



Knowledge Organiser

PHYSICAL EDUCATION

Physical Education



Component 1: Fitness and Body Systems	
Physical Training	
What is the definition of health?	Complete physical, mental and social wellbeing and not only the absence of illness or infirmity
What is the definition of fitness?	The ability to meet the demands of the environment
What is the definition of exercise?	A form of physical exercise done to improve health or fitness or both
What are the health-related components of fitness?	Body composition – The percentage of body weight that is fat, muscle and bone. Cardiovascular fitness – Being able to work or exercise the entire body for long periods of time. Flexibility – Is the range of movement possible at a joint Muscular endurance – Is the ability to use the voluntary muscles many times without getting tired/ Strength – The amount of force a muscle can exert against a resistance
What are the skill related components of fitness?	Agility – Is the ability to change the position of the body quickly and to control the movement of the whole body. Balance – Is the ability to retain the body's centre of mass (gravity) above the base of support. Coordination – The ability to use two or more body parts together. Power – Is the ability to do strength performances quickly (power = speed x strength) Reaction time – This is the time between the presentation of a stimulus and the onset of a movement. Speed – is how fast a task is completed
What is the purpose of baseline fitness tests?	To assess baseline fitness to identify a person's ability to meet the demands of an environment and set a relevant goal. (<i>Baseline testing is also used to monitor the impact of training and judge the success of the training</i>)
What are the principles of training?	The principles of training are a set of values and ideas that should be followed in order to make training effective: Individual needs – Considers the needs of the individual rather than the needs of the sporting activity. Specificity – Is matching the training to the demands of the sport. Progressive overload – Is gradually increasing the amount of training an athlete does without increasing the potential for injury FITT (frequency, intensity, time and type): Frequency - How often you train Intensity – How hard you work when you train (at what intensity) Time – How long you train for within each session Type – This is the principle of specificity Overtraining – A decrease in performance due to insufficient rest and recovery from training sessions. Reversibility – The loss of training adaptations due to a reduction in training levels Thresholds of training - <i>Aerobic</i> = 60-80% MaxHR and <i>anaerobic</i> = 80-90% of MaxHR)
What factors should be considered when deciding appropriate training movements?	Fitness/sport requirements, facilities available, current levels of fitness
What are the different training methods?	Continuous – Develops cardiovascular fitness and muscular enduring where you do not rest when training. Fartlek – Is another form of continuous training where you run at different paces over different terrains. Circuit – A number of different exercises at stations; rotate from one exercise to the next. Interval – Is a form of intermittent training. Breaks are built into the training session so that performer can recover before working against. This training method allows the performer to work at higher intensities. Plyometric training – A form of intermittent training that develops power and strength. Resistance training – A training method where the performer must manage an additional weight or resistance when carrying out the exercise; used to increase strength, power or speed. Fitness classes for specific components of fitness – Are designed to train a specific component of fitness. Examples are: body pump, aerobics, Pilates, yoga, spinning.
What does the Physical Activity Readiness Questionnaire assess?	To assess personal readiness for training and recommendations for amendment to training
How do you prevent injury during training?	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.
What common injuries occur during physical activity and sport?	Concussion, fractures, dislocation, sprain, torn cartilage and soft tissue injury (strain, tennis elbow, golfers elbow, abrasions)
How do you treat an injury?	RICE (rest, ice, compression, elevation)
What are performance enhancing drugs?	Anabolic steroids, beta blockers, diuretics, narcotic analgesis, peptide hormones (erythropoietin (EPO), growth hormones (GH)), stimulants, blood doping
What is the purpose of a warm up and cool down?	To increase muscle temperature, loosen joints, increase range of motion at the joints, sport specific activities to increase coordination of antagonistic muscle pairs.
What are the three key phases of a warm up?	Pulse raising activity; stretching and mobility exercises; sport specific activities

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Structure and functions of musculo-skeletal system	
What are the functions of the skeleton?	Protection of vital organs, muscle attachment, joints for movement, platelets, red and white blood cell production, storage of calcium and phosphorus
What are the bone classifications?	Long (leverage), short (weight bearing), flat (protection, broad surface for muscle attachment), irregular (protection and muscle attachment)
What is the structure of the skeleton?	Cranium, clavicle, scapula, vertebral column regions (cervical, thoracic, lumbar, sacrum, coccyx), ribs, sternum, humerus, radius, ulna, carpals, metacarpals, phalanges (hand), pelvis, femur, patella, tibia, fibula, tarsals, metatarsals, phalanges (foot).
What are the joint classifications?	Pivot (neck – atlas and axis), hinge (elbow, knee and ankle), ball and socket (hip and shoulder), condyloid (wrist)
What are the movement possibilities at joints depending on their classification?	Flexion – Bending a limb at a joint Extension – Straightening a limb at a joint Abduction – Movement of a limb sideways from the centre of the body Adduction – Movement of a limb sideways towards the centre of the body Rotation – Circular movement around the joint Circumduction – Conical movement allowing 360 degree range of movement Dorsi-flexion – Bending the foot at the ankle to pull the toes towards the shin. Plantar-flexion – Bending of the foot at the ankle to point the toes away from the shin.
What is the classification of muscle types?	Voluntary muscles (of the skeletal system) - muscle that is consciously controlled by the individual. Involuntary muscles (in blood vessels or organs) - muscle that is not consciously controlled by the individual. Cardiac muscle (in the heart) - specialised muscle found in the heart
Where are voluntary muscles located?	Deltoid, biceps, triceps, pectoralis major, latissimus dorsi, external obliques, hip flexors, gluteus maximus, quadriceps, hamstrings, gastrocnemius and tibialis anterior
What is the role of antagonistic muscle pairs? (The agonist and antagonist)	They create opposing movement at joints to allow physical activities . Origin and insertion – the points where a muscle attaches to a bone. Origin – the fixed end of the muscle attachment; when the muscle contracts this end of the bone will not move. Insertion – The end of the muscle that is attached to the bone that will move when the muscle contracts. Flexion – reducing the angle between bones at a joint, for example, when bending the arm at the elbow. Extension – Increasing the angle between bones at a joint, for example, when straightening the arm at the elbow. Antagonistic muscle pairs – pairs of muscles that work together to bring about movement. In order to allow the agonist to contract, the antagonist muscle relaxes.
What are the characteristics of fast and slow twitch muscle fibre types?	There are two types: Type I and Type II: Type I (slow twitch) - good for endurance activities as they are slow to tire Type II (fast twitch) - Can generate more force but tire more quickly, so are used in anaerobic work.

The Short-term effects of exercise	
What happens when a person begins exercise?	The cardiovascular, muscular and respiratory systems all begin to work together
What are the short-term effects of exercise on the cardiovascular system?	Increase in stroke volume (SV) - is the amount of blood ejected from the heart per beat. Increase in heart rate (HR) - measured in beats per minute Increase in cardiac output (Q) - Is the amount of blood ejected from the heart per minute Increase in blood pressure (BP) - Pressure exerted by the blood on the walls of the blood vessel (measured in <i>systolic blood pressure</i> – blood pressure when the heart is contracting and <i>diastolic blood pressure</i> – blood pressure exerted on the walls of the arteries when the heart is resting).
What are the short-term effects of exercise on the respiratory system?	Increase in breathing rate; increase in tidal volume
What are the short-term effects of exercise on the cardio-respiratory system?	Increase in oxygen uptake; increase in carbon dioxide remove
What are the short-term effects of exercise on the energy system?	Increase in lactate production
What are the short-term effects of exercise on the muscular system?	Increase in temperature of muscles; increased pliability; muscle fatigues
What are the post-exercise effects on the muscles?	The muscles need rest to adapt and recover; increased risk of injury if the body is not rested for long enough.

The Long-Term Effects of Exercise	
What happens when an individual participates in regular exercise?	The body systems will be adapted (trained) which will increase performance in that type of exercise (or sport) and improve health
What is hypertrophy?	Hypertrophy is the increase in muscle size as a consequence of regular exercise

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What are the long-term effects of exercise on the cardiovascular system?	Cardiac hypertrophy; increased size and strength of the heart; increased SV, increased maximum Q; capillarisation at the lungs and muscles; decrease in resting heart rate (HR); increase in red blood cells; drop in resting blood pressure
What are the long-term effects of exercise on the respiratory system?	Increased vital capacity; increased number of functioning alveoli; increased strength of the respiratory muscles (internal and external intercostals and diaphragm); increased lung capacity and volume
What are the long-term effects of exercise on the energy system?	Increased production of energy from the aerobic energy system; increased tolerance to lactic acid
What are the long-term effects of exercise on the muscular system?	Muscular hypertrophy; increased strength of tendons; increased strength of ligaments
What are the long-term effects of exercise on the skeletal system?	Increase in bone density
What is cardiac hypertrophy?	Cardiac hypertrophy is where the ventricle wall gets larger or thickens as a result of exercise
What is capillarisation?	Is the process where new capillaries are formed. It takes place at the alveoli in the lungs and at the skeletal muscles.
What are the effects of capillarisation?	The amount of oxygen that can be transported to working muscles increased. The amount of carbon dioxide that can be removed increases.

Movement analysis	
What are levers formed of?	Bones, joints and muscles.
What do levers consist of?	Bone (a rigid structure); a force acting on the bone (muscular contraction) to produce a turning movement (angular motion); a fulcrum which is a fixed point (joint); a load or resistance placed on the rigid structure (weight of body part and anything it is carrying)
What is a first class lever?	The fulcrum is in the middle of the load (e.g. in the neck)
What is a second class lever?	The load is in the middle between the fulcrum and the effort (e.g. in the ankle)
What is a third class lever?	The effort is in the middle between the fulcrum and the load
How do you remember this?	First Class Lever – Fulcrum is in the middle Second Class Lever – Load is in the middle Third Class Lever – Effort is in the middle
How is mechanical advantage expressed?	Mechanical advantage = effort arm ÷ resistance arm
What is a plane?	An imaginary flat surface running through the body
What is an axis?	Is an imaginary line at right angles to the plane, about which the body rotates or spins
What are the three planes?	Sagittal plane; transverse plane; frontal plane
What are the three axes?	Frontal axis; sagittal axis; vertical axis
What is the sagittal plane or movement?	A vertical plane that divides the body into left and right sides. Flexion and extension types of movement occur in this plane, eg kicking a football, chest pass in netball, walking, jumping, squatting
What is the frontal plane of movement?	Passes from side to side and divides the body into the front and back. Abduction and adduction movements occur in this plane, eg jumping jack exercises, raising and lowering arms and legs sideways, cartwheel
What is the transverse plane of movement?	Passes through the middle of the body and divides the body horizontally in an upper and lower half. Rotation types of movement occur in this plane, eg hip rotation in a golf swing, twisting in a discus throw, pivoting in netball, spinning in skating
What is the frontal axis of movement?	This line runs from left to right through the centre of the body. For example, when a person performs a somersault they rotate around this axis.
What is the sagittal axis of movement?	This line runs from front to back through the centre of the body. For example, when a person performs a cartwheel they are rotating about the sagittal axis.
What is the vertical axis of movement?	This line runs from top to bottom through the centre of the body. For example, when a skater performs a spin they are rotating around the vertical axis.

Component 2: Health and Performance	
Topic 1: Health, Fitness and Well-being	
How can you improve physical, emotional, and social health?	Through participating in physical activity and understanding how the components of fitness influence this change, how physical activity brings about emotional improvement and how interaction can improve social health.
How does physical activity influence wellbeing?	By understanding how they are linked to positive and negative health effects?
How can physical activity interventions be needs leads?	By designing, developing, monitoring and evaluating a personal exercise plan.
What influences a healthy lifestyle?	Diet, activity level, work/rest/sleep balance, recreational drug misuse.
What is caused by a sedentary lifestyle?	Obesity, depression, coronary heart disease, high blood pressure, diabetes, osteoporosis, loss of muscle tone, posture, impact of component of fitness.
Why is a balanced nutritional intake important?	To maintain a healthy lifestyle and optimise specific performances by ensuring consumption of macro and micronutrients.
What are the factors that affect optimum weight?	Sex, height, bone structure and muscle girth
What are the consequences of a sedentary lifestyles?	Becoming overweight, overfat, obese, increased risk to long-term health e.g. depression, coronary heart disease, high blood pressure, diabetes, increased risk of osteoporosis, loss of muscle tone, posture, impact on components of fitness
How do you interpret graphical representations of data associated with physical health issues?	Identify trends (commonalities amongst the data)
What is the role and importance of macronutrients (carbohydrates and proteins and fats) for performers?	Carbohydrate loading for endurance athletes and timing protein intake for power athletes.
What is the role and importance of micronutrients for performers?	Water (for hydration) and fibre (soluble: to reduce cholesterol; and insoluble: maintain bowel health).
What are the factors affecting optimum weight?	Gender, height, bone structure and muscle girth
Does weight variation affect team roles in sports teams?	Yes. Different weight variations are suited to different team role.

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Is there a correct energy balance to maintain a healthy weight?	Yes. Diet must be tailored to the factors affecting weight. This is called basal metabolic rate.
Why is hydration important for sports participation?	1.6ltrs for women and 2 litres for men. Hydration must be tailored to how rigorous the exercise is.

Topic 2: Sport Psychology	
What are the classification of skills?	Sports skills are classified as open-closed, basic (simple)-complex, and low organisation-high organisation continua
How are practice structures organised?	Sports structured are organised as being either: massed, distributed, fixed and variable
Why would an athlete or coach use goal setting?	An athlete or coach might use goal setting in order to improve and or optimise the performance of the athlete in readiness for an event or competition.
What are the principles of SMART targets?	Specific, measurable, achievable, realistic and time-bound. The principles are used to improve and/or optimise performance.
What are the modes of feedback used to provide guidance on a performance?	There are four forms of guidance feedback: Visual guidance – the use of a demonstration (or similar) to provide information to the performer to aid their learning of a skill. Verbal guidance – this is the use of a verbal explanation from the coach to the performer about the correct way to complete a technique. Manual guidance – the performer is physically moved by the coach into the correct position to perform a technique to provide information about the feel of the movement. Mechanical guidance – The coach uses an aid to move the performer into the correct position when learning a skill, for example, a tumbling belt in gymnastics
What are the different types of feedback used to optimise performance?	There are four forms of feedback: Intrinsic – is information about the movement being carried out from the performers own body that can be used to detect errors and improve performance. Extrinsic – is information about the movement being carried out from external sources, for example, from a coach, in an attempt to improve performance. Concurrent – is information about the movement being carried out given at the same time that the skill is being performed. Terminal – is information given about a movement after it has been carried out
What strategies are used to prepare mentally for a performance?	Warm ups and mental rehearsal: Mental rehearsal – forming a mental picture of a skill or technique you are about to perform

Topic 3: Socio-cultural influences	
What factors influence engagement patterns of different social groups in physical activity and sport?	Gender, age, socio-economic group, ethnicity and disability
What is the relationship between commercialisation, the media and physical activity and sport?	Commercialisation – is making a product available for purchase Sponsorship – cash or resources paid for commercial return through increased exposure of a brand. Commercialisation is about selling a product – through increased awareness of a product more people are likely to buy it therefore the company hope that they will earn more increased sales than the cost of the sponsorship. If commercialisation is all about selling more products, then it stands to reason that those sports with the highest profile will receive more sponsorship. This is where the link to the media is made. People use the media to follow the success of their teams, whether this is reading about them in the paper, listening on the radio or watching via the television or internet. The more popular a sport the more the media will cover it.
What are the advantages and disadvantages of commercialisation and the media for: the sponsor, the sport, the player/performer and the spectator?	Some of the advantages and disadvantages of the relationship between commercialism, the media and sport are shown below: For the <i>sponsor</i> : <ul style="list-style-type: none"> Increased awareness of brand therefore more products sold so increased profit. Associated with performer who has poor reputation could have negative impact on product sales, for example, drug use, illegal activity outside sport. For the <i>sport</i> : <ul style="list-style-type: none"> Increased income Money from broadcasting means clubs are less reliant on ticket sales at fixtures Use of income to buy better players Better facilities Better training resources Less control over sport (for example, timing of matches) Format of sport can change to make it more exciting for television viewers, for example, 'golden goals' For the <i>player/performer</i> : <ul style="list-style-type: none"> Global superstars Earn vast sums of money In public eye/reduction in private life Become a commodity that can be bought and sold Increased risk of injury due to extended length of playing season

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	<ul style="list-style-type: none"> • Increased pressure to perform to maintain sponsorship • May become associated with a negative product <p>For the <i>spectator</i>:</p> <ul style="list-style-type: none"> • More exciting players to watch • Better facilities • More competitions • More opportunity to watch sport • Sports played at a time they are more likely to be able to watch • Some sports only accessible via satellite TV or 'pay per view' therefore increased costs
What ethical and socio-cultural issues influence different types of sporting behaviour?	<p>Sportsmanship, gamesmanship, and the reasons for, and consequences of, deviance at elite level:</p> <p>Sportsmanship – the qualities of fairness, following the rules, being gracious in defeat or victory.</p> <p>Gamesmanship – is bending the rules/laws of a sport without actually breaking them.</p> <p>Deviancy – doing something against the norms or values of society</p>

Topic 4: Use of data	
How is data collected?	Data is collected in two methods: either quantitatively (using numbers) or qualitatively (not using numbers)
How is data usually presented?	Data is usually presented in graphs or tables
What is the purpose of normative data in sport?	To provide a benchmark for comparison between an individual's performance and the average performances for their age and gender