

Cambridge Secondary 1 Mathematics

Key Changes from 2011

Cambridge
Secondary

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Purpose of this document

This document aims to provide an overview for teachers of changes to the Cambridge Lower Secondary Programme and Cambridge Checkpoint curriculum.

From 2012 onwards Cambridge Checkpoint assessments will be aligned to the revised curriculum.

Progression tests aligned to the revised curriculum will be available from September 2011.

Cambridge Secondary 1: Mathematics

General Statement

Two different sources of information have informed the changes to the Cambridge Lower Secondary/Cambridge Checkpoint Mathematics curriculum framework; the first is feedback from schools during training sessions and through evidence from exams; the second builds on continually developing research based on an understanding of how lower secondary school children can become more proficient in mathematical skills.

The aim in revising the framework at lower secondary level was to make the stages more explicit by which the students progress to the standard expected at the start of the IGCSE or O Level.

The good news is that changes are mostly in emphasis and clarity rather than in content and standards. Most of the resources that you are currently using should continue to be appropriate for teaching the new syllabus and planning should not need significant changes. Crucially the standards that students are expected to reach, year on year, have not substantially changed. Most changes have been made to reflect the way that teachers were already delivering the programme.

The new framework emphasises the development of mathematical understanding alongside numeracy skills and for this reason the strand of problem solving has been expanded to facilitate tasks that enable students to do this.

In addition a new set of mental mathematics objectives has been introduced at each stage, called 'Mental Strategies'. This is designed to provide a structure for teaching mathematical understanding of the content of the framework.

This is a change in the emphasis of teaching rather than a change in the actual content of the curriculum. The purpose of the framework is to manage and plan the teaching but students will develop their numeracy skills by placing mathematics in context via application and problem solving.

Terminology in the new programme

On the subject of terminology, the new programme (covering all core subjects) will be known as **Cambridge Secondary 1** and this will support the revised Cambridge Checkpoint tests available from May 2012 just as the previous Cambridge Checkpoint or Cambridge Lower Secondary Programme curriculum frameworks did before it.

Each school year will be referred to as a '**stage**' because the ages at which students start their Primary and Secondary education varies around the world.

What were previously referred to as 'statements' in the existing curriculum framework will be known as '**Learning Objectives**' in the revised version.

Changes to Content

The great majority of the learning objectives remain unchanged in the new curriculum framework but a number have been rewritten for greater clarity or to change the emphasis to that of applying skills, a few have been removed and a few new objectives have been added. Some rearrangement has also taken place as a result of the changed emphasis.

Most teachers will find that they already cover the areas within the suggested time scales and order.

As to particular changes, please find these outlined below:

Number – Mental Strategies

The largest change in the new framework is the inclusion of a new set of mental mathematics objectives at each stage, called 'Mental Strategies'. This group of objectives resides within 'Calculation' which itself forms a sub-strand of 'Number.'

Its intent is to allow students to develop a range of strategies to aid quick recall of number facts and solve problems. Students should be encouraged to explain their strategies and invent ways of recording their actions so they build up a network of associated skills and knowledge that can be used for investigating functions and relationships. Teachers are advised to discuss the merits of various strategies to encourage students' understanding of the most practical and efficient strategy for each problem.

By the end of Stage 9, students should have a repertoire of known facts, have developed a range of mental strategies and be able to use efficient and effective written strategies for calculation. This should provide a smoother transition towards IGCSE and O Level.

Despite these changes, the calculation skills in the old and new frameworks are very similar. From 2012 the new approach will be reflected in the Cambridge Checkpoint tests.

Algebra

The Algebra section is extended with items demonstrating the use of Algebra in real life and trial and improvement methods for the solution of quadratic equations.

Geometry

The Geometry section includes more on constructions and geometric reasoning but the understanding and use of Trigonometry, which many teachers clearly felt should be left until later in the curriculum, has been removed.

Measure

There is little change within the Measure section.

Handling Data

The Handling Data section now includes more work on the design and use of questionnaires and on the drawing of conclusions from the statistics generated. Likewise, the comparison of theoretical and experimental probabilities has been slightly expanded in order to help teachers explain its uses in application.

Problem solving

The last section deals with problem solving which follows naturally from the ideas of logical discussion, conjecture and generalisation within all other areas of the curriculum.

Teaching the Framework

Teachers need to:

- Review the new Curriculum Frameworks and note any areas that will need to be worked into existing lessons
- Implement the new approach to calculation
- Spread work on problem solving and using and applying mathematics throughout the curriculum
- Check whether there are any new areas of knowledge required of teachers, according to your school's particular circumstances

It might be helpful to start by incorporating additional work on developing mental strategies into lessons. The correct approach depends on your school's context, though one possible approach would be to include a short period of mental mathematics as a 'warm up' at the beginning of each lesson. It is suggested that in the delivery of the programme, mental and informal methods are first laid down for students and then more formal methods are built up afterwards.

A good starting point is to give students a calculation problem, allow them time to work out an answer and invite them to share their methods. The change of emphasis towards applied and mental mathematics will be reflected in the addition of a few problem solving questions on the new Cambridge Checkpoint papers.

For further guidance please review the Specimen Papers now available on the Cambridge website at www.cie.org.uk.

Changes to Testing

Progression Tests

Progression tests are being revised to align with the new curriculum frameworks and will be available from September 2011. As previously Progression tests will be available for stages 7 and 8; new tests are available for stage 9. Note that progression tests will only assess knowledge and skills at the level of a particular stage.

Cambridge Checkpoint Tests

Mathematics will be assessed using two papers. Each paper will be taken in an hour-long session.

Questions will be on the Number, Algebra, Geometry, Measure and Handling Data sections of the curriculum framework in both papers.

Both papers will contain short, structured questions totalling 50 marks each. The questions will demand a variety of skills including recall of information and application of Mathematical knowledge. Problem solving techniques, skills and strategies will be assessed within the other strands (Number, Algebra, Geometry, Measure and Handling Data) and therefore will not be reported separately.

All the questions on both papers will be compulsory. As far as possible the questions will be arranged in difficulty throughout each paper covering, cumulatively, the content of Stages 7 to 9.

As with current Checkpoint the use of an electronic calculator will be allowed for Paper 2 but **not** for Paper 1.

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