

Singapore General Certificate of Education Ordinary Level (2022)

Exercise and Sports Science (Syllabus 6081)

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AIMS

The O-Level Exercise and Sports Science syllabus aims to enable candidates to:

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

AREAS OF STUDY

There are five areas of study on which the assessment is based:

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

Details of the areas of study are organised in the following tables:

Exercise Physiology:

	Knowledge Skills				
St	tudents will know:		udents will be able to:		
a.	the major bones and joints in the body and their functions;	a.	improve performance and manage injuries through analysis of joint movement;		
b.	the characteristics of muscles, how they are classified and the roles of the major muscle groups;	b.	identify the different muscles used in various sports and improve muscular system, and thereby sporting performance;		
c.	the components and functions of the circulatory system;	C.	analyse the requirements of the circulatory and respiratory systems in physical activities; and		
d.	the components and functions of the respiratory system; and	d.	evaluate the nutritional requirements before, during and after a physical activity.		
e.	the different components of food and their effects on sporting performance.		during and arter a physical activity.		

Contents to be assessed may include the following:

Skeletal System

- Explain the functions of the skeleton and functions of the major bones.
- Describe the roles and functions of the different joints.

- Describe the different types of joint movement.
- Explain the characteristics of freely movable joints.
- Describe the roles and functions of connective tissue.
- Describe the injuries at joints; and their associated causes and preventive measures.

Muscular System

- Recognise the types and characteristics of muscles.
- Identify the major muscle groups.
- Show an understanding of muscle action and control.
- Explain the relevance of muscle groups in physical activities and sporting performance.
- Explain the role and function of tendons during movement.

Circulatory System

- Identify the components and show an understanding of the functions of circulatory system.
- Identify the components of blood and show an understanding of the functions of the components.
- Explain the short and long term effects of exercise on circulatory system.

Respiratory System

- Identify the components and show an understanding of the functions of respiratory system.
- Describe the different energy systems and explain how they contribute to sporting performance.
- Explain the effects of exercise on aerobic and anaerobic systems.

Training Principles and Methods

- Explain and apply the principles of Frequency, Intensity, Time and Type (FITT) and Specificity, Progression, Overload, Reversibility and Individuality (SPORI) in the development of a suitable training programme with an understanding of the components of fitness.
- Explain and apply the methods of circuit training, continuous training, cross training, fartlek training, interval training, weight training and altitude training in developing a suitable training programme.

Nutrition

- Explain the effects of nutritional components on the body.
- Explain the concept of energy balance.
- Recognise the nutrition for different phases of activity.
- Explain the importance of fluid replacement on the body.

Biomechanics:

	Knowledge	Skills	
Students will know:		Students will be able to:	
	a. the effects of the natural laws and forces on the human body in sports movement and performances;	observe and evaluate efficiency of movements accurately; and	
	b. the biomechanical principles such as force, centre of gravity, summation of forces and projectile motion; and	 apply biomechanical principles such as force, centre of gravity, summation of forces and projectile motion to analyse movements for refinement and improvement. 	
	c. the phases (during preparation, action and follow through) of performances for analysis.		

Contents to be assessed may include the following:

- State Newton's Laws of motion.
- Explain the effects of the following on biomechanical movement in sports and physical activities
 - force
 - centre of gravity
 - stability
 - mass and weight
 - acceleration
- Know the different classes of levers in the human body and their application in sports and physical activities.
- Explain how summation of forces can be applied to performances in sports and physical activities.
- Describe how projectile motion can influence performance.
- Recognise the phases of performance and use a biomechanical analysis to analyse physical performances.
- Apply concepts in biomechanics to modify physical performance responses for improvement.

Sports Psychology:

	Knowledge	Skills	
St	udents will know:	Students will be able to:	
a.	the concept of self-efficacy, the sources of self-efficacy and its relation to sports performance;	use different mental strategies to improve performance in a physical activity; and	
b.	the factors affecting anxiety and coping strategies for stress;	b. analyse the psychological factors of exercis participation.	e
C.	the relation of extrinsic and intrinsic motivation to sports performance; and		
d.	the factors influencing exercise participation.		

Contents to be assessed may include the following:

Self-Efficacy

- Define and know what is self-efficacy and the factors influencing self-efficacy.
- Explain the concept of self-efficacy in relation to performance in sports and physical activities as well as how self-efficacy can affect performance.

Motivation

- Define what is motivation and the types of motivation.
- Explain the factors affecting the types of motivation and how motivation will influence performance.

Arousal & Performance

- Recognise the physiological responses of the body to arousal.
- Know and explain the relationship between arousal and performance.

Anxiety

- Explain how personal and situational factors affects anxiety.
- Explain the effects of anxiety on performance as well as the coping strategies in managing anxiety.

Factors influencing exercise participation

 Explain the influence of self-efficacy and motivation on exercise participation and the effect of exercise on psychological well-being.

Sports Sociology:

Knowledge	Skills
Students will know:	Students will be able to:
a. how equity can affect participation in exercise and sports;	a. communicate ideas and beliefs while examining issues regarding equity, commercialisation, and ethics in sports.
b. the impact of commercialisation on participation in exercise and sports; and	, and an appendix
c. the ethical issues prevalent in sports today.	

Contents to be assessed may include the following:

Equity

- Discuss the factors affecting participation in exercise and sport with regard to
 - gender
 - race
 - disability

Commercialisation

- Discuss the issue of sponsorship in sports
 - advantages and disadvantages of sponsorship in sports
 - advantages and disadvantages of sponsorship from the perspective of a sponsor
- Recognise and discuss the issue of media (social, internet, visual and print) and sport
 - impact of media technology in sport
 - positive and negative effects of media
 - media coverage of female sports

Ethics

- Discuss the issue of drugs in sport
 - Reasons for drug taking
 - Types of drugs (performance enhancing) and their effects
- Recognise and discuss the issue of sportsmanship and gamesmanship in sports
 - Definitions of sportsmanship and gamesmanship
 - Examples of sportsmanship and gamesmanship

Motor Learning and Development:

Knowledge			Skills
Students will know:		Students will be able to:	
a.	the different classification of skills;	a.	perform the activity-specific motor skills and movement patterns effectively and apply
b.	factors affecting motor learning and development;		them in different practical activities; and
C.	the activity-specific motor skills and movement patterns; and	b.	combine skills and movement concepts effectively in the context of the selected practical activities.
d.	the movement concepts involved in the selected practical activities.		

Contents to be assessed may include the following:

- Show an understanding of the Skills Classification.
- Explain the factors affecting variations in skill level in motor development and motor learning.
- Explain the differences between the skills of Novice and Expert performer in relation to
 - Information Processing Model
 - Different types of feedback and their importance
- Explain key considerations in design of practice when acquiring a new skill.
- Demonstrate the understanding of movement concepts using the BSER framework.
- Apply the activity-specific movement concepts in different practical activities.
- Show an understanding of game-related concepts and apply these concepts in different practical activities.

ASSESSMENT OBJECTIVES

Knowledge and Understanding

AO1: Candidates will be able to demonstrate knowledge and understanding of

- factors that influence performance
- issues related to physical activities

Analysing and Evaluating

AO2: Candidates will be able to demonstrate their ability to analyse, evaluate and improve physical performance in self or others.

Physical Performance

AO3: Candidates will be able to demonstrate proficiency in performing physical activities.

ASSESSMENT OBJECTIVES WEIGHTING

	Paper 1 (e-Examination Paper)	Paper 2 (Coursework)	Weighting
AO1	30%		30%
AO2	10%	20% (Development Log)	30%
AO3		40% (Physical Performance)	40%

SCHEME OF ASSESSMENT

The scheme of assessment consists of two compulsory papers: Paper 1 and Paper 2.

Paper/ Weighting	Duration	Mode	Components	Descriptions/ Marks allocation
1 (80 marks, 40%) All questions	2 hrs	e-Examination	Section A	Variety of item types e.g. Multiple-choice Questions, Matching, Drag and Drop, Checking of Boxes and Fill in the Blanks. (20 Marks)
in the paper are compulsory			Section B	Short answer and Structured Questions based on texts and pictures (40 Marks)
			Section C	Structured Questions based on ONE video (20 Marks)
2 (80 marks,	24 weeks	Coursework	Physical Performance of 2 Practical	Individual/ Dual Practical Activity (20 Marks)
`60%) This paper			Activities (40%)	Team Practical Activity (20 Marks)
is internally assessed and				Individual/ Dual Practical Activity Log:
externally moderated				Phase 1: Analyse and Plan (15 Marks)
			Development Log (20%)	Phase 2: Perform, Evaluate and Improve (10 Marks)
				Phase 3: Consolidate (5 Marks)
				Team Practical Activity Log: Analyse and Justify (10 Marks)

DESCRIPTION OF PAPERS

PAPER 1: E-EXAMINATION PAPER (80 marks)

The e-Examination paper assesses candidates' knowledge and understanding of the areas of study in Exercise and Sports Science. Candidates are also required to demonstrate the ability to analyse, evaluate and improve practical performance in self or others. 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 and Fill in the Blanks.

Section B (40 marks)

Short answer and Structured Questions based on texts and pictures.

Section C (20 marks)

Structured Questions based on ONE video.

PAPER 2: COURSEWORK (INTERNALLY ASSESSED AND EXTERNALLY MODERATED) (80 marks)

The Coursework assesses candidates' proficiency in performing practical activities and their ability to analyse, evaluate and make improvement on their physical performance through a Development Log.

Candidates must choose <u>ONE</u> practical activity from <u>EACH</u> of the categories below:

Categories	Practical Activities
Individual / Dual	Individual
Team	 Basketball Floorball Football Hockey Netball Softball Volleyball

(I) PHYSICAL PERFORMANCE OF PRACTICAL ACTIVITIES (40 marks)

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

- participate in a recognised version of a practical activity 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 awareness of own role and apply appropriate tactics to gain advantage during play for a dual or team practical activity.
- achieve the quantitative standard where applicable for an 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, pg. 12-13). 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 Swimming, Track and Field and Crosscountry Running, the assessment of the candidate's performance will be based on quantitative standards.

Evidence of Practical Activities Performance

Centres are required to provide video-recorded evidence of their candidates' physical performance of the practical activities. Each filming of the activity should be approximately 15 minutes in duration. The video-recorded evidence, on DVD format, should be sent to SEAB by the stipulated Coursework deadline. In activities which are objectively tested, such as Cross-country Running; Track and Field; and Swimming, video recordings are not required. For these, Centres must send all recorded times and distances in support of the mark awarded.

During the Coursework assessment period, for practical activities being offered for assessment, there is no fixed number that should be filmed for each activity, or the number of performance times/distances to be recorded. However, candidates should be given the opportunity to produce evidence of more than just one performance in the practical activities they are offering so that there will be some choices of what to submit for assessment and candidates' best work/performance/time/ distance can be selected. It is recommended that teachers assess candidates at least three times so that a periodic, progressive assessment procedure is evident.

(II) DEVELOPMENT LOG (40 marks)

For this component of Coursework, candidates are required to complete a Development Log, comprising an Individual/ Dual Practical Activity Log and a Team Practical Activity Log. The Development Log is to be completed in conjunction with the training and preparation for candidates' two practical activities. Candidates should be briefed by the Coursework Supervisor of the requirements for both the Individual/ Dual Practical Activity Log and the Team Practical Activity Log before the start of the Coursework. For the Individual/ Dual Activity Log, candidates are allowed one consultation with their Coursework supervisor in Phase 1. The Coursework Supervisor should only endorse candidates' proposed training plan provided that it is safe for implementation. During Phase 2, candidates are allowed 3 to 4 consultations during the implementation of the training programme. There will be no consultation for Team Log.

Assessment Criteria for Individual/ Dual Practical Activity Log (30 marks)

Candidates will be assessed individually on: their ability to analyse factors affecting their performance; design, implement and evaluate a 8 to 10-week training plan to improve their chosen practical activity; and consolidate their learning in order to make recommendations for improvement. This process that candidates undertake through the log is summarised in the 3 phases below:

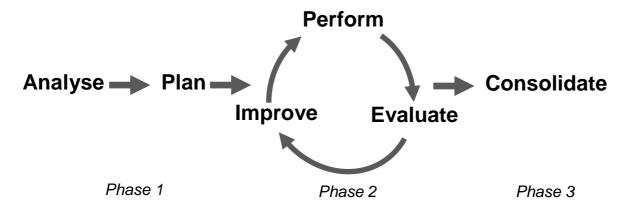


Figure 1. Process of Individual/ Dual Log

Each candidate's Individual/ Dual Practical Activity Log will be assessed using the Assessment Criteria given in Annex B (pg. 14-17). Each phase of the log will be marked according to the given marking criteria using a 'best fit' approach.

Assessment Criteria for Team Practical Activity Log (10 marks)

This task requires candidates to demonstrate their ability to analyse factors in their individual contribution which impact the team performance and provide justifications for their suggestions to improve the team performance. Each candidate's Team Practical Activity Log will be assessed using the Assessment Criteria given in Annex C (pg. 18). Marks are awarded according to the given marking criteria using a 'best fit' approach.

Teacher Supervision of the Development Log

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 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 at each section. The Log must be the original work produced by the candidates. All reference materials should be acknowledged and additional information included as annexes. The final copy for submission to SEAB should be in both pdf and hardcopy formats.

(Annex A)

ASSESSMENT CRITERIA FOR PERFORMANCE OF PRACTICAL ACTIVITIES

Marks	Bands	Individual / Dual	Team
17-20	Band 5	 Individual Achieve the quantitative standard for this band. Dual 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. 	 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	 Individual Achieve the quantitative standard for this band. Dual 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. 	 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	 Individual Achieve the quantitative standard for this band. Dual 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. 	 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. Demonstrate good regard for the safety of self and others.

Marks	Bands	Individual / Dual	Team
5-8	Band 2	 Individual Achieve the quantitative standard for this band. Dual 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. 	 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	 Individual Achieve the quantitative standard for this band. Dual 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 play. Demonstrate little regard for the safety of self and others. 	 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.

(Annex B)

ASSESSMENT CRITERIA FOR INDIVIDUAL/ DUAL PRACTICAL ACTIVITY LOG (30 Marks)					
Phase 1 (15m)	Phase 2 (10m)	Phase 3 (5m)			
Analyse and Plan	Perform, Evaluate and Improve	Consolidate			
Thoroughly-developed analysis that clearly identifies and prioritises multiple factors that are likely to bring about the largest improvement in the overall performance of the practical activity develops targets/goals which relate strongly to, and aim to improve, the factors that are identified. Extensive evidence of planning that 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. Extensive evidence that shows accurate application and sound justification from multiple areas of study.	 Extensive evidence that shows precise completion and recording of each session the use of planned evaluative procedures to monitor the effectiveness of the plan through comparison with the planned programme and actual performances and results clear rationale for modifications or adherence to training plan and proposes an effective follow-up action where necessary accurate application with sound justification from multiple areas of study. 	Through consideration of the original analysis and subsequent plan, the candidate can express in detail the effectiveness of the plan and how it has affected the overall performance of the practical activity. The candidate is able to justify several recommendations to be considered.			

	Phase 2 (10m)	Phase 3 (5m)
Analyse and Plan	Perform, Evaluate and Improve	Consolidate
 8—11 Sufficient analysis that identifies and prioritises several factors that are likely to bring about the largest improvement in the overall performance of the practical activity develops targets/goals which relate strongly to, and aim to improve, the factors that are identified. Sufficient evidence of planning that 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. Sufficient evidence that shows accurate application and sound justification from several areas of study. 	 5—7 Sufficient evidence that shows precise completion and recording of each session the use of planned evaluative procedures to monitor the effectiveness of the plan through comparison with the planned programme and actual performances and results rationale for modifications or adherence to training plan and proposes an appropriate follow-up action where necessary mostly accurate application with sound justification from several areas of study. 	Through consideration of the original analysis and subsequent plan, the candidate can express several aspects of the effectiveness of the plan and how it has affected the overall performance of the practical activity. The candidate is able to justify a few recommendations to be considered.

Phase 1 (15m)	Phase 2 (10m)	Phase 3 (5m)
Analyse and Plan	Perform, Evaluate and Improve	Consolidate
 Simple analysis that identifies and prioritises a few factors that are likely to bring about the largest improvement in the overall performance of the practical activity develops targets/goals which relate to, and aim to improve, the factors that are identified. Some evidence of planning that 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. Some evidence that shows accurate application and justification from two or three areas of study. 	 3—4 Some evidence that shows completion and recording of each session the use of planned evaluative procedures to monitor the effectiveness of the plan through comparison with the planned programme and actual performances and results rationale for modifications or adherence to training plan and proposes an appropriate follow-up action where necessary application and justification from one or two areas of study. 	Through consideration of the original analysis and subsequent plan, the candidate can express one or two aspects of the effectiveness of the plan and indicate one or two changes in the overall performance of the practical activity. The candidate is able to justify one or two recommendations to be considered.

Phase 1 (15m) Analyse and Plan	Phase 2 (10m) Perform, Evaluate and Improve	Phase 3 (5m) Consolidate
 Limited analysis that identifies and prioritises one or two factors that are likely to bring about the largest improvement in the overall performance of the practical activity develops targets/goals which relate to, and aim to improve, the factors that are identified. Limited evidence of planning that 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. Limited evidence that shows accurate application and justification from one or two areas of study. 	 Limited evidence that shows completion and recording of each session monitoring of the effectiveness of the plan rationale for modifications or adherence to training plan and proposes an unproductive follow-up action where necessary application from one or two areas of study. 	Through consideration of the original analysis and subsequent plan, the candidate can express one aspect of the effectiveness of the plan and indicate one change in the overall performance of the practical activity.
Work that does not meet the criteria for a mark.	Work that does not meet the criteria for a mark.	Work that does not meet the criteria for a mark.

(Annex C)

ASSESS	ASSESSMENT CRITERIA FOR TEAM PRACTICAL ACTIVITY LOG (10 Marks)		
8-10	A thoroughly-developed analysis with considerations of multiple significant factors affecting individual contribution that impacts team performance through detailed and relevant examples during training and game situations.		
	Extensive evidence that		
	shows accurate application with sound justification from the three areas of study		
	demonstrates sophisticated understanding of the factors raised and provide effective solutions.		
5-7	A sufficiently-developed analysis with considerations of a few significant factors affecting individual contribution that impacts team performance through detailed and relevant examples during training and game situations.		
	Sufficient evidence that		
	shows mostly accurate application with sound justification from two to three of the areas of study		
	demonstrates good understanding of the factors raised and provide appropriate solutions.		
3-4	A simple analysis with considerations of one or two significant factors affecting individual contribution that impacts team performance through relevant examples during training and game situations.		
	Sufficient evidence that		
	shows application with justification from one to two of the areas of study		
	demonstrates simple understanding of the factors raised and provide appropriate solutions.		
1-2	A weak analysis with considerations of insignificant and/ or irrelevant factors affecting individual contribution that impacts team performance through examples during training and game situations.		
	Limited evidence that		
	 shows inaccurate application with justification from one or two of the areas of study 		
	demonstrates limited understanding of the factors raised and provide solutions.		
0	Work that does not meet the criteria for a mark.		