Component 1: Fitness and Body Systems

Overview

This component assesses students' knowledge and understanding of the factors underpinning physical activity and sport performance. Students will develop their theoretical knowledge and understanding of applied anatomy and physiology, movement analysis and physical training so that they can use this knowledge to analyse and evaluate performance and devise informed strategies for improving/optimising their own practical performance.

Questions in the examination paper may be contextualised by reference to any of the activities in the activity list (as well as gym/fitness activities) in Component 3: Practical Performance.

A glossary of key terms for the content of this component is found in *Appendix 5: Glossary of key terms* (pages 53–55).

Content

Topic 1: Applied anatomy and physiology

Subject content	What students need to learn	
In this topic students will develop knowledge and understanding of the key body systems and how they impact on health, fitness and performance in physical activity and sport through the following content.		
1.1 The structure and functions of the musculo-skeletal system	1.1.1	The functions of the skeleton applied to performance in physical activities and sports: protection of vital organs, muscle attachment, joints for movement, platelets, red and white blood cell production, storage of calcium and phosphorus
	1.1.2	Classification of bones: long (leverage), short (weight bearing), flat (protection, broad surface for muscle attachment), irregular (protection and muscle attachment) applied to performance in physical activities and sports
	1.1.3	Structure: cranium, clavicle, scapula, five regions of the vertebral column (cervical, thoracic, lumbar, sacrum, coccyx), ribs, sternum, humerus, radius, ulna, carpals, metacarpals, phalanges (in the hand), pelvis, femur, patella, tibia, fibula, tarsals, metatarsals, phalanges (in the foot), and their classification and use applied to performance in physical activities and sports
	1.1.4	Classification of joints: pivot (neck – atlas and axis), hinge (elbow, knee and ankle), ball and socket (hip and shoulder), condyloid (wrist), and their impact on the range of possible movements

Subject content	What students need to learn	
	1.1.5	Movement possibilities at joints dependant on joint classification: flexion, extension, adduction, abduction, rotation, circumduction, plantar-flexion, dorsi-flexion and examples of physical activity and sporting skills and techniques that utilise these movements in different sporting contexts
	1.1.6	The role of ligaments and tendons, and their relevance to participation in physical activity and sport
	1.1.7	Classification and characteristics of muscle types: voluntary muscles of the skeletal system, involuntary muscles in blood vessels, cardiac muscle forming the heart, and their roles when participating in physical activity and sport
	1.1.8	Location and role of the voluntary muscular system to work with the skeleton to bring about specific movement during physical activity and sport, and the specific function of each muscle (deltoid, biceps, triceps, pectoralis major, latissimus dorsi, external obliques, hip flexors, gluteus maximus, quadriceps, hamstrings, gastrocnemius and tibialis anterior)
	1.1.9	Antagonistic pairs of muscles (agonist and antagonist) to create opposing movement at joints to allow physical activities (e.g. gastrocnemius and tibialis anterior acting at the ankle -plantar flexion to dorsi flexion; and quadriceps and hamstrings acting at the knee, biceps and triceps acting at the elbow, and hip flexors and gluteus maximus acting at the hip – all flexion to extension)
	1.1.10	Characteristics of fast and slow twitch muscle fibre types (type I, type IIa and type IIx) and how this impacts on their use in physical activities
	1.1.11	How the skeletal and muscular systems work together to allow participation in physical activity and sport
1.2 The structure and functions of the cardio-respiratory system	1.2.1	Functions of the cardiovascular system applied to performance in physical activities: transport of oxygen, carbon dioxide and nutrients, clotting of open wounds, regulation of body temperature
	1.2.2	Structure of the cardiovascular system: atria, ventricles, septum, tricuspid, bicuspid and semi-lunar valves, aorta, vena cava, pulmonary artery, pulmonary vein, and their role in maintaining blood circulation during performance in physical activity and sport
	1.2.3	Structure of arteries, capillaries and veins and how this relates to function and importance during physical activity and sport in terms of blood pressure, oxygenated, deoxygenated blood and changes due to physical exercise

Subject content	What students need to learn	
	1.2.4	The mechanisms required (vasoconstriction, vasodilation) and the need for redistribution of blood flow (vascular shunting) during physical activities compared to when resting
	1.2.5	Function and importance of red and white blood cells, platelets and plasma for physical activity and sport
	1.2.6	Composition of inhaled and exhaled air and the impact of physical activity and sport on this composition
	1.2.7	Vital capacity and tidal volume, and change in tidal volume due to physical activity and sport, and the reasons that make the change in tidal volume necessary
	1.2.8	Location of main components of respiratory system (lungs, bronchi, bronchioles, alveoli, diaphragm) and their role in movement of oxygen and carbon dioxide into and out of the body
	1.2.9	Structure of alveoli to enable gas exchange and the process of gas exchange to meet the demands of varying intensities of exercise (aerobic and anaerobic)
	1.2.10	How the cardiovascular and respiratory systems work together to allow participation in physical activity and sport
1.3 Anaerobic and aerobic exercise	1.3.1	Energy: the use of glucose and oxygen to release energy aerobically with the production of carbon dioxide and water, the impact of insufficient oxygen on energy release, the by-product of anaerobic respiration (lactic acid)
	1.3.2	Energy sources: fats as a fuel source for aerobic activity, carbohydrates as a fuel source for aerobic and anaerobic activity
1.4 The short- and long-term effects of exercise	1.4.1	Short-term effects of physical activity and sport on lactate accumulation, muscle fatigue, and the relevance of this to the player/performer
	1.4.2	Short-term effects of physical activity and sport on heart rate, stroke volume and cardiac output, and the importance of this to the player/performer
	1.4.3	Short-term effects of physical activity and sport on depth and rate of breathing, and the importance of this to the player/performer
	1.4.4	How the respiratory and cardiovascular systems work together to allow participation in, and recovery from, physical activity and sport: oxygen intake into lungs, transfer to blood and transport to muscles, and removal of carbon dioxide
	1.4.5	Long-term effects of exercise on the body systems – see 3.4.1–3.4.4
	1.4.6	Interpretation of graphical representations of heart rate, stroke volume and cardiac output values at rest and during exercise

Topic 2: Movement analysis

Subject content		What students need to learn
In this topic students will develop knowledge and understanding of the basic principles of movement and their effect on performance in physical activity and sport through the following content.		
2.1 Lever systems, examples of their use in activity and the mechanical advantage they provide in movement	2.1.1	First, second and third class levers and their use in physical activity and sport
	2.1.2	Mechanical advantage and disadvantage (in relation to loads, efforts and range of movement) of the body's lever systems and the impact on sporting performance
2.2 Planes and axes of movement	2.2.1	Movement patterns using body planes and axes: sagittal, frontal and transverse plane and frontal, sagittal, vertical axes applied to physical activities and sporting actions
	2.2.2	Movement in the sagittal plane about the frontal axis when performing front and back tucked or piked somersaults
	2.2.3	Movement in the frontal plane about the sagittal axis when performing cartwheels
	2.2.4	Movement in the transverse plane about the vertical axis when performing a full twist jump in trampolining

Topic 3: Physical training

Subject content		What students need to learn
 In this topic students will develop knowledge and understanding of the principles of training and different training methods in order to plan, carry out, monitor and evaluate personal exercise and training programmes, through the following content.		
3.1 The relationship between health and fitness and the role that exercise plays in both	3.1.1	Definitions of fitness, health, exercise and performance and the relationship between them
3.2 The components of fitness, benefits for sport and how fitness is measured and improved	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, and speed

Subject content	What students need to learn	
	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 (run, swim), Harvard Step Test; agility – Illinois agility run test; strength – grip dynamometer; muscular endurance – one-minute sit-up, one-minute press-up; speed – 30 m sprint; power – vertical jump; flexibility – sit and reach
	3.2.5	How fitness is improved – see section 3.3.1–3.3.3
3.3 The principles of training and their application to personal exercise/ training programmes	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% and anaerobic target zone: 80%–90% calculated using simplified Karvonen formula, i.e. (220) – (your age) = MaxHR; (MaxHR) x (60% to 80%) = aerobic training zone; (MaxHR) x (80% to 90%) = anaerobic training zone)
	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
3.4 The long-term effects of exercise	3.4.1	Long-term effects of aerobic and anaerobic training and exercise and the benefits to the muscular-skeletal and cardio-respiratory systems and performance
	3.4.2	Long-term training effects: able to train for longer and more intensely
	3.4.3	Long-term training effects and benefits: for performance of the 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

Subject content	What students need to learn	
	3.4.4	Long-term training effects and benefits: for performance of the cardio-respiratory system: decreased resting heart rate, faster recovery, increased resting stroke volume and 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
3.5 How to optimise training and prevent injury	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
3.6 Effective use of warm up and cool down	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

Topic 4: Use of data

Subject content	What students need to learn	
In this topic students will develop knowledge and understanding of data analysis in relation to key areas of physical activity and sport, through this content and linking it to other topics.		
4.1 Use of data	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

Assessment information

- First assessment: May/June 2018.
- The assessment is 1 hours and 30 minutes.
- The assessment is out of 80 marks.
- Students must answer all questions.
- The assessment consists of multiple-choice, short-answer, and one extended writing question.
- For the nine-mark extended writing question, students will be expected to draw on their knowledge and understanding in relation to the question, apply their knowledge and understanding and come to a reasoned judgement in order to answer the specific requirement of the question.
- Calculators may be used in the examination. Information on the use of calculators during the examinations for this qualification can be found in *Appendix 7: Calculators*.

Sample assessment materials

A sample paper and mark scheme for this paper can be found in the *Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Physical Education Sample Assessment Materials (SAMs)* document.

Component 2: Health and Performance

Overview

This component assesses students' knowledge and understanding of the factors underpinning participation and performance in physical activity and sport. Students will develop their theoretical knowledge and understanding of the contribution that physical activity and sport make to health, fitness and wellbeing and how these can impact on their own performance.

Sports psychology will be introduced, with a focus on skill development, through relevant practice, guidance and feedback, as well as knowledge that learners can then apply to their own learning in practical situations in order to improve their performance. Key socio-cultural influences that can affect people's involvement in physical activity and sport will also be considered.

Questions in the examination paper may be contextualised by reference to any of the activities in the activity list (as well as gym/fitness activities) in Component 3: Practical Performance.

A glossary of key terms for the content of this component is found in *Appendix 5: Glossary of key terms* (pages 53–55).

Content

Topic 1: Health, fitness and wellbeing

Subject content		What students need to learn
In this topic students will develop knowledge and understanding of the benefits of participating in physical activity and sport to health, fitness and wellbeing through the following content.		
1.1 Physical, emotional and social health, fitness and wellbeing	1.1.1	Physical health: how increasing physical ability, through improving components of fitness can improve health/reduce health risks and how these benefits are achieved
	1.1.2	Emotional health: how participation in physical activity and sport can improve emotional/psychological health and how these benefits are achieved
	1.1.3	Social health: how participation in physical activity and sport can improve social health and how these benefits are achieved
	1.1.4	Impact of fitness on wellbeing: positive and negative health effects
	1.1.5	How to promote personal health through an understanding of the importance of designing, developing, monitoring and evaluating a personal exercise programme to meet the specific needs of the individual
	1.1.6	Lifestyle choices in relation to: diet, activity level, work/rest/sleep balance, and recreational drugs (alcohol, nicotine)
	1.1.7	Positive and negative impact of lifestyle choices on health, fitness and wellbeing, e.g. the negative effects of smoking (bronchitis, lung cancer)

Subject content	What students need to learn	
1.2 The consequences of a sedentary lifestyle	1.2.1	A sedentary lifestyle and its consequences: 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
	1.2.2	Interpretation and analysis of graphical representation of data associated with trends in physical health issues
1.3 Energy use, diet, nutrition and hydration	1.3.1	The nutritional requirements and ratio of nutrients for a balanced diet to maintain a healthy lifestyle and optimise specific performances in physical activity and sport
	1.3.2	The role and importance of macronutrients (carbohydrates, proteins and fats) for performers/players in physical activities and sports, carbohydrate loading for endurance athletes, and timing of protein intake for power athletes
	1.3.3	The role and importance of micronutrients (vitamins and minerals), water and fibre for performers/players in physical activities and sports
	1.3.4	The factors affecting optimum weight: sex, height, bone structure and muscle girth
	1.3.5	The variation in optimum weight according to roles in specific physical activities and sports
	1.3.6	The correct energy balance to maintain a healthy weight
	1.3.7	Hydration for physical activity and sport: why it is important, and how correct levels can be maintained during physical activity and sport

Topic 2: Sport psychology

Subject content	What students need to learn
In this topic students will develop knowledge and understanding of the psychological factors that can affect performers and their performance in physical activity and sport through the following content.	
2.1 Classification of skills (basic/ complex, open/closed)	2.1.1 Classification of a range of sports skills using the open-closed, basic (simple)-complex, and low organisation-high organisation continua
	2.1.2 Practice structures: massed, distributed, fixed and variable
	2.1.3 Application of knowledge of practice and skill classification to select the most relevant practice to develop a range of skills
2.2 The use of goal setting and SMART targets to improve and/or optimise performance 	2.2.1 The use of goal setting to improve and/or optimise performance
	2.2.2 Principles of SMART targets (specific, measureable, achievable, realistic, time-bound) and the value of each principle in improving and/or optimising performance
	2.2.3 Setting and reviewing targets to improve and/or optimise performance
2.3 Guidance and feedback on performance	2.3.1 Types of guidance to optimise performance: visual, verbal, manual and mechanical
	2.3.2 Advantages and disadvantages of each type of guidance and its appropriateness in a variety of sporting contexts when used with performers of different skill levels
	2.3.3 Types of feedback to optimise performance: intrinsic, extrinsic, concurrent, terminal
	2.3.4 Interpretation and analysis of graphical representation of data associated with feedback on performance
2.4 Mental preparation for performance	2.4.1 Mental preparation for performance: warm up, mental rehearsal

Topic 3: Socio-cultural influences

Subject content		What students need to learn
In this topic students will develop knowledge and understanding of the socio-cultural factors that impact on physical activity and sport, and the impact of sport on society, through the following content.		
3.1 Engagement patterns of different social groups in physical activity and sport	3.1.1	Participation rates in physical activity and sports and the impact on participation rates considering the following personal factors: gender, age, socio-economic group, ethnicity, disability
	3.1.2	Interpretation and analysis of graphical representation of data associated with trends in participation rates
3.2 Commercialisation of physical activity and sport	3.2.1	The relationship between commercialisation, the media and physical activity and sport
	3.2.2	The advantages and disadvantages of commercialisation and the media for: the sponsor, the sport, the player/performer, the spectator
	3.2.3	Interpretation and analysis of graphical representation of data associated with trends in the commercialisation of physical activity and sport
3.3 Ethical and socio-cultural issues in physical activity and sport	3.3.1	The different types of sporting behaviour: sportsmanship, gamesmanship, and the reasons for, and consequences of, deviance at elite level
	3.3.2	Interpretation and analysis of graphical representation of data associated with trends in ethical and socio-cultural issues in physical activity and sport

Topic 4: Use of data

Subject content		What students need to learn
In this topic students will develop knowledge and understanding of data analysis in relation to key areas of physical activity and sport, through this content and linking it to other topics.		
4.1 Use of data	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

Assessment information

- First assessment: May/June 2018
- The assessment is 1 hours and 15 minutes.
- The assessment is out of 60 marks.
- Students must answer all questions.
- The assessment consists of multiple-choice, short-answer, and one extended writing question.
- For the nine-mark extended writing question, students will be expected to draw on their knowledge and understanding in relation to the question, apply their knowledge and understanding and come to a reasoned judgement in order to answer the specific requirement of the question.
- Calculators may be used in the examination. Information on the use of calculators during the examinations for this qualification can be found in *Appendix 7: Calculators*.

Sample assessment materials

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