



2015 GCSE Mathematics launch event

Agenda

1. The changes
2. Our approach
3. Our new GCSE Mathematics specification
4. Supporting you through the changes
5. Contact information

The changes

Government view

“I remain persuaded that there is an urgent need for reform, to ensure that young people have access to qualifications that set expectations that match and exceed those in the highest performing jurisdictions. There was broad agreement in the meetings we held during the consultation period that GCSEs as currently constituted are not giving our pupils the best chance to succeed, and that change is required. I have therefore decided that GCSEs should be comprehensively reformed.”

Michael Gove, Secretary for State, February 2013

Ofqual view

“The new reforms we are announcing now bring in the further changes that are needed if GCSEs are to become more engaging and worthwhile to teach and study, as well as more resilient and respected. We want to make sure that employers, colleges and universities, who use GCSEs when making selection decisions, can have confidence in the value of the qualifications they are using.”

Ofqual, Reforms to GCSEs in England from 2015, November 2013

First teaching dates

- September 2015: Mathematics, English Literature and English Language.
- September 2016: Science, Geography, History, Languages, Art & Design, Citizenship, Computer Science, Dance, Design & Technology, Drama, Music, PE and Religious Studies.
- September 2017: Other subjects – list to be confirmed. The fate of GCSE Statistics isn't yet known.

Changes to all GCSEs

- Now all to have a fully linear structure.
- A new 1–9 grading scale with 9 being the highest grade. Grade 4 will be pegged to current C grade.
- Tiering is only agreed for Mathematics and Science.

Mathematics timeline

	2014	2015	2016	2017
Current specification	Summer series as normal November re-sits	Summer series as normal November re-sits	Final GCSE examinations November re-sits	
New specification	Specifications in centres	First teaching		First GCSE examinations November re-sits

Changes to subject criteria

- New content at both Foundation and Higher tiers
- Linear examinations only
- Allows for two or three papers
- Increased assessment time – at least 4½ hours
- New assessment objectives
- Less formulae available in examinations
- 33-50% non-calculator

Changes to teaching and learning

- GCSE assessment objectives are based on the aims of KS3 and KS4 Programme of Study: fluency, reasoning and problem solving. Find opportunities to build these skills and track progress against them early on.
- A shift in content from Higher to Foundation tier - introduce the beginnings of some of these topics in KS3
- Start getting students in the habit of learning and memorising formulae early on, e.g. area of a trapezium and volume of a prism (no longer provided on formulae sheets).
- Prepare your students dealing with more assessments – there will now be three examinations over the summer session.

Our approach

Our research: scope

1. **International benchmarking** - Content and assessment comparisons with some high performing jurisdictions e.g. Hong Kong, Singapore.
2. **Item trialling** – testing how new style items work with real students
3. **Stakeholder engagement** – teachers, HE lecturers, learned societies, employer representatives

Our research: outcomes

Our content and assessments are comparable with some of the world's highest performing jurisdictions, but more can be done to:

- Ensure students with a pass at GCSE have the numerical skills required to progress to **employment**
- **Stretch** the **most able** students and **prepare** them thoroughly for the study of **A level** Mathematics
- Embed **problem solving** more rigorously in teaching, learning and assessment



The specification



The specification

- Content taken from the Department for Education's *Mathematics GCSE subject content and assessment objectives document*, published in November 2013.
- Content is indicated that is for all students (standard font), for the overlap between Foundation and Higher tier (underlined font) and for Higher tier only (**bold font**).

Six content areas:	F	H
• Number	25%	15%
• Algebra	20%	30%
• Ratio, proportion, rates of change	25%	20%
• Geometry	15%	20%
• Probability & Statistics	15%	20%



The specification

- Coverage of broader and deeper mathematical content, delivered through a single extended GCSE
- Higher tier will include questions that will stretch the most able
- Foundation tier will focus on core mathematical understanding and skills for all students to master
- A greater focus on problem-solving
- Additional requirements to provide clear mathematical arguments
- Fewer formulae provided on formulae sheets



The specification: new assessment objectives

- AO1: Use and apply standard techniques
(50% Foundation, 40% Higher)
- AO2: Reason, interpret and communicate mathematically
(25% Foundation, 30% Higher)
- AO3: Solve problems within mathematics and other contexts
(25% Foundation, 30% Higher)
- More emphasis on problem-solving, communication, proof, interpretation
- QWC and Functional Maths no longer explicitly required



The specification: assessment

- The GCSE Mathematics specification will be examined by three written papers, each of 1½ hours.
- The first paper will be assessed without the use of a calculator; calculators will be expected for papers 2 and 3.
- There will be no difference in the content or assessment objectives assessed in each of the papers.



The specification: new content

Moved from Higher to Foundation:

- Pi, reverse percentages, simultaneous equations, factorising quadratics, trigonometry, circle properties, vectors, tree diagrams

Added to Higher tier:

- Gradient at a point on a curve as rate of change, areas under graphs, Venn diagrams, APs and GPs



New styles of assessment

The formula $F = 1.8C + 32$ can be used to convert between temperatures in degrees Celsius (C) and degrees Fahrenheit (F).

(a) Find 28° in degrees Fahrenheit.

At the North Pole one day, the temperature at midnight was X° Celsius and X° Fahrenheit.

(b) Find the value of X .

(a) 1 mark for substitution and solving

(b) 1 mark for working with $F = C$ (e.g. $F = 1.8F + 32$) and 1 mark for solving to get $X = -40$



New styles of assessment

Linda keeps chickens. She sells the eggs that her chickens lay.

She has 140 chickens. Each chicken lays 6 eggs a week.

Each chicken eats about 100g of chicken feed each day. The chicken feed costs £6.75 for a 25 kg bag.

Work out an estimate for the cost of the chicken feed used for every 12 eggs.

(5 marks)

1 mark for correct first step (e.g. = 840 eggs per week); 1 mark for a correct process to find weight of feed per week, 1 mark for the weekly cost; 1 mark for a process to find cost required for 12 eggs; 1 mark for 37.8 p (or in the range £0.37 to £0.38).



New styles of assessment

Ashten chooses three different whole numbers between 1 and 50.

The first is a prime number.

The second is 4 times the first number.

The third number is 6 less than the second number.

The sum of the three numbers is greater than 57; find the three numbers.

(3 marks)

1 mark for setting up an inequality, 1 mark for a correct process to solve the inequality, 1 mark for 11, 44, 38



New styles of assessment

C is the curve with equation $y = x^2 - 4x + 4$

L is the straight line with equation $y = 2x - 4$

L intersects **C** at two points, *A* and *B*.

Calculate the exact length of *AB*.

(6 marks)

2 marks for process to eliminate y by forming quadratic, 2 marks for solving for x and y , 2 marks for finding distance between two points as $\sqrt{20}$



New styles of assessment

The median of five consecutive integers in n .

Show that the difference between the mean and the median of the squares of the five integers is always 2.

(3 marks)

1 mark for listing the numbers $(n-2)$, $(n-1)$, n , $(n+1)$, $(n+2)$

1 mark for finding the squares of each of these and adding them

1 mark for dividing by 5 to find the mean and comparing to n^2



New styles of assessment

A rectangular sheet of paper can be cut into two identical rectangular pieces in two different ways.

When the original sheet of paper is cut one way, the perimeter of each of the two pieces is 50 cm.

When the original sheet of paper is cut the other way, the perimeter of each of the two pieces is 64 cm.

What is the perimeter of the original sheet of paper?

(5 marks)

1 mark for setting up equations, 1 mark for finding value of one variable, 1 mark for finding the other variable, 1 mark for process to find value of perimeter, 1 mark for correct value (76 cm)

Supporting you through the changes

Planning and delivery

We will provide you with:

- an editable scheme of work to save you time
- a Getting Started guide, with exemplars and detailed guidance
- a student guide to help them understand their course
- support for new topic areas.

Teaching and learning

Preparing for changes may require a fresh approach to teaching and learning.

- Our free resources will focus on how to help learners achieve their potential in mathematics
- Materials are based on tried and tested pedagogies that are underpinned by an evidence base, so we know they work.
- Our CPD programme will focus on aspects of the specification where you have said you need more support.



Understanding the standard

We will provide you with information and support to help you understand the standard:

- **Exemplar** student work and examiner commentaries derived from our trialling with centres
- **Exemplification** of content, assessment objectives through the SAMs

Personal and local support

The Mathematics Emporium – help keeps you up to date about everything related to all our mathematics qualifications including training events, key dates and support materials.

www.edexcelmaths.com

mathsemporium@pearson.com

Mathematics Collaborative Networks – sharing best practice to improve teaching and learning

Curriculum and centre support

- **Curriculum Development Managers** are curriculum experts who provide information and guidance to senior management.
- **Curriculum Support Consultants** provide invaluable support to our existing heads of department.

www.edexcel.com/contactus

Tracking progress

ResultsPlus

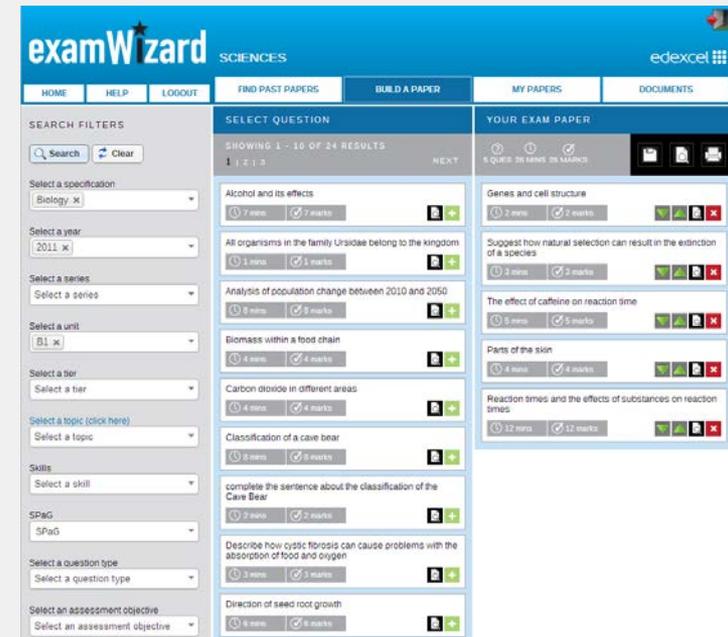
- Our new qualification will be accompanied by an additional set of papers prior to first teaching, for you to use as a mock exam or earlier in the course.
- We will also be providing free Key Stage 3 and 4 tests
- ResultsPlus provides the most detailed analysis available of your students' exam performance. It can help you to identify topics and skills where students could benefit from further learning.
- Mock Analysis provides a detailed breakdown of student performance on past exam papers set as mock exams.

www.edexcel.com/resultsplus

Tracking progress

ExamWizard

- allows you to create your own tests online using FREE past paper questions.
- contains a bank of past Edexcel exam questions to help you create your own mock exams, topic tests, homework or revision activities.
- helps you search for past papers, mark schemes and examiners' reports.



www.examwizard.co.uk

Training from Pearson

Events in a timely manner to help you prepare to teach the new specification:

- Getting ready to teach events in early 2015.
- Professional development events with a focus on developing expertise to support good teaching and learning.

www.edexcel.com/training



Contact information

Contact information

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www.edexcel.com/learningforabetterfuture