

# Cycle OCR Sport Science Knowledge Organiser

RO42 LO1 Know the principles of training in a sporting context



## Specificity

Progressive overload by increasing frequency, intensity, time, type, adherence (FITTA)

For example: more repetitions from one session to another.

## Progression

Practices a skill used in a sport, to trains the muscle group(s) Make sure it is a skill predominantly used in a sport

For example: passing the ball in rugby

## Reversibility/Regression

'use it or lose it'

For example: injury may affect performance

## Moderation

Taking into account age, gender, environment and experience

For example: a session which will include young athletes and mature performers

## Variance

Avoiding boredom by changing routine. Gives the body a different challenge and allows a mixture of fitness and skill.

For example: lifting different types of weights.

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## RO42 LO2 Know how training methods target different fitness components

Specific training methods for each of the fitness components
<p><b>Cardiovascular/ continuous training</b></p> <ul style="list-style-type: none"> <li>• Long periods of moderate work, without rest</li> <li>• Improves cardiovascular fitness and muscular endurance.</li> <li>• Suitable for long distance runners and triathletes.</li> </ul>
<p><b>Interval training</b></p> <ul style="list-style-type: none"> <li>• Involves alternating periods of work and rest</li> <li>• Can be used to improve speed, recovery time and aerobic and anaerobic fitness</li> <li>• Suitable for team games involving short bursts of speed.</li> </ul>
<p><b>Resistance training</b></p> <ul style="list-style-type: none"> <li>• A workout using weights as a form of resistance</li> <li>• Can be tailored to improve muscular endurance, power and strength</li> <li>• Suitable for all activities and general fitness/toning.</li> </ul>
<p><b>Power/Plyometric training</b></p> <ul style="list-style-type: none"> <li>• A series of explosive movements such as jumps, bounds, hops etc. <ul style="list-style-type: none"> <li>• Improves power</li> </ul> </li> <li>• Beneficial for activities that require explosive strength e.g. Long jump and high jump</li> </ul>
<p><b>Flexibility training</b></p> <ul style="list-style-type: none"> <li>• Stretching methods including static (passive and active) and dynamic movements <ul style="list-style-type: none"> <li>• Improves range of movement, reducing the chance of injury</li> </ul> </li> <li>• Beneficial for all sporting activities in particular gymnastics and dance</li> </ul>
<p><b>Agility/SAQ training</b></p> <ul style="list-style-type: none"> <li>• Exercises aimed at activating neural pathways <ul style="list-style-type: none"> <li>• Improves speed, agility and quickness</li> </ul> </li> <li>• Suitable for team games involving changes to direction.</li> </ul>
<p><b>Balance training</b></p> <ul style="list-style-type: none"> <li>• Involves doing exercises that strengthen the muscles that help keep you upright, including your legs and core using a balance board or exercise ball. <ul style="list-style-type: none"> <li>• Improve stability and help prevent falls.</li> </ul> </li> <li>• Beneficial for all sporting activities in particular gymnastics and dance .</li> </ul>
<p><b>Fartlek training</b></p> <ul style="list-style-type: none"> <li>• A continuous workout, involving changes in speed and/or terrain</li> <li>• Improves recovery time and both aerobic and anaerobic fitness</li> <li>• Suitable for cross country runners and team games involving changes in speed</li> </ul>
<p><b>Circuit training</b></p> <ul style="list-style-type: none"> <li>• A series of exercises performed in a circuit</li> <li>• Improves cardiovascular endurance and muscular endurance.</li> <li>• Beneficial for general fitness and can be structured to suit most sports.</li> </ul>

Aerobic exercise  
Utilises oxygen to fuel the body during exercise  
Aerobic exercise is steady and not too fast (e.g. walking, jogging, cycling)

Aerobic exercise  
Fuels the body during exercise without using oxygen  
Anaerobic exercise is performed in short, fast bursts (e.g. weight lifting, interval training)

### The components of fitness

Strength  
The extent to which a muscle or muscle groups can contract against resistance (e.g. restraining an opponent in rugby)

Power  
Exerting muscular strength rapidly (e.g. sprint start)

Agility  
Move quickly and change direction under control (e.g. weaving between objects or opponents in a zig-zag motion)

Balance  
The ability to maintain a position (e.g. handstand)





Flexibility  
the ability to move joints through an ample range of motion (e.g. performing the splits in gymnastics)

Muscular endurance  
The ability of a muscle to sustain repeated contractions (e.g. cycling)

Cardiovascular endurance  
the heart and lungs getting blood and oxygen to muscles and them using it (e.g. long distance running)

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## RO42 LO3 Be able to conduct fitness tests

Fitness Component	Name of Test	Protocol – How to carry it out
Speed 	30m sprint test	Run 30m as fast as you can
Co-ordination 	Rebound catch	Stand 1m away from a wall. Throw a tennis ball one-handed against the wall and catch the rebound with your other hand. As many as you can in 30 secs
Reaction Time 	Ruler Drop	Have a partner hold a 30cm ruler in front of you. Have your thumb and index finger either side of the 0cm mark. When your partner drops the ruler, pinch the ruler and see how far it has dropped.
Agility 	Illinois Agility Run	Start lying on your back. Stand, run to far cone (10m) and back, then zig-zag through 4 cones (3.3m apart and back, then 10m and back.
Power 	Standing Long Jump Sergeant Jump	Stand with both feet together and jump as far forward as you can. Reach up and mark the wall with chalk. Jump as high as you can and mark the wall again. Measure the distance between the marks
Balance 	Standing Stork Test	Stand on one foot. Place your other foot against your knee. Close your eyes. Stand for as long as you can.

### How to interpret the results of fitness tests

- How do the outcomes compare to average results for the tests used measure against normative data?

#### Validity of the results

- Validity relates to whether the test actually measures what it sets out to measure
- (e.g. a speed test using shuttle runs may actually test a person's ability to turn, which is more about agility than speed)

#### Reliability of the results







- Reliability is a question of whether the test is accurate. It is important to ensure that the procedure is correctly maintained for all participants
- (e.g. the conditions of the test must always be identical so that it is most likely that the same results will be produced).

### Test sequence is important

Always conduct the tests in the same order to aid validity of results  
The order in which fitness tests are performed can affect the outcome of further tests.

### Protocol

According to protocols and guidelines set down by the fitness industry:  
Does the subject need to seek medical advice before performing tests?  
How does test procedure ensure accuracy?

Fitness Component	Name of Test	Protocol – How to carry it out
Muscular Endurance 	30sec sit ups	Do as many sit ups as you can in 30s
	30secs press ups	Do as many press ups as you can in 30s
Muscular Strength 	Hand Grip <u>Dynamometer</u>	Squeeze the grip as tightly as you can and record your score. Re-set and repeat with your other hand.
Body Composition 	Skin fold Callipers	Pinch the skin on top of your bicep and grip it with the callipers. Read of how many mm of skin you grab. Repeat at <u>tricep</u> , sub-scapular and hip (supra- <u>illiac</u> ).
Cardiovascular Fitness 	Multi-stage fitness test 'bleep test'	Start at the triple bleep. Run 20m to arrive at the line when the 'bleep' sounds again.
Flexibility 	Sit and reach test	Place your feet against a board. Keeping your legs straight, reach towards your toes with both hands. Record your score.

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## RO42 LO4 Be able to develop fitness training programmes

**STEP 1**

- Gather details about the subject the programme is for (e.g. age, any recent or current injuries, health problems, access to facilities)

**STEP 2**

- Clarify the aims of the training programme (e.g. which components of fitness need to be improved and by how much)

**STEP 3**

- Set realistic goals which can be measured (e.g. reduce the time it takes to complete a 5k run by 2 minutes)

**STEP 4**

- Duration of the training programme (e.g. suitable length to achieve goals)
- Suitability of activities (e.g. activities meet the needs of the subject, activities target specific areas)

**STEP 5**

- Organisation of activities (e.g. variety of training methods, sufficient rest days)
- Adaptability (e.g. an activity can be performed inside or outside in case of bad weather)
  - Progression (e.g. applies the FITTA principle)

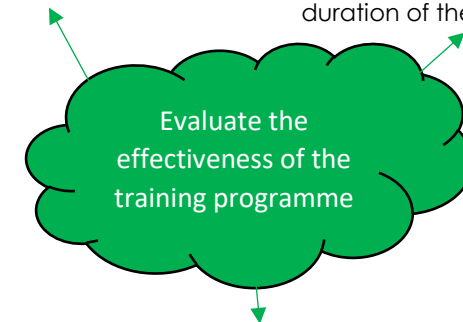
	Exercise	Muscle Group	Sets	Reps	Rest
Monday	Lateral Raises	Shoulders	3	12-15	30 seconds
	Front Raises	Shoulders	3	12-15	30 seconds
	Front Lunges	Quads & Glutes	3	12 each leg	1 minute
	Squats	Quads & Glutes	3	12-15	1 minute
	Ankle Crunches	Abdominals	3	30	10 seconds
Tuesday	Alternating Knee Tucks	Abdominals	3	30	10 seconds
	Flyes on Swiss Ball	Chest	3	12	30 seconds
	Chest Press on Swiss Ball	Chest	3	12	30 seconds
	Tricep Kickbacks	Triceps	3	12	30 seconds
	Dips	Triceps	3	15	45 seconds
Wednesday	Interval Training				
	Push-ups	Entire upper body	3	To failure	30 seconds
	Reverse leg curls	Hams & Glutes	3	15 each leg	30 seconds
	Alternating Leg Raises	Abdominals	2	30	30 seconds
	Twist & Slap	Abs/Obliques	2	30	30 seconds
Thursday	Hammer Curls	Biceps	3	12-15	30 seconds
	Bicep Curls	Biceps	3	12-15	30 seconds
	One arm rows	Back	3	12 each arm	45 seconds
	Bent over rows	Back	3	12	45 seconds
	Interval Training				
Friday	Stiff-Leg Deadlifts	Hamstrings	3	12	1 minute
	Step-ups	Hams & Quads	3	12 each leg	1 minute
	Push Throughs	Abdominals	3	30	30 seconds
	Reverse Crunch	Abdominals	3	30	30 seconds
	Interval Training				
Saturday	Seated Calve Raises	Calf	3	15	15 seconds
	Interval Training				

### Measurement

Repeat tests and compare results against original results

### Improvement

Need more results or more accuracy in results, adjust the duration of the training programme



### Reflection on self / interview subject

- Were the goals met?
- Did I include an appropriate range of training methods?
- Did the training methods used target my needs / the needs of the subject?
- Did I / you stick to the training programme?

WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
<b>1</b>	strength workout lower body	walk 20 min	rest & stretch	run 5 min easy 5 min moderate	strength workout upper body	walk 5 min run 10 min (alternate 1 min run & 1 min walk) walk 5 min	rest & stretch
<b>2</b>	strength workout lower body	walk 30 min	rest & stretch	run 5 min slow 5 min moderate 5 min quick	strength workout upper body	walk 5 min run 10 min (alternate 1 min run & 1 min walk) walk 5 min	cross train bike or hike
<b>3</b>	strength workout lower body	walk 30 min	rest & stretch	run 20 min (increase effort every 5 min)	strength workout upper body	walk 5 min run 20 min (alternate 2 min run & 1 min walk) walk 5 min	cross train bike or hike
<b>4</b>	strength workout upper body	walk 30 min	rest & stretch	walk 5 min run 20 min (alternate 1 min run & 1 min walk) walk 5 min	strength workout lower body	walk 5 min run 20 min (alternate 1 min run & 1 min walk) walk 5 min	cross train bike or hike
<b>5</b>	strength workout upper body	walk 30 min	rest & stretch	run 20 min (increase effort every 5 min)	strength workout lower body	walk 5 min run 20 min (alternate 1 min run & 1 min walk) walk 5 min	cross train bike or hike
<b>6</b>	strength workout upper body	run 0.5 mi moderate 1.5 mi hard 0.5 mi walk	rest & stretch	walk 5 min run 20 min (alternate 1 min run & 1 min walk) walk 5 min	strength workout lower body	<b>RACE DAY</b>	rest & stretch