EXPERT GROUP REPORT

FOR

AWARDS SEEKING ADMISSION TO

THE UCAS TARIFF

THE INTERNATIONAL BACCALAUREATE

February 2006

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INTRODUCTION

The UCAS Tariff is a new points score system for entry to HE from September 2002. It replaces the existing A-level points system. The new system was developed to reflect a wider range of qualifications currently offered by applicants to and accepted by Higher Education Institutions. It also embraces substantial reforms to post-16 qualifications implemented from September 2000, popularly known as Curriculum 2000. These reforms completely restructured GCE A/AS levels, replaced the Advanced GNVQ with a suite of VCE awards, and introduced more emphasis on the attainment of Key Skills. For the first time, the points system accommodates Scottish Framework Qualifications.

The Tariff was developed with three specific purposes in mind as follows:

- To report achievement as a points score to Higher Education
- To allow admissions staff to make flexible offers
- To allow broad comparisons to be made between different types of achievement and different volumes of study

The table on the next page shows the points values within the Tariff of the qualifications currently contained within the system:

GCE/VCE Qualifications				BTEC Nationals			OCR Nationals			Points	Irish Leaving Cert		Scottish Qualifications			
GCE AS/ AS VCE	GCE AS Double Award	GCE A level/ AVCE	GCE/ AVCE Double Award	Award	Certificate	Diploma	Certificate	Diploma	Extended Diploma		Higher	Ordinary	Advanced Higher	Higher	Int 2	Standard Grade
						DDD			D1	360						
						DDM			D2/M1	320						
						DMM			M2	280						
			AA		DD	MMM		D	M3	240						
			AB							220						
			BB		DM	MMP		M1	P1	200						
			BC							180						
			CC		MM	MPP		M2/P1	P2	160						
			CD							140						
	AA	A	DD	D	MP	PPP	D	P2	P3	120			A			
	AB									110						
	BB	B	DE							100			B			
	BC									90	A1					
	CC	C	EE	M	PP		M	P3		80			C			
										77	A2					
										72			D	A		
										71	B1					
	CD									70						
										64	B2					
A	DD	D								60				B		
										58	B3					
										52	C1					
B	DE									50						
										48				C		
										45	C2					
										42				D	A	
C	EE	E		P			P			40						
										39	C3	A1				
										38						Band 1
										35					B	
										33	D1					
D										30						
										28					C	Band 2
										26	D2	A2				
E										20	D3	B1				
										14		B2				
										7		B3				

BTEC Nationals in Early Years			CACHE Diploma in Child Care & Education		Diploma in Foundation Studies (Art and Design)	Points	Music Examinations					
							Practical			Theory		
Theory		Practical	Theory	Practical			Grade 6	Grade 7	Grade 8	Grade 6	Grade 7	Grade 8
Certificate	Diploma											
	DDD					320						
					Distinction	285						
	DDM					280						
	DMM		AA			240						
					Merit	225						
	MMM					220						
DD			BB			200						
					Pass	165						
DM	MMP		CC			160						
MM	MPP	D	DD	A		120						
				B		100						
MP	PPP	M	EE	C		80						
						75			D			
						70			M			
				D		60		D				
						55		M	P			
						45	D					
PP		P		E		40	M	P				
						30						D
						25	P					M
						20					D	P
						15				D	M	
						10				M	P	
						5				P		

Free standing Maths	IFS CeFS	COPE	Advanced Extension Awards	Points	Core Skills	Key Skills	Welsh Baccalaureate Core
				120			Pass
		Pass		70			
	A			60			
	B			50			
	C		Distinction	40			
	D			30		Level 4	
A	E		Merit	20	Higher	Level 3	
B				17			
C				13			
D				10	Int 2	Level 2	
E				7			

The Tariff and the National Qualifications Framework

The Tariff gives numerical values to qualifications, and establishes agreed equivalences between the types of qualifications covered. The system allows broad comparisons to be made between applicants with different volumes of study and types of achievement. The equivalences derive from those established within the English, Welsh, and Northern Irish National Framework of Qualifications. Qualifications admitted to the framework are the subject of a rigorous regulation system operated by three sister regulatory authorities, led by the Qualifications and Curriculum Authority. The framework has been developed to give coherence and clarity to the provision of qualifications. It includes three broad categories of qualifications:

- General, e.g. GCE GCE A-level and the new GCE AS
- Vocationally-related, e.g. VCE A level, VCE AS and VCE Double Award
- Occupational, e.g. National Vocational Qualifications.

Details of the accreditation process are contained in the publication *Arrangements for the statutory regulation of external qualifications in England, Wales and Northern Ireland.*

The qualification which forms the subject of this report, the International Baccalaureate Diploma (IB), the qualification seeking entry into the Tariff, and the A Level qualifications against which the components of the IB are benchmarked, all fall within the general category.

It was always envisaged that other qualifications would be brought into the Tariff system as they become accredited into the National Framework. The approach by the International Baccalaureate Organisation was made following accreditation of the International Baccalaureate Diploma in 2003.

The Tariff – promoting wider access to Higher Education

The Tariff is highly relevant in the context of the UK government's aim to increase participation rates in Higher Education, in that it covers both standard and non-standard entry routes. One of the features of the expansion of HE over the last decade has been an increase in the types of qualification presented by applicants, some of which may be vocational, some general, some taken mainly by adults, and so on. The advantage of the Tariff is that it facilitates comparison across applicants with very different types and sizes of achievement. It also ensures that UCAS communicates information to HE admissions and academic staff about the nature of such achievements, and that entry requirement information is collected.

The qualifications now seeking entry into the Tariff tend to be used for progression for specific types of HE programme. For example, evidence is presented in this report of the relevance of the IB to progression into HE courses. In terms of the overall number of applicants to HE, the percentage progressing from qualifications such as these is currently small compared to say GCE A Level. However, it is anticipated that the number of applicants will increase significantly as the value of these awards becomes more widely known.

THE CONDUCT OF THE COMPARABILITY STUDY

In order to ensure a robust and transparent procedure for allocating UCAS tariff points to qualifications seeking admission to the framework, UCAS approached the University of Oxford, Department of Educational Studies for assistance in developing an appropriate methodology. Acknowledging the problematic nature of comparability studies, the Department proposed a procedure based on the premise that such comparisons can only be achieved through the exercise of collaborative judgement by an expert group. Guidelines were drawn up for the composition of the Expert Group, the evidence that would need to be collected and examined and the choice of a benchmark qualification. Procedures were developed for the conduct of the work of the expert group, including detailed sets of questions to be addressed at different stages in the process.

On this occasion the guidelines were translated into a series of tasks which Expert Group members were asked to complete prior to the Expert Group meeting (see Section 4).

The judgements made by the Expert Group in this report are presented as suggested allocations of UCAS points which take account of the size and demand of the award seeking admission to the Tariff and a candidate's level of attainment within that award. However, the guidelines provide for an automatic review process to be conducted at a later stage in the light of further evidence. This latter point acknowledges the fact that both benchmark qualifications and those seeking admission to the Tariff may still be relatively new. Consequently there may only be a relatively small amount of evidence available at the time of the work of the Expert Group. There is, therefore, a need to review the decisions of the Group when more evidence becomes available and when HE admissions tutors have gained more experience of using the awards as entry qualifications.

The work of the Expert Group is subject to a quality assurance procedure, which includes scrutiny of the Group's report by an independent auditor from Higher Education.

SUMMARY AND RECOMMENDATIONS

This report provides details of the Comparability Study conducted by an Expert Group to consider the admission of the International Baccalaureate Diploma to the UCAS Tariff. Section 1 sets out the composition of the Expert Group.

Section 2 contains an overview of the International Baccalaureate Diploma, an international university entrance qualification, recognised by higher education institutions in over 100 countries. The subjects available for study are divided into six groups and are generally offered at two levels: Higher Level and Standard Level. In addition, IB Diploma students must also complete three core components:

- Write an extended essay, based on their individual research (EE)
- Follow a course in the theory of knowledge, intended to stimulate critical reflection on the knowledge and experience gained inside and outside the classroom (TOK)
- Engage in a programme of creativity, action and service (CAS)

Section 3 contains a description of the aims, content and assessment of the three IB Diploma subjects selected for the Comparability Study: Geography, Mathematics and Chemistry. Mathematics and Chemistry were selected because they are taken by the majority of students. Geography was selected because preliminary analysis identified that the content of the syllabus was well defined, and that the application of the guidelines in the Protocol would, therefore, be relatively straightforward. The description of each of these subjects is followed by an overview of each of the awards against which the subject is benchmarked, namely Edexcel GCE A level Geography Syllabus B, AQA GCE A level Mathematics and Statistics Syllabus B and OCR GCE A level Chemistry.

Section 4 reports on the proceedings and findings of the Expert Group which comprised three Subject Groups and a fourth group which considered the IB core components.

Section 5, drawing on the work of the Subject Groups and the work of the group considering the core components, provides a mechanism for the allocation of UCAS Tariff Points to the range of subjects offered by the IB. The recommended allocation is set out in the table on the next page.

Allocation of UCAS Tariff Points to the IB Diploma

IB Diploma points	UCAS Tariff
45	768
44	744
43	722
42	698
41	675
40	652
39	628
38	605
37	582
36	559
35	535
34	512
33	489
32	466
31	442
30	419
29	396
28	373
27	350
26	326
25	303
24	280

SECTION 1: THE COMPOSITION OF THE EXPERT GROUP

The following individuals with expert knowledge and experience of the qualifications under consideration in this study were selected:

GCE A Level Examiners
Dr Helen Eccles, Chair of Examiners for Chemistry, OCR
Mrs Sue Warne, Chief Examiner for Geography, Edexcel
Mr Sam Boardman, Chief Examiner for Mathematics, AQA

International Baccalaureate Examiners
Mr Jason Murgatroyd, Chief Examiner for Chemistry
Mrs Briony Cooke, Deputy Chief Examiner for Geography
Dr John Reynolds, Deputy Chief Examiner for Mathematics (HL)
Mrs Sheila Messer, Acting Chief Examiner for Mathematical Methods (SL)

Higher Education Representatives (Subject Groups)
Dr Stephen Roser, Admissions Tutor, Department of Chemistry, University of Bath
Dr Anthony Hoare, Admissions tutor, School of Geographical Sciences, University of Bristol
Dr James Blowey, Department of Mathematical Sciences, University of Durham

The CVs of the ten Expert Group members are provided in Appendix 1.

Higher Education Representatives (TEC Group)
Mr Hywel Davies, Head of Admissions & Recruitment, University of Aberystwyth
Ana Hidalgo-Kingston, Head of Admissions, Student Recruitment & Admissions Office, University of Sheffield
Ms Jane Minto, Director of Admissions, University of Oxford

IB School Representatives
An IB school representative attended each of the three subject groups and the TEC group:
Chemistry Group: Ms Heather McKissack, Senior Mistress, King's College School
Geography Group: Ms Margaret Harrison, International Curriculum Manager, Anglo-European School
Mathematics Group: Mr John P Knee, IB Co-ordinator, Malvern College
TEC Group: Ms Sue Austin, IB Co-ordinator, Sevenoaks School

Anne Matthews, Jennifer Tuson and Jill Johnson acted as facilitators for the work, ensuring that the Group worked systematically through the procedures laid down in the Protocol.

Helen Wakefield, Catherine Thomson, Anne Marie Watson and Judith Doughty from the UCAS Outreach Department, acted as Secretaries to the Group.

The whole process was overseen and quality assured by Dr Geoff Hayward, as an independent representative of Higher Education.

SECTION 2: OVERVIEW OF THE AWARD SEEKING ADMISSION TO THE TARIFF

This section contains an overview of the overarching award seeking admission to the Tariff – the International Baccalaureate Diploma (IB). Section 3 contains a description of the aims, content and assessment of each of the IB subjects selected for the Comparability Study, followed by an overview of each of the awards against which the IB subject is benchmarked.

GENERAL DESCRIPTION OF THE INTERNATIONAL BACCALUAREATE DIPLOMA

Aims and purpose of the qualification

The IB diploma is an international university entrance qualification, recognised by higher education institutions in over 100 countries. Diploma students have to follow a broad range of subjects over the two years of the programme, but can at the same time specialise in those subject areas of greatest interest to them. Students are expected to develop the critical thinking skills, independent learning styles and knowledge of academic research that are expected for successful university level study. They are also expected to consider the nature of knowledge, to engage in community service and promote international understanding, valuing cultural diversity.

History of the qualification

The IBO is a Swiss based charitable foundation, established in Geneva in 1968. Initially designed as a programme for students in international schools, IB diploma examinations were first taken by about 300 candidates in 11 schools in 1970. Every year since then has seen significant growth. In 2004, there are about 64 000 candidates (not all taking the full diploma) in about 1200 schools in over 100 countries. Approximately half of these schools are state schools operating within national education systems. The basic structure of the diploma programme (six subject groups with three additional core requirements) has remained unchanged since the programme's introduction.

Entry requirements for the qualification

Given the wide diversity in educational contexts in which the diploma programme is taught, there are no specified entry requirements. Individual schools may establish their own entry policies. Many students follow the programme in what is their second, or even third, language.

Age of candidates

Candidates are normally 18-19 years old when they take the examinations after two years of study.

Hours

Candidates for the diploma must study six subjects, three at higher level and three at standard level. Higher level courses are each based on 240 hours of teaching, while standard level courses are each 150 hours. Three additional core requirements are an extended essay (40 hours), theory of knowledge (100 hours) and creativity, action, service (150 hours).

Content and structure of the qualification

In addition to the range of subjects studied as described below, IB Diploma students must also:

- Write an extended essay, based on their individual research (EE)
- Follow a course in the theory of knowledge, intended to stimulate critical reflection on the knowledge and experience gained inside and outside the classroom (TOK)
- Engage in a programme of creativity, action and service (CAS)

These aims and content of these three core components are discussed in detail in Section 4.

The subjects available for study are divided into six groups:

Group 1: a literature course in the student's best language
Group 2: second language course
Group 3: individuals and societies, including history, geography and economics
Group 4: experimental sciences, including biology, chemistry and physics
Group 5: mathematics and computer sciences, including further mathematics and mathematical methods
Group 6: the arts, including visual arts, music and theatre

Students must study one subject from each of groups 1 to 5. Their sixth subject may come from Group 6, or be a second choice from one of the other groups, or be an authorised school-devised syllabus.

Three subjects (or occasionally four) are studied at Higher Level, and three subjects (occasionally two) at Standard Level.

Diploma candidates may choose to take at most two standard level subjects after the first year of study. Candidates are allowed at most three different examination sessions in which to gain their diploma. It is possible for candidates to enter for just some subjects and receive certificates for these on their own, without obtaining the diploma.

Assessment – procedures, methods and levels

There are two examination sessions per year, in May and November. For most subjects, there are three or four assessment components, with one of them being internally assessed coursework. The examination papers take a variety of forms, some multiple choice, but mainly short answer, structured response or essay type questions. There are also data analysis papers, text commentary papers and case study papers. Some subjects have in addition a coursework component that is externally assessed. The extended essay and theory of knowledge essay are produced under coursework conditions and also

externally assessed. Externally assessed work is marked by examiners around the world, whose marking is moderated by sample re-marking. Moderation by sample re-marking is also applied to internal assessment. Grade award meetings are held by the senior examiners for each subject to determine final grade boundaries on a component basis.

Grading

Candidates receive a grade from 1 (lowest) to 7 (highest) for each subject. Additionally, theory of knowledge and the extended essay are each graded from E (lowest) to A (highest), with these two results being combined by a matrix table that generates a further 0-3 points. The maximum possible diploma points score is therefore 45. Only a small proportion of candidates gains over 40 points each session. Candidates who gain at least 24 points, subject to certain conditions relating to the distribution of grades, are awarded the diploma.

QA systems and code of practice

Mark schemes for each examination paper are finalised by the senior examiners in the light of marking actual candidate scripts at a standardisation meeting held a few days after each examination is taken. Assistant examiners are supported and moderated by team leaders. Moderation is carried out by use of tailed regression lines. Examiners and teachers whose marking is found to be unsatisfactory have their marking re-marked. Examiners are given instruction and exemplar marking materials via a dedicated web site. A principal examiner sets the marking standard for each component.

After the release of results, schools are able to request re-marks on behalf of candidates. They can also request the return of copies of marked examination scripts, before or after requesting re-marks, and reports on the moderation of internal assessment marks.

The IB diploma is accredited by ACCAC as part of the UK qualifications framework, and the IBO complies with the appropriate code of practice.

SECTION 3: OVERVIEW OF IB SUBJECTS AND THE BENCHMARK AWARDS

This section contains a description of the aims, content and assessment of the three IB subjects selected for the Comparability Study: Geography, Mathematics and Chemistry. Mathematics and Chemistry were selected because they are taken by the majority of students. Geography was selected because preliminary analysis identified that the content of the syllabus was well defined, and that the application of the guidelines in the Protocol would, therefore, be relatively straightforward.

Each of the benchmark awards described in this section was chosen because they represented the closest match in aims and content to qualifications which had already been admitted to the UCAS Tariff.

3.1 IB GEOGRAPHY

Aims and objectives

The aims of the diploma programme in geography are the same for higher and standard level and enable students to:

1. develop a global perspective and a sense of world independence
2. develop an understanding of the interrelationship between people, place and the environment
3. develop a concern for the quality of the environment, and an understanding of the need to plan and manage for present and future generations
4. appreciate the relevance of geography in analysing contemporary world issues, and develop and modify values and attitudes in relation to geographical problems and issues
5. recognise the need for social justice, equality and respect for others; appreciate diversity, and combat bias, prejudice and stereotyping
6. develop an appreciation of the range of geographical methodologies and apply appropriate techniques of inquiry.

Objectives

Having followed the diploma course at higher and standard level, candidates will be able to:

1. demonstrate knowledge of relevant factual information, examples and case studies
2. use and apply geographical terminology
3. demonstrate understanding of geographical concepts and theories through the acquisition, selection and effective use of knowledge
4. demonstrate knowledge and understanding of spatial processes, patterns and interaction; and be able to recognise change at various scales and locations
5. recognise and appreciate the interaction between people, place and the environment
6. appreciate and understand the social, economic and political interdependence of peoples
7. understand the use of human and physical resources and evaluate the management strategies involved
8. recognise and appreciate the relevance of geography to contemporary world issues
9. demonstrate knowledge of and an ability to apply appropriate geographical methodologies and techniques relevant to geographical inquiry.

Development of syllabus

The current higher and standard level syllabuses were first examined in May 2003. The curriculum review process occurred during the previous two years. In order to broaden the perspective of the syllabus, the review involved consultation and contribution from teachers representing different countries and backgrounds. The content of the course was redesigned to include geographical skills, a core and optional themes and to offer candidates at both levels greater choice. Higher and standard level candidates can study the same options and can be taught together, although standard level candidates cover fewer optional themes. Coursework requirements were revised at both levels to accommodate a variety of local restrictions affecting some schools and to allow greater flexibility in approach particularly at standard level.

Content and Structure

For both higher and standard levels the syllabus consists of three compulsory parts:
geographical skills, core theme, and optional themes.

The recommended time required to cover the two-year course is 240 hours at higher level and 150 hours at standard level. This includes 90 hours for the core and 30 hours for each option at both levels and an extra 30 hours for fieldwork at higher level.

1. **Geographical skills**
   Geographical skills are delivered through the content of the core and optional themes as appropriate.

   Candidates are expected to:
   1.1 locate and differentiate elements of the earth's surface
   1.2 read, interpret, analyse and produce maps
   1.3 interpret topographical maps where appropriate to the optional themes
   1.4 read, interpret, analyse and construct graphs
   1.5 undertake statistical calculations to show patterns and changes
   1.6 manipulate and interpret data using quantitative techniques
   1.7 undertake geographical investigation
   1.8 produce written material including essays reports and investigations.

2. **Core Theme**
   All topics are compulsory at both levels.

   2.1 Population distribution density at global and local scales.
   2.2 Population fertility.
   2.3 Population mortality.
   2.4 Population movement.
   2.5 Population structure.
   2.6 Population and resources.
   2.7 Specific resource production and consumption.
   2.8 Food as a resource.

2.9 Food production, trade and aid
2.10 Development indicators and patterns.
2.11 Development issues in poorer and richer countries.
2.12 Sustainable development and resource management.

3. Optional themes

Higher level candidates study a minimum of four options and standard level two options.

Section A
3.1 Drainage basins and their management.
3.2 Coasts and their management.
3.3 Arid environments and their management.
3.4 Lithospheric processes and hazards.
3.5 Ecosystems and human activity.
3.6 Climatic hazards and change.

Section B
3.7 Contemporary issues in geographical regions.
3.8 Settlements.
3.9 Productive activities: aspects of change.
3.10 Globalisation.

Section C
3.11 Topographic mapping

Assessment

The level of difficulty for both higher and standard level examinations is the same, but the length of examination is reduced in paper two at standard level.

Assessment component	**Higher Level**	**Standard Level**
Written examination Paper 1 – Core Theme	1.5 hours (25%) Candidates answer two out of three structured questions.	1.5 hours. (40%) Candidates answer two out of three structured questions.
Written examination Paper 2 - Optional themes	2.5 hours (50%) Each theme has a choice of either an essay or a structured question. Candidates answer four questions; two from section A, one from section B and a fourth question from sections A, B or C.	1.5 hours. (40%) Each theme has a choice of either an essay or a structured question. Candidates answer any two questions from different themes.
Internal assessment Coursework	One fieldwork report of 2500 words (25%).	One piece of coursework of 1500 words (20%). Either fieldwork or a research assignment.

3.2 EDEXCEL A LEVEL GEOGRAPHY B

Aims and objectives

The course will encourage students to:

- acquire and apply knowledge and understanding of physical and human processes, their interactions and outcomes over space and time, through the study of places and environments;
- acquire and apply a range of geographical and transferable skills necessary for the study of geography
- develop an understanding of the interrelationships between people and their environments, and of the opportunities, challenges and constraints that face people in different places and environments
- appreciate the dynamic nature of geography; how places, environments and issues change and how people respond to these changes
- understand how decisions are made concerning the use and management of environments and resources, and understand the nature, significance and effects of people's values and attitudes, including their own, in relation to geographical issues and questions
- clarify and develop their own values and attitudes in relation to geographical issues and questions.

In addition, at Advanced GCE the course will encourage students to acquire a deeper understanding of the connections between different aspects of geography.

Four Assessment Objectives have been defined:

AO1 show knowledge of specified content

AO2 show critical understanding of the specified content

AO3 apply knowledge and critical understanding to unfamiliar contexts

AO4 select and use a variety of skills and techniques, including communication skills, appropriate to geographical investigation.

History of the specification

This specification has been developed from Edexcel Geography Syllabus B (9211). It has been designed so that teachers can use the majority of their existing resources, but has been extensively revised to include some of the new ideas in geography. The specification framework is in a user-friendly format and provides greater coherence by emphasising linkages between the units. The balanced central core, with a range of linked, parallel options at A2, provides opportunities for individual yet comparable routes through the specification.

Entry requirements

The specification is designed to provide a balanced geographical education for post-16 students, which builds on, but is not dependent on, prior knowledge of the subject at **GCSE level**. It can be studied as part of a one-year or two-year course as the AS has been designed as a free standing qualification. The

unit-based structure means it is possible to spread study of the course over a longer period of time, making it suitable for mature students and those who want part-time study, perhaps in evening classes.

Age

Normally 16 to 18 years old.

Hours

There is no official guidance on the number of guided learning hours. This issue is discussed further in Section 4.

Content and structure of the qualification

The specification includes the following key features:

- Emphasises a balanced understanding of physical and human geography.
- Focuses on understanding the interrelationships between people and their varied environments, and the questions, issues and problems which arise from these relationships.
- Supports an enquiry approach to learning, thus encouraging a variety of teaching and learning styles.
- Leads to a varied **assessment** package, specifically designed to recognise achievement and progression over the course. The AS **coursework** component of 33%, and the A2 coursework component of 7.5% (equating to approximately 24% of the Advanced GCE) includes primary and secondary investigative work. This gives students the opportunity to develop **fieldwork** and **research** skills.

The three AS and three A2 units are set out in the following table:

AS	**Unit 1**	**Changing landforms and their management** – *River environments* – *Coastal environments*
	Unit 2	**Managing change in human environments** – *Rural environments* – *Urban environments*
	Unit 3	**Environmental investigation** – *Coursework based on fieldwork related to Units 1 and/or 2*
A2	**Unit 4**	**Global challenge** – *The natural environment* – *Population and the economy*

	Unit 5	**Researching global futures** • *Select one from* – *Environments and resources* – *Living with hazardous environments* – *The pollution of natural environments* – *Wilderness environments* • *and one from* – *Development and disparity* – *Feeding the world's people* – *Health and welfare* – *The geography of sport and leisure*
	Unit 6	**Synoptic unit**: **Issues analysis**

Assessment – procedures, methods and levels

The assessment procedures are summarised in the following table.

	Unit	**Mode**	**Duration & length**	**Weighting** **AS%**	**A%**
AS	1. Changing landforms & their management	Written exam	1 hour 30 mins	33.3	16.7
	2. Managing change in human environments	Written exam	1 hour 30 mins	33.3	16.7
	3. Environmental investigation	Coursework investigation	2,500 words	33.3	16.7
A2	4. Global Challenge	Written exam	2 hours		15
	5. Researching global futures	A Written exam B Courswk rpt	1 hour 20 mins 1,500 word		15
	6, Synoptic: issues analysis	Written exam	2 hours		20

Grading

Grades are awarded in line with OCR procedures and the QCA Code of Practice

The raw mark for each Assessment Unit is converted to a Uniform Mark Scale (UMS) and then converted to a grade for each unit. For both the AS and the full A Level qualifications the total marks for all units are converted to the UMS and then to a five-grade scale: A, B, C, D and E. Candidates who fail to reach the minimum standard for Grade E will be recorded as U (unclassified) and will not receive a qualification certificate.

QA systems and code of practice

The qualification works within the terms of the QCA's *'GCSE, GCE, VCE and GNVQ Code of Practice'*.

3.3 IB MATHEMATICS HIGHER LEVEL

Mathematics is a compulsory subject in the IB Diploma and four different programmes are offered. Mathematics (Higher Level) caters for students with a good background in mathematics who are competent in a range of analytical and technical skills. The majority of these students will be expecting to include mathematics as a major component of their university studies, either as a subject in its own right or within courses such as physics, engineering and technology. The programme is offered in three languages, English, French and Spanish.

The aims of the Mathematics (Higher Level) programme are to:

1. appreciate the international dimensions of mathematics and the multiplicity of its cultural and historical perspectives
2. foster enjoyment from engaging in mathematical pursuits, and to develop an appreciation of the beauty, power and usefulness of mathematics
3. develop logical, critical and creative thinking in mathematics
4. develop mathematical knowledge, concepts and principles
5. employ and refine the powers of abstraction and generalisation
6. develop patience and persistence in problem solving
7. have an enhanced awareness of, and utilise the potential of, technological developments in a variety of mathematical contexts
8. communicate mathematically, both clearly and confidently, in a variety of contexts.

The objectives of the programme are to

1. know and use mathematical concepts and principles
2. read and interpret a given problem in appropriate mathematical terms
3. organise and present information/data in tabular, graphical and/or diagrammatic forms
4. know and use appropriate notation and terminology
5. formulate a mathematical argument and communicate it clearly
6. select and use appropriate mathematical techniques
7. understand the significance and reasonableness of results
8. recognise patterns and structures in a variety of situations and draw inductive generalisations
9. demonstrate an understanding of, and competence in, the practical applications of mathematics
10. use appropriate technological devices as mathematical tools.

Development of syllabus

The programme is reviewed every five years. A review has just taken place and the last examination under the current syllabus will be in 2005 with the first examination under the new syllabus in 2006. The personnel contributing to the review consist of IB teachers and examiners from as wide a geographical range as possible. This is essential to ensure that the syllabus takes into account the different mathematical traditions in countries around the world. The new core syllabus is actually very similar to the current one with only a few minor changes. The optional part of the syllabus has, however, been altered by the removal of the geometry option which has been by far the least popular of the five options. Of the other options, Statistics has been modified by the removal of some of the statistical tests which have been replaced by some probability distribution theory. It was felt that the current syllabus may well concentrate too much on statistical tests to the exclusion of theory and this has

been redressed. The Algebra option (Sets, Relations and Groups) is virtually unchanged. The Discrete Mathematics option has been modified by the removal of difference equations and the inclusion of more number theory, eg linear diophantine equations and more graph theory, eg the Chinese postman problem. The Analysis and Approximation option has suffered the greatest change, so much so that it has been retitled Series and Differential Equations. The main change has been the removal of numerical methods of integration and the numerical solution of equations to be replaced by differential equations, including both analytical methods and the Euler numerical method. The graphical display calculator is an important tool in this programme and examination questions are set to exploit some of its features, eg the SOLVER facility for solving equations, matrix and complex number arithmetic and statistical tests. A version of the syllabus is in the process of being piloted in which calculators with symbolic manipulation are used throughout the programme, including the examination.

Content and Structure

The syllabus consists of a core plus five options. Candidates are expected to study the entire core and one of the options. The details are as follows (the times given are notional teaching times):

Part 1 : Core

- Number and Algebra (20 hours)
- Circular Functions and Trigonometry (25 hours)
- Vector Geometry (25 hours)
- Probability (20 hours)

Functions and Equations (25 hours)

- Matrices and Transformations (20 hours)
- Statistics (10 hours)
- Calculus (50 hours)

Part 2 : Options

- Statistics (35 hours)
- Discrete Mathematics (35 hours)
- Euclidean Geometry and Conic Sections (35 hours)
- Sets, Relations and Groups (35 hours)
- Analysis and Approximation (35 hours)

Assessment

This is done in two ways, External Assessment weighted 80% and Internal Assessment weighted 20%.

External Assessment consists of two written papers, Paper 1 which is a 2-hour paper weighted 30% and Paper 2 which is a 3-hour paper weighted 50%. Paper 1 contains twenty compulsory short-response questions, carrying an equal number of marks, based on the core syllabus. Paper 2 is divided into Section A and Section B. Section A contains five compulsory extended-response questions based on the core syllabus. Section B contains five extended-response questions, one on each of the optional topics, one question to be answered on the chosen topic. In the new programme, examined first in 2006, Sections A and B will become two separate papers. Each candidate is required to have access to a graphical display calculator during the examinations and some questions are set to exploit some of the features of these calculators. Each candidate is also given a copy of the IB Formula booklet and statistical tables for use in the examination. The examinations are held in May, for northern hemisphere candidates, and in November for the southern hemisphere.

Internal Assessment consists of a portfolio, that is three pieces of work assigned by the teacher and completed by the candidate during the course. The assignments must be based on different areas of the

syllabus and represent the three activities, mathematical investigation, extended closed problem solving and mathematical modelling. The portfolio is internally assessed by the teacher against a number of specific criteria and externally moderated by the IB.

3.4 IB MATHEMATICAL METHODS STANDARD LEVEL

Aims and objectives

Mathematical Methods caters for students who anticipate a need for a sound mathematical background in preparation for their future studies. The programme focuses on introducing important mathematical concepts through the development of mathematical techniques rather than insisting on a highly rigorous approach.

The aims of this programme are the same as for the Higher Level programme (see above).

Development of syllabus

The current Mathematical Methods programme was first examined in 2000. The syllabus content is broadly similar to the previous programme. It consists of a core and three options of which candidates study one. There was some reduction in content to allow for the introduction of an internal assessment component.

The internal assessment component (the portfolio) was designed to address objectives 3, 4, 8, 9 and 10 more fully than is possible in examination papers.
Graphic display calculators are required in examinations. Previously they were allowed but not required. This change allows "calculator active" rather than "calculator neutral" questions to be set.

A revised programme is now in place and will be examined for the first time in 2006. The content is broadly similar to the current programme but there are no longer any options. Parts of each option are incorporated into the new syllabus. The assessment objectives have been weighted. Each examination paper will be 1½ hours with a weight of 40%. This gives more time for considered responses on paper one and paper two no longer requires section B. The portfolio will consist of two pieces of work of two types; mathematical investigation and mathematical modelling. The assessment criteria have been revised.

Content and Structure

The Mathematical Methods syllabus consists of six core topics and three options. Students study all six core topics and one option.

Core:

- Number and Algebra
- Circular Functions and Trigonometry
- Statistics and Probability
- Functions and Equations
- Vector Geometry
- Calculus

Options:

- Statistical Methods
- Further Geometry
- Further Calculus

Assessment

External Assessment accounts for 80% of the final mark and consists of two terminal written papers.

Paper 1 1 hour 30%
Fifteen compulsory short-response questions based on the core

Paper 2 2 hours 50%
Section A:
Five compulsory extended response questions based on the core (35%)
Section B:
Three extended response questions, one on each of the options. One question to be answered. (15%)

Internal Assessment:
Portfolio 20%
A collection of three pieces of work assigned by the teacher and completed during the course. Tasks must be based on different areas of the syllabus and represent three types of activity; mathematical investigation; extended closed problem solving; mathematical modelling. Tasks may be taken from those provided by IBO or designed by the teacher. The portfolio is assessed by the teacher according to prescribed assessment criteria and externally moderated by IBO.

3.5 IB FURTHER MATHEMATICS STANDARD LEVEL

Aims and Objectives

The aims and objectives of the further mathematics standard level course are the same as those for the higher level mathematics course. Further mathematics caters for students with a good background in mathematics who have attained a high degree of competence in a range of skills. Most of these students will intend to study mathematics at university, either as a subject in its own right or as a major component of a related subject. In particular, the course is designed to allow students to learn about a variety of branches of mathematics in depth and also to appreciate practical applications.

Development of syllabus

Candidates registering for further mathematics standard level will be presumed to know the topics in the core syllabus of mathematics HL and to have studied one of the options of mathematics HL, irrespective of whether they have also registered for mathematics HL. The syllabus consists of all five optional topics from the higher level mathematics course. All these topics are compulsory, with the great majority of candidates already having studied one of them in their higher level mathematics course.

Content and Structure

The five topics of the course are: statistics; sets, relations and groups; discrete mathematics; analysis and approximation; Euclidean geometry and conic sections. Each of these topics takes up 35 hours of

teaching. On the assumption that one of these topics has already been studied as part of the higher level mathematics course, the remaining four topics take up 140 hours of the course. The final 10 hours of the course are spent on the portfolio of 2 assignments based on different areas of the syllabus, chosen from the following 3 activities: mathematical investigation, extended closed-problem solving, and mathematical modelling (note that these requirements are different from those stated in the subject guide, following an adjustment introduced in May 2001). The two assignments for the portfolio should be incorporated into the programme of study, and should relate directly to topics in the syllabus. Candidates are required to have access to a graphic display calculator at all times during the course.

Assessment

The assessment model comprises 2 written examination papers, worth 75% of the total mark, and the internally assessed portfolio, worth 25% of the total mark. Paper 1 (25% weighting) is a 1-hour paper comprising 10 compulsory short-response questions based on the five topics in the syllabus. Paper 2 (50% weighting) is a 2-hour examination paper comprising 5 compulsory extended-response questions based on the five topics in the syllabus. Candidates are required to have access to a graphic display calculator for the duration of both examination papers. The portfolio assignments are internally assessed by the classroom teacher against a range of assessment criteria, and then externally moderated by examiners.

3.6 AQA GCE A LEVEL MATHEMATICS

Aims and Objectives

The specification is intended to provide candidates with a progression from the knowledge, understanding and skills established at GCSE. It caters for those who wish to develop their study of Mathematics to GCE AS or A Level, providing a foundation for those who wish to study either Mathematics or related subjects in Higher Education.

- The specification is a traditional scheme which offers certification in AS and A Level Mathematics, Further Mathematics, Pure Mathematics and Statistics. It complies with the QCA Common Criteria and the Subject Criteria for Mathematics.

The aims of the specification are for candidates to

- develop positive attitudes toward learning and applying mathematics in a way that promotes confidence and fosters enjoyment;
- develop abilities to reason logically and recognise incorrect reasoning, to generalise and to construct mathematical proofs;
- acquire a sound base of the knowledge, skills and attitudes required for further study in mathematics, in other subjects and in employment;
- develop skills of modelling, generalisation and interpretation of results relevant to both the application and development of mathematics;
- use mathematics as an effective means of communication;
- encourage the appropriate use of technology such as calculators and computers, to recognise when such use may be inappropriate and be aware of limitations.

Development of syllabus

The new specification was introduced in September 2000, with first AS examinations in January 2001. It was developed out of the highly successful AEB Mathematics specification. There has been a conscious retention of many of the elements which characterised the old specification; no coursework for the applications; a wide choice of applications from Mechanics, Statistics or Decision (Discrete) Mathematics; a strong element of Pure Mathematics; associated AS and A-Levels in Pure Mathematics and Further Mathematics.

Mathematics is, inherently, a sequential subject. There is a progression of material through all levels at which the subject is studied. Candidates embarking on AS/A Level study in mathematics subjects are expected to have achieved at least Grade C in GCSE Mathematics, or equivalent. They need to have covered all the material in the Intermediate Tier and to be able to use further topics from the Higher Tier of GCSE.

Content and Structure

The minimum content at both AS and A Level is detailed in the QCA Subject Criteria for Mathematics. The AQA specification is based on a modular structure with three modules at AS Level and three at A2 (two Pure plus one Application module). The main combinations for single subject A-Level Mathematics are shown below. It is possible to study one Application such as Statistics in depth or to study two different applications such as Mechanics and Statistics. The specification gives full details.

AS Modules		**A2 Modules**	
P1	*Pure Mathematics* Includes approximately 50% of the AS Core containing algebra, functions, coordinate geometry, differentiation and integration.	P4	*Pure Mathematics* Includes approximately 50% of the A2 Core developing the topics of P1 and P2 including further algebra and calculus methods.
P2	*Pure Mathematics* Includes approximately 50% of the AS Core developing the topics of P1 and including radian measure, exponentials and logarithms.	P5	*Pure Mathematics* Includes approximately 50% of the A2 Core developing the topics of P1,P2 and P4 including vectors and further calculus and trigonometry.
S1 or M1 or D1	*Statistics* *Mechanics* *Discrete Mathematics*	S4 or M2 or D2	*Statistics building on S1* *Mechanics building on M2* *Discrete Mathematics building on D1*

The A2 modules build on the skills and processes developed at AS Level as candidates' study of Mathematics widens and deepens. The synoptic rules for A Level Mathematics are automatically satisfied by taking (in any order and examination series) the units required for the qualification.

Other modules are available for Further Mathematics A-Level.

Assessment

Each of the above modules leads to an Assessment Unit with the same title. There are six examinations taken over the course of the two year programme: three at AS Level, normally taken in June (or November) of the first year and three at A2 Level taken in June of the second year. Modules may also be taken in January of each year and each module may be re-taken with the best mark counting towards the final award.

Each of the examinations in Pure Mathematics (P1, P2, P4 and P5) carries 15% of the total A Level marks and is of length 1hr 15min. The Applied examination papers (eg M1 and M2) are of length 1hr 45 min and each unit is worth 20% of the total A Level marks.

There are five Assessment Objectives (AOs) which are given different weightings in each paper. All examination questions are marked against the relevant AOs, the first two having the greatest weighting; AO1 refers to recalling knowledge; AO2 assesses logical deduction and manipulation of mathematical expressions; AO3 involves setting up mathematical models and AO4 is concerned with the interpretation of such models and using calculations to make predictions; AO5 refers to the use of (or understanding when NOT to use) contemporary technology.

The examination requirements and subject content for each module are fully described in the Specification document.

3.7 IB CHEMISTRY

Aims and Objectives

Both Higher and Standard Levels have the same aims and objectives, which are also common to the other experimental sciences in Group 4 of the IB diploma hexagon.

Aims:

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

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

Development of syllabus

The current syllabus was introduced in February 2001, for first examination in May 2003.

The final examinations on the syllabus will be in 2008.

The current syllabus was based very much on the previous syllabus, on which examinations were set from 1998 to 2002. Relatively minor changes in the content were made, although substantial parts of the content were moved between sections.

Content and Structure

The syllabus content is divided into a Core (containing twenty Topics) and eight Options.

- Standard Level candidates study eleven designated topics from the core, plus two options.
- Higher Level candidates study all twenty topics from the extended core, plus two options.

Approximate recommended teaching times are specified as follows:

- Standard Level candidates have 80 hours for the core and 30 hours for the options.
- Higher Level candidates have 135 hours for the core and 44 hours for the options.
- (Standard Level options have 15 hours and Higher Level options 22 hours).

The eleven Standard Level topics in the Core are
- stoichiometry
- atomic theory
- periodicity
- bonding
- states of matter
- energetics
- kinetics
- equilibrium
- acids and bases
- oxidation and reduction
- organic chemistry

The nine Higher Level topics in the Core consist of additional material in each Standard Level topic, excluding stoichiometry and states of matter.

One Option is available only at Standard Level:
- Higher physical organic chemistry

Two Options are available only at Higher Level:
- Modern analytical chemistry
- Further organic chemistry

Five Options are available at both Standard and Higher Levels:

- Medicines and drugs
- Human biochemistry
- Environmental chemistry
- Chemical industries
- Fuels and energy

Assessment

External assessment consists of three papers taken at the end of the course.
At Standard Level they are:

Paper 1 (20%)	45 min	30 objective questions on the core
Paper 2 (32%)	75 min	short-answer and extended-response questions on the core (choice within Section B but not in Section A)
Paper 3(24%)	60 min	short-answer questions on two options (choice of options but no choice of questions within options)

At Higher Level they are:

Paper 1 (20%)	60 min	40 objective questions on the extended core
Paper 2 (36%)	135 min	short-answer and extended-response questions on the extended core (choice within Section B but not in Section A)
Paper 3(20%)	75 min	short-answer and extended-response questions on two options (choice of options but no choice of questions within options)

Paper 1 tests Objectives 1 and 2
Papers 2 and 3 test Objectives 1, 2 and 3

The remaining 24% of the assessment at both Standard and Higher Levels is carried out by teachers during practical work and externally moderated.
Objectives 4 and 5 are tested in this assessment.

3.8 OCR GCE A LEVEL CHEMISTRY

Aims and purposes of the qualification

The aims of the GCE AS and A Level specifications in chemistry are to:

- develop essential knowledge and understanding of the concepts of chemistry, and skills needed for the use of these new and changing situations
- develop an understanding of the link between theory and experiment
- be aware of how advances in information technology and instrumentation are used in chemistry
- appreciate the contributions of chemistry to society and the responsible use of scientific knowledge and evidence

- sustain and develop enjoyment of, and interest in, chemistry.

In GCE only
- to bring together knowledge of ways in which different areas of chemistry relate to each other.

History of the qualification

The current chemistry syllabus was developed from the modular chemistry syllabus which was introduced in 1991, and was revised in 1993/4.

Entry requirements

Grade CC in GCSE Science: Double Qualification (or equivalent).

Age of candidates

Normally 16 – 18.

Hours

There is no official guidance on the number of hours of guided learning. It varies widely in Centres from about 3.5 to 6 hours per school week.

Content and structure of the qualification

The OCR specification is based on a modular structure with three modules at AS Level and three at A2. At AS level students must study the first two modules and Component 01 of the third module. At A2 Level students must study the first module, Component 01 and one of Components 02 – 06 of the second module, and Component 01 of the third module.

AS Modules		A2 Modules	
2811	*Foundation Chemistry* Atoms, Molecules and Stoichiometry Atomic Structure Chemical Bonding and Structure The Periodic Table	2814	*Chains, Rings and Spectroscopy* Further organic chemistry and spectroscopy
2812	*Chains and Rings* Organic chemistry	2815	Component 01: *Trends and Patterns* Component 02: *Biochemistry* Component 03: *Environmental chemistry* Component 04 : *Methods of analysis and detection* Component 05: *Gases, liquids and solids* Component 06: *Transition elements*
2813	Component 01: *How Far, How Fast?* Enthalpy, rates and equilibria Component 02: *Coursework* Component 03: *Practical Examination*	2816	Component 01: *Unifying concepts* Further enthalpy, rates and equilibria Component 02: *Coursework* Component 03: *Practical Examination*

Assessment – procedures, methods and levels

Each of the above modules leads to an Assessment Unit with the same number and title.

AS Assessment Units 2811 and 2812 and Component 01 of 2813 are each assessed by a written examination. In addition, for 2813, students must choose to enter either Component 02 (coursework) or 03 (the practical examination).

At A2, Assessment Unit 2814, Component 01 and the Centre/candidate's choice of 02 to 06 of Assessment Unit 2815, and Component 01 of Assessment Unit 2816 are each assessed by a written examination. In addition, for 2816, students must choose to enter either Component 02 (coursework) or 03 (the practical examination).

Coursework

The skills assessed are:

- Planning
- Implementing
- Analysing evidence and drawing conclusions
- Evaluating evidence and procedures

These skills can be assessed in the context of separate practical exercises, or a single whole investigation. Candidates' work is internally marked and externally moderated. There are four descriptors for each skill, to a maximum of 8 marks, applied hierarchically.

Practical examination

This tests the same skills as the coursework. The planning exercise is done before the practical examination. The candidate develops this plan in 500 – 1000 words.

Grading

Grades are awarded in line with OCR procedures and the QCA Code of Practice

The raw mark for each Assessment Unit is converted to a Uniform Mark Scale (UMS) and then converted to a grade for each unit. For both the AS and the full A Level qualifications the total marks for all units are converted to the UMS and then to a five-grade scale: A, B, C, D and E. Candidates who fail to reach the minimum standard for Grade E will be recorded as U (unclassified) and will not receive a qualification certificate.

QA systems and code of practice

The qualification works within the terms of the QCA's *'GCSE, GCE, VCE and GNVQ Code of Practice'*.

SECTION 4: THE WORK OF THE EXPERT GROUP

Preparatory work

Prior to the Expert Group meeting, all members of the Subject Groups were sent copies of the IB and A level syllabuses, together with other relevant documentation, and were asked to complete a number of tasks in preparation for the meeting. These tasks required members to compare the aims, content and assessment models of the two sets of specifications. Preliminary mapping exercises for each subject were provided to assist this work. In addition, group members were asked to review a number of candidate scripts at significant grade boundaries.

A separate group, consisting of university admissions tutors, was also sent documentation relevant to the three additional components that constitute the IB core and were asked to form a preliminary judgement about the value of these components for progression to Higher education and the potential contribution that these components might make to the allocation of UCAS Tariff Points to the International Baccalaureate.

The Expert Group meeting

The Expert Group then met on one occasion for two days to examine and discuss the evidence listed in Appendix 2 and the preparatory work completed by group members. This section contains an account of the deliberations of this meeting.

The first day began with a number of short briefing sessions:

- Jill Johnson briefing the group about the development and use of the UCAS Tariff
- Dr Geoffrey Hayward briefing the group on the aims and conduct of a Comparability Study
- George Pook presenting an overview of the International Baccalaureate.

The Expert Group then spent the majority of the remaining time in Subject Groups with plenary sessions to compare progress and identify emerging issues held at regular interval through the course of the two days. An account of the work of each group and its findings is set out below.

4.1 THE GEOGRAPHY GROUP

It was noted that the three group members had between them experience of teaching both IB and A level geography, and of three different A level syllabuses from three different Awarding Bodies.

Comparison of aims

The Group agreed that the aims of the two syllabuses are very similar. For example, both sets of aims are concerned with:

- The interrelationship between people, place and the environment
- The acquisition of geographical skills and methodologies
- Consideration of the dynamic nature of the subject and changes in space and time

- Responsibility and concern for the environment for future generations
- Respect for different values and attitudes of others.

Certain differences in emphasis were noted. For example, the position of Geography within the IB as a social science leads to more emphasis on human geography than in the A level. In addition, given the international dimension of the IB, there is more emphasis on contemporary world issues with less of a regional focus than in the A level. These differences, however, were not felt to be significant for admissions purposes since, as the HE rep noted, HEIs are more concerned with student potential than coverage of identical syllabuses.

Structure of the syllabuses

As with all GCE A levels, the Edexcel specification comprises six units, three to be completed for the AS award, normally in the first year of the course, with a further three required for the full A level qualification, normally awarded at the end of the second year. Two of the AS units are assessed by external examination; the third unit is a coursework investigation. Two of the A2 units are assessed by external examination; the third is a combination of an examination and a further piece of coursework.

Higher Level and Standard Level candidates study the same IB syllabus, which is designed to be delivered over two years with a terminal examination. The syllabus is structured on a core plus options basis, plus a coursework requirement. Higher Level and Standard Level candidates are both required to study the core and sit the same examination paper. Higher Level candidates are required to study four out of 10 available options, Standard Level candidates are required to study two. Both Higher Level and Standard Level students are required to undertake fieldwork and produce a written report.

It was noted, therefore, that Higher Level and Standard Level students study a common syllabus, although Standard Level candidates study fewer options and do a smaller amount of coursework.

Comparing size – study hours

A measure of the size of an award is normally the number of hours of study needed to complete it. It was noted that the IB syllabus states that there should be 240 class contact hours for the Higher Level and 150 hours for the Standard Level. Class contact hours are not specified for A levels.

However, the A level Chief Examiner thought that a figure of 300 to 330 hours was more realistic for the whole A level, although any safe determination of hours was complicated by different practices across centres in respect of when the teaching of the A2 units was started and the time needed for assessment periods in January and June. Both Chief Examiners and the school representative also reported that the number of teaching hours devoted to each syllabus was being eroded due to funding constraints, so that the recommended 240 hours for Higher Level was not always adhered to, and A level may sometimes need to be completed in 260 hours.

Given these complexities, it was agreed that study hours was not a good indicator of the comparative size of the two syllabuses, although the figures would suggest that the Higher Level syllabus may be smaller than the A level syllabus. (240/300 = 80%)

Comparing size – content

The Group began by identifying the number of themes, or designated branches of geography, a candidate is required to study in each syllabus, as shown in Table 1.

Table 1: Geographical themes in each syllabus

A level		IB	Higher Level	Standard Level
	Themes by unit	**Core themes**		
Unit 1	Rivers	Population	All 3 studied	All 3 studied
	Coasts	Resources		
Unit 2	Rural	Development		
	Urban			
Unit 4	People, weather, climate	**Optional themes** Drainage basins Coasts Arid environments Lithospheric processes Ecosystems Hazards Geog regions Settlements Change Globalisation	4 required	2 required
	Ecosystems			
	Population migration			
	Economy			
Unit 5	Natural envir: 1 from 4			
	Human envir: 1 from 4			
Total no of themes	**10**		**7**	**5**

This suggested IB Higher Level = 70% of A level, Standard Level = 50% of A level

To determine the size on the basis of themes alone did not seem to represent a fair comparison.

The Group then mapped the content of the IB themes to the A level themes and found a significant degree of overlap, as shown in Table 2.

Table 2: IB geographical themes mapped to A level themes

A level	International Baccalaureate
AS Themes	
Rivers (unit 1)	Option 3.1 Drainage basins. Same breadth and depth
Coasts (unit 1)	Option 3.2. Coasts. Same breadth and depth
Rural (unit 2)	Option 3.8 Settlement. Very little on Rural. Would equate to about half of the Rural and Urban combined.
Urban (unit 2)	
Coursework (2500 word assignment) (unit 3)	Different because Standard Level is only 1500 words but Higher Level is 2500 words. The volume of learning and what candidates are being asked to do is very similar.
A2 Themes	
People Weather and climate (unit 4)	No direct equivalence
Ecosystems (unit 4)	Although A level has more of a global slant, Option 3.5 Ecosystems is equivalent.

Population migration (unit 4)	Core theme, Population, is the same.
Economy (unit 4)	Equivalent content found across Core themes and options.
Natural Options (Unit 5) Hazards 5.2 Resources, 5.1	 Options 3.4, Lithospheric processes and hazards, and 3.6, Climatic Hazards – half of each of these options would be equivalent to Natural Options 5.2, Hazards. Some overlap with Core theme, Resources.
Human Options (Unit 5) Development 5.5 Food Production – 5.6 has many similarities with IB 2.8 and 2.9 in the core)	 Some overlap with Core theme, Development Some overlap with Core theme, Feeding World's People (2.8 and 2.9) Core IB 2.12 Option (sustainable development) permeates throughout A level units 4 and 5.
Skills (Unit 6) Synoptic unit, requiring a broad range of skills, e.g. issues analysis and decision making skills	The examination of the Core by definition has a synoptic element, although the range of skills required is not as broad, and less depth of knowledge is required, i.e. there is no requirement for issues analysis or decision making skills.

The Group also noted a number of content areas which are unique to each syllabus, as shown in Table 3. However, IB units 3.3, 3.7 and 3.11 are all options and not part of the core. This makes comparison with 4.0-4.3 + 2.1-2.5 from the A level difficult because they are compulsory.

Table 3: Content areas unique to each syllabus

A level	**IB**
4.0 – 4.3 Although people shared, weather and climate unique	3.7 Contemporary issues in geographic regions
2.1 – 2.5 Rural environments	3.3 Arid environments and their management
5.3 Pollution of natural environments	3.11 Topographical mapping
5.4 Wilderness environments	
5.8 Geog of sport and leisure	

In drawing their conclusions from the content mapping exercise, the Group allowed for differences in the sizes of the themes, and other compensating factors; for example, some of the A level themes are done at AS level and will therefore be done in less depth than comparable IB themes.

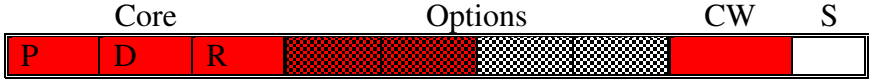
The Group also took into account the differences in the coursework requirements. The skills required for the AS Unit 3 and the IB Higher Level fieldwork are very similar. However, a broader range of skills is required in the coursework element of A2 Unit 5 including research skills and constructing a detailed report which explores values and opinions from a wide range of sources. Set against this the IB representatives pointed out that at AS coursework titles are submitted for Awarding Body approval who suggest modifications, and at A2 approved titles are provided, whereas the IB candidate is not supported in this way and needs to show more initiative in the choice of topic.

A range of skills is also required for the Issues Analysis in Unit 6 of the A level. These include:

- Using a structured route of enquiry
- Interpreting and analysing a range of data and resources
- Selecting and using an evidence base analysed from a wide range of sources
- Using their decision making skills to evaluate a number of options and where appropriate recommending a decision and explain the resulted.
- Evaluating a range of options concerning an issue, using their geographical experience to identify and analyse potential conflicts
- Offering advice on various techniques of investigation by decision makers and on implementation to suggest ways of monitoring the impact of decisions

The argument was made that (a) these skills are not explicitly required by the IB and (b) they require teaching. Thus, even though the skills required for the topographical component of the IB syllabus may offset to a limited extent these skills in the A level, their presence makes the A level syllabus larger in volume than the IB syllabus. The Group therefore concluded that the size of the IB Higher Level syllabus was in the region of 85% of the A level syllabus. This was represented diagrammatically as follows.

IB



= 9 themes, where coursework, and the geographical skills taught throughout the course are taken to be an additional themes

Red = Standard Level

A level

AS				Global Challenge				Options		CW/S
U1	U1	U2	U2	U4	U4	U4	U4	N U5	H U5	U3 + U6

= 11 themes, including coursework and the skills unit as one theme

A level = 9/11 themes = 82%, rounded up to 85% after looking at coursework.
It was argued that this figure reflected the estimation of size as calculated by the number of hours (240/300 = 80%)

Standard Level = 6/9 themes, therefore 66% of the Higher Level
= 66% of 85% = 50% of A level
Again it was argued that this matched the size as determined by the number of study hours (150/300 = 50%)

However, there was a perception amongst the Subject Group that the Edexcel syllabus was content heavy, so the AQA Geography B syllabus was examined as a control exercise. This was felt to be a much closer match to the IB syllabus. So that in terms of size the A level content as set out in the AQA syllabus B was a close match (95%) to the IB Higher Level.

Nevertheless, there is still the need to take account of the greater emphasis that is being placed on geographical skills in the A level which are examined in the Unit 5 and the Unit 6 synoptic skills paper. The combination of depth and breadth at A2, and the need for a synoptic unit which requires complex overviews and interlinkages, suggests that the A2 components, in particular, would definitely require more time to teach than the equivalent IB material. The IB Chief Examiner concurred with this view pointing out that, whilst the depth of knowledge and understanding required by each syllabus appears to be similar, the range of skills is greater in the A level. For example, issues analysis features strongly in the A level course but very little in the IB (though there was possibly some in the topographical map work). Furthermore, in Unit 6 of the A level, candidates are expected to demonstrate a synoptic approach, which does not feature in the IB syllabus except perhaps in the IB core. In addition, the A level requires students to complete two substantial pieces of course work rather than one as is the case with the IB.

Taken together the evidence suggests that the IB syllabus is smaller than the A level. As the diagrams above indicate this is because of the slightly greater content of the A level but primarily because of the need to develop a greater range of geographical skills amongst A level candidates in order to meet the demands of the variety of assessment styles in particular on the synoptic paper.

Comparing assessment models

Although the approach to writing and use of assessment objectives differed between the two syllabuses, it was agreed that there were close similarities in the expectations of candidates in terms of knowledge and understanding and the application of geographical skills. While it was noted that there appeared to be more emphasis in the A level assessment objectives on the application of knowledge to unfamiliar contexts, it was agreed that working with unfamiliar situations does appear in one of the IB options – Topographical Skills.

This was confirmed by the comparison of grade descriptors – see below

Comparing examination requirements – question papers, mark schemes and coursework

The details of the examination requirements for each syllabus are provided in Section 2. The main differences between the examination requirements for the two syllabuses lie in

- the difference between a unit and linear assessment model
- the clear distinction made between AS and A2 assessment requirements whilst the there is far less distinction in the demand of the assessment between Higher and Standard Level.

A level candidates take 2 papers of 1.5 hours each at AS Level, normally at the end of the first year, together with an internally assessed and externally moderated coursework investigation of 2,500 words. A2 candidates take a further 3 papers totalling 4 hours 20 minutes, normally at the end of the second year, together with a course work report of 1,500 words.

IB Higher Level candidates take 2 papers of 1.5 and 2.5 hours respectively, together with an internally assessed course work report of 2,500 words. For Standard Level candidates, who do two options not 4,

the assessment time is reduced to 3 hours with 1,500 word coursework report. Higher Level and Standard Level candidates take the same Paper 1. Standard Level candidates take same paper 2, but only required to do 2 questions.

It was noted that the greater length of examination time in the A level compared to the Higher Level was a function of the unit based assessment model adopted for the GCE. The balance of internal to external assessment was agreed to be broadly similar.

The group found no significant differences in the demand placed on candidates in the style of the respective examination papers, both examinations including a mixture of data response questions and essays, with all papers containing an element of choice. However, in the case of IB candidates no pre-release material was provided and this might increase the level of difficulty relative to A2, where this type of support is given in unit 5.

The style of mark schemes was similar, with each using mark bands for more extended responses, although the A Level mark schemes were more specific over the weightings given to individual skills.

It was noted that the Standard Level questions are marked to the same criteria and standard as the Higher Level questions. This suggested that Standard Level is more demanding than AS, and although smaller in size, is of a comparable demand to the A level.

Comparing grade descriptors

As part of their preparatory work, the group had compared the published grade descriptors for each subject. The group agreed that the expectations of candidate performance described in A level Grade A and IB Grade 7 were very similar. For example, both required an in-depth knowledge of places, themes and environments and of the physical and human processes which affect their development. Other skills included an ability to analyse, synthesise, apply and evaluate geographical concepts, issues and theories. Equally, comparison of A level Grade E and IB Grade 4 also showed similar levels of expectation, both requiring, for example, an awareness of the contribution that concepts, principles and theories can make to the interpretation of geographical contexts and some ability to develop ideas and substantiate assertions.

The expectations of performance in these grade descriptors apply equally to Higher Level and Standard Level, given that Standard Level is assessed to the same standard as Higher Level.

Comparing levels of performance – candidate evidence

Higher Level/A level

As part of the preparatory work the A level and IB examiners and the HE representative had each reviewed the candidate scripts provided at the A level Grade A/B and IB Grade 6/7 boundaries and the A level Grade E/U and IB 3/4 boundaries. The A level and IB examiners had each applied their own marking scheme to the other's examination scripts.

All three group members confirmed the findings of the earlier QCA study, agreeing that the levels of performance required for an A level Grade A were comparable to those required for an IB Grade 7, and an A level Grade E was comparable to an IB Grade 4. They supported this conclusion by reference to the candidate evidence on a number of similar questions on comparable content across the two sets of papers. For example, in the area of physical geography, comparable levels of performance were demonstrated by A level candidates on Question 2b on Edexcel's Unit 4 May 2003 paper and IB candidates taking the May 2003 IB Paper 1, Question 1. Both questions required an extended piece of writing in response to a data stimulus concerning El Nino. Similarly, in the area of human geography, comparable levels of performance were found in the answers to Question 4 of A level Unit 4 May 2003 paper and IB's May 2003 Paper 1, Question 1. There was similar content on population and resources, both requiring extended pieces of writing in response to a data stimulus.

Both examiners agreed that where the examinations addressed comparable content an IB candidate would achieve a similar result to and A level candidate and vice versa.

During the meeting the group had access to some IB coursework at the relevant grade boundaries. An examination of this evidence served not only to confirm the judgement they had reached using the candidate examination scripts, but also to suggest that the IB Grade 7 may be higher than the A level Grade A threshold and that the top of IB Grade 6 should be aligned with the A level Grade A threshold. The IB mark scheme made it more difficult to get a Grade 7 than a Grade A because higher order skills such as analysis and evaluation are given a relatively high weighting by the IB compared to the composite weighting across AS and A2 in the A level. Thus a 7 would constitute a good A level pass. Furthermore the group thought that an upper grade 6 would probably align with a lower grade A at Higher Level.

Standard Level/A level

For the Standard Level examination the questions are the same, although fewer, and the Standard Level scripts are marked to the same standard, using the same marking scheme as the Higher Level scripts. The group therefore agreed that the level of candidate performance demonstrated by the Standard Level scripts matched that of the A level candidates at A/7 and E/4. The HE representative stated that in his judgement he could see no difference on the common questions in standard of performance between a Higher Level 7/4 and an Standard Level 7/4.

Coursework differences

Coursework for Higher Level forms 25% of the assessment. At A2 it forms 24%. Demands of coursework were thought to be greater at A level than at Higher Level. The demands of the AS coursework unit are very similar to the Higher Level coursework, in terms of length (both 2,500 words), structure and assessment criteria. However, A2 candidates are required to do a second piece of research assessed against a more demanding set of criteria than those used at AS. A review of coursework showed A2 reports more sophisticated than the Higher Level reports.

Aligning the grades

A level/IB Higher Level

The evidence from the comparison of candidate scripts had indicated that it could be argued that an IB Grade 7 was equivalent to a good A level Grade A and that top of an IB Grade 6 was equivalent to a threshold Grade A. In order to complete the alignment of the two sets of grades, the IB examiner and the school representative reviewed a number of A level Grade C script which were made available during the meeting and discussed their findings with the other group members.

On the basis of the available evidence the group agreed the following alignments for A level/Higher Level grades:

A level	**Higher Level**
A	7
	6
B	
C	5
D	
	4
E	
U	1 2 3

SL 7

Conclusions on size and demand

Although the demand of the IB Higher Level was agreed to be equal to the demand of the A level at the top and bottom grades, the size of the IB Higher Level was stated as 85% of the Edexcel A level but more akin to 90% of the AQA A level. 85% of 120 = 102 Tariff Points

For Standard Level, the level of demand is the same as Higher Level, but the size is 50% of the A level. 50% of 120 = 60 Tariff Points = A level Grade D or a Grade A at AS.

The group found this latter result problematic, believing that the standard of work of a Standard Level Grade 7 candidate should equate to a Grade C at A level.

4.2 THE MATHEMATICS GROUP

Taking some form of mathematics is compulsory for IB students. To cater for the likely wide range of interests, needs and aptitudes amongst IB students a number of different mathematics qualifications are available:

a) Mathematics Higher Level
b) Mathematical Methods Standard Level
c) Further Mathematics Standard Level
d) Mathematical Studies Standard Level

Each of these is considered in turn in this report.

a) Mathematics Higher Level

Introduction

The mathematics A level used as the benchmark award in this exercise was the AQA Mathematics and Statistics Specification B. In order to make the tasks of the Subject Group manageable, examination papers, mark schemes and candidate work from four units (P1, S1, P4, S4) at A level, not six, were made available to the group. It was pointed out that the IB examiner found it difficult to make comparisons between the two awards with this incomplete picture of A level. The content comparisons were, however, made using an example of a full A level (P1, P2, S1, P4, P5, S4). The mathematics Higher Level considered was the Core plus the statistics option.

Comparison of aims

There was general agreement that the aims of the two qualifications were broadly similar. Both awards mention knowledge and skills, logical thinking, communication, generalisation, technology and attitudes. The A level aims include proof which is not mentioned in the IB aims but is addressed in the specification. In addition, modelling and interpretation of results is not specifically mentioned in the IB aims. Although a stated aim in both IB and A level courses is the use of calculators, this is taken much further in the IB; in fact calculator skills are specifically tested in the IB. A further difference was noted to be in the international flavour of the IB which is most obvious in the portfolio work.

Comparing size – study hours

The study hours for the IB Higher Level were recommended to be 240 – opinion differed as to whether or not this was generally achieved in practice – and for A level around 250 - 300 hours. It was expected, therefore, that the A level specification would contain more material than the IB Higher Level but this was found to be not the case.

Comparing size – content

A large amount of common material was found in the two syllabuses. The material unique to the IB consisted of several large topics, whilst the material unique to the A Level consisted of a larger selection of small topics (see Table 4).

Table 4: Material unique to the IB and A level mathematics syllabuses.

International Baccalaureate	GCE A level Mathematics
Induction Complex numbers Matrices Kinematic problems	Odd, even and periodic functions Polynomial inequalities Small angle approximations Coordinate geometry of circle Recurrence relationships Parametric equations of curves General solution of trigonometric equations Trapezium and Simpson's rules

It was agreed that the major topics unique to the IB Higher Level needed introduction, assimilation and application, and practice whereas the topics unique to the A level were essentially additional applications of what had been already taught. Taking into account the time needed to cover these unique items the group suggested that the IB Higher Level content specification was between 10 and 20% larger than that of the A level.

One possible suggestion for how a larger syllabus may be completed in a shorter time was offered. An IB candidate has a choice of level of mathematics course for the diploma. Candidates who choose Mathematics Higher Level and those who choose Mathematical Methods Standard Level would be capable of beginning an A level course. They are in effect put into two streams by ability and the Higher Level group is thus able to go at a greater pace in the first year. This is borne out by the fact that IB teachers agree that it is very difficult to try to combine Higher Level and Methods classes. A level candidates will study three AS units in their first year. The candidates may be a mix of those who will end their mathematics with an AS qualification and those who will go on to complete a full A level. The pace will be sufficient to meet the demands of AS level and this will be the depth of study too. Some of the students would be capable of great pace and depth. Thus Higher Level students are ahead of both Methods students and those who have studied 3 AS units.

Comparing assessment models

It was agreed that the assessment objectives for the two awards are broadly similar in their manifestation as seen in the examination papers but not as expressed in the specifications. The IB objectives appear to be more modest than those of A level but detailed examination of the papers suggested that all the IB objectives are tested and some of the A level objectives seem to be over ambitious. For example, part of AO2 in the A Level requires 'the construction of extended arguments for handling substantial problems presented in unstructured form' but the questions in P1 and P4 tend to be well structured. The A level examiner suggested that even in P2 and P5 the questions would be unlikely to be unstructured; the A Level papers are set to ensure that the objectives have been met in the appropriate proportions whilst at the same time following good assessment practice of making the questions accessible within the constraints of a 1.5 hour examination.

The assessment models were, of course, felt to be different with the A level modular structure allowing examinations to be taken (and retaken) over a two-year period. One view was put forward that this modular structure was less demanding for a candidate even though the amount of assessment was greater.

Comparing grade descriptors

Comparison of the grade descriptors suggested that the A level grade descriptions tended to be more specific. They were related to the assessment objectives and gave a fairly detailed list of skills that could be identified in a candidate's script whereas the IB descriptions were more holistic and generic (and these descriptions were same for all IB mathematics Higher Level and Standard Level qualifications). Both sets of descriptors described a transition from the lower to the higher grades: in A Level this was some of → most of → almost all of facts, concepts and techniques , and in IB this was minimal knowledge → limited knowledge → partial knowledge → satisfactory knowledge → good knowledge → broad knowledge → thorough knowledge. The main difference between candidates of the same level in the two awards would tend to be the greater familiarity of IB Higher Level candidates with some important topics not covered in A Level, such as matrices and complex numbers, and probably a more competent use of a calculator.

Aligning the grades

Based on their preparatory work inspecting the papers and mark schemes for the two awards, members of the Expert Group agreed that grade alignment suggested in the QCA report was not quite appropriate for the mathematics comparison. Instead, it was agreed that the A Level A/B borderline is lower than the IB Higher Level 7/6 borderline (the top of IB level 6 is equivalent to A level grade A). It was agreed that the A/B boundary was not as low as the IB Higher Level 6/5 boundary. The HE representative added that five students in his institution with Higher Level grade 7 had done very well suggesting an alignment with a good grade A at A level and students with IB Higher Level grade 6 had done not quite so well.

Further evidence was then inspected – portfolios from candidates with IB Higher Level bottom grades 7 and 4 and top grade 3 – to assess the validity of this initial suggestion.

For the ***bottom grade 7*** it was agreed that some of the answers were extremely good; the work was very clearly presented and well structured, written with meticulous care. The problems tackled did not represent a soft option, with strong algebra, not just accuracy. The work revealed the same characteristics of an A grade A Level candidate, with a lot of work completed with sustained reasoning. It was suggested that the Grade 7 material is comparable with a good grade A at A Level. Importantly, the coursework demands are such that they enable students to demonstrate a greater range and depth of quality.

For the ***bottom grade 4*** it was suggested that the candidate had had 'a good stab', and that it was similar to a pass at A Level - key ideas had been grasped. It was agreed that the work was to be expected from a candidate at the lower end of grade E at A Level.

b) Mathematical Methods Standard Level

Introduction

The mathematics A level used as the benchmark award in this exercise was the AQA Mathematics and Statistics Specification B. The Mathematical Methods Standard Level considered was the Core plus the statistical methods option. The content of this IB Standard Level is a subset of the IB Higher Level core. There is no overlap between the Standard Level statistics option and the Higher Level statistics option. Both contain elements of the S1 and S4 A Level units.

Comparison of aims

The aims of all the IB subjects in Group 5 are the same and hence there is the same conclusion here as for the IB Higher Level, that is that the aims of the two qualifications are broadly similar.

Comparing size – study hours and content

The study hours for the IB Standard Level were recommended to be 150, the same as for AS Level.

It was agreed that the IB Standard Level mathematical methods content represented about the same as three AS level units plus one A2 unit. The IB Standard Level covered most of the A Level units P1, P2 and S1 and also included some topics from P4, S4 and P5.

Comparing grade descriptors

The grade descriptors of all the IB subjects in Group 5 are the same and hence there is the same conclusion here as for the IB Higher Level.

Aligning the grades

Based on their preparatory work inspecting the papers and mark schemes for the two awards, members of the Expert Group agreed that the IB Standard Level mathematical methods was more demanding than AS Level and not as demanding as A Level.

This was exemplified in a number of different themes from the two awards:

Probability	the IB Standard Level questions matched closely the demands of those of the AS unit S1
Differentiation	the IB Standard Level questions were similar in demand to those of the A2 unit P4 but the P4 questions went further because they covered more content
Statistical testing	the IB Standard Level questions were not as demanding as those of the A2 unit S4 as the S4 questions required more detailed explanations and justifications
Calculus	little difference between the standards of the questions set on common content in both P1 and P4

It was again pointed out that papers from P2 and P5 were needed to complete this exercise fully. A theme in mathematics, such as calculus, is only covered in the totality of all the Pure Mathematics papers (P1, P2, P4, P5).

The group agreed that, on matched question types:

Grade A
on P1 (AS standard) was equivalent to a grade 7 on the IB Standard Level
on S1 (AS standard) was equivalent to a grade 7 and top grade 6 on the IB Standard Level
on P4 (A2 standard) was equivalent to a grade 7 on the IB Standard Level

and that no sensible judgement could be made about S4 as there was insufficient overlap

Grade E
on P1 (AS standard) was equivalent to a grade 4 on the IB Standard Level
on S1 (AS standard) was equivalent to a grade 4 on the IB Standard Level
on P4 (A2 standard) was equivalent to a grade 4 on the IB Standard Level
on S4 (A2 standard) was equivalent to a grade 4 on the IB Standard Level

The HE representative noted that Durham's Engineering Faculty would accept grade 7 at Standard Level Mathematical Methods **only with** a completed Calculus option. However one weak IB student with Standard Level Grade 6 and 29 points overall who did this ended up failing the Maths module that formed part of the Engineering degree. Other students doing Mathematical Methods Standard Level obtained similar Standard Level grade but on average scored 38 IB points and passed their mathematics modules.

Further evidence – portfolios from candidates with IB Standard Level bottom grades 7 and 4 - was inspected to assess the validity of this initial work.

For the ***bottom grade 7*** it was agreed that the standard of work presented was good but the tasks were insufficiently demanding to show A2 level work – the tasks did not differentiate at the top end. The tasks set for the portfolio work at Standard Level were not of the same level of demand as those set at Higher Level and thus may disadvantage strong Standard Level candidates.

For the ***bottom grade 4*** it was agreed that the work presented was little different to that at Higher Level at grade 4, and that such work would obtain a pass at A Level.

In summary, for the Standard Level Mathematical Methods, where the content overlapped with A level, grade 7 was equivalent to grade A on the basis of the examination papers, with the proviso that only two thirds of the content was covered. However, the portfolio evidence gave rise to concerns about this and suggested that 7/A equivalence was rather optimistic.

It was suggested that grade 7 equivalent to grade B might be a fairer conclusion for this aspect of the IB Standard Level as the tasks set were not demanding enough to differentiate between the more able candidates. This was felt to be too drastic a difference by some members of the Expert Group. It was also suggested that grade 7 could be equivalent to grade A at AS level but not A2.

As a final note on this matter, it was pointed out that the portfolio represented 20% of the marks at IB Standard Level and so perhaps any disagreements here might not be too important.

c) Further Mathematics Standard Level

Introduction

It was noted that very few candidates take this subject (47 in May 2003) and tend to do so in addition to six Diploma subjects. The content of this IB Standard Level consists of all of the options of IB Higher Level. There is little overlap in content with the A level except in statistics and so members of the Expert group were unable to complete the detailed comparability exercises that had been carried out for the IB Higher Level and IB Standard Level Mathematical Methods. The A level examiner and HE representative were, however, able to give some indication of where content overlap might be found within the suite of A levels.

Statistics	**A level Statistics**
Sets, relations and groups	More sophisticated than A level Further Mathematics (P7), rather more appropriate to first year undergraduate
Discrete mathematics	About half in A level Decision mathematics D1 (AS) and D2 (A2), and half in first year undergraduate
Analysis and approximation	Rarely features in A level Further Mathematics but some of it is and also in first year undergraduate
Euclidean geometry and conic sections	Euclidean geometry is no longer found in mathematics in the UK (not at A level or in HE) except in its most basic form.

Co-ordinate geometry of conic sections appears in some A Level syllabuses (usually Further maths)

Comparison of aims

The aims of all the IB subjects in Group 5 are the same.

Comparing size – study hours

The study hours for the IB Standard Level were recommended to be 150, the same as for AS Level.

Comparing grade descriptors

The grade descriptions of all the IB subjects in Group 5 are the same.

The Expert Group considered that, with regard to demand, the IB Standard Level Further Mathematics should not be considered as just another Standard Level subject. Analogies were made with Advanced Extension Awards and the double A Level subject combination of Mathematics and Further Mathematics. These two A Levels together were considered to be reasonably equivalent to IB Higher Level mathematics together with IB Standard Level Further Mathematics. Given that the IB Higher Level was felt to be between 10 and 20% bigger than A Level and of similar demand, and that IB Standard Level Mathematical methods was felt to be about two thirds the size of an A Level and mainly of AS demand, it was agreed that the IB Standard Level Further Mathematics should be considered as one and a half Standard Level with the grade equivalence as for the IB Higher Level.

There were no candidate scripts available for this examination.

d) Mathematical Studies Standard Level

Introduction

Candidates of this examination were reported to be, generally, those who lacked interest in mathematics, those who were weak in mathematics or those who had no intention of using mathematics in their future studies or careers. It was possible for candidates to complete this Standard Level in one year. (Candidates are allowed to take one or two Standard Level subjects after one year; in practice Mathematical Studies is the usual one.)

Comparing aims

The aims of all the IB subjects in Group 5 are the same.

Comparing size – study hours

The study hours for the IB Standard Level were recommended to be 150, the same as for AS Level.

Comparing grade descriptors

The grade descriptions of all the IB subjects in Group 5 are the same.

There were no candidate scripts available for this examination. Members of the Expert group inspected a selection of question papers and the content specification. It was very hard to find any overlap with A level. The questions in the examination papers tended to be of a similar demand to those set at Higher Level GCSE but the content was different. The options (15% of the marks available) and the project (20%) were agreed to be comparable in demand with A level. Together with the few topics from the Core that were at A level standard, this suggested that about half of the IB Standard Level Mathematical Studies was at A level standard. If the size was considered to be the same as the IB Standard Level Mathematical methods (two thirds of an A level) then the group suggested that this award be considered to be equivalent to one third of an A level. Members expressed concern about this rather low tariff, particularly as this Standard Level may be the only one to which it is applied, and agreed to suggest that it should be considered up to 40% of an A level.

The group was unable to suggest any grade alignments for this award due to the lack of a suitable award to compare it with.

In conclusion

The results of the group's findings are summarised in Table 5 below:

Table 5: Aligning IB Mathematics with A level

IB Subject	Size	Grade alignment
Higher Level Mathematics	10-20% larger than A level	top 6, 7 ≡ A 4 ≡ E
Standard Level Mathematical Methods	2/3 A level	7 ≡ A 4 ≡ E
Standard Level Further Mathematics	≡ 1 A Level (taking into account size and demand together) and accept 7 ≡ A, 4 ≡ E	
Standard Level Mathematical Studies	≡ 30 – 40% A Level (taking into account size and demand together)	

The group considered the implications of allocating UCAS Tariff Points to the various IB awards on the basis of its conclusions. It was made clear that there was no decision yet as to how UCAS Tariff Points would be awarded – by subject grade or by Diploma points.

The HE representative proposed a mapping along the lines:

"7"=133
"6"=96
"5"=58
"4"=20

The reasons were as follows:

1. The group had agreed that overall the IB qualification was worth more than an A level.
2. The HE representative argued that admissions officers would not make a UTP offer solely on the IB as a whole as this would be 'easy' to achieve given the breadth of the IB. He would expect Admissions Officers to make offers either on the whole IB qualification (with a specific maths grade) or to simply make an offer on three IB Higher level subjects (as this would be roughly equivalent to 3 A levels).
3. It was suggested that the proportion of students achieving three H7s was small.
4. IB students would be applying to universities requiring high A level scores.
5. If the UTP "H7"=120 then an offer of 360 points would greatly disadvantage IB students. Thus, the UTP mapping above would mean that to achieve 360 UTP an IB student could achieve H7+H7+H6=362.

4.3 CHEMISTRY EXPERT GROUP

Structure of the syllabuses

Each Chief Examiner started the process by giving an overview of each syllabus. It was indicated that the IB Higher Level syllabus was made up of around 20 topics, all of which are found in a typical A level syllabus, and 11 of which are also found in the IB Standard Level syllabus. The subject is studied at both Standard and Higher level over a 2 year period with a terminal examination. The core is covered first, followed by the options. Higher Level has more detail and more depth than Standard Level, e.g. kinetics is dealt with qualitatively at Standard Level, but quantitatively in addition at Higher Level. As far as practical work is concerned, candidates have to show evidence of practical skills although there is no prescription of what should be done. This includes investigation, planning, undertaking and interpretation, working both as an individual and within a group. Each candidate submits 2 pieces of coursework.

As far as A level is concerned, it was confirmed that the qualification is made up of 3 AS units and 3 A2 units, each unit having an external examination. Two units, one in AS and one in A2, have a 50% assessed practical component. Synopticity is a key feature of A level, with a minimum of 20% synoptic assessment.

The overview confirmed that although there were differences across the two syllabuses, these were not significant. Indeed, similar, and perhaps greater, differences would be found within A level, e.g. from a Nuffield to a Salters to a standard syllabus. The amount of Mathematics in each syllabus was discussed, but it was confirmed that this did not differ between IB and A level. However, all IB students will be studying Mathematics as part of the overall IB Diploma; this would not be the case with A level candidates.

Comparing aims and objectives

The Expert Group went on to explore the respective aims and objectives of each syllabus. It was confirmed that these were considered to be very similar, although within IB they were organised differently and subsumed wider skills. On the other hand, such skills were flagged within A level

through the signposting of Key Skills. As far as synopticity was concerned, it was thought that this was inevitable in a linear course, although this may have had more to do with the nature of Chemistry as a subject as opposed to being implicitly or explicitly stated in the respective syllabuses.

Comparing size – study hours

First, the number of recommended contact hours was considered. For IB these were 240 and 150 hours for the Higher and Standard Levels respectively. There was considerable discussion about the average contact time for A level, and suggestions of between 280 and 370 hours were made. Different practices across centres in respect of beginning of teaching of A2 units made matters more complicated, as did the time needed for assessment periods in January and June. Furthermore, the school representative confirmed that the recommended contact time is not always adhered to within IB centres. In view of these complexities, it was agreed that study time was not a good indicator of size; however, as an early judgement, albeit not robust, it did appear that there may be a difference between IB and A level based on learning hours.

Comparing size – content

The next task was to consider size from the perspective of amount and nature of content. The HE representative considered that although at first look the IB syllabus appeared more traditional, both syllabuses had their respective strengths and weaknesses but on balance these evened out. Both core units and option units were considered, it first being confirmed that the respective core areas were about the same 'size'. By their nature, options are more difficult to deal with, but again the Group felt that on balance their respective 'sizes' were very similar. Thus it was confirmed that both IB Higher Level and A level could be considered to be of equivalent size.

Moving now to Standard Level, again consideration was given to topics covered in the respective syllabuses. From this it appeared that Standard Level was more than half an Higher Level or A level, and that the content over 50 per cent was about the equivalent of that required for a single A level unit. From this it was decided that Standard Level was two-thirds of the size of Higher Level and of A level. The Expert Group indicated that this finding was confirmed by the recommended teaching hours for Higher Level and Standard Level at 240 and 150 respectively. As far as progression to HE was concerned, the HE representative considered that for progression to Chemistry as a single subject, Standard Level was unlikely to have sufficient content.

Comparing examination requirements

Assessment objectives

The first component to be considered covered assessment objectives. Because within IB these were integrated into the general aims and objectives whereas for A level there were additional documents covering assessment, comparisons were not straightforward. It was thought that the A level objectives were more focused on chemistry skills with the wider skills flagged up through Key Skills. Nevertheless, despite slight differences, mainly to do with the implicit versus explicit nature of synoptic assessment within IB and A level respectively, assessment objectives were considered to be broadly the same.

Grade descriptions

The Chief Examiners indicated that grade descriptions were used to judge performance at grade boundaries. Consideration of the IB descriptor indicated that for IB level 7, a candidate would display no gaps in content knowledge. It was also considered that the descriptor for level 6 was very similar to that for Grade A at A level. All indicated a need for understanding of principles and concepts, but level 7 for IB required comprehensive understanding of complex knowledge against a possible few significant omissions for A level. It was concluded that on the basis of descriptions for IB levels 6 and 7 and Grade A at A level, levels 6 and 7 appeared to be equivalent to those for Grade A, although this would need to be checked against candidate scripts, and that the bottom of level 6 would only just tip into A level Grade A.

Moving to lower down the grade scales, at first consideration level 4 in IB appeared more demanding than the description for Grade C at A level; therefore level 3 and Grade E descriptions were also considered. It was pointed out that candidates performing at IB level 3 display limited knowledge of the factual information in the syllabus and as that at A level Grade E candidates need to be able to recall chemical knowledge from some parts of the syllabus, level 3 was thought to be more like the boundary for Grade E, particularly as there was a need for application in order to achieve Grade E. It was pointed out that the structure of the descriptions made comparisons problematic in that IB descriptors contained only two sentences, whereas those for A level grades were more lengthy. In addition, the descriptors for IB levels 7 down to 4 used positive words whereas those for the lower levels used negative words. This made direct comparisons impossible. Nonetheless, it was thought that broadly A level Grade E fell between IB levels 3 and 4, and IB levels 6 and 7 equated to Grade A. This would mean that IB levels 4 and 5 would span A level grades B to D and part of E. These considerations apply to IB Higher Level and A level only.

Assessment models

Expert group members reminded themselves of the differences between linear and modular forms of assessment. However, the balance of assessment was spread across a number of factors – coursework, options, number of examination papers, assessment time. Inevitably, discussion once again centred on possible differences in demand between linear assessment and synopticity associated with A level assessment. Starting with coursework, there were differences in assessment between IB and A level, and at A level there is the possibility of doing an alternative additional formal examination. Coursework for IB forms 24% of total assessment; for A level 20%. However, it was agreed that although coursework can have different forms, and a number of different models exist, differences in the context of demand overall are not significant. Assessment of options varies because of the nature of the subject matter involved and also popularity of the optional areas on offer. In terms of number of examination papers, IB students at Higher Level take 3 papers of ¾ hour, 1 hour and 1 ¼ hours respectively, whereas A level students take 6 papers amounting to 2 ¾ hours for AS and 3 ¾ hours for A2. There is correspondingly less assessment time for Standard Level. A further factor was the type of question. IB Paper 1 is multiple choice, both IB and A level papers have extended response type questions, There are also differences in amount of choice which is available in IB but not in A level; however, IB needs to take account of different cultures and national interests and choice is therefore a necessity. Despite these differences it was the opinion of the Expert Group that assessment models used within both qualifications had more in common and differences were not significant in terms of overall demand.

Comparing examination requirements – question papers and mark schemes

The Chief Examiners found similar questions based on similar content for both IB and A level in the papers considered. However, there were some differences in application of assessment objectives in that IB focused more on recall, and A2 more on application. On the other hand, there was substantially more recall allowed for AS, and therefore it was the general assessment of the Expert Group that papers and mark schemes were broadly the same. In looking at specific questions where there was a good level of commonality between IB and A level, the conclusion of the group was that in terms of demand Higher Level and A level papers were equivalent.

Moving now to Standard Level, close consideration of papers and mark schemes determined that Standard Level papers mapped closely to AS, but with an additional demand equivalent to that required for a proportion of A2 units amounting to a fifth overall. Therefore, from consideration of Standard Level papers, it was determined that 4/5 of the demand was equal to AS and 1/5 equal to A2. This puts demands within Standard Level just above that of AS, but well below that of A2.

Comparing levels of performance – candidate evidence

To start the Chief Examiners each ‘marked’ a number of papers applying assessment objectives and grade descriptions to each other’s papers. Consideration of an IB level 7 script by the A level Chief Examiner indicated that in her view this paper ‘felt’ like an A level Grade A paper. She also indicated that in her view the level of demand was slightly greater at A2 level because of synoptic questions and the presence of more open-ended questions, although this was not wholly endorsed by the IB Chief Examiner nor the HE representative. The IB Chief Examiner had marked three Grade A scripts at A2 and ‘awarded’ two at level 7 and one at level 6. It was pointed out that all papers considered were at the

bottom of the grade boundaries as opposed to the top, and that firm conclusions are problematic on the basis of one question paper alone.

Grade E scripts were also considered, two of which were 'marked' at IB level 4 and one at level 3. Turning to the 'marking of IB level 3 papers, these were considered to be lower than Grade E at A2 level. Most of the A2 equivalent work had not been done or had been done badly. A candidate awarded IB level 3 could not do any A2 Maths based questions. It was thought that the standard was higher than Grade E at AS but not as high as Grade E at A2. It was therefore confirmed by the group that the A level Grade E candidate falls between IB levels 3 and 4.

Comparisons with grades given to AS and A2 and IB respectively are complicated in that whereas AS is of a lower demand than the overall A level, A2 is of higher demand. Therefore, although there is direct equivalence between A2 and IB level 7, a full Grade A at A level might be more like a 'top' level 6 at IB or 'low' level 7, or put another way, level 6 is equivalent to a low Grade A, and level 7 equivalent to a high Grade A. The HE representative therefore suggested that, in terms of the Tariff, IB level 6 might attract 110 points.

Some consideration was given as to whether or not IB level 7 was of greater demand than Grade A at A level particularly as consideration of the respective grade descriptions had suggested that this might be the case, although on balance the Expert Group did not think that this was so. This decision was made on the basis that neither the IB examinations nor the A level assessments provided an opportunity to provide evidence of demand at a higher level.

On the basis that the whole of IB level 7 and the bulk of level 6 fell into the A level Grade A band, and that Grade E at A level fell between levels 3 and 4, it would appear that IB level 5 would slip partly into Grade B and wholly into Grade C. This was confirmed through consideration by the school representative of A level Grade C scripts who indicated that they 'felt' definitely level 5, and that they were not level 4. It was also considered that A level Grade C did not hit level 6 within IB.

The IB Chief Examiner also looked at 6 A2 scripts; of those graded A, one was IB level 7, the other two were more level 6 than level 7. The decision to put two into level 6 was made on the basis that omissions and errors evidenced through the scripts would not be expected from a level 7 candidate. Conversely, the A level Chief Examiner considered Standard Level scripts and confirmed that those at level 7 were of higher quality than that required for the award of Grade A at AS. This bore out the earlier finding that through consideration of question papers and mark schemes, the Standard Level was of a higher demand than AS. Overall, it was thought that IB candidates doing Standard Level were dealing with a level demand equivalent to Grade E at A level.

The Higher Education perspective

The HE representative described his experience of taking A level and IB students. Offers tended to be ABB for A level students and an overall diploma score of 32 including 6 at Chemistry Higher Level. He indicated that standard entry requirements were set high, as under this situation it was likely that more well-qualified students would apply, and he was only interested in firm choices, not insurance decisions. In respect of A level, there was a close correlation between grades on entry and final degree classification. The few IB students he had experienced were all overseas students and therefore likely to be highly motivated, but that from a mixture of Higher Level levels 5 and 6, all students had performed well. Although it was felt that with the small numbers involved no firm conclusions could be drawn, the HE representative confirmed all were well prepared and well organised.

Allocating UCAS Tariff Points

Starting with IB Higher Level, on the basis that this was equivalent in volume and demand, it was obvious that the maximum number of points allocated should be 120 for level 7 achievement. On the basis that level 6 fell within the A level band, but was considered not to be of equivalent quality to that evidenced by a 'high' Grade A, the suggestion from the HE representative that level 6 should attract 110 points was confirmed. Using the finding that Grade E at A level fell between IB levels 3 and 4, it was then possible to determine an alignment of IB level 5.

Moving now to IB Standard Level, starting with the volume finding of 2/3 of Higher Level and/or A level, this indicated a maximum of 80 points for level 7 achievement. However, because the level of demand associated with Standard Level was not as great as that required for A level, there would need to be an adjustment downwards. Mathematical calculations determined that for Standard Level with 2/3 the volume but only 4/5 demand of A level, the number of points for level 7 should be 72, or perhaps 70 if these were rounded down. Again, on the basis of previous findings as to alignment of grade 4 of Standard Level with A level, it was apparent that this should attract 30 points. Assumptions were made, together with some mathematical calculation, that levels 6 and 5 at Standard Level should be given 60 and 50 points respectively.

Presented diagrammatically the position of the Chemistry Expert Group in terms of points to be allocated was as follows:

<table>
<tr><th>Tariff Points</th><th>GCE A Level</th><th>IB Higher Level</th><th>IB Standard Level</th><th>Tariff Points</th></tr>
<tr><td rowspan="2">120</td><td rowspan="2">A</td><td>7</td><td rowspan="5"></td><td>120</td></tr>
<tr><td rowspan="2">6</td><td>110</td></tr>
<tr><td rowspan="2">100</td><td rowspan="2">B</td><td>100</td></tr>
<tr><td rowspan="3">5</td><td>90</td></tr>
<tr><td rowspan="2">80</td><td rowspan="2">C</td><td>80</td></tr>
<tr><td>7</td><td>70</td></tr>
<tr><td rowspan="2">60</td><td rowspan="2">D</td><td rowspan="3">4</td><td>6?</td><td>60</td></tr>
<tr><td rowspan="2">5?</td><td>50</td></tr>
<tr><td rowspan="2">40</td><td rowspan="2">E</td><td>40</td></tr>
<tr><td>3</td><td>4</td><td>30</td></tr>
</table>

The HE representative confirmed his satisfaction that everything that had been concluded was based on evidence and not on opinion.

4.4 THE CORE COMPONENTS OF THE IB DIPLOMA

We start this section of the report with two observations. First, the core is a crucial, integral part of the course with spin-off effects to all subject areas. The learning associated with and assessed through the core components pervades the learning required to achieve the whole Diploma. The value of the core in relation to progression to Higher Education needs to be seen in a holistic way. However, separating the core components of the Diploma runs the risk of representing the core to the Higher Education admission community as in some sense a stand alone optional component. This is not our intention and the process outlined below was only undertaken for analytical purposes.

Second, the standard bench marking procedure we normally use does not work well for something as distinctive as the core components of the Diploma. Consequently, the expert group on this occasion consisted solely of Higher Education representatives and IB examiners of the core components of the Diploma, supported by colleagues from the IBO and schools teaching the IB Diploma.

The Core of the IB Diploma has three components:

- Creativity, Action, Service
- The Theory of Knowledge
- An Extended Essay

Creativity, Action, Service (CAS)

The IB Diploma aims to produce rounded individuals, which means that the overall programme does not focus solely on academic work. CAS requires all IB students to provide evidence of their engagement with:

- Creativity – for example production of poetry, painting, 3-D artefacts or photographs; participation in theatre groups or a choir
- Action – for example involvement with a school sports programme, the Duke of Edinburgh award, or a personal past time such as mountaineering
- Service – evidence of activity that develops citizenship.

Evidence is required of activity in all three areas amounting to about 150 hours in total over two years. Activities can involve overlapping the elements or a project involving all three, for example working in a Romanian school for handicapped children developing ‘lessons’ in creative subjects.

Inevitably students vary in their willingness and ability to participate. In particular, the creative element causes problems for some. Nonetheless, they must produce evidence of some engagement in all areas. They have to record formally their CAS activities and their reflections on them.

Successful completion of CAS is required to be awarded the Diploma but attainment in CAS is not explicitly recognised by awarding IB Diploma points. Each year 20 – 40 candidates do not achieve the Diploma because they have not completed the CAS requirement. Success is assessed by the individual school but regional officers do make checks. For example, Sevenoaks School has been asked 'out of the blue' for students' CAS reports.

Theory of Knowledge (TOK)

TOK was originally the idea of the philosopher of education Alec Peterson. It was stressed by the IB representatives in the expert group that TOK should be seen as representing a reflective element in the Diploma and not as a course in philosophy. This is reflected in the course documentation, which stresses that TOK should encourage students to become aware of themselves as thinkers, to become aware of the complexity of knowledge, and to recognize the need to act responsibly in an increasingly interconnected way. Thus it is intended to be highly learner focused and practical, with the student cast in the role of knower and with their claims to knowledge being challenged through discussion and debate. Students are challenged, for example, to explain how they relate to a particular piece of knowledge and why/how they know something. Thus TOK is very different in intent and content to the AS in Critical Thinking, for example, or a course in epistemology. Nonetheless, anyone undertaking and completing this component of the core has to deal with a range of essentially epistemological issues, in particular addressing the question 'How do I, or how do we, know that a given assertion is true, or a given judgement is well grounded?'

TOK is intended to be taught in about 100 hrs over the whole of the IB course and it is delivered in different ways. For example, some schools have one co-ordinator who must be a polymath capable of looking at range of knowledge and the basis of knowledge/creativity. In other institutions TOK will be delivered by teams of teachers with different subject backgrounds.

The characteristic feature of TOK teaching is the amount of debate/discussion. It looks at the knowledge base of all the subject groups within the IB Diploma, and the ethical and practical implications of decisions made in relation to topical matters. Students are expected to examine a topic from different standpoints and from the perspective of emotional, rational, linguistic and empirical ways of knowing.

Students are assessed in two ways. The external assessment consists of a 1200-1600 word essay on a topic chosen from a list of ten titles prescribed by the IBO for each examination session. This essay is not done under exam conditions. Teachers advise on the choice of title, and they read and comment on a first draft. This approach provides the student with choice and the opportunity to develop depth in their writing. The element of choice is reflected in the difference between excellent and mediocre essays, with the former being characterised by ownership of, and personal reflection on, the chosen topic at a reasonable level of academic maturity. The TOK essay is externally marked out of 40 using six prescribed assessment criteria.

The internal assessment consists of a class presentation and a written self-evaluation report. This is marked out of 20 using 4 prescribed assessment criteria. This teacher assessment is only moderated if there are any doubts over the validity of the judgements being made. This was justified to us in the meeting on both educational and practical grounds: this mark represents a very small contribution to the

overall grade of the IB diploma, and it would be a shame to stifle the enthusiasm of teachers and students by making the assessment more burdensome.

The scores from the two components of the assessment are then combined and a candidate graded A-E on their overall performance. Only 7-8% of students achieve a grade A.

Extended Essay

All IB candidates have to produce an extended essay of 4000 words based upon individual research with a suggested learning time of 40 hours. The process of completing the Extended Essay in one school was described. At a meeting early in the course, candidates are encouraged to start thinking about their topic. Responsibility to run sessions to develop the skills needed to meet the assessment criteria is devolved to heads of subject departments for students choosing to base their extended essay within their subject area. Scientific extended essays have to be based on practical laboratory work. Each student, once they have chosen an area of interest, is allocated a teacher who acts as their supervisor. They help the student to refine their topic, for example encouraging them to move from general areas (The Holocaust) to the specific question(s) or statements they will investigate. In general such supervision was felt to be essential in order to rein in the enthusiasm of the students.

Over the remainder of the first year of the course the students develop their plans for their extended essay. Over the summer holidays they then write a first draft. This is then checked by the supervisor who can make suggestions for improvement or additional sources that might be consulted. However, they are not supposed to either edit or correct the work. This leads to the production of the final draft by the November deadline which has to have an abstract (300 words), a contents page, appropriate use of footnotes and a correctly compiled bibliography[1].

All extended essays are externally marked by examiners appointed by the IBO. They are marked on a scale from 0 to 36 made up from sub-totals derived from general and subject specific assessment criteria in the ratio of 2:1. The criterion levels are awarded to each extended essay using a best match model. The total score obtained is used to determine in which of the bands from A to E the extended essay is placed.

Inevitably the concerns that arose from the expert group about the extended essay included: the originality of the work; the detection of plagiarism; the extent to which supervisors edited or corrected the work; and the extent of coaching from parents. These are not issues unique to the IB Diploma and could also be directed at student research projects undertaken in Higher Education for instance. It was clear that the IBO was aware of the issues. They provided specific instructions to supervisors but ultimately had to rely on their integrity. It is possible to see from a number of pieces of work from a school if there is a pattern that might suggest plagiarism or inappropriate supervisory activities and these are investigated. The IBO has also suggested that supervisors interview students to attempt to ensure the originality of the work.

[1] This process is similar to that followed for individual subject studies in A level subjects such as history, where students may be expected to produce an essay of up to 6000 words.

The overall grading of the core

The performance of a candidate in TOK and the extended essay is described using one of the band descriptors A-E. Performance on both components is then combined using the Diploma Points Matrix (Figure 1) to produce an overall number of Diploma points from 0 – 3 for performance in the core. CAS is not graded in this way but success in this component is required for the Diploma to be awarded.

		Theory of Knowledge					
		Excellent A	Good B	Satisfactory C	Mediocre D	Elementary E	Not Submitted
Extended Essay	Excellent A	3	3	2	2	1	N
	Good B	3	2	1	1	0	N
	Satisfactory C	2	1	1	0	0	N
	Mediocre D	2	1	0	0	0	N
	Elementary E	1	0	0	0	Failing Condition	N
	Not Submitted	N	N	N	N	N	N

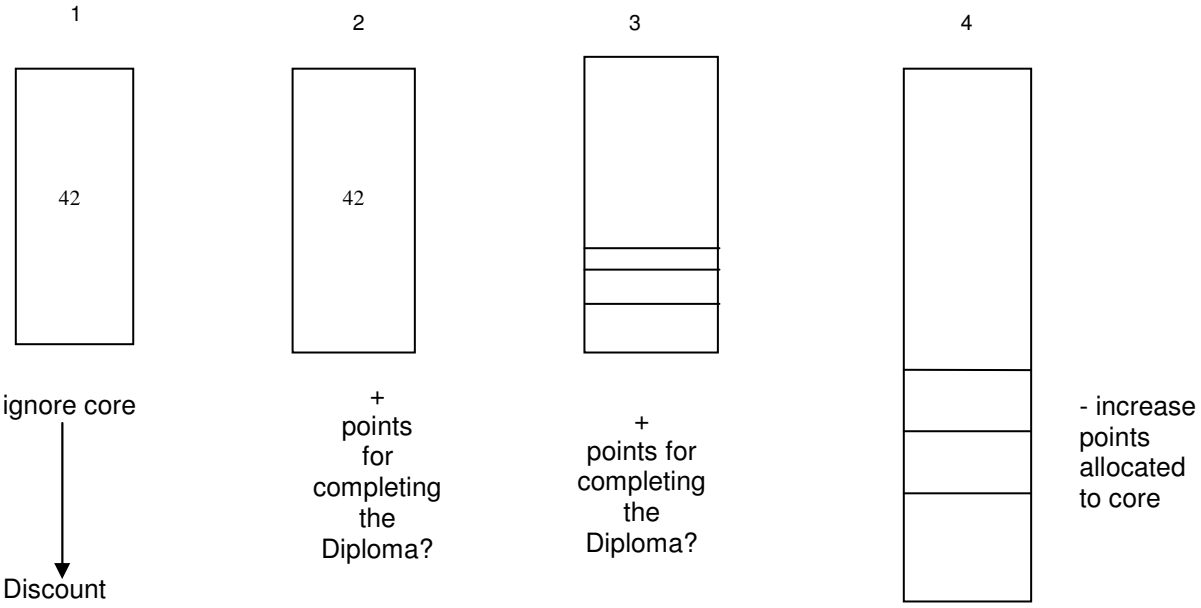
Figure 1: The Diploma Points Matrix

Does the core have value for progression purposes?

The Higher Education representatives varied in their views as to the value of the core for the purposes of progression to Higher Education. For some the skills and knowledge developed through the additional demands of the core components were seen as being valuable in their own right for progression purposes. For them this should be explicitly recognised in the UCAS Tariff. For others, the same skills and knowledge were simply what was expected of any student progressing to Higher Education from whatever pathway. They were therefore not considered to have any special significance for Higher Education admission purposes. Which view was held was contingent upon the institutions members of the expert group came from, but on balance the view was that the core did have something to contribute to progression into Higher Education. Consequently, it was judged that attainment in this component of the IB diploma should be explicitly recognised by the award of UCAS Tariff points, though individual institutions can of course exclude this contribution in making offers to applicants.

Given the methodology for allocating IB Diploma points to achievement in the core components (see Figure 1), it is practically impossible to separate the contribution from the Extended Essay and TOK. As a learning experience everyone agreed that CAS was educationally very valuable. However, that does not necessarily mean that its successful completion should lead to the allocation of Tariff Points which signal potential to succeed in Higher Education. An element in an overall qualification such as CAS was not recognised separately anywhere else in the Tariff though it could be argued that such an element is recognised holistically by the points awarded to the Welsh Baccalaureate Core.

Four different models for recognising the core were elaborated.



In Model 1 the core is simply discounted and the UCAS Tariff Points are simply awarded to attainment in the subject areas of the IB Diploma. Model 2 requires us simply to allocate UCAS Tariff Points to the achievement of the Diploma overall, i.e. by integrating all of the components. However, this could only

be achieved by allocating UCAS Tariff points to different components of the IB Diploma and then adding the Tariff Points together. This means that the UCAS Tariff would only recognise successful completion of the whole Diploma. But some concern was expressed that a student just missing the Diploma would receive no credit and that some Higher Education institutions may wish to make an offer to an IB applicant who does not complete the whole Diploma. However, the only qualification offered by the IBO that is accredited in the National Qualifications Framework is the Diploma and certificate candidates[2] cannot currently be accommodated within the Tariff.

Model 3 represents the core as three separate elements to be added to the attainment in the subject areas of the IB Diploma. This model would retain the internal relationship within the IB Diploma between the potentially 42 points allocated to the subject areas and the 3 points allocated to the core. Model 4, on the other hand, would allocate more UCAS Tariff Points to the core because it has special value for the purposes of progression.

After a long discussion it was agreed that Models 1 and 2 should be rejected. Several members of the group were uneasy about Model 4, as they felt it was up to the IBO to decide on the weight given to different components of their qualification. Furthermore, it was thought that Model 4 would seem 'over the top' to Admissions Tutors, leading to difficult political questions and difficulties in justification that could undermine the trust placed in the Tariff. However, others pointed out that the recommended learning time for the core elements amounted to 290 hours, i.e. more than is recommended for the Higher Level courses. This suggests that the core is a substantial part of the Learning programme. However, discounting the CAS component brings the recommended learning time down to 140 hours, i.e. about that recommended for a Standard Level programme, and there was some agreement that only the graded components of the core should be considered.

What is the value?

In the absence of a bench marking award the expert group had to rely to a large extent on intuitive judgements supported by background knowledge about the allocation of UCAS Tariff Points to other qualifications, such as the Welsh Baccalaureate Core and the Key Skills. A long discussion of various possibilities led to the following suggestion. First the size of the core including CAS suggests that it should be allocated Tariff Points using the same mechanism being developed for the Higher Level subject areas. Given that 0 points for the two graded core elements (Figure 1) is not a fail, and that a candidate has to successfully complete the CAS to obtain the Diploma, this level of attainment should attract 1 'Higher Level Diploma point'. *Note that this notion of a Higher Level Diploma point is a purely analytical construct developed for the purpose of this activity, as the IB Diploma does not recognise any distinction between the points they award for different elements of the Diploma.* Successively higher levels of attainment in the graded core components would then add 'Higher Level points' as indicated in the Table 6 below.

[2] A certificate candidate is one who currently either fails the Diploma but is given Diploma points for achievement in individual components of the qualification or one who just takes some elements of the Diploma.

Table 6: Towards an allocation of UCAS Tariff Points for the IB Core

IB Core Points	IB Higher Level Points	UCAS Tariff Points
0 + CAS	1	10
1 + CAS	2	20
2 + CAS	3	30
3 + CAS	4	40

At the time of this discussion we did not know the outcomes of the work of the subject groups. Subsequently it was agreed in the subject groups that that a 4 in a Higher Level subject was equivalent to a Grade E in an A level and would therefore attract 40 UCAS Tariff points, (see Sections 4.1 to 4.3). This allows us to complete the final column of the table.

Other possibilities were also considered. For example, since the number of recommended learning hours for the core exceeded the number of hours recommended for a Higher Level subject, then the core should attract more points. This could be achieved by allocating 1, 3, 5 and 7 'Higher Level points' to the 4 levels of achievement in the core components set out in the table above. This would imply, however, that attaining in the upper quartile of achievement in the IB Diploma would require an amount of learning equivalent to more than 4 A levels. An increasing proportion of young people do take this number of A levels, but suggesting that 25% of all IB candidates were capable of this level of study may not be credible in current circumstances.

Completing the IB core with 3 Diploma points could be equivalent to passing all six key skills at Level 3. It is certainly the case that candidates taking the IB Diploma would touch on many elements of the Key Skill qualifications, and would probably meet all of the elements of the Communication Key Skill, but they are certainly not covering all of them in the core components.

Awarding 120 points to the IB core would also imply that it was of the same size and demand as the Welsh Baccalaureate Core. However, there are elements in the Welsh Baccalaureate Core that are not covered in the IB core, for example the language component, but are covered, and would therefore be recognised by the allocation of UCAS Tariff points, elsewhere in the IB Diploma.

Another alternative discussed was to discount CAS and align the Core IB points with the 'Standard Level points' using the work of the subject working groups. In general the subject groups suggested that a Standard Level is about two thirds the size of a Higher Level subject. So, if we were to distinguish between 'Standard Level' and 'Higher Level points' (which of course the IBO does not) then that would suggest that someone achieving 3 Diploma points for the core, i.e. a minimum of two good grades on the extended essay and the TOK component plus successful completion of CAS, would receive 26 UCAS Tariff points. This is only slightly more than they would receive for completing one Level 3 Key Skill qualification. This does not seem to reflect adequately the performance of such a candidate.

At this point the discussion of this expert group had to be terminated in order to join the other groups for the plenary session.

SECTION 5: ALLOCATING UCAS TARIFF POINTS TO THE IB

Following the work of the various subject groups on the IB Diploma, a number of points remained unresolved, including, in particular:

- The values to be given to the varying levels of achievement in the Higher and Standard subjects taken by a candidate
- The value to be given to achievement within the IB Core
- How to aggregate UCAS Tariff Points across the different elements of the IB Diploma.

There was, for example, disagreement between the subject groups on the relative size of the subject components of the Diploma relative to the benchmark A level awards they were using. The mathematics groups felt that the Diploma Higher Level syllabus was about 15% larger in volume than the A level; the geographers found the Higher Level to be about 10-15% smaller than the A level; and the chemists found them to be equivalent in size. These conclusions, based upon a detailed analysis of the content of the specification, do not fit with the smaller number of study hours typically assigned to the Higher Level Diploma subjects compared to the A level. However, previous studies we have undertaken have indicated the unreliability of study hours as an indicator of volume of learning, thus we should take the findings from the content analysis as the best available indicator of volume. Looking across the analyses from all groups it seems that, on average, a Higher Level Diploma subject is about the same size as an A level.

In terms of demand the groups broadly agreed that a Grade 7 in a Higher Level Diploma subject aligned with the Grade A of an A level and a Grade 4 with the grade E of an A level. However, all the groups indicated that the Higher Level Grade 7 constituted a 'good pass' at A level and that the Grade 6 aligned with the A/B boundary. Some suggested that this meant that the Grade 7 in the Higher Level subjects of the Diploma should attract 130 UCAS Tariff points. One objection to this was that the IB examinations should include elements assessed in the same way as in the Advanced Extension Awards. However, it is not the fault of an IB candidate achieving a Grade 7 in a Higher Level Diploma subject that the assessment system for GCE A level does not recognise the difference between a good pass and a bare pass at Grade A. Following this line of argument, it would be justifiable to allocate 130 UCAS Tariff Points to a Grade 7 in a Higher Level subject.

These issues were resolved through the construction of a variety of models and suggestions and extensive consultation with the UCAS Tariff Advisory and Reference groups, the Academic Registrars Council Admissions Practitioners' Group (ARC APG), the Scottish Practitioners' Group (SPG), and the International Baccalaureate Organisation. Following these discussions allocation of points to attainment in the Higher and Standard Grade subjects and core was agreed as shown in Table 7. Note no UCAS points are allocated for subject scores below 3, and that the Standard Level is given two thirds of the points allocated to a similar level of achievement at the Higher Level.

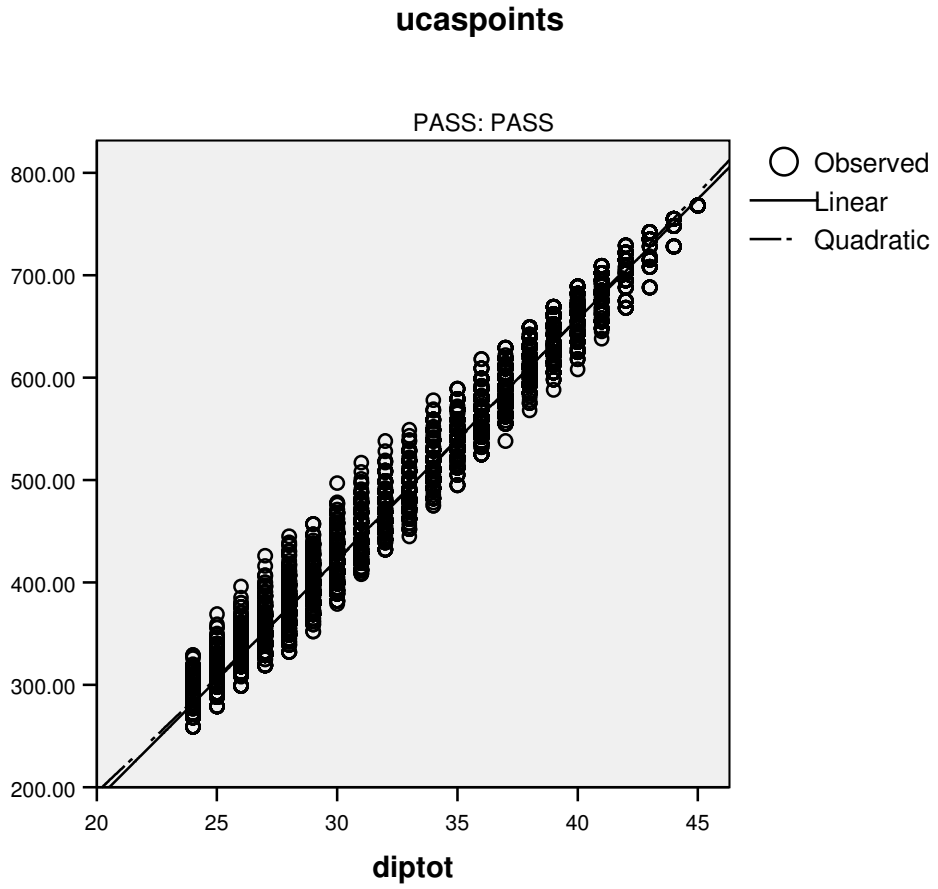
Table 7: Allocation of UCAS Tariff Points to differing levels of attainment in the Subject Components of the IB Diploma and the Core

Higher Level		Standard level		Core	
7	130	7	86	3	120
6	110	6	73	2	80
5	80	5	53	1	40
4	50	4	33	0	10
3	20	3	13		

This leaves the issue of how to allocate UCAS Tariff Points to achievement in the whole Diploma. Two approaches were considered. First aggregating UCAS Tariff Points across all Diploma elements for each candidate; second, using the values in Table 7 to construct a statistical model that relates overall attainment in the Diploma to UCAS Tariff Points.

Following extensive consultation it was agreed to adopt a statistical approach to allocating UCAS Tariff Points to the overall achievement of Diploma Candidates. This approach is based upon a regression model that takes account of the differential allocation of UCAS Tariff Points to different elements of the IB Diploma. Using the values from Table 7, the relationship between the Diploma point scores of those passing the IB Diploma in 2004 and the recommended UCAS Tariff Points was modelled, as is shown in Figure 2.

Figure 2 The relationship between IB Diploma Points and proposed UCAS Tariff Points



The linear regression equation is

UTP = -281.5 + 23.47 Diploma Points

Solving this for an applicant who attains 45 Diploma Points gives a UCAS Tariff Point Score of 774. However, we know that the maximum that a Diploma candidate can obtain on the basis of maximum grades on 3 Highers and 3 Standard grades plus 3 in the core would be 768. Consequently we recommended fixing the top of the line at 768 UCAS Tariff Points. The 24 point Diploma pass on the basis of the statistical model would achieve 282 points. For reasons of simplicity this was set at 280. Table 8 then shows the UCAS Tariff Points for applicants with different Diploma scores.

Given that the proportion of IB candidates achieving different Diploma point scores varies only very slightly between years, Table 8 can be used to allocate UCAS Tariff Points to those passing the Diploma[3]. However, we should check the validity of the relationship in a few years time to ascertain that

[3] Note that this exercise only applies to those passing the complete Diploma. Currently no recommendations are being made for certificate candidates as the different elements of the IB Diploma are currently not accommodated with the NQF.

the model still holds. Out of the 10705 IB Diploma passes in this year, just forty diploma candidates achieved 45 Diploma points, 9 of whom had taken four HL subjects. It is important to note that the median IB Diploma candidate achieves around 30 Diploma points equating to 425 UCAS Tariff Points. In the main this reflects the larger volume of study being undertaken by a Diploma candidate compared to, say, a candidate taking 3 A levels rather than the achievement of some higher academic standard though those achieving a Grade 7 in a Higher level subject are being allocated 130 UCAS Tariff Points in this model. This relationship may well change with the introduction of the new A levels in 2008.

Table 8: Allocation of UCAS Tariff Points to the IB Diploma

IB Diploma points	UCAS Tariff
45	768
44	744
43	722
42	698
41	675
40	652
39	628
38	605
37	582
36	559
35	535
34	512
33	489
32	466
31	442
30	419
29	396
28	373
27	350
26	326
25	303
24	280

This leaves the issue of IB Certificate candidates. Currently this qualification is not in the National Qualifications Framework. Consequently we cannot consider allocating UCAS Tariff Points to these learners even though many of them will be attractive for some universities. As soon as the Certificate is accommodated we will, therefore, undertake the necessary work to accommodate this qualification in the UCAS Tariff.

APPENDIX 1

CURRICULA VITAE

OCR Chair of Examiners for Chemistry	Helen Eccles
IB Chief Examiner for Chemistry	Jason Murgatroyd
HE representative for Chemistry	Stephen Roser
Edexcel Chief Examiner for Geography	Sue Warne
IB Deputy Chief Examiner for Geography	Briony Cooke
HE representative for Geography	Anthony Hoare
AQA Chief Examiner for Mathematics	Sam Boardman
IB Deputy Chief Examiner for Mathematics (HL)	John Reynolds
IB Acting Chief Examiner for Mathematical Methods (SL)	Sheila Messer
HE representative for Mathematics	James Blowey

Maryke Helen Eccles

Academic Qualifications
Ph.D. University of Cambridge
B.Sc. ARCS Imperial College of Science and Technology, University of London
PGCE University of Cambridge
Fellow, Royal Society of Chemistry
Associate Fellow, Clare College Cambridge
Fellow, Cambridge Philosophical Society

Present Employment
Assistant Director, Quality and Standards Division, OCR.

Recent Previous Experience
Chair of Examiners, Science, OCR.
This post carried responsibility for the quality and standards of all general qualifications in science subjects.

Hills Road Sixth Form College, Cambridge
At this leading sixth form college Dr Eccles was an A-level Chemistry Teacher.

Homerton College, University of Cambridge
Dr Eccles taught on the B.Ed course, the Science Conversion Course PGCE and the JYA course.

Education
Dr Eccles received her education at Loughborough High School and Queen Anne's Grammar School for Girls, York.

Name (Edwin Paul) Jason Murgatroyd

University University of Wales, Aberystwyth, 1964-68

Qualifications B Sc, Dip Ed

Teaching posts University School, Southport, 1968-70
St Mary's College, Crosby, 1970-2001
(Head of Chemistry Department from 1986)

Examining work

(1) **Northern Examinations and Assessment Board**
1984-91 Examiner: 16+ and GCSE level Chemistry
1992-97 Adviser and Moderator: A-level Practical Chemistry

(2) **University of Cambridge Local Examinations Syndicate**
1987-98 Examiner: International O-level Practical Chemistry
2002-date Examiner: International O-level Practical Chemistry

(3) **Associated Examining Board**
1992-98 Examiner, then Team Leader: A-level Chemistry
1993-98 Reviser: A-level and S-level Chemistry
1999-2000 Principal Examiner: A-level Chemistry

(4) **International Baccalaureate Organisation**
1995-99 Examiner, External Advisor: Diploma programme
1999-2004 Chief Examiner: Diploma programme

(5) **AQA**
2001-date Examiner: AS Chemistry
2002-date Reviser: A-level Chemistry and Advanced Extension award

(6) **Edexcel**
2001-date Examiner: International O-level Chemistry
2001-date Question Writer: Key Skills Application of Number
2003-date Chief Examiner: IGCSE Chemistry

Dr. Stephen John Roser

Date of Birth 29/1/1957

Education

Secondary School	Lewes Priory School	1968 1975
First Degree	University of Oxford: BA(Hons) Natural Sciences(Chemistry) 2nd class	
Doctorate	University of Oxford: DPhil "neutron scattering from absorbed species"	

Qualifications: MA DPhil, MRSC, CChem

Relevant employment history

University of Bath, Lecturer 1989-2002
University of Bath, Senior Lecturer 2002 –

Relevant Professional responsibilities

Admissions Tutor, Chemistry Dept, University of Bath

CURRICULUM VITAE FOR SUE (SUZANNE) WARN MBE

Education:

1954 - 1961	Notting Hill & Ealing High School - 10 O-levels, 4 A-levels
1961 - 1964	University of Bristol - BA Special Hons Geography (2/i)
1964 - 1965	University of Sheffield - Dip Ed (Dist.)
1986 - 1989(P/T)	University of Lancaster - MA 16-19 Education (Dist.)

Teaching Experience:

1965-1968	Wellington Girls' High School, Shropshire	Assistant Geography teacher
1968-1973	Morpeth Girls' Grammar School, Northumberland	Head of Geography/Geology
1973-1979	King Edward VI School, Morpeth, Northumberland	Head of Vth Year
1979-1988	Nelson and Colne College, Lancashire	Lecturer in geography, leisure, travel & tourism; Deputy Head of Arts & Humanities
1989-1994	City of Stoke-on-Trent VI Form College, Staffordshire	Head of Social Science faculty
1994-1997	City of Stoke-on- Trent College, Staffordshire	Assistant Principal; Curriculum and Quality College Link for FEFC Inspection

Industrial Experience:

Conference organiser for Philip Allan Updates from 1999.

Professional Experience:

1979 - 1991	Chief Examiner CSE/GCSE NEAB
1991 →	QCA Consultant (Post-16 and Geography)
1979 →	Provider of Inset in Geography for numerous LEAs (including recently) Staffordshire, Walsall, Lancashire, Cheshire, Shropshire, Notts, Cumbria
1982 →	Chief Examiner A-level (Edexcel Foundation)
1994 -99FEFC Inspector (P/T) (Geography and other Humanities)	
1997-99 Chair of Examiner GCSE (Edexcel Foundation)	
1999 →	Tutor and teaching practice supervisor for he University of Keele
2000-02	External assessor for the Institute of Education PGCE and geography course

Name: Briony Elizabeth Cooke
Date of birth: 29th December 1952

Education:

1963 - 1969	St. Nicholas' School, Fleet, Hants.
1969 - 1971	Aldershot County High School, Hants.
1971 - 1975	King's College, University of London.

Qualifications:

1974	BA Geography, University of London
1975	PGCE, University of London
1994	Certificate of Professional Studies - Counselling.

Employment:

1975 -1978	St. Paul's Girls' School, London – Geography teacher
1985 - 1987	Reading School and Hugh Faringdon School – supply teacher
1987 - present	The Henley College – Geography lecturer
1995 - present	International Baccalaureate Organisation - Geography examiner.

Professional responsibilities:

The Henley College

1987 - 1991	Part-time Lecturer, Geography
1991 - 1994	Associate Lecturer, Geography. Personal Tutor
1994 - present	Subject Leader, Geography and Environmental Science
1994 - present	Mentor to PGCE interns from Oxford University
1999 - 2000	Senior Tutor, Humanities
1999 - 2003	Lead Observer of classroom teaching and learning.

International Baccalaureate Organisation

1995 - 1998	Assistant Examiner, Geography
1998 - 2003	Principal Examiner, Geography Higher Level internal assessment.
1998 - present	Principal Examiner, Geography paper two
2001 - present	Deputy Chief Examiner, Geography.

Anthony George Hoare

Education and Qualifications :

1956-1964 : Sutton County grammar School, Sutton, Surrey

1964-1967 : B.A.Hons, University of Cambridge (Class 1 Part 1 and Part 2 of Geographical Tripos)

1967 – 1970 : graduate student, Department of Geography, University of Cambridge

1971 : M.A. University of Cambridge

1972 : PhD awarded, University of Cambridge

***Relevant Employment* :**

1979 – 1976 : Lecturer in Geography, The Queen's University of Belfast

1976-present : Lecturer (subsequently Senior Lecturer) in Geography, University of Bristol

1974-1985 : Assistant Chief Examiner (subsequently Chief Examiner) in Geography A Level, Northern Ireland Examinations Board, Belfast

Various dates : assessor for degree programmes, University of the West of England, and University of Ulster

Various dates : external examiner for undergraduate degrees: University of Cambridge, University of Wales, Swansea, Lancaster University, University of West of England

Prime Professional Responsibilities :

Lecturer, researcher and administrator in Geographical Sciences, University of Bristol, including spells as Head of School and head of Undergraduate School

Additional Professional Memberships :

Regional Studies Association, Geographical Association, Fellow of the Royal Geographical Society and Institute of British Geographers

Samuel Boardman, B.Sc, M.Sc

Education:

Chadderton Grammar School, Lancashire (1960-1966)

GCE O-Level (June 1964)

Mathematics, English Language, English Literature, Latin, French, German, Geography, History, Physics.

GCE A-Level (June 1966)

Mathematics (Grade A) ; Further Mathematics (Grade A) ; Physics (Grade A)
S-Level Mathematics (Grade 1) ; S-Level Further Mathematics (Grade 1)

University of Manchester (1967-1970) B.Sc. Mathematics (First Class Honours)

University of Keele (1991-1992 part-time) M.Sc. by Thesis

Industrial Experience:

GEC Trafford Park, Manchester Scholarship Award
1 Year pre-University (1966/7) and 1 Year Postgraduate (1970/71)

Teaching Experience:

Jan 1972	Chadderton Grammar School	Scale 1/2
Sep 1975	The Radclyffe School (Mixed Comprehensive) Second in Maths Department	Scale 3
Jan 1979	The Windsor Boys' School (Comprehensive) Head of Maths Department	Scale 4
Sep 1985	St Austell Sixth Form College Head of Maths Faculty and Computing	Allowance E
Sep 1992	Manchester Metropolitan University, Senior Lecturer Institute of Education (Crewe) Head of Mathematics and Maths Education	

Current Professional Responsibilities

Senior Mathematics Lecturer on Two Year PGCE and BA Programmes (MMU) and Chief Examiner for Mathematics A-Level Core and Decision Maths (AQA)

Examination Work:

1977-84	Examiner for A-Level Maths (Oxford Board)
1985-95	Chief Examiner, setter, awarder for A-Level Maths, Further Maths and S-Papers (Oxford Board)
1989-95	Awarder and Chief Examiner for 100% Coursework A-Level at WSIHE
1983 -	Chief Examiner for A-Level Mathematics (AQA) , Principal Examiner for Pure Mathematics and Decision Maths (Setting, awarding, etc) (AQA)

External Examinerships:

2000-03	University College, Chichester (external examiner for Mathematics)
2002–05	NEWI (Wrexham) (external examiner for Mathematics)

CURRICULUM VITAE FOR DR JF REYNOLDS

Name: John Frederick Reynolds
Date of Birth: 12 January 1935

Education:
Whitchurch Grammar School, Cardiff
Emmanuel College, Cambridge

Qualifications:
Degrees awarded – Mathematics Faculty, Cambridge University
1956 BA
1960 MA
1974 PhD

Career details:
- 1956 – 59 Lieutenant, Royal Navy
- 1959 – 61 Scientific Officer, Royal Radar Establishment, Malvern
- 1961 – 63 Lecturer in Mathematics and Electronics, College of Electronics, Malvern
- 1963 – 66 Lecturer in Mathematics, Glamorgan Polytechnic
- 1966 – 88 Lecturer, then Senior Lecturer, then Head of the Department of Mathematical Statistics, University College, Cardiff
- 1988 – 2000 Senior Lecturer in Mathematics, Christ Church University College, Canterbury

Relevant Examining Posts:
- 1984 – Chief Examiner in Pure Mathematics and Statistics, Welsh Joint Education Committee
- 2000 – Deputy Chief Examiner in Mathematics, International Baccalaureate Organisation

SHEILA ELIZABETH MESSER

CURRENT EMPLOYMENT

FREELANCE MATHEMATICS EDUCATION CONSULTANT

Acting Chief Examiner: IB Mathematical Methods SL
Associate Lecturer: Open University, Mathematics Education
Consultancy Work: International Baccalaureate Organisation, OUP and CUP.
Teacher: IB Summer School, St Clare's Oxford; Adult Education GCSE, Somerset County Council
. **Examiner:** GCE Statistics examiner for AQA; GCSE Mathematics examiner for OCR, AQA and CIE.
Workshop Leader: IB professional development workshops.
Individual tuition to "A" level.

TEACHING CAREER

Sept '97 - Sept '02 DEPUTY CHIEF EXAMINER, IB MATHEMATICAL METHODS
PRINCIPAL MODERATOR FOR INTERNAL ASSESSMENT
Jointly responsible for setting and marking of examinations and award of grades.
Responsible as Principal Moderator for moderation of coursework component from 2000.

Sept '00 - Oct '01 INTERNATIONAL SCHOOL OF THE HAGUE, THE NETHERLANDS
HEAD OF MATHEMATICS
Leading a team of eight teachers including the development of materials for IB courses; development of schemes of work; team building; monitoring and development of departmental policies; fostering professional development of department members; budget planning and stock control.
Teaching across the age range including IGCSE and IB courses.
Tutor to first year IB students.

Aug '99 – Aug '00 AMERICAN SCHOOL OF THE HAGUE, THE NETHERLANDS
TEACHER OF MATHEMATICS
Teaching upper level high school courses including IB Higher and AP Calculus.
Tutor to final year students.

Aug '91 – Jul '99 INTERNATIONAL SCHOOL MOSHI, TANZANIA
HEAD OF MATHEMATICS AND KS4 COORDINATOR
Leading a team of four teachers including the development of new curriculum for junior secondary mathematics on two campuses and development of use of IT in Mathematics. Teaching across the age and ability range including all three IB Mathematics courses.
Responsible for all aspects of IGCSE courses; pastoral and curricular responsibility for students in Key Stage 4.
Active in school-wide curriculum development initiatives.

1986 – 90 PORT MORESBY INTERNATIONAL HIGH SCHOOL, PAPUA NEW GUINEA
HEAD OF MATHEMATICS

Leadership of a team of six teachers including the introduction of IBand IGCSE courses; writing programmes to prepare students for both IB and Australian requirements; teaching across the age and ability range including all three IB courses.
Member of Senior Management Team
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1983 – 85 KHARTOUM INTERNATIONAL HIGH SCHOOL, SUDAN
TEACHER IN CHARGE OF MATHEMATICS

1981 – 82 YORK COLLEGE OF ARTS AND TECHNOLOGY
PART-TIME LECTURER IN MATHEMATICS

1971 –74 SAFFRON WALDEN COUNTY HIGH SCHOOL, ESSEX, UK
TEACHER OF MATHEMATICS up to 'A' level.

EDUCATION

1970 – 71 University of London, Chelsea College of Science and Technology
Postgraduate Certificate in Science Education (Mathematics)
1966 – 69 University of Kent at Canterbury, B. Sc. (Honours) Class 2 Div 1 Mathematics
1959 – 66 Blandford Grammar School, Blandford, Dorset
A levels: Pure Mathematics (A), Applied Mathematics (B), Physics (A)

PROFESSIONAL DEVELOPMENT

Feb 2000 Graphic Display Calculators and IB Mathematics (2 days)
Southbank International School, London
June 1998 Assessment of Student Learning (1 week)
Principals Training Centre, Summer Institute, London
1992 – 3 MA distance learning Modules "Curriculum" and "Methods of Educational Enquiry"
University of Bath
1991 – 2 One year distance learning courses "Teaching and Learning Mathematics" and "Using Mathematical Thinking"
Open University

CURRICULUM VITAE

Name: JAMES FORD BLOWEY

Higher Education: Higher Education B.Sc. (Hons.) in Mathematics (Special Option), First Class, University of Sussex, October 1984 to July 1987

D.Phil., University of Sussex, October 1987 to September 1990

Membership of Bodies: London Mathematical Society
Institute of Learning and Teaching

Present Employment: Postdoctoral Research Assistant at the University of Sussex, October 1990 to September 1992

Current appointment: Reader in the Department of Mathematical Sciences, October 1992–Present

Research:
Assessed member of the Applied Mathematics group graded 6* at the last RAE.
21 Refereed Publications.
Organisation of 4 Summer Schools for postgraduates.
Referee for 17 International Journals.

Teaching
External examiner of undergraduate and M.Sc. teaching at Heriot-Watt University (2003—2006).
External examiner for 4 postgraduate student degrees.
Supervision of 4 Ph.D. students.
Introduction of innovative teaching methods:
A symbolic manipulation package, MAPLE, to computer practicals and lectures.
"Active Learning In a Computing Environment" (ALICE) is used to assess students on-line (with immediate feedback) — each student is generated a "random" question which has a different solution.
An EU project which: compares the national experiences and different starting backgrounds; promotes Mathematics to secondary school pupils locally, nationally and internationally.
Curriculum development: Brush Up Your Skills Committee (2002–Present) — supporting key mathematical skills for incoming undergraduates.

Administration
Liaison with Engineering on the Mathematics modules for their TQA and Faculty Review (1997, 2000).
Sole organiser and developer of the Mathematical Sciences stand at the first Science, Engineering and Technology week.

APPENDIX 2

EVIDENCE EXAMINED FOR THE IB AND GCE A LEVEL

Syllabuses and specifications

IB Subject Guides and syllabuses

Geography (covers HL & SL)
Mathematics HL
Further Mathematics SL
Mathematical Methods SL
Mathematical Studies SL
Chemistry (covers HL & SL)

Theory of Knowledge Guide
Extended Essay Guide
CAS Guide

GCE A Level specifications

Edexcel GCE Geography B (8215/9215), Issue 2 August 2002
AQA GCE Mathematics and Statistics B
OCR GCE Chemistry

Examination papers and marking schemes

IB documents

Geography papers and marking schemes, May 2002 and 2003
Mathematics papers and marking schemes, May 2002 and 2003
Chemistry papers and marking schemes, May 2002 and 2003

GCE A Level documents

Edexcel Geography examination papers and marking schemes, June 2002 and 2003
AQA Mathematics examination papers and marking schemes, June 2002 and 2003
OCR Chemistry examination papers and marking schemes, June 2002 and 2003

Candidate material

A selection of candidate scripts and coursework, at relevant grade boundaries, from all of the above examinations was available for scrutiny.

APPENDIX 3

The following appendices are very long documents. Readers wishing to review them are invited to contact UCAS who will be happy to provide them.

3.1 Mapping IB Geography content to Edexcel GCE A Level Geography B

3.2 Mapping IB Geography non content areas to Edexcel GCE A Level Geography B

3.3 Mapping IB Mathematics (HL) to AQA GCE A Level Mathematics and Statistics B

3.4 Mapping IB Mathematical Methods (SL) to AQA GCE A Level Mathematics and Statistics B

3.5 Mapping IB Chemistry to OCR GCE A Level Chemistry