

MARCH 2011 OHIO GRADUATION TESTS STATISTICAL SUMMARY

This document is a summary of the March 2011 administration of the Ohio Graduation Tests (OGT). Students attempt the tests for the first time in the spring of 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 non-public schools, respectively. 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 2011 OGT Administration for Public Grade 10 Students.

	Subject				
	Reading	Mathematics	Writing	Science	Social Studies
No. Tested	131,383	131,908	130,977	132,135	131,323
Max. Raw Score	48	46	48	48	48
Max. Scaled Score	559	566	577	599	592
Min. Scaled Score	255	255	274	206	227
Raw Mean	30.98	30.28	32.37	28.23	30.91
Raw SD	8.30	9.62	5.82	8.25	9.46
Raw SEM	3.02	2.86	2.53	2.91	2.89
Scaled Mean	428.81	432.67	429.56	420.44	430.97
Scaled SD	24.16	32.90	23.46	31.95	35.49
Scaled SEM	8.80	9.78	10.20	11.27	10.83
Reliability	0.87	0.91	0.81	0.88	0.91

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 2011 OGT Administration for Non-Public Grade 10 Students.

	Subject				
	Reading	Mathematics	Writing	Science	Social Studies
No. Tested	12,309	12,312	12,306	12,320	12,260
Max. Raw Score	48	46	48	48	48
Max. Scaled Score	559	566	577	599	592
Min. Scaled Score	255	255	274	206	227
Raw Mean	35.23	33.72	35.25	31.31	34.23
Raw SD	6.08	7.70	3.90	6.48	6.73
Raw SEM	2.85	2.75	2.15	2.85	2.70
Scaled Mean	441.09	444.00	441.80	431.95	442.08
Scaled SD	19.00	28.80	18.83	25.72	26.69
Scaled SEM	8.91	10.29	10.37	11.32	10.72
Reliability	0.78	0.87	0.70	0.81	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 non-public 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	29,891	22.7	87.8
	Accelerated	42,647	32.4	
	Proficient	42,960	32.7	
Below Proficient	Basic	10,099	7.7	12.2
	Limited	5,894	4.5	

Mathematics				
Performance Level		Number	Percent	
Proficient or Above	Advanced	49,587	37.6	83.2
	Accelerated	31,754	24.1	
	Proficient	28,454	21.6	
Below Proficient	Basic	11,182	8.5	16.8
	Limited	11,021	8.3	

Writing				
Performance Level		Number	Percent	
Proficient or Above	Advanced	2,510	1.9	90.1
	Accelerated	65,213	49.7	
	Proficient	50,423	38.5	
Below Proficient	Basic	10,164	7.8	9.9
	Limited	2,777	2.1	

Science				
Performance Level		Number	Percent	
Proficient or Above	Advanced	31,423	23.8	75.0
	Accelerated	30,793	23.3	
	Proficient	36,924	27.9	
Below Proficient	Basic	24,416	18.5	25.0
	Limited	8,671	6.6	

Table 3 (continued)

Social Studies				
Performance Level		Number	Percent	
Proficient or Above	Advanced	49,852	37.9	80.5
	Accelerated	22,779	17.3	
	Proficient	33,204	25.2	
Below Proficient	Basic	12,218	9.3	19.5
	Limited	13,486	10.3	

Table 4. Number and Percent of Non-Public Grade 10 Students at Each Performance Level.

Reading				
Performance Level		Number	Percent	
Proficient or Above	Advanced	4,885	38.8	97.5
	Accelerated	4,854	38.6	
	Proficient	2,523	20.1	
Below Proficient	Basic	242	1.9	2.5
	Limited	73	0.6	

Mathematics				
Performance Level		Number	Percent	
Proficient or Above	Advanced	6,306	50.1	93.6
	Accelerated	3,357	26.7	
	Proficient	2,115	16.8	
Below Proficient	Basic	523	4.2	6.4
	Limited	279	2.2	

Writing				
Performance Level		Number	Percent	
Proficient or Above	Advanced	457	3.6	98.1
	Accelerated	9,021	71.7	
	Proficient	2,862	22.8	
Below Proficient	Basic	192	1.5	1.9
	Limited	42	0.3	

Table 4 (continued)

Science				
Performance Level		Number	Percent	
Proficient or Above	Advanced	4,075	32.4	90.0
	Accelerated	3,729	29.6	
	Proficient	3,527	28.0	
Below Proficient	Basic	1,119	8.9	10.0
	Limited	138	1.1	

Social Studies				
Performance Level		Number	Percent	
Proficient or Above	Advanced	6,041	48.2	93.6
	Accelerated	2,816	22.5	
	Proficient	2,872	22.9	
Below Proficient	Basic	542	4.3	6.4
	Limited	256	2.0	

Table 5 provides the raw and scaled scores associated with each performance level on each test for the March 2011 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 – 559
	Accelerated	31.5 – 37.5	429 – 447
	Proficient	20.5 – 31.0	400 – 428
	Basic	14.5 – 20.0	383 – 399
	Limited	0.0 – 14.0	255 – 382
Mathematics	Advanced	35.5 – 46.0	444 – 566
	Accelerated	29.0 – 35.0	425 – 443
	Proficient	20.0 – 28.5	400 – 424
	Basic	14.5 – 19.5	384 – 399
	Limited	0.0 – 14.0	255 – 383
Writing	Advanced	40.5 – 48.0	476 – 577
	Accelerated	33.5 – 40.0	430 – 475
	Proficient	25.0 – 33.0	400 – 429
	Basic	17.0 – 24.5	378 – 399
	Limited	0.0 – 16.5	274 – 377
Science	Advanced	35.0 – 48.0	445 – 599
	Accelerated	30.0 – 34.5	425 – 444
	Proficient	23.0 – 29.5	400 – 424
	Basic	14.5 – 22.5	371 – 399
	Limited	0.0 – 14.0	206 – 370
Social Studies	Advanced	36.0 – 48.0	446 – 592
	Accelerated	32.0 – 35.5	429 – 445
	Proficient	22.5 – 31.5	400 – 428
	Basic	16.5 – 22.0	382 – 399
	Limited	0.0 – 16.0	227 – 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	0.0-4.0	4.5-5.5	6.0-8.0	8
	Reading Process	0.0-4.0	4.5-6.5	7.0-10.0	10
	Informational, Technical, and Persuasive Text	0.0-4.5	5.0-7.0	7.5-16.0	16
	Literary Text	0.0-6.0	6.5-8.0	8.5-14.0	14
Mathematics	Number, Number Sense, and Operations	0.0-3.5	4.0-5.5	6.0-9.0	9
	Measurement	0.0-2.0	2.5-4.5	5.0-8.0	8
	Geometry and Spatial Sense	0.0-3.5	4.0-5.5	6.0-8.0	8
	Patterns, Functions, and Algebra	0.0-5.5	6.0-7.5	8.0-10.0	10
	Data Analysis and Probability	0.0-3.0	3.5-5.0	5.5-11.0	11
Writing	Writing Processes	0.0-6.0	6.5-8.5	9.0-12.0	12
	Writing Applications	0.0-9.0	9.5-12.0	12.5-24.0	24
	Writing Conventions	0.0-8.0	8.5-10.5	11.0-12.0	12
Science	Scientific Processes	0.0-5.5	6.0-7.5	8.0-12.0	12
	Earth and Space Sciences	0.0-5.0	5.5-7.5	8.0-12.0	12
	Life Sciences	0.0-5.0	5.5-7.0	7.5-12.0	12
	Physical Sciences	0.0-5.0	5.5-7.5	8.0-12.0	12

Table 6 (continued)

Subject	Content Standard	Below Prof.	Near Prof.	Above Prof.	Total Points
Social Studies	History	0.0-4.5	5.0-7.0	7.5-14.0	14
	People in Societies and Geography	0.0-7.0	7.5-9.5	10.0-12.0	12
	Economics, Government, and Citizenship	0.0-4.5	5.0-6.5	7.0-13.0	13
	Social Studies Skills and Methods	0.0-4.0	4.5-6.5	7.0-9.0	9

Concordance between Raw Scores and Cut Scores

Tables 7-11 provide the concordance between raw scores and scaled scores for all five tests administered in March 2011.

**Table 7. Raw Score to Scaled Score Conversion for Reading,
March 2011 OGT Administration.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	255	16.5	389	33.0	433
0.5	284	17.0	391	33.5	434
1.0	301	17.5	392	34.0	436
1.5	311	18.0	394	34.5	437
2.0	319	18.5	395	35.0	439
2.5	325	19.0	396	35.5	440
3.0	330	19.5	398	36.0	441
3.5	334	20.0	399	36.5	443
4.0	338	20.5	400	37.0	444
4.5	342	21.0	402	37.5	446
5.0	345	21.5	403	38.0	448
5.5	348	22.0	404	38.5	449
6.0	351	22.5	406	39.0	451
6.5	353	23.0	407	39.5	453
7.0	356	23.5	408	40.0	454
7.5	358	24.0	409	40.5	456
8.0	361	24.5	411	41.0	458
8.5	363	25.0	412	41.5	461
9.0	365	25.5	413	42.0	463
9.5	367	26.0	415	42.5	466
10.0	369	26.5	416	43.0	468
10.5	371	27.0	417	43.5	471
11.0	372	27.5	419	44.0	475
11.5	374	28.0	420	44.5	479
12.0	376	28.5	421	45.0	483
12.5	377	29.0	422	45.5	488
13.0	379	29.5	424	46.0	494
13.5	381	30.0	425	46.5	502
14.0	382	30.5	426	47.0	513
14.5	384	31.0	428	47.5	530
15.0	385	31.5	429	48.0	559
15.5	387	32.0	430		
16.0	388	32.5	432		

**Table 8. Raw Score to Scaled Score Conversion for Mathematics,
March 2011 OGT Administration.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	255	16.5	391	33.0	437
0.5	285	17.0	392	33.5	438
1.0	303	17.5	394	34.0	440
1.5	314	18.0	395	34.5	441
2.0	322	18.5	396	35.0	443
2.5	328	19.0	398	35.5	445
3.0	333	19.5	399	36.0	447
3.5	337	20.0	400	36.5	449
4.0	341	20.5	402	37.0	451
4.5	345	21.0	403	37.5	453
5.0	348	21.5	404	38.0	455
5.5	351	22.0	406	38.5	457
6.0	354	22.5	407	39.0	459
6.5	356	23.0	408	39.5	462
7.0	359	23.5	410	40.0	464
7.5	361	24.0	411	40.5	467
8.0	363	24.5	412	41.0	470
8.5	365	25.0	414	41.5	474
9.0	367	25.5	415	42.0	477
9.5	369	26.0	416	42.5	481
10.0	371	26.5	418	43.0	486
10.5	372	27.0	419	43.5	491
11.0	374	27.5	420	44.0	497
11.5	376	28.0	422	44.5	506
12.0	377	28.5	423	45.0	517
12.5	379	29.0	425	45.5	535
13.0	381	29.5	426	46.0	566
13.5	382	30.0	427		
14.0	383	30.5	429		
14.5	385	31.0	430		
15.0	387	31.5	432		
15.5	388	32.0	433		
16.0	389	32.5	435		

**Table 9. Raw Score to Scaled Score Conversion for Writing,
March 2011 OGT Administration.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	274	16.5	377	33.0	428
0.5	298	17.0	378	33.5	431
1.0	312	17.5	379	34.0	433
1.5	320	18.0	381	34.5	435
2.0	325	18.5	382	35.0	438
2.5	330	19.0	383	35.5	440
3.0	333	19.5	384	36.0	443
3.5	337	20.0	386	36.5	446
4.0	339	20.5	387	37.0	449
4.5	342	21.0	388	37.5	452
5.0	344	21.5	390	38.0	455
5.5	346	22.0	391	38.5	458
6.0	348	22.5	393	39.0	462
6.5	350	23.0	394	39.5	466
7.0	352	23.5	396	40.0	470
7.5	353	24.0	397	40.5	476
8.0	355	24.5	398	41.0	479
8.5	356	25.0	400	41.5	483
9.0	358	25.5	402	42.0	488
9.5	359	26.0	403	42.5	492
10.0	361	26.5	405	43.0	496
10.5	362	27.0	406	43.5	501
11.0	363	27.5	408	44.0	505
11.5	365	28.0	410	44.5	509
12.0	366	28.5	411	45.0	514
12.5	367	29.0	413	45.5	518
13.0	368	29.5	415	46.0	524
13.5	370	30.0	417	46.5	530
14.0	371	30.5	418	47.0	539
14.5	372	31.0	420	47.5	553
15.0	373	31.5	422	48.0	577
15.5	374	32.0	424		
16.0	376	32.5	426		

**Table 10. Raw Score to Scaled Score Conversion for Science,
March 2011 OGT Administration.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	206	16.5	378	33.0	437
0.5	244	17.0	380	33.5	438
1.0	266	17.5	382	34.0	440
1.5	279	18.0	383	34.5	443
2.0	289	18.5	385	35.0	445
2.5	297	19.0	387	35.5	447
3.0	303	19.5	389	36.0	449
3.5	309	20.0	390	36.5	451
4.0	314	20.5	392	37.0	453
4.5	318	21.0	394	37.5	456
5.0	322	21.5	396	38.0	458
5.5	326	22.0	397	38.5	460
6.0	329	22.5	399	39.0	463
6.5	332	23.0	401	39.5	465
7.0	336	23.5	402	40.0	468
7.5	339	24.0	404	40.5	471
8.0	341	24.5	406	41.0	474
8.5	344	25.0	408	41.5	477
9.0	347	25.5	409	42.0	480
9.5	349	26.0	411	42.5	483
10.0	351	26.5	413	43.0	487
10.5	354	27.0	415	43.5	491
11.0	356	27.5	416	44.0	495
11.5	358	28.0	418	44.5	500
12.0	360	28.5	420	45.0	505
12.5	362	29.0	422	45.5	511
13.0	364	29.5	423	46.0	518
13.5	367	30.0	425	46.5	527
14.0	368	30.5	427	47.0	540
14.5	371	31.0	429	47.5	562
15.0	372	31.5	431	48.0	599
15.5	374	32.0	433		
16.0	376	32.5	435		

**Table 11. Raw Score to Scaled Score Conversion for Social Studies,
March 2011 OGT Administration.**

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
0.0	227	16.5	383	33.0	433
0.5	262	17.0	384	33.5	435
1.0	283	17.5	386	34.0	437
1.5	295	18.0	387	34.5	439
2.0	304	18.5	389	35.0	441
2.5	311	19.0	390	35.5	443
3.0	317	19.5	392	36.0	446
3.5	322	20.0	393	36.5	448
4.0	326	20.5	395	37.0	450
4.5	330	21.0	396	37.5	452
5.0	334	21.5	398	38.0	455
5.5	337	22.0	399	38.5	457
6.0	340	22.5	400	39.0	460
6.5	343	23.0	402	39.5	462
7.0	346	23.5	403	40.0	465
7.5	348	24.0	405	40.5	468
8.0	351	24.5	406	41.0	471
8.5	353	25.0	408	41.5	474
9.0	355	25.5	409	42.0	478
9.5	358	26.0	411	42.5	481
10.0	360	26.5	412	43.0	485
10.5	362	27.0	414	43.5	489
11.0	364	27.5	415	44.0	494
11.5	366	28.0	417	44.5	498
12.0	367	28.5	418	45.0	503
12.5	369	29.0	420	45.5	509
13.0	371	29.5	422	46.0	516
13.5	373	30.0	423	46.5	525
14.0	374	30.5	425	47.0	537
14.5	376	31.0	426	47.5	557
15.0	378	31.5	428	48.0	592
15.5	379	32.0	430		
16.0	381	32.5	432		

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%.

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 2011 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 2011 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 2011 difficulty value so that the mean item difficulties from the March 2011 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 2011 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.