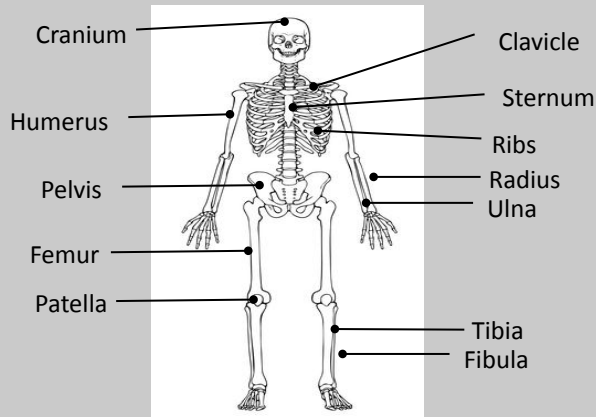
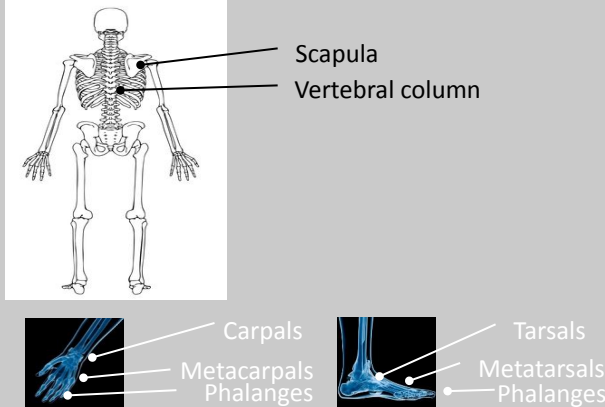


GCSE Physical Education – The structure and functions of the skeletal system (Paper 1)

Structure of the skeletal system



Structure of the skeletal system



Vertebral Column

The vertebral column is divided into 5 sections. It is made up of irregularly shaped bones called vertebrae.

Each vertebra is protected with cartilage to prevent friction.

The vertebrae protects the spinal cord.



Function of the skeleton

- Protection of vital organs
- Movement
- Support
- Blood cell production (platelets, red and white)
- Mineral Storage
- Structural shape



Classification of joint

- Hinge (elbow and knee)
- Ball and socket (hip and shoulder)



Connective tissue

Ligaments – attaches bone to bone to add joint stability.

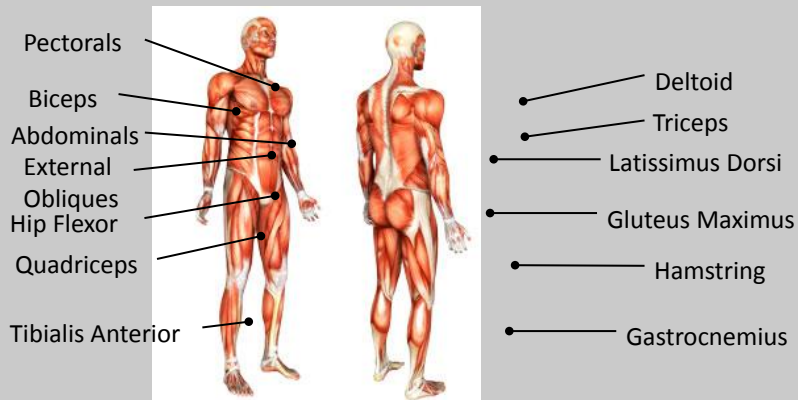
Tendons – attaches muscles to bone and contributes to joint movement as a result of muscle contraction.

Classification of bones

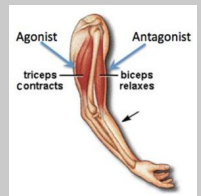
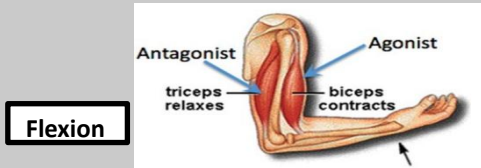
Long (leverage)	Short (weight bearing)	Flat (protection + muscle attachment)	Irregular (protection and muscle attachment)
Clear shaft region to the bone. <i>i.e. femur, humerus & phalanges</i>	Light, small and very strong. <i>i.e. carpals tarsals</i>	Broad surface area for muscle attach <i>i.e. cranium</i>	Assist the functioning of certain joints. <i>i.e. Patella/vertebrae</i>

Flexion	Adduction	Rotation	Dorsi-Flexion (ankle joint)
Decreasing the angle at a joint (bending)	Limbs moving towards the midline of the body.	A twisting/turning action around a joint.	When the toes are turned up to the body.
Extension	Abduction	Circumduction	Planter-Flexion (ankle joint)
Increasing the angle at a joint (straightening)	Limbs moving away from the midline of the body.	A combination of flexion, extension, adduction & abduction.	When the toes are pointed away from the body.

Structure of the muscular system



Antagonistic pairs - Muscles are arranged in antagonistic pairs. As one muscle contracts (shortens) its partner relaxes (lengthens) *i.e. Biceps and Triceps.*



Agonist = the muscle that contracts to produce movement.
Antagonist = the muscle that relaxes to allow the movement to occur.

- Examples in the body:**
- Biceps & Triceps
 - Quadriceps & Hamstring
 - Hip Flexor & Gluteus Maximus
 - Tibialis Anterior & Gastrocnemius

Types of muscle



Voluntary muscles enable movement throughout the body.

Involuntary muscles are essential in maintaining healthy body systems.

Cardiac muscle is vital in sport because it makes the heart pump. Fitness training will strengthen cardiac muscle making the heart more efficient at pumping blood around the body.

Muscle Contractions

Isotonic Contraction - These occur when the muscle changes in length when it contracts, and they result in limb movement. Isotonic contractions can be concentric (where the muscle contracts and shortens) or eccentric (where the muscle contracts and lengthens, usually in the downwards phase of a movement).



Isometric Contraction - These occur when the muscle stays the same length. There is no actual movement of either limb or the joint because the muscles are working to keep the joint stationary.

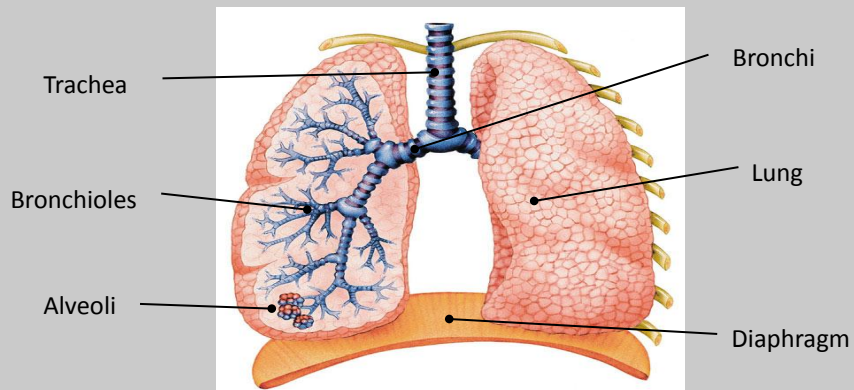


The short term effects of exercise on the muscles:

1. Working muscles produce heat
2. Increased muscle fatigue due to lactate accumulation
3. Blood is redistributed to working muscles (shunting)

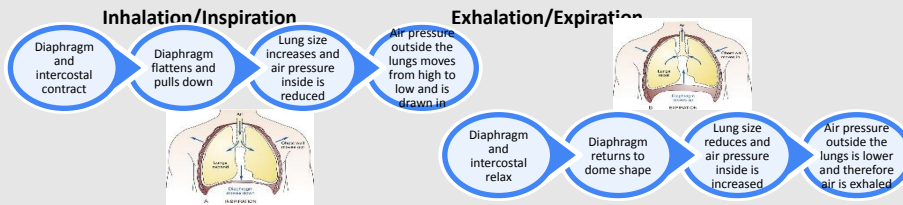
Link of the muscular and skeletal system – both systems work together to produce movement. *i.e. a contracting muscle pulls*

Structure of the respiratory system



Composition of inhaled and exhaled air

Gas	Inhaled air	Exhaled air
Oxygen	21%	16%
Carbon dioxide	0.04%	4%
Nitrogen	78%	78%



Respiratory values

Tidal Volume – the amount of air inhaled and exhaled per breath.

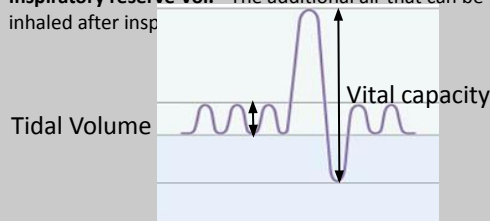
Resting value = 500ml

Vital Capacity – The maximum amount of air exhaled following a maximal breath in.

Residual Vol– The Vol of air that remains in the lungs after a max expiration.

Expiratory reserve Vol. – The additional air that can be forcibly exhaled after the expiration of norm Tidal Vol

Inspiratory reserve Vol. - The additional air that can be forcibly inhaled after insp

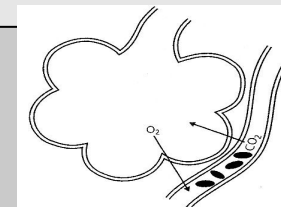


Gaseous exchange at the alveoli

- Diffusion is the movement of molecules from an area of high concentration to a low one.
- The alveoli have thin moist walls to allow diffusion to occur.
- Capillaries are closely wrapped around the alveoli to reduce the distance of diffusion and increase efficiency.

During inhalation:

- The concentration of **oxygen** in air is higher than the alveoli.
- The concentration of **carbon dioxide** in the blood is higher than that in the air.

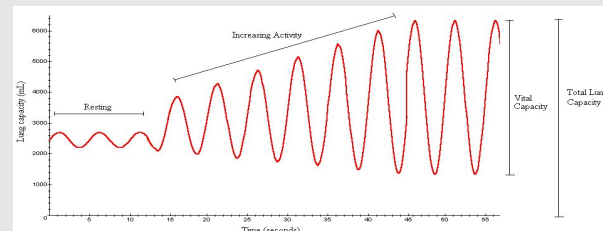


During exercise

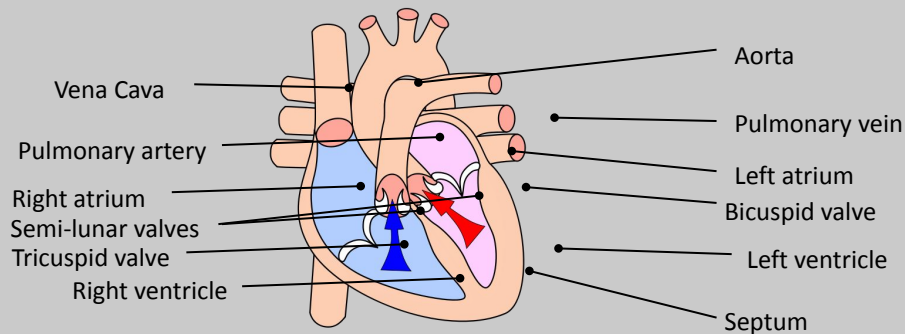
Gaseous exchange increases as the intensity of the activity increases to cope with:

- An increase demand for oxygen at working muscles
- An increase in carbon dioxide production and the need to rid this waste product.

Frequency ↑ + Tidal Volume ↑



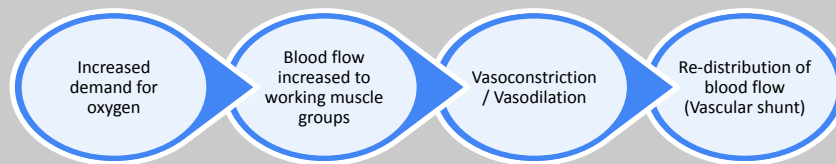
Structure of the cardiovascular system



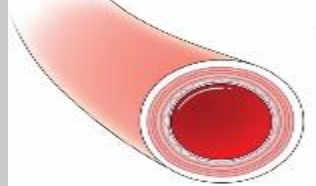
Deoxygenated blood = **BLUE** (Right side)

Oxygenated = **RED** (Left side)

Vascular Shunting



Vasoconstriction – NARROWING

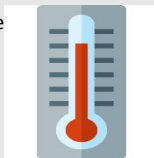


Vasodilation – EXPANDING



Function of the cardiovascular system

- Transport of oxygen, carbon dioxide and nutrients
- Clotting of open wounds
- Regulation of body temperature



Arteries

1. Away from the heart
2. Oxygenated blood (except pulmonary artery)
3. Thick/elastic walls
4. High pressure
5. Small lumen



Veins

1. Back to the heart
2. Deoxygenated blood (except pulmonary vein)
3. Thin walls + larger lumen
4. Lower pressure
5. Valves



Capillaries

1. In the tissue
2. Site of gaseous exchange
3. Very thin walls



Components of blood - Red blood cells

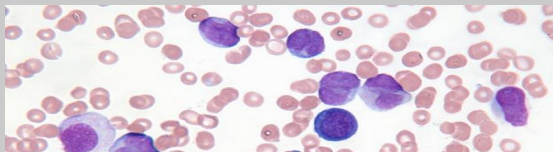
Carry oxygen from the lungs to the working muscles + Removes CO₂.

Haemoglobin binds the oxygen



White blood cells

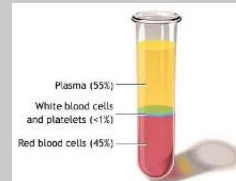
Are part of the immune system and **fight disease** and infection.



Platelets & Plasma

Platelets **clot blood** and form a scab around the site of injury.

Plasma is the **liquid/fluid** part of blood that allows it to flow.



GCSE Physical Education – Aerobic/Anaerobic and long term effects of exercise (Paper 1)

Aerobic and Anaerobic exercise – two methods of energy production by the body (Energy: the capacity to do work)

Two factors determine which method is used: **Intensity & duration**

Aerobic energy production – Takes place in the presence of Oxygen



Exercise intensity is moderate/low for a sustained period of
i.e. *cycling i.e. marathon runner/endurance cycling*
By products are released as sweat and CO₂ exhaled.



Anaerobic energy production – takes place in the absence of oxygen



Intensity of anaerobic activity is high as muscle contractions are powerful & quick time.
i.e. *100m sprinter/long jump*
By product (lactic acid) builds up and causes fatigue.



Cardiovascular system

Cardiac equation – Cardiac output (Q) = Stroke Volume (SV) x Heart Rate (HR)

Long term effects of exercise

1. Cardiac hypertrophy – this is the increased size of the heart due to training. This causes:

* **Lower resting HR** * **Increased Cardiac Output** * **Increased SV**

2. Increased elasticity in the walls of arteries and veins – more efficient constriction and dilation.

3. Increased number of red blood cells – has capacity to carry more oxygen to working muscles.

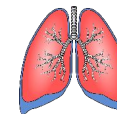
4. Increased Aerobic Capacity



Respiratory system

Long term effects of exercise

1. Increased capillarisation – better blood supply around the alveoli.
2. Increased number of alveoli – results in better gaseous exchange (oxygen delivery and waste product removal)
3. Increased strength of diaphragm and intercostal muscles
4. Increased tidal volume and minute Volume



Muscular system

Long term effects of exercise

1. Muscular hypertrophy – increase in muscle size and strength/endurance.
2. Increase size and number of mitochondria – produces more energy aerobically. *** (Not in SPEC!)
3. Increased tolerance to lactic acid – Resistance to muscle fatigue.



Skeletal system

Long term effects of exercise

1. Increased bone density – strong bones reduce the risk of injuries.




2. Increased strength of ligaments and tendons – allows the body to change direction quickly without injury occurring.

3. Increased rate of recovery



GCSE Physical Education – Movement analysis (Paper 1)

Levers – a rigid bar that moves around a pivot point with force applied to it.

Fulcrum (F)	Effort (E)	Load (L)
A fixed pivot point 	The source of energy that will be applied 	The weight/resistance to be moved 

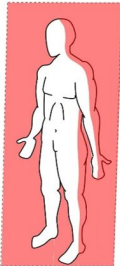
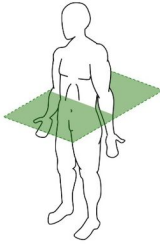
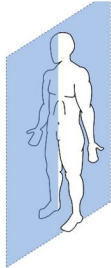
Classes of lever

First class lever: Drawing shows Effort (red arrow down) on the left, Fulcrum (blue triangle) in the middle, and Load (yellow square) on the right. Example: Neck tilting (head tilting back and forth).



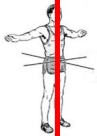



Second class lever: Drawing shows Effort (red arrow up) on the left, Fulcrum (blue triangle) on the right, and Load (yellow square) in the middle. Example: Jumping (heel of foot as fulcrum, ball of foot as load, body as effort).

Third class lever: Drawing shows Fulcrum (blue triangle) on the left, Effort (red arrow up) in the middle, and Load (yellow square) on the right. Example: Bicep curling (elbow as fulcrum, forearm as load, hand as effort).

Planes – imagery lines that divide the body into two.

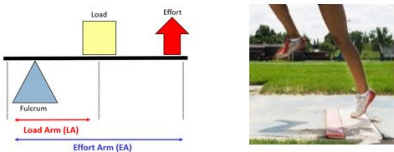
Frontal plane	Transverse plane	Sagittal plane
A vertical plane but this divides the body into front and back. 	A horizontal plane that divides the body into upper and lower halves. 	A vertical plane that divides the body into right and left sides. 

Axes – imagery lines that the whole body turns around.

Frontal axis	Longitudinal axis	Transverse axis
Runs through the body horizontally from the back to front.  Example: Cartwheel 	Runs through the body vertically from the top to bottom.  Example: Full twist 	Runs through the body horizontally from the left to right.  Example: Somersault 

Mechanical advantage

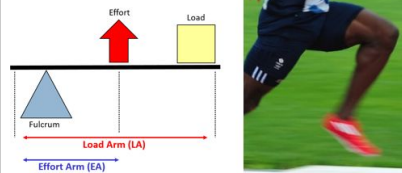
This is where a lever's **effort arm** is greater than its **load arm**.



Large loads can be moved with limited effort.

Mechanical disadvantage

This is where a lever's **load arm** is longer than its **effort arm**.



Lifestyle choices – the decisions we make about how we live and behave that impact on health.

Diet

Eating healthy	Eating unhealthy
<ol style="list-style-type: none"> Boosts energy levels Reduces the risk of developing serious health conditions Help lose weight 	<ol style="list-style-type: none"> Leads to deficiencies Increases weight and % body fat Causes depression with poor body shape

Activity levels

Active lifestyle	Inactive lifestyle
<ol style="list-style-type: none"> Boosts self esteem Reduces stress and anxiety Improves fitness levels 	<ol style="list-style-type: none"> Increases risk of disease Decreases muscle mass, strength and energy levels

Work/rest/sleep balance

Good balance	Poor balance
<ol style="list-style-type: none"> Improves mood Increases productivity at work Contributes to quality of sleep 	<ol style="list-style-type: none"> Increases the risk of depression Leads to weight gain Increased blood pressure

Well being – a combination of physical, emotional and social health.

Positives effects of training/exercise on:

Physical health

- Improves heart function
- Improves efficiency of the body systems
- Reduces the risk of some illness
- Able to do everyday tasks • to avoid obesity.



Emotional health

- Reduces stress/tension
- Release of feel good hormones (serotonin)
- Able to control emotions.



Social health

- Opportunities to socialise/make friends
- Cooperation
- Teamwork
- Have essential human needs (food, shelter, clothing)



Social benefits may vary depending on age group:

- Elderly
- Children

Recreational drugs – these are taken for pleasure and are legal to those over a certain age.

Smoking

Causes breathlessness and reduces the oxygen-carrying capacity. This affect aerobic ability for endurance events. Smoking (nicotine) increases the risk of lung cancer, bronchitis, pneumonia & emphysema.



Alcohol - contains chemicals which act on the brain affect judgement.



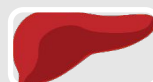
Balance, co-ordination and reactions are affected



Diuretic –increased water levels in urine and cause dehydration



Reduction of glycogen levels and slower lactic acid removal

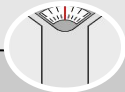


Liver problems

Sedentary lifestyle – a lifestyle with no or irregular physical activity. This includes sitting, reading, watching television & playing video games.

Health risks associated are:

- Heart disease
- Type 2 diabetes
- Obesity
- Osteoporosis
- Depression



Impact of a sedentary lifestyle on weight

Overweight – weighing more than the expected weight for height and gender / **Overfat** – high percentage of body fat

Obese – weighing significantly more than expected

GCSE Physical Education – Components of Fitness (Paper 1)

Health – A state of complete mental, physical and social well-being.

Fitness - The ability to meet the demands of the environment.

Exercise - A form of physical activity done primarily to improve health and/or fitness. Not competitive sport.

Performance – The action of performing a task/action.



Relationship between these:

- Regular **exercise** increases general **health & fitness**.
- High levels of **fitness** can in turn have a positive impact on **performance**.

Components of Fitness - These are more health based components

Component	Definition	Sporting Example
Muscular Strength (Maximal, static dynamic and explosive)	The amount of the force muscles can generate against a resistance.	
Muscular Endurance	The ability to use voluntary muscles, over long periods of time without getting tired.	
Flexibility	The range of movement at a joint.	
Cardiovascular endurance (Aerobic power)	The ability of the heart and circulatory system to meet the demands of the body for a long period of time.	

Components of Fitness - These are more skilled based components

Component	Definition	Sporting Example
Coordination	The ability to move two or more body parts at the same time.	
Reaction Time	The time taken for a response to occur after a stimulus.	
Agility	The ability to change direction at speed.	
Balance	The ability to keep the body steady when in a static position or when moving.	
Speed	The time taken to cover a set distance/complete a movement.	
Power/explosive strength (aerobic power)	The ability to combine speed and strength.	

GCSE Physical Education – Fitness Testing (Paper 1)

Muscular Strength

Test: Hand Grip Dynamometer Test

Protocol: Grip the dynamometer in one hand. Start with your hand up and bring down to side while pulling in handle. No swinging your hand.



Advantages	Disadvantages
<ul style="list-style-type: none"> • Simple and easy to complete 	<ul style="list-style-type: none"> • Only one size of dynamometer which may affect reading • Focuses solely on forearm strength.

Muscular Endurance

Test: 1 minute sit up test



1 minute press up test



Protocol: Complete as many full sit ups/press ups as possible in 1 minute.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Simple test to complete • Minimal equipment needed. 	<ul style="list-style-type: none"> • Difficult to assess whether each repetition is performed correctly. Difficult to accurately measure large groups.

Flexibility

Test: Sit and Reach Test

Protocol: Sit with legs straight out in front and soles of feet against box/table. Reach forward without bending knees. No jerking movements.



Advantages	Disadvantages
<ul style="list-style-type: none"> • Quick and easy to perform. • Data table readily available for comparison. 	<ul style="list-style-type: none"> • Can cause injury if not fully warmed up appropriately. • Only measures flexibility of lower back and hamstrings.

Cardiovascular Endurance (Aerobic Power)

Test: Multi Stage Fitness Test

Protocol: Cones, tape measure (20m) tape/CD, sheet to record. Run over 20m, Progressive Individual runs 20m in time with 'bleeps'.



Test: Harvard Step Test

Protocol: Step continuously for 5 minutes. Measure heart rate at 1, 2 and 3 minutes after exercise.



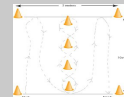
Advantages	Disadvantages
<ul style="list-style-type: none"> • Minimal equipment needed • Test can be self administered. 	<ul style="list-style-type: none"> • Inaccuracy of heart rate measurements • Motivation dependant

Advantages	Disadvantages
<ul style="list-style-type: none"> • Simple test to complete 	<ul style="list-style-type: none"> • Motivation dependant

Agility

Test: Illinois Agility Test

Protocol: Start lying down at the start line. Complete course as quick as possible (10m x 5m – 4 central cones)



Advantages	Disadvantages
<ul style="list-style-type: none"> • Simple and easy to complete 	<ul style="list-style-type: none"> • Motivation dependant / Timing errors.

Speed

Test: 30m Sprint Test

Protocol: Start from stationary position. Complete distance in the quickest possible time. Time is stopped when chest crosses the line.



Advantages	Disadvantages
<ul style="list-style-type: none"> • Quick test to complete. • Minimal equipment needed and can be performed anywhere with a flat 50m run. 	<ul style="list-style-type: none"> • Running surfaces/weather conditions can affect the results. • Inaccuracies with stopwatch usage.

Power

Test: Vertical jump Test

Protocol: Stand next to wall and mark an initial reach while feet are flat on the ground. Standing jump to reach as high as possible. Measure distance from first mark to second.



Advantages	Disadvantages
<ul style="list-style-type: none"> • Quick and easy to perform. • Easy to complete with large groups. 	<ul style="list-style-type: none"> • Technique plays a large role in successful completion.

Reliability /Validity

Validity relates to whether the test actually measures what it sets out to measure.

Reliability is a question of whether the test is accurate. It is important to ensure that the procedure is correctly maintained for ALL individuals.



Results can be improved:

- By using experienced testers & calibrating equipment
- Ensuring performers have the same level of motivation to complete each test
- Repeatedly test to avoid human error (x3)

GCSE Physical Education – Principles of Training (Paper 1)

Principles of training - **Guidelines** that ensure **training is effective** and results in **positive adaptations**. These principles are used in **Personal Exercise Programmes (PEP)**

PAR-Q – Physical Activity Readiness Questionnaire

Conducted before fitness testing or an activity programme to examine the performer's readiness for training or any health conditions/lifestyle choices that may affect the successful completion.

FITT Principle

Frequency	How often training takes place.	<i>Increase training from once a week to two</i>
Intensity	How hard the exercise is.	<i>Increase resistance from 10kg to 15kg or increase incline on the treadmill.</i>
Time	The length of the session.	<i>Increase training session from 45 minutes to 55 minutes.</i>
Type	The method of training used.	<i>Change to from interval training to Fartlek training.</i>

Progressive Overload

Working the body harder than normal/gradually increasing the amount of exercise you do. *i.e. bench press 50kg x 10 repetitions and increase to 55kg x5 repetitions.* Training should sensibly overload the body as if it progresses too quickly, then injury may occur



Reversibility

If training is not regular, adaptations will be reversed. This can happen when:

- Suffering from illness and cannot train
- Injury
- After an off-season.



Specificity

Training should be **matched** to the requirements of the sport or position the performer is involved in.

Training must be specifically designed to develop the right:

- Muscles
- Type of fitness
- Skills



Individual needs

All PEP's would differ depending on:

- Performer's goals/targets
- Strength and weaknesses
- Age/gender
- Current health/fitness levels



Overtraining

Occurs when you **train too hard** and do not allow the body enough **rest/recovery time**. Signs/symptoms include: extended muscle soreness, frequent illness & increase injuries.

Calculating Training Zones/Thresholds of Training

Karvonen formula used to calculate aerobic and anaerobic target training zones.

Maximum Heart Rate (MHR) = 220 – age	Aerobic target zone: 60–80% of MHR (60% = $x \cdot 0.6$ / 80% = $x \cdot 0.8$)	Anaerobic target zone: 80%–90% of MHR (80% = $x \cdot 0.8$ / 90% = $x \cdot 0.9$)
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90%
80%
60%



Anaerobic training target zone
(Training for power and speed)

Aerobic training target zone (Training for cardiovascular fitness and muscular endurance)

GCSE Physical Education – Methods of Training (Paper 1)

Continuous training - Involves a steady but regular pace at a moderate intensity (aerobic) which should last for at least 20 minutes.

i.e. running, walking, swimming, rowing or cycling.

Used by a **marathon runner**.



Advantages	Disadvantages
<ul style="list-style-type: none"> • Ideal for beginners • Highly effective for long distance athletes 	<ul style="list-style-type: none"> • Can be extremely boring as repetitive

Interval training - Involves periods of work followed by periods of rest. i.e. *Sprint for 20 metre + walk back to start.*

Used by a **200m sprinter**



Advantages	Disadvantages
<ul style="list-style-type: none"> • Quick and easy to set up. • Can mix aerobic and anaerobic exercise which replicates team games. 	<ul style="list-style-type: none"> • It can be hard to keep going when you start to fatigue (high motivation and self discipline needed) • Over training can occur if sufficient rest is not allowed between sessions (48 hours)

Fartlek training – Referred to as ‘**speed play**’

This is a form interval training but without rest.

Involves a variety of changing intensities over different distances and terrains.

i.e. *1 lap at 50% max, 1 lap walking, 1 lap at 80% (aerobic and anaerobic used)*

Used by **games players – Hockey players**

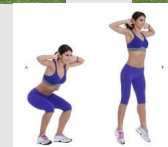


Advantages	Disadvantages
<ul style="list-style-type: none"> • More enjoyable than interval and continuous training • Good for sports which require changes in speed • Easily adapted to suit the individuals level of fitness and sport. 	<ul style="list-style-type: none"> • Performer must be well motivated particularly when intensity is high • Difficult to assess whether performer is performing at the correct intensity

Plyometrics training

Involves high-impact exercises that develop **power**. i.e. *bounding/hopping, squat jumps*. Used by **long jumpers, 100 m sprinters or basketball players**.

Advantages
<ul style="list-style-type: none"> • Easy to set up requiring little or no equipment • Hugely effective in developing power
Disadvantages
<ul style="list-style-type: none"> • Can result in injury if not fully warmed up. • Can place a great stress on joints and muscles.



Weight/Resistance training – A form of training that uses progressive resistance against a muscle group. Used by **cyclists**.

Muscular strength: **High weight x low repetitions**

Muscular endurance: **Low weight x high repetitions**



Advantages	Disadvantages
<ul style="list-style-type: none"> • Variety of equipment to prevent boredom • Strengthens the whole body or the muscle groups targeted. • Can be adapted easily to suit different sports 	<ul style="list-style-type: none"> • Requires expensive equipment • If exercises are not completed with the correct technique it can cause injury to the performer

Circuit training - A series of exercises completed one after another. Each exercise is called a station. Each station should work a different area of the body to avoid fatigue.

i.e. *press ups, sit ups, squats, shuttle runs.*



Advantages	Disadvantages
<ul style="list-style-type: none"> • Quick and easy to set up • Easy to complete with large groups • Can be adjusted to be made specific for certain sports. i.e. <i>netball specific circuit</i> 	<ul style="list-style-type: none"> • Technique can be affected by fatigue and can increase risk of injury • Must have motivation and drive to complete the set amount of repetitions and sets.

Fitness classes

Another example of training is **High Altitude training**.

This suits endurance athletes e.g - marathon runners and athletes that work Aerobically - athletes that sustain exercise for long periods of time. This type of training has no benefit to anaerobic athletes such as sprinters.



Advantages	Disadvantages
<ul style="list-style-type: none"> • Variety avoids boredom • Instructor will challenge & motivate • Great way to meet new people 	<ul style="list-style-type: none"> • Gym membership can be expensive. • Group classes are not tailored to individual needs.

Injury prevention – to prevent injury performers and coaches should recognise and identify risks and reduce them.

						
Using the right principles of training to overuse injuries	Understand and following the rules of the sport during play	Using appropriate protective clothing	Checking the equipment to make sure it is in good condition and age appropriate	Following a full warm up and cool down	Checking the facilities	Ensuring competition is balanced

Potential Hazards

Sports Hall – Slippery Surface , Equipment around the sides

Fitness Centre – Faulty equipment

Playing field – litter , broken glass , dog faeces , damaged goal posts

Artificial outdoor areas – litter , faulty equipment , burns and grazes from the surface

Swimming pool – slippery surfaces , water and drowning , chemicals in the swimming pool

WARM UP and COOL DOWN

Key Components of a warm up:

Pulse Raiser – Steady Jog

Mobility – (knee raises , side steps , high kicks)

Stretching – Static (8-10 seconds)

Dynamic Movements – SAQ (movements through ladders)

Skill Rehearsal – Skills practice (square passing in football)

Physical Benefits of a warm up:

- Prepare muscles for physical activity
- Increase body temperature
- Increase heart rate
- Increase flexibility
- Pliability of ligaments / tendons
- Increase blood flow /oxygen to muscles
- Increase speed of muscle contraction



Key Components of a Cool Down:

Low intensity exercise – slow jog

Stretching – (static and dynamic)

Physical Benefits of a cool down:

- Helps body's transition back to rest
- Gradually lowers heart rate
- Gradually lowers temperature
- Circulates oxygen and blood
- Gradually reduces breathing rate
- Increases removal of waste products (lactic acid)
- Reduces risk of DOMS
- Helps recovery by stretching

Lifestyle choices – the decisions we make about how we live and behave that impact on health.

Diet		Activity levels		Work/rest/sleep balance	
Eating healthy	Eating unhealthy	Active lifestyle	Inactive lifestyle	Good balance	Poor balance
<ol style="list-style-type: none"> Boosts energy levels Reduces the risk of developing serious health conditions Help lose weight 	<ol style="list-style-type: none"> Leads to deficiencies Increases weight and % body fat Causes depression with poor body shape 	<ol style="list-style-type: none"> Boosts self esteem Reduces stress and anxiety Improves fitness levels 	<ol style="list-style-type: none"> Increases risk of disease Decreases muscle mass, strength and energy levels 	<ol style="list-style-type: none"> Improves mood Increases productivity at work Contributes to quality of sleep 	<ol style="list-style-type: none"> Increases the risk of depression Leads to weight gain Increased blood pressure

Well being – a combination of physical, emotional and social health.

Positives effects of training/exercise on:

Physical health

- Improves heart function
- Improves efficiency of the body systems
- Reduces the risk of some illness
- Able to do everyday tasks • to avoid obesity.



Emotional health

- Reduces stress/tension
- Release of feel good hormones (serotonin)
- Able to control emotions.



Social health

- Opportunities to socialise/make friends
- Cooperation
- Teamwork
- Have essential human needs (food, shelter, clothing)



Social benefits may vary depending on age group:

- Elderly
- Children

Negative effects of training on:

- Physical health – overexertion leading to heart failure / overuse injuries
- Emotional health – training can lead to injury and cause depression
- Social health – training long hours means less time spent with family.

Recreational drugs – these are taken for pleasure and are legal to those over a certain age.

Smoking

Causes breathlessness and reduces the oxygen-carrying capacity. This affect aerobic ability for endurance events. Smoking (nicotine) increases the risk of lung cancer, bronchitis, pneumonia & emphysema.



Alcohol - contains chemicals which act on the brain affect judgement.



Balance, co-ordination and reactions are affected



Diuretic –increased water levels in urine and cause dehydration



Reduction of glycogen levels and slower lactic acid removal



Liver problems

Sedentary lifestyle – a lifestyle with no or irregular physical activity. This includes sitting, reading, watching television & playing video games.

Health risks associated are:

- Heart disease
- Type 2 diabetes
- Obesity
- Osteoporosis
- Depression



Impact of a sedentary lifestyle on weight

Overweight – weighing more than the expected weight for height and gender / **Overfat** – high percentage of body fat


Obese – weighing significantly more than expected.




Classification of skill
 Skills are specific tasks that can be learnt and practiced. *i.e.* Golf swing / Lay up / Tennis volley

Continuum = sliding scale of extremes at each end

Environmental influence – Open/Closed Continuum




OPEN




CLOSED

Complex/Basic Continuum



COMPLEX



BASIC/SIMPLE

Gross /Fine
Gross - large muscle group movements - a rugby tackle
Fine - Precision and small movements in the wrist.

Gross **Fine**

Self paced / externally paced
Self paced- Skills started when performer decides to start
Externally paced - skill starts because of an external factor

Self paced Externally paced

Information processing
 This is making decision. It involves gathering data from the display (senses) and prioritising the most important stimuli to make a suitable decision, for example choosing a suitable skill.



Input - basic information taken in for environment

Decision making - Performer selects an appropriate response from memory

Output - The decision chosen is sent to the appropriate muscles to carry out the response



Feedback - Information is received by themselves (intrinsic) or by others (extrinsic) regarding the success of the action.

Guidance
Visual guidance: Learners are shown the whole action by the coach.
i.e. demonstration/use of video playback.

Verbal guidance: Learners listen to information given to a performer often using associated terminology.
i.e. instructions told to a team.

Manual guidance: Coaches will physically move a performer and support them in performing a skill. *i.e. Trampolineing somersault support.*


Mechanical guidance: Learners use equipment to help support the practicing of a skill.
i.e. floats during swimming stroke development.

Feedback
 Vital part of information processing which provides confidence, motivation and improves performance.

Intrinsic feedback: This comes from within the performer. Kinaesthetic senses provide feelings from muscles/joints about the action.

Extrinsic feedback: This comes from results and match analysis.



1. Knowledge of results – the outcome
2. Knowledge of performance



Mental Preparation for Performance
Mental rehearsal/Imagery involves the athlete imagining themselves in an environment performing a specific activity using all of their senses.

This can be used to:

- Familiarise the athlete with a competition site or a complex play pattern or routine.
- Motivate the athlete by recalling images of their goals or of success in a past competition.
- Perfect skills or skill sequences the athlete is learning or refining.
- Reduce negative thoughts by focusing on positive outcomes.

SMART Targets	Specific	Measurable	Attainable	Realistic	Time-Bound
Goal setting motivates performers <ul style="list-style-type: none"> • Short Term goals • Long Term goals • Outcome goals 	Targets must be concise. <i>“To take a 0.5 second off my time personal best time”</i>	Must be measured and compared. <i>“I will time my runs every training session for the next five weeks of training”</i>	Target must be challenging but yet reachable. <i>“My coach and I devised the training programme around improving leg power for my start”</i>	Matched to the performers skill level. <i>“We agreed that a 0.5 seconds off my personal best is realistic for my current ability and status”</i>	Set for a particular time to be completed. <i>“We agreed to do the training programme four times per week for the next five weeks”</i>

GCSE Physical Education – Participation rates, Commercialisation & Ethical Conduct (Paper 2)

Participation rates – The number of people taking part in physical activity.



Age – The reason why different age groups participate can vary based on **access, cost, time available** and the **nature of the activity**.



Gender – Men and women can participate for different reasons including image, cost, time and society. Increased media coverage has helped remove many stereotypes.



Ethnicity – The number of **ethnic groups** (black, white & other minorities) playing sport are on the rise. Reasons for the difference include stereotypes, cost and cultural influences.



Disability – This can be a physical or mental impairment. Activities and rules are often adapted *i.e. Wheelchair tennis*. Other barriers include availability, cost and access.

Staying active from childhood into adulthood can improve quality of life.



Friends and Family – Family members can pass on positive or negative attitudes towards sport, Peers and ‘peer pressure’ can influence whether or not you take part in sport or the types of sport you take part in.

Early involvement in sport is key to lifelong participation

Data – facts and statistics gathered to highlight information. Shown in table or graph format.

Trends – a general direction in which something is developing or changing.

Ethical Conduct

Sportsmanship – Appropriate, polite and fair behaviour while participating at a sporting event

Gamesmanship – The use of dubious methods that are not strictly legal to gain an advantage

Etiquette – *A convention or unwritten rule in an activity. It is not an enforceable rule but it is usually observed.*

Contract to compete – *The contract to compete is an unwritten code governing how to strive to play fairly, within the rules.*

Deviancy such as doping or acting violently breaks the contract to compete.

Consequences:

1. Punishment – red card/sin bin/bans
2. Loss of sponsors / contracts with clubs
3. Damaging own reputation or club/country



Commercialisation - Sport, media and commercialisation are closely linked in a what is known as a ‘GOLDEN TRIANGLE’

Advantages

- Raise awareness of brand leading to increased sales.
- Displays goodwill.

Disadvantages

- Poor behaviour from athletes/clubs causes negative media attention.
- Smaller sponsors might struggle to compete with larger more global brands.
- Some sponsors are not suitable to be promoted within sport. *i.e. tobacco*

Advantages

- Allows athletes to earn income as a full time job.
- Can lead to additional roles post playing career within the sport.

Disadvantages

- Encourages deviant behaviour due to the pressure of success.
- Generally, favours male over female and able bodied over disabled.
- Sponsorship might be short term.

Commercialisation/Business

Sponsorship, advertising, merchandising and ticket sales



Advantages

- Raises the profile of the sport due to increased exposure.
- Changes to sport format/rules to make audience friendly.

Disadvantages

- Tends to only support the popular sports.
- The influence of TV has caused an increase in adverts and changed TV timings (traditions lost).

Advantages

- Offers a wider choice of sports available to watch.
- Viewing experience has been enhanced due to technology.

Disadvantages

- Encourages spectating not participating.
- Can become very expensive for fans/spectators.
- Affects view experience - increased TV breaks.

GCSE Physical Education – Performance-enhancing drugs, injury and prevention (Paper 2)

Injury prevention – to prevent injury performers and coaches should recognise and identify risks and reduce them.



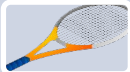
Using the right principles of training to overuse injuries



Understand and following the rules of the sport during play



Using appropriate protective clothing



Checking the equipment to make sure it is in good condition and age appropriate



Following a full warm up and cool down








Checking the facilities



Ensuring competition is balanced

Performance Enhancing Drugs (PEDs)

The rewards that come with winning are so great that athletes are increasingly tempted to cheat. Fame, money and pressure are commonly cited despite the health risks or even death.

Drug	Reason for athlete taking this	Health risk	Sporting example who might use it
Beta Blockers	Slows heart rate, calms and steadies hands	Nausea, poor circulation (lead to heart problems), tiredness and weakness	Target sports 
Anabolic Steroids	Promote muscle growth and promotes a faster recovery time	Addiction, High blood pressure, develop male features & damage to liver/kidney/heart	Power Events - 100m 
Narcotic Analgesics	Masks pain and increase pain threshold	Vomiting, addiction and liver/kidney damage	Any athlete wanted to mask pain.
Diuretics	Rapid weight loss from removal of fluids. Masks other PEDs	Dehydration, low blood pressure and headaches. Heart/kidney failure.	Jockey Boxing 
Stimulants	Increased alertness and reduce tiredness	High blood pressure, strokes and heart/liver problems	Boxing 100m sprinter 
Peptide Hormones	EPO – increase Red Blood Cell production Growth Hormone – increase muscle mass	Increased blood thickness, blood clots, strokes/heart attacks, abnormal growth	

Blood doping – a method of artificially increasing red blood cell count – increases endurance.

Injuries

Soft tissue injuries

Strain – Pulled or overstretched muscle.

Sprain - Twisted or wrenched ligament.

Treatment for strain and sprain = **RICE** (Rest, Ice, Compression, Elevation)



R – rest the injured part.



I - Apply ice to reduce the swelling for a maximum of 10 minutes.



C – **Compress** the injured area using a bandage.



E – **Elevate** the injured part to decrease the blood supply.

Golfers Elbow/Tennis Elbow – overuse injury caused by inflamed tendons that attach muscles to the elbow joint. Symptoms also include soreness and pain.

Abrasions – minor injuries to the surface of the skin. *i.e. a graze*. Symptoms are a hot/burning sensation, redness and occasionally some light bleeding. Treatment – clean and cover with a low adhesive dressing.

Torn Cartilage – This can occur when a joint is twisted excessively. This is commonly caused when players change direction quickly. Treatment – ice and surgery

Concussion – An injury to the brain caused by a knock to the head. Common in contact sports. If an athlete is concussed, they may:

- Become unconscious.
- Feel sick, dizzy or drowsy.
- Get confused, stare & suffer memory loss.

Dislocation - a sudden impact on a joint can cause the bones that meet to become disconnected.



Fracture – a broken bone.

Open/compound/complex fracture – bone through the skin

Closed/simple fracture – bone remains in the skin.

Greenstick fracture – bone bends (younger children)


Stress fracture - repeated or prolonged forces against the bone



A balance diet – eating the right foods in the correct proportions. Insufficient macro and micronutrients can cause health issues *i.e. anaemia, rickets and scurvy.*

7 components of a balanced diet:

- – Main energy source. *i.e. pasta & potatoes*
- – Secondary energy source & provides insulation. *i.e. butter*
- – Help growth and repair of muscles. *i.e. eggs, meat & fish*
- – Maintains a healthy bodily functioning. *i.e. iron and calcium*
- – Maintains a healthy immune system. *i.e. vitamin C/D*
- – Aids digestion of food in the gut. *i.e. cereals & nuts*
- – Maintains hydration of an athlete.



Hydration and physical activity


Water is necessary for:

- Transportation of nutrients
- Removes waste products through urine
- Regulates body temperature



A lack of water can cause **dehydration**. Symptoms are tiredness, lack of concentration and headaches.


After the event - An athlete will continue to drink fluids to replace the water and carbohydrate levels that are depleted.



Organising meals around exercise – it is recommended to eating 2-3 hours before exercise. This is due to redistribution of blood during exercise (Blood Shunting)

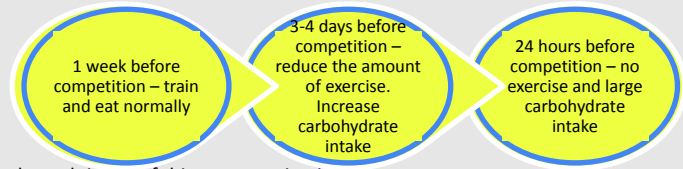
When exercising, the distribution of blood around the body changes according to the demands. *i.e. away from digestive system and to working muscles.*

Energy Balance – this relates to intake and energy expenditure.




Dietary manipulation to optimise performance

Carbohydrate Loading – a strategy used by endurance athletes to increase carbohydrate stores



Protein intake – the intake and timing of this consumption is vital to maximise the repair of muscle tissues after training. Protein should be taken straight away to increase muscle repair. Used by **sprinters, shot putters & power events.**



Optimum Weight – this is the ideal weight someone should be. This will depend on:

- Height
- Gender
- Bone structure
- Muscle size

Optimum weight varies depending on the requirements of different sports/positions. *i.e. rugby forwards & backs*






Somatotypes

1. Endomorph Remember the 'D' stands for DUMPHY
 Extreme endomorphs have the following characteristics:
 A lot of body fat
 Wide hips and narrow shoulders
 Sumo Wrestler, Shot putter

2. ECTOMORPH Remember the 'T' stands for THIN.
 Extreme ectomorphs have the following characteristics:
 Very little muscle or body fat
 Narrow hips and shoulders
 Thin legs and arms
 I.e. High Jumper, Marathon runner

3. Mesomorph Remember the 'M' stands for MUSCULAR.
 Extreme mesomorphs have the following characteristics:
 Very little body fat
 A muscular body
 Broad shoulders and narrow hips
 100m Sprinter

