Department for Education

Post-16 maths participation in 2015 to 2016

Ad-hoc notice

July 2017

Contents

Introduction

This report includes new analysis of post-16 maths participation in 2015/16 based on prior attainment in the subject. This analysis was produced to help inform the forthcoming report of Sir Adrian Smith's review of post-16 mathematics.

Methodology

The data used in this release is from the department's Young Person's Matched Administrative Dataset (YPMAD) which is the source of the Level 2 and 3 attainment by young people aged 19 in 2016 Statistical First Release. A technical document is published alongside that release which explains the concepts, methods and data sources used in collating the dataset and the Statistical First Release. This is not the source of the Official Statistics on post-16 participation but the data can be used as a proxy. Information about a young person's highest level of participation during the academic year is derived from the school census, Individualised Learner Record (ILR) and awarding body datasets (attainment data).

For analysis of A level entries and higher education participation based on prior maths attainment, the YPMAD has been joined to DfE's 16-18 attainment data and Higher Education Statistics Agency (HESA) data.

The YPMAD (including when joined to other sources) in this release covers those in the state sector in England at academic age 15. When 16-18 attainment data is joined to key stage 4 attainment data, the coverage is those in the state sector in England at the end of key stage 4. The A level entries data (Table 8) is for all 16-18 year olds in England.

Analysis

The table below shows that the higher the maths GCSE grade achieved at 15, the higher the level of maths participation at academic age 16.

Table 1: Maths participation at academic age 16 by GCSE maths attainment at academic age 15

GCSE maths grade at 15	Number in cohort	A Level	AS Level	Other Level 3	GCSE	Below GCSE	None
A*	40,400	6%	81%	1%	0%	0%	12%
A	64,500	2%	58%	1%	0%	0%	39%
B	107,500	0%	19%	2%	0%	1%	78%
C	166,200	0%	1%	1%	2%	1%	95%
A-C*	*378,500*	*1%*	*24%*	*1%*	*1%*	*1%*	*72%*
D	74,700	0%	0%	0%	86%	6%	7%
E and below	101,700	0%	0%	0%	17%	64%	19%
Total	**554,900**	**1%**	**17%**	**1%**	**15%**	**13%**	**53%**

Source: DfE Matched Administrative Dataset, cohort academic age 16 in 2015/16

This table also shows that those with a grade C in GCSE maths are the most likely to stop studying the subject at 16. Those with a D are most likely to retake the subject due to the maths and English condition of funding which requires those on a study programme of 150 hours or more without an A*-C to continue studying the subject. Sub-national level 3 maths participation at academic age 16 for those with A*/A and A*-C GCSE maths at age 15 is shown in the Annex.

As Table 1 focuses on participation at 16, it does not show the full extent of A level maths participation, so Table 2 shows the highest maths participation at either academic age 16 or 17. This shows that over three quarters (76 per cent) of those with an A* GCSE at 15 study maths A level and a third (33 per cent) of those with an A grade at 15 do. Only 5 per cent of those with a B grade at 15 study A level maths at 16 or 17.

Table 2: Highest maths participation at academic age 16/17 by GCSE maths attainment at academic age 15

GCSE maths grade at 15	Number in cohort	A Level	AS Level	Other Level 3	GCSE	Below GCSE	None
A*	38,300	76%	11%	1%	0%	0%	11%
A	64,600	33%	28%	1%	0%	0%	37%
B	107,800	5%	16%	1%	0%	1%	76%
C	177,700	0%	1%	0%	3%	4%	92%
A-C*	*388,400*	15%	11%	1%	1%	2%	70%
D	62,000	0%	1%	0%	79%	15%	5%
E and below	109,700	0%	1%	0%	23%	62%	14%
Total	**560,200**	**10%**	**8%**	**1%**	**14%**	**16%**	**52%**

Source: DfE Matched Administrative Dataset, cohort academic age 17 in 2015/16

Table 3 shows whether students that studied maths at 16 progressed to a higher level in the subject at 17 by their GCSE grade at 15. This shows that 38% progress to a higher level of maths participation and 35% stop studying the subject at 17.

Table 3: Maths participation at academic age 17 for those that studied the subject at academic age 16 by GCSE maths attainment at academic age 15

GCSE maths grade at 15	Number	Higher level at 17	Same level or lower at 17	No maths at 17
A*	33,700	79%	10%	11%
A	39,800	52%	11%	37%
B	24,400	22%	14%	64%
C	11,800	6%	12%	82%
A-C*	*109,800*	*49%*	*11%*	*40%*
D	57,100	20%	43%	37%
E and below	90,000	37%	37%	26%
Total	**256,900**	**38%**	**27%**	**35%**

Source: DfE Matched Administrative Dataset, cohort academic age 17 in 2015/16

Table 4 shows the highest overall study aim at 16 by GCSE maths grade at 15. This shows that those with higher GCSE maths attainment at 15 are more likely to study academic level 3 qualifications at age 16.

Table 4: Highest study aim at academic age 16 by GCSE maths attainment at academic age 15

GCSE maths grade at 15	Number in cohort	Academic Level 3	L3 App*	Other Level 3	L2 App*	Other Level 2	Below Level 2	None
A*	40,400	96%	1%	2%	0%	0%	0%	1%
A	64,500	92%	1%	5%	1%	1%	0%	1%
B	107,500	77%	2%	15%	2%	3%	1%	1%
C	166,200	44%	2%	30%	5%	15%	2%	2%
A-C*	*378,500*	*67%*	*2%*	*18%*	*3%*	*7%*	*1%*	*1%*
D	74,700	17%	2%	22%	8%	47%	1%	3%
E and below	101,700	*3%*	*0%*	*7%*	*7%*	*43%*	*31%*	*9%*
Total	**554,900**	**49%**	**2%**	**17%**	**4%**	**19%**	**7%**	**3%**

* App = Apprenticeship
Source: DfE Matched Administrative Dataset, cohort academic age 16 in 2015/16

Table 5 shows the highest study aim at academic age 16 for those not studying any form of maths. In comparison with the figures in Table 4, this shows that those with A*-B grades at 15 but not studying maths at 16 are less likely to be studying academic level 3 courses compared to everyone with those grades.

Table 5: Highest study aim at academic age 16 for those not studying maths by GCSE maths attainment at academic age 15

GCSE maths grade at 15	Number	Academic Level 3	L3 App*	Other Level 3	L2 App*	Other Level 2	Below Level 2	None
A*	4,800	80%	2%	7%	1%	1%	1%	9%
A	24,900	82%	2%	10%	1%	1%	0%	2%
B	84,000	72%	2%	18%	2%	4%	1%	1%
C	157,300	44%	2%	30%	5%	14%	2%	2%
A-C*	*271,100*	*57%*	*2%*	*24%*	*4%*	*10%*	*2%*	*2%*
D	5,200	3%	3%	5%	26%	10%	8%	45%
E and below	19,300	*1%*	*0%*	*1%*	*4%*	*7%*	*40%*	*47%*
Total	**295,500**	**52%**	**2%**	**23%**	**4%**	**10%**	**4%**	**5%**

* App = Apprenticeship
Source: DfE Matched Administrative Dataset, cohort academic age 16 in 2015/16

Table 6 shows where pupils study at academic age 16 based on their maths attainment at academic age 15.

Table 6: Main institution type at academic age 16 by GCSE maths attainment at academic age 15

GCSE maths grade at 15	Number in cohort	School	Sixth form college	FE college	Apprenticeship	Other	None
A*	40,400	75%	17%	5%	1%	1%	1%
A	64,500	67%	19%	10%	2%	1%	1%
B	107,500	54%	19%	21%	4%	1%	1%
C	166,200	36%	14%	40%	7%	1%	2%
A-C*	*378,500*	*51%*	*17%*	*26%*	*5%*	*1%*	*1%*
D	74,700	21%	10%	53%	10%	3%	3%
E and below	101,700	17%	4%	56%	8%	7%	9%
Total	**554,900**	**41%**	**13%**	**35%**	**6%**	**2%**	**3%**

Source: DfE Matched Administrative Dataset, cohort academic age 16 in 2015/16

This shows that those with higher grades at 15 tend to study at a school or sixth form college at 16 and those with lower prior attainment are more likely to study in an FE college.

As can be seen in Table 1, those with A* to B GCSE grades in maths at 15 are those most likely to study AS/A level maths at 16. Table 7 shows that the proportion of those going on to study these qualifications differs depending on the characteristics of the pupils.

Table 7: Proportion studying AS/A level maths at academic age 16 by pupil characteristic and GCSE maths attainment at academic age 15

	A*	A	B
Total	**87%**	**60%**	**19%**
Gender			
Male	92%	70%	25%
Female	81%	50%	13%
Free School Meal (FSM) eligibility			
Not eligible for FSM	87%	59%	19%
Eligible for FSM	91%	67%	22%
Income Deprivation Affecting Children Index			
25% most deprived	89%	69%	24%
Lower middle	87%	61%	20%
Upper middle	86%	57%	18%
25% least deprived	87%	57%	17%
Special Educational Need (SEN)			
No identified SEN	87%	60%	19%
SEN - No Statement or EHCP*	87%	60%	19%
Statement of SEN or EHCP*	89%	65%	20%
Ethnic Group			
White summary ethnic group	85%	55%	16%
Mixed summary ethnic group	88%	63%	20%
Asian summary ethnic group	94%	80%	36%
Black summary ethnic group	90%	74%	30%
Chinese	91%	79%	38%
Other	90%	80%	36%

Source: DfE Matched Administrative Dataset, cohort academic age 16 in 2015/16

* - Education, Health and Care Plan

Table 8 shows the number of entries in A level subjects that include an assessment of mathematics and quantitative skills.

Table 9 shows the type of level 3 study at age 17 for for those who had achieved A*-C maths at 15. This shows that 57 per cent of those with A*-C in maths at academic age 15 in 2013/14 had a level 3 academic qualification as their highest study aim at age 17 in 2015/16. Just under a quarter of these (24 per cent) entered maths A level and a further 12 per cent entered another STEM A level.

Table 8: Number of entries in selected A level subjects, 2015/16

Subject	Number of entries
Accounting	2,300
Biology	54,300
Business	25,100
Chemistry	45,400
Computer Science	5,600
Design and technology	10,600
Economics	27,600
Electronics	900
Environmental science	800
Geography	32,200
Geology	1,900
Physical Education	10,200
Physics	31,000
Psychology	55,900

Source: 16-18 attainment data

Table 9: Academic level 3 study aims for those with A*-C maths GCSE

	Number
Total in cohort (state sector at 15)	**560,200**
Achieved A*-C maths GCSE at 15	388,400
Academic L3 highest study aim at 17	**223,300**
Maths A level entry	53,000
Other STEM A level entry	27,800
Other A level that includes an assessment of mathematics and quantitative skills	60,300
Other A level entry	55,600
Other academic L3 aim (see below)	26,700
Maths split of the Other academic L3 aims:	**26,700**
AS level maths	5,300
Maths A level aim but not maths entry	1,000
Other maths study	700
No maths study	19,700

Source: DfE Matched Administrative Dataset and 16-18 attainment data, cohort academic age 17 in 2015/16

Table 10 shows the most popular A levels for pupils that had achieved A*/A GCSE maths at academic age 15 and had entered an A level at academic age 17 in 2015/16 but had not entered maths or further maths. This shows that Biology, English, and History were the most popular subjects for those with high maths attainment who didn't enter a maths A level.

Table 10: Most popular A levels for pupils who achieved A*/A GCSE maths at academic age 15 and had entered an A level at academic age 17 in 2015/16 but had not entered maths or further maths

Subject	Percentage
Biology	32%
English	32%
History	28%
Psychology	27%
Chemistry	20%
Geography	19%
Economics	13%
Art and Design	11%
Religious Studies	10%

Source: 16-18 attainment data

Table 11 shows the proportion of A level entries by GCSE grade for some selected subjects. This shows that a far higher proportion of maths entries are by pupils with A*/A grades at GCSE when compared with History and English Literature.

Table 11: Proportion of A level entries in 2015/16 by subject GCSE grade in 2013/14

	Maths	History	English Literature
A*	53%	22%	17%
A	39%	36%	36%
A/A*	*92%*	*58%*	*53%*
B	8%	28%	35%
C	0%	9%	11%
D and below	0%	5%	1%
Total	**100%**	**100%**	**100%**

Source: 16-18 attainment data and key stage 4 attainment data

The following table shows the relationship between GCSE grade and the proportion that go on to enter the subject at A level. This shows that a high proportion of A* grade maths students entered an A level in the subject, but a very low proportion of students that achieved a B grade or below do compared to other subjects.

Table 12: Proportion entering A levels in the same subject in 2015/16 by subject GCSE grade in 2013/14

	Maths	History	English Literature
A*	75%	42%	29%
A	32%	34%	18%
A/A*	*48%*	*37%*	*21%*
B	4%	22%	9%
C	0%	8%	2%
D and below	0%	0%	0%

Source: 16-18 attainment data and key stage 4 attainment data

Table 13 shows the highest prior maths attainment of students studying mathematical science degrees. Those at Russell Group universities were more likely to have achieved further maths A level compared to those in non-Russell Group institutions.

Table 13: Highest prior maths attainment for those studying mathematical science degrees

Institution type	Number	Further Maths A level	Maths A level	Other
Russell Group	3,200	68%	31%	1%
Non Russell Group	2,900	36%	59%	5%
Total	**6,100**	**53%**	**44%**	**3%**

Source: DfE Matched Administrative Dataset and HESA, cohort academic age 19 in 2015/16

Annex

Table A1: Participation in level 3 maths at academic age 16 by GCSE attainment at academic age 15 by local authority

ONS LA code	Old LA code	Name	A*/A at 15	A*-C at 15
E08000020	390	Gateshead	70%	22%
E08000021	391	Newcastle upon Tyne	63%	15%
E08000022	392	North Tyneside	63%	23%
E08000023	393	South Tyneside	71%	22%
E08000024	394	Sunderland	64%	16%
E06000001	805	Hartlepool	74%	21%
E06000002	806	Middlesbrough	70%	12%
E06000003	807	Redcar and Cleveland	69%	29%
E06000004	808	Stockton-on-Tees	69%	25%
E06000047	840	Durham	66%	19%
E06000005	841	Darlington	65%	26%
E06000048	929	Northumberland	72%	28%
		North East	**67%**	**20%**
E08000011	340	Knowsley	61%	10%
E08000012	341	Liverpool	75%	26%
E08000013	342	St. Helens	78%	35%
E08000014	343	Sefton	75%	21%
E08000015	344	Wirral	72%	28%
E08000001	350	Bolton	72%	27%
E08000002	351	Bury	67%	21%
E08000003	352	Manchester	69%	26%
E08000004	353	Oldham	71%	23%
E08000005	354	Rochdale	70%	20%
E08000006	355	Salford	56%	15%
E08000007	356	Stockport	65%	21%
E08000008	357	Tameside	67%	21%
E08000009	358	Trafford	68%	35%
E08000010	359	Wigan	70%	30%
E06000006	876	Halton	61%	16%
E06000007	877	Warrington	68%	21%
E10000017	888	Lancashire	68%	26%
E06000008	889	Blackburn with Darwen	64%	18%
E06000009	890	Blackpool	72%	22%
E06000049	895	Cheshire East	71%	24%
E06000050	896	Cheshire West and Chester	72%	28%
E10000006	909	Cumbria	75%	29%
		North West	**70%**	**25%**
E08000016	370	Barnsley	57%	10%
E08000017	371	Doncaster	73%	22%
E08000018	372	Rotherham	69%	24%
E08000019	373	Sheffield	68%	25%

ONS LA code	Old LA code	Name	A*/A at 15	A*-C at 15
E08000032	380	Bradford	74%	26%
E08000033	381	Calderdale	66%	25%
E08000034	382	Kirklees	72%	28%
E08000035	383	Leeds	71%	25%
E08000036	384	Wakefield	66%	19%
E06000010	810	Kingston Upon Hull, City of	69%	15%
E06000011	811	East Riding of Yorkshire	71%	21%
E06000012	812	North East Lincolnshire	71%	21%
E06000013	813	North Lincolnshire	65%	22%
E10000023	815	North Yorkshire	73%	32%
E06000014	816	York	60%	17%
		Yorkshire and the Humber	**70%**	**23%**
E10000007	830	Derbyshire	73%	27%
E06000015	831	Derby	60%	17%
E10000018	855	Leicestershire	78%	33%
E06000016	856	Leicester	80%	28%
E06000017	857	Rutland	73%	30%
E10000024	891	Nottinghamshire	71%	29%
E06000018	892	Nottingham	66%	19%
E10000019	925	Lincolnshire	69%	25%
E10000021	928	Northamptonshire	70%	24%
		East Midlands	**72%**	**26%**
E08000025	330	Birmingham	76%	30%
E08000026	331	Coventry	76%	24%
E08000027	332	Dudley	68%	24%
E08000028	333	Sandwell	75%	20%
E08000029	334	Solihull	70%	29%
E08000030	335	Walsall	78%	33%
E08000031	336	Wolverhampton	71%	27%
E10000028	860	Staffordshire	69%	21%
E06000021	861	Stoke-on-Trent	70%	21%
E06000019	884	Herefordshire	64%	24%
E10000034	885	Worcestershire	71%	26%
E06000051	893	Shropshire	65%	28%
E06000020	894	Telford and Wrekin	72%	27%
E10000031	937	Warwickshire	72%	27%
		West Midlands	**72%**	**26%**
E06000032	821	Luton	82%	31%
E06000055	822	Bedford	70%	20%
E06000056	823	Central Bedfordshire	72%	27%
E10000003	873	Cambridgeshire	75%	33%
E06000031	874	Peterborough	68%	21%
E10000012	881	Essex	72%	27%
E06000033	882	Southend-on-Sea	67%	22%
E06000034	883	Thurrock	67%	27%

ONS LA code	Old LA code	Name	A*/A at 15	A*-C at 15
E10000015	919	Hertfordshire	75%	31%
E10000020	926	Norfolk	67%	19%
E10000029	935	Suffolk	67%	22%
		East of England	**72%**	**26%**
E09000001	201	City of London	-	-
E09000007	202	Camden	75%	29%
E09000011	203	Greenwich	79%	32%
E09000012	204	Hackney	79%	31%
E09000013	205	Hammersmith and Fulham	75%	31%
E09000019	206	Islington	79%	25%
E09000020	207	Kensington and Chelsea	80%	40%
E09000022	208	Lambeth	80%	36%
E09000023	209	Lewisham	77%	26%
E09000028	210	Southwark	79%	37%
E09000030	211	Tower Hamlets	82%	32%
E09000032	212	Wandsworth	79%	30%
E09000033	213	Westminster	77%	27%
E09000002	301	Barking and Dagenham	80%	24%
E09000003	302	Barnet	78%	46%
E09000004	303	Bexley	77%	39%
E09000005	304	Brent	85%	43%
E09000006	305	Bromley	77%	29%
E09000008	306	Croydon	73%	26%
E09000009	307	Ealing	83%	44%
E09000010	308	Enfield	83%	40%
E09000014	309	Haringey	75%	29%
E09000015	310	Harrow	84%	45%
E09000016	311	Havering	67%	20%
E09000017	312	Hillingdon	77%	27%
E09000018	313	Hounslow	84%	41%
E09000021	314	Kingston upon Thames	80%	38%
E09000024	315	Merton	82%	38%
E09000025	316	Newham	85%	43%
E09000026	317	Redbridge	88%	47%
E09000027	318	Richmond upon Thames	72%	22%
E09000029	319	Sutton	75%	43%
E09000031	320	Waltham Forest	83%	31%
		London	**79%**	**34%**
E10000002	825	Buckinghamshire	69%	39%
E06000042	826	Milton Keynes	71%	27%
E10000011	845	East Sussex	61%	19%
E06000043	846	Brighton and Hove	67%	29%
E10000014	850	Hampshire	70%	29%
E06000044	851	Portsmouth	72%	21%
E06000045	852	Southampton	61%	19%

ONS LA code	Old LA code	Name	A*/A at 15	A*-C at 15
E06000036	867	Bracknell Forest	78%	18%
E06000040	868	Windsor and Maidenhead	74%	28%
E06000037	869	West Berkshire	76%	34%
E06000038	870	Reading	87%	57%
E06000039	871	Slough	82%	39%
E06000041	872	Wokingham	78%	39%
E10000016	886	Kent	73%	31%
E06000035	887	Medway	64%	18%
E06000046	921	Isle of Wight	67%	18%
E10000025	931	Oxfordshire	74%	27%
E10000030	936	Surrey	70%	29%
E10000032	938	West Sussex	68%	24%
		South East	**71%**	**29%**
E06000053	420	Isles of Scilly	-	-
E06000022	800	Bath and North East Somerset	74%	26%
E06000023	801	Bristol, City of	72%	27%
E06000024	802	North Somerset	72%	24%
E06000025	803	South Gloucestershire	73%	25%
E10000009	835	Dorset	74%	31%
E06000029	836	Poole	71%	22%
E06000028	837	Bournemouth	80%	35%
E06000054	865	Wiltshire	69%	30%
E06000030	866	Swindon	77%	22%
E10000008	878	Devon	68%	25%
E06000026	879	Plymouth	70%	23%
E06000027	880	Torbay	72%	30%
E06000052	908	Cornwall	72%	22%
E10000013	916	Gloucestershire	71%	29%
E10000027	933	Somerset	62%	22%
		South West	**71%**	**26%**
		England	**72%**	**27%**

Source: DfE Matched Administrative Dataset, cohort academic age 16 in 2015/16

Note: Pupils are assigned to the Local Authority of study at academic age 16

Department for Education

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