MEI

Mathematics in Education and Industry

MEI MATHEMATICS

The New 2-Tier GCSE specification

First certification in 2008

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MEI Mathematics

GCSE Specification
From September 2006

- available to all;
- modular approach;
- one year or two year course;
- Amended set of text books

Specification Aims

The stated aim of MEI is:

To promote the links between Education and Industry in Mathematics and to produce relevant examinations and teaching specifications and support material.

The overall aims of this specification are to encourage students to:

- Develop a positive attitude to Mathematics
- Consolidate basic skills and meet appropriately challenging work
- Think and communicate mathematically – precisely, logically and creatively
- Develop problem solving skills so that they can apply their mathematical knowledge in everyday life, in other curriculum areas and in employment
- Make efficient use of appropriate technology
- Work both independently and as a team
- Appreciate the place and use of Mathematics in society
- Develop an appreciation of the interdependence of different branches of Mathematics
- Work towards a Key Skills qualification
- Build a firm foundation for further study

Design considerations

The specification is designed to:

- Address the needs of real students
- Motivate and encourage students
- Be easy for Centres to deliver
- Enable a flexible approach for fast track students
- Pay particular attention to the needs of FE
- Enable links to be made with the mathematics in Key Skills and GNVQ's

The Structure of the specification

(a) Tiers

In common with all specifications and new regulations, there are two tiers of entry; Foundation, and Higher.

In each tier there are five grades available.

<table>
<tr><td>Grades</td><td colspan="2"></td></tr>
<tr><td>A*</td><td></td><td rowspan="4">HIGHER
TIER
Grades D to A*</td></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td></td></tr>
<tr><td>C</td><td rowspan="5">FOUNDATION
TIER
Grades G to C</td></tr>
<tr><td>D</td><td rowspan="4"></td></tr>
<tr><td>E</td><td></td></tr>
<tr><td>F</td><td></td></tr>
<tr><td>G</td><td></td></tr>
</table>

(b) Modularity

There are three parts to the assessment:

(i)	Modular paper	30%
(ii)	Terminal paper	50%
(iii)	Internal Assessment	20%

The first paper specifically aims to:

- provide an accessible paper which can be taken during the course to give candidates a sense of achievement and progress;
- provide information on candidates' mathematical progress;
- help candidates who are also working towards Key Skill Application of Number by providing the techniques they need in the early part of the course.

(c) Units

Unit	Title	Duration	Weighting
B261	Foundation Modular Paper, Paper 1	1½ hours	30%
B263	Higher Modular Paper, Paper 3	1½ hours	30%
B262	Foundation Terminal Paper, Paper 2	2 hours	50%
B264	Higher Terminal Paper, Paper 4	2 hours	50%
B265	Coursework(Centre Set and Marked)		20%
B266	Coursework (OCR Set and Marked)		20%

Grades	Foundation Tier G to C	Higher Tier D to A*
A*		Candidates take units B263, B264 and either B265 or B266
A		
B		
C	Candidates take units B261, B262 and either B265 or B266	
D		
E		
F		
G		

(d) Entry Options

- two year course, full assessment at the end
- two year course, Paper 1 taken early
- one year course, full assessment at the end
- one year course, Paper 1 in January, Paper 2 in June
- one term course for retakes in January
- fast track for yr 11 by taking paper 1 in June and paper 2 in January

Candidates who do not do as well as they had hoped in Paper 1 taken early are able to re-sit.

(e) Question Papers

Marks:
Paper 1 is out of 72
Paper 2 is out of 100.

Each paper has:
Section A (non-calculator); Section B (calculator).

Allocation of marks between grades

Foundation

	G to F	E to C	Total
Paper 1	43	29	72
Paper 2	40	60	100
Total	83	89	172

Foundation

	G	F	E	D	C	Total
Paper 1	23-26	20-23	14-18	5-8	5-8	72
Paper 2	23-26	20-24	20-25	15-18	15-18	100

Higher

	D to C	B to A*	Total
Paper 1	43	29	72
Paper 2	40	60	100
Total	83	89	172

Higher

	D	C	B	A	A*	Total
Paper 3	23-26	20-23	14-18	5-8	5-8	72
Paper 4	23-26	20-24	20-25	15-18	15-18	100

(f) Assessment Objectives

- Using and Applying Mathematics (AO1)
- Number and Algebra (AO2)
- Shape, Space and Measures (AO3)
- Handling Data (AO4)

Assessment Objective AO1 are assessed in contexts provided by the other assessment objectives.

The allocation of marks between assessment objectives is as follows:

Paper	AO2 Number	AO2 Algebra	AO3 Shape and Space	AO4 Handling Data	Total
1	25	16	20	11	72
2	34	23	28	15	100
3	16	25	20	11	72
4	23	34	28	15	100

The number/algebra split is approximately as follows:

Foundation	2:1
Higher	1:2

A proportion of the paper will be deemed "multistep" as follows:

Tier	Foundation	Higher
	7 - 10	13 - 15

Some marks will also be allocated to AO1 (approximately 13%).

In the coursework the weighting is 10% for AO1 and 10% AO4.

(g) Uniform Marks

The Modular paper will be reported as a uniform mark. For the purposes of aggregation the terminal paper and the coursework will also be converted to a uniform mark.

The grade thresholds will be as follows:

	Foundation Paper 1	Foundation Paper 2	Higher Paper 3	Higher Paper 4	Coursework	Total (Max 400)
A*	-	-	108	180	72	360
A	-	-	96	160	64	320
B	-	-	84	140	56	280
C	72	120	72	120	48	240
D	60	100	60	100	40	200
E	48	80	48	80	32	160
F	36	60	-	-	24	120
G	24	40	-	-	16	80

Availability

There are two sessions, January and June. Both papers in both tiers will be offered in both sessions.

Papers 1 and 3 (Modular papers) will be available in June 2007 and January 2008.

All papers will be offered in June 2008 and every session thereafter.

Examples of AO1 marks on the written papers

There are questions that meet the criteria for AO1, Using and Applying Mathematics. These also meet the content of one of the other Assessment Objectives (i.e. marks will be "double-flagged".)
In particular most Multistep marks meet the criteria for Strand 1 (Strategy).

Examples:
Strand 2 Reorganising data and drawing a chart to display the data
Strand 3 Explaining why something is correct or why it is wrong. "Show your method clearly" and "explain your reasoning" falls within in this criteria.

Strand 1 All multistep questions

Strand 2
Stating units
Explanations (e.g. explain your reasoning)
Interpreting graphs
Reorganising data and drawing a chart to display the data

Strand 3
Proofs
Strand 3 Explaining why something is correct or why it is wrong. "Show your method clearly" and "explain your reasoning" falls within in this criteria.

Higher Tier examples

A. The variables x and y are related by the equation $y = ax^{\frac{1}{2}} + b$ where a and b are constants.
The table shows three values of x and the corresponding values of y.

x	***y***
1	12
4	17

Find the value of x when $y = 21.3$.

B. Prove that the line $4y + 3x = 25$ is a tangent to the circle $x^2 + y^2 = 25$.

C. The lengths of the sides of a set of cubes is 6.4cm, correct to the nearest mm.

A circular hole has a radius of 4.55cm, correct to two places of decimals.

Explain whether or not all of the cubes will pass through the hole.

Internal assessment (Coursework)

There is a requirement for two tasks to be completed and both will count.

AO	Type of task	Strands	Max mark
AO1	A task, or tasks, involving the skills and concepts outlined in AO2 and/or AO3	Strategy Communication Reasoning	8 8 8
AO4	A single task involving the skills and concepts outlined in AO4	Specify & plan Collect, process & represent data Interpret & discuss results	8 8 8

Coursework options

Option	A	**B**
Selection of Tasks	**Centre-set** Centres may design suitable open-ended tasks or the tasks may be drawn from a bank provided by OCR.	**OCR-set** Tasks suitable for Foundation / Intermediate Tier OR tasks suitable for Intermediate / Higher Tier candidates will be provided.
Time for Each Task	One to two weeks of mathematics lessons and homework time	One to two weeks of mathematics lessons and homework time
Marking Arrangements	Marked by the class teacher and internally standardised by the Centre	OCR-marked
External Standardisation	By post using OCR procedures	
Deadline	April in the year of the examination	April in the year of the examination

N.B. Option B is only available in the Summer session.

The OCR set and marked tasks are published around May of the previous year (so that there are 14 months or so for the completion of the tasks). These are the only ones that may be used for that session and they may not be used in that session for Centre set and marked tasks. They may subsequently be used however. (i.e. those set for June 2008 may be used as Centre set and marked tasks for 2009)

Supervision and Authentication of Coursework

Teachers are expected to:

- offer candidates advice;
- supervise work, monitor progress and
- prevent plagiarism;
- ensure specification requirements are followed.

The teacher must be satisfied that the work submitted for assessment is the candidate's own work.

Marking Criteria for internally assessed work

There is a set of interboard Generic marking guides.

MEI also offer Task-specific marking guides.

Using and Applying Mathematics (AO1):

- Strategy (S);
- Communication (C);
- Reasoning (R).

Handling Data (AO4):

- Specify & Plan (S);
- Collect, Process & Represent (C);
- Interpret & Discuss (I).

Assessment of coursework

The assessor should write and ring, for example, 'S6' at the point on the script where there is evidence that the candidate has attained a mark of 6 in strand S.

Where there are references to 'at least the level detailed in the Handling Data paragraph of the grade description for grade X', work which uses no technique beyond the specified grade is indicative of the lower of the two marks. To obtain the higher of the two marks requires processing and analysis using techniques that best fit a more demanding standard.

The assessor will record the highest mark in each strand on a copy of the front cover sheet (see Appendix E1) for the candidate's work.

The assessor will add together the marks for each strand across both tasks completed by the candidate to give an overall mark out of 48.

Moderation

All internally assessed work is marked by the teacher and internally standardised by the Centre. Marks are then submitted to OCR by a specified date, after which moderation takes place in accordance with OCR procedures. The purpose of moderation is to ensure that the standard of the award of marks for internally assessed work is the same for each Centre and that each teacher has applied the standards appropriately across the range of candidates within the Centre.
A separate cover sheet containing reference to the criteria applied and their location within the project is recommended. An example of an appropriate cover sheet, which may be photocopied is given in Appendix E1.

Minimum Requirements for internally assessed work

There should be clear evidence that work has been attempted and some work produced.
If a candidate submits no work for an internally assessed component, then the candidate should be indicated as being absent from that component on the mark sheets submitted to OCR. If a candidate completes any work at all for an internally assessed component then the work should be assessed according to the criteria and marking instructions and the appropriate mark awarded, which may be zero.

Arrangements for Candidates with Special Needs

For candidates who are unable to complete the full assessment or whose performance may be adversely affected through no fault of their own, teachers should consult the *Inter-Board Regulations and Guidance Booklet for Special Arrangements and Special Consideration.*
In such cases, advice should be sought from the OCR Special Requirements team
(tel 01223 552505) as early as possible during the course.

Support

OCR will provide:

A full programme of In-Service training
(telephone 01223 552950).

Specimen question papers and mark schemes
(telephone 0870 870 6622 - also on the OCRE Website)

Past question papers and mark schemes
(telephone 0870 870 6622).

Coursework guidance materials.

- Examples of marked work.
- Written advice on coursework proposals.
- Feedback on the moderation of internally assessed work.

Examination reports.

MEI will provide:

Annual Conference in July.

INSET days and half days.

Local branches.

Newsletters.

Website.

Advice from mathematicians.

Practice Papers and other relevant materials.

Coursework Bank.

The future for GCSE
Starting from now …

- **The present GCSE does not work well**
  Too few students go on to AS/A Level
  Weaker students learn little useful
- **The basic problem is the spread in students' attainment at 16**
- **2-tier will make this worse not better**
- **Double Award is a chance for a much better provision**

The future for GCSE

Models for double award GCSE

- **Double grades model**
- **Parallel model**
- **Sequential model**

The future for GCSE

Double grades model

- **Everything stays as at present except that instead of getting, say, grade D a candidate gets 2 grade Ds**

Problems

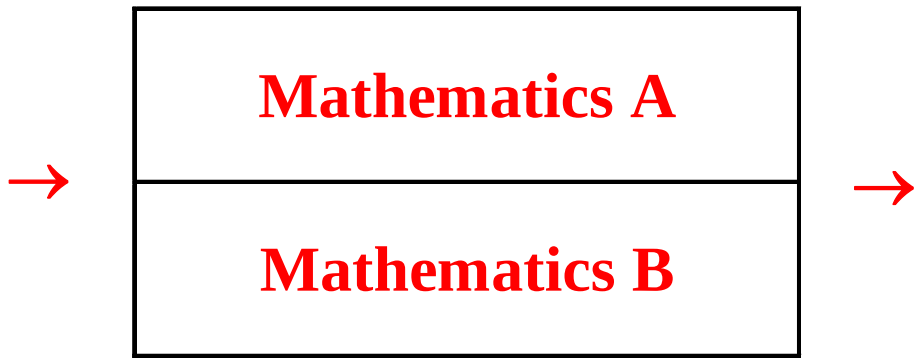
- **It leaves all the current problems with GCSE Mathematics in place and merely doubles the stakes**

Advantages

- **Mathematics may get taken more seriously**

The future for GCSE

Parallel model



The future for GCSE

Parallel model

Problems

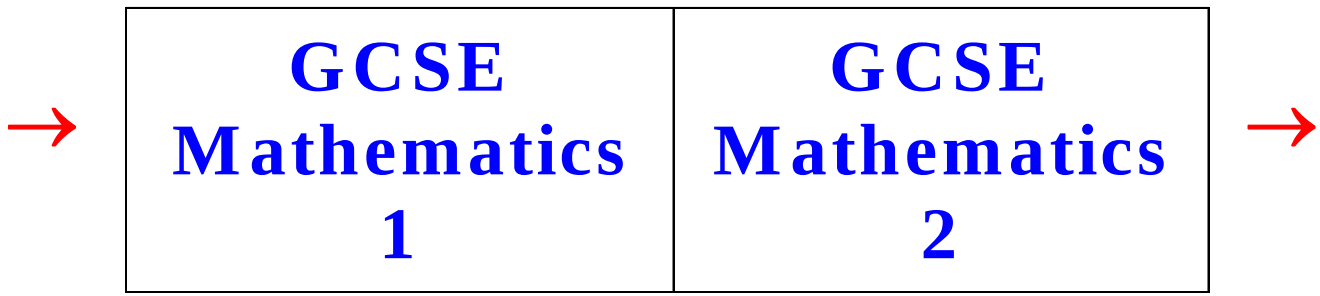
- **It is not clear how best to divide up the material into two parallel strands**
- **It does not address the variability among students and does nothing for the bottom 50%**
- **It does nothing to overcome the problems with the current GCSE**

Advantages

- **Mathematics may get taken more seriously**

The future for GCSE

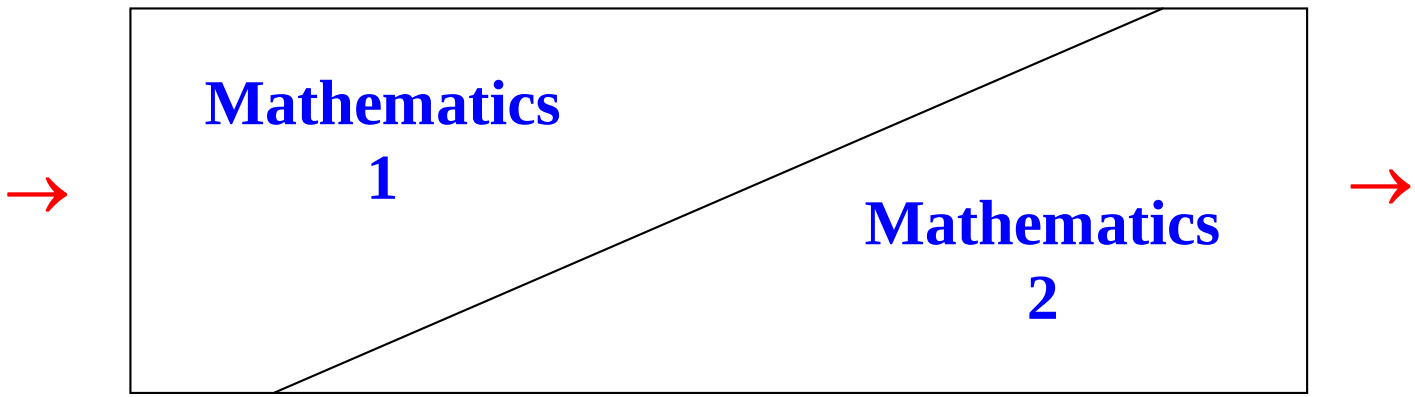
Sequential model



Content and assessment

The future for GCSE

A sequential model in practice



Teaching and learning

The future for GCSE

Sequential model

Problems

- **Some schools might not offer GCSE 2**

Advantages

- **It deals with the variability of students**
- **Both GCSEs can be made into worthwhile qualifications**
- **It need not be just a rearrangement of the deckchairs**

The future for GCSE
Principles for double award (1)

1. No additional content should be required for the double award beyond that in the present National Curriculum

2. There should be no reduction in teaching time for any mathematics student

3. Those proceeding to AS and A Level should be expected to have taken both GCSEs

The future for GCSE
Principles for double award (2)

4 Schools and colleges must ensure that all those who would benefit from taking both GCSEs are able to do so

5 The content and demand of the two GCSEs should be such that the first is a valuable qualification in its own right, but that both are accessible to a substantial proportion of students

The future for GCSE
Exemplification

- There is a great danger that the decision as to which double award model is chosen is based on no more than a thought experiment

- MEI have produced draft syllabuses and examination papers for the sequential model

- They can be found on the MEI web-site, www.mei.org.ukwww.mei.org.uk

Double Award GCSE Mathematics

Exemplification

This document has been prepared by the whole MEI professional team

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Section A

Rationale

The decision to move to a double award for GCSE Mathematics presents a window of opportunity for an improved mathematics provision at this level.

There are various ways in which a double award can be organised and some of these would not result in any significant improvement on the present system. The work presented here stems from a conviction that it will only be possible to decide on the most advantageous approach when a number of models are developed in considerable detail. To choose a model without that level of information would be no more than a thought experiment, albeit one influencing the futures of millions of young people.

This work is presented by MEI and builds on ideas presented in the report "Delivering Curriculum Pathways in Mathematics"[1], written for QCA in 2005. It illustrates the model which MEI believe to be most appropriate. All the MEI professional staff have contributed to it, as well as two external consultants, in total some 11 mathematicians, all of whom are experienced in curriculum development work.

MEI is a registered charity and this work has been undertaken at its own expense, in accordance with its charitable aim of improving the quality of mathematical education in this country.

Principles

There has been considerable discussion within the mathematics community about the principles that should underpin the design and delivery of the double award. This exemplification is based on five such principles; the first three of these were first enunciated by the Mathematical Association.

1. No additional content should be required for the double award beyond that in the present National Curriculum.
2. There should be no reduction in mathematics teaching time for any student.
3. Those proceeding to AS and A Level should be expected to have taken both GCSEs.
4. Schools and colleges must ensure that all those who would benefit from taking both GCSEs are able to do so.
5. The content and demand of the two GCSEs should be such that the first is a valuable qualification on its own, but that both are accessible to a substantial proportion of students.

Outline of the design

In the model presented, there are two different GCSE subjects. For the sake of this paper, these are entitled GCSE 1 and GCSE 2.

Syllabuses

The syllabuses for GCSE 1 and GCSE 2 are given at the end of this document. The syllabus for GCSE 2 subsumes the content of GCSE 1. The overall content is the same as that of the present National Curriculum; no new topics have been included (in accordance with Principle 1), nor have any been excluded.

GCSE 1 consists of essentially concrete mathematics and the assessment is largely through recognisable contexts.

GCSE 2 is more abstract. Although some of the assessment questions are context based many of them are, by design, abstract.

Assessment

Paper 1	Paper 2	Paper 3
80 marks	100 marks	120 marks

Both of the two GCSE subjects have the same pattern of assessment.

- A foundation tier candidate takes papers 1 and 2 and is eligible for grades C to G.
- A higher tier candidate takes papers 2 and 3 and is eligible for grades A* to D.
- Paper 2 is common to all candidates.
- A grade is awarded on the total mark for a candidate's two papers.

Features

The overall assessment structure necessitates a number of features that either differ from current practice in the existing GCSE or are completely new.

In the current GCSE most of the topics in GCSE 1 are examined at a standard that is consistent with grade C or below. In contrast, in GCSE 1 paper 3 more searching questions are set on this basic material, allowing the possibility of grades up to A*. Thus a candidate who obtains a good grade on GCSE 1 has demonstrated a high level of understanding of the more elementary material and its use in problem solving. The current GCSE does not allow this to happen.

Correspondingly, GCSE 2 paper 1 consists of very elementary questions on more advanced material. A Foundation tier candidate in GCSE 2 would be unable to obtain a grade C overall without a high mark on this paper.

The strict association between content and grades encapsulated in the document "Targets and Tariffs" is no longer applicable; the validity of this association was questioned in the evaluation report on the possible 2-tier GCSE models.[2]

The exemplar examination papers include a number of innovative types of question, particular the extended questions on the two compulsory papers 2, which have data released a month in advance of the papers, in a similar way to FSMQs. The style of the most basic paper, GCSE 1 paper 1 is unlike anything currently found in GCSE but is also similar to that used in the Level 1 FSMQ. The model does not, of course, require papers to be set in these styles; however, it seems a pity when looking at a new structure not to consider the possibility of new styles of assessment materials.

The exemplar examination papers have been condensed in this document by removing the spaces for students to answer in, but full versions are available on the MEI website, together with the answers.

Delivery

The scheme is designed to allow 4 different levels of entry.

GCSE 1 Foundation Tier

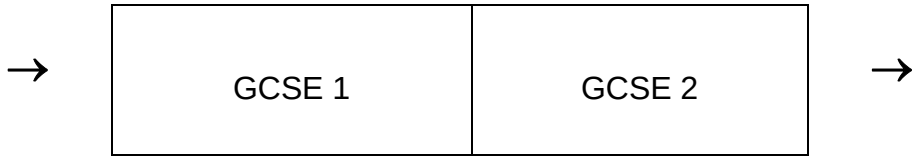
GCSE 1 Higher Tier

GCSE 1 Higher Tier + GCSE 2 Foundation Tier

GCSE 1 Higher Tier + GCSE 2 Higher Tier

GCSE 1 will be taken by virtually all students. For most it will be a Year 11 examination, although some may take it earlier. A substantial proportion (at least 50%) are expected to take GCSE 2 as well and all schools will be required to offer it to those students who would benefit (Principle 4).

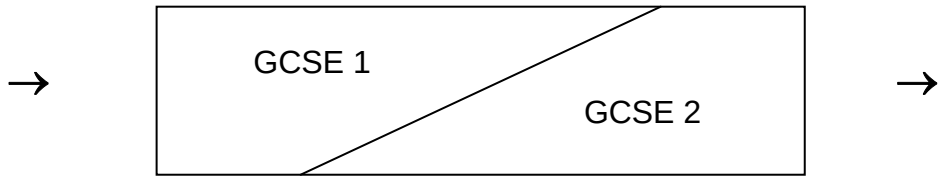
The allocation of material to GCSE 1 and 2 may be represented as the sequential model illustrated below.



Content

However, this is not an accurate representation of many students' learning pattern. GCSE 1 consists largely of concrete mathematics and GCSE 2 contains a significant amount of abstract work. The ability to do abstract work

is built up over time and good teachers foster it by providing students with increasing amounts of suitable work over a prolonged period, often starting in a small way at quite an early age. The diagram below gives a better representation of the expected teaching and learning.



Teaching and learning

Comparison with the present provision

In what ways will this be an improvement on the present GCSE?

Meeting students' needs

The attainment of students in mathematics varies widely, covering a range of at least 10 learning years at the age of 16[3]. The 2-tier GCSE offers only two options, each of which covers the requirements of students with an attainment range of about 5 learning years. Consequently, the assessment, and the associated teaching, is poorly focused on the needs of many students. By contrast with the present "2 sizes fit all" GCSE, the double award model presented here has 4 levels of entry which will allow and foster appropriate teaching for many more students. They will be presented with an appropriate level of challenge rather than mathematics that is either much too hard for them, or much too easy.

Better preparation for future employment

The Smith report highlighted the fact that employers are often dissatisfied with the capabilities of young people entering the work force[4]. The emphasis of GCSE 1 is on developing intuitive understanding and using mathematics in context. By opening up the possibility of achieving grades A*-B on the kind of mathematics that many people are likely to encounter in employment, GCSE 1 will directly address these concerns.

Preparation for further study of mathematics and related subjects

Currently, even students achieving grade A/B in Mathematics may have weak algebraic skills. These students often experience difficulties if they go on to study AS/A-level in Mathematics or related subjects. This inadequate preparation leads to the perception that Mathematics, Physics etc are harder than other subjects at AS and A-Level and so fewer students opt for them. GCSE 2, with its concentration on mastery of more abstract skills, would be a more suitable preparation, without the addition of any more content overall.

Better routes of progression

Currently GCSE in mathematics does not always successfully build on prior attainment at KS3. The most able students sometimes feel as though too much time is spent going over material which they already understand, whereas less able students may feel that they have insufficient time to deal with previous misconceptions which hamper their progress. Focusing GCSE 1 on a narrower range of content, some of which students will have encountered at KS3, while emphasising the applications of this content, allows students who have not understood it at KS3 to approach it from a different perspective, while also allowing students who have understood it to extend and develop their understanding. GCSE 2 provides opportunities to further extend the more able.

An alternative to coursework

The intention was that the GCSE Mathematics Coursework would allow students the time to use mathematics to explore a situation in depth and to use ICT in handling and interpreting a complex set of data. However, the value of coursework as a learning tool has been undermined by a variety of factors, all related to its assessment: excessive help from parents, teachers and others; plagiarism over the internet, inappropriate tasks and marking criteria. Consequently coursework is not expected to survive. However, that does not remove the importance of providing students with experience of undertaking mathematical investigations and tasks, of glimpsing what doing mathematics for real is like. In this scheme this gap is filled by the extended context questions on Paper 2 of each GCSE.

By issuing material in advance for teachers to explore with their students, the extended context questions allow for students to be guided in their understanding and to use ICT appropriately. Testing their understanding in examination conditions ensures there is genuine evidence of student attainment. This retains those aspects of mathematics coursework that are of educational value and which cannot be tested through more traditional examination questions.

Links to other subjects

Students sometimes struggle with the mathematical aspects of their studies in science, business, the social sciences or the humanities. Although they have been taught the necessary skills in mathematics lessons, they do not easily transfer them because they do not always realise that mathematics is useful. Moreover, the numbers usually encountered in realistic applications are harder to deal with than the numbers usually encountered in mathematics lessons. The emphasis of GCSE 1 on working in context, with realistic numbers, will foster greater transferability of knowledge and skills.

Points for discussion

This section addresses a number of issues that have arisen during the development of this exemplification, or in discussions leading up to it, either within the MEI team or in the wider mathematics community.

They are presented in question and answer format but in many cases the answers are only the first step in a process that will be informed by further discussion and by trials on this exemplification and further development work.

How was content allocated to the two syllabuses?

The starting point was provided by the two Programmes of Study for KS4 in the National Curriculum. Three criteria were then used to decide on possible changes.

- Topics should be presented coherently.
- GCSE 1 should be a valid and valuable qualification in its own right.
- It should be possible to set sufficiently demanding questions on GCSE 1 paper 3 to justify the award of A* and A grades.

Could the allocation be improved?

It would be very surprising if the allocation could not be improved, rather like getting a hole in one. The allocation evolved during the process of setting the papers and no doubt this process will continue when they are discussed outside the group that set them.

Further information will be provided when the question papers are attempted by real students. However, it will need to be borne in mind that they are testing syllabuses for which students have not been taught and for which they have not revised.

The critical question is how much content should be put into GCSE 1. There are conflicting arguments.

- If the content is set at rather a low level, many students will achieve success and so might be encouraged to take GCSE 2 as well. However, they will then have a lot more work to do and may well become demoralised by GCSE 2.
- By contrast, if the content of GCSE 1 is set at quite a high level, fewer students will achieve success and be motivated to take GCSE 2. However, those that do take it will find they have relatively little extra work to do.

Ultimately, the allocation will probably be a matter of professional judgement.

It is also the case that to make the outline of content in this document into a workable specification for teaching and examination purposes, more detail and exemplification will be needed.

Is the difficulty level of the papers appropriate?

The circumstances under which the papers were produced make it impossible to know whether they have hit the right standard. The double award does not yet exist and no students have been prepared for it. So it is likely that the papers will give the impression of being on the hard side if they are trialled on real students.

The purpose of writing these papers was to give a sense of the demands likely to be placed on students in the GCSE courses, rather than to provide actual assessment material. It would be easy enough to make them a little easier or a little harder, but that is not really the point.

For GCSE 1, the important question is: “Is someone who can answer these sort of questions well prepared for the world of work?” The equivalent question for GCSE 2 is whether those that take it have been prepared for moving on to further study, typically AS and A Level.

These questions can only be considered if the exemplar papers are sufficiently close to the standard at which real papers would be set, and the team responsible for setting them believe this to be the case.

What about Functional Mathematics?

The demand for Functional Mathematics stems from the perception that many students taking the present GCSE are not functional in mathematics. With the introduction of double award GCSE, a well-designed GCSE 1 could overcome this problem.

Introducing a qualification in Functional Mathematics does not address the questions of when will it be taught and whether the teaching will be effective. The scheme presented in this exemplification does, however, provide possible answers. The same teaching will often be required to support both GCSE 1 and the Functional Mathematics qualification and because GCSE 1 is, by design, functional in its character, there is a realistic prospect of the teaching being effective.

Paper 2 of GCSE 1 could in fact prove very suitable as a test of Functional Mathematics. There would be two major advantages in this approach.

- The need for a separate examination for Functional Mathematics would disappear
- Mark thresholds could be designed so that it would be impossible to fail Functional Mathematics and still obtain grade C in GCSE; this would resolve anomalies that will always be present if GCSE and Functional Mathematics are assessed differently but a pass in Functional Mathematics is a requirement for a GCSE pass.

Could students take one paper early?

With the assessment scheme used in this exemplification it would be possible for students to take one paper in a tier before the other(s).

There is a risk, at this exemplification stage, of giving too much attention to what is essentially a point of detail at the expense of the more serious issue of whether this is the best design for the double award GCSE. However, this does lead onto another question which is more central to the double award GCSE.

Could students enter all 3 papers in one of the GCSE subjects?

It would be possible, particularly if paper 1 was taken early. In that case, a candidate would be entered for both tiers and the higher grade from the two would be taken. Although this would involve taking an extra examination paper, it could well prove attractive and helpful to those students who are uncertain whether to enter foundation or higher tier. The outcome could be that more students attempt the higher tier in one or other of the GCSEs.

There are twice the number of possible outcomes from double award than from the present single GCSE and so students will overall be more finely differentiated. This means that more students will be genuinely uncertain about their best entry pattern. This would be one way of helping them.

Will some schools only run GCSE 1 and not GCSE 2?

This is a serious concern and one that needs to be addressed at the strategic level. It should be national policy that every student who would benefit from GCSE 2 should have the opportunity to take it.

A number of measures could be taken to ensure that all schools offer the double award.

- Double award should be the standard route to AS and A Level.
- Failure to offer it should naturally contribute to a bad Ofsted report for the school.
- The standard should be set so that GCSE 2 is accessible to a majority of students; if it is taken by enough students nationally it will be unacceptable to the community it serves for a school not to offer it.

For some schools, particularly those that do not currently offer higher tier GCSE, this will involve a change of culture, and not before time.

Will some students will take GCSE 1 early and then give the subject up?

It is hard to see how this could arise, since there is a statutory requirement for students to continue mathematics up to the age of 16. The fact that such concerns have been raised indicates the need to work towards a culture where this practice would be unthinkable in England, as it would be in many parts of the world.

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