GCSE Physical Education

Component 1

Part 3

Revision Booklet

- Health and fitness
- Principles of training
- Long term effects of training
- How to optimise training and prevent injury
- Effective use of warm-up and cool-down
- Use of data

Health and Fitness

Topic Number	Description	Pre Revision	Post revision
3.1.1	Definitions of: • Fitness • Health • Exercise • performance Explain the relationship between them		
3.2.1	**Components of fitness** and the relative importance of these components in physical activity and sport: • cardiovascular fitness (aerobic endurance) • strength • muscular endurance, • flexibility • body composition • agility • balance • coordination, • power • reaction time • speed		
3.2.2	Fitness tests: the value of fitness testing, the purpose of specific fitness tests, the test protocols, the selection of the appropriate fitness test for components of fitness and the rationale for selection		
3.2.3	Collection and interpretation of data from fitness test results and analysis and evaluation of these against normative data tables		
3.2.4	**Fitness tests** for specific components of fitness: • cardiovascular fitness – Cooper 12-minute tests Harvard Step Test • strength – grip dynamometer, • muscular endurance – one-minute sit-up, one-minute press-up • speed – 30m sprint • power – vertical jump, • flexibility – sit and reach		
3.2.5	How fitness is improved – see section 3.3.1–3.3.3		

Areas of Strength	
Areas to revise	

Health and Fitness

You need to know the differences between these terms:

- Fitness
- Health
- Exercise
- Performance

Component	Definition	Explanation
Fitness	'The ability to meet the demands of the environment'	Are you fit enough to do your everyday tasks in your everyday life. e.g. the fitness needed to be a window cleaner to that of an office worker
Health	'A state of complete emotional, physical and social wellbeing ant not merely the absence of disease and infirmity'	Not only are you free from disease and infirmity you are socially active, physically fit and have no emotional problems such as stress
Exercise	'A form of activity done to maintain and improve health or physical fitness, it is not competitive sport'	Exercise can be going to the gym to improve your health such as to lose weight or it could be to make you physically fitter such as improving your strength
Performance	'How well a task is performed'	When taking a free kick did you: • Demonstrate a high level of performance • Hit the ball with fluency and accuracy • Did you make any mistakes

The relationship between health and fitness

Exercise improves fitness, an increase in fitness will improve performance. E.g. if you increase your strength you will be able to throw the shot-put further

Exercise improves health (physical, social, emotional)

- Physical – exercise can make your heart bigger and stronger reducing the chance of coronary heart disease
- Social – meet new friends at fitness classes or clubs
- Emotional – exercise can reduce stress and anxiety

Components of fitness

When thinking of components of fitness think!

- What is it
- Who needs it
- Why is it important
- How does it affect performance

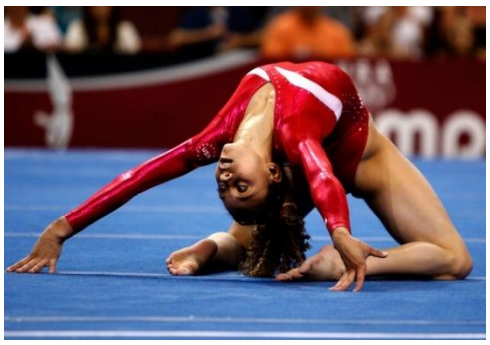
Cardiovascular fitness		
What	Who	Why
'The ability to exercise the entire body for long periods of time without getting tired'	Performers who exercise over a long period of time such as: • games players • long distance runners • long distance rowers	They need good cardiovascular fitness to be able to maintain a high standard of performance throughout the race/match. without cardiovascular fitness they would tire easily which would affect their overall time and position in the race


Muscular endurance		
What	Who	Why
'The ability to exercise the voluntary muscles many times without getting tired'	Performers who exercise the same muscles for a long duration, such as: • cyclist (legs) • boxing (punching) • swimmer (arms & legs)	They need good muscular endurance to be able to maintain a high standard of performance throughout the race/match. without muscular endurance they would tire easily



Flexibility		
What	Who	Why
'The range of movement possible at a joint'	Performers need a wide range of movement to stretch/move into position, such as: • gymnasts • goal keepers • divers	They need good flexibility to be able to get into position without getting injured a gymnast and a diver may need good flexibility to perform complex movements whilst a goal keeper needs it to stretch to save a shot.





Reaction time		
What	Who	Why
'The time taken to respond to a stimulus'	Performers who need to make quick decisions and movements, such as: • sprinters • badminton players • Rugby players	Sprinters need good reaction time to get a good start a rugby player needs good reaction time to catch a bad pass or a loose ball. Badminton players need to react when the shuttle is to return a shot. A stimulus can include: a ball, whistle, starters gun, opponent, error or a dangerous situation



Speed		
What	Who	Why
'The amount of time it takes to perform a particular action or cover a particular distance'	Performers who need to win events with the quickest time, and also those that need to gain advantage over their opponents. Such as: • sprinters • long jumper • javelin thrower	Speed is needed in the legs when sprinting to get the fastest time possible, Speed is needed in the arm to throw the javelin as far as possible. Remember, speed is needed in all power events. Speed can gain an advantage over opponents by getting to the ball first in team sports


Strength		
What	Who	Why
'The amount of force a muscle can exert against a resistance'	Performers that require a lot of muscular force in singular movements or contractions (not repeated) such as: • weight lifters • rugby players • Gymnasts	Strength is needed to create a large force this can help performers such as rugby player to bust through tackles to score a try it can help support your weight in gymnastics. Greater strength will also mean you can lift heavier weights in events that require it.


Power		
What	Who	Why
'Is the ability to do strength performances quickly' Power = Strength x Speed	Performers who use strength at speed. Events or activities that require explosive and intense movements, such as: • shot-put • football (shooting) • high jump	Power is needed when throwing the shot-put both speed and strength are needed to throw the shot further. Power is needed in the legs when shooting in football to make the ball travel faster. Power is needed in the legs to jump higher



Agility		
What	Who	Why
'Is the ability to change position of the body quickly while maintaining control of the movement'	Performers who need to change direction quickly, this can be to avoid an opponent or to get into position to return a shot. Such as: • rugby (sidestep) • tennis • netball (marking)	Agility is needed to sidestep an opponent in rugby. You need to confuse the opponent by going one way then the other. To mark a player in netball you need to be able to change position quickly to stay close. Agility is needed in tennis to get from one side of the court to the other to return a shot.



Balance		
What	Who	Why
'Is the ability to retain the body's centre of mass above the base of support' (static or dynamic)	Performers who need to be able to keep steady to get the best result in performance. Such as: • gymnastics (static) • hammer throw (dynamic) • skiing (dynamic)	Performers need balance so they do not fall over. For example, in gymnastics when performing a balance (static) or travelling across the beam (dynamic). Balance is also needed when throwing the hammer so you do not step out the circle and skiing down a slope so you do not fall over.

Coordination		
What	Who	Why
'Is the ability to use two or more body parts together'	Performers who need to be controlled so the end result is efficient, smooth and effective. Such as: • archery (hands & eyes) • football (feet & eye) • tennis (hand & eye)	An archer uses hand/eye coordination in order to hit the target and score as many points as possible, a footballer uses foot/eye coordination to kick the ball accurately and a tennis player uses hand/eye coordination to strike the ball accurately

Body Composition		
What	Who	Why
'Is the relative ratio of fat mass to fat-free mass in the body'	Performers need different amounts of fat-free mass depending on the nature of the activity, such as: • long distance runner • Sprinter • Sumo wrestler	A long-distance runner needs to be light so they do not get weighed down, they need low fat and low muscle mass. A sprinter needs power for speed, they need high muscle mass and low fat. A sumo wrestler needs weight so they do not get pushed over, they need both high muscle and fat

PAR-Q and Fitness Tests

PAR-Q		
What is it?	Why is it important?	Example questions
Physical Activity Readiness Questionnaire	It is designed to identify any potential health problems that mean exercise would not be recommended such as high blood pressure or heart disease	• What is your height • What is your weight • Family medical history (high blood pressure, heart disease) • Do you smoke

When to use fitness testing?

- At the start of an exercise programme
- During the exercise programme (to monitor training)
- At the end of an exercise programme

Fitness Tests

- How?
- Why?

Reasons for fitness testing?

- Establish current fitness levels
- Identify strengths and weaknesses
- Using information to plan a relevant fitness programme
- Help set SMART targets
- Check for improvements since

Cardiovascular Fitness tests

Used for endurance activities such as games players, long distance runners/swimmers

12-minute cooper run test

- Run for 12 minutes
- Calculate the distance ran
- Compare your result to a ratings chart

12-minute swim test

- Swim for 12 minutes
- Calculate the distance swam
- Compare your result to a ratings chart

Harvard step test

- Step up and down onto bench (33cm for females 40cm for males)
- Continue for 5 minutes (1 step every 2 seconds)
- When finished take your heart rate for 30 seconds every minute for 3 minutes and add the three heart rates up
- Complete the following calculation: 100 x 300 (seconds) divided by the sum of the three heart rates
- Compare your result to a rating s chart

Strength Fitness test

Used where strength is important such as rock climbing, boxing and rugby (grip strength only measures strength in the forearm and hand but is a general indicator of an individual's strength)

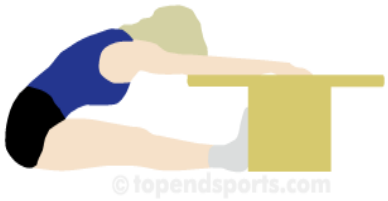
Grip Dynamometer

- Adjust the grip to fit your hand
- Keep your arm beside and at a right angle to body
- Squeeze your hand as hard as you can
- Compare your result to a ratings chart

Flexibility Fitness test

Used where flexibility is important such as gymnasts, divers, dancers

Sit and reach test

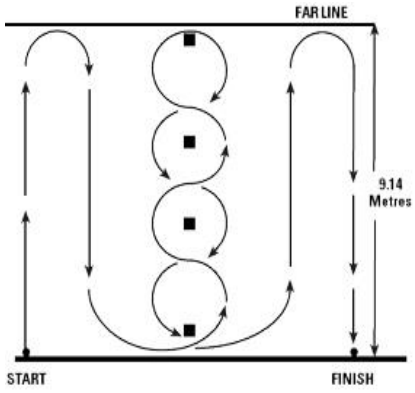


- Sit with the legs straight and soles of feet flat against the box
- Palms face down one on top of the other
- Stretch and reach as far as possible
- Record the distance reached
- Compare your result to a ratings chart

Agility Fitness test

Used where agility is important such as basketball, rugby, badminton

Illinois agility run



- Lie face down on the floor
- Run the course as fast as you can
- Record the time taken
- Compare your result to a ratings chart

Speed Fitness test

Used where speed is important such as sprinters, rugby, hockey

30-meter sprint

- Run 30 metres as fast as you can
- Record the time taken
- Compare your result to a ratings chart

Power Fitness test

Used where power is important such as sprinters, rugby, javelin

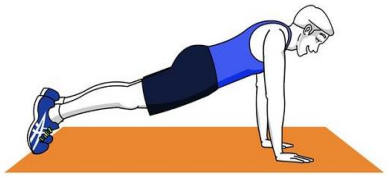
Vertical jump test

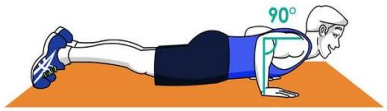
- Stand side onto a wall with feet flat on the floor
- Mark the highest point where the tips of your fingers can reach
- Holding a piece of chalk jump as high as you can
- Mark the wall on the top of the jump
- Measure the difference between the first and second chalk marks
- Compare your result to a ratings chart

Muscular Endurance Fitness tests

Used where muscular endurance is important such as running, cycling, swimming

One-minute press-up test





- Lie face down, flat on a mat
- Push up extending your arms until straight
- Lower until arms are 90°
- Push up again
- Complete as many as you can in one minute
- Compare your result to a ratings chart

One-minute sit-up test

- Lie on a mat, knees bent, feet flat on the floor
- Place arms across the chest hands on opposite shoulders
- Sit up until back is at 90° Then return to start position
- Complete as many as you can in one minute
- Compare your result to a ratings chart

Interpreting fitness test results

You need to be able to collect and interpret data from fitness tests and analyse and evaluate the results against normative data tables

Key terms	
Normative data	The name given to the rating charts you use to determine test results
Test protocol	How the test is carried out
Raw data	The score from the fitness test result
Interpret	Using the data tables to provide a rating of your fitness
Analyse	Break down the information to determine where your strengths/weaknesses are based on the test results
Evaluate	Make a judgement based on looking at the impact of training

Example

Below is a table showing a normative table for the Illinois agility run. All you have to do is locate sex and the rating from a time. For example, a female scored a time of 17.4 seconds (she has above average agility)

Rating	Males (seconds)	Females (seconds)
Excellent	< 15.2	< 17.0
Above Average	15.2 - 16.1	17.0 - 17.9
Average	16.2 - 18.1	18.0 - 21.7
Below Average	18.2 - 19.3	21.8 - 23.0
Poor	> 19.3	> 23.0

Principles of Training

Topic Number	Description	Pre Revision	Post revision
3.3.1	Planning training using the **principles of training**: • Individual needs • Specificity • Progressive overload • FITT (frequency, intensity, time, type) • Overtraining • Reversibility • Thresholds of training Aerobic target zone: 60–80% Anaerobic target zone: 80%–90% Calculated using Karvonen formula		
3.3.2	Factors to consider when deciding the most appropriate training methods and training intensities for different physical activities and sports (fitness/sport requirements, facilities available, current level of fitness)		
3.3.3	The use of different **training methods** for specific components of fitness, physical activity and sport: • Continuous • Fartlek • Circuit • Interval • plyometrics, • weight/resistance Fitness classes for specific components of fitness, physical activity and sport (body pump, aerobics, Pilates, yoga, spinning). The advantages and disadvantages of different training methods		

Areas of Strength	
Areas to revise	

Principles of Training

For training to be successful it is important that you do not train too little or too hard. It is important that the training is right for each person, and it will help them to improve. In order to make sure this happens you need to apply the principles of training.

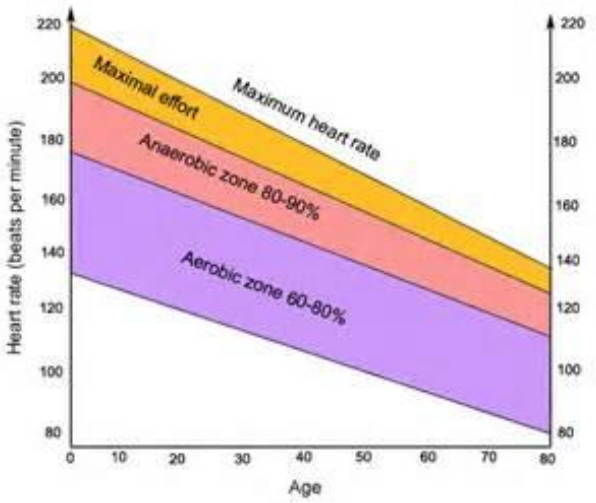
SPORRIO

Principle	Explanation	Application
F.I.T.T	F = Frequency (how often) Intensity = How hard Time = How long Type = Type of training	F= I train 3 times per week I = 3 sets of 8 repetitions of 15kg (bicep curls) T = I train for 60 minutes T = I use circuit training
Individual Needs	Everybody is different and has different needs. It is important to match training to the requirements of the individual	Ronaldo is a professional football he trains 5 days per week. John plays Sunday league and trains once per week
Reversibility	Just as fitness improves with training it can decline if you stop training.	Reversibility can be caused by lack of training or injury
Specificity	This means that training must match the requirements of the activity so that the right muscles and body systems are adapted	A sprinter should train for speed A rower should train using a rowing machine not a treadmill
Thresholds of Training	To improve fitness, you should train within your target zone. Your target zone will depend on the intensity of your activity Aerobic = 60 – 80% of max HR Anaerobic = 80 – 90% of max HR	Running a 10k is an aerobic activity. I will therefore train in my aerobic training zone of 60 – 80% of my max heart rate
Overtraining	This means doing too much training. This can lead to injury and prevent improvement. Rest, duration of session and the intensity are important when training	Training everyday does not allow rest for recovery and adaptations
Progressive Overload	Gradually increasing the amount of working training so that fitness gains occur, but without the risk of injury	Week 1 = run 10 minutes Week 2 = run 15 minutes

Thresholds of Training

Aerobic training zone = 60 – 80% of max HR

Anaerobic training zone = 8 – 90% of max HR



The Karvonen Formula

Maximum Heart rate = 220 - age

Worked example

John is 16 years old

His maximum heart rate = 220 – age = **204 bpm**

Aerobic training zone = 60 -80 %

60% = 60 x 204 ÷ 100 = **122 bpm**

80% = 80 x 204 ÷ 100 = **163 bpm**

Training Methods

Continuous Training

Characteristics:

- Is aerobic
- Has no breaks or rest (20 minutes or more)
- Sub-maximal exercise
- Improves cardiovascular & muscular endurance

Benefits/Advantages:

- No equipment or facilities
- Has many health benefits (CHD)

Disadvantages:

- Boring
- No change of pace
- Can cause impact injuries

Sports or Activities:

Long distance running, swimming, cycling

Fartlek Training

Characteristics:

- Form of continuous training
- Varies in pace and terrain
- Aerobic & Anaerobic (jogging & sprinting)
- Improves cardiovascular fitness & muscular endurance

Benefits/Advantages:

- No equipment or facilities
- Change of pace can be more interesting

Disadvantages:

- High intensity can be avoided
- A safe route may be hard to find

Sports or Activities:

Netball, Hockey, Rugby, Basketball

(Matches the fitness demands of a game)

Plyometric Training

Characteristics:

- High Intensity
- Short duration
- Breaks between sets (exercises)
- Involves jumping/bounding
- Improves power (speed & strength)

Benefits/Advantages:

- Develops power quickly
- No equipment

Disadvantages:

- Can cause injury due to high intensity

Sports or Activities:

Volleyball, basketball, hurdles

Weight/Resistance Training

Characteristics:

- Form of interval training
- Involves reps and sets
- Weight provides the resistance
- Can be completed with free or fixed weights
- Improves strength, power and muscular endurance

Benefits/Advantages:

- Can target specific areas of the body

Disadvantages:

- Equipment can be expensive
- Can cause injury with poor technique
- Need to have a spotter with free weights

Sports or Activities:

Weight lifting, rugby, shot-put

Tennis (muscular endurance)

Circuit Training

Characteristics:

- Contains a number of stations
- Stations are organised in a circuit
- Stations can be skill or fitness based
- Can be aerobic or anaerobic
- Intensity is measure by time repetitions or number of circuits
- Can develop all the components of fitness

Benefits/Advantages:

- Variety of stations generates interest
- Can work on skill or fitness
- Can easily be adapted for the individual

Disadvantages:

- Equipment can be costly
- Can be time consuming to set up

Sports or Activities:

Circuit training can be adapted to all sports and activities

Interval Training

Characteristics:

- High intense exercise followed by periods of rest to allow for recovery
- Usually anaerobic but can be aerobic
- Interval can be used on an athletics track, in a circuit or through weight training
- Improves speed but can be adapted to improve cardiovascular and strength

Benefits/Advantages:

- Can be used to improve health and fitness (aerobic & anaerobic)
- No equipment is needed

Disadvantages:

- Can be repetitive and boring
- Need to plan and keep track of sets

Sports or Activities:

Usually for speed such as sprinters and swimmers (it can be adapted to other sports with justification)

Fitness Classes

Aerobics

Fitness:

- Cardiovascular fitness

Characteristics:

- Involves continuous activity between 30 – 60 minutes
- Examples include step and aqua aerobics

Body Pump

Fitness:

- Muscular endurance
- Strength

Characteristics:

- Moderate to high intensity
- Lots of repetitions & uses barbells
- Targets all areas of the body

Pilates

Fitness:

- Flexibility
- Balance
- Strength

Characteristics:

- Exercises done on a mat
- Uses resistance
- Focuses on core strength

Yoga

Fitness:

- Flexibility
- Balance
- Strength

Characteristics:

- Exercise don on a mat
- Include relaxation & breathing technique

Spinning

Fitness:

- Cardiovascular fitness
- Muscular endurance

Characteristics:

- Continuous cycling to music
- An instructor motivates
- Pace and intensity changes throughout the session

Long Term Effects of Exercise

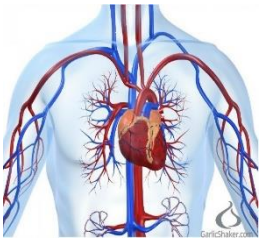
Topic Number	Description	Pre Revision	Post revision
3.4.1	Long-term effects of: • aerobic and anaerobic training and exercise • the muscular-skeletal systems • cardio-respiratory systems • performance		
3.4.2	Long-term training effects: • train for longer • train with more intensely		
3.4.3	Long-term training effects and benefits: **Muscular-Skeletal system** • increased bone density, • increased strength of ligaments and tendons • muscle hypertrophy The importance of rest for adaptations to take place, and time to recover before the next training session		
3.4.4	Long-term training effects and benefits: **Cardio-Respiratory System** • decreased resting heart rate • faster recovery • increased resting stroke volume • maximum cardiac output • increased size/strength of heart, • increased capillarisation • increase in number of red blood • cells, drop in resting blood pressure due to more elastic • muscular wall of veins and arteries • increased lung capacity/volume and vital capacity • increased number of alveoli • increased strength of diaphragm and external intercostal muscles		

Areas of Strength	
Areas to revise	

The long-term effects of exercise

Regular exercise has many benefits on health on the cardiovascular system they include:

- Reduced chance of stroke
- Reduced chance of coronary heart disease
- Reduced chance of type II diabetes



Cardiovascular System	
Adaptation	**Explanation**
• Increased elasticity of the muscular wall of veins and arteries • Reduced resting blood pressure	An increase in the elasticity of veins and arteries means that you will lower your blood pressures and have less chance of developing coronary heart disease
• Increase in size and strength of the heart (cardiac hypertrophy) • Increase in resting stroke volume • Lower resting heart rate • Increase in maximum cardiac output	An increase in the size and strength of the heart allows more blood to be ejected from the heart in one beat (stoke volume) Because the heart can pump more blood per beat the amount of times the heart beats per minute at rest reduces. Because the heart is bigger and stronger, when exercising the heart can pump more blood around the body per minute (cardiac output). The more blood that can be pumped around the body means that the blood can carry more oxygen to the working muscles and remove carbon dioxide **Cardiac Output = Stroke Volume x Heart rate**
• Increased capillarisation • Increased number of red blood cells • Faster recovery rate	More capillaries allow more oxygen to get into the blood and into the working muscles. It also allows carbon dioxide to be removed. An increase in red blood cells allows the blood to carry more oxygen to the working muscles Because the heart is bigger and more efficient we can recover quicker after exercise

Respiratory System	
Adaptation	**Explanation**
• Increased number of alveoli • Increased strength of intercostal muscles • Increased strength of the diaphragm • Increased tidal volume • Increased vital capacity	All the adaptations to the respiratory system allow more oxygen can be breathed in and transported to the working muscles More alveoli mean that more oxygen can be exchanged between the alveoli and the capillaries and more carbon dioxide can be removed. An increase in the diaphragm and intercostal muscles means that more space is created for the lungs to fully inflate An increase in tidal volume and vital capacity allows more oxygen to be taken into the lungs and more carbon dioxide can be removed

Skeletal System	
Adaptation	**Explanation**
• Increased bone density	Weight bearing activities lead to stronger bones, stronger bones mean that you are less chance of breaks/fractures. There is also less chance of osteoporosis
• Stronger ligaments and tendons	Stronger ligaments and tendons mean that joints are more stable so you are less likely to dislocate or an overuse injury of the tendon such as golfer elbow

Muscular System	
Adaptation	**Explanation**
Aerobic adaptations • Hypertrophy of slow twitch fibres • Increased myoglobin content • Increased size of mitochondria	Slow twitch muscle fibres will get bigger through aerobic exercise, muscular endurance will improve An increase in myoglobin means that more oxygen can get to the working muscles for aerobic exercise An increase in mitochondria allows us to produce more energy aerobically
Anaerobic adaptations • Hypertrophy of fast twitch fibres • Increased strength • Increased tolerance to lactic acid	Fast twitch muscle fibre will get bigger allowing more strength and power for anaerobic activities An increase in strength allows us to produce more force in anaerobic activities An increase in tolerance to lactic acid allows to muscles to carry on exercising at a high intensity without getting tired

How to Optimise Training and Prevent Injury			
Topic Number	**Description**	**Pre Revision**	**Post revision**
3.5.1	The use of a PARQ to assess personal readiness for training and recommendations for amendment to training based on PARQ		
3.5.2	Injury prevention through: • correct application of the principles of training to avoid overuse injuries • correct application and adherence to the rules of an activity during play/participation • use of appropriate protective clothing and equipment; • checking of equipment and facilities before use all as applied to a range of physical activities and sports		
3.5.3	Injuries that can occur in physical activity and sport: • Concussion • Fractures • Dislocation • Sprain • torn cartilage • and soft tissue injury (strain, tennis elbow, golfers elbow, abrasions)		
3.5.4	RICE (rest, ice, compression, elevation)		
3.5.5	Performance-enhancing drugs (PEDs) and their positive and negative effects on sporting performance and performer lifestyle, including: • anabolic steroids • beta blockers • diuretics • narcotic analgesics • peptide hormones (erythropoietin (EPO) • growth hormones (GH)) • stimulants • blood doping		

Areas of Strength	
Areas to revise	

Injuries

Injury prevention

Injury prevention	Explanation
PAR-Q	Identify potential health risks such as high blood pressure
Allow recovery time	Prevent overuse injuries by allowing time to rest and recover
Warm-up	Increases elasticity of muscles
Use correct clothing	Clothing can protect different parts of our body
Apply the rules	Rules are there to protect performers from injury
Use correct equipment	Equipment should be checked and appropriate for the age group
Check Equipment	Equipment should be checked so that faulty or inappropriate does not cause injury
Check facilities	Facilities should be checked and to remove obstacles from the playing area
Apply principles of training	Ensure you use progressive overload and are working at the correct intensity and allow rest
Balanced competition	Competition should be balanced in age, weight, skill and sex.

Application of injury prevention

PAR-Q
Before the player trains they will fill in a PAR-Q to highlight any health problems

Correct Clothing
Player wears a gum-shield to protect their teeth

Allow Recovery Time
After the match the player will rest to allow recovery and adaption. This prevents overuse injuries

Warm-Up
Player warms up before they play to ensure the elasticity of muscle so they are less likely to pull or stain them

Check Equipment
When playing plays must check the correct equipment such as padded goal posts. The padded posts reduce the chance of injury if a player runs or fall into them

Apply the Rules
Player are not allowed to tackle above the shoulder this prevents injuries to the head such as concussion

Use Correct Equipment
Players should use the correct sized and weight of ball to reduce the chance of injury

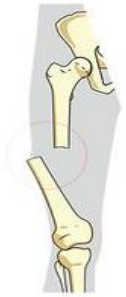
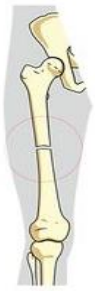
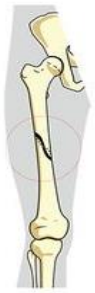
Check Facilities
Before you play obstacles such as broken glass should be removed from the pitch

Balanced Competition
Player will only play against his own age, sex, ability

Apply Principles of Training
Players should use the correct sized and weight of ball to reduce the chance of injury

Identify risks in sport: In rugby possible injuries include:			
Broken nose	Grazes	Concussion	Dislocation
Cuts	fracture	Bruising	Whiplash

Fractures

Fractures			
Compound	Simple	Greenstick	Stress
			
Compound or open fractures are when the bone is broken and causes the skin to break	Simple or closed fractures are when the bone is broken but does not break the skin	Greenstick fractures is where the bone breaks at one side and bends on the other. They are common in cildren	Stress fractures is where there is a small crack in the bone usually casused through overuse
Symtoms		**Treatment**	
• Pain • Bruising • Swelling • Misshapen limb		Need to be treate dby a doctor who will make sure the bone is properly aligned and imobilised unitil it has healed	
A fracture is cause when a force on the bone is greater than the bone iself. A fracture can be caused by a tackle in football, or falling from a height in basketball			

Concussion and Dislocation

Concussion		
 Concussion is a mild head/brain injury. It is caused by a blow to the head or by whiplash shaking the brain inside the skull	**Symtoms** • Confusion • Dizziness • Unconsciousness • Nausea	**Treatment** Seek medical advice and monitor closely to make sure the symptoms do not get worse
Concussion is common in contact sports such as rugby when getting tackled, it can also be caused in cycling where falling off the bike		

Dislocation

Dislocation is where one of the bones at a joint comes out of place, e.g. shoulder, knee finger

Symtoms
- Pain
- Misshapen joint
- Swelling

Treatment
Seek medical advice because of possible damage to surrounding nerves

Dislocations are often caused by a fall or a blow to the area. The shoulder can become dislocated in a rugby tackle or the finger in cricket when catching the ball

Injuries at joints and soft tissue injuries

Sprain

A sprain is a soft tissue injury where some of the fibres of the ligament are torn

Symtoms
- Pain
- bruising
- Swelling

Treatment
- Rest
- Ice
- Compression
- Elevation

A sprain can occur during a twisting or overstretching the joint

Strain

Strains are a soft tissue injury and is a stretch or tear to the muscle. Sometimes known as a pulled muscle

Symtoms
- Pain
- bruising
- Swelling

Treatment
- Rest
- Ice
- Compression
- Elevation

A strain occur due to overstretching

Tennis/Golfers Elbow

Tennis elbow is a joint injury where the tendons are inflamed pain is felt on the outside of the elbow

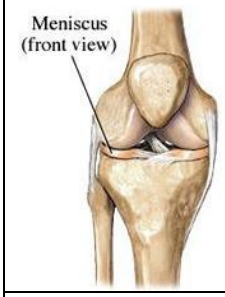
Tennis elbow is a joint injury where the tendons are inflamed pain is felt on the inside of the elbow

Symtoms
- Pain
- Swelling

Treatment
- Rest
- Ice
- Compression
- Elevation

Tennis and golfers elbow are caused by overuse

Torn Cartilage



Cartilage act as cushion at the ends of bones. Torn cartilage is an injury where small tears appear in the cartilage

Symtoms

- Pain
- Swelling
- Stiffness at the joint

Treatment

Rest and strengthening exercises

Torn cartilage can happen when you twist forcefully, sudden impact/stopping

Abrasions

Abrasions are minor injuries to the skin and include cuts and grazes

Symtoms

- Pain
- Swelling

Treatment

Abrasions must be cleaned and covered with a sterile dressing, pressure should be applied if bleeding

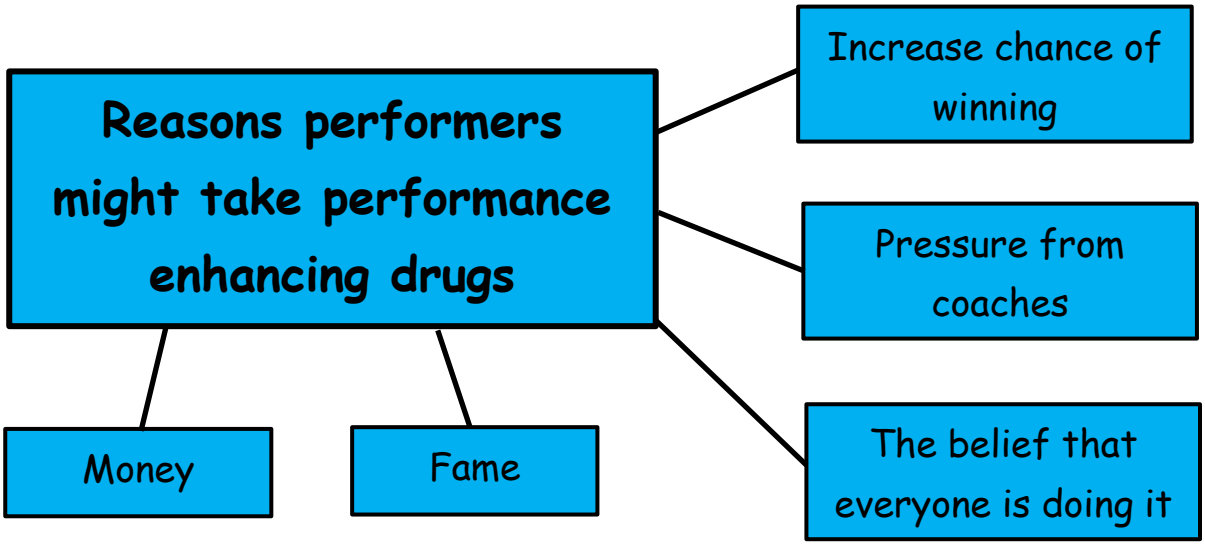
Abrasions can occur in any activity due to a knock or a fall

R.I.C.E.

	Do not use the injured area, allowing time to heal and to prevent further damage
	The cold from the ice will help reduce swelling and pain by constricting the blood vessels. Do not apply ice direct onto the skin and not for too long
	Apply a bandage to the area to help reduce swelling and provide support. Make sure the bandage is not too tight
	Keep the effected area raise to reduce swelling by reducing the blood flow

Performance enhancing drugs

Drug		Effect on performance	Health risks	Who might take it
Anabolic Steroids		allows performers to train longer and harder It increases protein synthesis helping develop lean muscle mass Speeds up recovery time	• Liver damage • CHD • Testicular atrophy • Infertility • Skin problems • Mood swings • Aggression • baldness	Activities that require power: • Sprinters • Rugby players • Weight lifters • Boxers
Beta Blockers		Beta blockers slow heart rate and reduce anxiety and allow the performer to remain calm	• Disturbance of sleep • Tiredness • Lower blood pressure • Slowing of heart rate	Activities that require precision • Archery • Diving • Shooting
Diuretics		Diuretics achieve quick weight loss (fluids). They also mask other drugs making them harder to detect	• Dehydration • Nausea/headaches • Heart/kidney failure	Activities with weight categories • Boxing • Jockey • Drug cheats
Narcotic Analgesics		Narcotic analgesics increases the performers pain threshold so can mask injuries, also give a feeling of invincibility	• Nausea/vomiting • Anxiety/depression • Kidney/liver damage • Addiction • Risk further injury	Any sport that a performer is injured or • Boxers • Sprinters
Peptide Hormones	**EPO**	Erythropoietin (EPO) Can increase red blood cell production increasing O_2 delivery	• Blood thickness • Blood clots • Strokes • Heart attack	Aerobic events e.g. long distance: • Running • Cycling
	HGH	Human Growth Hormone Helps muscle mass and burns fat	• Arthritis • Heart failure • Abnormal feet/hands	Strength events • Weightlifting • Sprinting
Stimulants		Stimulants increase alertness, reduce tiredness and increase heart rate	• Insomnia • Anxiety • Aggression • Irregular heart rate	Alert/aggressive sports/activities • Rugby • boxing
Blood Doping		Blood doping is when Blood is put into a performers body prior to an event (more red blood cells = more O_2)	• Infection • Blood clots • Stroke • HIV/hepatitis • Deep vein thrombosis	Aerobic events e.g. long distance: • Running • cycling


Reasons performers might take performance enhancing drugs
Increase chance of winning
Pressure from coaches
The belief that everyone is doing it
Money
Fame

Effective use of Warm up & Cool down

Topic Number	Description	Pre Revision	Post revision
3.6.1	The purpose and importance of warm-ups and cool downs to effective training sessions and physical activity and sport		
3.6.2	Phases of a warm-up and their significance in preparation for physical activity and sport		
3.6.3	Activities included in warm-ups and cool downs		

Areas of Strength	
Areas to revise	

Warm-up

A warm-up has three phases:

Warm-up

Phase 1 Pulse raiser
To raise the heart rate and speed up oxygen delivery to the working muscles. E.g. jogging a lap of the pitch

Phase 2 Stretching
Stretching the muscles and soft tissues you are about to use increases their elasticity and range of movement

Phase 3 Drills
These are more intense practices relating to the main session, such as dribbling if you are playing basketball

Why we warm-up

- To physical and mentally prepare for exercise
- To increase oxygen delivery to the working
- Increase temperature of muscles, tendons, and ligament. Reducing the chance of injury
- Increase flexibility which will aid performance

Cool-down

A cool-down has two phases:

Cool-down

Phase 1 Light exercise
e.g. slow jogging at a much lower intensity you have been working

Phase 1 Stretching
Stretch the muscles you have used in the main activity

Why we cool-down

- The removal of lactic acid
- The removal of carbon dioxide
- Bring heart and breathing rate slowly back to resting
- Helps avoid dizziness due to blood pooling
- Improves flexibility

A cool down is **NOT** designed to prevent injury it is to return the body to its resting levels

Use of Data

Topic Number	Description	Pre Revision	Post revision
4.1.1	Develop knowledge and understanding of data analysis in relation to key areas of physical activity and sport		
4.1.2	Demonstrate an understanding of how data is collected in fitness, physical and sport activities – using both qualitative and quantitative methods		
4.1.3	Present data (including tables and graphs)		
4.1.4	Interpret data accurately		
4.1.5	Analyse and evaluate statistical data from their own results and interpret against normative data in physical activity and sport		

Areas of Strength	
Areas to revise	

The use of data

Data can be collected in many ways.

- Data can be collected on the quality that you see, e.g. how well a skill is performed **(qualitative)**
- Data can be collected based on numbers e.g. how many press-ups completed **(quantitative)**

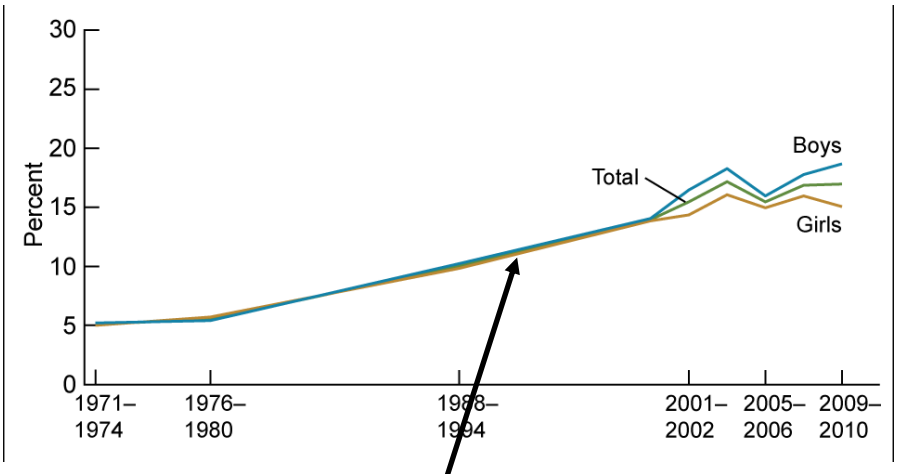
Use of data

Below is a table showing lots of data in normative table of a 12-minute cooper run test. There are lots of number but all you have to do is locate the age group and the score. For example, a 17-year-old scored 1750m

Age	Excellent	Above Average	Average	Below Average	Poor
13-14	>2000m	1900-2000m	1600-1899m	1500-1599m	<1500m
15-16	>2100m	2000-2100m	1700-1999m	1600-1699m	<1600m
17-20	>2300m	2100-2300m	1800-2099m	1700-1799m	<1700m
20-29	>2700m	2200-2700m	1800-2199m	1500-1799m	<1500m
30-39	>2500m	2000-2500m	1700-1999m	1400-1699m	<1400m
40-49	>2300m	1900-2300m	1500-1899m	1200-1499m	<1200m
>50	>2200m	1700-2200m	1400-1699m	1100-1399m	<1100m

Trends

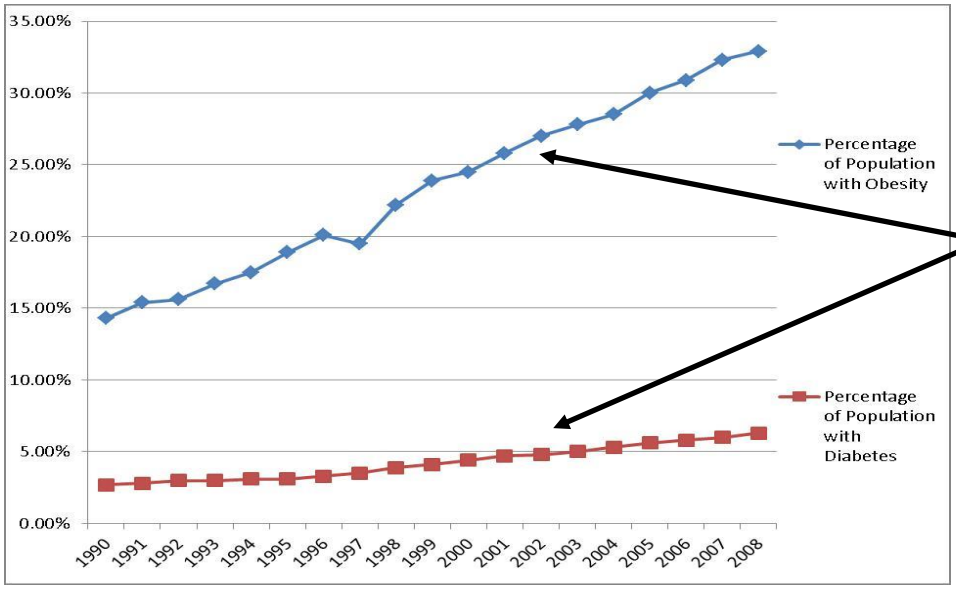
Below is a graph showing trends in obesity of young children aged 2 -19. You will need to analyse the date and identify the trends in data.



The overall trend is that obesity is rising steadily from 1971-1974 to 2009-2010. It has risen from 5% to 15%. Boys are more obese than girls.

Graphs and Charts

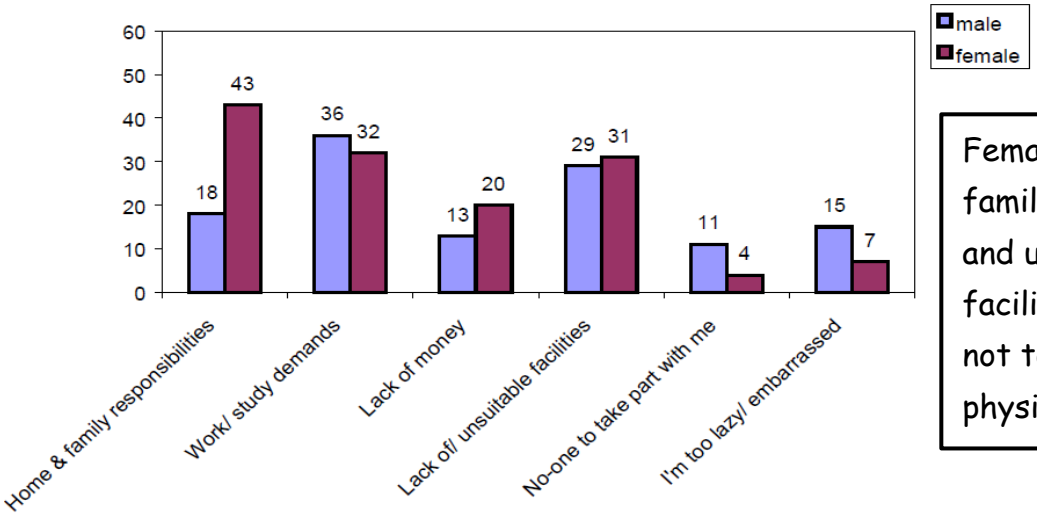
Some information that happens over time will be represented as a line graph, such as the correlation between obesity and diabetes over time. See below



Obesity and diabetes have both risen from 1990-2008.

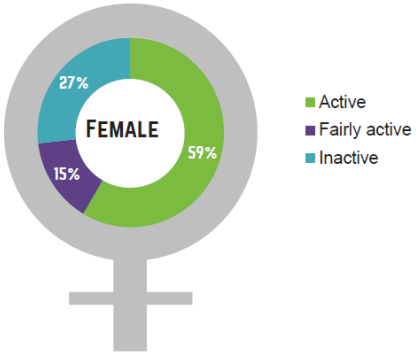
Obesity levels have risen at a greater rate than diabetes

In information that compares different categories of data may be represented in a bar graph, such as the reason why males and female don't take part in physical activity.



Females find home & family, lack of money and unsuitable facilities reasons why not to take part in physical exercise

If you are trying to compare parts of a whole you may use a pie chart such as a pie chart to show the percentage of women who are active, fairly active and inactive.



59% of females are active

15% are fairly active

27% are inactive

Apply your Knowledge

- Health and fitness
- Principles of training
- Long term effects of training
- How to optimise training and prevent injury
- Effective use of warm-up and cool-down
- Use of data

1. Define the following terms? (3 marks)

Heath: _____

_____

Exercise: _____

_____

Performance: _____

_____

2. Explain how flexibility is important to both the performers below? (4 marks)

_____

_____

_____

_____

_____

_____

3. Explain how both static and dynamic balance are used in gymnastics? (4 marks)

_____

_____

_____

_____

4. Explain the importance of body composition to both the athletes below (4 marks)

_____

_____

_____

_____

_____

5. What is a PARQ and why is it important? (2 marks)

_____

_____

6. Explain why fitness testing is important? (3 marks)

_____

_____

_____

7. Complete the table below? (5 marks)

Component of fitness		**Fitness Test**
Cardiovascular		
		Illinois Run
Speed		
		Vertical Jump
Muscular Endurance		

8. What type of muscle fibre is the most important to a marathon runner, explain your answer? (4 marks)

9. Below shows normative data for the 12-minute cooper run. Compare both John's and Holly's results? (3 marks)
    - John is 16 and scored 2400m
    - Holly is 27 and scores 2300m

Age		Very good	Good	Average	Bad	Very bad
13-14	M	2700+ m	2400 - 2700 m	2200 - 2399 m	2100 - 2199 m	2100- m
	F	2000+ m	1900 - 2000 m	1600 - 1899 m	1500 - 1599 m	1500- m
15-16	M	2800+ m	2500 - 2800 m	2300 - 2499 m	2200 - 2299 m	2200- m
	F	2100+ m	2000 - 2100 m	1700 - 1999 m	1600 - 1699 m	1600- m
17-20	M	3000+ m	2700 - 3000 m	2500 - 2699 m	2300 - 2499 m	2300- m
	F	2300+ m	2100 - 2300 m	1800 - 2099 m	1700 - 1799 m	1700- m
20-29	M	2800+ m	2400 - 2800 m	2200 - 2399 m	1600 - 2199 m	1600- m
	F	2700+ m	2200 - 2700 m	1800 - 2199 m	1500 - 1799 m	1500- m
30-39	M	2700+ m	2300 - 2700 m	1900 - 2299 m	1500 - 1899 m	1500- m
	F	2500+ m	2000 - 2500 m	1700 - 1999 m	1400 - 1699 m	1400- m
40-49	M	2500+ m	2100 - 2500 m	1700 - 2099 m	1400 - 1699 m	1400- m
	F	2300+ m	1900 - 2300 m	1500 - 1899 m	1200 - 1499 m	1200- m
50+	M	2400+ m	2000 - 2400 m	1600 - 1999 m	1300 - 1599 m	1300- m
	F	2200+ m	1700 - 2200 m	1400 - 1699 m	1100 - 1399 m	1100- m

10. What is the difference between the principle of training: specificity and individual needs. Give examples of both? (4 marks)

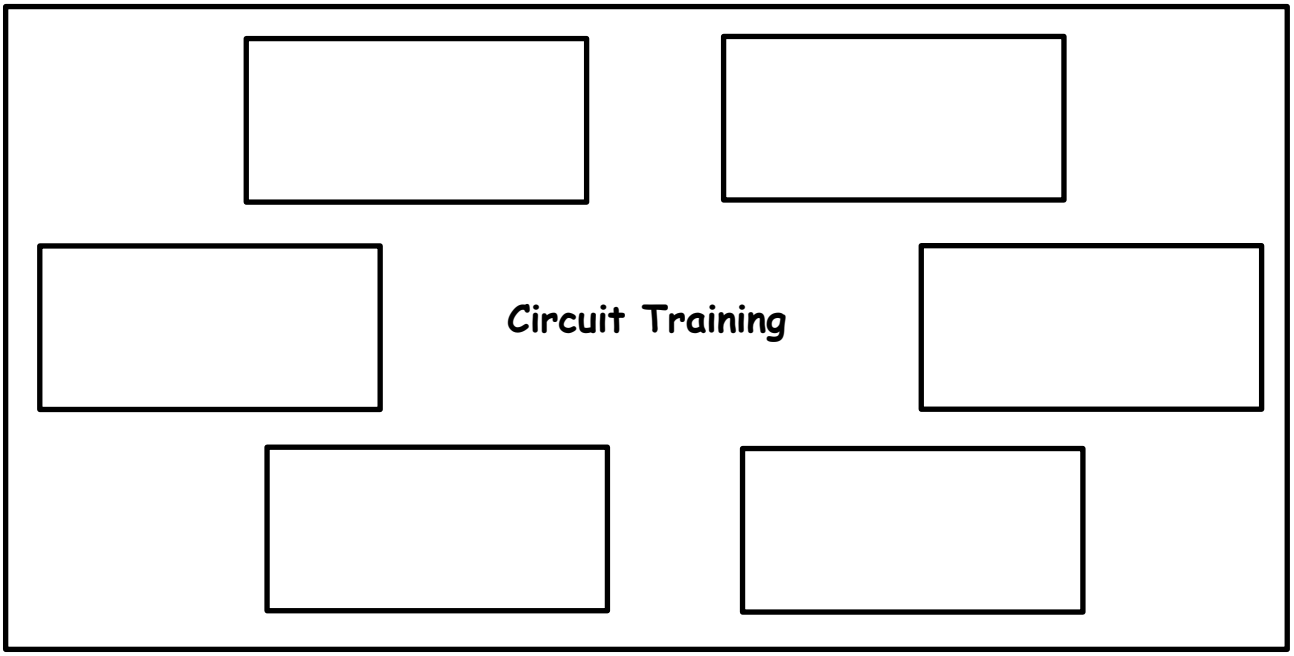
11. John is current circuit training each week last week he did:
    - 7 stations
    - 40 seconds on each station
    - 2 circuits
    - 1-minute rest after each circuit

    From the information above, explain three ways John could use progressive overload in next week's session? (3 mark)

12. Megan is 20 years old, Using the Karvonen formula work out her aerobic training threshold? (5 marks)

13. Kacey is a rugby player and wants to improve her cardiovascular fitness. She has been told that both continuous and fartlek training are suitable methods to improve her cardiovascular fitness. Explain which is the most suitable training method for Kacey? (5 marks)

14. Design a 6-station circuit training session for long jumper below? (4 marks)



15. Justify your choice of stations? (3 marks)

16. Describe interval training? (2 marks)

17. Explain how the long-term effects of exercise on the skeletal system can improve performance? (3 marks)

_____

_____

_____

18. Regular aerobic exercise will lead to adaptations of the cardiovascular system. Explain the health benefits of these adaptations? (3 marks)

_____

_____

_____

19. Name two long term effects of exercise on the respiratory system. Explain how these adaptations improve performance? (4 marks)

_____

_____

_____

_____

_____

20. Explain four ways injury can be prevented through personal readiness during a game of American football? (4 marks)

_____

_____

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_____

_____

21. Kayaking can be a dangerous sport, explain two ways in which injury can be prevented? (2 marks)

_____

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_____

_____

_____

22. Name a soft tissue injury and explain how it should be treated? (2 marks)

_____

_____

23. Why may a boxer take diuretics, explain the health risks associated with this drug? (2 marks)

_____

_____

_____

_____

24. Using the pictures below, name a performing enhancing drug and describe how the drug would affect their performance? (8 marks)

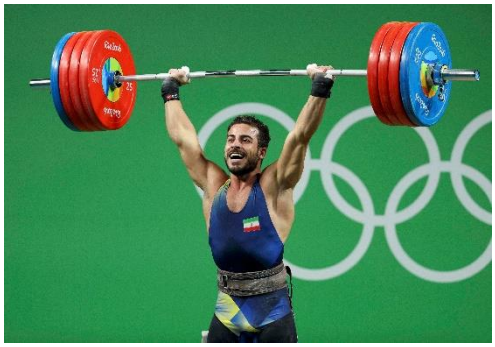
Drug:

_____

Effect on Performance:

_____

_____



Drug:

_____

Effect on Performance:

_____

_____

Drug:

_____

Effect on Performance:

_____

_____

Drug:

_____

Effect on Performance:

_____

_____

25. Give two reasons why a performer may be tempted to take performance enhancing drugs (2 marks)

_____

_____

26. What is blood doping and explain what effect does it has on performance? (4 marks)

_____

_____

_____

_____

_____

27. Name the three phases of a warm-up (3 marks)

_____

_____

28. Give three reasons why we warm-up (3 marks)

_____

_____

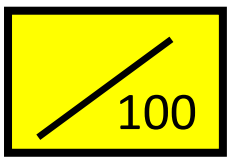
29. Give two reasons why we cool-down (2 marks)

_____

_____

Self-Assessment

- You are now going to use your revision notes to mark your work
- Fill in any incorrect answers in Green pen
- Give yourself a score



Post *it*

Write a short post it note about your knowledge at this stage of component 1 and what you need to do to improve!