

Assessment outline

SL assessment specifications

First examinations 2009

Component	Overall weighting (%)	Approximate weighting of objectives (%)		Duration (hours)	Format and syllabus coverage
		1+2	3		
Paper 1	20	20		¾	30 multiple-choice questions on the core
Paper 2	32	16	16	1¼	Section A: one data-based question and several short-answer questions on the core (all compulsory) Section B: one extended-response question on the core (from a choice of three)
Paper 3	24	12	12	1	Several short-answer questions in each of the two options studied (all compulsory)

External assessment

The external assessment consists of three written papers.

Paper 1

Paper 1 is made up of multiple-choice questions that test knowledge of the core only for students at SL and the core and AHL material for students at HL. The questions are designed to be short, one- or two-stage problems that address objectives 1 and 2 (see the “Objectives” section). No marks are deducted for incorrect responses. Calculators are not permitted, but students are expected to carry out simple calculations.

Paper 2

Paper 2 tests knowledge of the core only for students at SL and the core and AHL material for students at HL. The questions address objectives 1, 2 and 3 and the paper is divided into two sections.

In section A, there is a data-based question that requires students to analyse a given set of data. The remainder of section A is made up of short-answer questions.

In section B, students at SL are required to answer one question from a choice of three, and students at HL are required to answer two questions from a choice of four. These extended-response questions may involve writing a number of paragraphs, solving a substantial problem, or carrying out a substantial piece of analysis or evaluation. A calculator is required for this paper.

Paper 3

Paper 3 tests knowledge of the options and addresses objectives 1, 2 and 3. Students at SL are required to answer several short-answer questions in each of the two options studied. Students at HL are required to answer several short-answer questions and an extended-response question in each of the two options studied. A calculator is required for this paper.

A clean copy of the *Physics data booklet* is required for papers 1, 2 and 3 at both SL and HL.

Note: Wherever possible, teachers should use, and encourage students to use, the *Système International d’Unités* (International System of Units—SI units).

Practical work and internal assessment

General introduction

The internal assessment (IA) requirements are the same for all group 4 subjects, with the exception of design technology, which has an additional element. The IA, worth 24% of the final assessment (or 36% for design technology), consists of an interdisciplinary project, a mixture of short- and long-term investigations (such as practicals and subject-specific projects) and, for design technology only, the design project.

Student work is internally assessed by the teacher and externally moderated by the IBO. The performance in IA at both SL and HL is marked against assessment criteria, with each criterion having a maximum mark of 6.

Rationale for practical work

Although the requirements for IA are mainly centred on the assessment of practical skills, the different types of experimental work that a student may engage in serve other purposes, including:

- illustrating, teaching and reinforcing theoretical concepts
- developing an appreciation of the essential hands-on nature of scientific work
- developing an appreciation of the benefits and limitations of scientific methodology.

Therefore, there may be good justification for teachers to conduct further experimental work beyond that required for the IA scheme.

Practical scheme of work

The practical scheme of work (PSOW) is the practical course planned by the teacher and acts as a summary of all the investigative activities carried out by a student. Students at SL and HL in the same subject may carry out some of the same investigations.

Syllabus coverage

The range of investigations carried out should reflect the breadth and depth of the subject syllabus at each level, but it is not necessary to carry out an investigation for every syllabus topic. However, all students must participate in the group 4 project and the IA activities should ideally include a spread of content material from the core, options and, where relevant, AHL material. A minimum number of investigations to be carried out is not specified.

Choosing investigations

Teachers are free to formulate their own practical schemes of work by choosing investigations according to the requirements outlined. Their choices should be based on:

- subjects, levels and options taught
- the needs of their students
- available resources
- teaching styles.

Each scheme must include some complex investigations that make greater conceptual demands on students. A scheme made up entirely of simple experiments, such as ticking boxes or exercises involving filling in tables, will not provide an adequate range of experience for students.

Teachers are encouraged to use the online curriculum centre (OCC) to share ideas about possible investigations by joining in the discussion forums and adding resources in the subject home pages.

Note: Any investigation or part investigation that is to be used to assess students should be specifically designed to match the relevant assessment criteria.

Flexibility

The IA model is flexible enough to allow a wide variety of investigations to be carried out. These could include:

- short laboratory practicals over one or two lessons and long-term practicals or projects extending over several weeks
- computer simulations
- data-gathering exercises such as questionnaires, user trials and surveys
- data-analysis exercises
- general laboratory work and fieldwork.

The group 4 project

The group 4 project is an interdisciplinary activity in which all Diploma Programme science students must participate. The intention is that students from the different group 4 subjects analyse a common topic or problem. The exercise should be a collaborative experience where the emphasis is on the **processes** involved in scientific investigation rather than the **products** of such investigation.

In most cases all students in a school would be involved in the investigation of the same topic. Where there are large numbers of students, it is possible to divide them into several smaller groups containing representatives from each of the science subjects. Each group may investigate the same topic or different topics—that is, there may be several group 4 projects in the same school.

Practical work documentation

Details of an individual student's practical scheme of work are recorded on **form 4/PSOW** provided in section 4 of the *Vade Mecum*. Electronic versions may be used as long as they include all necessary information. In addition, the laboratory work corresponding to the best two marks achieved by each student when assessed using the internal assessment criteria (design, data collection and processing, and conclusion and evaluation) and the instructions given by the teacher for the laboratory work must be retained for possible inclusion in the sample work sent to an internal assessment moderator.

Time allocation for practical work

The recommended teaching times for all Diploma Programme courses are 150 hours at SL and 240 hours at HL. Students at SL are required to spend 40 hours, and students at HL 60 hours, on practical activities (excluding time spent writing up work). These times include 10 hours for the group 4 project. Only 2–3 hours of investigative work can be carried out after the deadline for submitting work to the moderator and still be counted in the total number of hours for the practical scheme of work.

Note: For design technology, students at SL are required to spend 55 hours, and students at HL 81 hours, on practical activities.

Only some of the 40/60 hours of practical work need be allocated to the practical work that is assessed using the IA criteria. This will normally be done during the latter part of the course when students have become more familiar with the criteria and can be assessed in complex practical work.