



Sports, exercise and health science subject outline

First examinations 2014

This document explains the major features of the course, and outlines the syllabus and assessment requirements.

More detailed information about the course can be obtained by referring to the guide for this subject, which is available on the subject page of the IB online curriculum centre (OCC) website (<http://occ.ibo.org>) and can also be purchased from the IB store (<http://store.ibo.org>).

Nature of the subject

The attainment of excellence in sport is the result of innate ability or skill and the dedicated pursuit of a programme of physical and mental training accompanied by appropriate nutrition. Training programme design should not be left to chance. Rather, it should be designed thoughtfully and analytically after careful consideration of the physiological, biomechanical and psychological demands of the activity. This is the role of the sport and exercise scientist who, regardless of the athletic event, should be equipped with the necessary knowledge to be able to perform this task competently. Furthermore, in a world where many millions of people are physically inactive and afflicted by chronic disease and ill health, the sport and exercise scientist should be equally proficient when prescribing exercise for the promotion of health and well-being.

Scientific inquiry conducted over many decades, has accumulated a vast amount of information across a range of sub-disciplines that contribute to our understanding of health and human performance in relation to sport and exercise. The Diploma Programme course in sports, exercise and health science involves the study of the science that underpins physical performance and provides the opportunity to apply these principles.

The course incorporates the traditional disciplines of anatomy and physiology, biomechanics, psychology and nutrition, which are studied in the context of sport, exercise and health. Students will cover a range of core and option topics and carry out practical (experimental) investigations in both laboratory and field settings. This will provide an opportunity to acquire the knowledge and understanding necessary to apply scientific principles and critically analyse human performance. Where relevant, the course will address issues of international dimension and ethics by considering sport, exercise and health relative to the individual and in a global context.

The sports, exercise and health science course is offered at standard level only.

Group 4 subjects and prior learning

Past experience shows that students will be able to study a group 4 science subject at SL successfully with no background in, or previous knowledge of, science. Their approach to study, characterized by the specific IB learner profile attributes—inquirers, thinkers and communicators—will be significant here.

Links to the Middle Years Programme

Students who have undertaken the IB Middle Years Programme (MYP) sciences, technology and mathematics courses will be well prepared for group 4 subjects. Group 4 subjects build on and apply the inquiring and reflective approach to science learning, as well as analytical critical thinking and problem solving skills developed during MYP science courses. The MYP science objectives and assessment criteria A–F are aligned with the group 4 objectives and internal assessment criteria, and allow for a smooth transition from the MYP to Diploma Programme. Scientific inquiry, central to teaching and learning of the MYP sciences is evident in the internal assessment of group 4 courses. The “One world” objective in MYP sciences is further developed in group 4 science with the increased emphasis on aim 8—that is, to “raise awareness of the moral, ethical, social, economic and environmental implications of using science and technology”. There are specific references to aim 8 implications in assessment statements and teacher’s notes in the syllabus details sections in all group 4 guides. The “knowledge and understanding of science” objective in MYP sciences is enhanced by the content of the group 4 courses. Objectives D, E and F in MYP sciences are further developed in internal assessment of group 4 courses.

The Diploma Programme sports, exercise and health science course aims to build on the aims of the MYP physical education to “encourage and enable students to appreciate and understand the value of physical education” and “to develop an interest in the promotion of health and wellness”. The sport and health-related fitness knowledge, as well as critical thinking and reflection skills acquired during the MYP physical education curriculum is further developed in the Diploma Programme course. The “Use of knowledge” objective is further developed in the Diploma Programme sports, exercise and health science course as students continue to use physical education terminology, and gain increased understanding of concepts and principles.

Aims

Through studying any of the group 4 subjects, students should become aware of how scientists work and communicate with each other. While the “scientific method” may take on a wide variety of forms, it is the emphasis on a practical approach through experimental work that distinguishes the group 4 subjects from other disciplines and characterizes each of the subjects within group 4.

It is in this context that all the Diploma Programme experimental science courses should aim to:

1. provide opportunities for scientific study and creativity within a global context that will stimulate and challenge students
2. provide a body of knowledge, methods and techniques that characterize science and technology
3. enable students to apply and use a body of knowledge, methods and techniques that characterize science and technology
4. develop an ability to analyse, evaluate and synthesize scientific information
5. engender an awareness of the need for, and the value of, effective collaboration and communication during scientific activities
6. develop experimental and investigative scientific skills
7. develop and apply the students’ information and communication technology skills in the study of science
8. raise awareness of the moral, ethical, social, economic and environmental implications of using science and technology
9. develop an appreciation of the possibilities and limitations associated with science and scientists
10. encourage an understanding of the relationships between scientific disciplines and the overarching nature of the scientific method.

Assessment objectives

The assessment objectives for all group 4 subjects reflect those parts of the aims that will be assessed. Wherever appropriate, the assessment will draw upon environmental and technological contexts and identify the social, moral and economic effects of science.

It is the intention of all the Diploma Programme experimental science courses that students achieve the following objectives.

1. Demonstrate an understanding of:
 - a. scientific facts and concepts
 - b. scientific methods and techniques
 - c. scientific terminology
 - d. methods of presenting scientific information.
2. Apply and use:
 - a. scientific facts and concepts
 - b. scientific methods and techniques
 - c. scientific terminology to communicate effectively
 - d. appropriate methods to present scientific information.
3. Construct, analyse and evaluate:
 - a. hypotheses, research questions and predictions
 - b. scientific methods and techniques
 - c. scientific explanations.
4. Demonstrate the personal skills of cooperation, perseverance and responsibility appropriate for effective scientific investigation and problem solving.
5. Demonstrate the manipulative skills necessary to carry out scientific investigations with precision and safety.

Syllabus outline

Syllabus component	Teaching hours
Core There are six compulsory topics in the core.	80
Topic 1: Anatomy 1.1 The skeletal system 1.2 The muscular system	7 4 3
Topic 2: Exercise physiology 2.1 Structure and function of the ventilatory system 2.2 Structure and function of the cardiovascular system	17 5 12
Topic 3: Energy systems 3.1 Nutrition 3.2 Carbohydrate and fat metabolism 3.3 Nutrition and energy systems	13 4 2 7
Topic 4: Movement analysis 4.1 Neuromuscular function 4.2 Joint and movement type 4.3 Fundamentals of biomechanics	15 4 3 8
Topic 5: Skill in sport 5.1 The characteristic and classification of skill 5.2 Information processing 5.3 Principles of skill learning	15 4 6 5
Topic 6: Measurement and evaluation of human performance 6.1 Statistical analysis 6.2 Study design 6.3 Components of fitness 6.4 Principles of training programme design	13 2 4 4 3

Syllabus component	Teaching hours
Options There are four options. Students are required to study any two options.	30
Option A: Optimizing physiological performance A.1 Training A.2 Environmental factors and physical performance A.3 Non-nutritional ergogenic aids	15 5 6 4
Option B: Psychology of sport B.1 Individual differences B.2 Motivation B.3 Mental preparation for sport B.4 Psychological skills training	15 5 3 4 3
Option C: Physical activity and health C.1 Hypokinetic disease C.2 Cardiovascular disease C.3 Physical activity and obesity C.4 Physical activity and type 2 diabetes C.5 Physical activity and bone health C.6 Prescription of exercise for health C.7 Exercise and psychological well-being	15 1.5 3 2 2 2.5 1.5 2.5
Option D: Nutrition for sport, exercise and health D.1 Digestion and absorption D.2 Water and electrolyte balance D.3 Energy balance and body composition D.4 Nutritional strategies	15 3 4 2 6
Internal assessment	40
Total teaching hours	150

Assessment outline

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Assessment component	Weighting
External assessment (3 hours) Paper 1 (45 minutes) Syllabus content: Core Assessment objectives 1 and 2 30 multiple-choice questions on the core syllabus. (30 marks)	76% 20%
Paper 2 (1 hour 15 minutes) Syllabus content: Core Assessment objectives 1–3 Section A: Students answer one data-based question and several short-answer questions on the core (all compulsory). (30 marks) Section B: Students answer one extended-response question on the core (from a choice of three). (20 marks) (50 marks)	32%
Paper 3 (1 hour) Syllabus content: Options Assessment objectives 1–3 Several short-answer questions (all compulsory) in each of the two options studied. (40 marks)	24%
Internal assessment/Practical work (40 hours) (48 marks) This component is internally assessed by the teacher and externally moderated by the IB at the end of the course. Investigations (30 hours) A mixture of short- and long-term investigations (42 marks) Group 4 project (10 hours) Interdisciplinary project. Assessed for personal skills (PS) only. (6 marks)	24%