Bringing Maths to life

GCSE 2012

Mathematics B

Teachers' Handbook

J567

Version 1
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OCR

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1 Introduction

The Mathematics B specification has been designed following consultation with over 1000 teachers and other key stakeholders in the mathematics community. By listening to you, we have shaped the new specification to meet your needs and those of your learners.

This Guide is intended to answer some of the most common questions regarding the specification and teachers and Heads of Department are encouraged to keep it readily available. It is important to make the point, however, that this Teachers' Guide plays a secondary role to the specification itself. The GCSE Mathematics B specification is the document on which the assessments are based: it specifies the content and skills that need to be covered. At all times therefore, the Teacher's Guide should be read in conjunction with the specification. If clarification on a particular point is sought, then that clarification must be found in the specification document itself.

1.1 Why study GCSE Mathematics?

The study of mathematics provides students with the power to describe, explain, and analyse the world around them. Mathematics students of all abilities will find there is great satisfaction to be gained when working out problems or making links for the first time. Students will come to appreciate that mathematics is an inventive discipline, and the language of mathematics transcends national boundaries.

GCSE Mathematics in particular provides opportunities for these moments, as well as allowing students to follow a broad, coherent and worthwhile course of study. Students should come to recognise the significance of mathematics in their own lives as well as to society. A good understanding of mathematics is vital for those wishing to study technology, engineering, science and a whole range of other disciplines.

GCSE Mathematics specifications incorporate the functional elements of the subject. Students who are functional in mathematics are able to think independently both in realistic and theoretical situations, and have skills of reasoning and problem solving. They are able to transfer their mathematical skills to different contexts and situations.

GCSE Mathematics students will have the opportunity to gain a valuable qualification often requested by employers or for entry to further study.

1.2 Why choose OCR?

OCR is one of the UK's leading awarding bodies, developing up-to-date GCSE qualifications for the 21st century. We are part of the Cambridge Assessment Group, Europe's largest assessment agency and a department of the University of Cambridge. Cambridge Assessment plays a leading role in developing and delivering assessments throughout the world, operating in over 150 countries.

OCR works with a range of education providers including schools, colleges, workplaces and other institutions in the public and private sector. Over 13,000 centres choose our A Levels, GCSEs and vocational qualifications including OCR Nationals, NVQs and Basic Skills.

At OCR, we believe in developing specifications that help you bring the subject to life, so learners are more likely to get involved and achieve more. And because we listen to schools and colleges that teach our specifications, we can ensure that you and your learners get as much as possible from the qualification. The Mathematics B specification provides an exciting, motivating scheme for GCSE Mathematics, presented in a straightforward and accessible way.

1.3 Rationale for GCSE Mathematics B

The approach to the content is significantly different from Mathematics A.

For the purposes of teaching (but not for the purposes of assessment) the content of each tier in Specification B is carefully divided into stages to ensure that students progress. Each of these stages addresses all areas of content and because the different areas of mathematics are linked, the topics within each stage are selected, where appropriate, to be mutually supportive.

This structure builds upon successes and allows for a smooth transition upwards through the stages of the tier, or from foundation to higher.

Mathematics B encourages a distinctly different curriculum approach to delivery.

Mathematics B brings additional benefits to users, has an innovative approach to delivery and meets the needs of an identifiable population. In creating this specification, great care has been taken to ensure that it is 'fit for purpose'. Fundamental to this are the findings of The Cockcroft Report, *Mathematics Counts* (HMSO, 1982).

Cockcroft pointed to three factors that influenced achievement in mathematics;

- level of attainment at the beginning of the course
- speed of learning
- obtaining a sufficient understanding of certain topics before being able to proceed to others which depend on them

The design of Mathematics B reflects this.

At each tier there are four stages of content allowing weaker students within the tier to start at 'the beginning' and stronger ones to start part way through, as there is no need to repeat content that is already well understood. Students are able to take responsibility for their own learning and, with the assistance of their teachers, use the stages to produce individual plans and monitor progress throughout the course – promoting assessment for learning in mathematics.

The specification, by structuring the teaching content in this way, allows certain students to study for Entry Level and GCSE in parallel and to make a smooth transition or dual entry where this is appropriate.

Recording achievement against the stages allows students and teachers to set both short and long term targets and monitor progress. Teachers can informally assess students' achievement within the stages to validate and recognise achievement. Within this specification, and where students make appropriate progress, the achievement made provides the confidence to move on with a clear foundation for studying the next stage.

Mathematics B exemplifies this approach to teaching mathematics.

The specification is designed in stages to encourage teachers to target the level of the course to the level of ability of the students. However, since Mathematics B is a linear GCSE, candidates will be assessed at the end of the course on the entire content for their tier of entry. Mathematics departments and teachers are free to teach and use this specification in whichever way is desired. An appendix to the specification lists the content in a more conventional order, to help those departments wanting to use the specification in a more traditional linear way.

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2 Using GCSE Mathematics B

2.1 Content of GCSE Mathematics B

- The entire content of the foundation tier is assessed in the foundation tier question papers, and the entire content of the higher tier is assessed in the higher tier question papers. However, the specification content is presented in four stages within each tier: Initial, Bronze, Silver and Gold. These stages are graduated in content and level of difficulty. These stages:

- Allow you to account for the fact that different students, or groups, start a GCSE Mathematics course at different points. They make it easy for you to identify content in which students may already be secure.

- Give you the opportunity to target teaching appropriately to the needs of different students or groups, which helps motivate students and promote a positive 'can-do' attitude to mathematics.

- Promote assessment for learning by providing a series of progressive, accessible targets throughout the GCSE course.

- Allow you to use formative assessments for each stage. This helps to identify strengths and areas for improvement, as well as give an indication of the current level of performance in relation to the whole tier.

- Can be used objectively to give students a *Stage Certificate* (which does not contribute to the GCSE). This links students' attainment to criteria, gives them a sense of achievement and progress, and provides both you and the student with an indication of current performance.

The Foundation Silver Stage is identical to the Higher Initial Stage, and the Foundation Gold Stage is identical to the Higher Bronze stage. This means that there are six unique stages in the specification when taken as a whole. The two overlapping stages allow you to use the statements to help decide the tier of entry for a student.

Each of the six stages addresses content from all topic areas, namely, number, algebra, geometry and measures, and statistics. As candidates progress through the stages they continue to study each of these areas.

As this is a linear GCSE specification centres are free to disregard the stages if desired, and teach the specification content in whichever order they choose. An appendix to the specification lists the content in a more conventional order, to help those departments wishing to do this.

2.2 Which stage to start on?

If you and your department wish to use the stages to deliver the specification, you may find the following guidance helpful in deciding which stage students should start on.

However OCR must point out that the teacher is in the best position to judge a student's ability. Teachers therefore need to use their professional judgement about students' capabilities, and their potential, when making these decisions. OCR recommends mathematics departments look carefully at the content for the stages in the specification, and decide which level is the most appropriate starting point, using the indicators below as a general guide.

The first indicator is the grade that you expect the candidate to achieve at GCSE:

GCSE target grades	Suggested starting point
D or below	Foundation Initial Stage
C/D	Foundation Bronze Stage
B/C	Higher Initial Stage
A/B	Higher Bronze Stage
A*/A	Higher Silver Stage

The second indicator is the level achieved at the end of Key Stage 3:

Key Stage 3 level	Suggested starting point
Below 3	OCR Entry Level Mathematics (R448)
3 or 4	Foundation Initial Stage
5	Foundation Bronze Stage
6	Higher Initial Stage
7	Higher Bronze Stage
8	Higher Silver Stage

Of course the Key Stage 3 level is a discrete measure, and students' abilities fit onto more of a continuum than this suggests. For instance, a student working at the "top end of level 6" may reasonably be given a target of grade A for GCSE – you may therefore wish to start him or her on the Higher Bronze Stage. Also, two students, where one is working at the "top end of level 6" and another working at the "lower end of level 7" may be closer in ability than two students both working at different points within the same level.

It is important to monitor students' attainment against the stage being taught. In doing this, teachers will be able to make any adjustments necessary if the course is proving to be either too difficult or not stretching enough.

Each the stages is designed to take around 6 months of teaching time, based on 2·5 hours of teaching time per week. Students' prior knowledge of any content within a stage would shorten this time.

2.3 Tier of entry

The following guidance is taken from the leaflet *Changes to GCSE mathematics: A two-tier model* (QCA, 2006):

At the point of entry for the GCSE examination, the tier chosen should depend on what students are expected to achieve in their final assessments. This decision should involve considering students' current level of performance [and] expected progress in the remainder of the course […]

- Students expected to achieve grades G to D should be entered for the foundation tier.
- Students expected to achieve grades C to A* should be entered for the higher tier.

Some students do better than predicted on the examination papers. The above pattern of entry means the actual grade can be higher or lower than the predicted grade, and sets high expectations for all students. Most importantly, for students expected to achieve grade C, it does not limit the level of achievement to grade C.

A question which is often raised concerns which tier to enter "D/C borderline students" for. OCR's advice regarding such students remains to enter them for the foundation tier. This is because higher tier papers begin with questions that would be stretching for such a candidate and then become more challenging still, whereas a foundation paper builds up to the questions which stretch such a candidate. OCR's understanding of the term "D/C borderline students" is that the teacher expects these students to achieve a grade D, but that there is a possibility the students will exceed this. This is consistent with the QCA's guidance above.

If students are thought to have a chance of achieving a grade B, and are therefore *expected* to achieve a grade C, then the higher tier would be more appropriate, as noted in the QCA's guidance.

As well as expected grades, teachers can use the stages in the specification to help make the decision.

The assessments for each tier cover the stages as shown in the following table.

	Initial and Bronze Stages	Silver and Gold Stages
Foundation	≈ 70 marks	≈ 30 marks
Higher	≈ 50 marks	≈ 50 marks

The figures in **bold** represent content overlapping the two tiers: the Foundation Silver Stage is identical to the Higher Initial Stage, and the Foundation Gold Stage is identical to the Higher Bronze Stage. These proportions give consistency with the allocation of marks to grades in the previous GCSE Mathematics specifications (taught from September 2007).

This information also allows you to make an informed judgement regarding the suitability of a candidate for either tier, based on their competence at each of the stages.

It is also worth noting that where a candidate is working at the top end of *either* tier, there will be a fairly high proportion of questions which assess work below their current level of ability. Teachers should ensure that such students are still familiar with, and competent at, work that they may have met in a previous stage of their education.

2.4 Assessment of GCSE Mathematics B

Candidates take **either** foundation tier Papers 1 and 2 **or** higher tier Papers 3 and 4.

Title	Duration	Weighting
Paper 1 (Foundation)	1 hour 30 minutes	50%
Paper 2 (Foundation)	1 hour 30 minutes	50%
Paper 3 (Higher)	1 hour 45 minutes	50%
Paper 4 (Higher)	1 hour 45 minutes	50%

- All four of the components are written examination papers of 100 marks.
- Candidates answer all questions on each paper.
- All papers are all externally assessed.
- Candidates are not permitted to use a calculator for Papers 1 and 3.
- Candidates are permitted to use a scientific or graphical calculator for Papers 2 and 4. Calculators are subject to the rules in the document *Instructions for Conducting Examinations*, published annually by the Joint Council for Qualifications (http://www.jcq.org.uk).
- In some questions, candidates will have to decide for themselves what mathematics they need to use.
- In each question paper, candidates are expected to support their answers with appropriate working.
- Functional elements of mathematics are assessed in this specification. The weightings are 30-40% at foundation tier and 20-30% at higher tier.

- Candidates should have the usual geometric instruments available. Tracing paper may also be used to aid with transformations etc.

2.5 Assessment availability

From June 2014, assessment is available in **June** and **November**. This means that the specification can be used as a two-year course from September 2012, and as a one-year course from September 2013. As there are two series per year for the specification, this gives flexibility over the start and end points for a course.

2.6 Entries and certification

The entry code for this specification is **J567**.

Each candidate should be entered for J567 and either option **F** or option **H**. Option F enters a candidate for Papers 1 and 2. Option H enters a candidate for Papers 3 and 4. No other entries are required.

Candidates entered for the foundation tier will be awarded grade C, D, E, F, G, or will be unclassified. Candidates entered for the higher tier will be awarded grade A*, A, B, C, D, E or will be unclassified.

The overall grade is based on the total weighted mark achieved in the two papers taken. The two papers are equally weighted.

2.7 Re-sits

As this is a linear specification, candidates wishing to re-sit the GCSE must be entered again for J567 and an option code, as in 2.6. No credit can be carried forward from previous attempts. Candidates may be entered an unlimited number of times, for the lifetime of the specification.

3 Other forms of Support

In order to help you implement the new GCSE Mathematics B Specification effectively, OCR offers a comprehensive package of support. This includes:

3.1 Published Resources

OCR offers centres a wealth of quality published support with a fantastic choice of 'Official Publisher Partner' and 'Approved Publication' resources, all endorsed by OCR for use with OCR specifications.

Publisher partners

OCR works in close collaboration with three Publisher Partners; Hodder Education, Heinemann and Oxford University Press (OUP) to ensure centres have access to:

- Better published support tailored to OCR specifications
- Quality resources produced in consultation with OCR subject teams, which are linked to OCR's teacher support materials
- Materials that are subject to a thorough quality assurance process to achieve endorsement

Hodder Education is the publisher partner for OCR GCSE Mathematics B and has produced the following resources.

OCR Mathematics for GCSE Specification B – Student Book 1 Foundation Initial & Bronze
Howard Baxter, Michael Handbury, John Jeskins, Jean Matthews, Mark Patmore
ISBN: 9781444118506, Published: 25/06/2010

OCR Mathematics for GCSE Specification B – Student Book 2 Foundation Silver & Gold and Higher Initial & Bronze
ISBN: 9781444118513, Published: 25/06/2010

OCR Mathematics for GCSE Specification B – Student Book 3 Higher Silver & Gold
Howard Baxter, Michael Handbury, John Jeskins, Jean Matthews, Mark Patmore
ISBN: 9781444118520, Published: 25/06/2010

OCR Mathematics for GCSE Specification B – Teacher and Assessment Pack 1 Foundation Initial & Bronze
Howard Baxter, Michael Handbury, John Jeskins, Jean Matthews, Mark Patmore
ISBN: 9781444118568, Published: 27/08/2010

OCR Mathematics for GCSE Specification B – Teacher and Assessment Pack 2 Foundation Silver & Gold and Higher Initial & Bronze
Howard Baxter, Michael Handbury, John Jeskins, Jean Matthews, Mark Patmore
ISBN: 9781444118575, Published: 27/08/2010

OCR Mathematics for GCSE Specification B – Teacher and Assessment Pack 3 Higher Silver & Gold
Howard Baxter, Michael Handbury, John Jeskins, Jean Matthews, Mark Patmore
ISBN: 9781444118582, Published: 27/08/2010

OCR Mathematics for GCSE Specification B – Homework Book 1 Foundation Initial & Bronze
Howard Baxter, Michael Handbury, John Jeskins, Jean Matthews, Mark Patmore
ISBN: 9781444118537, Published: 24/09/2010

OCR Mathematics for GCSE Specification B – Homework Book 2 Foundation Silver & Gold and Higher Initial & Bronze
Howard Baxter, Michael Handbury, John Jeskins, Jean Matthews, Mark Patmore
ISBN: 9781444118544, Published: 24/09/2010

OCR Mathematics for GCSE Specification B – Homework Book 3 Higher Silver & Gold
Howard Baxter, Michael Handbury, John Jeskins, Jean Matthews, Mark Patmore
ISBN: 9781444118551, Published: 24/09/2010

Dynamic Learning
The unique online assessment allows you to track learners' progress, highlighting routes to achieve success. The reports not only identify students' areas of strength and weakness, but provide links to print and digital resources that will help them improve their knowledge and skills.

Approved publications

OCR still endorses other publisher materials, which undergo a thorough quality assurance process to achieve endorsement. By offering a choice of endorsed materials, centres can be assured of quality support for all OCR qualifications.

Endorsement

OCR endorses a range of publisher materials to provide quality support for centres delivering its qualifications. You can be confident that materials branded with OCR's "Official Publishing Partner" or "Approved publication" logos have undergone a thorough quality assurance process to achieve endorsement. All responsibility for the content of the publisher's materials rests with the publisher.

These endorsements do not mean that the materials are the only suitable resources available or necessary to achieve an OCR qualification. Any resource lists which are produced by OCR shall include a range of appropriate texts.

3.2 OCR Training

The 2012-13 OCR Professional Development Programme offers more accessible and more cost effective training, with the same valued content that you expect from us.

At OCR, we are constantly looking for ways in which we can improve the support we offer to teachers. Most recently we have been considering the increasing challenges that schools face in releasing teachers for INSET, and how OCR can make its professional development programme more accessible and convenient for all.

From September 2012, our new improved programme will include:

- FREE online professional development units available when and where you want them
- FREE live web broadcasts of professional development events
- FREE face to face training for GCSE controlled assessment and GCE coursework
- A series of 'not to be missed' premier professional development events.

For more information, please email training@ocr.org.uk or visit www.ocr.org.uk/training.

3.3 OCR Social

Visit our social media site (www.social.ocr.org.uk). By registering you will have free access to a dedicated platform where teachers can engage with each other - and OCR - to share best practice, offer guidance and access a range of support materials produced by other teachers; such as lesson plans, presentations, videos and links to other helpful sites.

3.4 Interchange

OCR Interchange has been developed to help you to carry out day to day administration functions online, quickly and easily. The site allows you to register and enter candidates online. In addition, you can gain immediate free access to candidate information at your convenience. Sign up at https://interchange.ocr.org.uk

3.5 OCR support services

Active Results

Active Results is available to all centres offering OCR's GCSE Mathematics specifications.

activeresults

Active Results is a free results analysis service to help teachers review the performance of individual candidates or whole schools.

Devised specifically for the UK market, data can be analysed using filters on several categories such as gender and other demographic information, as well as providing breakdowns of results by question and topic.

Active Results allows you to look in greater detail at your results:

- Richer and more granular data will be made available to centres including item level data available from e-marking.
- You can identify the strengths and weaknesses of individual candidates and your centre's cohort as a whole.
- Our systems have been developed in close consultation with teachers so that the technology delivers what you need.

Further information on Active Results can be found on the OCR website.

OCR Mathematics Support Team

A direct number gives access to a dedicated and trained support team handling all queries relating to GCSE Mathematics and other Mathematics qualifications – 0300 456 3142.

3.6 OCR support resources

OCR has produced a range of resources to support the GCSE Mathematics B (J567) specification:

Specimen assessment materials

Sample schemes of work and lesson plans

Mock papers- only via Interchange

Learner/Parent's Guide

Dedicated problem solving guide

HOW TO GET IN TOUCH

OCR Mathematics support team

If you'd like to find out more about our Mathematics qualifications, please call our dedicated and trained mathematics support team on **0300 456 3142**

They are available from 8am–5.30pm, Monday – Friday. You can also email us at **maths@ocr.org.uk**

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