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Components of fitness

Cardiovascular endurance / stamina	Ability of the heart and lungs to get oxygen to the working muscles.	Long distance running Long distance swimming / cycling Teams games e.g. hockey, rugby, netball	Multistage fitness test (bleep test) 12 minute coopers run
Muscular endurance	Ability of a muscle to sustain repeated movements (contractions)	Road cycling Rowing Swimming	30 second sit up One minute press up test
Speed	It is the maximum rate a performer can perform movement or cover a distance	100 m sprint Long jump run up Rugby to dodge tackling	30 m speed test
Power	Speed x strength Exerting muscular strength rapidly	Jumping in basketball , long jump Punching quickly in boxing Releasing the javelin Kicking in rugby	Vertical jump test Standing broad jump

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Components of fitness

Strength	The extent to which a muscle or group of muscles can contract against a resistance.	Retraining an opponent in rugby Lifting a weight Pulling an oar through water	Handgrip dynamometer
Agility	Ability to move and change direction quickly whilst maintaining control	Weaving in-between poles in skiing Sprinting and dodging to avoid tackle in rugby Dribbling a football and changing direction to beat an opponent	Illinois agility test Shuttle run test
Balance	Ability to maintain position, this means maintaining the centre of mass over the base of support	Holding a handstand or head stand Holding a position in dance Balance on edge of platform in a high dive	Standing stork test
Flexibility	The range of movement possible at a joint	Splits in gymnastics Stretching to save a ball in football Perform a straddle of pike	Sit and reach Trunk flexion

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Components of fitness

Coordination	Ability to use tow or more body parts together smoothly and efficiently	Arms and legs to run effectively Catch a ball hand and eye Kick a ball eyes and feet	Anderson wall toss test
Reaction time	The time taken form the onset of a stimulus to the start of the reactive movement	Start of 100 m stimulus is the gun Time taken to move to return a tennis serve Time taken to move to intercept a ball in netball	Ruler drop reaction time test

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Fitness components requirements of sport

Hockey

Cardiovascular endurance	Needed to supply oxygen to the working muscles so that a hockey player can last a whole game (70 mins)	Opponents will gain space and possible score if the performer lacks cardiovascular endurance
Muscular endurance	Repeated movements of the arms and legs through running and the arms and upper body through hitting, pushing or slapping the ball	If they have poor muscular endurance you would not be able to continue to run throughout a game of maintain your performance when passing the ball
Speed	Dribbling the ball in hockey whilst running to beat an opponent	Starting form a starting position and sprinting away with the ball from a defender. The players would be caught and tackled if they did not have speed
Agility	Hockey player performing an Indian dribble has to change direction quickly whilst in control of the ball	If they lack agility the hockey players would not be able to maintain ball control when changing direction.

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Fitness components requirements of sport

Gymnastics

Strength	To hold you body weight when preforming a handstand	Holding you weight on your hands still requires strength in your muscles and if you did not have strength you could not hold you body weight on your hands
Muscular endurance	To repeatedly use the same muscle when performing a tumbling routine in the arms and legs	Maintaining momentum during a somersault routine needs high levels of muscular endurance without this you could not perform multiple somersaults.
Balance	Holding a static balance e.g. handstand	Holding a balance still, without balance the gymnast would lose marks and fall down
Flexibility	Being able to preform the splits	Being able to perform the splits having good range of movement at the hip joint without this you could not preform the splits

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Justification of 2 most important components of fitness

Gymnastics

Strength	Needed to be able to hold any position or get into position e.g. head stand , handstand
Agility	The gymnast needs to move into different position quickly in control, for instance when preforming a somersault or pike position

Hockey

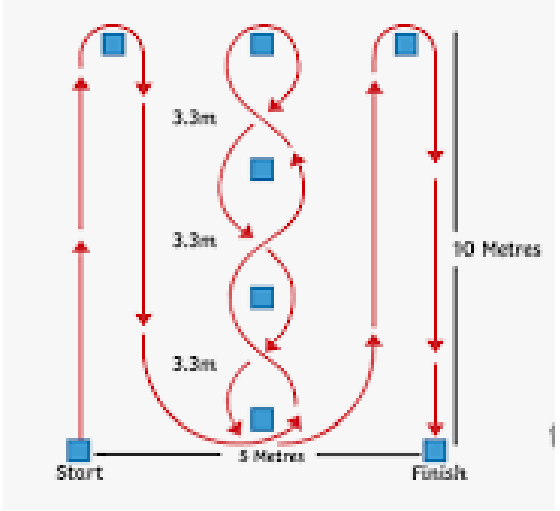
Cardiovascular endurance	Needed to be able to last the whole 70 mins and play at the performers top level
Speed	Need to be able to beat and opponent and defend against an opponent to make a tackle

Pressured drills

Can be against time

Can be against an opponent

e.g.
Dribbling the ball around the Illinois agility course in the fastest time



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Collection and interpret data

Normative data	Data that is collected so you can compare you results. The data comes form national averages and allows the participant to classify themselves as excellent, good, average, or poor. Help identify weaknesses
Validity	Fitness test should be completed to the protocol and that the fitness test measure the component of fitness you want to measure e.g. vertical jump measures leg power not arm power
Reliability	Means that if the test is reliable if repeated similar results will be obtained so test conditions must be the same.

Normative data 12 min copper run – if you got 2100m as a female you would be classed as above average

	Excellent	Above Average	Average	Below Average	Poor
Male	>2800m	2500 – 2800m	2300 – 2499m	2200 – 2299m	<2200m
Female	>2100m	2000 – 2100m	1700 – 1999m	1600 – 1699m	<1600m

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Devising skill based fitness tests

Test the component of fitness and the ability to carry out the desired skill.

Be clear on how the test should be carried out

Have a suitable measurement e.g. time, passes completed.

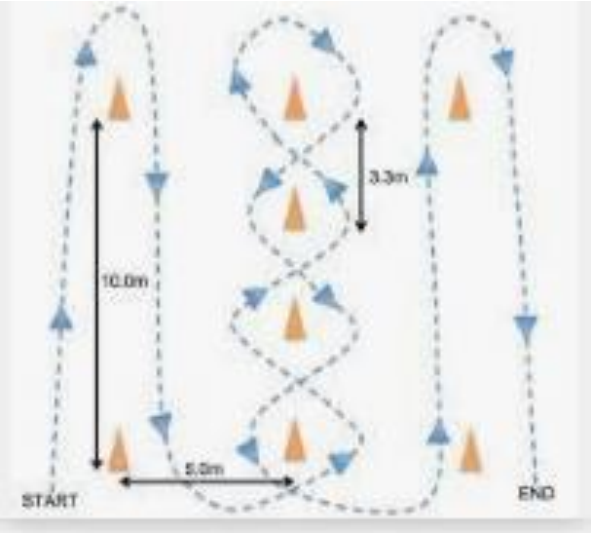
Example Hockey

Fitness component : Agility

Skill tested : dribbling

Measurement : seconds

Dribble around course as fast as you can



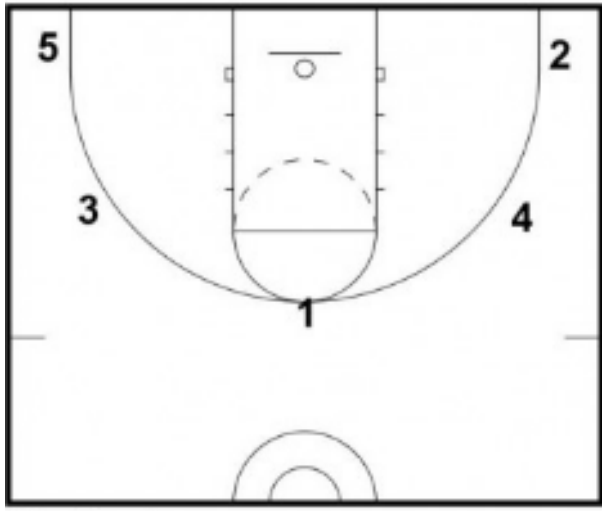
Example Basketball

Fitness component : Coordination

Skill tested : Shooting

Measurement : Shots made

Shoot from 5 different sports 3 x each



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SPOR – Principles of training

Specificity	Making training specific to the movements, skills and muscles that are used in the activity e.g. a swimmer will do a lot of there training in the pool as they need to swim. A basketball player will do plyometric training to practice jumping for rebounding in basketball
Progression	Gradually making training harder as it becomes too easy. e.g. add in 2 kg of weight to weight training after 2 weeks of training
Overload	Working harder than normal e.g. Training at a higher heart rate intensity Training for an extra 10 minutes or adding an extra mile to a run.
Reversibility	Use it or lose it. If you stop training, you will lose fitness e.g. A rugby player breaks a leg they will not be able to train for a number of months so they will lose the fitness levels they have developed. A football player suffers from an ACL they will not be able to train for a number of months so it will take a lot of training to get back to the same level of fitness after the injury

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FITT - Principle

Frequency	How often the person trains e.g. training three times a week rather than twice a week
Intensity	How hard the person trains e.g. Working at 70% of your maximum heart rate rather than 65% of your maximum heart rate
Time	How long the person trains for e.g. Increasing the length of the exercise by 15 minutes from 30 to 45 minutes.
Type	The method of training the person uses. e.g. Circuit training and Fartlek training as the chosen type of training for the athlete.

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SMART goal

Specific	Goals should be specific to the person and make use of the muscles, movements and energy capabilities of that person
Measurable	Goals should be able to be measured and assessed e.g. I want to be able to throw the javelin an extra 50cm is a measured target, where as I want to throw the javelin further is not a measured target.
Achievable	The goals should be achievable e.g. I want to increase my 10km run by 1 minute during the next 12 weeks is achievable . I want to increase my 10KM run by 5 minutes in the next 12 weeks is not.
Realistic	Goals should be realistic for example there should be enough time for the participant to reach them. e.g. it is a goal that I can reach so that I keep my motivation
Time bound	Goals should be set over a realistic period of time. e.g. between 6-12 weeks depending on if it is a short, medium or long term goal. But they should always be broken down into shorter term goals.

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Methods of training and their benefits

Method of training	Advantages	Disadvantages
Continuous training – An activity that can be continuously repeated without suffering undue fatigue	Little to no equipment required Improves Cardiovascular endurance Can be done virtually anywhere Same movement is repeated over and over.	Can be time consuming Can be boring Can cause injury due to repetitive strain Does not match many sports as intensity remains constant
Fartlek training - Speed play which generally involves running combining continuous and interval training with varying speed and intensity	Can be done in many environment outdoors Mimics the demand of team games (change of intensity) Requires little equipment	Difficult to know when change intensity Harder to judge intensity as heart varies a lot Higher intensity work can lead to injury
Interval training - Any training that involves periods of work and rest	Easily adapted to suit the participant by changing the work; rest ratio Can be used for aerobic or anaerobic fitness	High intensity work can lead to injury High levels of motivation are needed in the work intervals

Year 10 / 11

Methods of training and their benefits

Method of training	Advantages	Disadvantages
Circuit training – A series of exercises performed at work stations with periods of work and rest	There is flexibility in what is done at each station The circuit can easily be manipulated to suit performers needs The work; rest ratio can be altered easily	Quite a lot if space is required and there may be equipment needs depending on what each station requires It is hard to gauge whether the performer is working as hard as they should at the station.
Plyometric - Repeated exercises such as bounding , hopping or jumping over hurdles which are designed to create fast, powerful movements.	Effective way to improve power Requires little to no equipment	Puts stress and strain on muscles and joints Can lead to sore muscles (DOMS)
Weight /Resistance training – Training that involves working against some kind of force that resists the movement.	Can increase muscular tone and endurance using low weight, high repetition and high sets Can increase muscular strength/bulk by heavy weight, low repetition and low sets	Can cause injury with poor technique Can cause injury if lift to heavy weight Can be boring

Year 10 / 11

Methods of training and their benefits

Method of training	Advantages	Disadvantages
High intensity interval training (HITT)	Has aerobic and anaerobic benefits Burns calories and uses fat quickly Can be completed fairly quickly Balance of work: rest ratio can be altered to suit the individual	High intensity work can lead to injury High levels of motivation are needed in the works intervals Can lead to dizziness or nausea

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Aerobic exercise – Using oxygen to fuel the body during exercise

Anaerobic exercise not using oxygen to fuel the body during exercise

	Intensity	**Duration**	**Oxygen consumption**	**Method of training**
Aerobic	Low intensity exercise e.g., jogging, walking	Long	Enough oxygen to meet the demands of exercise	Fartlek Continuous
Anaerobic	High intensity exercise e.g. sprinting, jumping	Short usually under a minute	Not enough oxygen to meet demands of exercise	HITT Interval Plyometric Resistance

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Factors when designing a fitness training programme

1. Considerations to inform planning – Part 1 of 2

Facilities/equipment	What facilities and equipment does the performer have to complete a training programme? How much space for they have and do they have access to technology (e.g. heart rate monitor) to monitor their performance.
Safety assessment	A PAR-Q (Physical Activity Readiness Questionnaire) is used to determine if the performer is healthy enough to undertake the programme. Injuries or illnesses may affect their participation.
Risk Assessment	Risk assessments aim to reduce the risk to participants within the activity
Aims/goals/objectives	The aim or goal of the programme is what the performer wants to achieve at the end of the programme. The objective is how they do this. SMART (Specific, Measurable, Achievable, Realistic, Time-bound) targets are set as part of the objective.

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Factors when designing a fitness training programme

1. Considerations to inform planning – Part 2 of 2

Current fitness levels/injuries	Through fitness assessments the level of fitness of the performer is considered and used to inform the planning of the programme
Organisation	The leader of the programme needs to be organised to ensure that the right equipment is in the right place ready for the session, allows for variety in the programme and includes appropriate rest periods.
Environment	As part of the risk assessment the trainer must consider if the environment is checked, ready and safe for the performer
Skills to be improved	Adding skill based fitness work will lead to improved performance in the component of fitness and the skill e.g. using continuous running in football with a ball to improve fitness and stamina along with dribbling and running with the ball skills.

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Factors when designing a fitness training programme

1. Appling principles of training –

Specificity	**Progression and Overload**				**Reversibility**
	Frequency	**Intensity**	**Time**	**Type**	
Ensuring the training meets the demands of the activity e.g. running technique developed through carrying out continuous training	As training gets easier the number of sessions per week will increase e.g. increasing the number of training sessions from three to four per week	As the training gets easier the intensity of the exercise heart rate used can be increased e.g. increasing the intensity from 65% to 75% of the of the maximum heart rate	Increasing the amount of time spent on the activity e.g. increasing the time spent running from 30 minutes to 35 minutes	Matching the demands of the activity to the training used e.g. long distance cyclist requires muscular endurance – weight training for endurance needed	Regular training to prevent the benefits being lost through too much rest or injury e.g. training three times or more a week each week to prevent a loss of fitness

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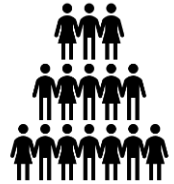
Factors when designing a fitness training programme

1. Appling principle of overload –



Using heart rate	**Using one rep maximum (1 RM)**	**Using Work: Rest ratio**	**Applying specificity**
For improving cardiovascular fitness/stamina	For improving muscular endurance or muscular strength	For interval or HIIT training	All forms of training
Calculating maximal heart rate 220-age	Calculating 1 RM	Balancing the amount of work done with the rest period – to avoid overload and injury	Activities and exercises used in a training programme need to be specific to the needs of the participant, targeting the areas they want to improve or the body parts/fitness components used in their sport.
Aerobic training zone = 60-80% of maximum heart rate	Lift weight once	HIIT session often involves 2:1 Work: Rest ratio e.g. work for 30 seconds rest for 15 seconds	
e.g. 220-16 (yr. old) = 204 60% of 204 = 122bpm 80% of 204 = 163bpm Aerobic heart rate zone for 16 year old 122-163 bpm	Younger participants should predict their 1RM from a 10RM or 5RM to avoid injury Muscular strength = 70-80% of 1RM Muscular endurance = 40-60% of 1RM	Work period can be increased or rest period decreased	

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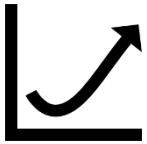
Planning a fitness-based training programme

2. Elements of a programme







Warm up and cool down routines	**Activities/main content of the programme**	**Duration of the plan/sessions**	**Equipment, facilities and coaching points**	**Adaptation of the programme based on each session or mid-term testing**
Carried out at the start and end of each session to ensure that the participant are safe to take part in the activity	The main content of the training session including exercises chosen, muscles used and number of rest days	A minimum of 6 weeks Usually 8-12 weeks to allow adaptations to be seen	All equipment needed needs to be considered to ensure it is accessible before planning	Adaptability of the programme to ensure the goals of the programme are met
Includes: Pulse raising activity Mobility exercises Dynamic stretches Skill rehearsal	Exercises should match the demands of the sport and muscles used. Rests between activities and rest days between sessions are required	Length of the sessions Beginners = 20-30 mins Intermediate = 30-40 mins Advanced = 30-90 mins Include whole session e.g. warm ups and cool down	Instructions on how to do the exercise or use the equipment are called coaching points – this helps the performer to carry out the activities correctly.	Using an indoor treadmill rather than outdoor running when the weather is bad Using free weights when the fixed weight machine is broken

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Planning a fitness-based training programme

2. Elements of a programme – Target area and suitable activities (1)

Warm up and cool down routines	Specific exercises	Overload intensity	Time
Cardiovascular endurance/stamina	Cycling, swimming, jogging, walking, rowing	60-80% of maximum heart rate (220-age)	20 minutes or more 3-4 times per week
Muscular strength	High resistance – weights, resistance machines, body weight	More than 70% of 1RM 3 sets of 6-8 repetitions	30 minutes plus
Muscular endurance	Low resistance - weights, resistance machines, body weight	Less than 70% of 1RM 3 sets of 10-15 repetitions	30 minutes plus
Agility	Shuttles or circuits involving changing direction at speed – sprinting round cones, ladder runs	Work: Rest ratio 1:3 e.g.30 seconds work:90 seconds rest	30 minute sessions 2-3 times per week

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Planning a fitness-based training programme

2. Elements of a programme – Target area and suitable activities (2)

Warm up and cool down routines	Specific exercises	Overload intensity	Time
Speed	Use of speed ladders, sprints, interval sprints	Work: Rest ratio 1:3 e.g.30 seconds work:90 seconds rest	30 minute sessions
Power	Interval training – high intensity, quick activities, acceleration sprint training & plyometric training – box and hurdle jumps	Box jumps – 3-6 sets of 8-15 repetitions Sprints – W:R 1:3 e.g.30 seconds work:90 seconds rest	30 minutes or more per session
Balance, flexibility, co-ordination or reaction time	Circuit training to include flexibility stretches, co-ordination drills and balance exercise	2-3 sets of 12 repetitions 30 second recovery between intervals	30 minutes or more per session

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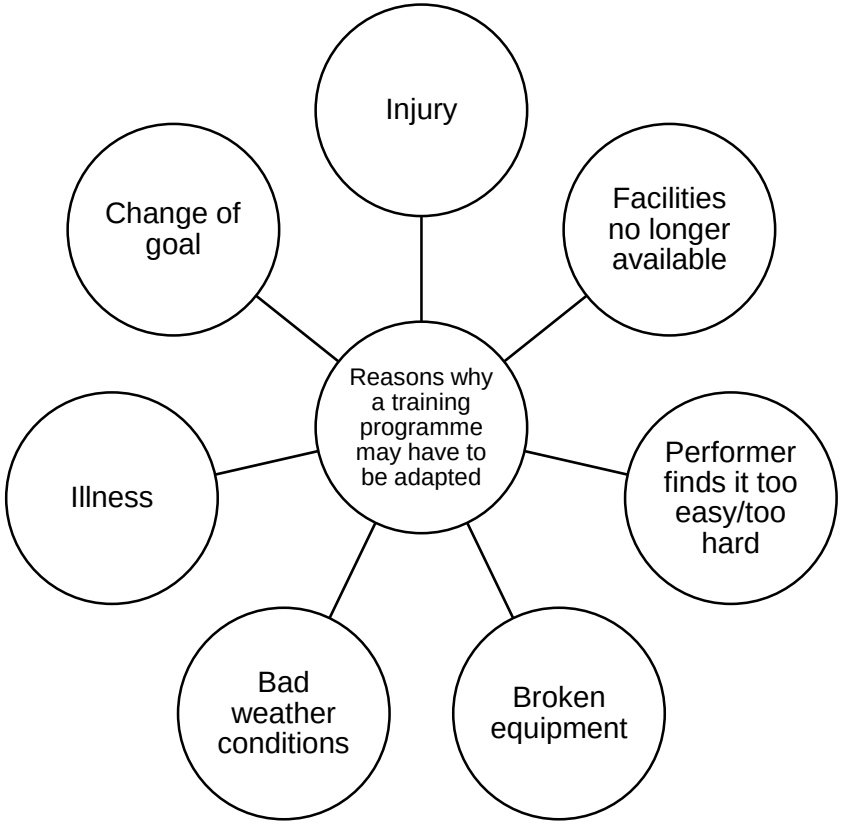
Planning a fitness-based training programme

2. Elements of a programme – How to monitor progress and adapt a programme

Objective measures

You may use fitness test data to determine if changes need to be made to the programme



Subjective measures

You may speak to the athlete or look at a training diary to determine if changes need to be made to the programme

Year 10 / 11

Recording results from a fitness training programme

3. Post-programme tests

Skill and fitness based tests

Carried out at the start, middle and end of the programme

Scores compared between the start and end

Conclusions can then be made and achievements recognised

If final tests do not show an improvement the goals may need to be reset and training may need to continue for longer.

Year 10 / 11

Recording results from a fitness training programme

3. Achievement recognition

Recognising the achievements of a programme is important to motivate the performer for further and future programmes and performance

Consider each of the parts of the strength programme

Consider the fitness tests results before, during and after the training programme – have they improved, stayed the same or got worse?

Consider the skill test results before, during and after the training programme – have they improved, stayed the same or got worse?

Provide a conclusion for the overall effect of the programme on the performer – provide suggestions of what they could do next time to have a greater effect

Year 10 / 11

Reflections on the fitness training programme

Goals Set	Does you programme achieve the SMART goals set? Do the measures you used allow you to make a judgement
Training methods used	Has the training method helped you achieve your goals? If so why ? If not why?
Fitness component links correctly to skill test	Look at your fitness test scores you complete after the programme do they show an improvement? Yes they do explain why ? No they don't explain why?

Year 10 / 11

Strengths and area's for improvement of the fitness training programme

Has the programme been a success or failure?

What areas of the programme went well?

Did they enjoy it? Did it motivate them? Was the intensity appropriate? Was then training frequent enough?

What aspects of the programme did not work well?

Did the participant find it hard to complete? Did they lack motivation? Did they dislike any session?

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Further development suggestions for improvement to the fitness training programme

Results	Were the results acceptable? If not , why not? How could you improve the outcomes / results
Boredom / Variety	Was the programme boring? If so, how could you improve this? What could you change to make improvements to programme?
Intensity	Was the intensity too easy or hard? How could you adjust the intensity?