



Llywodraeth Cymru  
Welsh Government

## **Additional analysis of PISA 2015 results – regional performance and GCSE/BTEC**

## **PISA 2015 results by regional performance**

The four regions are made up as follows:

South East Wales - Blaenau Gwent, Caerphilly, Monmouthshire, Newport, Torfaen

Central South – Bridgend, Cardiff, Merthyr Tydfil, Rhondda Cynon Taff, Vale of Glamorgan

North Wales – Conwy, Denbighshire, Flintshire, Gwynedd, Wrexham, Ynys Mon

Mid and West Wales – Carmarthenshire, Ceredigion, Neath Port Talbot, Pembrokeshire, Powys, Swansea

There are no significant differences in PISA outcomes between regional consortia. Whilst the figures may appear to suggest that GwE and ERW outperform CSC and SEW, due to the range of uncertainty around the mean estimates (signified by the confidence intervals in the tables) it is not possible to say that those values are significantly different in terms of statistical significance. There is a similar pattern for Reading and Mathematics.

It is also important to note that the PISA sample was not designed to produce representative and accurate estimates for different areas within Wales and therefore the schools included in sample may not be representative of the region as a whole. This analysis has been produced only as an indication of PISA outcomes geographically across Wales amongst those schools that were sampled.

What is clear from this analysis is that there is no region in Wales outperforming the others and that the imperative is to continue with implementing the reforms in education policy started in 2014. As the OECD noted in its Rapid Assessment in 2016, the Welsh approach to school improvement has moved from a piecemeal and short-term policy orientation towards one that is guided by a longer term vision and is characterised by a process of co-construction with key stakeholders. The OECD advised that Wales should continue its curriculum reform efforts that are underpinned by sustained investments in key policy areas and strengthen the implementation process to ensure that its reform journey is comprehensive and effective.

### Estimated average (mean) PISA 2015 Science score by Welsh Education Regional Consortia <sup>1,2</sup>

PISA points

Welsh Educational Regional Consortia	Average (mean)	Standard error of the mean	95% confidence interval lower bound	95% confidence interval upper bound	Number of pupils
Central South Wales	479.7	5.7	468.3	491.1	1020
South East Wales	479.6	4.3	471.0	488.3	643
North Wales	488.7	6.7	475.3	502.1	793
Mid and West Wales	490.0	4.0	481.9	498.0	995

Source: University College London Institute of Education analysis of PISA 2015

#### Notes

1. The educational regional consortia are made up as follows: South East Wales - Blaenau Gwent, Caerphilly, Monmouthshire, Newport, Torfaen. Central South Wales - Bridgend, Cardiff, Merthyr Tydfil, Rhondda Cynon Taff, Vale of Glamorgan. North Wales - Conwy, Denbighshire, Flintshire, Gwynedd, Wrexham, Ynys Mon. West and Mid Wales - Carmarthenshire, Ceredigion, Neath Port Talbot, Pembrokeshire, Powys, Swansea.
2. Standard error, 95% confidence intervals and the number of pupils used in deriving the estimated average (mean) are provided in order to allow assessment of the quality of the estimates.

### Estimated average (mean) PISA 2015 Mathematics score by Welsh Education Regional Consortia <sup>1,2</sup>

PISA points

Welsh Educational Regional Consortia	Average (mean)	Standard error of the mean	95% confidence interval lower bound	95% confidence interval upper bound	Number of pupils
Central South Wales	475.0	5.5	464.0	486.0	1,020
South East Wales	472.8	4.8	463.1	482.4	643
North Wales	481.7	5.9	469.9	493.6	793
Mid and West Wales	481.9	4.8	472.4	491.5	995

Source: University College London Institute of Education analysis of PISA 2015

#### Notes

1. The educational regional consortia are made up as follows: South East Wales - Blaenau Gwent, Caerphilly, Monmouthshire, Newport, Torfaen. Central South Wales - Bridgend, Cardiff, Merthyr Tydfil, Rhondda Cynon Taff, Vale of Glamorgan. North Wales - Conwy, Denbighshire, Flintshire, Gwynedd, Wrexham, Ynys Mon. West and Mid Wales - Carmarthenshire, Ceredigion, Neath Port Talbot, Pembrokeshire, Powys, Swansea.
2. Standard error, 95% confidence intervals and the number of pupils used in deriving the estimated average (mean) are provided in order to allow assessment of the quality of the estimates.

## Estimated average (mean) PISA 2015 Reading score by Welsh Education Regional Consortia<sup>1,2</sup>

PISA points

Welsh Educational Regional Consortia	Average (mean)	Standard error of the mean	95% confidence interval lower bound	95% confidence interval upper bound	Number of pupils
Central South Wales	471.5	5.5	460.5	482.5	1,020
South East Wales	475.4	4.7	466	484.7	643
North Wales	481.5	6.9	467.8	495.2	793
Mid and West Wales	481.7	5.5	470.7	492.6	995

Source: University College London Institute of Education analysis of PISA 2015

### Notes

1. The educational regional consortia are made up as follows: South East Wales - Blaenau Gwent, Caerphilly, Monmouthshire, Newport, Torfaen. Central South Wales - Bridgend, Cardiff, Merthyr Tydfil, Rhondda Cynon Taff, Vale of Glamorgan. North Wales - Conwy, Denbighshire, Flintshire, Gwynedd, Wrexham, Ynys Mon. West and Mid Wales - Carmarthenshire, Ceredigion, Neath Port Talbot, Pembrokeshire, Powys, Swansea.

2. Standard error, 95% confidence intervals and the number of pupils used in deriving the estimated average (mean) are provided in order to allow assessment of the quality of the estimates.

## **PISA 2015 results GCSE/BTEC performance**

### **Background and context**

Following the publication of the PISA 2015 results in December 2016, the UCL Institute of Education was requested to undertake further analysis of the results specifically to map across the average (mean) science by best GCSE/BTEC Science grade in Wales, given that Science was the main domain tested in PISA 2015.

The analysis suggests a clear relationship between GCSE grades and average PISA scores, with those achieving A\*-B at GCSE performing significantly better on average at PISA than those at C grade or below. Furthermore the data suggests that, on average, performance at PISA was lower amongst those whose best science grade was in a BTEC than those who achieved a grade D GCSE. However we would also note that (i) small sample sizes result in relatively wide confidence intervals for the average PISA Science scores for BTEC Distinction, BTEC Distinction\*, BTEC Level 1 and GCSE Science G / U grades and (ii) that no tests of the statistical significance of the differences between average PISA scores at each grade have been undertaken.

Cautious interpretation of the analysis confirms the policy direction taken for Science GCSEs is broadly correct. Schools have already begun transition from a mix of BTEC and GCSEs to prepare and enter learners for science

GCSEs. We saw an increase of over 5,500 more entries into GCSE across the sciences in 2016. This will impact on headline figures during the transition, as we saw last summer, but it also means more young people access qualifications that lead to greater opportunities for further science study and careers.

The science curriculum will change as part of the reform of the curriculum and assessment arrangements currently underway through the introduction of a new Science and Technology Area of Learning and Experience, better supporting the teaching and learning of science.

Curriculum reform will be essential to improve the flow of science skills and knowledge. This is currently being developed by Pioneer Schools – they are determining what is taught and how. The Pioneer schools are working with experts and other key stakeholders, who know what works, to lead on the design and development of the new curriculum.

A new suite of (WJEC) science GCSEs was introduced for first teaching in September 2016, replacing legacy GCSEs currently being accessed by schools from across a number of awarding organisations. The new science GCSEs underpin the need for all young people to be scientifically literate.

## Proportion of pupils reaching each PISA 2015 Science level by best GCSE grade<sup>1,2</sup>

% at PISA level

GCSE grade	Below level 1b	Level 1b	Level 1a	Level 2	Level 3	Level 4	Level 5	Level 6
A*	0	0	0	5	23	43	27	2
A	0	0	1	8	33	49	9	0
B	0	0	3	19	46	28	4	0
C	0	1	10	39	38	11	1	0
D	0	2	22	52	23	1	0	0
E	0	4	40	46	9	0	0	0
F	0	14	47	34	5	0	0	0
G	1	23	59	17	0	0	0	0
U	2	24	53	21	0	0	0	0
Missing	0	6	21	23	22	19	7	1

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

### Notes

1. More information on what PISA levels represent is available in Appendix E of the 2015 National PISA report for Wales: <http://gov.wales/statistics-and-research/achievement-15-year-olds/>

2. Missing refers to pupils for whom it was not possible to match their PISA score to a Science GCSE grade.

## Proportion of pupils reaching each PISA 2015 Science level by best BTEC grade<sup>1,2</sup>

% at PISA level

BTEC grade	Below level							
	1b	Level 1b	Level 1a	Level 2	Level 3	Level 4	Level 5	Level 6
BTEC Level 2 Distinction *	0	8	24	37	27	4	0	0
BTEC Level 2 Distinction	0	7	42	36	12	2	0	0
BTEC Level 2 Merit	0	5	28	48	19	1	0	0
BTEC Level 2 Pass	1	10	37	37	13	2	0	0
BTEC Level 1 Pass	0	3	89	7	0	0	0	0
Missing	0	2	11	25	33	23	6	0

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

### Notes

1. More information on what PISA levels represent is available in Appendix E of the 2015 National PISA report for Wales: <http://gov.wales/statistics-and-research/achievement-15-year-olds/>
2. Missing refers to pupils for whom it was not possible to match their PISA score to a Science BTEC grade.



## Proportion of pupils reaching each PISA 2015 Science level by best GCSE or BTEC grade<sup>1,2</sup>

% at PISA level

GCSE or BTEC grade	Below level 1b	Level 1b	Level 1a	Level 2	Level 3	Level 4	Level 5	Level 6
<b>GCSE grade:</b>								
A*	0	0	1	4	19	45	27	3
A	0	0	2	9	33	44	11	1
B	0	1	5	21	42	28	4	0
C	0	4	19	39	30	8	0	0
D	0	3	22	49	23	3	0	0
E	1	6	43	42	9	0	0	0
F	0	18	51	27	3	0	0	0
G	2	24	58	16	0	0	0	0
U	4	28	58	11	0	0	0	0
<b>BTEC grade:</b>								
BTEC Level 2 Distinction *	0	16	33	27	23	2	0	0
BTEC Level 2 Distinction	1	10	39	35	11	4	0	0
BTEC Level 2 Merit	0	6	32	45	16	0	0	0
BTEC Level 2 Pass	1	11	39	32	15	2	0	0
BTEC Level 1 Pass	1	26	50	23	0	0	0	0
Missing	1	13	32	29	15	6	3	1

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

### Notes

1. More information on what PISA levels represent is available in Appendix E of the 2015 National PISA report for Wales: <http://gov.wales/statistics-and-research/achievement-15-year-olds/>
2. Missing refers to pupils for whom it was not possible to match their PISA score to either a Science BTEC or Science GCSE grade.

## Proportion of pupils reaching each PISA 2015 Mathematics level by GCSE Mathematics grade

% at PISA level

GCSE grade	Below level 1	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
A*	0	0	4	23	44	25	4
A	0	2	11	38	40	9	0
B	0	4	23	44	25	4	0
C	3	17	40	31	8	1	0
D	10	34	40	14	1	0	0
E	18	44	32	6	0	0	0
F	30	41	24	5	0	0	0
G	47	41	12	1	0	0	0
U	41	45	13	1	0	0	0
Missing	10	12	17	29	20	9	1

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

### Notes

1. More information on what PISA levels represents is available in Appendix E of the 2015 National PISA report for Wales: <http://gov.wales/statistics-and-research/achievement-15-year-olds/>
2. Missing refers to pupils for whom it was not possible to match their PISA score to a Mathematics GCSE grade.

## Proportion of pupils reaching each PISA 2015 Reading level by GCSE English or Welsh literature grade

% at PISA level

GCSE grade	Below level 1b	Level 1b	Level 1a	Level 2	Level 3	Level 4	Level 5	Level 6
A*	0	0	0	6	27	48	17	2
A	0	0	2	15	37	36	10	1
B	0	1	6	30	41	19	3	0
C	0	3	20	41	28	7	1	0
D	1	8	32	42	15	2	0	0
E	2	17	45	26	8	1	0	0
F	2	26	48	20	3	0	0	0
G	4	37	47	11	1	0	0	0
U	0	29	71	0	0	0	0	0
Missing	3	6	8	23	27	19	12	2

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

### Notes

1. More information on what PISA levels represents is available in Appendix E of the 2015 National PISA report for Wales: <http://gov.wales/statistics-and-research/achievement-15-year-olds/>
2. Missing refers to pupils for whom it was not possible to match their PISA score to a English or Welsh Literature GCSE grade.

**Average (mean) PISA 2015 Science score by best GCSE Science grade<sup>1,2</sup>**

						PISA points
GCSE or BTEC grade	Average (mean)	Standard error of the mean	95% confidence interval lower bound	95% confidence interval upper bound	Number of pupils	
A*	593.6	7.3	579.0	608.2	66	
A	565.2	4.7	555.8	574.6	177	
B	527.1	4.3	518.6	535.7	432	
C	483.3	3.1	477.1	489.5	747	
D	446.2	4.2	437.8	454.5	271	
E	417.2	4.6	408.0	426.4	158	
F	395.2	6.4	382.5	407.8	96	
G	365.2	10.7	343.9	386.6	35	
U	365.1	12.5	340.2	390.1	17	
Missing	482.7	4.7	473.3	492.1	1452	

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

**Notes**

- Standard error, 95% confidence intervals and the number of pupils used in deriving the estimated average (mean) are provided in order to allow assessment of the quality of the estimates.
- Missing refers to pupils for whom it was not possible to match their PISA score to a Science GCSE grade.

**Percentiles of PISA 2015 Science score by best GCSE Science grade<sup>1,2</sup>**

								PISA points	
GCSE or BTEC grade	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	Standard Deviation	Number of pupils		
A*	510.3	550.8	600.4	641.2	668.4	64.4	66		
A	490.3	531.8	570.5	603.3	632.8	57.7	177		
B	447.5	489.3	529.1	569.9	603.1	62.6	432		
C	404.2	441.8	483.5	526.7	564.4	62.5	747		
D	376.7	411.6	445.5	483.1	517.0	53.8	271		
E	355.5	384.6	416.6	447.6	482.9	50.2	158		
F	322.6	359.5	393.8	433.5	467.1	53.2	96		
G	306.6	339.3	364.9	395.2	424.2	43.2	35		
U	295.0	328.2	366.1	399.4	430.2	47.1	17		
Missing	350.3	401.0	479.8	563.3	619.8	102.2	1452		

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

**Notes**

- Standard deviation is provided in order to allow assessment of the spread of the data around the average estimate.
- Missing refers to pupils for whom it was not possible to match their PISA score to a Science GCSE grade.

### Average (mean) PISA 2015 Science score by best BTEC Science grade<sup>1,2</sup>

						PISA points
BTEC grade	Average (mean)	Standard error of the mean	95% confidence interval lower bound	95% confidence interval upper bound	Number of pupils	
BTEC Level 2 Distinction *	446.0	14.3	417.6	474.5	27	
BTEC Level 2 Distinction	418.6	11.6	395.4	441.7	30	
BTEC Level 2 Merit	433.5	5.9	421.7	445.2	119	
BTEC Level 2 Pass	415.7	3.4	408.8	422.6	746	
BTEC Level 1 Pass	383.7	14.8	354.3	413.2	3	
Missing	508.2	3.0	502.3	514.2	2526	

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

#### Notes

- Standard error, 95% confidence intervals and the number of pupils used in deriving the estimated average (mean) are provided in order to allow assessment of the quality of the estimates.
- Missing refers to pupils for whom it was not possible to match their PISA score to a Science BTEC grade.

### Percentiles of PISA 2015 Science score by best BTEC Science grade<sup>1,2</sup>

							PISA points	
GCSE or BTEC grade	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	Standard Deviation	Number of pupils	
BTEC Level 2 Distinction *	340.2	392.8	456.3	505.6	537.7	72.3	27	
BTEC Level 2 Distinction	343.3	370.1	411.2	464.1	502.0	65.1	30	
BTEC Level 2 Merit	353.0	394.3	436.5	474.7	504.4	58.8	119	
BTEC Level 2 Pass	332.7	369.5	413.4	458.9	502.6	66.2	746	
BTEC Level 1 Pass	361.0	361.0	387.4	402.3	402.3	17.7	3	
Missing	395.8	449.3	510.7	569.5	615.6	84.5	2526	

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

#### Notes

- Standard deviation is provided in order to allow assessment of the spread of the data around the average estimate.

**Average (mean) PISA 2015 Science score by best GCSE or BTEC Science grade<sup>1,2</sup>**

PISA points

GCSE or BTEC grade	Average (mean)	Standard error of the mean	95% confidence interval lower bound	95% confidence interval upper bound	Number of pupils
<b>GCSE grade:</b>					
A*	597.6	5.4	586.7	608.4	245
A	562.8	5.0	552.8	572.8	381
B	523.3	4.0	515.3	531.2	658
C	461.9	3.1	455.8	468.0	1209
D	447.3	5.3	436.8	457.8	210
E	413.4	6.0	401.5	425.3	81
F	384.9	10.4	364.2	405.7	49
G	363.1	14.8	333.6	392.6	19
U	355.1	18.3	318.6	391.5	10
<b>BTEC grade:</b>					
BTEC Level 2 Distinction *	422.1	17.4	387.4	456.8	13
BTEC Level 2 Distinction	418.9	18.8	381.5	456.4	18
BTEC Level 2 Merit	424.8	7.6	409.6	439.9	59
BTEC Level 2 Pass	414.0	5.3	403.6	424.5	310
BTEC Level 1 Pass	370.1	12.5	345.1	395.0	14
Missing	429.8	10.1	409.8	449.8	175

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

**Notes**

### Average (mean) PISA 2015 Mathematics score by GCSE Mathematics grade<sup>1,2</sup>

						PISA points
GCSE grade	Average (mean)	Standard error of the mean	95% confidence interval lower bound	95% confidence interval upper bound	Number of pupils	
A*	576.8	5.2	566.5	586.9	293	
A	540.9	4.3	532.4	549.3	387	
B	513.8	4.3	505.2	522.3	485	
C	467.8	3.5	460.7	474.7	1408	
D	426.3	4.5	417.3	435.1	339	
E	403.3	5.9	391.5	414.9	221	
F	387.4	6.7	374.2	400.5	151	
G	363.7	9.7	344.5	382.7	74	
U	369.5	16.2	337.2	401.3	14	
Missing	491.1	15.3	460.7	521.0	79	

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

#### Notes

- Standard error, 95% confidence intervals and the number of pupils used in deriving the estimated average (mean) are provided in order to allow assessment of the quality of the estimates.
- Missing refers to pupils for whom it was not possible to match their PISA score to a Mathematics GCSE grade.

### Percentiles of PISA 2015 Mathematics score by GCSE Mathematics grade<sup>1,2</sup>

							PISA points	
GCSE or BTEC grade	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	Standard Deviation	Number of pupils	
A*	508.5	541.1	577.3	613.0	644.7	52.8	293	
A	473.4	509.1	544.2	575.5	604.5	51.9	387	
B	442.6	478.2	514.9	550.6	580.8	54.0	485	
C	392.4	429.9	468.4	506.4	542.4	58.5	1408	
D	356.4	391.3	427.3	462.6	495.3	54.5	339	
E	333.9	370.1	404.4	439.6	468.6	52.4	221	
F	315.6	349.6	386.7	426.2	459.2	55.2	151	
G	305.9	329.5	366.6	396.7	429.1	50.8	74	
U	304.0	335.7	373.3	404.0	431.6	50.3	14	
Missing	350.1	430.3	499.2	558.7	608.6	95.7	79	

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

#### Notes

- Standard deviation is provided in order to allow assessment of spread of data around the average estimate.
- Missing refers to pupils for whom it was not possible to match their PISA score to a Mathematics GCSE grade.

### Average (mean) PISA 2015 Reading score by GCSE English or Welsh literature grade<sup>1,2</sup>

						PISA points
GCSE grade	Average (mean)	Standard error of the mean	95% confidence interval lower bound	95% confidence interval upper bound	Number of pupils	
A*	576.2	6.6	563.0	589.1	184	
A	543.7	4.2	535.3	552.0	532	
B	501.9	3.9	494.3	509.5	813	
C	456.5	3.4	449.8	463.1	1134	
D	420.3	4.7	410.9	429.5	421	
E	387.7	6.6	374.5	400.7	175	
F	369.1	8.1	352.9	385.0	87	
G	346.3	15.8	314.9	377.3	21	
U	350.5	22.9	304.9	395.3	2	
Missing	501.2	19.2	462.9	538.9	82	

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

#### Notes

- Standard error, 95% confidence intervals and the number of pupils used in deriving the estimated average (mean) are provided in order to allow assessment of the quality of the estimates.
- Missing refers to pupils for whom it was not possible to match their PISA score to a English or Welsh Literature GCSE grade.

### Percentiles of PISA 2015 Reading score by GCSE English or Welsh literature grade<sup>1,2</sup>

							PISA points	
GCSE or BTEC grade	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	Standard Deviation	Number of pupils	
A*	500.0	539.9	579.3	613.7	646.2	59.5	184	
A	460.5	499.1	546.1	588.8	625.9	64.8	532	
B	420.3	459.0	501.3	545.4	584.7	65.1	813	
C	370.8	411.0	455.7	501.6	544.7	68.2	1134	
D	337.1	377.1	422.0	464.0	502.0	65.0	421	
E	303.6	346.4	386.5	427.2	473.7	66.0	175	
F	297.1	328.3	369.6	405.8	441.1	56.5	87	
G	282.3	316.2	344.0	368.8	416.9	48.0	21	
U	332.0	332.0	358.7	367.8	367.8	17.9	2	
Missing	341.8	440.7	501.0	586.9	641.5	110.4	82	

Source: University College London Institute of Education analysis of PISA 2015 and PLASC data

#### Notes

- Standard deviation is provided in order to allow assessment of spread of data around the average estimate.
- Missing refers to pupils for whom it was not possible to match their PISA score to a English or Welsh Literature GCSE grade.



Mae'r ddogfen yma hefyd ar gael yn Gymraeg.  
This document is also available in Welsh.



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