



MARCH 2015 OHIO GRADUATION TESTS STATISTICAL SUMMARY

This document is a summary of the March 2015 administration of the Ohio Graduation Tests (OGT). Students attempt the tests for the first time in the spring of their 10th-grade year. Students who take the tests at a later time do so because they have not yet achieved a proficient score on one or more of the tests. Because these students are not representative of the population as a whole, only 10th-graders are included in this report. The Class of 2017 (this year's 10th-graders) is the last class required to pass the OGT.

Tables 1 and 2 summarize the performance of 10th-graders in public and chartered nonpublic totals. Community school students are included in the public totals. Students who used an alternate form for security purposes are not included in Tables 1 and 2, so the total numbers of students are slightly smaller than those reported in Tables 3 and 4 and in the OGT Highlights.

TABLE 1. SUMMARY STATISTICS OF THE MARCH 2015 OGT ADMINISTRATION FOR PUBLIC GRADE 10 STUDENTS.

	Subject				
	Reading	Mathematics	Writing	Science	Social Studies
No. Tested	131,878	132,368	131,526	132,348	131,584
Max. Raw Score	48	46	48	48	48
Max. Scaled Score	547	552	568	591	580
Min. Scaled Score	259	256	269	214	231
Raw Mean	29.24	30.19	31.69	29.19	30.21
Raw SD	8.50	10.61	6.72	9.58	9.66
Raw SEM	3.02	3.07	2.85	3.26	3.11
Scaled Mean	424.81	432.66	419.67	418.34	426.93
Scaled SD	23.02	35.86	22.73	32.29	32.10
Scaled SEM	8.19	10.38	9.66	11.00	10.35
Reliability	0.87	0.92	0.82	0.88	0.90

Note: SD = standard deviation; SEM = standard error of measurement. Students who used an alternate form of the test are not included in these figures.

TABLE 2. SUMMARY STATISTICS OF THE MARCH 2015 OGT ADMINISTRATION FOR NONPUBLIC GRADE 10 STUDENTS.

	Subject				
	Reading	Mathematics	Writing	Science	Social Studies
No. Tested	11,658	11,630	11,633	11,639	11,603
Max. Raw Score	48	46	48	48	48
Max. Scaled Score	547	552	568	591	580
Min. Scaled Score	259	256	269	214	231
Raw Mean	32.93	34.09	35.16	33.01	33.70
Raw SD	6.13	8.37	4.23	7.37	7.27
Raw SEM	2.82	2.99	2.31	3.13	3.07
Scaled Mean	434.43	444.72	431.62	430.56	437.75
Scaled SD	16.71	30.68	16.69	26.34	25.35
Scaled SEM	7.69	10.96	9.13	11.20	10.69
Reliability	0.79	0.87	0.70	0.82	0.82

Note: SD = standard deviation; SEM = standard error of measurement. Students who used an alternate form of the test are not included in these figures.

Tables 3 and 4 present the number and percent of 10th-graders at each of the five performance levels for each test for public and chartered nonpublic schools, respectively. Community school students are included in the public totals.

TABLE 3. NUMBER AND PERCENT OF PUBLIC GRADE 10 STUDENTS AT EACH PERFORMANCE LEVEL.

Reading				
Performance Level		Number	Percent	
Proficient or Above	Advanced	20,467	15.3	85.5
	Accelerated	42,919	32.1	
	Proficient	50,971	38.1	
Below Proficient	Basic	11,847	8.9	14.5
	Limited	7,552	5.6	

Mathematics				
Performance Level		Number	Percent	
Proficient or Above	Advanced	53,100	39.6	81.0
	Accelerated	27,733	20.7	
	Proficient	27,879	20.8	
Below Proficient	Basic	13,053	9.7	19.0
	Limited	12,469	9.3	

Writing				
Performance Level		Number	Percent	
Proficient or Above	Advanced	714	0.5	83.6
	Accelerated	44,114	33.1	
	Proficient	66,660	50.0	
Below Proficient	Basic	16,169	12.1	16.4
	Limited	5,735	4.3	

Science				
Performance Level		Number	Percent	
Proficient or Above	Advanced	28,910	21.5	73.3
	Accelerated	30,270	22.6	
	Proficient	39,147	29.2	
Below Proficient	Basic	25,539	19.0	26.7
	Limited	10,354	7.7	

Social Studies				
Performance Level		Number	Percent	
Proficient or Above	Advanced	40,458	30.3	80.2
	Accelerated	28,107	21.1	
	Proficient	38,437	28.8	
Below Proficient	Basic	13,644	10.2	19.8
	Limited	12,801	9.6	

TABLE 4. NUMBER AND PERCENT OF NONPUBLIC GRADE 10 STUDENTS AT EACH PERFORMANCE LEVEL.

Reading				
Performance Level		Number	Percent	
Proficient or Above	Advanced	2,643	21.1	96.7
	Accelerated	5,694	45.4	
	Proficient	3,794	30.2	
Below Proficient	Basic	313	2.5	3.3
	Limited	102	0.8	

Mathematics				
Performance Level		Number	Percent	
Proficient or Above	Advanced	6,559	52.4	93.4
	Accelerated	2,999	23.9	
	Proficient	2,142	17.1	
Below Proficient	Basic	576	4.6	6.6
	Limited	247	2.0	

Writing				
Performance Level		Number	Percent	
Proficient or Above	Advanced	96	0.8	97.1
	Accelerated	7,031	56.1	
	Proficient	5,026	40.1	
Below Proficient	Basic	322	2.6	2.9
	Limited	47	0.4	

Science				
Performance Level		Number	Percent	
Proficient or Above	Advanced	3,717	29.7	89.5
	Accelerated	3,801	30.3	
	Proficient	3,692	29.5	
Below Proficient	Basic	1,141	9.1	10.5
	Limited	177	1.4	

Social Studies				
Performance Level		Number	Percent	
Proficient or Above	Advanced	4,936	39.5	93.9
	Accelerated	3,370	27.0	
	Proficient	3,424	27.4	
Below Proficient	Basic	524	4.2	6.1
	Limited	234	1.9	

Table 5 provides the raw and scaled scores associated with each performance level on each test for the March 2015 OGT administration. The scaled score required to achieve a certain performance level does not change from administration to administration, but the raw score required to achieve that scaled score may change.

TABLE 5. SCORE RANGES FOR ALL SUBJECTS AND ALL PERFORMANCE LEVELS.

Subject	Performance Level	Raw Score	Scaled Score
Reading	Advanced	38.0 – 48.0	448 – 547
	Accelerated	31.5 – 37.5	429 – 447
	Proficient	19.5 – 31.0	400 – 428
	Basic	13.5 – 19.0	383 – 399
	Limited	0.0 – 13.0	259 – 382
Mathematics	Advanced	35.5 – 46.0	444 – 552
	Accelerated	29.0 – 35.0	425 – 443
	Proficient	19.5 – 28.5	400 – 424
	Basic	14.0 – 19.0	384 – 399
	Limited	0.0 – 13.5	256 – 383
Writing	Advanced	43.0 – 48.0	476 – 568
	Accelerated	35.5 – 42.5	430 – 475
	Proficient	26.0 – 35.0	400 – 429
	Basic	18.0 – 25.5	378 – 399
	Limited	0.0 – 17.5	269 – 377
Science	Advanced	38.0 – 48.0	445 – 591
	Accelerated	32.5 – 37.5	425 – 444
	Proficient	23.5 – 32.0	400 – 424
	Basic	13.5 – 23.0	371 – 399
	Limited	0.0 – 13.0	214 – 370
Social Studies	Advanced	37.0 – 48.0	446 – 580
	Accelerated	32.0 – 36.5	429 – 445
	Proficient	21.5 – 31.5	400 – 428
	Basic	15.5 – 21.0	382 – 399
	Limited	0.0 – 15.0	231 – 381

Performance levels for each content standard (subscale) on each of the five tests are presented in Table 6. A “near proficient” score represents the performance typical of a minimally proficient student. These data are provided for descriptive purposes only; students do not “pass” or “fail” standards.

TABLE 6. RAW SCORE BANDS FOR CONTENT STANDARDS.

Subject	Content Standard	Below Prof.	Near Prof.	Above Prof.	Total Points
Reading	Acquisition of Vocabulary	0.0 – 2.0	2.5 – 4.0	4.5 – 8.0	8
	Reading Process	0.0 – 6.0	6.5 – 8.0	8.5 - 10.0	10
	Informational, Technical, and Persuasive Text	0.0 – 6.0	6.5 – 9.0	9.5 - 18.0	18
	Literary Text	0.0 – 3.5	4.0 – 5.5	6.0 - 12.0	12
Mathematics	Number, Number Sense, and Operations	0.0 – 3.5	4.0 – 6.0	6.5 – 9.0	9
	Measurement	0.0 – 3.0	3.5 – 5.5	6.0 – 8.0	8
	Geometry and Spatial Sense	0.0 – 3.0	3.5 – 5.5	6.0 – 8.0	8
	Patterns, Functions, and Algebra	0.0 – 3.5	4.0 – 5.5	6.0 - 11.0	11
	Data Analysis and Probability	0.0 – 3.5	4.0 – 6.0	6.5 - 10.0	10
Writing	Writing Processes	0.0 – 5.5	6.0 – 8.0	8.5 - 12.0	12
	Writing Applications	0.0 - 11.5	12.0 - 14.0	14.5 - 24.0	24
	Writing Conventions	0.0 – 7.5	8.0 - 10.0	10.5 - 12.0	12
Science	Scientific Processes	0.0 – 4.0	4.5 – 6.0	6.5 - 12.0	12
	Earth and Space Sciences	0.0 – 6.0	6.5 – 8.5	9.0 - 12.0	12
	Life Sciences	0.0 – 6.0	6.5 – 8.5	9.0 - 12.0	12
	Physical Sciences	0.0 – 5.5	6.0 – 8.0	8.5 - 12.0	12
Social Studies	History	0.0 – 5.5	6.0 – 7.5	8.0 - 14.0	14
	People in Societies and Geography	0.0 – 5.5	6.0 – 8.0	8.5 - 12.0	12
	Economics, Government, and Citizenship	0.0 – 4.5	5.0 – 7.0	7.5 - 13.0	13
	Social Studies Skills and Methods	0.0 – 4.0	4.5 – 6.0	6.5 – 9.0	9

Equating and Scaling: The Conversion of Raw Scores to Scaled Scores

Ohio uses the Rasch model (a one-parameter logistic model) for computing item difficulties and student abilities. This model is used because of its widespread acceptance, its relative simplicity and the commercial availability of software for implementing it. The model measures each student's ability and each item's difficulty, and places all students and items on the same scale. Both ability and difficulty are measured in log-odds units, or logits. When student ability and item difficulty are equal, the probability of a correct response is 50 percent.

Pre-Equating and Test Form Construction

Equating is a process by which test forms composed of different items are calibrated to the same performance standards. Because each test form is made up of items that have been calibrated, items can be selected so that the new form is approximately equal to previous forms in overall difficulty.

Common Item Post-Equating

Following the administration of the March 2015 OGT, operational item difficulty values were obtained using data from an early return sample of grade 10 students. This sample was selected to be statistically representative of the Ohio student population.

For the reading, mathematics, science and social studies tests, calibration and equating proceeded through a series of steps. First, the March 2015 operational difficulty values were computed from the early return data and compared to the reference values in the item bank. The mean difference between the operational and bank difficulties of the anchor items is called the equating constant, or EQK. The equating constant was then added to each March 2015 difficulty value so that the mean item difficulties from the March 2015 administration and from the bank were equal. The spring OGT writing tests are not post-equated. The summer and fall OGT administrations are also not post-equated.

Scaling

Ohio's performance standards are expressed as scaled scores. Scaled scores are constant across different forms of the same test, while raw scores may reflect minor differences in the difficulty of different test forms. A scaled score of 430 on the March 2015 administration represents the same level of performance as a scaled score of 430 on any other administration of the same test, but the raw score corresponding to a 430 may vary slightly from administration to administration.

After the equating process was complete, Rasch ability estimates, or theta scores, were computed for each possible raw score. The Rasch ability estimates were then converted to the appropriate scale by a linear transformation. In all cases, the proficient standard is equal to a scaled score of 400. The advanced, accelerated and basic standards are constant across different forms of the same test, but are not constant across different tests.

The Ohio Rounding Rule

Raw scores are reported to the half-point, but scaled scores are reported as whole numbers. In general, scaled scores are rounded to the nearest whole number; e.g., 417.848 would be reported as 418. Occasional exceptions must be made at the cut points used to mark the performance standards for each test so that the scaled score associated with each possible raw score is placed in the correct performance level.

Ohio uses a rounding rule to match the raw score closest to the performance standard with the associated scaled cut score for that standard. For example, if a raw score of 21.0 is associated with a scaled score of 399.437 and this is the closest scaled score to the proficient performance standard of 400, the scaled score associated with 21.0 is reported as 400 rather than 399.

If the closest scaled score exceeds the standard, the rounded scaled score is not changed. For example, if a raw score of 22.0 produces a scaled score of 398.126 and a raw score of 22.5 produces a scaled score of 401.246, the raw cut would be 22.5 and the associated scaled score would be reported as 401.

Concordance between Raw Scores and Scaled Scores

Tables 7-11 provide the concordance between raw scores and scaled scores for all five tests administered in March 2015.

**TABLE 7. RAW SCORE TO SCALED SCORE CONVERSION FOR READING,
MARCH 2015 OGT ADMINISTRATION.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	259	16.5	392	33.0	434
0.5	288	17.0	394	33.5	435
1.0	305	17.5	395	34.0	436
1.5	316	18.0	396	34.5	438
2.0	324	18.5	398	35.0	439
2.5	330	19.0	399	35.5	440
3.0	335	19.5	400	36.0	442
3.5	339	20.0	402	36.5	443
4.0	343	20.5	403	37.0	444
4.5	347	21.0	404	37.5	446
5.0	350	21.5	405	38.0	448
5.5	353	22.0	407	38.5	449
6.0	355	22.5	408	39.0	451
6.5	358	23.0	409	39.5	452
7.0	360	23.5	410	40.0	454
7.5	363	24.0	412	40.5	456
8.0	365	24.5	413	41.0	458
8.5	367	25.0	414	41.5	460
9.0	369	25.5	415	42.0	462
9.5	371	26.0	416	42.5	464
10.0	372	26.5	418	43.0	466
10.5	374	27.0	419	43.5	469
11.0	376	27.5	420	44.0	472
11.5	378	28.0	421	44.5	475
12.0	379	28.5	423	45.0	478
12.5	381	29.0	424	45.5	483
13.0	382	29.5	425	46.0	488
13.5	384	30.0	426	46.5	494
14.0	385	30.5	427	47.0	503
14.5	387	31.0	428	47.5	519
15.0	388	31.5	430	48.0	547
15.5	390	32.0	431		
16.0	391	32.5	432		

TABLE 8. RAW SCORE TO SCALED SCORE CONVERSION FOR MATHEMATICS, MARCH 2015 OGT ADMINISTRATION.

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	256	16.5	392	33.0	437
0.5	286	17.0	393	33.5	438
1.0	304	17.5	395	34.0	439
1.5	315	18.0	396	34.5	441
2.0	323	18.5	397	35.0	442
2.5	329	19.0	399	35.5	444
3.0	334	19.5	400	36.0	445
3.5	338	20.0	402	36.5	447
4.0	342	20.5	403	37.0	448
4.5	346	21.0	404	37.5	450
5.0	349	21.5	406	38.0	452
5.5	352	22.0	407	38.5	453
6.0	354	22.5	408	39.0	455
6.5	357	23.0	410	39.5	457
7.0	359	23.5	411	40.0	459
7.5	362	24.0	412	40.5	461
8.0	364	24.5	414	41.0	463
8.5	366	25.0	415	41.5	466
9.0	368	25.5	416	42.0	469
9.5	370	26.0	418	42.5	472
10.0	372	26.5	419	43.0	476
10.5	373	27.0	420	43.5	481
11.0	375	27.5	422	44.0	486
11.5	377	28.0	423	44.5	493
12.0	378	28.5	424	45.0	504
12.5	380	29.0	426	45.5	521
13.0	382	29.5	427	46.0	552
13.5	383	30.0	428		
14.0	385	30.5	430		
14.5	386	31.0	431		
15.0	388	31.5	432		
15.5	389	32.0	434		
16.0	391	32.5	435		

**TABLE 9. RAW SCORE TO SCALED SCORE CONVERSION FOR WRITING,
MARCH 2015 OGT ADMINISTRATION.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	269	16.5	375	33.0	421
0.5	293	17.0	376	33.5	423
1.0	307	17.5	377	34.0	425
1.5	315	18.0	378	34.5	427
2.0	321	18.5	380	35.0	429
2.5	326	19.0	381	35.5	431
3.0	330	19.5	382	36.0	433
3.5	333	20.0	383	36.5	435
4.0	336	20.5	385	37.0	437
4.5	339	21.0	386	37.5	440
5.0	341	21.5	387	38.0	442
5.5	343	22.0	389	38.5	445
6.0	345	22.5	390	39.0	448
6.5	347	23.0	391	39.5	451
7.0	349	23.5	393	40.0	454
7.5	351	24.0	394	40.5	457
8.0	352	24.5	395	41.0	461
8.5	354	25.0	397	41.5	464
9.0	355	25.5	398	42.0	468
9.5	357	26.0	400	42.5	472
10.0	358	26.5	401	43.0	476
10.5	359	27.0	402	43.5	481
11.0	361	27.5	404	44.0	486
11.5	362	28.0	405	44.5	491
12.0	363	28.5	407	45.0	496
12.5	365	29.0	408	45.5	502
13.0	366	29.5	410	46.0	509
13.5	367	30.0	411	46.5	517
14.0	368	30.5	413	47.0	527
14.5	370	31.0	414	47.5	543
15.0	371	31.5	416	48.0	568
15.5	372	32.0	418		
16.0	373	32.5	419		

**TABLE 10. RAW SCORE TO SCALED SCORE CONVERSION FOR SCIENCE,
MARCH 2015 OGT ADMINISTRATION.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	214	16.5	380	33.0	427
0.5	252	17.0	382	33.5	428
1.0	274	17.5	383	34.0	430
1.5	287	18.0	385	34.5	432
2.0	297	18.5	386	35.0	433
2.5	304	19.0	388	35.5	435
3.0	311	19.5	389	36.0	437
3.5	316	20.0	391	36.5	439
4.0	321	20.5	392	37.0	441
4.5	325	21.0	393	37.5	443
5.0	329	21.5	395	38.0	445
5.5	333	22.0	396	38.5	447
6.0	336	22.5	397	39.0	449
6.5	339	23.0	399	39.5	452
7.0	342	23.5	400	40.0	454
7.5	345	24.0	401	40.5	457
8.0	348	24.5	403	41.0	460
8.5	350	25.0	404	41.5	462
9.0	352	25.5	405	42.0	466
9.5	355	26.0	407	42.5	469
10.0	357	26.5	408	43.0	473
10.5	359	27.0	410	43.5	477
11.0	361	27.5	411	44.0	481
11.5	363	28.0	412	44.5	486
12.0	365	28.5	414	45.0	492
12.5	367	29.0	415	45.5	498
13.0	369	29.5	416	46.0	506
13.5	371	30.0	418	46.5	516
14.0	372	30.5	419	47.0	530
14.5	374	31.0	421	47.5	552
15.0	375	31.5	422	48.0	591
15.5	377	32.0	424		
16.0	379	32.5	425		

TABLE 11. RAW SCORE TO SCALED SCORE CONVERSION FOR SOCIAL STUDIES, MARCH 2015 OGT ADMINISTRATION.

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	231	16.5	386	33.0	432
0.5	266	17.0	387	33.5	434
1.0	286	17.5	389	34.0	435
1.5	299	18.0	390	34.5	437
2.0	307	18.5	392	35.0	438
2.5	314	19.0	393	35.5	440
3.0	320	19.5	395	36.0	442
3.5	325	20.0	396	36.5	444
4.0	329	20.5	398	37.0	446
4.5	333	21.0	399	37.5	447
5.0	337	21.5	401	38.0	449
5.5	340	22.0	402	38.5	451
6.0	343	22.5	403	39.0	453
6.5	346	23.0	405	39.5	455
7.0	349	23.5	406	40.0	458
7.5	352	24.0	407	40.5	460
8.0	354	24.5	409	41.0	462
8.5	356	25.0	410	41.5	465
9.0	359	25.5	412	42.0	468
9.5	361	26.0	413	42.5	471
10.0	363	26.5	414	43.0	474
10.5	365	27.0	416	43.5	478
11.0	367	27.5	417	44.0	482
11.5	369	28.0	418	44.5	486
12.0	371	28.5	420	45.0	491
12.5	372	29.0	421	45.5	497
13.0	374	29.5	422	46.0	504
13.5	376	30.0	424	46.5	513
14.0	378	30.5	425	47.0	525
14.5	379	31.0	426	47.5	545
15.0	381	31.5	428	48.0	580
15.5	383	32.0	429		
16.0	384	32.5	431		