



Qualifications and
Curriculum Authority

GCSEs and IGCSEs compared

*GCSE and IGCSE examinations in 2005 in English, French,
mathematics and science (double award)*

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Executive summary

Background

The Qualifications and Curriculum Authority (QCA) was commissioned by the Department for Education and Skills (DfES) to carry out a comparability study into a selection of General Certificate of Secondary Education (GCSE) syllabuses and comparable International General Certificate of Secondary Education (IGCSE) syllabuses. The context was a request by Ministers for advice relevant to considering the suitability of IGCSE for use in state-maintained schools in England. The focus of the work was therefore primarily on the extent to which the IGCSEs met GCSE criteria and corresponding programmes of study required for use in England. It did not attempt to evaluate the IGCSE syllabuses in terms of their own aims.

These studies were carried out with the voluntary cooperation of the two awarding bodies currently offering IGCSEs – Cambridge International Examinations (CIE) and Edexcel – and we are very grateful to them.

The studies were carried out by teams of three independent consultants working autonomously, with one of each team appointed to summarise the outcomes and report them to QCA. The work was carried out to a very tight timescale over a four-week period in late June and July, 2006.

Methodology

Four subjects, English, French, mathematics and science, were chosen as covering both a range of subject types and including key curriculum subjects. They were also subjects QCA had recently reviewed at GCSE so that it was possible to understand the findings from a wider perspective.

In each subject, there are two IGCSE syllabuses: both were reviewed. Two GCSE comparators were chosen, taking account of entry numbers and ease of comparison. For example, because the IGCSE syllabuses in science were both coordinated, the GCSE syllabuses used were also coordinated. The specifications considered were those used in 2005. Where changes have subsequently been proposed or made, these were not taken into account.

All reviewers looked at all four syllabuses, using syllabus documentation, question papers and mark schemes. In some cases there were also Examiner's Reports available. They carried out the work using established QCA documentation first to create a firm factual knowledge base about the materials. They then analysed the question papers in terms of the demands they placed on candidates, and evaluated all the information.

Limitations of the study

The tight timescale and a range of other factors mean that any findings from the work must be seen as provisional. Particular issues include:

- student work was not included in the review
- the range of subjects
- the range of GCSE syllabuses
- only a single series of each qualification was considered
- the relatively limited number of reviewers for each subject
- the lack of opportunity to tailor the review protocols to the specific task.

Main findings

In all four subjects there were major differences between the IGCSEs and the GCSE examinations in the same subject. In almost every case, these differences meant that the IGCSE examinations did not meet the GCSE subject criteria in significant ways. The GCSE criteria are tightly bound up with key stage 4 programmes of study in England. Hence, where those differences were found to occur, the IGCSE cannot be regarded as assessing the relevant programme of study to the extent that the GCSE does. This probably reflects the different contexts in which the IGCSEs were developed.

In all four subjects there were also marked differences between the two IGCSE syllabuses. These were usually as large as – or larger than – the differences between the IGCSEs and the comparator GCSEs. This means it is not possible to come to any general conclusion about the utility of IGCSE in England as an alternative to GCSE in a given subject; rather, each time, one would have to consider both syllabuses.

There were differences between the GCSEs, but these tended to be minor.

1 Background

Currently for schools within the state sector in England the principal form of assessment at the end of key stage 4 is the GCSE. However, there also exist two suites of examinations (IGCSEs), which were developed for the overseas market.

These qualifications are not approved by the Secretary of State under Section 96 of the Education Act,¹ so state-maintained schools cannot run courses leading to the qualifications for pupils aged up to 16 years. Neither do the qualifications contribute to the Achievement and Attainment Tables. They are not accredited by QCA (the awarding bodies have not sought accreditation for them) but accreditation is not an essential condition for Section 96 approval. However, they can be used in England by schools which are not state-maintained, such as independent schools. It is in the interests of clarity and fairness that there is an informed view as to the appropriateness of the IGCSE as a qualification for use in England.

As a result, DfES asked QCA to commission an independent comparability study into the respective demands and standards of IGCSEs and GCSEs, to be completed by the end of July 2006. The particular aim of the work was to provide advice to inform a view of whether it would be appropriate for IGCSEs to be available for use in state-maintained schools in England. Following established procurement procedures QCA put the study out to tender, but because of the tight schedule involved, no bids were received. As an alternative, and with the agreement of DfES, QCA commissioned teams of independent consultants to carry out the work.

It must be stressed from the outset that there are important considerations regarding the context surrounding the development and use of the IGCSE. The qualification is intended for an international market. The CIE IGCSE has existed for almost 20 years and has established functions in a range of nations. The Edexcel IGCSE is a more recent development but has a similar focus on meeting the requirements of different national settings. This key difference produces a number of constraints of its own in terms of the subject content, the nature of the schemes of assessment and the presentation of the question papers. At the same time, in meeting those constraints, the IGCSE is freed from the constraints of meeting the regulatory requirements associated with GCSE in terms of qualification criteria, subject criteria and national curriculum programmes of study. GCSE criteria have changed over time and continue to change, partly in response to changed views on such matters as use of calculators in exams, coursework etc. In comparison the IGCSEs have tended to be more stable in form and content. They are also an important educational export from this country. This study does not attempt to evaluate the success of the IGCSE in fulfilling the needs of its market; it simply tries to determine the extent to which the various qualifications differ from the GCSE as a result of fulfilling those needs.

¹Section 96 authorises a list of all qualifications approved for use in pre-16 education in England.

In much of its work reviewing the standards of examinations, QCA investigates two aspects: examination demands and standards of performance. Examination demands are generalisable qualitative features of examinations. In this context, they reside in the syllabuses, schemes of assessment, question papers (and associated mark schemes) and coursework requirements. Evaluating demands involves judgement rather than empirical measurement. Grading standards depend on the empirical performances of candidates and are most effectively compared when the demands are broadly similar. Although there is some overlap between the two aspects they remain essentially distinct, and the nature of this work meant that the emphasis was exclusively on the examination demands outlined above.

We are aware of the fact that a number of comparability studies have been undertaken in the past by Cambridge Assessment (or its predecessor organisations), comparing aspects of its IGCSEs with comparable GCSEs in 1993 (English), 1997 (grading standards in general) and 2002/03 (mathematics and science). Those studies did include examination of student work. However, it was not practicable or appropriate to integrate their findings with those of the rather different exercise described in this report.

2 Methodology

2.1 Approach

It was proposed by QCA and agreed by DfES that four subjects should be covered in the study: English, French, mathematics and science. QCA recruited 12 consultants in four teams of three, with each team reviewing one subject (for consultant biographies see section 5, 'Consultants'). One consultant in each team acted as coordinator. The consultants reviewed 2005 syllabus materials using standard QCA analytical tools (for details see below); the coordinators drew together their team's findings and wrote a summary report.

Each team of consultants reviewed four qualifications: the CIE and Edexcel IGCSEs and two GCSEs (for listing of qualifications see section 6, 'Qualifications'). The aim of the review was to examine:

- the level of variation between the two IGCSE and the two GCSE syllabuses, specifically:
 - ground covered by the IGCSEs that is not covered by the GCSEs
 - ground covered by the GCSEs that is not covered by the IGCSEs
- any differences between the schemes of assessment of the IGCSEs and those of the GCSEs
- any differences between the nature of the assessment instruments and assessment criteria of the IGCSEs and those of the GCSEs.

The consultants were also asked to identify any elements of the subject criteria and the key stage 4 programmes of study that are not covered by the IGCSEs.

2.2 Analytical tools

The consultants used three standard QCA analytical tools:

- a summary factual description of the syllabuses, question papers and mark schemes
- an evaluation of the demand of the syllabuses, question papers and mark schemes
- a CRAS analysis of question papers in terms of:
 - Complexity (the complexity of each constituent operation or idea and the links between them)
 - Resources (the use of data and information)

- Abstractness (the extent to which the candidate deals with ideas rather than concrete objects/phenomena)
- Strategy (the extent to which the candidate devises (or selects) and maintains a strategy for tackling and answering the question).

2.3 Consultants' role

Consultants:

- reviewed the existing summary factual descriptions of each of the GCSEs
- wrote summary factual descriptions of each of the IGCSEs
- evaluated the demand of all four qualifications
- analysed the question papers of all four qualifications.

2.4 Coordinators' role

Coordinators:

- received a preliminary briefing from QCA's comparability programme leader
- briefed the other two consultants in their team
- managed the consultants during the review stage
- answered the consultants' queries (with reference to QCA when necessary)
- reviewed the consultants' analysis forms and wrote the summary report.

2.5 Materials and forms

QCA supplied consultants with the necessary syllabus materials (which had been supplied to QCA by the relevant awarding bodies), template forms, subject criteria and national curriculum documentation. QCA supplied coordinators with an outline of the format of the final report.

3 Limitations of the study

Before presenting any conclusions, whether overall or at the level of the individual subject, it is important to note that there are several key reasons to regard any finding as provisional.

3.1 Range of subjects

The first of these reasons applies to any overall conclusions. The work looked at a selection of four subjects. The subjects, taken together, cover a good deal of the compulsory curriculum at key stage 4, in English, mathematics and science, and include a foreign language. However, there is an inevitable danger in generalising, even from a wide-ranging and critical range of subjects, the overall picture. Indeed, it can be argued that the range of subjects chosen might be less likely to reveal differences than in subjects less central to the curriculum.

It should be remembered in this context that, although the subjects were chosen to cover a range of different disciplines, the main rationale was to ensure that the investigation covered a great deal of the statutory curriculum at key stage 4. The subjects were also chosen because each had been the focus of a wider ranging investigation by QCA of the GCSE examinations in the last year, enabling some level of overview of the situation at GCSE.

In addition, although it was felt to be essential for the reasons given above to include both mathematics and science in the work, both subjects are undergoing far-reaching changes at GCSE. In particular, students taking examinations in either subject in 2008 will be taking radically restructured assessments (and, in mathematics, again in 2009). It is also the case that the IGCSE qualifications undergo revision so that, for example, the CIE mathematics syllabus in 2006 is different from the one evaluated for this review. This is another aspect of the snapshot nature of the work explored further below under range of materials.

3.2 Range of materials

There are several aspects of the work which affect the confidence with which to interpret the findings.

The first of these derives from the fact that only two GCSE syllabuses were used as comparators. The main reason for this was the level of resources available (in terms of time and personnel as much as money) although the inclusion of all, or even most, GCSE syllabuses would run the risk of swamping the focus on IGCSE. (In the case of science, for example, there would be at least six syllabuses, some with a somewhat different flavour from the ones used). The choice of comparator syllabuses is thus potentially significant to this work, and it is important therefore to explain the rationale for their

choice. In each case, one of the two comparators was offered by the awarding body with the largest entry.² The second comparator was selected with a view to making the task of comparison as straightforward as possible. Evidence from other work suggests that significantly differing schemes of assessment present additional problems for those making already difficult judgements. However, it remains possible that a different choice of comparators might have led to different conclusions. The choice of subjects in which QCA already had an informed overview about how typical the chosen syllabuses were in terms of scheme of assessment and overall demand was designed to help combat this aspect.

The next of the concerns is that a single examination series was involved.³ This affects several different features. First, all examinations sample the content and skills to a degree. In any single examination series, therefore, it is possible that the particular range of material that is sampled will affect judgements about the demand of the examination. In addition, it is very difficult to make any confident judgements from a single series about issues that might affect the real demand of the assessments. For example, if particular questions or tasks are highly predictable, this would affect judgements about how inherently demanding those questions were. This is always a difficulty when coursework has a different role in two qualifications.

However, probably the most significant limitation of the study derives from the fact that it did not consider student work. This affects more than the absolute issue that the work makes no attempt to judge grading standards, but concerns itself only with the demands of the examinations as already described. Clearly this has major importance when it comes to interpreting any findings, in terms of the grades awarded. But the absence of candidate work has other implications in terms of the confidence that can be placed on judgements about demand. Reviewers often revise their views when they see how the mark schemes have been applied in practice, even in subjects such as mathematics which lend themselves to highly objective marking. The effect is more marked in subjects such as English, which involve high levels of judgement in the marking.

3.3 Personnel involved

Inevitably, where human judgement is involved, findings are dependent on those involved. In this case, QCA used consultants who had experience of working on this kind of study and thus required relatively little briefing. Also, as far as possible those involved were chosen to offer a balanced team, although the timescale allowed less opportunity to achieve this than was ideal. Thus they included some reviewers who had experience

²In point of fact, the AQA science syllabus used was not the one with the largest entry, which is their modular syllabus, but their coordinated syllabus, which has the largest entry of the non-modular syllabuses available. The rationale for this was the same as in the choice of the OCR syllabus as the other comparator; it was felt to provide fewer obstacles to the reviewers that might make any comparisons harder to make.

³In fact, in the case of the Edexcel IGCSE, there were live examination papers only for English Language. For the other three subjects the materials used were the sample assessment materials. These may be atypical of the live examinations.

marking and/or preparing students for both GCSE and IGCSE examinations as well as some who were independent (for details of consultants' experience see section 5, 'Consultants'). However, it is possible that a different team would have judged the materials differently, although the instruments used should have ensured that the judgements were based on an appropriately systematic evaluation of the materials.

3.4 Methodology employed

Although the various instruments used are tried and tested from a number of comparability studies, there was little time to check how applicable they were to this particular work, or to make any adaptations. The four consultants asked to coordinate the work in each subject were given a degree of freedom in tailoring to various forms, but the timescale allowed little real scope for this, and none for testing out any adaptations. However, none of the consultants reported any significant difficulties in this respect, nor did they suggest that they had been unable to reflect key aspects of the qualifications as a result of the methodology. It remains inevitable, however, that the process of evaluating highly complex assessments will be approximate.

4 Findings

The following section presents a summary of the key findings. It has two main elements. First there is a brief set of issues which emerge across all four subjects. There is then a summary of the main issues identified within each subject. The individual coordinators' subject reports are presented as Annexes to this main report. These offer more detailed source information and a range of specific and more detailed findings at the subject level. The reports are presented in alphabetical order of subject.

4.1 Summary of general findings

In all four subjects there were major differences between the IGCSEs and the GCSE examinations in the same subject. In almost every case, these differences meant that the IGCSE examinations did not meet the GCSE subject criteria in significant ways. The GCSE criteria are tightly bound up with key stage 4 programmes of study in England. Hence, where those differences were found to occur, the IGCSE cannot be regarded as assessing the relevant programme of study to the extent that the GCSE does.

In all four subjects there were also marked differences between the two IGCSE syllabuses. These were usually as large as – or larger than – the differences between the IGCSEs and the comparator GCSEs. This means it is not possible to come to any general conclusion about the utility of IGCSE in England as an alternative to GCSE in a given subject; rather, each time, one would have to consider both syllabuses. There were differences between the GCSEs, but these tended to be minor.

4.2 Summary of subject-specific findings

4.2.1 English

In English, the main issues identified were:

- The IGCSEs did not meet the full key stage 4 programme of study, which contains a significant element of prescribed reading. Both IGCSEs acknowledged this in their syllabuses. Their titles help to make this clear: CIE calls the syllabus English First Language; Edexcel, English Language.
- The treatment of speaking and listening varied. For the Edexcel IGCSE this was assessed only if candidates took the coursework option, and then it was weighted at 10 per cent. For CIE it was entirely optional, there were two routes to the assessment and it was separately endorsed rather than integrated into the final grade.
- There was significantly less prescribed reading in both IGCSEs; in the case of CIE, there was no explicit prescription. These differences arose partly because the GCSE was required to cover the key stage 4 programme of study in its entirety and partly because of the international nature of the IGCSE already described.

- Both IGCSEs had a lower amount of assessment than the GCSEs. Candidates took either one paper with coursework or two papers. GCSE candidates took two papers plus coursework.
- The IGCSE syllabuses were in places less specific than the GCSEs. This made it unclear as to the balance of assessment across different reading texts and writing tasks. GCSEs were very precise in these matters.

4.2.2 French

In French, the main issues identified were:

- Reviewers judged that neither IGCSE offered enough material suitable for the assessment of the lowest attaining candidates. This was a particular feature of the Edexcel version, where the papers were not tiered.
- The Edexcel IGCSE did not include a speaking test.⁴
- There were differences between the two IGCSEs in the approach to the use of target language, with the Edexcel version being similar to GCSE. The differences should be seen in the light of the need to cater for candidates in an international market, many with first languages other than English.

4.2.3 Mathematics

In mathematics, the main issues identified were:

- Neither IGCSE examination had a non-calculator paper. In GCSE one of the two papers at each tier was non-calculator.
- In effect, neither IGCSE made use of coursework.⁵ In 2005, coursework was compulsory in GCSE.
- There were differences in content between the IGCSEs and the GCSEs and between the two IGCSEs, with some of these differences affecting coverage of the relevant programmes of study.
- The approach to assessment in one of the CIE papers was significantly different from those presented in any of the other qualifications.

4.2.4 Science: double award

Overall, these four syllabuses were less different than those in the other subjects. However, important differences remained:

⁴Candidates could opt for a speaking test in the scheme but it was separately endorsed rather than counting towards the overall subject grade.

⁵In fact, a very small minority of CIE candidates did do optional coursework. The structure of the examination was such that candidates' final grades could only be enhanced by this decision.

- The content of the IGCSE syllabuses did not cover all the requirements of the key stage 4 programme of study, although each contained additional content instead.
- The content of the CIE IGCSE was more extensive and demanding than any of the other qualifications.
- Both IGCSEs offered alternative routes to the assessment of practical skills. Reviewers questioned the extent to which these effectively assessed the full range of skills in investigative science.
- There would be an additional amount of assessment for candidates opting for the written alternative coursework in the Edexcel IGCSE.

5 Consultants

English

Russell Carey	<p><i>Current post:</i> Head of English, Silcoates School, Wakefield</p> <p><i>Examining experience:</i> Examiner and Coursework Moderator, SEG GCSE English 1994–2001; Assistant Principal Examiner, OCR GCSE English 2002–present; team leader, OCR GCSE English Literature 2003–present; Assistant Examiner, CIE IGCSE English 2004–present</p> <p><i>Work for QCA:</i> GCSE English standards review 2006</p>
Jo Haffenden	<p><i>Current post:</i> English teacher (nine years' experience, responsibilities up to Head of English); freelance consultant</p> <p><i>Examining experience:</i> Examiner, AQA GCE English Literature 2006</p> <p><i>Work for QCA:</i> GCSE English standards review 2006</p>
Jim Sweetman (Coordinator)	<p><i>Current post:</i> Freelance consultant and publisher</p> <p><i>Examining experience:</i> Principal Examiner, NEAB/JMB and TWMEB/MEG (now AQA and OCR) English 1989–94</p> <p><i>Work for QCA:</i> Principal Scrutineer, GCE/GCSE English Literature/English Language/English 1994–present; 14–19 scrutiny materials review 2006</p>

French

Mary Culpan (Coordinator)	<p><i>Current post:</i> Freelance consultant</p> <p><i>Most recent examining experience:</i> Chair of Examiners, Edexcel GCSE French 1993–99</p> <p><i>Work for QCA:</i> Principal Scrutineer, GCE/GCSE MFL scrutiny 2002–05; GCSE and A level French comparability studies; syllabus approval for GCSE and A level French</p>
Andrew Portas	<p><i>Current post:</i> MFL Advanced Skills teacher, Ringwood School, Hampshire</p> <p><i>Examining experience:</i> Coursework moderator, Edexcel A level French 2000–present (team leader 2001–02)</p> <p><i>Work for QCA:</i> A level French standards review 2005; A level MFL reform review 2005; GCSE French comparability study 2006</p>
Janet Searle	<p><i>Current post:</i> Part-time teacher of German and French to GCSE, AS and A2 levels</p> <p><i>Examining experience:</i> Assistant Examiner, OCR GCSE French Speaking 1989–99; Principal Examiner, Edexcel IGCSE German 2005; Principal Examiner, Edexcel GCE German 2006</p> <p><i>Work for QCA:</i> GCSE German standards review 2003; Principal Scrutineer, GCE French standards review 2005; GCSE French comparability study 2006</p>

Mathematics

Susan Barker	<p><i>Current post:</i> Mathematics teacher, Framlingham College</p> <p><i>Examining experience:</i> OCR A level mathematics examiner 1989–present (team leader 2005); Edexcel mathematics examiner 1994–present</p> <p><i>Work for QCA:</i> GCSE and A level mathematics standards review 2005; GCSE mathematics two-tier trial evaluation 2005</p>
Sheila Messer	<p><i>Current post:</i> Associate lecturer, Open University/freelance consultant</p> <p><i>Examining experience:</i> Assistant Examiner, AQA GCE maths 2002–present; Assistant Examiner, CIE additional maths 2002–present; Chief Examiner, IB maths standard level 2004–present</p> <p><i>Work for QCA:</i> GCE/GCSE maths standards review 2005; GCSE maths two-tier pilot/trials review 2005; post-14 project maths and ICT qualification design 2006</p>
Kevin Wallis (Coordinator)	<p><i>Current post:</i> Head of Mathematics, Oakwood Park Grammar School</p> <p><i>Examining experience:</i> CIE International GCE (4 years); Edexcel International GCE (5 years); OCR (2 years)</p> <p><i>Work for QCA:</i> Mathematics standards review 2005; GCSE mathematics two-tier pilot/trials review 2005; GCSE mathematics scrutiny 2006</p>

Science

Nick Cox	<p><i>Current post:</i> Head of Science, Downside School</p> <p><i>Examining experience:</i> Assistant Examiner, OCR GCSE 2002–04; Assistant Examiner, AQA A level 2005–present</p> <p><i>Work for QCA:</i> A level physics scrutiny 2004; Principal Scrutineer, A level physics scrutiny 2005; GCSE science standards review 2006</p>
Susan Hoare	<p><i>Current post:</i> Freelance consultant</p> <p><i>Examining experience:</i> Chief Examiner, WJEC A level linear biology 1991–99; Chief Examiner, WJEC A/AS level modular biology 1995–99</p> <p><i>Work for QCA:</i> GCSE scrutineer 2001; GCE/GCSE biology standards reviews 1998, 2004</p>
John Skevington (Coordinator)	<p><i>Current post:</i> Manager, Standards Department, National Examinations Board for Occupational Safety and Health</p> <p><i>Examining experience:</i> Member of JMB and NEAB physics and science committees 1990–93</p> <p><i>Work for QCA:</i> Principal Scrutineer, Edexcel/OCR GCSE science 2004; Principal Scrutineer, Edexcel/OCR GCE Physics 2005; GCE/GCSE science comparability study 2004/2005</p>

6 Qualifications

IGCSE qualifications

English

CIE First Language English (syllabus 0500)

Edexcel English Language (syllabus 4355)

French

CIE Foreign Language French (syllabus 0520)

Edexcel French (syllabus 4365)

Mathematics

CIE Mathematics:

Syllabus 0580 (without coursework)/Syllabus 0581 (with coursework)

Edexcel Mathematics (syllabus 4400)

Science

CIE Coordinated Sciences (Double Award) (syllabus 0654)

Edexcel Science (Double Award) (syllabus 4437)

GCSE qualifications

The comparator GCSE qualifications were chosen to include (i) the qualification with the largest entry and (ii) the qualification offering the most comparability with the two IGCSEs.

English

AQA English Specification A (syllabus 3702)

Edexcel English A (syllabus 1203)

French

AQA French Specification A (syllabus 3651)

OCR French (syllabus 1925)

Mathematics

AQA Mathematics Specification A (syllabus 3301)

Edexcel Mathematics A (syllabus 1387)

Science

AQA Science: Double Award Specification B (Coordinated) (syllabus 3462)

OCR Science Double Award A (syllabus 1983)

Annex: Coordinators' reports on individual subjects

Each of these reports follows broadly the same structure. They identify the main requirements of the GCSE subject criteria and use principal headings within those (assessment objectives, content and scheme of assessment) to identify and evaluate differences between each syllabus. They also provide an analysis and evaluation of the question papers and mark schemes to determine how the demands of the qualifications as expressed in the syllabus are realised through the examination.

A1 Report on the English study

The GCSE English syllabuses in 2005 conformed to the National Criteria for English (2002). This document stated that English was to be viewed as a unified course leading to an assessment in speaking and listening, reading, and writing. Weightings were specified as follows:

speaking and listening	20 per cent
reading	40 per cent
writing	40 per cent

Coursework was limited to 40 per cent of the final assessment.

The requirements for speaking and listening include a range of activities in a range of contexts, providing opportunities for individual contributions, group discussion and interaction, and drama-focused activities.

The requirements for reading cover those in the national curriculum, so that candidates who take GCSE English will have met the requirements of the key stage 4 programme of study. Therefore, candidates were required to study a Shakespeare play, work from the English literary heritage and texts from different cultures and traditions. There is also a requirement to study non-fiction text and media texts.

The requirements for writing adopt writing 'triplets', which group similar forms of writing together by their purpose. Four triplets were identified to cover writing intended to:

- explore, imagine, entertain
- inform, explain, describe
- argue, persuade, advise
- analyse, review, comment.

The criteria also mention regional variations within the United Kingdom, and require the identification of evidence in relation to key skills including:

- application of number
- communication
- information technology
- improving own learning and performance
- problem solving
- working with others.

One outcome of the application of these criteria is that GCSE English is a highly demanding course. Few other GCSEs require the equivalent of three pieces of written coursework and an incorporated assessment of speaking and listening in order to meet the requirements of a rich and varied set of assessment objectives.

A1.1 Materials considered

Reviewers considered the syllabus documents and question papers with associated mark schemes from both of the awarding bodies offering IGCSE, CIE (0500) and London Examinations (4355), and those from the GCSE syllabuses offered by AQA (3702) and Edexcel (1203). The 2005 examination papers and mark schemes were reviewed. Details of the syllabuses included in the study are given in section 6, 'Qualifications'.

A1.2 Assessment objectives

The national criteria identify three broad assessment objectives and then identify areas within each which syllabuses must assess. They are as follows:

AO1 A syllabus must include objectives for speaking and listening which require candidates to demonstrate their ability to:

(i) communicate clearly and imaginatively, structuring and sustaining their talk and adapting it to different situations, using standard English appropriately

(ii) participate in discussion by both speaking and listening, judging the nature and purposes of contributions and the roles of participants

(iii) adopt roles and communicate with audiences using a range of techniques.

AO2 A syllabus must include objectives for reading which require candidates to demonstrate their ability to:

(i) read, with insight and engagement, making appropriate references to texts and developing and sustaining interpretations of them

(ii) distinguish between fact and opinion and evaluate how information is presented

- (iii) follow an argument, identifying implications and recognising inconsistencies
- (iv) select material appropriate to their purpose, collate material from different sources, and make cross references
- (v) understand and evaluate how writers use linguistic, structural and presentational devices to achieve their effects, and comment on ways language varies and changes.

AO3 A syllabus must include objectives for writing which require candidates to demonstrate their ability to:

- (i) communicate clearly and imaginatively, using and adapting forms for different readers and purposes
- (ii) organise ideas into sentences, paragraphs and whole texts using a variety of linguistic and structural features
- (iii) use a range of sentence structures effectively with accurate punctuation and spelling.

The two GCSE syllabuses in the review reproduce these assessment objectives in full and without modification.

However, there are differences in the ways that the assessment objectives are defined in the IGCSE syllabuses. In CIE, there are 14 assessment objectives, four for reading, five for writing, and five for speaking and listening. Assessment objectives may be differently phrased but actually cover similar ground so it is hard in some instances to draw firm conclusions as to whether these assessment objectives would meet the requirements set out in the national criteria. There is no stated requirement for standard English, reflecting the fact that the syllabus needs to be used in a range of different international contexts. In addition, the assessment objectives for speaking and listening are separately endorsed and have no weighting in a unified assessment.

The main differences are to be found within reading. CIE English First Language does not aim to meet the requirements of the key stage 4 programme of study and this is reflected in the relevant assessment objectives. The CIE objectives place less emphasis on textual study than do the GCSE criteria. AO2.5 requires candidates to 'understand and evaluate how writers use linguistic, structural and presentational devices to achieve their effects, and comment on ways language varies and changes'. CIE requires candidates to 'understand how writers achieve effects'. In the full set of assessment objectives for reading, there is no mention of texts. A candidate entered for English First Language would not be assessed against the full national curriculum reading entitlement. In addition, the requirement to distinguish between fact and opinion is not made explicit.

Where writing is concerned, the CIE syllabus places less weight on whole texts. The GCSE criteria require candidates to 'organise ideas into sentences, paragraphs and whole texts using a variety of linguistic and structural features' while the CIE assessment objectives only set out expectations at paragraph level. This is significant in terms of the criteria requirements to engage with texts of different types. It is also manifested in the grade descriptions where those in the national criteria discuss 'the organisation of the

writing as a whole'. This emphasis is not reflected in the CIE syllabus. It is also not made clear to see what proportion of the marks is available for GCSE AO3iii and the notions of correctness and accuracy in English.

There are also differences in the assessment of the Core and Extended papers relating to the weighting of the assessment objectives. The Extended paper gives an additional weighting to R4, 'understand how writers achieve effects'.

In overall terms, it is worth noting that there is a lack of clarity within the CIE syllabus. This can be seen in the absence of the specific citing of topics which must be covered. The syllabus does not make clear where any particular skill (reading genre/type of writing) is to be covered. The syllabus groups informative, analytical and argumentative writing together; in practice, they have little in common apart from being non-narrative forms. This arises from a lack of definition in the assessment objectives.

There are fewer differences in the ways that the assessment objectives are set out in the Edexcel IGCSE syllabus in comparison to the national criteria. The syllabus does not require the structuring and sustaining of talk as identified in the national criteria or role-play and a drama focus. The reading criteria are less demanding, particularly in terms of AO2.4 and the requirements for cross-reference and comparison. There is no requirement in the syllabus for comment on language change and variation. However, the links to the national criteria are closer than for CIE and the assessment objectives for writing are drawn directly from that document.

In this syllabus, the assessment of speaking and listening is optional. When assessed, its weighting is 10 per cent in comparison with the GCSE weighting of 20 per cent.

The chart on the following pages sets out the assessment objectives as stated in the GCSE national criteria for English, and in the GCSE syllabuses reviewed, and as set out in the two IGCSE syllabuses.

Table 1 Assessment objectives compared

	GCSE National Criteria – AQA/Edexcel	CIE 0500	LE4355
Speaking and listening (S) (AO1)	<ol style="list-style-type: none"> 1. Communicate clearly and imaginatively, structuring and sustaining their talk and adapting it to different situations, using Standard English appropriately. 2. Participate in discussion by both speaking and listening, judging the nature and purposes of contributions and the roles of participants. 3. Adopt roles and communicate with audiences using a range of techniques. 	<ol style="list-style-type: none"> 1. Understand, order and present facts, ideas and opinions. 2. Articulate experience and express what is thought, felt and imagined. 3. Communicate clearly and fluently. 4. Use language and register appropriate to audience and context. 5. Listen to and respond appropriately to the contributions of others. 	<ol style="list-style-type: none"> 1. Communicate clearly and imaginatively. 2. Use Standard English appropriately. 3. Listen to and understand varied speech. 4. Participate in discussion, by both speaking and listening, judging the nature and purposes of contributions and the role of participants.
Reading (R) (AO2)	<ol style="list-style-type: none"> 1. Read, with insight and engagement, making appropriate references to texts and developing and sustaining interpretations of them. 2. Distinguish between fact and opinion and evaluate how information is presented. 3. Follow an argument, identifying implications and recognising inconsistencies. 4. Select material appropriate to their purpose, collate material from different sources, and make cross references. 5. Understand and evaluate how writers use linguistic, structural and presentational devices to achieve their effects, and comment on ways language varies and 	<ol style="list-style-type: none"> 1. Understand and collate explicit meanings. 2. Understand, explain and collate implicit meanings and attitudes. 3. Select, analyse and evaluate what is relevant to specific purposes. 4. Understand how writers achieve effects. 	<ol style="list-style-type: none"> 1. Read with insight and engagement, making appropriate references to texts and developing and sustaining interpretations of them. 2. Follow an argument, distinguishing between fact and opinion. 3. Understand and make some evaluation of how writers use linguistic and structural devices to achieve their effects.

	changes.		
Writing (W) (AO3)	<ol style="list-style-type: none"> 1. Communicate clearly and imaginatively, using and adapting forms for different readers and purposes. 2. Organise ideas into sentences, paragraphs and whole texts using a variety of linguistic and structural features. 3. Use a range of sentence structures effectively with accurate punctuation and spelling. 	<ol style="list-style-type: none"> 1. Articulate experience and express what is thought, felt and imagined. 2. Order and present facts, ideas and opinions. 3. Understand and use a range of appropriate vocabulary. 4. Use language and register appropriate to audience and context. 5. Make accurate and effective use of paragraphs, grammatical structures, sentences, punctuation and spelling. 	<ol style="list-style-type: none"> 1. Communicate clearly and imaginatively, using and adapting forms for different readers and purposes. 2. Organise ideas into sentences, paragraphs and whole texts using a variety of linguistic and structural features. 3. Use a range of sentence structures effectively, with accurate punctuation and spelling.

A1.3 Syllabus content

Table 2 IGCSE syllabus content compared

	CIE 0500	LE 4355
Speaking and listening (S) (AO1)	<p>OPTIONAL</p> <p>Either: Test (Paper 5)</p> <p>or: Moderated internal assessment (Paper 6)</p> <p>Separately endorsed</p>	<p>OPTIONAL (only included with coursework option)</p> <p>Record of two activities and two contexts</p> <p>Weighted at 10% but cannot be assessed within non-coursework option</p>
Reading (R) (AO2)	<p>50% overall</p> <p>(40% in Papers 0500/01 & 0500/02 and 10% in 0500/03 – the examination alternative to coursework)</p>	<p>50% (100% exam route) or 45% (exam and coursework route)</p> <p>Either: Papers 1F or 2H (35%) and Paper 03 (15%)</p> <p>or: Papers 1F or 2H (35%) and coursework (10%)</p>
Writing (W) (AO3)	<p>50% overall</p> <p>(10% in Papers 0500/01 & 0500/02 and 40% in 0500/03 – the examination alternative to coursework)</p>	<p>50% (100% exam route) or 45% (exam and coursework route)</p> <p>Either: Papers 1F or 2H (35%) and Paper 03 (15%)</p> <p>or: Papers 1F or 2H (35%) and coursework (10%)</p>
Coursework	<p>OPTIONAL</p> <p>50% (40% writing and 10% reading)</p> <p>Three written pieces worth 50% overall</p>	<p>OPTIONAL (Coursework can be replaced by Paper 3).</p> <p>30% (10% speaking and listening and 20% writing)</p> <p>Two written pieces worth 20% overall</p>

A1.3.1 Speaking and listening

In the CIE syllabus, speaking and listening is separately endorsed on a five-point scale. The marks for this assessment do not contribute to the overall grade. This differs from the national criteria for GCSE English requirement for a unified course. It is also an optional component whereas it is compulsory in terms both of the GCSE national criteria and the national curriculum for English at key stage 4.

In this syllabus, the speaking and listening component can be covered either by a test which takes approximately 10 to 12 minutes to complete or through internal assessment. In the test, the individual task is worth 10 marks and the discussion is worth 20. In the coursework, each of three tasks is allocated 10 marks.

In the Edexcel IGCSE syllabus, speaking and listening is a compulsory element within the optional coursework component. It requires the recording of two activities in two different contexts for 10 per cent of the overall weighting.

The GCSE syllabuses allocate a 20 per cent weighting to speaking and listening in line with national criteria. These require a record of three activities and three contexts.

A1.3.2 Reading

Most of the differences between IGCSE and GCSE syllabuses requirements in reading stem from the differences in audience for the qualifications, a factor implied in their titles. GCSE English is designed to deliver the key stage 4 programme of study, which includes a significant entitlement to reading literature. The two IGCSEs (English First Language and English Language) are not so designed.

In the CIE syllabus, there are 50 marks available for reading in total, of which 40 are assigned to Paper 1 (Core)/Paper 2 (Extended). The tasks are based on an unseen extract (or extracts) which was fictional in nature in 2005. The syllabus does not make clear whether this is a set format. Paper 3 offers an advertisement as a stimulus for a writing task and the mark scheme allocates some of the marks for the paper for reading associated with that stimulus.

In the coursework, assignment 3, labelled directed writing, also allocates some marks for reading. Given the nature of the sample tasks, this assignment appears to be focused on media texts.

In the Edexcel IGCSE syllabus, the marks available for reading vary according to whether the coursework option is chosen, with its assessment of speaking and listening. The tasks in the compulsory paper (Paper 1F or 2H) are based on an unseen reading passage and a passage from the supplied anthology.

A1.3.3 Reading: Shakespeare, reading from other cultures and the literary heritage

There is no requirement for responses to Shakespeare to be addressed in either of the IGCSE syllabuses. One consequence is that the quantity of reading is not as great as that for required for GCSE and there is not the same emphasis on critical analysis of literature. Some of the tasks set by AQA and Edexcel in GCSE in this area were judged to be formulaic and based on prepared materials. In addition, the extracts used in the IGCSE syllabuses were considered to be slightly more demanding than those at GCSE and were unseen. However, there is a need to engage with poetry in GCSE. This involves extended preparation and one of the tasks is unseen. Overall, the extended GCSE requirement for reading remains a significant extra demand compared to the IGCSE syllabuses.

In the Edexcel IGCSE, the use of the anthology as a source for both fiction and non-fiction texts ensures that a range of genres is studied. The anthology contains a number of texts from cultures other than English, although their study is not compulsory. The optional coursework is based on a response to reading from the anthology.

A1.3.4 Writing

In the CIE syllabus, writing is largely tested either in coursework or in its externally assessed alternative, Paper 3. A distinction is made between directed writing and composition with the former assessed for reading as well as for writing.

In the Edexcel IGCSE syllabus writing is tested in the compulsory papers and in Paper 3, the optional alternative to coursework. Three writing triplets are covered.

The GCSE syllabuses systematically assess writing across all four of the triplets identified in the national criteria. There is, typically, some degree of choice within a triplet, particularly with the AQA syllabus. Within the CIE syllabus reviewers were not always clear if a particular triplet was being targeted. In addition, depending on the choice of tasks, a candidate might attempt a limited range of writing types with an emphasis on descriptive and narrative imaginative writing.

A1.3.5 Range of topics

The IGCSE syllabuses do not test as wide a range of topics as GCSE. This is particularly the case with speaking and listening, where the GCSE requirement for a drama-focused activity is absent from both IGCSE syllabuses under review.

A1.4 Schemes of assessment

The schemes of assessment reflect the different approaches to speaking and listening in the IGCSE syllabuses. In CIE, the assessment of speaking and listening is optional, separately assessed on a scale ranging from 1 (high) to 5 (low). The assessment is attached to an IGCSE certificate, rather than certificated in its own right. In the assessment, the GCSE triplets are not targeted explicitly although there are three specified contexts: individual, pair and group. A drama-focused activity is not required and there is no mention of standard English in either the assessment objectives or the marking criteria.⁶ In addition, CIE offers an alternative route to assessment of speaking and listening through a test. In Edexcel, where speaking and listening exists as part of the optional coursework assessment, its weighting is 10 per cent.

Reviewers concluded that the schemes of assessment for IGCSE do not make the same assessment demands on candidates as do those for GCSE. GCSE students must complete three assessed components: coursework and two examination papers. In contrast, IGCSE candidates complete only two components and the examination papers are at most only slightly more demanding than those at GCSE. Thus the CIE Core examination paper is 105 minutes and the Extended paper 2 hours in duration, with either an additional 2-hour paper or coursework. Similarly, IGCSE candidates with Edexcel take a 2-hour paper and either a further paper of 90 minutes or coursework. In contrast, Edexcel GCSE candidates on the Foundation tier complete two 2-hour papers as well as

⁶This must be seen in the context of the international nature of the target candidature described earlier.

coursework. Those for AQA take two papers (90 minutes plus 105 minutes) in addition to their coursework.

In addition, the CIE syllabus does not have a defined body of content which candidates have to study prior to assessment. This is not true of either the GCSE syllabuses, which have an extended reading requirement, or of the Edexcel IGCSE syllabus, which requires the study of an anthology.

In both IGCSE syllabuses there is an untiered paper. With the Edexcel IGCSE, this included an extended passage which reviewers judged would be challenging for lower attaining candidates. Conversely, section A of the CIE Paper 3 was considered not to give more able candidates the opportunity to show what they are capable of.

Table 3 IGCSE schemes of assessment compared

	Component	Percent age	Time	Content
Edexcel	Paper 1F (Foundation tier) or	70	2 hours	Section A unseen passage Section B based on anthology text, Section C writing
	Paper 2H (Higher tier)	70	2 hours	Section A unseen passage Section B based on anthology text, Section C writing
	Paper 03 (both tiers)	30	1 hour 30 minutes	Section A based on anthology text, Section B writing
	OPTIONAL Written coursework	20	NA	Unit 1: Unit 2: explore, imagine, entertain or argue, persuade, advise
	Speaking and listening coursework	10	NA	Individual talk (explain, describe, narrate) 5% Group work (discuss, argue, persuade) 5%
CIE 0500	Paper 1 Reading passage (Core)	50	1 hour 45 minutes	All questions relate to one previously unseen text
	Paper 2 Reading passages (Extended)	50	2 hours	All three questions relate to one previously unseen text. The third also relates to a second previously unseen text.

Paper 3 Directed writing and composition (common paper alternative to coursework) or	50	2 hours	Candidates either sit this paper or submit the coursework portfolio. 50% of marks relate to one previously unseen text; 50% to writing task
Coursework portfolio (common - candidates from both tiers either submit this coursework portfolio or sit Paper 3)	50	NA	Three assignments, each of 500–800 words. Assignments 1 and 2 are both assessed for writing Assignment 3 is assessed for reading and writing. The text must be submitted with the portfolio.
OPTIONAL Speaking and listening test or	NA	12 minutes	Individual task – presentation, etc. on a topic prepared by the student. Discussion – develops from the individual task. Discussion is between the candidate and the teacher/examiner.
Speaking and listening coursework	NA	NA	Individual activity Pair-based activity Group activity

A1.5 Options

CIE offers options within the syllabus. It is possible not to do any coursework but it is also possible to do 50 per cent – a proportion which is no longer available in GCSE syllabuses, including speaking and listening. Speaking and listening is entirely optional and, where included, makes no contribution to the final grade. In speaking and listening, there is a choice between a test assessment which takes less than 15 minutes and an internal assessment based on activities undertaken within the course. It is not clear that these will be comparable in demand.

CIE allows candidates to make a choice between Core and Extended papers (Paper 1 and Paper 2) which broadly reflect the tiering in GCSE. Candidates can then also choose the common Paper 3 or coursework which requires three written tasks.

Within the papers, there is an element of choice. On Paper 1 there are two compulsory questions and on Paper 2 there are three. On Paper 3 there is one compulsory question on directed writing and a choice from six titles for extended writing.

Edexcel allows candidates to make a choice of tier of entry. These tiers (Foundation and Higher) reflect those in the current GCSE syllabuses. Candidates can then also choose

the common Paper 3 or coursework. If they choose coursework, the speaking and listening element is a requirement.

Within the papers, there is limited choice. Paper 1F has nine compulsory questions, seven of which are based on reading comprehension and two of which involve extended writing. Paper 2H has six compulsory questions, four of which are based on reading comprehension and two of which involve extended writing. The common Paper 3 has one compulsory comprehension question and a single extended writing task from a choice of three options.

In terms of routes, both IGCSE syllabuses offer alternatives which would not be compliant with the current GCSE criteria. In terms of choice in the examination papers, the situation is broadly similar to that within the GCSE syllabuses, which offer a degree of choice for writing tasks.

A1.6 Question papers

The style and type of questions in the CIE papers is broadly in keeping with that found in the current GCSE examinations. However, the Core paper includes a highly structured comprehension exercise on an unseen passage. Reviewers considered this will not have differentiated effectively.

The Extended paper includes a question (Q2) which exclusively targets assessment objective R4 (an understanding of how writers achieve their effects). This assessment objective and this task were introduced into the assessment for the first time in 2005; reviewers considered that the Core paper does not clearly target the objective.

In the compulsory Edexcel IGCSE paper (Paper 1F/2H) there is an assessment of the response to an unseen non-fiction text and to a text from the provided anthology. The questions on the two tiers are clearly differentiated. In the writing assessment, triplets are not differentiated explicitly but it is easy to infer that there is a requirement for argument at the Higher tier. In the Foundation paper in 2005 both tasks related to the triplet 'inform, explain, describe', limiting the range of the assessment.

The optional paper (Paper 3) offered a single question based on the understanding of one or more extracts from the anthology. This was considered to be set at a relatively low level in terms of demand but is clearly intended to differentiate by outcome rather than by task.

In terms of question style and layout, and in terms of the QCA CRAS analysis, the IGCSE questions are in keeping with those found in the current GCSE examinations. However, GCSE candidates spend significantly more time overall on their written papers, and also have to produce evidence for the assessment of each writing triplet. These factors represent a significantly increased demand for GCSE candidates that is not compensated for elsewhere.

A1.7 Tiering

In the CIE syllabus there is no tiering as such. However, there is a choice of examination papers to include Paper 1 (Core) and Paper 2 (Extended), with the available grades

broadly corresponding to those available to the two tiers at GCSE. In the Edexcel syllabus, the tiering used reflects that employed in GCSE.

However, both of the reviewed IGCSE syllabuses offer the choice of an alternative paper to coursework which is not differentiated by tier.

A1.8 Coursework

The coursework can be replaced in the IGCSE syllabuses by an optional Paper 3. Where the coursework option is followed it would appear to lead to a reduced level of demand in comparison to GCSE syllabuses. This is particularly the case with CIE, where 40 per cent of the credit is available for only two writing pieces with an additional 10 per cent for one piece based on reading. Each piece should be of 500–800 words. Edexcel IGCSE requires two coursework pieces but these are worth 20 per cent. The syllabus says that a coursework piece might be 450 to 600 words, but there is no penalty for exceeding the guidelines. Both GCSEs give 20 per cent weighting to their written coursework, designed to assess both reading and writing. To cover what is needed, Edexcel require three pieces and AQA four. There is no specified length to the pieces, but AQA refers to fitness for purpose and Edexcel specifies that a piece should be substantial. In addition, the GCSE syllabuses require work involving comparison, which is not explicit within either IGCSE syllabus. It should be remembered also that the GCSE coursework includes three further assessments of speaking and listening.⁷

	GCSE	CIE 0500	LE4355
Coursework	Three (Edexcel) or four pieces (AQA) worth 20% overall to assess reading and writing	OPTIONAL – Three pieces worth 50% overall Pieces 1 and 2 are assessed for writing and piece 3 is assessed for reading and writing. The text must be submitted with the portfolio.	Two pieces worth 20% overall Coursework is optional and can be replaced by an additional paper (Paper 3)

A1.9 Summary

There are several key differences that distinguish the IGCSE syllabuses from those reviewed at GCSE. Many of these derive from the different purposes of the two qualifications. For GCSE the aim is to ensure that candidates are properly tested on the key stage 4 programme of study for English as reflected in the GCSE subject criteria. The different titles for the IGCSE, First Language English and English Language, help to emphasise these differences. However, reviewers noted that candidates prepared for

⁷The AQA coursework allow candidates to opt for the oral assessment of one reading text (5 per cent of the total). Reviewers judged that this would be a less demanding route.

these syllabuses would not be assessed on significant elements in the programme of study.

The key differences are:

- The different treatment of speaking and listening. In this area, neither IGCSE syllabus complies with QCA requirements for GCSE because the assessment of speaking and listening is not part of a unified assessment, can be optional and has a lower weighting. Reviewers were concerned that candidates not entered for this element would not be assessed in a critical area of their language development.
- The IGCSE syllabuses either exclude or give low weight to whole text study, the study of Shakespeare, the study of the literary heritage and works from other cultures. There is also a reduced emphasis on the study of media texts.⁸
- Because of the reduced requirements for reading, there is a corresponding reduction in examination time and in the requirements for coursework. The effect is to make the IGCSE syllabuses less demanding.
- Optional coursework in the IGCSE syllabuses. The replacement of coursework by a relatively short examination paper restricts what is assessed; in particular, both IGCSEs assess a narrower range of writing. Reviewers were also concerned about the comparability across the optional routes. This was a particular issue with Edexcel, where the coursework route included the assessment of speaking and listening.
- Reviewers noted a lack of specificity in the IGCSE syllabuses, compared with GCSE, where the assessment of reading and writing is concerned. The place of media texts, the balance in extracts between fiction and non-fiction, and the assessment of reading through writing are all areas which lack clarity. The assessment of writing triplets and the ad hoc allocation of writing types to new triplets, the assessment of similar writing types in the same suite of examination papers and a lack of clarity over coursework writing requirements all compound that difference. The reviewers commented particularly on the comparative lack of specificity in the CIE syllabus.

Finally, reviewers wished to make clear that they also had concerns about the nature of GCSE English as currently formulated. These include concerns about workload for less able candidates, about the effective assessment of speaking and listening, about formulaic questions in examination papers, about the coursework, and about the overlaps with English Literature and the emphasis on critical analysis. They would wish fitness for purpose and manageability to be central concerns in any revision of the criteria.

⁸It should be noted that the CIE IGCSE, as with GCSEs, offers a separate English Literature syllabus.

A2 Report on the French study

Summary of the GCSE criteria for modern foreign languages

These criteria are applicable to all MFL GCSE specifications except where, in particular languages, the regulatory authorities indicate otherwise.

- 1 According to the criteria for GCSE MFL, students must be given opportunities to:
 - develop understanding of the spoken and written forms of the modern foreign language in a range of contexts
 - develop the ability to communicate effectively in the modern foreign language, through the spoken and written word, using a range of vocabulary and structures
 - develop knowledge and understanding of the grammar of the modern foreign language and the ability to apply it
 - apply their knowledge and understanding in a variety of relevant contexts which reflect their previous learning and maturity
 - develop knowledge and understanding of countries and communities where the modern foreign language is spoken
 - develop positive attitudes to modern foreign language learning
 - provide a suitable foundation for further study and/or practical use of the modern foreign language.

- 2 All GCSE MFL specifications must have a defined content consistent with national curriculum orders for MFL.

- 3 GCSE specifications must require candidates to show proficiency in the four language skills of listening, speaking, reading and writing.

- 4 A specification must specify topic areas, grammar and linguistic structures, and for Foundation level, a minimum core vocabulary.

- 5 GCSE specifications in MFL should provide opportunities for developing and generating evidence of key skills, ie application of number, communication, information technology, improving own learning and performance, problem solving, working with others.

- 6 Specifications must require candidates to demonstrate ability to:
 - AO1 understand and respond to spoken language
 - AO2 communicate in speech

- AO3 understand and respond to written language
- AO4 communicate in writing.

In AO2 and AO4 candidates must show knowledge and apply accurately the grammar and structures prescribed in the specification.

- 7 The assessment objectives must be equally weighted.
- 8 A terminal examination must carry at least 70 per cent of the total weighting.
- 9 A maximum of 10 per cent of marks may be awarded for answers in English.
- 10 The use of dictionaries will not be permitted in any external assessment.
- 11 Question papers must be tiered at two grades, A*–D and C–G.
- 12 Appendices provide grammar and structures lists for French, German and Spanish.

This study analyses the extent to which IGCSE French specifications from CIE and Edexcel conform to and diverge from these criteria as a factor in the study of comparability between these two syllabuses and the GCSE syllabuses of AQA and OCR.

Specification aims for AQA and OCR and Edexcel IGCSE are those given in the National Criteria. The aims in the CIE IGCSE specification are broadly the same but have an additional aim: 'to encourage fuller integration into the local community where relevant'. This underlines the international perspective of the examination.

A2.1 Materials considered

Reviewers looked at the syllabus documents, question papers and mark schemes for all four syllabuses reviewed. Further details are provided in section 6, 'Qualifications'.

A2.2 Assessment objectives

These are the same for both GCSE syllabuses and CIE, namely:

- AO1 Understand and respond to spoken language.
- AO2 Communicate in speech, showing knowledge of and applying accurately grammar and structures prescribed in the specification.
- AO3 Understand and respond to written language.
- AO4 Communicate in writing, showing knowledge of and applying accurately the grammar and structures prescribed in the specification.

Edexcel uses the same AO1 and AO3, but reverses and slightly amends AO2 and AO4, thus:

- AO2 Communicate in writing using a register appropriate to the situation, showing knowledge of a range of grammar and structures in common usage, and using them accurately.
- AO4 Communicate in speech showing knowledge of a range of vocabulary in common usage and of the grammar and structures prescribed in the specification and using them accurately (only applicable to candidates entered for paper 3).

Note: In Edexcel IGCSE, the speaking test is not compulsory and is endorsed separately. The candidate's grade reflects performance only in listening, reading and writing.

It seems likely that the standard order of AO2 and AO4 has been inverted in the Edexcel specification simply to reflect the add-on nature of the speaking component.

Edexcel does not offer a rationale for the format of the qualification. However, it does have some fairly wide-reaching implications:

1. Total productive language demand is limited to one skill carrying a weighting of 33.3 per cent of the total exam whereas in the other syllabuses productive language demand carries 50 per cent of total weighting.
2. There are implications for topic coverage and thus active vocabulary production.

Undoubtedly there is an impact on demand. The relatively lesser weighting for productive skills compared with other syllabuses has been noted. There is also an impact on topic coverage. Without a speaking test there is less opportunity for covering a range of topics. Across awarding bodies speaking tests all include a conversation on one or more topics, as does CIE. These include many of the GCSE topics such as home, family, school and daily routine which form the basis of many speaking tests especially at the Foundation level.

These may affect the suitability of the syllabus as a springboard to further language qualifications, since they usually have a speaking component.

There is also an impact on examination time as well as coverage. The total examining time for Edexcel is some 40 minutes less than for the GCSE syllabuses under consideration. The discrepancy with CIE is greater.

A2.3 Syllabus content

This is broadly the same across all four syllabuses.

A2.4 Scheme of assessment

OCR and AQA GCSE use the standard GCSE pattern for MFL. Each skill is assessed in a separate equally weighted paper, given a weighting of 25 per cent per skill.

Each skill is also tiered. Foundation and Higher candidates may enter for different tiers for different skill areas, with the final grade depending on the overall performance across

all four skills. The skills are examined externally by terminal examination, although writing can alternatively be assessed through coursework, when it is untiered. The speaking test is conducted by the teacher. For AQA it is externally assessed; for OCR it may be externally assessed, or internally assessed and moderated by OCR. (Where a candidate's speaking test is internally assessed, they have to take the external writing assessment.)

Examining times in the GCSE syllabuses are broadly similar, with OCR typically setting slightly longer assessments than AQA, especially at Foundation tier.

The CIE scheme of assessment is very different:

Paper	Weighting/duration: Core	Weighting/duration: Extended
1 (Listening)	33%/30 minutes	25%/45 minutes
2 (Reading and directed writing)	33%/60 minutes	25%/90 minutes
3 (Speaking)	33%/15 minutes	25%/15 minutes
4 (Continuous writing)	NA	25%/75 minutes

All candidates sit the Core curriculum papers. Those entered for Extended also sit these papers. All Extended curriculum candidates are graded twice, once on their performance on the Core papers and once on the Extended papers. Candidates are awarded the higher of the two grades they achieve. Speaking is untiered, so all candidates carry out the same tasks. All written papers are externally assessed by terminal examination. Speaking is conducted and marked by the teacher and a sample of six candidates sent for moderation by CIE. There is no coursework option. For the written papers the structure provides a sort of halfway house between tiered (as GCSE) and untiered examinations.⁹

The format of all CIE papers is broadly the same as for the GCSE. There are three sections, with Section 1 targeted at grades G, F and E. Section 2 is targeted at the GCSE overlap grades D and C, and Section 3 is targeted at GCSE grades B, A and A*. The difference is that Extended level candidates sit the whole of the Core papers as well. This gives the examination an added safety net but it also means that able candidates have to work through some unchallenging material.

The Edexcel scheme of assessment is wholly untiered:

⁹In fact the model is similar to that used at GCSE from 1988 to 1995, where candidates did either a Core or a Core plus Extended assessment in each skill, with performance across the skills aggregated to determine the final grade. The exact pattern of papers taken could also limit the grade obtained.

Paper 1	Weighting/duration
Listening	33.3%/30 minutes + 5 minutes reading time
Reading and writing	33.3% for each skill/90 minutes

Both papers are assessed by terminal examination.

There are significant differences in the total times of each examination. There are some differences between the two GCSE syllabuses:

	Foundation	Higher
AQA	1 hour 55 minutes	2 hours 50 minutes
OCR	2 hours 20 minutes	2 hours 50 minutes

For the IGCSE times are:

	Core	Extended
CIE	1 hour 45 minutes	3 hours 45 minutes
Edexcel (untiered)	2 hours 5 minutes	

The greatest disparities are not between the GCSE and the IGCSE syllabuses but between the two IGCSEs, with CIE Extended candidates having close to twice as much time being assessed as those from Edexcel. Of course, these are not the only considerations. The demands of the individual questions and tasks, which will be considered in subsequent sections, are relevant. Nevertheless the disparities in timing are a factor in determining the relative demands of the syllabuses in terms of range and depth.

A2.5 Options

Both GCSE syllabuses have coursework as an alternative to the terminal examination for writing. Coursework is untiered. In addition, OCR allows centres to opt for internal assessment of speaking, although they cannot choose internal assessment for both speaking and writing.

In the terminal writing examination AQA allows no choice. OCR, and both the IGCSE syllabuses, allow choice at the level of more demanding writing tasks, although not in the simpler tasks.

In speaking examinations all syllabuses allow some choice in a part of the test, usually one conversation topic, which is commonly preceded by a brief candidate presentation on that topic.

There is no choice in any of the listening or reading parts of any examination.

A2.6 Question papers

The speaking test for both AQA and OCR comprises role-plays (one for each tier in AQA, two per tier for OCR), a presentation and follow-up discussion on a topic chosen beforehand by the candidate and conversation on one or more topics within the syllabus but not known by the candidate in advance. Candidates are expected to use different time frames and express opinions to achieve grade C or above.

Broadly speaking the reviewers found that the GCSE question papers were similar in their use of varying task types, with mainly fixed response questions for Foundation listening and reading, and more challenging question types (matching halves of sentences, open-ended questions to be answered in French) at Higher level. Some questions, especially in OCR comprehension papers, allowed candidates to get correct answers without necessarily showing understanding, for instance by following grammatical clues. OCR Higher listening had one question that demanded a great deal of reading, which was judged to be undesirable in a listening test. All reviewers considered that the AQA examination was demanding, especially at Higher tier. The sheer number of texts to be read or listened to made for high demand.

The tasks in writing papers were appropriately targeted. Where there were alternative questions (OCR) these were judged to be comparable. It is extremely difficult to assess the impact of mark schemes for writing on the demand of the examination without seeing the way they are interpreted in candidates' work. In writing, both awarding bodies weighted marks more heavily towards quality of language and accuracy at Higher tier. Both awarding bodies give mark grids for assessing communication, quality of language and accuracy. Unless one knows how these are interpreted it is possible only to infer the demand. Both awarding bodies have quite complex and prescriptive mark schemes which do not necessarily operate in the best interest of the candidate, particularly when allied to quite prescriptive tasks. For instance, AQA has Higher writing tasks where there are bullet points to guide candidates. Candidates must cover all of the tasks to achieve maximum communication marks. For each point, minimal coverage is not enough; there must be development in the form of an additional piece of information such as an additional detail in the overlap question (C/D) or an additional phrase or clause in the more demanding question. There can be one development per task in the overlap question and up to two developments per task for the more demanding question. Reviewers doubted whether candidates, even knowing the nature of the mark scheme, will write precisely to order in this way under the pressure of the examination. OCR also has a prescriptive and extremely complex mark scheme.

For both awarding bodies, the papers were judged to provide good topic coverage. Overall, the papers and mark schemes were judged to provide adequate discrimination and differentiation so that the examinations provide a fair assessment of a candidate's ability across the full range of performance to be expected at GCSE.

The general format and variety of task types for CIE is the same as for OCR GCSE. However, one extremely important difference is that all rubrics and instructions are in the target language. This, and the absence of examples in the comprehension papers, constitutes added difficulties and in the listening paper might be a real barrier to some

candidates. It should be noted, however, that using the target language rather than English as the carrier language for rubrics and questions arises from the international nature of the target candidature, where there can be no assumptions that English is the mother tongue. It is also worth pointing out that the approach to the use of the target language has not been consistent throughout the history of the GCSE.

In both the listening and reading papers there is extremely good topic coverage. The listening paper is very demanding. The early questions are far from straightforward, with distractors, negatives and redundant language. Many questions require inference, whereas this is usually required in questions targeted at the more able.

Reading is also very demanding. The early part of the Core paper provides little that is appropriate to lower attaining candidates. The Extended paper contains some extremely long texts, two of well over 400 words. Candidates have to give quite complex answers in French to open-ended questions in French. Reviewers judged that some candidates who may have understood the passage will not have sufficient command of language to make their answers clear. The range of question types was considered to be fairly restricted.

There are two writing tasks in Paper 2, the combined core reading and writing paper. In the first of these, Ex.4 question 16, candidates are not explicitly told that they must write in sentences, although the mark scheme makes it clear that they need to do so. The second writing task, Ex.2 question 26, does not enable the candidate to meet the GCSE grade C descriptors for writing, since there is no demand for time frames other than the present.

The Extended writing paper comprises two tasks. For the first there is a choice of two titles, both requiring descriptive writing. The second is a narrative piece, with no choice. Each piece carries a mark of 25, heavily weighted towards quality of language and accuracy. The mark scheme, as with that for the second task in Paper 2, contains a long list of grammatical structures, which can be credited with ticks, and marks are awarded mechanically according to the number of ticks achieved.

The speaking test is completely untiered. It comprises two role-plays, a presentation and discussion followed by general conversation. The mark scheme is weighted towards grammatical competence and accuracy.

All in all this is a demanding examination. In all papers reviewers found little for the weakest GCSE candidates so that it is not comparable to GCSEs in genuinely targeting the full GCSE ability range. On the other hand, it would prove a challenging test for able pupils who by key stage 4 are capable of achieving higher than GCSE. Within this range, it is most suitable for candidates who have received a particular type of language training, with a focus more on technical accuracy than communicative competence.

All Edexcel IGCSE papers are untiered, with rubrics and instructions given in French and English. The listening paper is of reasonable demand although speed of delivery on the tape may be a barrier for some candidates. The first question is not really suitable for weaker candidates and may put them off. They have to extract a lot of information from quite a short text. Several later questions are cloze tests, with candidates able to lift from

the text. Reviewers questioned how reliable these would be, with examiners having to decide whether a candidate has not understood and is merely attempting to transcribe sounds heard.

Paper 2 is a combined reading and writing paper. Topic coverage in this paper was thought by the reviewers to be poor. Fifteen out of 30 marks are on the topic of work. However, the paper considered was a specimen paper and it is possible that stricter checks would have been made on an operational paper. The final question was considered challenging even for able candidates. In addition, reviewers questioned the value of expecting candidates to sit for 1.5 hours when they will be unable to make a sensible attempt at many of the questions.

Mark schemes for both listening and reading offer no alternative acceptable answers to open-ended questions. This may also be a result of the papers reviewed being sample rather than live, but without such alternatives it is difficult to assess the level of demand. Reviewers did note one unsatisfactory element to the approach to marking Paper 2: the awarding of 5 marks for language in a comprehension question. Reviewers wondered what marks would be awarded if the French is correct, but the answer in terms of comprehension is wrong.

There are two writing tasks on the paper. The first is a compulsory short descriptive piece. The second is longer, targeted at able candidates. This offers three choices: a job application letter, a discursive piece and a narrative. They provide an interesting choice for candidates, but reviewers did not consider them wholly comparable in demand. Only a generic mark scheme is provided. Weighting for language is slightly greater than for communication, but by no means as great as in the CIE syllabus.

The final grade is based entirely on performance in listening, reading and writing. However, candidates can take an optional speaking test, which is separately reported. This test comprises two parts: a presentation and discussion on a topic area chosen by the candidate, and two further conversations on two further topic areas chosen by the interviewer.

A2.7 Tiering

The issue of tiering has already been mentioned. It is a requirement of GCSE examinations. Reviewers were unclear whether the semi-tiering in CIE would meet the GCSE requirement. They also considered that the CIE syllabus provided for the needs of the lowest ability group covered by GCSE, The Edexcel syllabus, where papers are completely untiered, does not meet the tiering requirement. This has significant impact on the range and depth of the assessment. Where one paper has to target all ability levels there will be fewer questions appropriate to any one target group.

A2.8 Coursework

This has already been discussed. Coursework (though with some different conditions) is a feature of the GCSE syllabuses. It is not an option in either of the two IGCSE syllabuses under consideration.

A2.9 Summary

All four syllabuses test broadly the same range of topics.

Overall the reviewers found that AQA and OCR GCSE provided appropriate assessment for the full range of candidates for a GCSE examination although the AQA examination was judged to be somewhat more demanding.

Reviewers did not consider CIE to be appropriate as a direct equivalent of a GCSE qualification. It is not suitable for the full ability range since there was insufficient material appropriate for the less able candidates. It is a demanding examination in terms of amount and depth of testing across all four language skills. It is suitable for candidates who are capable of reaching a level somewhat beyond GCSE in terms of a high level of linguistic competence and accuracy. A wide range of topics is tested and the demand in writing is heavily weighted towards linguistic rather than communicative skill.

Edexcel was more difficult to assess. It is further removed in format from GCSE than the CIE syllabus and reviewers were not entirely in agreement about its level of demand. These varied opinions can be explained in terms of the factor seen to be most important in evaluating the examination. From the point of view of topic coverage it is less demanding than other syllabuses. On the other hand, there is very little in the papers for the lowest attaining candidates. At the top end of the range some individual questions are demanding and require high-order skills. However, because of the time limitations of untiered papers there are not many of these, so that it is not a sufficiently wide-ranging test of high-flying candidates.

The other significant factor in assessing the demands of this syllabus is the fact that there is no compulsory speaking component and the candidate is awarded a grade on the three skills of listening, reading and writing. The omission of one of the active skills from a language examination raises questions about its validity as an overall assessment of language.

Overall, neither IGCSE can be considered a comparable examination to national GCSEs. Equally, they are too different from each other to be considered to offer a comparable challenge.

A3 Report on the mathematics study

The 2002 criteria define the subject specific essentials for GCSE syllabuses in mathematics which must also meet the requirements of the appropriate national curriculum (NC) order for mathematics.¹⁰

Syllabuses must identify the relevant content from the appropriate tier. They should also provide opportunities for developing and generating evidence for assessing the key skills (application of number, communication, information technology, improving own learning and performance, problem solving and working with others).

The assessment objectives (and weightings) relate to knowledge, skills and understanding in the following areas:

- AO1 Using and applying mathematics (10 per cent external assessment in the context of AO2 or AO3, 10 per cent coursework)
- AO2 Number and algebra (40 per cent external assessment)
- AO3 Shape, space and measures (20 per cent external assessment)
- AO4 Handling data (10 per cent external assessment, 10 per cent coursework).

Externally assessed components requiring written responses must have three tiers of assessment:

- a Foundation tier awarding grades G–D
- an Intermediate tier awarding grades E–B
- a Higher tier awarding grades C–A*.

Assessment should be balanced across the grades within each tier except for the Foundation tier, where approximately one-third of the marks should target grade G.

There should be a sufficient proportion of questions demanding the unprompted solution of multi-step problems. Grade descriptors are provided to give a general indication of the standards of achievement likely to have been shown by candidates awarded particular grades.

¹⁰It should be noted that the CIE syllabus has undergone significant changes for 2006 and that GCSE syllabuses are due for revision in 2008.

A3.1 Materials considered

Reviewers considered the syllabus documents and question papers with associated mark schemes from both of the awarding bodies offering IGCSE and from AQA and Edexcel for GCSE. Details of the syllabuses included in the study are given in section 6, 'Qualifications'.

A3.2 Assessment objectives

	Edexcel/AQA GCSE	Edexcel IGCSE	CIE IGCSE
AO1 Using and applying mathematics	10% coursework 10% exam papers	Not specified explicitly No coursework option	Optional coursework
AO2 Number and algebra	40% exam papers	55% exam papers	Not specified explicitly*
AO3 Shape, space and measures	20% exam papers	25% exam papers	Not specified explicitly*
AO4 Handling data	10% coursework 10% exam papers	20% exam papers	Not specified explicitly*

*A rough analysis of marks for the paired papers 1C and 3C, 2E and 4E indicates a breakdown in the region of 50 per cent number and algebra, 40 per cent shape, space and measures and 10 per cent data handling.

Edexcel IGCSE has a narrower focus because it does not contain a coursework element. In addition inspection of the terminal papers for Edexcel IGCSE suggests there is no increased emphasis on assessing using and applying mathematics. Indeed the style and structure of the questions that appear on the papers for Edexcel IGCSE are virtually indistinguishable from those on their GCSE papers. Consequently all reviewers judged that in comparison with GCSE, Edexcel IGCSE was less demanding in terms of assessment objectives.

CIE IGCSE has a different structure from the other three qualifications. Its assessment objectives are stated in more general terms and are not classified according to AO1 to AO4. In order to identify possible weightings it is necessary to analyse the allocation of marks within the papers. On this basis, reviewers agreed that CIE is similar to GCSEs in terms of assessment objectives.

A3.3 Syllabus content

A comparison of content in the two IGCSE and the GCSE syllabuses (the syllabus content for both GCSEs is the same) yielded the following significant differences.

Table 4 Topics included in GCSE but not included in Edexcel IGCSE

Comment	All reviewers remarked that because IGCSE is assessed without coursework there were no explicit statements regarding using and applying mathematics. There is a paragraph 4.7 in AO2 Foundation and Higher syllabuses related to geometrical reasoning.
Number	Repeated proportional change (eg compound interest)
Algebra	<p>Construct the graphs of simple loci</p> <p>Solve quadratic equations by completing the square</p> <p>Use systematic trial and improvement to find approximate solutions of equations where there is no simple analytical method of solving them</p> <p>Plot graphs of an exponential function for integer values of x, the circular functions $y = \sin x$, $y = \cos x$</p> <p>Apply to the graph of $y = f(x)$ the transformations $y = f(x) + a$, $y = f(ax)$, $y = f(x + a)$, $y = af(x)$ for linear, quadratic, sine and cosine functions $f(x)$</p> <p>Construct the graphs of simple loci, including the circle $x^2 + y^2 = r^2$ for a circle radius r centre the origin</p> <p>Exponential growth and graphs of exponential functions</p> <p>Geometric significance of solving a linear and a quadratic equation simultaneously</p>
Shape	<p>Prove alternate segment theorem (use of appears on both syllabuses)</p> <p>Given the coordinates of the points A and B find the length AB</p> <p>Formal proofs of congruence</p> <p>Frustrum of a cone</p> <p>Enlargement with negative scale factors</p> <p>Loci</p>
Data	<p>Calculate an appropriate moving average</p> <p>Scatter graphs and drawing lines of best fit by eye</p> <p>Identify seasonality and trends in time series</p> <p>Appreciate that correlation is a measure of the strength of the association between two variables</p> <p>Distinguish between positive, negative and zero correlation using lines of best fit</p> <p>Appreciate that zero correlation implies merely 'no linear relationship'</p> <p>Two-way tables (not explicit)</p> <p>Questionnaires</p> <p>Sampling</p> <p>Box plots</p>

Table 5 Topics included in Edexcel IGCSE but not included in GCSE

Comment	A great deal of the extra material is contained in Papers 3H and 4H
Number	<p>Understand the definition of a set of numbers</p> <p>Understand sets defined in algebraic terms</p> <p>Use the set notation for 'union', 'intersection' and 'is a member of'</p> <p>Understand the concept of the universal set and the null set and the symbols for these sets</p> <p>Understand and use subsets</p> <p>Understand and use the complement of a set</p> <p>Use Venn diagrams to represent sets and the number of elements in sets</p> <p>Use the notation $n(A)$ for the number of elements in the set A</p> <p>Use sets in practical situations</p> <p>Evaluate the lowest common multiple (LCM) and highest common factor (HCF)</p> <p>Solve problems using upper and lower bounds where values are given to a degree of accuracy (The reference at GCSE is much narrower.)</p>
Algebra	<p>Understand and use the convention for open and closed intervals on a number line</p> <p>Represent simple linear inequalities on rectangular Cartesian graphs</p> <p>Identify regions on rectangular Cartesian graphs defined by simple linear inequalities</p> <p>Harder examples of regions defined by linear inequalities</p> <p>Manipulate algebraic fractions where the numerator and/or the denominator can be numeric, linear or quadratic</p> <p>Use (algebraic) index notation involving fractional powers</p> <p>Understand the concept that a function is a mapping between elements of two sets</p> <p>Use function notations of the form $f(x) = \dots$ and $f:x \rightarrow \dots$</p> <p>Understand the terms 'domain' and 'range' and which parts of a domain need to be excluded</p> <p>Understand and use the notations composite function fg and inverse function</p> <p>Plot graphs of the form $y = Ax^3 + Bx^2 + Cx + D + E/x + F/x^2$ where the constants are numerical and at least three are zero</p> <p>Find gradients of non-linear graphs (by drawing a tangent)</p> <p>Understand the concept of a variable rate of change</p> <p>Differentiate integer powers of x</p> <p>Determine gradients, rates of change and turning points (maxima and minima) by differentiation, and relate these to graphs</p> <p>Distinguish between maxima and minima by considering the general</p>

	shape of the graph Apply calculus to linear kinematics and to other simple practical problems
Shape	*Recognise line and rotational symmetry *Identify any lines of symmetry and the order of rotational symmetry of a given two-dimensional figure Understand and use the internal and external intersecting chord properties Understand and use angles of elevation and depression Calculate the modulus (magnitude) of a vector
Data	No significant differences

*These features are not explicitly stated in GCSE syllabuses but are assessed in exam.

Table 6 Topics included in GCSE but not included in CIE IGCSE

Comment	The IGCSE syllabus is displayed in a different way. It has 37 sections which have specific titles and similar topics are usually grouped together. Core syllabuses and Extended syllabuses are set out as the second and third columns.
Number	Represent repeated proportional change using a multiplier raised to a power, eg compound interest Use surds and π without a calculator, rationalise a denominator such as $1/\sqrt{3} = \sqrt{3}/3$
Algebra	Use simple instances of (algebraic) index laws Use systematic trial and improvement to find approximate solutions of equations where there is no simple analytical method of solving them Construct the graphs of simple loci Transformation of graphs Equation of circle $x^2 + y^2 = r^2$ for a circle radius r , centre the origin Conditions on gradients for perpendicularity Simultaneous equations with one linear and one quadratic
Shape	Prove circle theorems angle subtended at centre twice angle subtended at circumference, angle subtended at the circumference is a right angle and alternate segment theorem (prove not stated in IGCSE syllabuses) Find the coordinates of the midpoint of a line segment
Data	Calculate an appropriate moving average Scatter graphs and drawing lines of best fit by eye Identify seasonality and trends in time series Appreciate that correlation is a measure of the strength of the association between two variables Distinguish between positive, negative and zero correlation using lines of best fit Appreciate that zero correlation implies merely 'no linear relationship' Two-way tables Box plots Questionnaires Sampling

Table 7 Topics included in CIE IGCSE but not included in GCSE

Comment	See above
Number	<p>Use language, notation and Venn diagrams to describe sets and represent relationships between sets as follows:</p> <p>Definition of sets</p> <p>Number of elements in set A $n(A)$</p> <p>'...is an element of...'/ '...is not an element of...'</p> <p>Complement set of A</p> <p>The empty set</p> <p>Universal set</p> <p>A is a subset of B/A is a proper subset of B</p> <p>A is not a subset of B/A is not a proper subset of B</p> <p>Union of A and B</p> <p>Intersection of A and B</p> <p>Give appropriate upper and lower bounds for data given to a specified accuracy</p> <p>Obtain upper and lower bounds to solutions of simple problems (This is much more superficial in GCSE.)</p>
Algebra	<p>Plot graphs of the form $y = Ax^3 + Bx^2 + Cx + D + E/x + F/x^2$ where the constants are numerical and at least three are zero</p> <p>Manipulate algebraic fractions with numerators and denominators that are numeric, linear or quadratic</p> <p>Gradients of curves by drawing tangents</p> <p>Use function notations of the form $f(x) = \dots$ and $f:x \rightarrow \dots$ to describe simple functions</p> <p>Understand and use the notations composite function fg and inverse function</p> <p>Represent inequalities graphically and use this representation in the solution of simple linear programming (the conventions of using broken lines for strict inequalities and shading unwanted regions will be expected)</p> <p>Speed time graphs with gradient representing acceleration and area under graph representing distance</p>
Shape	<p>Solve trigonometrical problems in two dimensions involving angle of elevation and depression</p> <p>Calculate the magnitude of a two-dimensional vector.</p> <p>Use of shear and stretching transformations of the plane</p> <p>*Recognise rotational and line symmetry (including order of rotational symmetry) in two dimensions</p> <p>*Recognise symmetry properties of the prism (including cylinder) and the pyramid (including cone)</p>

Data	No significant differences
Matrices	<p>Display information in the form of a matrix of any order</p> <p>Calculate the sum and product (where appropriate) of two matrices</p> <p>Calculate the product of a matrix and a scalar quantity</p> <p>Use the algebra of 2×2 matrices, including the zero, and identity 2×2 matrices</p> <p>Calculate the determinant and inverse of a non-singular matrix</p> <p>Describe transformations using coordinates and matrices (singular matrices are excluded) using notation $AB(x)$ meaning first B on x then A on the resultant</p>

*Not explicitly stated in GCSE syllabuses but assessed in terminal papers

A comparison of the IGCSE syllabuses yielded the following differences.

Table 8 Topics included in CIE but not included in Edexcel IGCSE

Comment	There is a great deal of overlap between the two. The main differences are specific topics (loci, matrices and associated shear and stretch transformations)
Number	No significant omissions
Algebra	Calculate distance travelled as area under linear speed–time graph Construct tables of values and draw graphs for (positive integer) exponential functions Calculate the length of a straight line segment the coordinates of its end points
Shape	Use the following loci and method of intersecting loci for sets of points in two dimensions: <ul style="list-style-type: none"> • which are at a given distance from a point • which are at a given distance from a given straight line • which are equidistant from two given points • which are equidistant from two given intersecting straight lines Use of shear and stretching transformations of the plane
Data	No significant differences
Matrices	Display information in the form of a matrix of any order Calculate the sum and product (where appropriate) of two matrices Calculate the product of a matrix and a scalar quantity Use the algebra of 2×2 matrices, including the zero, and identity 2×2 matrices Calculate the determinant and inverse of a non-singular matrix Describe transformations using coordinates and matrices (singular matrices are excluded) using notation $AB(x)$ meaning first B on x then A on the resultant

Table 9 Topics included in Edexcel but not included in CIE IGCSE

Comment	There is a great deal of overlap between the two and the main differences are specific topics (surds and calculus)
Number	Understand the meaning of surds Manipulate surds, including rationalising the denominator where the denominator is a pure surd Evaluate HCF and LCM
Algebra	Understand and use the convention for open and closed intervals on a number line Determine the coordinates of the midpoint of a line segment given the

	coordinates of the two end points Solving simultaneous equations in two unknowns, one equation being linear and the other equation being quadratic Solve quadratic inequalities in one unknown and represent the solution set on a number line
Shape	Understand and use the internal and external intersecting chord properties
Data	No significant differences
Calculus	Understand the concept of a variable rate of change Differentiate integer powers of x Determine gradients, rates of change, turning points (maxima and minima) by differentiation and relate these to graphs Distinguish between maxima and minima by considering the general shape of the graph Apply calculus to linear kinematics and to other simple practical problems

A3.3.1 Depth of topics covered

There is a good deal of common material in all four syllabuses and there is some consistency in the topics introduced at IGCSE (sets and functions).

The depth covered in data handling is significantly less for the two IGCSEs; indeed all the topics covered in data handling at IGCSE are covered by GCSE. The two IGCSE syllabuses are very similar in their treatment of data handling. When taken with the data handling requirement in the GCSE coursework, this aspect of mathematics is significantly less demanding in the IGCSE than in GCSE.

Comparing GCSE content with IGCSE content, aside from the significantly higher data handling coverage at GCSE, topics absent from both IGCSE syllabuses but present in GCSE include:

- repeated proportional change (eg compound interest)
- constructing graphs of simple loci, including the equation $x^2 + y^2 = r^2$ for a circle radius r , centre the origin
- use systematic trial and improvement to find approximate solutions of equations where there is no simple analytical method for solving them
- transformation of graphs
- prove the alternate segment theorem.

These topics appear at the Intermediate and Higher tiers.

Reviewers agreed that each qualification had pitched coverage in terms of depth at about the correct level. However, when considering depth of coverage through the questions

asked in the terminal papers, there is a suggestion that CIE is slightly more demanding than both GCSE qualifications, especially for Extended papers, due in no small part to the structure and time allowed in Paper 4E. Edexcel IGCSE is slightly less demanding than both GCSE boards.

A3.3.2 Range of topics covered

The tables above show differences between the syllabuses in terms of their range of topics. However, on balance reviewers considered that the omissions and additions balanced each other out.

Again reviewers took the nature of the question papers as a further guide to their judgement, and considered that Core/Foundation tier at IGCSE was broadly comparable to GCSE intermediate tier.

A3.3.3 Number of topics covered

Reviewers agreed that both GCSE syllabuses were comparable in terms of number of topics. However, the position was less clear when comparing IGCSE, especially when the examination papers were taken into account.

A3.4 Scheme of assessment

Table 10 shows the structure of each examination by tier. The table below shows the numbers of questions contained in each paper for each qualification. Note that CIE Papers 1C and 2E consist of short answer questions whereas 3C and 4E contain extended but highly structured questions which often assess more than one topic within a question. Papers 3C and 4E cover fewer topics than the other examinations, which places a particular pressure on candidates in terms of knowledge of the subject content.

	Edexcel GCSE	AQA GCSE	Edexcel IGCSE	CIE IGCSE
Foundation	1F 23 questions 2F 26 questions	1F 24 questions 2F 27 questions	1F 23 questions 2F 18 questions	1C 23 questions 3C 8 questions
Intermediate	1I 26 questions 2I 26 questions	1I 22 questions 2I 24 questions		
Higher	1H 22 questions 2H 20 questions	1H 20 questions 2H 22 questions	3H 22 questions 4H 19 questions	2E 21 questions 4E 9 questions

Table 10 Scheme of assessment

	Edexcel/AQA GCSE	Edexcel IGCSE	CIE IGCSE
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Foundation	1F assesses grades DEFG 2F assesses grades DEFG 1 hour 30 minutes each 100 marks per paper	1F assesses grades CDEFG 2F assesses grades CDEFG 2 hours each 100 marks per paper	1C assesses grades CDEFG 3C assesses grades CDEFG 1 hour (1C) 56 marks 2 hours (3C) 104 marks
Total time	3 hours	4 hours	3 hours
Total marks	200	200	160 marks
Time/mark	0.9 minutes per mark	1.2 minutes per mark	1.125 minutes per mark
Intermediate	1I assesses grades BCDE 2I assesses grades BCDE 2 hours each 100 marks per paper		
Total time	4 hours		
Total marks	200		
Time/mark	1.2 minutes per mark		
Higher	1H assesses grades A*ABC 2H assesses grades A*ABC 2 hours each 100 marks per paper	1H & 2H assess grades A*ABCDE 2 hours each 100 marks per paper	2E & 4E assesses grades A*ABCDE 1 h 30m (2E) 70 marks 2h 30m (4E) 130 marks
Total time	4 hours	4 hours	4 hours
Total marks	200	200	200
Time/mark	1.2 minutes per mark	1.2 minutes per mark	1.2 minutes per mark

GCSE paper weightings 40 per cent each. For each tier, candidates also do compulsory coursework, which comprises two tasks, one involving using and applying mathematics, the other data handling. In addition, for all tiers one of the GCSE papers does not permit the use of a calculator.

IGCSE Edexcel 50 per cent each. Calculators are allowed in all papers.

CIE 1C & 2E 30 per cent (coursework) 35 per cent (non-coursework), 3C & 4E 50 per cent (coursework) 65 per cent (non-coursework). The (optional) CIE coursework is only counted if it is to the candidate's advantage. Scientific calculators are allowed in all papers.

Note: Despite the variations in time/mark at the Foundation tier, there was no indication in any examiner's report that time pressure was a factor.

A3.5 Options

There are three tiers at GCSE. Candidates are entered at Foundation, Intermediate or Higher level and take a pair of papers (one non-calculator and one calculator) at the appropriate level. Compulsory coursework is assessed in line with a candidate's tier of entry.

Both IGCSEs offer two routes. Edexcel IGCSE candidates are entered at Foundation or Higher level and take a pair of papers (both allow calculator) at the appropriate level. No coursework is submitted. CIE candidates are entered at Core or Extension level and take a pair of papers (again both allow calculators) at the appropriate level. Coursework is optional. (In practice just over 1 per cent of centres submitted coursework.)

All questions in all papers are compulsory. Apart from tier of entry, the only option available is for CIE coursework.

The effect of allowing calculators in both papers for IGCSE is unclear: it is by no means obvious that it makes a paper easier. What is clear, however, is that this, alongside the compulsory coursework, represents a real difference between the two pairs of qualifications. The testing of candidates' mathematics without the use of a calculator is a central part of the current philosophy of the assessment of mathematics at all phases of education in England, up to and including A level.

In order to assess relative demand over the various tiers available reviewers considered each pair of papers. This analysis suggested that Edexcel IGCSE at Foundation level is comparable to both GCSE Foundation papers whereas CIE Core papers are closer to GCSE Intermediate papers in terms of level of difficulty. The four Higher tier papers were broadly in line. These judgements need to be considered alongside the grades available in the various tiers.

A3.6 Question papers

Reviewers considered each suite of papers in terms of coverage of the syllabus content. The analysis suggested that there is significantly more of the Edexcel IGCSE content that is not assessed in the final papers than with the others. CIE addresses marginally more of its syllabus content in the final papers than the GCSE syllabuses. However, the fact that coursework is compulsory at GCSE extends the demands on GCSE candidates (possibly addressing some of the syllabus not covered in the final papers).

The extent to which candidates are expected to recall formulae in an examination or are provided with them is a factor where the current nature of GCSE reflects a particular view of the appropriate balance. Reviewers therefore compared the provision of formulae across the four syllabuses. This resulted in the following judgements about the effects of the formulae provided:

- it made Edexcel IGCSE significantly less demanding at both tiers
- it made both GCSEs more demanding
- it made CIE IGCSE more demanding.

In comparison with the other syllabuses, CIE is distinctive. It offers strictly limited provision of formulae; candidates taking Paper 4E are required to use a separate answer booklet (ie space is not given on the question paper to respond to each part of a question), which means that candidates need to demonstrate organisation and a systematic approach. Candidates are allowed to use only scientific calculators, and in Paper 4E candidates need to choose their own strategy in answering a question. All these factors mean that reviewers judged the CIE IGCSE (Extended) to be significantly more demanding overall than the others.

Edexcel IGCSE features a broad provision of formulae at all tiers, questions that are very similar to those at GCSE and no coursework. Reviewers judged Edexcel IGCSE as the least demanding of the four sets of question papers.

Reviewers agree that CIE Paper 4E is (by a long way) the most demanding individual paper out of all the papers offered.

A3.7 Tiering

The differing tiering structures in the two pairs of examinations have already been explored fully in A3.4 and A3.5.

A3.8 Coursework

Coursework at GCSE is currently compulsory.¹¹ Coursework at IGCSE is either not available (Edexcel) or is offered on an optional basis (CIE) with the proviso that it cannot penalise a candidate's overall grade, only enhance it. Evidence shows that most centres do not submit coursework, preferring instead to take advantage of the availability of increased teaching time. (The latter point has important implications for the demand of a qualification but these are very hard to estimate.)

Reviewers judged that CIE coursework demands were essentially less than those at GCSE but that this was to an extent irrelevant in the light of the small take-up by centres. It is important to note, however, that the use of a component of an examination that is entirely optional (that is, it is not an alternative to another component) and which can only benefit the candidate is not a practice that has been permitted in GCE or GCSE examinations for many years.

Overall, reviewers judged that the differing approaches to coursework between GCSE and IGCSE lowered the demands of the IGCSE in comparison with GCSE.

A3.9 Summary

GCSE and IGCSE have much common content, some content unique to GCSE and some content unique to IGCSE. The two IGCSE syllabuses have a great deal of common content but have topics unique to each.

¹¹Coursework will be removed for candidates taking GCSE in 2009.

Both IGCSEs incorporate a significantly narrower assessment of data-handling techniques.

Edexcel IGCSE was judged the least demanding of the four syllabuses analysed because:

- lack of coursework means that it has a narrower focus than GCSE
- significantly less of the Edexcel IGCSE syllabus was assessed in the papers in comparison with other syllabuses
- an extensive list of formulae was provided (at all tiers)
- a graphical calculator is allowed on both papers.

The CIE examination papers were considered demanding (with paper 4E viewed as the most demanding individual paper) because:

- there is a limited supply of formulae (there are no formula sheets)
- only scientific calculators allowed
- extensive structured questions, particularly at Extended level, require organisation and a systematic approach from candidates
- there are questions on the Extended paper which require the candidates to choose their own strategies
- there are fewer very simple 1-mark questions in Core papers (although this might make them very demanding for lower-attaining candidates)
- although data-handling questions are straightforward there are fewer of them and so they contribute less.

However, the overall rating of CIE depends to a significant extent on the value given to the compulsory coursework in GCSE. As well as the demands on the candidates involved in carrying out two extended investigations of differing aspects of mathematics, there is the impact that completing the coursework has on planning and delivering the course.

Appendix to the mathematics report: details of topics not covered in the 2005 examinations for each qualification

Table 11 Significant areas of AQA GCSE syllabus NOT covered in examination

Number	Order fractions by rewriting them with a common denominator Round to a given number of significant figures
Algebra	<p>Cancelling common factors in algebraic rational expressions</p> <p>Set up and use equations to solve word and other problems involving inverse proportion</p> <p>Solve quadratic equations by completing the square</p> <p>Use systematic trial and improvement to find approximate solutions of equations where there is no simple analytical method of solving them</p> <p>Find the gradient of lines given by equations of the form $y = mx + c$</p> <p>Explore the gradients of parallel and perpendicular lines</p> <p>Understand that in $y = mx + c$ that m is the gradient of the line and c is the value of the y-intercept</p> <p>Plot graphs of simple reciprocal functions</p>
Shape	<p>Understand the proof that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices</p> <p>Understand and use SSS, SAS, ASA and RHS conditions to prove congruence of triangles</p> <p>Use Pythagoras in three-dimensional problems</p> <p>Understand similarity of triangles and other plane figures</p> <p>Calculate the area of a triangle using $0.5ab \sin C$</p> <p>Understand and use the fact that tangents from an external point are equal in length</p> <p>Explain why the perpendicular from the centre to a chord bisects the chord</p> <p>Understand that inscribed regular polygons can be constructed by equal divisions of a circle</p> <p>Use the facts that the angle subtended at the circumference by a semicircle is a right angle, that angles in the same segment are equal and that opposite angles of a cyclic quadrilateral sum to 180 degrees</p> <p>Prove the alternate segment theorem</p> <p>Solve problems involving surface areas and volumes of prisms, cylinders, cones and spheres</p> <p>Understand that translations are specified by giving a vector</p> <p>Understand the difference between formulae for perimeter, area and volume by considering dimensions</p> <p>Given points A and B calculate the length AB</p> <p>Use a straight edge and compasses to do standard constructions, including the midpoint and perpendicular bisector of a line segment</p> <p>Calculate the lengths of arcs</p>

Data	Draw and produce cumulative frequency tables and diagrams, and box plots (possibly covered in coursework) Find the quartiles and IQR for large data sets Identify seasonality in time series
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Table 12 Significant areas of Edexcel GCSE syllabus NOT covered in examination

Number	Use the concepts and vocabulary of factor and common factor Rationalise a denominator expressed as a surd
Algebra	Interpret simultaneous equations as two lines and their common solution as the point of intersection Represent solution sets to simple linear inequalities on a number line Solve several linear inequalities in two variables and find the solution set Solve quadratic equations by completing the square Solve, exactly, by elimination of an unknown, two simultaneous equations in two unknowns, one of which is linear in each unknown and the other is linear in one unknown and quadratic in the other unknown, or of the form $x^2 + y^2 = r^2$ Construct linear functions and plot the corresponding graphs arising from real-life problems Find approximate solutions of a quadratic equation from the graph of the corresponding quadratic function Find the intersection points of the graphs of a linear and a quadratic function, knowing that these are the approximate solutions of the corresponding simultaneous equations representing the linear and quadratic functions Plot the graph of a (positive integer) exponential function Construct the graph of simple loci including $x^2 + y^2 = r^2$
Shape	Understand the proof that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices Understand congruence Recall and use the formula for the area of a parallelogram Convert between volume measures Understand and use SSS, SAS, ASA and RHS conditions to prove congruence of triangles Finding the angle between a line and a plane Explain why the perpendicular from the centre to a chord bisects the chord Use the facts that angles in the same segment are equal and that opposite angles of a cyclic quadrilateral sum to 180 degrees Prove and use the alternative segment theorem Solve problems including segments of circles and frustrums of cones Understand that translations are specified by giving a vector Given the coordinates of A and B, calculate the length AB Use straight edge and compasses to do standard constructions, eg perpendicular bisector of a line segment, bisector of an angle Find loci by reasoning
Data	Calculate an appropriate moving average Draw and produce box plots, histograms and stem and leaf diagrams (possibly covered in coursework) Identify seasonality and trends in time series

Table 13 Significant areas of Edexcel IGCSE syllabus NOT covered in examination

Number	<p>Use directed numbers in practical situations</p> <p>Identify prime factors, common factors and common multiples</p> <p>Apply common denominators to order fractions</p> <p>Express integers as the product of powers of prime factors</p> <p>Use index laws to simplify and evaluate numerical expressions involving integer, fractional and negative powers</p> <p>Evaluate HCF and LCM</p> <p>Understand and use subsets, complement of a set</p> <p>Use Venn diagrams to represent sets and the number of element in sets (using associated notation $n(A)$)</p> <p>Divide a quantity in a given ratio</p> <p>Solve problems using upper and lower bounds where values are given to a degree of accuracy</p>
Algebra	<p>Calculate the exact solution of two simultaneous equations in two unknowns</p> <p>Understand and use the convention for open and closed intervals on a number line</p> <p>Represent solution sets to simple linear inequalities on a number line</p> <p>Represent simple/harder linear inequalities on rectangular Cartesian graphs and identify regions defined by these linear inequalities</p> <p>Interpret information presented in a range of linear and non-linear graphs</p> <p>Determine the coordinates of the midpoint of a line segment given the coordinates of the two end points</p> <p>Draw and interpret straight line conversion graphs</p> <p>Recognise $y = mx + c$ as a straight line graph and understand the concept of a gradient of a straight line</p> <p>Use index notation involving fractional powers</p> <p>Set up problems involving direct or inverse proportion and relate algebraic solutions to graphical representations of the equations</p> <p>Solve simultaneous equations, one linear and the other quadratic</p> <p>Solve quadratic inequalities in one unknown and represent the solution set on a number line</p> <p>Plot graphs of the form $y = Ax^3 + Bx^2 + Cx + D + E/x + F/x^2$ where the constants are numerical and at least three are zero</p> <p>Find gradients of non-linear graphs (by drawing a tangent)</p> <p>Apply calculus to linear kinematics and to other simple practical problems</p>
Shape	<p>Estimate the size of an angle in degrees</p> <p>Understand that two or more polygons with the same shape and size are said to be congruent to each other</p> <p>Interpret scales on a range of measuring instruments</p> <p>Calculate time intervals in terms of the 24- and 12-hour clocks</p>

	<p>Understand and use the relationship between average speed, distance and time</p> <p>Solve problems using scale drawings</p> <p>Use straight edge and compasses to construct the perpendicular bisector of a line segment and construct the bisector of an angle</p> <p>Understand chord and tangent properties of circles</p> <p>Understand and use rotations and reflections</p> <p>Use and interpret maps and scale drawings</p> <p>Find the surface area and/or volume of a sphere and a right cone using relevant (provided) formulae</p> <p>Convert between volume measures</p> <p>Calculate the modulus (magnitude) of a vector</p>
Data	<p>Use appropriate methods of tabulation to enable the construction of statistical diagrams</p> <p>Understand the concept of a measure of spread</p> <p>Estimate the interquartile range from given data or from a cumulative frequency diagram</p>

Table 14 Significant areas of CIE IGCSE syllabus NOT covered in examination

Number	<p>Rational and irrational numbers</p> <p>Set concepts/notation subsets, proper subset, not a subset, empty set, universal set</p> <p>Calculations involving profit and loss</p> <p>Use and interpret fractional indices</p>
Algebra	<p>Interpret and use conversion graphs</p> <p>Demonstrate familiarity with the rate of change of 'easy' kinematics involving s–t and v–t graphs, acceleration and deceleration</p> <p>Calculate distance travelled as area under a linear speed–time graph</p> <p>Find the gradient of a straight line graph</p> <p>Calculate the length of a straight line segment from the coordinates of its end points</p>
Shape	<p>Express quantities in terms of larger or smaller units</p> <p>Read clocks, dials and timetables</p> <p>Use the relationships between areas of similar triangles, with corresponding results for similar figures and extension to volumes and surface areas of similar solids</p> <p>Use straight edge and compasses to construct the perpendicular bisector of a line segment and construct the bisector of an angle</p> <p>Equal chords are equidistant from the centre</p> <p>The perpendicular bisector passes through the centre</p> <p>Tangents from an external point are equal in length</p>

	<p>Angles in same segment are equal</p> <p>Angles in opposite segments are supplementary</p> <p>Solve simple trigonometrical problems in three dimensions, including angle between a line and a plane</p> <p>Calculate the magnitude of a vector</p> <p>Use stretching of the plane as a transformation</p>
Data	Identify the modal class from a grouped frequency distribution
Matrices	<p>Calculate the product of a matrix and a scalar quantity</p> <p>Use the algebra of 2×2 matrices, including the zero, and identity 2×2 matrices</p> <p>Calculate the determinant and inverse of a non-singular matrix</p> <p>Describe transformations using coordinates and matrices (singular matrices are excluded) using notation $AB(x)$ meaning first B on x then A on the resultant</p>

A4 Report on the science study

GCSE science syllabuses in 2005 conformed to the 2002 criteria, the main requirements of which are:

Aims

Students should be given opportunities to:

- acquire scientific knowledge and the skills needed to apply this in new and changing situations in a range of contexts
- acquire an understanding of how scientific ideas develop, the factors which may affect their development and their power and limitations
- plan and carry out a range of investigations, using ICT where appropriate
- evaluate the benefits and drawbacks of scientific development in terms of their scientific knowledge and understanding
- select, organise and present information using appropriate scientific terms and conventions and using ICT where appropriate.

Content

Specifications for double award should address all aspects of all sections of the key stage 4 programme of study for the part which refers to the Higher tier and must include aspects of every area of study for the part which refers to the Foundation tier.

Key skills

Specifications must provide opportunities for developing and generating evidence for assessing key skills and where appropriate these opportunities must be directly cross-referenced.

A4.1 Materials considered

Reviewers considered the syllabus documents and question papers with associated mark schemes from both of the awarding bodies offering IGCSE and from AQA and OCR. Details of the syllabuses included in the study are given in section 6, 'Qualifications'. Specimen question papers and mark schemes were considered for the Edexcel syllabus, as the first operational examination was in June 2006. AQA provided specification grids for the examination papers and examiners' reports were available for AQA, OCR and the CIE coordinated paper.

A4.2 Assessment objectives

AO1 Knowledge and understanding

Candidates must be able to:

- recognise, recall and show understanding of specific scientific facts, terminology, principles, concepts and practical techniques
- demonstrate understanding of the power and limitations of scientific ideas and factors affecting how these ideas develop
- draw on existing knowledge to show understanding of the benefits and drawbacks of applications of science
- select, organise and present relevant information.

AO2 Application of knowledge and understanding, analysis and evaluation

Candidates must be able to:

- describe, explain and interpret phenomena, effects and ideas in terms of scientific principles and concepts, presenting arguments and ideas clearly and logically
- interpret and translate, from one form into another, data presented as continuous prose or in tables, diagrams and graphs
- carry out relevant calculations
- apply principles and concepts to unfamiliar situations, including those related to applications of science in a range of domestic, industrial and environmental contexts
- evaluate scientific information and make informed judgements from it.

AO3 Investigative skills

Candidates must be able to:

- devise and plan investigations, drawing on scientific knowledge and understanding in selecting appropriate strategies
- demonstrate appropriate investigative methods, including safe and skilful practical techniques, obtaining data which are sufficient and of appropriate precision, recording these methodically
- interpret data to draw conclusions which are consistent with the evidence, using scientific knowledge and understanding, whenever possible, in explaining their findings
- evaluate data and methods.

A4.2.1 Scheme of assessment

Weighting of assessment objectives:

AO1 45 per cent to 55 per cent (about one-third of which must be allocated to recall)

AO2 25 per cent to 35 per cent

AO3 20 per cent to 25 per cent

Candidates must be required to carry out experimental and investigative work in the context of other content.

For specifications entitled Science: Double Award the content specified is to be weighted:

Scientific enquiry	25 per cent
Life processes and living things	25 per cent
Materials and their properties	25 per cent
Physical processes	25 per cent

Each scheme must include a terminal examination with a minimum weighting of 70 per cent, extended writing must feature in the terminal examination for both tiers, short-answer and objective questions must not account for more than two-thirds of the total credit assigned to externally assessed components.

Weighting allocated to internal assessment must be between 20 per cent and 30 per cent and internal assessment of AO3 should contribute at least 20 per cent.

Specifications entitled Science: Double Award must provide opportunities for investigative work to be carried out in all three sections of the programmes of study and must require evidence from work in at least **two** sections of the programme of study; at least two pieces of evidence from each aspect of AO3 and at least one providing evidence from all aspects.

Questions concerning the applications and implications of science must make a significant contribution to each scheme of assessment.

The mathematical demands of each tier of assessment must be made clear in the specification.

A4.2.2 Grade descriptions

Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by candidates awarded grades F, C and A.

Neither of the IGCSE syllabuses conforms to all of the requirements of the science criteria.

The most significant omissions are:

The aims:

- do not explicitly require opportunities for students to acquire an understanding of how scientific ideas develop and the factors which may affect their development
- do not require the use of ICT (although this is encouraged in teacher support materials).

The content:

- in Higher tier does not address all aspects of all of the areas of study (Sc2, Sc3, Sc4).

Key skills:

- are not directly cross-referenced
- opportunities for developing and generating evidence for assessing key skills in information technology, improving own learning and performance and working with others are not evident.

Assessment objectives:

- Candidates are not required to demonstrate understanding of the power and limitations of scientific ideas and factors affecting how these ideas develop (AO1, second bullet)
- Candidates who opt for the alternatives to coursework are not required to devise and plan investigations or demonstrate appropriate investigative methods.

Scheme of assessment:

- The proportion of AO1 allocated to recall is higher (half against one-third).
- Candidates do not have to carry out experimental and investigative work.
- The weighting for scientific enquiry is 20 per cent since the ideas and evidence strand is absent and so is not assessed in the theory papers. This raises the weighting of the other areas to slightly more than 25 per cent each.
- Candidates for CIE IGCSE do not have to submit evidence from an assessment containing all aspects of AO3.

In addition, neither of the IGCSE syllabuses addresses the requirements for citizenship.

Overall, the omission of these aspects of the science criteria results in a decrease in the demand of the IGCSE syllabuses.

	AO1	AO2	AO3	
AQA	50% ⁺	30%	20%	As GCSE criteria
OCR	50% ⁺	30%	20%	As GCSE criteria
IGCSE CIE Coordinated	50%*	30%	20%	Omits 'devise investigations' from AO3
IGCSE Edexcel	45–55% *	25–35%	20%	

⁺Syllabus stated as meeting GCSE science criteria so about one-third recall.

*Not more than half recall.

As already noted, all IGCSE syllabuses omit 'demonstrate understanding of the power and limitations of scientific ideas and factors affecting how these ideas develop' from AO1. This results in absence of coverage of the ideas and evidence strand of Sc1. Two areas of content which are often used as vehicles for this area, namely evolution and the Earth and beyond, are omitted from the content of the Edexcel IGCSE syllabus and the Earth and beyond is omitted from the CIE coordinated syllabus.

A4.3 Syllabus content

The GCSE syllabuses specify content which follows the content of each area of the key stage 4 programme of study.

The IGCSE syllabuses omit a number of statements from some of the topics in the programmes of study and significant sections of some topics, notably ideas and evidence (Sc1.1), seismic waves (Sc4.2 m/n) and the Earth and beyond (Sc4.4).

The IGCSE coordinated syllabus includes a number of additional topics, many of which are conceptually demanding (eg colloids, more advanced kinetic theory, momentum and collisions). Although some areas of these are additional topics restricted to extension material, Foundation tier candidates are required to study aspects of them. The inclusion of these topics increases the demand of this syllabus, especially for candidates at Foundation tier.

A4.4 Schemes of assessment

All schemes consist of a set of written papers which test assessment objectives AO1 and AO2, using a combination of short answer and structured questions unless otherwise stated in the table, and an element which assesses AO3, either by coursework investigations or practical tests which consist of a set of exercises in the context of each of the sections of the programme of study or written examinations which consist of questions designed to test practical skills.

Theory papers

	Paper 1	Paper 2	Paper 3	Total
AQA/OCR ^{1,2}	1 hour 30 minutes 26.6%	1 hour 30 minutes 26.6%	1 hour 30 minutes 26.6%	4 hours 30 minutes 80%
IGCSE CIE	45 minutes	Foundation tier	Higher tier 2	2 hours 45

coordinated (either Paper 2 or Paper 3)	30%	2 hours 50%	hours 50%	minutes 80%
IGCSE Foundation tier Edexcel ¹ Higher tier	(1) 1 hour 15 minutes (4) 1 hour 30 minutes 26.6%	(2) 1 hour 15 minutes (5) 1 hour 30 minutes 26.6%	(3) 1 hour 15 minutes (6) 1 hour 30 minutes 26.6%	3 hours 45 minutes 4 hours 30 minutes 80%

¹Each paper of the AQA, OCR and Edexcel syllabuses contains material from one section of the programme of study.

²AQA and OCR schemes each consist of one set of three papers at Foundation tier and one set of three papers at Higher tier.

For the CIE syllabus, all of the theory papers are drawn from all sections of the programme of study. Paper 1 is common to both tiers. Candidates take either Paper 2 (Foundation tier) or Paper 3 (Higher tier).

Practical/alternative tests

	Coursework	Paper 5 Practical test	Paper 6 Alternative to practical	2 from 7/8/9 Written alternative to coursework
AQA/OCR	Evidence from work in at least two sections of the programme of study; at least two pieces of evidence from each aspect of AO3; at least one providing evidence from all aspects	–	–	–
IGCSE CIE coordinated	Evidence from work in at least two sections of the programme of study with two pieces of evidence from each skill area. No requirement for a whole investigation	1 hour 30 minutes	1 hour written test	–
IGCSE Edexcel	Assignments in two science subjects. Candidates must submit evidence from at least one whole investigation, no more than four pieces of work to be submitted.	–	–	1 hour 15 minutes each 20% Written tests each covering one section from the programme of study

The variation in the time of assessment between the schemes is very significant. Candidates for the home GCSEs will take a total of 4½ hours of written papers plus the time taken for coursework. The Edexcel IGCSE is broadly in line with this although the written practical alternative test would add a further 2½ hours to the assessment time. For the IGCSEs the assessment time varies from as little as 2¾ hours for the CIE coordinated science with coursework to 7 hours for the Higher tier candidates with the alternative practical tests in the Edexcel scheme. For just the theory examination papers, the range was from 2¾ hours (CIE) to 4½ for GCSE and Edexcel IGCSE (Higher tier).

The assessment time for the Edexcel scheme with optional tests was judged to be excessive.

A4.5 Options

Apart from selection of tier, there are no optional routes in written papers for any of the syllabuses considered. Within the written papers there are no optional questions. Thus GCSE candidates would have to demonstrate achievement in all sections of the programme of study if they are to perform well after studying any of these syllabuses. Candidates for IGCSE would have to cover almost all of the programmes of study, with the exceptions noted in A4.3.

IGCSE syllabuses provide options to centre assessed coursework. The impact of these is discussed in A4.8.

A4.6 Question papers

Papers in the GCSE and Edexcel IGCSE schemes use a mixture of short answer and structured questions. Some of the short answer questions in Foundation tier papers are fixed response. The reviewers considered that there were insufficient questions on any syllabus to meet the criterion requirement that not more than two-thirds of the total credit should be assigned to short answer and objective questions, although the situation was less severe at GCSE. There was a noticeably greater proportion of questions requiring extended writing on Higher tier papers than on those for Foundation tier.

The CIE coordinated scheme uses a paper common to both tiers, which consists solely of multiple choice questions, and another paper that consists of short answer and structured questions. The form of some of the multiple choice questions is much more complex than those used on the other schemes and reviewers considered the demand of this paper for Foundation tier candidates high. In several cases, reviewers considered that candidates in possession of the relevant scientific knowledge may be prevented from answering the question correctly as a result of over-complex formats. All the content sections of the syllabus are assessed within each paper (and sometimes more than one topic within the same question). This has the effect of raising the demand of these papers. There is a further effect in that the relatively short time for assessment for each section of the subject content results in a relatively narrow sampling of the content (which in itself is much broader than that of the other syllabuses). This places a high premium on candidates being secure in their knowledge and understanding of those relatively restricted number of content areas covered in the papers. This increases the demand of these papers.

The mark schemes for the OCR papers provide a wider range of alternative answers to many questions than do those for the other syllabuses. This has the effect of easing the demand on those questions and makes the OCR question papers slightly less demanding than those for the AQA GCSE.

One particular feature of the GCSEs is the award of marks for quality of written communication. There is no provision for this in either of the IGCSE syllabuses. This may have a marginal impact on demand as candidates following the AQA or OCR syllabuses can gain credit for answers to the relevant questions where the science is incorrect, provided that it is an appropriately scientific answer.

A4.7 Tiering

All syllabuses are arranged with Foundation (or Core) and Higher (Extended) tiers which target the same range of grades (A*–D and C–G). There are no common theory papers in the AQA, OCR and Edexcel schemes although each paper includes overlap questions.

As has been noted above, the CIE coordinated common Paper 1 is very demanding for Foundation tier candidates.

A4.8 Coursework

Details of coursework requirements are given in the table above. AQA, OCR and Edexcel IGCSE all follow the common framework adopted by the GCSE boards for England and Wales for GCSE science syllabuses. Details of the rules for coursework are not given in the Edexcel syllabus, but are explained in the teacher's guide.

The marking scheme for the CIE coordinated syllabus differs from the others. Planning and evaluation are grouped, thus reducing the weighting of these areas compared with the other syllabuses. One skill area is mainly concerned with following instructions and using equipment, which requires less resource from students. This reduces the demand. A number of important areas such as reliability, predicting and relating conclusions back to the original idea are not assessed directly in the CIE syllabus.

Coursework is optional in both of the IGCSE syllabuses. Alternative written practical tests are available in each syllabus and the CIE coordinated syllabus offers a third option of a practical test. These papers are all common to Foundation and Higher tiers.

Candidates who follow these alternative routes may not be required to plan investigations (some of the investigation planning questions are experiments which are specified in the syllabus, eg Edexcel Paper 7 Q 6). CIE Paper 6 requires candidates to describe simple experiments (eg Q2(b), Q 6(c)) but not plan whole investigations using the higher level skills such as hypothesising and predicting. Reading printed scales tends to be easier than reading scales on instruments in the course of a practical because there are fewer possible sources of error, such as taking a time-dependent reading in a chemical reaction. The CIE written test includes questions which require knowledge beyond that for the practical exercises used in the practical test. In terms of the CRAS analysis, the demands on resource are higher for Paper 6 than for Paper 5.

Candidates for Edexcel IGCSE are only required to choose two papers and so do not demonstrate understanding of practical skills in all aspects of the National Curriculum. This has the effect of reducing overall demand.

Overall reviewers had concerns about the IGCSE approach to the assessment of practical skills. Any alternative to actual assessment of practical skills presents problems in terms of comparability, and in the case of the CIE IGCSE there is the need to align a coursework option (which was judged to be slightly less demanding than its GCSE equivalents), a practical test and a written paper alternative. In particular, the alternatives offered within the IGCSEs were considered to attach less weight to evaluation, which is typically the area that candidates find hardest.

None of the IGCSE alternatives to coursework was tiered. This is in line with the fact that the coursework is untiered, but is likely to lead to a differential effect on candidates aiming at different grades. In particular, reviewers judged that the effect of the alternatives being less demanding will be true for the Higher tier candidates; however, Foundation tier candidates will tend to experience the external assessments as more demanding.

A4.9 Summary

- The IGCSEs do not meet the GCSE criteria for science in a number of significant areas.
- Although each IGCSE contains content that is not covered in the GCSE, the content of the IGCSE syllabuses does not cover all requirements of the key stage 4 programme of study of the National Curriculum for Science.
- The content of the CIE IGCSE coordinated syllabus is broad and deep compared with the other syllabuses reviewed. A number of the areas included are currently part of AS syllabuses.
- The optional routes to coursework which are available in the IGCSE syllabuses reduce the requirements for pupils to acquire and develop the full range of skills in investigative science.
- The CIE coordinated syllabus places increased demands on candidates in terms of having secure enough knowledge of the topics to answer questions based on the restricted number of areas actually assessed in a given series.
- The use of the optional tests for the Edexcel IGCSE results in an excessive amount of assessment time for those choosing the option.

Overall demand was judged to be about right for AQA and OCR Foundation tier and the Edexcel IGCSE scheme. The AQA and OCR schemes were judged to be less demanding than they should be at Higher tier. CIE IGCSE was judged to be more demanding for the Higher tier candidates and very demanding for Foundation tier candidates.

Appendix to the science report: match with key stage 4 programme of study

In some areas judgements are difficult because the syllabus is not clear about content. Where there is uncertainty this is indicated by ?.

Statement	Edexcel IGCSE	CIE IGCSE	Comments
Sc1			
1.1 a	X	X	
1.1b	X	X	
1.1c	X	X	
1.1d	X	X	
1.2a		X	If coursework option not taken
1.2b		X	If coursework option not taken
1.2c		X	If coursework option not taken
1.2g	X	X	No use of ICT
1.2j	X	X	No use of ICT
1.2s	X	X	If coursework option not taken
Sc2			
1d		X	
1e	X	?	
2k		X	
2p	?		Skin not covered
2q	?		Only smoking
3e		?	
3g	X	X	
4i	X		
4j	X		
5a	X		
5b		?	
5c	X	X	
Sc3			
1f	X		
2o		X	
2p	X	X	
2q	X	?	

2r	X	?	
3j	X	X	
3l	?		
3m	?		
3n	?		
3p		?	
3r	X	?	
3s			
3v		X	
Sc4			
1a		X	
1d		X	Only considers resistors
1e	X		
1g		X	
1h		X	
1i		X	
1j	X	X	
1k	X	X	
1l	X	X	
1m	X	X	
1n	X	X	
1o		?	
1p		?	
2g	X	X	
2h	X	?	
3j	X	X	
3k	X		
3l	X	X	
3m	X	X	
3n	X	X	
4a	X	X	
4b	X	X	
4c	X	X	
4d	X	X	
4e	X	X	
5a		X	

5b	X	X	
5h	X	?	
5i	X	?	
5j	X	?	