

AS PHYSICAL EDUCATION SPECIFICATION

3.1 Factors affecting participation in physical activity and sport

3.1.1 Applied anatomy and physiology

Students should develop knowledge and understanding of the changes within the body systems prior to exercise, during exercise of differing intensities and during recovery.

Students should be able to interpret data and graphs relating to changes within the musculo-skeletal, cardio-respiratory and neuro-muscular systems, and the use of energy systems during different types of physical activity and sport, and the recovery process.

3.1.1.1 Cardio-respiratory system

Students should understand the relationship between the cardiovascular and respiratory systems and how changes within these systems prior to exercise, during exercise of differing intensities and during recovery allow the body to meet the demands of exercise. They should also understand how taking part in physical activity and sport, as part of a healthy lifestyle, can have a positive effect on these systems.

3.1.1.2 Cardiovascular system

	Content	Additional information
A	Understanding the impact of physical activity and sport on the health and fitness of the individual.	Health (heart disease, high blood pressure, effects of cholesterol, stroke). Fitness (cardiac output – trained and untrained individuals, maximal and sub-maximal exercise).
B	The hormonal, neural and chemical regulation of responses during physical activity and sport.	Anticipatory rise. Redistribution of blood (vascular shunting vasoconstriction, vasodilation). Cardiac conduction system. Sympathetic and parasympathetic. Carbon dioxide.
C	Receptors involved in regulation of responses during physical activity.	Chemoreceptor, proprioceptor, baroreceptor.
D	Transportation of oxygen	Haemoglobin. Myoglobin. Oxyhaemoglobin disassociation curve. Bohr shift.
E	Venous return.	Mechanisms. Relationship with blood pressure (systolic, diastolic).
F	Starling's law of the heart.	
G	Cardiovascular drift.	
H	Arterio-venous oxygen difference (A-VO ₂ diff).	Variations in response to an exercise session. Variations between trained and untrained individuals. Adaptations to body systems resulting in training effect.

3.1.1.3 Respiratory system

	Content	Additional information
A	Understanding of lung volumes and the impact of and on physical activity and sport.	Residual volume. Expiratory reserve volume. Inspiratory reserve volume. Tidal volume. Minute ventilation.
B	Gas exchange systems at alveoli and muscles.	Oxygen and carbon dioxide. Principles of diffusion and partial pressures.
C	The hormonal, neural and chemical regulation of pulmonary ventilation during physical activity and sport.	Adrenaline. Sympathetic and parasympathetic. Carbon dioxide.
D	Receptors involved in regulation of pulmonary ventilation during physical activity.	Chemoreceptor, proprioceptor, baroreceptor.
E	Impact of poor lifestyle choices on the respiratory system.	Smoking. Oxygen transport.

3.1.1.4 Neuromuscular system

Students should understand the relationship between the nervous and muscular systems and how changes within these systems prior to exercise, during exercise of differing intensities and during recovery allow the body to meet the demands of exercise.

	Content	Additional information
A	Characteristics and functions of different muscle fibre types for a variety of sporting activities.	Slow twitch (type I). Fast glycolytic (type IIx). Fast oxidative glycolytic (type IIa).
B	Nervous system.	Sympathetic and parasympathetic.
C	Role of proprioceptors in PNF	Muscle spindles. Golgi tendon organ.
D	The recruitment of muscle fibres.	Motor units. Spatial summation. Wave summation. All-or-none law. Tetanic.

3.1.1.5 The musculo-skeletal system and analysis of movement in physical activities

Students should understand the relationship between the muscular and skeletal systems to meet the demands of exercise. Students should be able to apply their knowledge and understanding to specific sporting actions and movement in a range of physical activities.

	Content	Additional information
A	Joint actions in the sagittal plane/transverse axis.	Shoulder and hip (flexion, extension and hyperextension). Elbow and knee (flexion and extension). Ankle (plantar flexion and dorsi flexion).
B	Joint actions in the frontal plane/sagittal axis.	Shoulder and hip (adduction and abduction).
C	Joint actions in the transverse plane/longitudinal axis.	Shoulder and hip (horizontal abduction and adduction)
D	Types of joint, articulating bones, main agonists and antagonists, types of muscle contraction.	Isotonic (concentric and eccentric), isometric.

3.1.2 Skill acquisition

This section focuses on how skill is acquired and the impact of psychological factors on performance. Students should develop knowledge and understanding of the principles required to optimise learning of new, and the development of existing, skills in a range of physical activities.

Students should be able to understand and interpret graphical representations associated with skill acquisition theories.

3.1.2.1 Skill, skill continuums and transfer of skills

	Content	Additional information
A	Characteristics of skill.	
B	Use of skill continua.	Open – closed. Discrete – serial – continuous. Gross – fine. Self-paced – externally paced. High – low. Simple – complex.
C	Justification of skill placement on each of the continua.	
D	Transfer of learning.	Positive. Negative. Zero. Bilateral.
E	Understanding of how transfer of learning impacts on skill development.	

3.1.2.2 Impact of skill classification on structure of practice for learning

	Content	Additional information
A	Methods of presenting practice.	Whole. Progressive part. Whole–part–whole.
B	Types of practice.	Massed. Distributed. Variable. Mental practice.
C	Understanding how knowledge of skill classification informs practice structure (presentation and type) to allow learning/ development of skills.	

3.1.2.3 Principles and theories of learning and performance

	Content	Additional information
A	Stages of learning and how feedback differs between the different stages of learning.	Cognitive, associative, autonomous.
B	Learning plateau.	Causes and solutions.
C	Cognitive theories.	Insight learning (Gestalt).
D	Behaviourism.	Operant conditioning (Skinner).
E	Social learning.	Observational learning (Bandura).
F	Constructivism.	Social development theory (Vygotsky).
G	Understanding of how theories of learning impact on skill development.	

3.1.2.4 Use of guidance and feedback

	Content	Additional information
A	Methods of guidance.	Verbal. Visual. Manual. Mechanical.
B	Understand the different purposes and types of feedback.	Knowledge of performance. Knowledge of results. Positive and negative. Intrinsic. Extrinsic.
C	Understanding of how feedback and guidance impacts on skill development.	

3.1.3 Sport and society

Students should develop knowledge and understanding of the interaction between, and the evolution of, sport and society.

Students should be able to understand, interpret and analyse data and graphs relating to participation in physical activity and sport.

3.1.3.1 Emergence of globalisation of sport in the 21st century

In this section, students develop an understanding of popular and rational recreation leading to the emergence of modern sport through to the globalisation of sport in the 21st century. Specifically students should understand the impact of the following social factors on the development of football, tennis and athletics.

3.1.3.1.1 Pre-industrial (pre-1780)

	Content	Additional information
A	Characteristics and impact on sporting recreation.	Rural, local, two-tier class system. Limited to mob football, real tennis and Much Wenlock Olympic Games.
B	Characteristics of popular and rational recreation linked to the two-tier class system.	Upper and lower.

3.1.3.1.2 Industrial and post-industrial (1780–1900)

	Content	Additional information
A	Characteristics and impact on sport (limited to development of association football, lawn tennis and rationalisation of track and field events).	Industrial Revolution. Urbanisation. Transport and communication. The British Empire. Provision through factories. Churches and local authorities. Three-tier class system (emphasis on middle class and working class). Development of national governing bodies. Characteristics of sport. Consideration of the changing role of women in sport. The status of amateur and professional performers.

3.1.3.1.3 Post World War II (1950 to present)

	Content	Additional information
A	Characteristics and impact on sport (limited to development of association football, tennis and athletics).	Golden triangle – the interrelationship between commercialisation (including sponsorship), media (radio, TV, satellite, internet and social media) and sports and governing bodies. The changing status of amateur and professional performers. Factors affecting the emergence of elite female performers in football (players and officials), tennis and athletics in the late 20 th and early 21 st century.

3.1.3.2 The impact of sport on society and of society on sport

This section introduces some of the key terms, key concepts and benefits of physical activity to both the individual and society.

3.1.3.2.1 Sociological theory applied to equal opportunities

	Content	Additional information
A	Understanding of the definitions of the following key terms in relation to the study of sport and their impact on equal opportunities in sport and society: <ul style="list-style-type: none"> • society • socialisation • social processes • social issues • social structures/stratification. 	Primary and secondary. Social control and social change. Causes and consequences of inequality. Eg schools/sports clubs.
B	Understanding social action theory in relation to social issues in physical activity and sport.	Interactionist approach, impact of sport on society and of society on sport.
C	Understanding the terms equal opportunities, discrimination, stereotyping and prejudice.	
D	Under represented groups in sport.	Disability. Ethnic group. Gender. Disadvantaged.
E	The barriers to participation in sport and physical activity and possible solutions to overcome them for under-represented groups in sport.	
F	Benefits of raising participation.	Health benefits. Fitness benefits. Social benefits
G	The interrelationship between Sport England, local and national partners to increase participation at grass roots level and under represented groups in sport.	

3.1.4 Exercise physiology

Students should understand the adaptations to the body systems through training or lifestyle, and how these changes affect the efficiency of that system.

3.1.4.1 Diet and nutrition and their effect on physical activity and performance

	Content	Additional information
A	Understand the exercise-related function of food classes.	Carbohydrate. Fibre. Fat (saturated fat, trans fat and cholesterol), protein, vitamins (C, D, B-12, B-complex), minerals (sodium, iron, calcium), water (hydration before, during and after physical activity).
B	Positive and negative effects of dietary supplements/manipulation on the performer.	Creatine, sodium bicarbonate, caffeine, glycogen loading.

3.1.4.2 Preparation and training methods in relation to maintaining physical activity and performance

Students should understand quantitative methods, the types and use of data for planning, monitoring and evaluating physical training, and to optimise performance.

	Content	Additional information
A	Understanding key data terms for laboratory conditions and field tests.	Quantitative and qualitative. Objective and subjective. Validity and reliability.
B	Physiological effects and benefits of a warm-up and cool down.	Stretching for different types of physical activity (static and ballistic).
C	Principles of training.	Specificity, progressive overload, reversibility, recovery, Frequency Intensity Time Type of training (FITT) principles.
D	Application of principles of periodisation.	Macro cycle, Meso cycle, Micro cycle. Preparation, competition, transition. Tapering, peaking.
E	Training methods to improve physical fitness and health.	Interval training (anaerobic power). Continuous training (aerobic endurance). Fartlek (aerobic endurance). Circuit training (muscular endurance). Weight training (strength). Proprioceptive Neuromuscular Facilitation (PNF) (flexibility).

3.1.5 Biomechanical movement

Students should develop knowledge and understanding of motion and forces, and their relevance to performance in physical activity and sport.

Students should have a knowledge and use of biomechanical definitions, equations, formulae and units of measurement and demonstrate the ability to plot, label and interpret biomechanical graphs and diagrams.

3.1.5.1 Biomechanical principles

	Content	Additional information
A	Newton's three laws of linear motion applied to sporting movements.	First law (inertia), second law (acceleration), third law (action/reaction). Force.
B	Definitions, equations and units of example scalars.	Speed, distance.
C	Centre of mass.	
D	Factors affecting stability.	Height of centre of mass, area of base of support, position of line of gravity and body mass.

3.1.5.2 Levers

	Content	Additional information
A	Three classes of lever and examples of their use in the body during physical activity and sport.	
B	Mechanical advantage and mechanical disadvantage of each class of lever.	

3.1.6 Sport psychology

In this section students develop knowledge and understanding of the role of sport psychology in optimising performance in physical activity and sport. Students should be able to understand and interpret graphical representations associated with sport psychology theories.

3.1.6.1 Psychological factors that can influence an individual in physical activities

3.1.6.1.1 Aspects of personality

	Content	Additional information
A	Understanding of the nature vs nurture debate in the development of personality.	Trait, social learning.
B	Interactionist perspective.	Hollander, Lewin.
C	How knowledge of interactionist perspective can improve performance.	

3.1.6.1.2 Attitudes

	Content	Additional information
A	Triadic model.	Components of an attitude. Formation of attitudes. Changing attitudes through cognitive dissonance and persuasive communication.

3.1.6.1.3 Arousal

	Content	Additional information
A	Theories of arousal.	Drive theory, inverted U theory, catastrophe theory and zone of optimal functioning theory.
B	Practical applications of theories of arousal and their impact on performance.	
C	Characteristics of peak flow experience.	

3.1.6.1.4 Anxiety

	Content	Additional information
A	Types of anxiety.	Somatic, cognitive, competitive trait and competitive state.
B	Advantages and disadvantages of using observations, questionnaires and physiological measures to measure anxiety.	

3.1.6.1.5 Aggression

	Content	Additional information
A	Difference between aggression and assertive behaviour.	
B	Theories of aggression.	Instinct theory, frustration aggression hypothesis, social learning theory and aggressive cue theory.
C	Strategies to control aggression.	

3.1.6.1.6 Motivation

	Content	Additional information
A	Motivation.	Intrinsic, extrinsic, tangible and intangible.

3.1.6.1.7 Social facilitation

	Content	Additional information
A	Social facilitation and inhibition.	Zajonc's model.
B	Evaluation apprehension.	
C	Strategies to eliminate the adverse effects of social facilitation and social inhibition.	

3.1.6.1.8 Group dynamics

Students should understand how group dynamics can influence the performance of an individual and/or team.

	Content	Additional information
A	Group formation.	Tuckman's model.
B	Cohesion.	Task and social.
C	Steiner's model of potential and actual productivity, faulty group processes.	Including cooperation and coordination.
D	Ringelmann effect and social loafing.	
E	Strategies to improve cohesion, group productivity and overcome social loafing to enhance team performance.	

3.1.6.1.9 Importance of goal setting

	Content	Additional information
A	Benefits of types of goal setting.	Outcome goals, task orientated. Performance related goals, process goals.
B	Principles of effective goal setting.	SMARTER (specific, measurable, achievable, realistic, time bound, evaluate, re-do).

3.1.7 Sport and society and the role of technology in physical activity and sport

Students should develop knowledge and understanding of the interaction between, and the evolution of, sport and society and the technological developments in physical activity and sport.

3.1.7.1 The role of technology in physical activity and sport

Students should understand the types of and use of data analysis to optimise performance. In this section, students should be able to select and justify their selection of technology for analysis of physical activity and sport to optimise performance by:

	Content	Additional information
A	Understanding of technology for sports analytics.	Use of technology in data collection (quantitative and qualitative, objective and subjective, validity and reliability of data). Video and analysis programmes. Testing and recording equipment (metabolic cart for indirect calorimetry). Use of GPS and motion tracking software and hardware. Maintaining data integrity.