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GETTING STARTED WITH CORE MATHS

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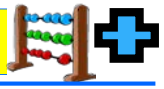
Abacus Plus 

Getting started with Core Maths

A workshop for those looking to first teach Core Maths from September 2018.

The session will include:

- practicalities of timetabling
- recruitment
- teaching programme
- resources
- different Core Maths qualifications.

Getting started with Core Maths

- Background/ Context
- Rationale
- Logistics (practicalities of timetabling, recruitment)
- Curriculum issues (teaching programme, resources, different Core Maths qualifications)
- Experiences of other centres

Background for Core Maths

we should set a new goal … within a decade the vast majority of pupils are studying maths right through to the age of 18	Core Maths 'will allow thousands more pupils to study the subject from age 16 to 18'	… more young people leave education properly prepared for the demands of university, work and life	*'we are going to look at teaching maths to 18 for all pupils'*	The DfE should … ensure that schools and colleges… offer all students … access to a core maths qualification.
June 2011	Oct 2013	Dec 2014	March 2016	July 2017

Who is it for?

Students who achieved a grade 9-4 (A*-C) in Mathematics GCSE, but don't intend taking AS or A level Mathematics.

"These qualifications should provide for students intending to follow various routes into higher education, vocational training or business and industry. For example, they could provide a grounding for students entering higher education in subjects such as geography, history or biology, for those choosing vocational training, for example in construction, leisure and tourism or hospitality and catering, for those undertaking teaching qualifications, or for those planning to do apprenticeships, such as the manufacturing industry."

Report from the ACME expert panel Oct 2013

What is Core Maths?

- Core Maths is the collective name given to a set of level 3 maths qualifications
- They are designed to a set of criteria set out in a technical guidance document
- The qualifications are equal in size to an AS (180GLH), and are graded A-E
- They have the same number of UCAS points as an AS

What is the purpose of Core Maths?

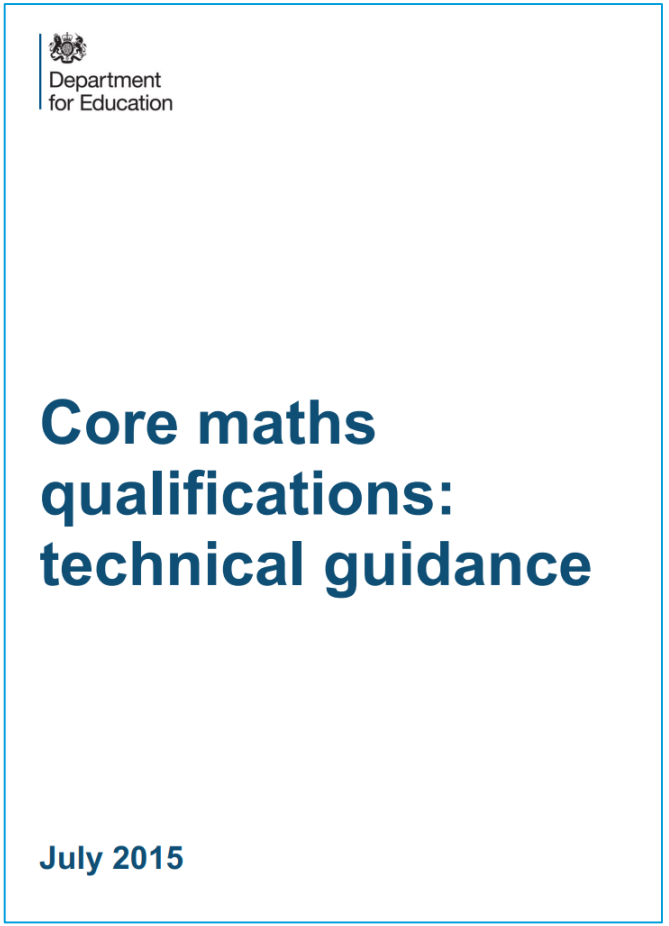
- Intended to provide continuing mathematical development that consolidates and extends their mathematical understanding
- Prepare students for mathematical demands of university and employment - *"for study, work and life"*
- Foster the ability to think mathematically and apply mathematical techniques in unfamiliar situations with confidence

"apply, deepen, and extend students' mathematics"

The objectives of Core Maths

1. Deepen competence in the selection and use of mathematical methods and techniques.
2. Develop confidence in representing and analysing authentic situations mathematically and in applying mathematics to address related questions and issues.
3. Build skills in mathematical thinking, reasoning and communication.

Core Maths technical guidance 2015



Rationale: The case for Core Maths

Identify reasons to convince senior leaders and parents of the benefits of your centre offering Core Maths.

- Economic
- International comparisons
- Curriculum
- Preparation for the workplace
- Financial awareness

Students

Identify five reasons to persuade students of the benefits for them of studying Core Maths.

Who should you target?

How do you recruit?

Logistics

Timetabling:

- Time allocation 180 hours – AS equivalence
- One year or two year course?
- Option block or enhancement?
- Targeted or general offer or compulsion?

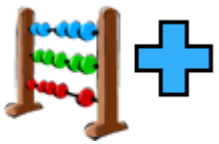
Curriculum Issues

- teaching programme
- resources
- different Core Maths qualifications

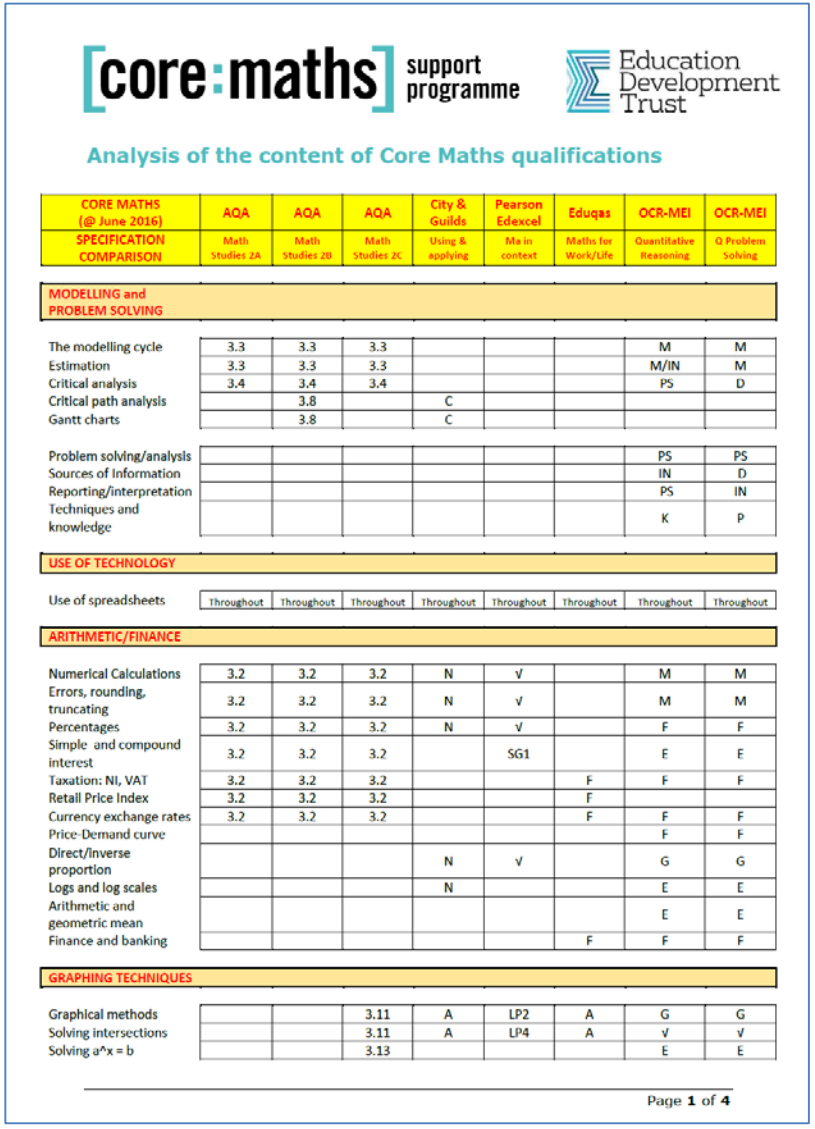
Core Maths qualifications

Currently there are 6 qualifications available from 5 awarding bodies

- Mathematical Studies (AQA)
- Using and Applying Mathematics (City & Guilds)
- Mathematics in Context (Pearson/Edexcel)
- Mathematics for Work and Life (Eduqas/WJEC)
- Quantitative Reasoning/Quantitative Problem Solving (OCR/MEI)



Content of Core Maths qualifications



[core:maths] support programme

Education Development Trust

Analysis of the content of Core Maths qualifications

CORE MATHS (@ June 2016) SPECIFICATION COMPARISON	AQA Math Studies 2A	AQA Math Studies 2B	AQA Math Studies 2C	City & Guilds Using & applying	Pearson Edexcel Ma in context	Eduqas Maths for Work/Life	OCR-MEI Quantitative Reasoning	OCR-MEI Q Problem Solving
MODELLING and PROBLEM SOLVING								
The modelling cycle	3.3	3.3	3.3				M	M
Estimation	3.3	3.3	3.3				M/IN	M
Critical analysis	3.4	3.4	3.4				PS	D
Critical path analysis		3.8		C				
Gantt charts		3.8		C				
Problem solving/analysis							PS	PS
Sources of Information							IN	D
Reporting/interpretation							PS	IN
Techniques and knowledge							K	P
USE OF TECHNOLOGY								
Use of spreadsheets	Throughout	Throughout	Throughout	Throughout	Throughout	Throughout	Throughout	Throughout
ARITHMETIC/FINANCE								
Numerical Calculations	3.2	3.2	3.2	N	√		M	M
Errors, rounding, truncating	3.2	3.2	3.2	N	√		M	M
Percentages	3.2	3.2	3.2	N	√		F	F
Simple and compound interest	3.2	3.2	3.2		SG1		E	E
Taxation: NI, VAT	3.2	3.2	3.2			F	F	F
Retail Price Index	3.2	3.2	3.2			F		
Currency exchange rates	3.2	3.2	3.2			F	F	F
Price-Demand curve							F	F
Direct/inverse proportion				N	√		G	G
Logs and log scales				N			E	E
Arithmetic and geometric mean							E	E
Finance and banking						F	F	F
GRAPHING TECHNIQUES								
Graphical methods			3.11	A	LP2	A	G	G
Solving intersections			3.11	A	LP4	A	√	√
Solving a^x = b			3.13				E	E

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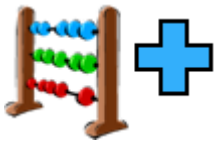
Note:

- 8 Core Maths exams
- Exam structure (p4)
- Specification headings (p4)
- Use of technology (p1)

Identify topics common to all Core Maths qualifications.



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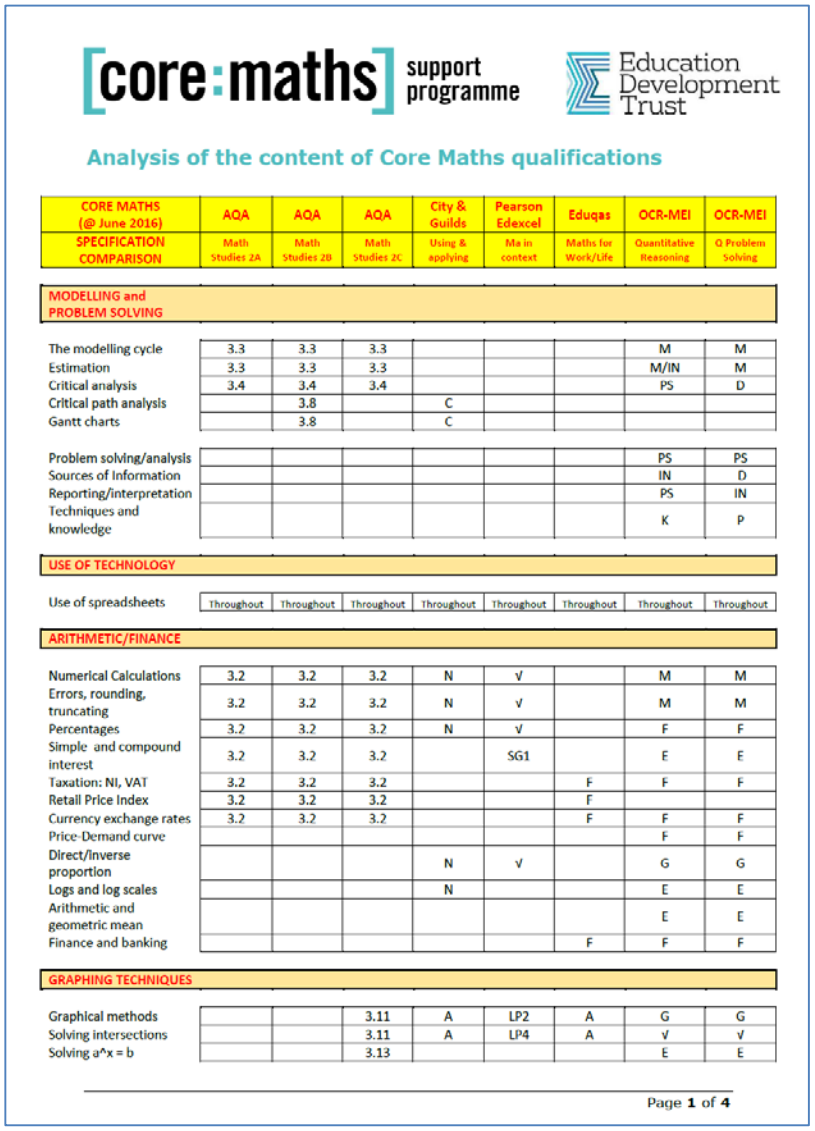

[core:maths] support programme

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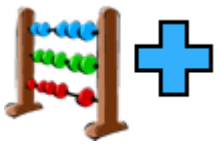
Questions

Which qualification will work best in your setting with your students and teachers?

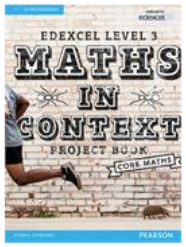
Rationale. Prepare a case for your chosen qualification to present to the senior leaders in your school/ college.



MEI Mathematics Education Innovation

Edexcel Maths in Context Project Book + eBook

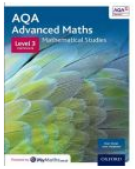
Part of the Edexcel Core Maths: Mathematics in context series



See larger version of cover

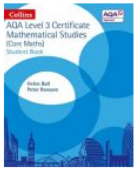
Price	£12.61 + £0.90 UK VAT
ISBN	9781292149288
Availability	Available
Publication Date	February 2016
Format	PACK

AQA Mathematical Studies Student Book



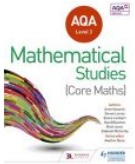
Authors: Stan Dolan, June Haighton
Publisher: Oxford University Press
ISBN-13: 9780198365938
Price: £24.99
Publication date: February 2016 - out now

Level 3 Certificate Mathematical Studies (Core Maths) Student Book



Authors: Peter Ransom, Kevin Davis and Helen Ball
Publisher: Collins
ISBN-13: 9780008116200
Price: Print: £19.99, Connect: £250 (1yr) or £600 (3yr)
Publication date: August 2016 - out now

AQA Level 3 Mathematical Studies (Core Maths)



Authors: Anne Haworth, Steven Lomax, Elaine Lambert, David Bowman, Ruth Gibson, Deborah McCarthy, Marc North. Series editor: Heather Davis
Publisher: Hodder Education
ISBN-13: 9781471863752
Price: £19.99
Publication date: June 2017
Digital version available: April 2017

Resources

Text books

Other Resources

- Amsp/ Integral
- Nuffield
- News items
- AS/A level text books
- Young Money (formerly **pfeg**)….

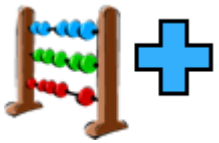
Learning from others – Case Studies

STEM website

- Huddersfield New College
- Malmesbury School
- Newham Sixth Form College
- Northampton Academy
- Queen Elizabeth's School
- St. Marylebone Church of England School
- The Duston School

Where we are up to with Core Maths?

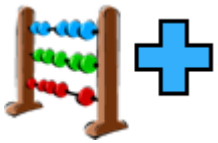
- First examined in 2016 with entries from 240 centres including approximately 150 early adopter centres
- Support provided from the DfE funded and sector-led Core Maths Support Programme (2014-2017)
- Strong endorsement in the Adrian Smith report into the feasibility of maths for all post-16 students (July 2017)
- From September 2018 will attract funding £600 per extra student
- Advanced Mathematics Support Programme (MEI) will provide support from May 2018 for two years.



Core Maths uptake by sector

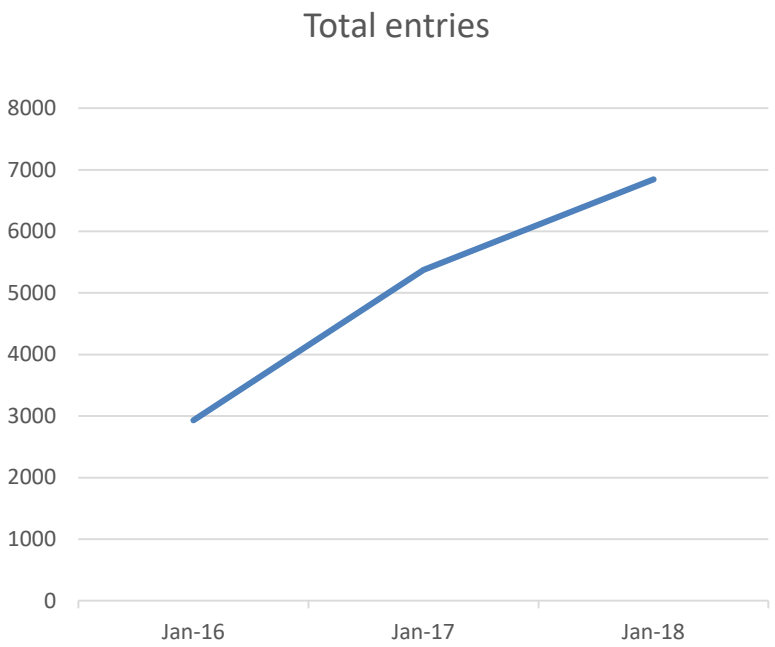
Type of institution	Number teaching Core Maths			Total number of institutions	Percentage coverage		
	2014-15	2015-16	2016-17		2014-15	2015-16	2016-17
Schools with sixth forms	77	245	490	2104	4%	12%	23%
Sixth Form Colleges	14	33	52	95	15%	35%	55%
FE Colleges	54	68	96	225	24%	30%	43%
Studio schools/UTC	3	15	26	52	6%	29%	50%
Total	**148**	**361**	**664***	**2476**	**6%**	**15%**	**27%**

*Figures based on centres known as of June 2017

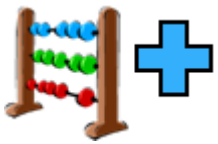


Exam entries 2016, 2017 and 2018

	Total entries
June 2016	2931
June 2017	5376
June 2018	6845*



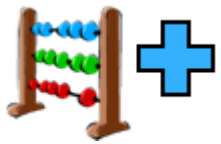
*estimate based on information provided by AQA, OCR and Pearson-Edexcel in April 2018



Exam entries 2016-18

	AQA	OCR	OCR	Pearson Edexcel	City & Guilds	Total entries
Series	Mathematical Studies	Quantitative Reasoning	Quantitative Problem Solving			
June 2016	2139	424	186	182	0	2931
June 2017	4044	454	309	554	15	5376
June 2018	5000*	635**	470*	740***		6845

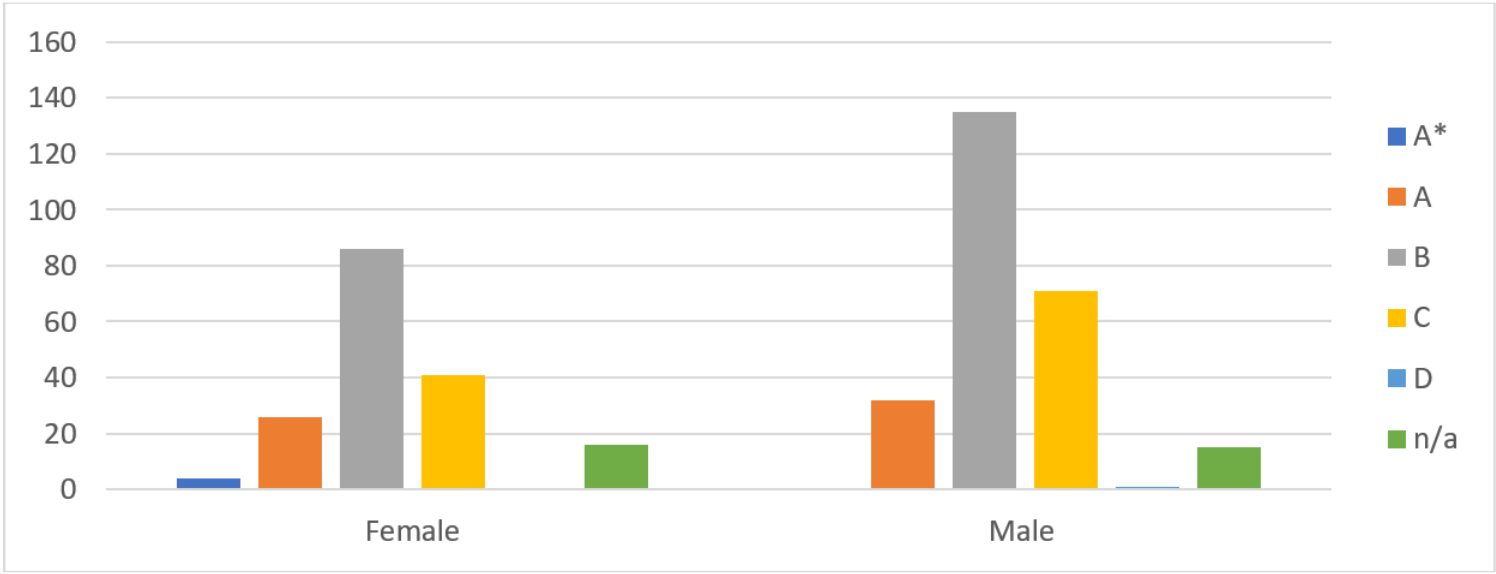
*estimated, entries from 400 centres
**confirmed entries as of 27/3/18
*** as at 3/4/18



Analysis of a sample of 2017 results

GCSE mathematics grade	A*	A	B	C	D	n/a	Grand Total
No. of females	4	26	86	41		16	173
No. of males		32	135	71	1	15	254
Grand Total	**4**	**58**	**221**	**112**	**1**	**31**	**427**

GCSE mathematics grade	A*	A	B	C	D	n/a	Grand Total
%ge of females	2%	15%	50%	24%	0%	9%	100%
%ge of males							
Grand Total							



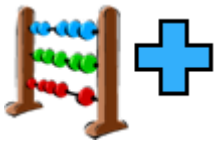
Abacus Plus

Analysis of a sample of 2017 results

- based on a sample of 23 centres: **Prior attainment**

GCSE mathematics grade	A*	A	B	C	D	n/a	Grand Total
Grand Total	4	58	221	112	1	31	427

- There is considerable variation in the number and profile of both entries and results for the 23 centres.
- For the aggregated prior attainment data the modal grade is grade B with over half the entry having this as their starting point
- The modal prior attainment GCSE grade is grade B in all but four of the centres. For three the modal grade was grade C and in the fourth it was grade A.
- There is considerable variation between the prior attainment of students in individual schools and colleges. This may reflect their entrance requirements for taking Core Maths.

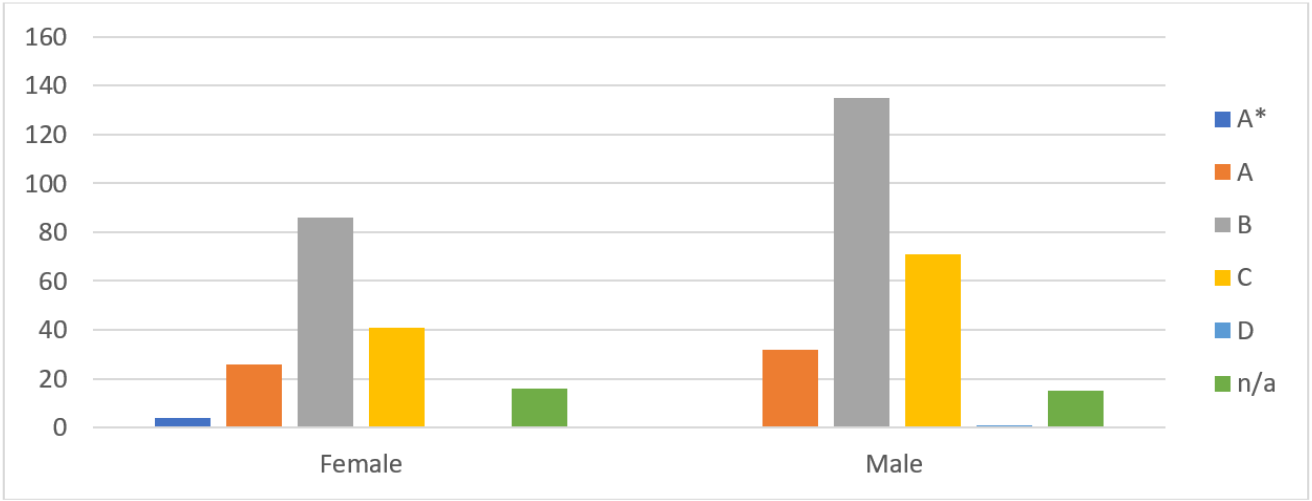


Analysis of a sample of 2017 results

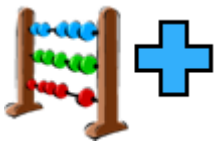
Prior attainment by gender

GCSE mathematics grade	A*	A	B	C	D	n/a	Grand Total
No. of females	4	26	86	41		16	173
No. of males		32	135	71	1	15	254
Grand Total	**4**	**58**	**221**	**112**	**1**	**31**	**427**

GCSE mathematics grade	A*	A	B	C	D	n/a	Grand Total
%ge of females	2%	15%	50%	24%	0%	9%	100%
%ge of males	0%	13%	53%	28%	0%	6%	100%
Grand Total	**1%**	**14%**	**52%**	**26%**	**0%**	**7%**	**100%**



While the profiles are similar the prior attainment profile of the females is slightly higher than that of the males.



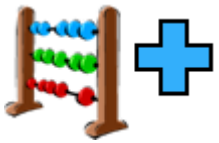
Analysis of a sample of 2017 results

Analysis of Core Maths results by gender

Numbers	A	B	C	D	E	U	X	Grand Total
Female	41	30	33	25	26	17	1	173
Male	34	50	55	38	36	38	3	254
Grand Total	75	80	88	63	62	55	4	427

Percentages	A	B	C	D	E	U	X	Grand Total
Female	24%	17%	19%	14%	15%	10%	1%	100%
Male	13%	20%	22%	15%	14%	15%	1%	100%
Grand Total	18%	19%	21%	15%	15%	13%	1%	100%

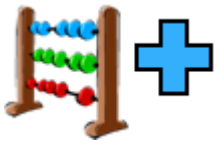
- The ratio of males to females of this sample is around 3:2 at 59% to 41%.
- A higher proportion of females achieved the highest grade A, 24% compared to 13% of the males.
- 60% of females achieved grades A-C compared to 55% of males.



Analysis of a sample of 2017 results
Progression from GCSE

Core Maths grade	A	B	C	D	E	U	X	Grand Total
A*	3	1						4
A	26	10	16	2	3	1		58
B	32	56	46	42	29	15	1	221
C	4	7	18	16	26	39	2	112
D							1	1
Grand Total	65	74	80	60	58	55	4	396

- There is positive correlation between GCSE mathematics grades and Core Maths results.
- The full range of Core Maths grades is available to GCSE mathematics grade B and grade C students.
- GCSE mathematics grade D does not appear to be a good starting point for Core Maths.

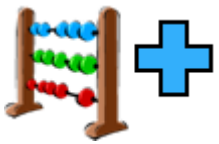


Analysis of a sample of 2017 results

- based on a sample of 23 centres

Course length

- Most centres (83%) offered the course over two years.
- As is to be expected the profile of results for a two-year course is better than that for one year with:
  - Higher proportions of the highest grades A and B;
  - Higher percentage of overall pass grades at 88% compared to 79%

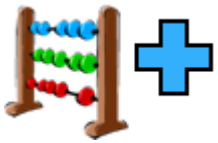


Analysis of a sample of 2017 results

- based on a sample of 23 centres

Teaching time

- Just over one half of the centres (52%) allocated between 1 and 2 hours a week for teaching Core Maths with 43% allocating between 2 and 3 hours and less than 5% allocating over 3 hours.
- The strongest profile of results is in the group allocated between 2 and 3 hours.



Analysis of a sample of 2017 results

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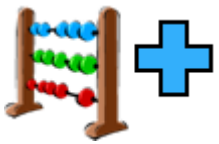
Two years or one year?

Two years:

- None of the centres offering Core Maths over two years allocated more than 3 hours per week to teaching the course.
- The strongest profile of results is in the group allocated between 2 and 3 hours.

One year

- Over half of the centres offering Core Maths over one year allocated between 1 and 2 hours per week to teaching the course.
- Again the strongest profile of results is in the group allocated between 2 and 3 hours.
- In those centres allocating between 1 and 2 hours per week to teaching the course over 30% failed to secure a pass grade.

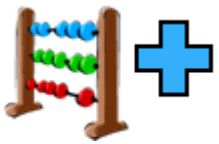


Analysis of a sample of 2017 results

- based on a sample of 23 centres

Summary

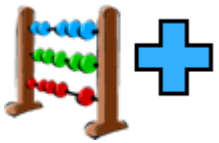
- Core Maths is proving fit for purpose proving accessible for students with a pass grade at GCSE and providing appropriate challenge for all students with at least a GCSE mathematics pass grade.
- Centres delivering the course over two years with an allocation of between 2 and 3 hours achieved the better results.



The early take-up of Core Maths: emerging findings

- There is a lot of scope for increase in Core Maths provision in all institution types, but particularly in schools that teach to 18.
- There is a strong gender imbalance in Core Maths participation, with female students in the minority (35.1%).
- **teachers** who have been involved with Core Maths … are enthusiastic about both the content and the pedagogical approach.
- **students** .. value what they are learning on the Core Maths course, and the way in which it is taught.
- Core Maths supports and interacts with other curriculum areas

Source: Proceedings of the British Society for Research into Learning Mathematics 37 (2) June 2017



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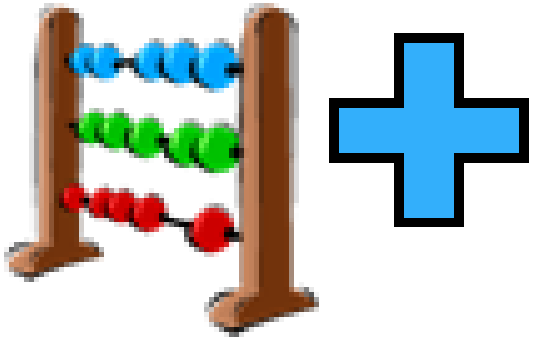

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