



Singapore–Cambridge Secondary Education Certificate (2027)

G3 Exercise and Sports Science (Syllabus K354)

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INTRODUCTION

Through the study of Exercise and Sports Science (ESS), students are grounded in the sub-disciplines of sports science with an understanding of sociology in relation to sports. They develop **disciplinary thinking and practices** of the subject and **interdisciplinary understanding**¹ to problem-solve and evaluate performance for improvement in different practical settings. They also adopt a balanced view in examining issues influencing sports and participation in physical exercise.

In ESS, movement is the focal point for performance, analysis and critique. Students understand the relationships amongst the sub-disciplines of sports science and how systems within these sub-disciplines interact to influence how the human body moves in relation to each other and in different contexts. Movement contexts exist in specific exercises and sports, which in turn, manifest themselves in why and how people exercise and participate in sports in society, as influenced by socio-cultural factors such as ethics, equity and commercialisation.

Movement. The sub-disciplines of sports science are inter-related and they influence how the human body moves in different contexts. A multi-faceted perspective is needed to analyse performance holistically and modify movement for improvement. Socio-cultural factors have an influence on people moving, exercising and staying active, thus shaping the movement culture of a society.

Systems and interactions. The human body is a complex system of many interacting parts and the various systems in the human body interact with each other to create movement. It is of essence to be cognisant of the role of each sub-discipline of sports science and how they interact with one another within a system to influence movement. A society is a system of inter-related parts and is greatly shaped by the interaction of the socio-cultural factors of ethics, equity and commercialisation. It is the interaction of these factors that would continue to shape how people move, exercise and participate in sports.

As students make sense of their acquired knowledge in the areas of study (i.e., Exercise Physiology, Motor Learning and Development, Biomechanics, Sports Psychology and Sports Sociology), they apply their learning in the performance of their physical activities, analysis of their performance, and critique of issues in exercise and sports from socio-cultural and global perspectives. These reinforce students' learning and thus deepen their understanding of the acquired knowledge and skills in the respective areas of study.

¹ Interdisciplinary understanding is the capacity to integrate knowledge and modes of thinking drawn from two or more disciplines to produce a cognitive advancement, for example, explaining a phenomenon, solving a problem, creating a product, or raising a new question in ways that would have been unlikely through single disciplinary means.

The curriculum concept for ESS is diagrammatically illustrated in Figure 1.

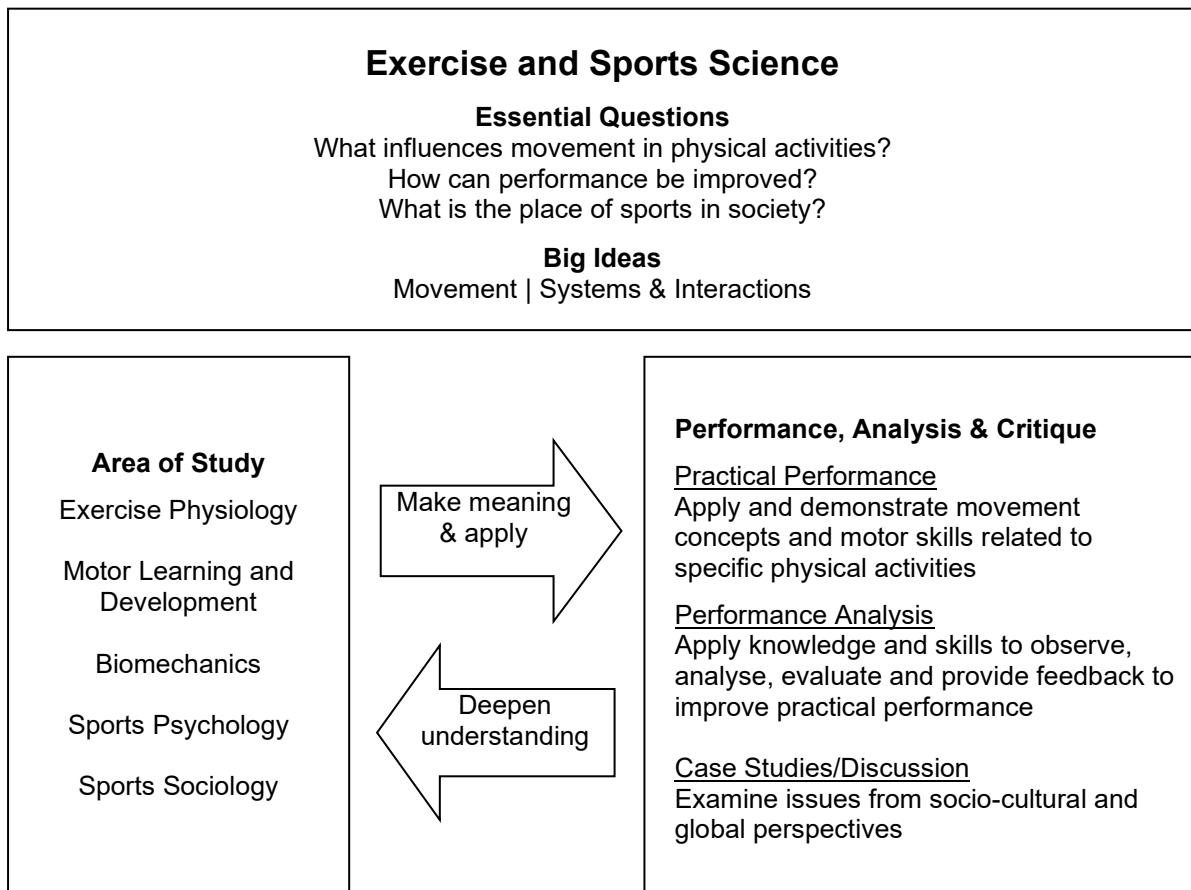
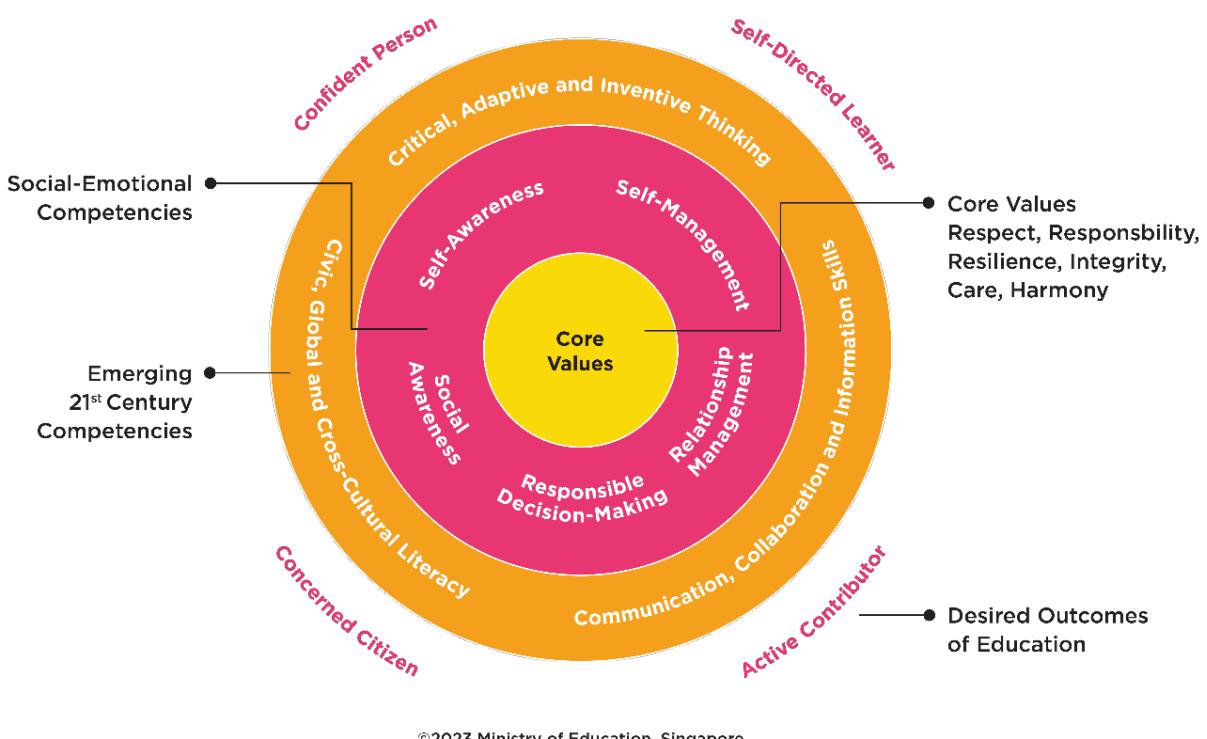


Figure 1. O-Level Exercise and Sports Science Curriculum Framework

21ST CENTURY COMPETENCIES

The Framework for 21st Century Competencies and Student Outcomes (“21CC Framework”) shows how Core Values, Social-Emotional Competencies and Emerging 21st Century Competencies support the realisation of MOE’s Desired Outcomes of Education. Refer to Figure 2.



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Figure 2. Framework for 21st Century Competencies and Student Outcomes

As values form the core of one's character, they are positioned at the centre of the framework. Social-Emotional Competencies, shown as an inner ring around the Core Values, are necessary for students to enact their values purposefully and demonstrate good character in all contexts of life. Building on a sound character foundation, the outer ring of Emerging 21CC enable students to thrive in and beyond school while living, learning and working in rapidly changing, highly digitalised and interconnected environments.

The development of Core Values, Social-Emotional Competencies and Emerging 21CC are complementary and mutually reinforce one another. Therefore, the holistic development of 21CC involves intentional teaching and reinforcing of knowledge, skills, dispositions and values from the core and both rings collectively. They should be developed through the total curriculum, which includes all student learning experiences delivered within and outside the structured timetable. These values and competencies will help our students live out the Desired Outcomes of Education.

As part of the total curriculum, ESS provides a platform for students to develop or reinforce these competencies, with a particular focus on Critical, Adaptive, and Inventive Thinking (CAIT), as well as Communication, Collaboration, and Information Skills (CCI). The learning experiences that facilitate the development of these competencies, aligned with the ESS learning outcomes have to be intentionally and meaningfully designed and enacted. Table 1 below illustrates how the ESS skills outcomes are aligned with the Learning Goals and Developmental Milestones for Emerging 21CC.

O-Level ESS Skills Outcomes	Emerging 21CC: Learning Goals & Developmental Milestones								
<ul style="list-style-type: none"> Examine critically issues related to sports and participation in physical activity from socio-cultural and global perspectives 	<p>Critical Thinking</p> <p>CAIT 1: Exercises sound reasoning and decision-making</p> <table border="1" data-bbox="616 361 1372 646"> <thead> <tr> <th data-bbox="620 368 1002 399">Lower Sec</th><th data-bbox="1002 368 1372 399">Upper Sec to Pre-University</th></tr> </thead> <tbody> <tr> <td data-bbox="620 399 1002 640">1.3 The student can use evidence and adopt different viewpoints to explain their reasoning and decisions.</td><td data-bbox="1002 399 1372 640">1.4 The student can use evidence and adopt different viewpoints to explain their reasoning and decisions, having considered the implications of the relationship among different viewpoints.</td></tr> </tbody> </table>	Lower Sec	Upper Sec to Pre-University	1.3 The student can use evidence and adopt different viewpoints to explain their reasoning and decisions.	1.4 The student can use evidence and adopt different viewpoints to explain their reasoning and decisions, having considered the implications of the relationship among different viewpoints.				
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<ul style="list-style-type: none"> Apply the performance analysis process to improve performance in exercise and sports Apply sports science concepts and principles to create a training programme Apply risk assessment to manage personal participation in exercise and sports Analyse and interpret data on issues related to sports and participation in physical activity to make valid inferences 	<p>Adaptive & Inventive Thinking</p> <p>CAIT 3: Assesses different contexts and situations in order to make connections and draw new insights</p> <table border="1" data-bbox="620 848 1372 1096"> <thead> <tr> <th data-bbox="620 855 1002 887">Lower Sec</th><th data-bbox="1002 855 1372 887">Upper Sec to Pre-University</th></tr> </thead> <tbody> <tr> <td data-bbox="620 887 1002 1089">3.3 The student can understand the similarities and differences between different contexts or situations and how this might affect their perspective or approach.</td><td data-bbox="1002 887 1372 1089">3.4 The student can draw on the similarities and differences between different contexts or situations to extract new insights to inform their perspective or approach.</td></tr> </tbody> </table> <p>CAIT 5: Explores possibilities and generates novel and useful ideas</p> <table border="1" data-bbox="620 1253 1372 1507"> <thead> <tr> <th data-bbox="620 1260 1002 1291">Lower Sec</th><th data-bbox="1002 1260 1372 1291">Upper Sec to Pre-University</th></tr> </thead> <tbody> <tr> <td data-bbox="620 1291 1002 1500">5.3 The student can generate ideas that may involve modifying existing ones and explore different pathways that are appropriate to respond to an issue or challenge.</td><td data-bbox="1002 1291 1372 1500">5.4 The student can generate ideas that are unique or modified substantially from existing ones and explore different pathways that lead to solutions.</td></tr> </tbody> </table>	Lower Sec	Upper Sec to Pre-University	3.3 The student can understand the similarities and differences between different contexts or situations and how this might affect their perspective or approach.	3.4 The student can draw on the similarities and differences between different contexts or situations to extract new insights to inform their perspective or approach.	Lower Sec	Upper Sec to Pre-University	5.3 The student can generate ideas that may involve modifying existing ones and explore different pathways that are appropriate to respond to an issue or challenge.	5.4 The student can generate ideas that are unique or modified substantially from existing ones and explore different pathways that lead to solutions.
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	<p>CAIT 6: Evaluates and refines ideas to formulate novel and useful solutions</p> <table border="1" data-bbox="620 1664 1372 1918"> <thead> <tr> <th data-bbox="620 1671 1002 1702">Lower Sec</th><th data-bbox="1002 1671 1372 1702">Upper Sec to Pre-University</th></tr> </thead> <tbody> <tr> <td data-bbox="620 1702 1002 1902">6.3 The student can evaluate and refine their ideas using relevant strategies and based on a set of criteria that is appropriate for the task or context.</td><td data-bbox="1002 1702 1372 1902">6.4 The student can evaluate and refine their ideas iteratively, using relevant strategies and based on a set of criteria that is appropriate for the task or context.</td></tr> </tbody> </table>	Lower Sec	Upper Sec to Pre-University	6.3 The student can evaluate and refine their ideas using relevant strategies and based on a set of criteria that is appropriate for the task or context.	6.4 The student can evaluate and refine their ideas iteratively, using relevant strategies and based on a set of criteria that is appropriate for the task or context.				
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O-Level ESS Skills Outcomes	Emerging 21CC: Learning Goals & Developmental Milestones					
<ul style="list-style-type: none"> Communicate ideas and beliefs while discussing issues regarding ethics, equity and commercialisation in sports 	<p>Communication</p> <p>CCI 2: Engages empathetically with diverse perspectives</p> <table border="1" data-bbox="620 361 1367 608"> <thead> <tr> <th data-bbox="620 361 1002 406">Lower Sec</th><th data-bbox="1002 361 1367 406">Upper Sec to Pre-University</th></tr> </thead> <tbody> <tr> <td data-bbox="620 406 1002 608">2.3 The student can respond with respect and empathy. The student is sensitive to the diverse backgrounds that influence different perspectives while interacting with others.</td><td data-bbox="1002 406 1367 608">2.4 The student can respond with respect and empathy. The student is sensitive to the diverse backgrounds that influence the context of communication with others.</td></tr> </tbody> </table>		Lower Sec	Upper Sec to Pre-University	2.3 The student can respond with respect and empathy. The student is sensitive to the diverse backgrounds that influence different perspectives while interacting with others.	2.4 The student can respond with respect and empathy. The student is sensitive to the diverse backgrounds that influence the context of communication with others.
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<ul style="list-style-type: none"> Apply movement concepts and skills in exercise and sports (in team practical activity) 	<p>Collaboration</p> <p>CCI 4: Collectively defines and negotiates the roles and tasks determined by the group to achieve its goals</p> <table border="1" data-bbox="620 900 1367 1125"> <thead> <tr> <th data-bbox="620 900 1002 945">Lower Sec</th><th data-bbox="1002 900 1367 945">Upper Sec to Pre-University</th></tr> </thead> <tbody> <tr> <td data-bbox="620 945 1002 1125">4.3 The student can determine and effectively assume the role they will play by considering the dynamics of the group.</td><td data-bbox="1002 945 1367 1125">4.4 The student can reflect on their working relationships with the group and adapt to contribute to the shared goals, as determined collectively by its members.</td></tr> </tbody> </table>		Lower Sec	Upper Sec to Pre-University	4.3 The student can determine and effectively assume the role they will play by considering the dynamics of the group.	4.4 The student can reflect on their working relationships with the group and adapt to contribute to the shared goals, as determined collectively by its members.
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Table 1. Alignment with Learning Goals for Emerging 21CC

With reference to Table 1, teachers can design ESS learning experiences accordingly, selecting appropriate content, pedagogy and assessment practices to attain the ESS learning outcomes, as well as reinforce or grow the students' competency over time.

SYLLABUS AIMS

The aims of the O-Level Exercise and Sports Science syllabus are for candidates to:

- a. apply the knowledge and skills in exercise physiology, biomechanics, and sports psychology to observe, analyse, evaluate and improve practical performances in exercise and sports;
- b. develop the movement concepts and motor skills to be proficient in the performance of an individual / dual² sport and team sport;
- c. understand the benefits and risks associated with exercise and sports to manage personal participation in them; and
- d. examine issues related to sports and participation in physical activity from socio-cultural and global perspectives.

Key Understandings

The syllabus intends for candidates to understand that:

- a. the sub-disciplines of sports science are inter-related and will influence how the human body moves in different contexts;
- b. a multi-faceted perspective is needed to analyse performance holistically for improvement; and
- c. socio-cultural factors have an influence on people moving, exercising and participating in physical activities.

Knowledge

The syllabus intends for candidates to know:

- a. the various systems such as musculoskeletal system and cardiorespiratory system, and the short-term effects and long-term adaptations of training;
- b. the factors influencing motor learning and development, the information processing model, and movement concepts;
- c. how natural laws and forces affect the body and objects in sports movement and performance;
- d. the concepts of motivation, arousal, anxiety and goal setting, and their impact on performance; and
- e. the issues pertaining to ethics, equity and commercialisation.

² Dual sports activities refer to sports that one can do with a partner such as badminton, tennis and fencing.

Skills

The syllabus intends for candidates to:

- a. apply the performance analysis process to improve performance in exercise and sports;
- b. apply sports science concepts and principles to create a training programme;
- c. apply risk assessment to manage personal participation in exercise and sports;
- d. apply movement concepts and motor skills in exercise and sports;
- e. examine critically issues related to sports and participation in physical activity from socio-cultural and global perspectives;
- f. communicate ideas and beliefs while discussing issues regarding ethics, equity and commercialisation in sports; and
- g. analyse and interpret data on issues related to sports and participation in physical activity to make valid inferences.

Desired Student Outcomes

The ESS candidates:

- a. are knowledgeable in the sub-disciplines of sports science. They are able to adopt an inter-disciplinary approach to problem-solve practical situations related to exercise and sports. Through the study of the subject, they develop the analytical skills to observe, analyse and evaluate practical performance for improvement.
- b. adopt a critical perspective when looking at issues related to sports in Singapore and the world. Through the study, they deepen their understanding of the factors influencing exercise and sports; and develop greater sensitivity and critical thinking when examining issues.
- c. are competent and confident to participate in at least an individual/dual sport and a team sport safely. Through the study, they develop the knowledge and skills in these sports and participate in them for recreation, health, and personal challenge and achievement.

They will have a strong foundation to continue in areas of studies directly related to exercise, sports, health and wellness at post-secondary education institutes. Through the course of study, they will also develop the relevant 21st Century Competencies, allowing them to be well-prepared to pursue other fields beyond exercise and sports science at the post-secondary level.

ASSESSMENT OBJECTIVES

Candidates should be able to:

AO1: Knowledge, Understanding and Application

Demonstrate and apply knowledge and understanding of factors that influence physical performance, and of issues related to sports and participation in physical activities.

AO2: Analysis and Evaluation

Analyse and evaluate factors that influence physical performance, and issues related to sports and participation in physical activities, and recommend improvements.

Analyse data related to physical performance, and data on issues related to sports and participation in physical activities, and make valid inferences.

AO3: Physical Performance

Demonstrate proficiency in performing physical activities.

ASSESSMENT OBJECTIVES WEIGHTING

	Paper 1 (Theory, e-Examination)	Paper 2 (Coursework)	Weighting
AO1	30%	--	30%
AO2	10%	20% (Development Log)	30%
AO3	--	40% (Performance of Practical Activities)	40%
Total	40%	60%	100%

SCHEME OF ASSESSMENT

The assessment comprises two compulsory papers: Paper 1 and Paper 2.

Paper/ Weighting	Duration	Components	Descriptions/ Marks allocation
1 Theory (e-Examination) (80 marks, 40%) All questions in the paper are compulsory.	2 hrs	Section A	Variety of item types (e.g., Multiple-choice Questions, Matching, Drag and Drop, Checking of Boxes, Fill-in-the Blanks and Short Answer) based on texts, images and short videos/animations (20 Marks)
		Section B	Structured Questions based on texts, images and short videos/animations (40 Marks)
		Section C	Structured Questions based on one video or two videos (20 Marks)
2 Coursework (80 marks, 60%) This paper is internally assessed and externally moderated.	21 weeks	Performance of Practical Activities (40%)	Individual/ Dual Practical Activity (20 Marks)
			Team Practical Activity (20 Marks)
		Development Log (20%)	Task 1: Improving Tactical Decisions in Team Practical Activity (10 Marks)
			Task 2: Development of Training Programme to Improve Practical Activity Performance
			Task 2(A): Analysis, and Development of Training Programme (15 Marks)
			Task 2(B): Implementation and Evaluation of Training Programme (10 Marks)
			Task 2(C): Consolidation of Experience (5 Marks)

DESCRIPTION OF PAPERS

PAPER 1: THEORY (e-Examination) (80 marks)

The electronic examination paper assesses candidates' ability to demonstrate knowledge, understanding and application of the areas of study in Exercise and Sports Science. The paper also assesses candidates' ability to analyse and evaluate factors that influence performance, and issues related to involvement in physical activities, and recommend improvements. Candidates will be required to analyse data on performance and issues related to physical activities to make valid inferences.

The question paper is divided into three sections and the duration is 2 hours. All questions in the paper are compulsory.

Section A (20 marks)

Variety of item types (e.g., Multiple-choice Questions, Matching, Drag and Drop, Checking of Boxes, Fill-in-the Blanks and Short Answer) based on texts, images and short videos/animations.

Section B (40 marks)

Structured Questions based on texts, images and short videos/animations.

Section C (20 marks)

Structured Questions based on one or two videos.

PAPER 2: COURSEWORK (80 marks)

(INTERNALLY ASSESSED AND EXTERNALLY MODERATED)

The coursework assesses candidates' proficiency in performing the Practical Activities (PA) and their ability to analyse, evaluate and make improvement to their physical performance through a Development Log (DL).

Candidates must choose ONE practical activity from EACH of the categories below:

Categories	Practical Activities
Individual / Dual	<p>Individual</p> <ul style="list-style-type: none"> • Cross-country Running • Swimming • Track and Field <p>Dual</p> <ul style="list-style-type: none"> • Badminton • Table Tennis • Tennis
Team	<ul style="list-style-type: none"> • Basketball • Floorball • Football • Hockey • Netball • Softball • Volleyball

(I) PERFORMANCE OF PRACTICAL ACTIVITIES (40 marks)

For this component of the coursework, candidates will be assessed on their ability to

- participate in a recognised version of two practical activities with regard for the safety of self and others.
- perform a variety of skills with precision, control and fluency, which are applied appropriately in authentic performance situations.
- respond to the actions of other players with an awareness of their own role and apply appropriate tactics to gain advantage during play for the Dual and Team Practical Activity.
- achieve the quantitative standard for the Individual Practical Activity.

Assessment Criteria for Performance of Practical Activities

Candidates are assessed on their individual performance proficiency in two practical activities based on the descriptors in the Assessment Criteria for Performance of Practical Activities (**Annex A**). A candidate must first generally fulfil the performance assessment descriptors at a particular band of marks. The candidate's mark, within that band, will be decided by the extent to which his/her ability meets the assessment descriptors. For Cross-country Running, Swimming, Track and Field, the assessment of the candidate's performance will be based on quantitative standards.

Evidence of Practical Activities Performance

Candidates will be given **two opportunities** to produce evidence of and be assessed on their performance in each of the practical activities they are offering so that the candidates' best performance for each practical activity can be selected. Centres should adhere to a periodic, progressive assessment procedure when scheduling the assessment sessions for the candidates.

Centres are required to provide video-recorded evidence of their candidates' physical performance of the Dual and Team Practical Activities. Each filming of the activity should be approximately 15 minutes in duration and should include an optimal number of other candidates. The video-recorded evidence should be submitted to SEAB by the stipulated coursework deadline. For the Individual Practical Activities, which are objectively tested, Centres must submit all recorded timings and distances in support of the mark awarded. For these, video recordings are not required.

(II) DEVELOPMENT LOG (40 marks)

This component of the Coursework requires candidates to complete a Development Log comprising the following tasks:

Task 1: Improving Tactical Decisions in Team Practical Activity

Task 2: Development of Training Programme to improve Practical Activity Performance

 Task 2(A): Analysis, and Development of Training Programme

 Task 2(B): Implementation and Evaluation of Training Programme

 Task 2(C): Consolidation of Experience

The Development Log is to be completed in conjunction with the candidates' training and preparation for the Performance of Practical Activities component. Candidates should be briefed by the Coursework Supervisor on the requirements for Tasks 1 and 2(A)-(C). For Task 2(A), candidates are allowed one consultation with their Coursework Supervisor. The Coursework Supervisor should only endorse candidates' proposed training programme provided it is safe for implementation. For Task 2(B), candidates are allowed three to four consultations during the implementation of the training programme. There will be no consultation for Task 1 and Task 2(C).

Assessment Criteria for Task 1: Improving Tactical Decisions in Team Practical Activity (10 marks)

For Task 1, the focus of the candidate's work should be on their chosen Team PA. Candidates will be assessed individually on their ability to use the performance analysis process to observe, analyse and evaluate the impact of their tactical decisions on their team's performance based on a video of their performance provided by the school. In the analysis, candidates should include discussions on factors that affect their tactical decisions. They should also provide detailed suggestions on how to improve their tactical decisions and justify how they may improve performance.

Each candidate's response to Task 1 will be assessed using the assessment criteria given in **Annex B**. Marks are awarded according to the given assessment criteria using a 'best fit' approach.

Assessment Criteria for Tasks 2(A)-(C): Development of Training Programme to Improve Practical Activity Performance (30 marks)

For Tasks 2(A)-(C), candidates should choose either their Team PA or Individual/Dual PA as the focus of the task. Candidates will be assessed individually on their ability to use the performance analysis process to analyse factors affecting their performance in their chosen PA; develop, implement and evaluate a 4 to 5-week training programme to improve their performance in the chosen PA; and consolidate their learning to make recommendations for improvement. The process that candidates undertake through the tasks is summarised in Figure 3:

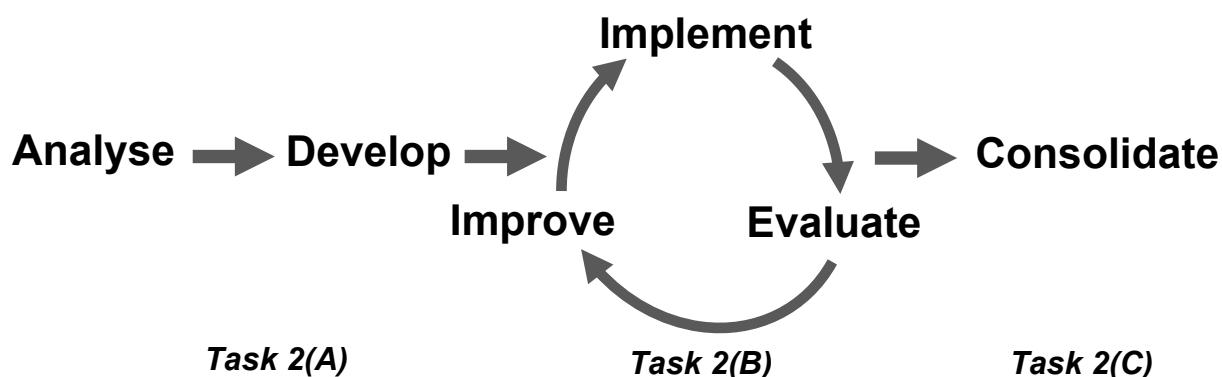


Figure 3. Process of Development of Training Programme to Improve Practical Activity Performance

Each candidate's response to Task 2(A)-(C) will be assessed using the assessment criteria given in **Annex C**. Each task will be marked according to the assessment criteria using a 'best fit' approach.

Teacher Supervision of the Development Log Tasks

Candidates must carry out the coursework under the ongoing supervision of their Coursework Supervisors. While Coursework Supervisors can help candidates understand the requirements of the Development Log, they are not to provide them with any solutions. They must not direct candidates on what to write, correct training plans or indicate marks to be awarded. The Development Log must be the original work produced by the candidates.

Content produced by Artificial Intelligence (AI) is not considered as candidates' own work. Coursework Supervisors should advise candidates to consider the relevance of AI-generated output for coursework as candidates need to be discerning and critically assess AI-generated output for accuracy, objectivity, and relevance. Candidates must acknowledge sources of information used in

their work, which include the use of AI tools. Candidates who pass off content generated by others (including AI) as their own will be subjected to disciplinary action.

All reference materials should be acknowledged, and additional information included as annexes. The final copy for submission to SEAB should be in PDF format and endorsed by the Coursework Supervisor.

AREAS OF STUDY

The assessment will be based on the five areas of study as follows:

- Exercise Physiology
- Motor Learning and Development
- Biomechanics
- Sports Psychology
- Sports Sociology

Exercise Physiology:

Knowledge	Skills
<p>Candidates will know:</p> <p>a. the major bones and joints in the body and their functions;</p> <p>b. the type and characteristics of muscles and how muscles work with the skeletal system to enable movement;</p> <p>c. the components and functions of the circulatory and respiratory systems and how they work together to influence movement;</p> <p>d. the different energy systems in the human body and their functions;</p> <p>e. the short-term effects and long-term adaptations of physical activity on the human body;</p> <p>f. the different types of sports injuries; and</p> <p>g. the training principles and methods to design an effective training programme.</p>	<p>Candidates will be able to:</p> <p>a. explain how the human body systems interact to influence movement;</p> <p>b. evaluate the energy systems needed for different physical activities;</p> <p>c. design a training programme to improve performance through the application of training principles and methods;</p> <p>d. identify hazards, assess risks and adopt control measures to manage personal participation in exercise and sports; and</p> <p>e. analyse and interpret data in relation to exercise and training.</p>
Contents	
<p>Skeletal System</p> <ul style="list-style-type: none"> • functions of the skeletal system • types of bones and their functions • major bones and their classifications • types of joints • components of a freely movable joint 	

- types of freely moveable joint and their types of movement
- how the types of movement are linked to the appropriate joint type
- planes and axes of the human body in relation to the types of movement

Muscular System

- characteristics of different types of muscles
- functions of major muscle groups
- how muscles work together
- how the skeletal and muscular systems (i.e., musculoskeletal system) work together to enable movement during exercise and sports

Circulatory System

- components and functions of the circulatory system
- pathway of blood through the heart and the rest of the body
- relationship between cardiac output, heart rate and stroke volume at rest and during exercise

Respiratory System

- components and functions of the respiratory system
- pathway of air through the respiratory system
- process of inhaling (at rest) and exhaling (at rest) with reference to the roles of the relevant organs and body parts
- lung volume and capacity
- how the circulatory and respiratory systems (i.e., cardiorespiratory system) work together to influence movement during exercise and sports

Energy System

- how energy can be released for muscle contraction
- role of macronutrients as energy sources for aerobic and anaerobic exercises
- relative contributions of the energy systems during aerobic and anaerobic exercise
- training zones to improve the energy systems for performance in exercise and sports

Training Principles and Methods

- components of fitness
- importance of each component of fitness for different exercise and sports
- principles of training to manipulate the training variables in developing a training programme
- methods of training to improve the components of fitness and the energy systems involved in exercise and sports

Fitness Testing

- rationale and limitations of fitness testing
- tests to measure each component of fitness with justification
- analysis of an individual's physical performance in exercise and sports using fitness tests

Effects of Exercise on the Body

- short-term effects of exercise on the musculoskeletal and cardiorespiratory systems
- long-term adaptations of the musculoskeletal and cardiorespiratory systems to aerobic and anaerobic exercises

Injury and Prevention

- common injuries sustained at joints and muscles and their associated causes
- risk assessment and management in exercise and sports
- importance of warm-up and cool-down activities in exercise and sports
- importance of hydration before, during and after exercise and sports

Motor Learning and Development:

Knowledge	Skills
Candidates will know: <ul style="list-style-type: none"> a. the different classification of skills; b. factors affecting motor learning and development; and c. the movement concepts and motor skills. 	Candidates will be able to: <ul style="list-style-type: none"> a. apply the games-related concepts in sports; and b. analyse and interpret data of tactical performance in sports
Contents	
<p>Classification of Skills</p> <ul style="list-style-type: none"> • classification of skills in sports with justifications <p>Factors affecting Motor Learning and Development</p> <ul style="list-style-type: none"> • factors affecting motor learning and development in relation to the individual, task and environment <p>Information Processing Model</p> <ul style="list-style-type: none"> • how an individual processes information in exercise and sports • differences between performance of a novice and an expert, in relation to the stages of the Information Processing Model <p>Feedback</p> <ul style="list-style-type: none"> • types of feedback and their application in motor learning <p>Movement Concepts and Motor Skills Framework</p> <ul style="list-style-type: none"> • Movement Concepts and Motor Skills Framework <p>Game-related Concepts</p> <ul style="list-style-type: none"> • game-related concepts in sports <p>Tactical Analysis</p> <ul style="list-style-type: none"> • notational analysis of individual and team tactical performance in sports 	

Biomechanics:

Knowledge	Skills
Candidates will know: <ul style="list-style-type: none"> a. the effect of the natural laws and forces on the human body in movement and performances; b. the biomechanical principles such as stability, summation of forces and projectile motion; and c. the movement phases of skill performances for analysis. 	Candidates will be able to: <ul style="list-style-type: none"> a. apply biomechanical principles such as force, stability, summation of forces and projectile motion to analyse movement for refinement and improvement; and b. observe, analyse and evaluate efficiency of movement.

Contents
Newton's Laws of Motion
<ul style="list-style-type: none"> definition of force Newton's laws of motion and the effects of forces on movement in exercise and sports
Factors affecting stability
<ul style="list-style-type: none"> definition of centre of mass how factors of stability affect movement in exercise and sports
Summation of Forces
<ul style="list-style-type: none"> how summation of forces can be applied to performances in exercise and sports
Projectile Motion
<ul style="list-style-type: none"> how factors of projectile motion can influence performance including the human body as a projectile how Magnus effect influence projectile motion
Movement Phases
<ul style="list-style-type: none"> movement phases of skill performances in exercise and sports
Technical Analysis
<ul style="list-style-type: none"> analysis of an individual's technical performance in exercise and sports using the phase analysis model analysis of an individual's technical performance with the aid of a performance analysis application

Sports Psychology:

Knowledge	Skills
<p>Candidates will know:</p> <ol style="list-style-type: none"> the relationship between arousal and performance; the factors affecting anxiety, and coping strategies; and the factors affecting motivation. 	<p>Candidates will be able to:</p> <ol style="list-style-type: none"> apply the principles of goal setting to improve performance in physical activities; and use coping strategies in managing anxiety to improve performance in physical activities.

Contents

Motivation
<ul style="list-style-type: none"> factors affecting the types of motivation, and how motivation influences performance
Arousal & Performance
<ul style="list-style-type: none"> physiological responses of the body to arousal inverted-U theory (Yerkes-Dodson theory) and the relationship between arousal and performance
Anxiety
<ul style="list-style-type: none"> state and trait anxiety and their effects on performance coping strategies in managing anxiety how cognitive appraisal affect performance

Goal Setting

- SMART principle in setting and reviewing goals to optimise performance
- types of goals

Sports Sociology:

Knowledge	Skills
Candidates will know: a. how socio-cultural factors influence behaviours and participation in exercise and sports; b. how equity can affect participation in exercise and sports; and c. the impact of commercialisation on participation in exercise and sports.	Candidates will be able to: a. evaluate the impact of issues such as equity and commercialisation on the level of participation in exercise and sports; and b. examine ethical issues regarding the behaviours of individual and groups in exercise and sports.
Contents	
<p>Ethics</p> <ul style="list-style-type: none"> • sportsmanship and gamesmanship in sports • issue of performance-enhancing drugs in sport <p>Equity</p> <ul style="list-style-type: none"> • issues affecting exercise and sports participation that are related to <ul style="list-style-type: none"> ○ race ○ gender ○ disability ○ socio-economic status <p>Commercialisation</p> <ul style="list-style-type: none"> • relationship among sport (sporting event, performer, spectator), sponsorship and the media 	

ASSESSMENT CRITERIA FOR PERFORMANCE OF PRACTICAL ACTIVITIES

Marks	Bands	Individual / Dual	Team
17-20	Band 5	<u>Individual</u> <ul style="list-style-type: none"> Achieve the quantitative standard for this band. <u>Dual</u> <ul style="list-style-type: none"> Demonstrate skills with excellent standard of precision, control and fluency. Demonstrate a variety of complex skills that are applied appropriately in authentic performance situations. Apply appropriate tactics resulting in excellent advantage during play. Demonstrate excellent regard for the safety of self and others. 	<ul style="list-style-type: none"> Demonstrate skills with excellent standard of precision, control and fluency. Demonstrate a variety of complex skills that are applied appropriately in authentic performance situations. Apply appropriate tactics resulting in excellent advantage during team play. Demonstrate excellent awareness of own role by responding very effectively to the actions of other players. Demonstrate excellent regard for the safety of self and others.
13-16	Band 4	<u>Individual</u> <ul style="list-style-type: none"> Achieve the quantitative standard for this band. <u>Dual</u> <ul style="list-style-type: none"> Demonstrate skills with very good standard of precision, control and fluency. Demonstrate some complex skills that are applied appropriately in authentic performance situations. Apply appropriate tactics resulting in very good advantage during play. Demonstrate very good regard for the safety of self and others. 	<ul style="list-style-type: none"> Demonstrate skills with very good standard of precision, control and fluency. Demonstrate some complex skills that are applied appropriately in authentic performance situations. Apply appropriate tactics resulting in very good advantage during team play. Demonstrate very good awareness of own role by responding effectively to the actions of other players. Demonstrate very good regard for the safety of self and others.
9-12	Band 3	<u>Individual</u> <ul style="list-style-type: none"> Achieve the quantitative standard for this band. <u>Dual</u> <ul style="list-style-type: none"> Demonstrate skills with a good standard of precision, control and fluency. Demonstrate a variety of basic skills that are applied appropriately in authentic performance situations. Apply appropriate tactics resulting in good advantage during play. Demonstrate good regard for the safety of self and others. 	<ul style="list-style-type: none"> Demonstrate skills with a good standard of precision, control and fluency. Demonstrate a variety of basic skills that are applied appropriately in authentic performance situations. Apply appropriate tactics resulting in good advantage during team play. Demonstrate good awareness of own role by responding appropriately to the actions of other players.

Marks	Bands	Individual / Dual	Team
			<ul style="list-style-type: none"> Demonstrate good regard for the safety of self and others.
5-8	Band 2	<u>Individual</u> <ul style="list-style-type: none"> Achieve the quantitative standard for this band. <u>Dual</u> <ul style="list-style-type: none"> Demonstrate skills with a fair standard of precision, control and fluency. Demonstrate some basic skills that are applied appropriately in authentic performance situations. Sometimes apply appropriate tactics resulting in some advantage during play. Demonstrate limited regard for the safety of self and others. 	<ul style="list-style-type: none"> Demonstrate skills with a fair standard of precision, control and fluency. Demonstrate limited basic skills that are applied appropriately in authentic performance situations. Sometimes apply appropriate tactics resulting in some advantage during team play. Demonstrate some awareness of own role by responding satisfactorily to the actions of other players. Demonstrate limited regard for the safety of self and others.
0-4	Band 1	<u>Individual</u> <ul style="list-style-type: none"> Achieve the quantitative standard for this band. <u>Dual</u> <ul style="list-style-type: none"> Demonstrate skills with a poor standard of precision, control and fluency. Demonstrate a few basic skills that are applied appropriately in authentic performance situations. Rarely apply tactics resulting in little advantage during team play. Demonstrate little awareness of own role by responding poorly to the actions of other players. Demonstrate little regard for the safety of self and others. 	<ul style="list-style-type: none"> Demonstrate skills with a poor standard of precision, control and fluency. Demonstrate a few basic skills that are applied appropriately in authentic performance situations. Rarely apply tactics resulting in little advantage during team play. Demonstrate little awareness of own role by responding poorly to the actions of other players. Demonstrate little regard for the safety of self and others.

ASSESSMENT CRITERIA FOR TASK 1: IMPROVING TACTICAL DECISIONS IN TEAM PRACTICAL ACTIVITY (10 Marks)	
8-10	A thoroughly developed analysis and evaluation with extensive evidence that demonstrates <ul style="list-style-type: none"> • sophisticated considerations and understanding of multiple significant tactical decisions, factors that affect those tactical decisions, their impact on performance, and provision of effective solutions with justifications elaborated through detailed and relevant examples from specific situations shown in the filmed performance • appropriate and accurate application with sound justification from three areas of study • appropriate and accurate selection, comparison, interpretation of data which is presented in a meaningful, detailed, concise and logical manner with suitable use of aids such as diagrams/charts.
5-7	A sufficiently developed analysis and evaluation with sufficient evidence that demonstrates <ul style="list-style-type: none"> • good considerations and understanding of several significant tactical decisions, factors that affect those tactical decisions, their impact on performance, and provision of appropriate solutions with justifications elaborated through detailed and relevant examples from specific situations shown in the filmed performance. • mostly appropriate and accurate application with sound justification from two to three of the areas of study • mostly appropriate and accurate selection, comparison, interpretation of data which is presented in a meaningful, detailed, concise and logical manner with suitable use of aids such as diagrams/charts.
3-4	A simple analysis and evaluation with sufficient evidence that demonstrates <ul style="list-style-type: none"> • simple considerations and understanding of a few significant tactical decisions, factors that affect the tactical decisions, their impact on performance, and provision of appropriate solutions with justifications elaborated through relevant examples from specific situations shown in the filmed performance. • application with justification from one or two of the areas of study • selection, comparison, interpretation of data which is presented with suitable use of aids such as diagrams/charts.
1-2	A weak analysis and evaluation with limited evidence that demonstrates <ul style="list-style-type: none"> • considerations of one or two tactical decisions, factors that affect the tactical decisions, their impact on performance, and provision of some solutions elaborated through examples shown in the filmed performance. • inaccurate application and justification from one or two of the areas of study • selection, comparison, interpretation of data which is presented with suitable use of aids such as diagrams/charts.
0	Work that does not meet the criteria for a mark.

ASSESSMENT CRITERIA FOR TASK 2(A), 2(B) and 2(C) (30 Marks)		
Task 2(A) (15m) Analysis, and Development of Training Programme	Task 2(B) (10m) Implementation and Evaluation of Training Programme	Task 2(C) (5m) Consolidation of Experience
<p>12-15 Thoroughly developed analysis that</p> <ul style="list-style-type: none"> clearly identifies and prioritises multiple factors that are likely to bring about the largest improvement in the overall performance of the practical activity clearly identifies multiple strengths and areas for improvement in the key performance indicators of the identified skill and components of fitness through accurate and appropriate use of skill analysis method and fitness testing protocol(s) develops targets/goals which relate strongly to, and aim to improve, the factors that are identified. <p>Extensive evidence of planning that</p> <ul style="list-style-type: none"> includes multiple effective strategies that are likely to have substantial impact on the overall performance of the practical activity reflects key considerations in the analysis and is specific to declared goals and includes detailed sessions that follow SMART principles reflects candidate's detailed understanding of training principles demonstrated through the nature of the planned training sessions is presented in a detailed, concise and logical manner in the structure of each training session with appropriate use of aids such as diagrams/charts. <p>Extensive evidence that shows appropriate and accurate</p> <ul style="list-style-type: none"> application and sound justification from multiple areas of study selection, comparison, interpretation of data which is presented in a meaningful, detailed, concise and logical manner with suitable use of aids such as diagrams/charts. 	<p>8-10 Extensive evidence that shows</p> <ul style="list-style-type: none"> precise completion and recording of sessions effective and meticulous use of planned evaluative procedures to monitor the effectiveness of the programme through comparison of the planned programme with actual performances and results clear rationale for adjustment or adherence to training programme and provides an effective follow-up action where necessary appropriate and accurate application with sound justification from multiple areas of study appropriate and accurate selection, comparison, interpretation of data which is presented in a meaningful, detailed, concise and logical manner with suitable use of aids such as diagrams/charts. 	<p>4-5 Through consideration of the original analysis and subsequent programme, the candidate can express in detail the effectiveness of the programme and how it has affected the overall performance of the practical activity.</p> <p>The candidate is able to justify several recommendations to be considered.</p> <p>There is extensive evidence that shows appropriate and accurate selection, comparison, interpretation of data which is presented in a meaningful, detailed, concise and logical manner with suitable use of aids such as diagrams/charts.</p>

Task 2(A) (15m) Analysis, and Development of Training Programme	Task 2(B) (10m) Implementation and Evaluation of Training Programme	Task 2(C) (5m) Consolidation of Experience
<p>8-11 Sufficient analysis that</p> <ul style="list-style-type: none"> identifies and prioritises several factors that are likely to bring about the largest improvement in the overall performance of the practical activity identifies several strengths and areas for improvement in the key performance indicators of the identified skill and components of fitness through accurate and appropriate use of skill analysis method and fitness testing protocol(s) develops targets/goals which relate strongly to, and aim to improve, the factors that are identified. <p>Sufficient evidence of planning that</p> <ul style="list-style-type: none"> includes several effective strategies that are likely to have substantial impact on the overall performance of the practical activity reflects key considerations in the analysis and it is specific to declared goals and includes detailed sessions that follow SMART principles reflects candidate's detailed understanding of training principles demonstrated through the nature of the planned training sessions is presented in a fairly detailed, concise and logical manner in the structure of each training session with some appropriate use of aids such as diagrams/charts. <p>Sufficient evidence that shows appropriate and accurate</p> <ul style="list-style-type: none"> application and sound justification from several areas of study selection, comparison, interpretation of data which is presented in a meaningful, detailed, concise and logical manner with suitable use of aids such as diagrams/charts. 	<p>5-7 Sufficient evidence that shows</p> <ul style="list-style-type: none"> precise completion and recording of sessions mostly effective and meticulous use of planned evaluative procedures to monitor the effectiveness of the programme through comparison of the planned programme with actual performances and results rationale for adjustment or adherence to training programme and provides an appropriate follow-up action where necessary mostly appropriate and accurate application with sound justification from several areas of study mostly appropriate and accurate selection, comparison, interpretation of data which is presented in a meaningful, detailed, concise and logical manner with suitable use of aids such as diagrams/charts. 	<p>3 Through consideration of the original analysis and subsequent programme, the candidate can express several aspects of the effectiveness of the programme and how it has affected the overall performance of the practical activity.</p> <p>The candidate is able to justify a few recommendations to be considered.</p> <p>There is sufficient evidence that shows mostly appropriate and accurate selection, comparison, interpretation of data which is presented in a meaningful, detailed, concise and logical manner with suitable use of aids such as diagrams/charts.</p>

Task 2(A) (15m) Analysis, and Development of Training Programme	Task 2(B) (10m) Implementation and Evaluation of Training Programme	Task 2(C) (5m) Consolidation of Experience
<p>4-7 Simple analysis that</p> <ul style="list-style-type: none"> identifies and prioritises a few factors that are likely to bring about the largest improvement in the overall performance of the practical activity identifies a few strengths and areas for improvement in the key performance indicators of the identified skill and components of fitness through appropriate use of skill analysis method and fitness testing protocol(s) develops targets/goals which relate to, and aim to improve, the factors that are identified. <p>Some evidence of planning that</p> <ul style="list-style-type: none"> includes effective strategies that are likely to have substantial impact on the overall performance of the practical activity reflects considerations in the analysis and includes sessions that follow SMART principles reflects candidate's understanding of training principles demonstrated through the nature of the planned training sessions is presented in a fairly detailed and logical manner in the structure of each training session with some appropriate use of aids such as diagrams/charts. <p>Some evidence that shows appropriate and accurate</p> <ul style="list-style-type: none"> application and justification from two or three areas of study selection, comparison, interpretation of data which is presented with suitable use of aids such as diagrams/charts. 	<p>3-4 Some evidence that shows</p> <ul style="list-style-type: none"> completion and recording of sessions the use of planned evaluative procedures to monitor the effectiveness of the programme through comparison of the planned programme with actual performances and results rationale for adjustment or adherence to training programme and provides an appropriate follow-up action where necessary application and justification from one or two areas of study selection, comparison, interpretation of data which is presented with suitable use of aids such as diagrams/charts 	<p>2 Through consideration of the original analysis and subsequent programme, the candidate can express one or two aspects of the effectiveness of the programme and indicate one or two changes in the overall performance of the practical activity.</p> <p>The candidate is able to justify one or two recommendations to be considered.</p> <p>There is some evidence that shows mostly appropriate and accurate selection, comparison, interpretation of data which is presented with suitable use of aids such as diagrams/charts.</p>

Task 2(A) (15m) Analysis, and Development of Training Programme	Task 2(B) (10m) Implementation and Evaluation of Training Programme	Task 2(C) (5m) Consolidation of Experience
<p>1-3 Limited analysis that</p> <ul style="list-style-type: none"> identifies and prioritises one or two factors that are likely to bring about the largest improvement in the overall performance of the practical activity identifies one or two strengths and areas for improvement in the key performance indicators of the identified skill and components of fitness through use of skill analysis method and fitness testing protocol(s) develops targets/goals which relate to, and aim to improve, the factors that are identified. <p>Limited evidence of planning that</p> <ul style="list-style-type: none"> includes strategies that are likely to have substantial impact on the overall performance of the practical activity reflects considerations in the analysis and includes sessions that follow SMART principles reflects candidate's simple understanding of training principles demonstrated through the nature of the planned training sessions is presented in a logical manner in the structure of each training session. <p>Limited evidence that shows accurate</p> <ul style="list-style-type: none"> application and justification from one or two areas of study selection, comparison, interpretation of data which is presented with suitable use of aids such as diagrams/charts. 	<p>1-2 Limited evidence that shows</p> <ul style="list-style-type: none"> completion and recording of sessions monitoring of the effectiveness of the programme rationale for adjustment or adherence to training programme and provides an unproductive follow-up action where necessary application from one or two areas of study selection, comparison, interpretation of data which is presented with suitable use of aids such as diagrams/charts. 	<p>1 Through consideration of the original analysis and subsequent programme, the candidate can express one aspect of the effectiveness of the programme and indicate one change in the overall performance of the practical activity.</p> <p>The candidate is able to make one or two recommendations to be considered without providing justification.</p> <p>There is limited evidence that shows accurate selection, comparison, interpretation of data which is presented with suitable use of aids such as diagrams/charts.</p>
0 Work that does not meet the criteria for a mark.	0 Work that does not meet the criteria for a mark.	0 Work that does not meet the criteria for a mark.