style-type: none"> <li>• Golf swing</li> <li>• Pirouette in ballet</li> </ul>	<ul style="list-style-type: none"> <li>• Star jump in gymnastics</li> <li>• Cartwheel in gymnastics</li> </ul>
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<p><b>Agility</b> <b>The ability to change direction quickly at speed, whilst maintaining control.</b></p> <p><b>Fitness test:</b> Illinois agility test.</p> <p><u>Which athletes is this component important for?</u> Basketball, gymnastics, rugby.</p>	<p><b>Balance</b> The ability to stay upright or stay in control of body movement. or The ability to retain the center of mass above the base of support</p> <p><b>Fitness test:</b> Standing Stork stand test.</p> <p><u>Which athletes is this component important for?</u> Gymnastics, figure ice skating.</p>	<p><b>Co-ordination</b> The ability to move two or more body parts under control, smoothly and efficiently to complete an objective.</p> <p>Fitness test: Wall ball throw test.</p> <p><u>Which athletes is this component important for?</u> Table tennis, tennis, Badminton.</p>											
		<p><b>Reaction time</b> The ability to respond quickly to the onset of a stimulus</p> <p>Fitness test: Ruler drop test</p> <p><u>Which athlete is this component important for?</u> 100m sprinter.</p>											