

MARCH 2014 OHIO GRADUATION TESTS STATISTICAL SUMMARY

This document is a summary of the March 2014 administration of the Ohio Graduation Tests (OGT). Students attempt the tests for the first time in the spring of their tenth grade. Students who take the tests at a later time do so because they have not yet achieved proficient score(s) on one or more tests. Because these students are not representative of the population as a whole, only tenth-graders are included in this report.

Tables 1 and 2 summarize the performance of tenth-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 2014 OGT ADMINISTRATION FOR PUBLIC GRADE 10 STUDENTS.

	Subject				
	Reading	Mathematics	Writing	Science	Social Studies
No. Tested	128,254	128,549	127,688	128,862	128,401
Max. Raw Score	48	46	48	48	48
Max. Scaled Score	552	556	566	591	575
Min. Scaled Score	262	252	269	210	232
Raw Mean	31.61	30.60	32.20	29.77	32.45
Raw SD	8.26	10.41	6.34	9.06	9.87
Raw SEM	3.04	3.03	2.77	3.11	3.12
Scaled Mean	428.51	434.26	423.99	423.19	431.04
Scaled SD	23.08	36.14	21.54	32.72	33.31
Scaled SEM	8.49	10.51	9.41	11.21	10.55
Reliability	0.86	0.92	0.81	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 2014 OGT ADMINISTRATION FOR NONPUBLIC GRADE 10 STUDENTS.

	Subject				
	Reading	Mathematics	Writing	Science	Social Studies
No. Tested	12,418	12,417	12,133	12,358	12,374
Max. Raw Score	48	46	48	48	48
Max. Scaled Score	552	556	566	591	575
Min. Scaled Score	262	252	269	210	232
Raw Mean	35.46	33.34	35.00	33.21	35.41
Raw SD	6.24	8.44	4.36	7.28	7.51
Raw SEM	2.83	2.95	2.30	3.01	3.02
Scaled Mean	438.99	442.65	433.64	435.06	439.67
Scaled SD	18.98	30.90	16.26	27.52	27.10
Scaled SEM	8.61	10.80	8.59	11.39	10.91
Reliability	0.79	0.88	0.72	0.83	0.84

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 tenth-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	26,618	20.7	89.4
	Accelerated	38,466	30.0	
	Proficient	49,684	38.7	
Below Proficient	Basic	9,297	7.2	10.6
	Limited	4,348	3.4	

Mathematics				
Performance Level		Number	Percent	
Proficient or Above	Advanced	52,763	41.0	82.3
	Accelerated	28,517	22.2	
	Proficient	24,657	19.2	
Below Proficient	Basic	9,982	7.8	17.7
	Limited	12,755	9.9	

Writing				
Performance Level		Number	Percent	
Proficient or Above	Advanced	431	0.3	88.0
	Accelerated	56,680	44.2	
	Proficient	55,730	43.5	
Below Proficient	Basic	10,826	8.4	12.0
	Limited	4,514	3.5	

Science				
Performance Level		Number	Percent	
Proficient or Above	Advanced	32,768	25.4	77.4
	Accelerated	32,935	25.5	
	Proficient	34,081	26.4	
Below Proficient	Basic	21,554	16.7	22.6
	Limited	7,648	5.9	

Social Studies				
Performance Level		Number	Percent	
Proficient or Above	Advanced	44,983	35.0	82.9
	Accelerated	26,449	20.6	
	Proficient	35,164	27.4	
Below Proficient	Basic	12,124	9.4	17.1
	Limited	9,803	7.6	

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

Reading				
Performance Level		Number	Percent	
Proficient or Above	Advanced	4,214	33.7	97.5
	Accelerated	4,789	38.3	
	Proficient	3,192	25.5	
Below Proficient	Basic	250	2.0	2.5
	Limited	63	0.5	

Mathematics				
Performance Level		Number	Percent	
Proficient or Above	Advanced	6,072	48.5	92.3
	Accelerated	3,316	26.5	
	Proficient	2,152	17.2	
Below Proficient	Basic	580	4.6	7.7
	Limited	387	3.1	

Writing				
Performance Level		Number	Percent	
Proficient or Above	Advanced	44	0.4	97.1
	Accelerated	7,931	64.9	
	Proficient	3,895	31.9	
Below Proficient	Basic	272	2.2	2.9
	Limited	81	0.7	

Science				
Performance Level		Number	Percent	
Proficient or Above	Advanced	4,479	36.0	91.0
	Accelerated	3,853	31.0	
	Proficient	2,995	24.1	
Below Proficient	Basic	959	7.7	9.0
	Limited	162	1.3	

Social Studies				
Performance Level		Number	Percent	
Proficient or Above	Advanced	5,258	42.2	93.9
	Accelerated	3,248	26.1	
	Proficient	3,195	25.6	
Below Proficient	Basic	539	4.3	6.1
	Limited	224	1.8	

Table 5 provides the raw and scaled scores associated with each performance level on each test for the March 2014 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	39.0 – 48.0	448 – 552
	Accelerated	33.0 – 38.5	429 – 447
	Proficient	20.5 – 32.5	400 – 428
	Basic	14.0 – 20.0	383 – 399
	Limited	0.0 – 13.5	262 – 382
Mathematics	Advanced	35.5 – 46.0	444 – 556
	Accelerated	28.5 – 35.0	425 – 443
	Proficient	19.5 – 28.0	400 – 424
	Basic	14.5 – 19.0	384 – 399
	Limited	0.0 – 14.0	252 – 383
Writing	Advanced	43.0 – 48.0	476 – 566
	Accelerated	34.5 – 42.5	430 – 475
	Proficient	25.0 – 34.0	400 – 429
	Basic	17.5 – 24.5	378 – 399
	Limited	0.0 – 17.0	269 – 377
Science	Advanced	37.0 – 48.0	445 – 591
	Accelerated	31.0 – 36.5	425 – 444
	Proficient	23.0 – 30.5	400 – 424
	Basic	14.0 – 22.5	371 – 399
	Limited	0.0 – 13.5	210 – 370
Social Studies	Advanced	38.5 – 48.0	446 – 575
	Accelerated	33.5 – 38.0	429 – 445
	Proficient	22.0 – 33.0	400 – 428
	Basic	15.5 – 21.5	382 – 399
	Limited	0.0 – 15.0	232 – 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 – 3.5	4.0 – 5.5	6.0 – 9.0	9
	Reading Process	0.0 – 4.5	5.0 – 6.5	7.0 - 10.0	10
	Informational, Technical, and Persuasive Text	0.0 – 6.5	7.0 – 9.0	9.5 - 16.0	16
	Literary Text	0.0 – 4.0	4.5 – 6.5	7.0 - 13.0	13
Mathematics	Number, Number Sense, and Operations	0.0 – 3.5	4.0 – 5.5	6.0 – 9.0	9
	Measurement	0.0 – 2.0	2.5 – 4.0	4.5 – 8.0	8
	Geometry and Spatial Sense	0.0 – 3.5	4.0 – 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 – 4.5	5.0 – 7.0	7.5 - 10.0	10
Writing	Writing Processes	0.0 – 5.5	6.0 – 8.0	8.5 - 12.0	12
	Writing Applications	0.0 - 10.0	10.5 - 13.0	13.5 - 24.0	24
	Writing Conventions	0.0 – 8.0	8.5 - 10.0	10.5 - 12.0	12
Science	Scientific Processes	0.0 – 4.5	5.0 – 7.0	7.5 - 12.0	12
	Earth and Space Sciences	0.0 – 5.5	6.0 – 7.5	8.0 - 12.0	12
	Life Sciences	0.0 – 5.5	6.0 – 7.5	8.0 - 12.0	12
	Physical Sciences	0.0 – 5.5	6.0 – 8.0	8.5 - 12.0	12
Social Studies	History	0.0 – 6.0	6.5 – 8.5	9.0 - 14.0	14
	People in Societies and Geography	0.0 – 5.0	5.5 – 7.5	8.0 - 12.0	12
	Economics, Government, and Citizenship	0.0 – 4.5	5.0 – 7.5	8.0 - 13.0	13
	Social Studies Skills and Methods	0.0 – 4.5	5.0 – 6.5	7.0 – 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 2014 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 2014 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 2014 difficulty value so that the mean item difficulties from the March 2014 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 2014 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 also 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 2014.

**TABLE 7. RAW SCORE TO SCALED SCORE CONVERSION FOR READING,
MARCH 2014 OGT ADMINISTRATION.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	262	16.5	391	33.0	430
0.5	290	17.0	392	33.5	431
1.0	307	17.5	393	34.0	432
1.5	317	18.0	394	34.5	434
2.0	325	18.5	396	35.0	435
2.5	330	19.0	397	35.5	436
3.0	335	19.5	398	36.0	438
3.5	340	20.0	399	36.5	439
4.0	343	20.5	400	37.0	441
4.5	347	21.0	402	37.5	442
5.0	350	21.5	403	38.0	444
5.5	353	22.0	404	38.5	446
6.0	355	22.5	405	39.0	448
6.5	358	23.0	406	39.5	449
7.0	360	23.5	407	40.0	451
7.5	362	24.0	409	40.5	453
8.0	364	24.5	410	41.0	455
8.5	366	25.0	411	41.5	457
9.0	368	25.5	412	42.0	460
9.5	370	26.0	413	42.5	462
10.0	372	26.5	414	43.0	465
10.5	373	27.0	415	43.5	468
11.0	375	27.5	417	44.0	471
11.5	377	28.0	418	44.5	475
12.0	378	28.5	419	45.0	479
12.5	380	29.0	420	45.5	483
13.0	381	29.5	421	46.0	489
13.5	382	30.0	422	46.5	496
14.0	384	30.5	424	47.0	506
14.5	385	31.0	425	47.5	523
15.0	387	31.5	426	48.0	552
15.5	388	32.0	427		
16.0	389	32.5	428		

TABLE 8. RAW SCORE TO SCALED SCORE CONVERSION FOR MATHEMATICS, MARCH 2014 OGT ADMINISTRATION.

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	252	16.5	391	33.0	437
0.5	283	17.0	393	33.5	439
1.0	301	17.5	394	34.0	440
1.5	312	18.0	396	34.5	442
2.0	320	18.5	397	35.0	443
2.5	326	19.0	399	35.5	445
3.0	331	19.5	400	36.0	446
3.5	336	20.0	401	36.5	448
4.0	340	20.5	403	37.0	449
4.5	343	21.0	404	37.5	451
5.0	347	21.5	405	38.0	453
5.5	350	22.0	407	38.5	454
6.0	352	22.5	408	39.0	456
6.5	355	23.0	409	39.5	458
7.0	358	23.5	411	40.0	461
7.5	360	24.0	412	40.5	463
8.0	362	24.5	414	41.0	465
8.5	364	25.0	415	41.5	468
9.0	366	25.5	416	42.0	471
9.5	368	26.0	418	42.5	475
10.0	370	26.5	419	43.0	479
10.5	372	27.0	420	43.5	484
11.0	374	27.5	422	44.0	489
11.5	376	28.0	423	44.5	497
12.0	377	28.5	425	45.0	508
12.5	379	29.0	426	45.5	525
13.0	381	29.5	427	46.0	556
13.5	382	30.0	429		
14.0	383	30.5	430		
14.5	386	31.0	431		
15.0	387	31.5	433		
15.5	389	32.0	434		
16.0	390	32.5	436		

TABLE 9. RAW SCORE TO SCALED SCORE CONVERSION FOR WRITING, MARCH 2014 OGT ADMINISTRATION.

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	269	16.5	376	33.0	424
0.5	293	17.0	377	33.5	426
1.0	307	17.5	378	34.0	428
1.5	315	18.0	380	34.5	430
2.0	321	18.5	381	35.0	432
2.5	325	19.0	383	35.5	434
3.0	329	19.5	384	36.0	436
3.5	332	20.0	385	36.5	438
4.0	335	20.5	387	37.0	440
4.5	338	21.0	388	37.5	442
5.0	340	21.5	390	38.0	445
5.5	342	22.0	391	38.5	447
6.0	344	22.5	392	39.0	450
6.5	346	23.0	394	39.5	453
7.0	348	23.5	395	40.0	456
7.5	350	24.0	397	40.5	459
8.0	352	24.5	398	41.0	462
8.5	353	25.0	400	41.5	466
9.0	355	25.5	401	42.0	469
9.5	356	26.0	403	42.5	473
10.0	358	26.5	404	43.0	477
10.5	359	27.0	405	43.5	481
11.0	361	27.5	407	44.0	485
11.5	362	28.0	408	44.5	490
12.0	363	28.5	410	45.0	495
12.5	365	29.0	411	45.5	501
13.0	366	29.5	413	46.0	508
13.5	368	30.0	415	46.5	515
14.0	369	30.5	416	47.0	525
14.5	370	31.0	418	47.5	541
15.0	372	31.5	419	48.0	566
15.5	373	32.0	421		
16.0	374	32.5	423		

**TABLE 10. RAW SCORE TO SCALED SCORE CONVERSION FOR SCIENCE,
MARCH 2014 OGT ADMINISTRATION.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	210	16.5	380	33.0	431
0.5	248	17.0	381	33.5	433
1.0	270	17.5	383	34.0	435
1.5	283	18.0	385	34.5	436
2.0	293	18.5	386	35.0	438
2.5	300	19.0	388	35.5	440
3.0	307	19.5	390	36.0	442
3.5	312	20.0	391	36.5	444
4.0	317	20.5	393	37.0	446
4.5	322	21.0	394	37.5	448
5.0	326	21.5	396	38.0	450
5.5	329	22.0	397	38.5	452
6.0	333	22.5	399	39.0	454
6.5	336	23.0	400	39.5	456
7.0	339	23.5	402	40.0	459
7.5	342	24.0	403	40.5	461
8.0	345	24.5	405	41.0	464
8.5	347	25.0	406	41.5	467
9.0	350	25.5	408	42.0	470
9.5	352	26.0	409	42.5	473
10.0	355	26.5	411	43.0	477
10.5	357	27.0	412	43.5	481
11.0	359	27.5	414	44.0	485
11.5	361	28.0	415	44.5	489
12.0	363	28.5	417	45.0	495
12.5	365	29.0	418	45.5	501
13.0	367	29.5	420	46.0	509
13.5	369	30.0	422	46.5	518
14.0	371	30.5	423	47.0	531
14.5	373	31.0	425	47.5	553
15.0	375	31.5	426	48.0	591
15.5	376	32.0	428		
16.0	378	32.5	429		

TABLE 11. RAW SCORE TO SCALED SCORE CONVERSION FOR SOCIAL STUDIES, MARCH 2014 OGT ADMINISTRATION.

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	232	16.5	385	33.0	427
0.5	267	17.0	386	33.5	429
1.0	287	17.5	387	34.0	430
1.5	299	18.0	389	34.5	432
2.0	308	18.5	390	35.0	433
2.5	315	19.0	392	35.5	435
3.0	321	19.5	393	36.0	436
3.5	326	20.0	394	36.5	438
4.0	330	20.5	396	37.0	440
4.5	334	21.0	397	37.5	441
5.0	338	21.5	398	38.0	443
5.5	341	22.0	400	38.5	446
6.0	344	22.5	401	39.0	447
6.5	347	23.0	402	39.5	449
7.0	349	23.5	403	40.0	451
7.5	352	24.0	404	40.5	454
8.0	354	24.5	406	41.0	456
8.5	357	25.0	407	41.5	459
9.0	359	25.5	408	42.0	462
9.5	361	26.0	409	42.5	465
10.0	363	26.5	411	43.0	468
10.5	365	27.0	412	43.5	471
11.0	367	27.5	413	44.0	475
11.5	369	28.0	414	44.5	480
12.0	370	28.5	416	45.0	485
12.5	372	29.0	417	45.5	491
13.0	374	29.5	418	46.0	498
13.5	375	30.0	419	46.5	507
14.0	377	30.5	421	47.0	519
14.5	379	31.0	422	47.5	540
15.0	380	31.5	423	48.0	575
15.5	382	32.0	425		
16.0	383	32.5	426		