

OHIO ACHIEVEMENT ASSESSMENTS MAY 2010 ADMINISTRATION

STATISTICAL SUMMARY

This document provides a summary of information from the May 2010 administration of the Ohio Achievement Assessments to students in grades three through eight. The statistics shown are computed from the entire population of Ohio public school students (including community school students) for each subject and grade tested. Tables 1-3 summarize parameters computed from the data. Tables 4-6 show the percent of students at each performance level for each grade and test. Tables 7 and 8 show the raw score cut points computed from test data. Subscale passing bands are shown in Tables 9-11. Tables 12-14 show the conversions of raw scores to scaled scores.

Table 1 - Summary of Parameters from the May 2010 Administration of the Ohio Achievement Assessments for Grades 3 and 4.

Parameter	Grade 3		Grade 4		
	Reading	Math	Reading	Math	Writing
N-count	126,655	130,606	131,042	130,989	Not Tested in 2010
Max Raw Score	49	52	49	52	
Max Scaled Score	501	513	533	568	
Min Scaled Score	265	234	265	233	
Raw Score Mean	36.90	38.16	30.64	31.96	
Raw Score Standard Deviation	8.88	8.49	9.32	9.86	
Raw Score SEM	3.15	3.02	3.34	3.32	
Scaled Score Mean	420.49	420.90	422.37	423.69	
Scaled Score Standard Deviation	28.27	30.87	27.33	34.69	
Scaled Score SEM	10.05	10.97	9.79	11.66	
Reliability	0.87	0.87	0.87	0.89	

The Grade 3 Reading test is administered in both fall and spring. The number of examinees (N-count) in Table 1 include only students who were tested in the Spring, so the figures for Grade 3 Reading do not include some students who achieved a Proficient (or above) score on the fall test and did not retake the test during the spring administration. Writing tests in Grades 4 and 7 and Social Studies tests in Grades 5 and 8 were not administered in 2010 although they were administered in prior years.

Table 2 - Summary of Parameters from the May 2010 Administration of the Ohio Achievement Assessments for Grades 5 and 6.

Parameter	Grade 5				Grade 6	
	Reading	Math	Science	Social Studies	Reading	Math
N-count	129,932	129,607	129,928	Not Tested in 2010	130,905	130,433
Max Raw Score	49	52	48		49	50
Max Scaled Score	542	551	547		554	606
Min Scaled Score	239	247	241		282	240
Raw Score Mean	30.33	28.22	28.40		25.73	28.32
Raw Score Standard Deviation	8.95	11.09	9.21		9.57	10.94
Raw Score SEM	3.16	3.45	3.32		3.45	3.38
Scaled Score Mean	413.87	414.45	412.27		426.63	431.16
Scaled Score Standard Deviation	31.64	35.69	31.68		26.82	42.48
Scaled Score SEM	11.15	11.09	11.42		9.66	13.14
Reliability	0.88	0.90	0.87		0.87	0.90

Table 3 – Summary of Parameters from the May 2010 Administration of the Ohio Achievement Assessments for Grades 7 and 8.

Parameter	Grade 7			Grade 8			
	Reading	Math	Writing	Reading	Math	Science	Social Studies
N-count	130,739	130,264	Not Tested in 2010	131,214	130,786	131,165	Not Tested in 2010
Max Raw Score	47	50		48	46	48	
Max Scaled Score	542	569		543	563	559	
Min Scaled Score	263	275		262	281	253	
Raw Score Mean	27.21	24.16		31.13	22.41	24.62	
Raw Score Standard Deviation	8.99	10.75		9.12	9.36	9.27	
Raw Score SEM	3.22	3.37		3.21	3.00	3.22	
Scaled Score Mean	423.64	418.28		424.57	416.30	411.02	
Scaled Score Standard Deviation	28.47	33.26		29.87	30.67	31.59	
Scaled Score SEM	10.21	10.42		10.52	9.83	10.96	
Reliability	0.87	0.90		0.88	0.90	0.88	

Table 4 - Percentage of Students at Each Performance Level for Grades 3 and 4, May 2010 Administration.

	Grade 3		Grade 4		
	Reading	Math	Reading	Math	Writing
Standard	Percent	Percent	Percent	Percent	Percent
Advanced	38.6	20.6	5.0	21.9	Not Tested in 2010
Accelerated	23.2	20.4	31.0	22.4	
Proficient	16.9	36.0	45.6	32.2	
Basic	11.3	15.0	10.6	15.6	
Limited	10.0	7.9	7.9	7.9	

Table 5 - Percentage of Students at Each Performance Level for Grades 5 and 6, May 2010 Administration.

	Grade 5				Grade 6	
	Reading	Math	Science	Social Studies	Reading	Math
Standard	Percent	Percent	Percent	Percent	Percent	Percent
Advanced	6.3	26.7	14.6	Not Tested in 2010	14.4	33.93
Accelerated	13.4	14.4	30.7		28.2	20.9
Proficient	52.1	26.1	24.8		42.2	22.8
Basic	12.8	15.1	24.1		10.2	12.5
Limited	15.3	17.8	5.8		5.1	9.8

Table 6 - Percentage of Students at Each Performance Level for Grades 7 and 8, May 2010 Administration.

	Grade 7			Grade 8			
	Reading	Math	Writing	Reading	Math	Science	Social Studies
Standard	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Advanced	16.9	13.6	Not Tested in 2010	19.6	9.8	16.6	Not Tested in 2010
Accelerated	27.2	17.1		26.8	21.8	16.5	
Proficient	36.4	40.5		35.0	37.8	31.8	
Basic	13.1	17.6		12.9	19.4	28.3	
Limited	6.4	11.2		5.9	11.3	6.8	

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

Ohio uses the Rasch model (a single parameter logistic model) for computing item difficulties and student abilities. The Rasch model is based on the probabilities that examinees answered each item correctly. This model is used because of its widespread acceptance, its ease of use, and commercial availability of software for implementing it. The Rasch model provides estimates of the difficulties of each item on a linear scale in log-odds units, or logits.

Equating and Test Form Construction

Equating is a process where test forms comprised of different items are calibrated to the same performance standards. Because each test form is made up of items that have been field-tested, item difficulty estimates from the field test administration are used to pre-equate operational forms during form construction so that operational test forms are of approximately equal difficulty for each administration.

Common Item Equating

Following administration of the May 2010 Achievement Assessments, item difficulty values were estimated using an early return sample for all grades. The early return sample was selected to be statistically representative of all Ohio public school students. Because item difficulty estimates were available from field tests, all the operational items could potentially serve as anchor items in the equating process.

Calibrating, equating and linking proceeded through four steps. First, the current administration difficulty values (from the early return sample) were computed and compared with the “bank” or reference difficulty values. The mean difference between the current and the bank difficulties of the anchor items is called the equating constant. Second, the equating constant was added to each difficulty value for items on the current test so that the mean item difficulties were equal. In step three, the “linked” current values were compared with the bank values to identify the item with the largest absolute difference between the two values. If the absolute value of the difference is greater than 0.3 logits, the item was eliminated as an anchor item. Fourth, this procedure was repeated until the largest difference between a linked current value and bank value was less than 0.3 logits. This procedure ensured that the items used to anchor the operational test to the reference scale were stable. When the equating process was complete, item difficulties from the current administration were calibrated to the same scale as the items used in setting performance standards.

Scaling

Ohio performance standards are expressed in scaled scores. Scaled scores are invariant while raw scores reflect minor differences in the difficulty of test items in any test administration. A scaled score of 400 for the May administration is the same as a scaled score of 400 from the October administration in terms of overall performance, but the number of raw score points corresponding to a 400 may shift slightly from administration to administration.

After the May 2010 operational test administration, test items were calibrated and test forms were equated. Rasch ability estimates (called theta scores) were computed for each

possible raw score. The Rasch ability estimates were then transformed to the appropriate Ohio Achievement Assessment scaled scores, all of which are calibrated so that the proficient standard is equal to a scaled score of 400.

Ohio Rounding Rule

Raw scores are integers that rarely have associated integer scaled scores at the points used to define Ohio performance standards. Therefore Ohio uses a rounding rule to match the raw score with the scaled score nearest the performance standard (e.g. 400 scaled score for Proficient) to establish the raw score cut points (e.g. Proficient). For example, if a raw score of 31 is associated with an observed scaled score of 399.14, and 399.14 is the closest observed scaled score to the proficient level performance standard, the scaled score is rounded up to 400. For that test, an examinee must have a raw score of 31 or more to be judged proficient.

If the closest scaled score value for an integer raw score exceeds the standard, then that raw score serves as the raw score cut point. For example, suppose that a raw score of 30 produces a rounded scaled score of 398 and a raw score of 31 produces a rounded scaled score of 401. The cut would be 31 raw score points.

Table 7 - Cut Score Points for Basic, Proficient, Accelerated, and Advanced Standards, May 2010 Administration

Grade	Subject	Score	Limited	Basic	Proficient	Accelerated	Advanced
3	Reading	Raw	< 24	24	31	37	42
		Scaled	< 385	385	400	415	432
	Math	Raw	< 25	25	33	42	46
		Scaled	< 378	378	400	429	447
4	Reading	Raw	< 16	16	22	36	44
		Scaled	< 384	384	400	435	467
	Math	Raw	< 17	17	25	35	41
		Scaled	< 377	377	400	432	452
	Writing	Raw	Not Tested in 2010				
		Scaled	-	-	-	-	-
5	Reading	Raw	< 21	21	26	39	43
		Scaled	< 384	384	400	441	459
	Math	Raw	< 17	17	23	32	37
		Scaled	< 382	382	400	424	439
	Science	Raw	< 13	13	24	31	39
		Scaled	< 363	363	400	417	448
	Social Studies	Raw	Not Tested in 2010				
		Scaled	-	-	-	-	-

- Notes:
1. The raw score cuts apply to the May 2010 administration only.
 2. The scaled scores reported in Tables 7 and 8 are the invariant cut scores that are applied to every test administration. Any apparent discrepancies between the cut scores in Tables 7 and 8 and Tables 12, 13 and 14 occur because the scaled score cuts shown in Tables 7 and 8 may not have occurred during the May 2010 test administration.

Table 8 - Cut Score Points for Basic, Proficient, Accelerated, and Advanced Standards, May 2010 Administration

Grade	Subject	Score	Limited	Basic	Proficient	Accelerated	Advanced
6	Reading	Raw	< 10	10	15	29	37
		Scaled	< 380	380	400	436	456
	Math	Raw	< 13	13	19	28	35
		Scaled	< 378	378	400	429	448
7	Reading	Raw	< 13	13	19	30	37
		Scaled	< 379	379	400	432	452
	Math	Raw	< 11	11	17	31	38
		Scaled	< 378	378	400	436	458
	Writing	Raw	Not Tested in 2010				
		Scaled	-	-	-	-	-
8	Reading	Raw	< 15	15	23	34	40
		Scaled	< 378	378	400	428	451
	Math	Raw	< 11	11	17	28	36
		Scaled	< 379	379	400	432	459
	Science	Raw	< 11	11	21	30	35
		Scaled	< 365	365	400	427	445
	Social Studies	Raw	Not Tested in 2010				
		Scaled	-	-	-	-	-

- Notes:
1. The raw score cuts apply to the May 2010 administration only.
 2. The scaled scores reported in Tables 7 and 8 are the invariant cut scores that are applied to every test administration. Any apparent discrepancies between the cut scores in Tables 7 and 8 and Tables 12, 13 and 14 occur because the scaled score cuts shown in Tables 7 and 8 may not have occurred during the May 2010 test administration.

Subscale bands

Subscale bands are estimated for all subjects tested. Subscale analysis data are provided for diagnostic purposes.

Table 9 - Subscale Bands for the Minimally Proficient Student in Grades 3 and 4, May 2010 Administration.

	Content Standard	Raw Score Bands			Possible Score
		Below	At or Near Proficient	Above	
Grade 3 Reading	Vocabulary	0 – 7	8 – 10	11	11
	Reading process	0 – 9	10 – 13	14 – 17	17
	Informational text	0 – 5	6 – 8	9 – 10	10
	Literary text	0 – 6	7 – 9	10 – 11	11
Grade 3 Mathematics	Number, Number Sense, and Operations	0 – 7	8 – 10	11 – 16	16
	Measurement	0 – 5	6 – 8	9	9
	Geometry and Spatial Sense	0 – 5	6 – 8	9	9
	Patterns, Function, and Algebra	0 – 5	6 – 8	9	9
	Data Analysis and Probability	0 – 5	6 – 8	9	9
Grade 4 Reading	Vocabulary	0 – 4	5 – 6	7 – 8	8
	Reading process	0 – 8	9 – 11	12 – 17	17
	Informational text	0 – 3	4 – 6	7 – 11	11
	Literary text	0 – 4	5 – 8	9 – 13	13
Grade 4 Mathematics	Number, Number Sense, and Operations	0 – 6	7 – 9	10 – 15	15
	Measurement	0 – 2	3 – 5	6 – 9	9
	Geometry and Spatial Sense	0 – 3	4 – 6	7 – 9	9
	Patterns, Function, and Algebra	0 – 3	4 – 6	7 – 9	9
	Data Analysis and Probability	0 – 5	6 – 8	9 – 10	10
Grade 4 Writing	Not Tested in 2010				

Table 10 - Subscale Bands for the Minimally Proficient Student in Grades 5 and 6, May 2010 Administration.

		Raw Score Bands			
Content Standard		Below	At or Near Proficient	Above	Possible Score
Grade 5 Reading	Vocabulary	0 – 5	6 – 8	9	9
	Reading process	0 – 8	9 – 11	12 – 16	16
	Informational text	0 – 4	5 – 7	8 – 13	13
	Literary text	0 – 5	6 – 8	9 – 11	11
Grade 5 Mathematics	Number, Number Sense, and Operations	0 – 5	6 – 9	10 – 15	15
	Measurement	0 – 2	3 – 5	6 – 9	9
	Geometry and Spatial Sense	0 – 4	5 – 6	7 – 9	9
	Patterns, Function, and Algebra	0 – 3	4 – 7	8 – 10	10
	Data Analysis and Probability	0 – 3	4 – 6	7 – 9	9
Grade 5 Science	Earth Science	0 – 5	6 – 8	9 – 10	10
	Life Science	0 – 6	7 – 9	10 – 12	12
	Physical Science	0 – 4	5 – 8	9 – 12	12
	Scientific Processes	0 – 6	7 – 9	10 – 14	14
Grade 5 Social Studies	Not Tested in 2010				
Grade 6 Reading	Vocabulary	0 – 2	3 – 5	6 – 8	8
	Reading process	0 – 3	4 – 6	7 – 12	12
	Informational text	0 – 3	4 – 6	7 – 14	14
	Literary text	0 – 3	4 – 7	8 – 15	15
Grade 6 Mathematics	Number, Number Sense, and Operations	0 – 5	6 – 8	9 – 14	14
	Measurement	0 – 2	3 – 5	6 – 8	8
	Geometry and Spatial Sense	0 – 2	3 – 5	6 – 9	9
	Patterns, Function, and Algebra	0 – 3	4 – 6	7 – 11	11
	Data Analysis and Probability	0 – 2	3 – 5	6 – 8	8

Table 11 - Subscale Bands for the Minimally Proficient Student in Grades 7 and 8, May 2010 Administration.

		Raw Score Bands			Possible Score
Content Standard		Below	At or Near Proficient	Above	
Grade 7 Reading	Vocabulary	0 – 4	5 – 7	8	8
	Reading process	0 – 3	4 – 6	7 – 12	12
	Informational text	0 – 3	4 – 7	8 – 14	14
	Literary text	0 – 4	5 – 8	9 – 13	13
Grade 7 Mathematics	Number, Number Sense, and Operations	0 – 2	3 – 5	6 – 11	11
	Measurement	0 – 2	3 – 5	6 – 10	10
	Geometry and Spatial Sense	0 – 3	4 – 6	7 – 10	10
	Patterns, Function, and Algebra	0 – 2	3 – 6	7 – 10	10
	Data Analysis and Probability	0 – 2	3 – 5	6 – 9	9
Grade 7 Writing	Not Tested in 2010				
Grade 8 Reading	Vocabulary	0 – 3	4 – 6	7 – 9	9
	Reading process	0 – 4	5 – 7	8 – 12	12
	Informational text	0 – 6	7 – 10	11 – 14	14
	Literary text	0 – 5	6 – 8	9 – 13	13
Grade 8 Mathematics	Number, Number Sense, and Operations	0 – 2	3 – 5	6 – 10	10
	Measurement	0 – 2	3 – 4	5 – 8	8
	Geometry and Spatial Sense	0 – 3	4 – 5	6 – 8	8
	Patterns, Function, and Algebra	0 – 3	4 – 6	7 – 11	11
	Data Analysis and Probability	0 – 3	4 – 6	7 – 9	9
Grade 8 Science	Earth Science	0 – 5	6 – 9	10 – 13	13
	Life Science	0 – 5	6 – 8	9 – 12	12
	Physical Science	0 – 4	5 – 7	8 – 11	11
	Scientific Processes	0 – 3	4 – 6	7 – 12	12
Grade 8 Social Studies	Not Tested in 2010				

Tables of Concordance between Raw Scores and Cut Scores

Tables 12, 13 and 14 provide the concordance between raw scores and scaled scores for all tests in the May 2010 administration of the Ohio Achievement Assessments¹.

Table 12 - Raw Score to Scaled Score Conversion Grades 3 and 4, May 2010 Administration.

Scaled Scores Corresponding to Raw Score Points for Each Grade and Subject					
Raw Score	Grade 3		Grade 4		
	Reading	Math	Reading	Math	Writing
0	265	234	265	233	Not Tested In 2010
1	283	255	286	257	
2	302	276	307	282	
3	313	289	320	296	
4	321	298	329	308	
5	328	306	337	317	
6	333	313	344	324	
7	338	318	349	331	
8	342	324	354	337	
9	346	328	359	343	
10	350	333	363	348	
11	353	337	367	352	
12	356	340	370	357	
13	359	344	374	361	
14	362	347	377	365	
15	365	351	380	369	
16	367	354	384	372	
17	370	357	386	377	
18	372	360	389	379	
19	374	363	391	383	
20	377	365	394	386	
21	379	368	397	389	
22	381	371	400	392	
23	383	373	402	395	
24	385	376	404	398	
25	387	379	407	401	
26	389	381	409	404	
27	391	384	411	407	
28	393	387	414	410	
29	395	389	416	413	
30	398	392	419	416	
31	400	395	421	418	
32	402	397	424	421	

¹ Some students were administered a breach form to remedy some inadvertent testing irregularity. Students taking irregular forms may have different tables of concordance than those reported here as Tables 12 - 14.

**Table 12 - Raw Score to Scaled Score Conversion Grades 3 and 4,
May 2010 Administration (continued).**

Scaled Scores Corresponding to Raw Score Points for Each Grade and Subject					
Raw Score	Grade 3		Grade 4		
	Reading	Math	Reading	Math	Writing
33	404	400	427	424	Not Tested In 2010
34	407	403	429	427	
35	409	406	432	432	
36	411	409	435	433	
37	415	412	438	437	
38	417	416	441	440	
39	420	419	444	443	
40	423	422	448	447	
41	426	426	452	452	
42	432	430	456	455	
43	435	434	461	460	
44	440	438	467	465	
45	446	443	474	470	
46	454	448	482	476	
47	465	453	494	484	
48	483	460	513	493	
49	501	468	533	504	
50		478		519	
51		496		543	
52		513		568	

**Table 13 - Raw Score to Scaled Score Conversion Grades 5 and 6,
May 2010 Administration.**

Scaled Scores Corresponding to Raw Score Points for Each Grade and Subject						
Raw Score	Grade 5				Grade 6	
	Reading	Math	Science	Social Studies	Reading	Math
0	239	247	241	Not Tested In 2010	282	240
1	262	270	264		304	267
2	284	294	287		326	294
3	297	308	301		339	310
4	307	318	312		348	321
5	315	326	320		356	331
6	322	333	327		363	339
7	328	340	333		368	346
8	334	345	339		373	352
9	339	350	344		378	358
10	343	355	349		382	363
11	348	359	353		386	368
12	352	363	358		390	372
13	356	367	363		393	378
14	359	371	366		396	381
15	363	375	369		400	385
16	366	378	373		402	389
17	370	382	376		405	392
18	373	385	380		408	396
19	376	388	383		410	400
20	380	391	386		413	403
21	384	394	390		416	406
22	386	397	393		418	409
23	389	400	396		420	412
24	392	403	400		423	415
25	396	406	402		425	418
26	400	409	404		428	422
27	402	412	407		430	425
28	405	415	410		432	429
29	408	417	413		436	431
30	411	420	416		437	434
31	415	423	418		440	437
32	418	426	421		442	440
33	421	428	424		445	443
34	424	431	428		447	446
35	428	434	431		450	450
36	431	436	434		453	454
37	435	439	438		456	458
38	438	442	442	459	462	

**Table 13 - Raw Score to Scaled Score Conversion Grades 5 and 6,
May 2010 Administration (continued).**

Scaled Scores Corresponding to Raw Score Points for Each Grade and Subject						
Raw Score	Grade 5				Grade 6	
	Reading	Math	Science	Social Studies	Reading	Math
39	442	445	448	Not Tested In 2010	463	466
40	446	448	451		466	471
41	451	451	456		470	477
42	456	455	462		475	482
43	462	458	469		480	489
44	468	462	477		486	496
45	476	467	487		493	505
46	485	472	501		501	515
47	499	478	524		513	528
48	520	485	547		534	546
49	542	494			554	576
50		507				606
51		529				
52		551				

**Table 14 - Raw Score to Scaled Score Conversion Grades 7 and 8,
May 2010 Administration.**

Scaled Scores Corresponding to Raw Score Points for Each Grade and Subject							
Raw Score	Grade 7			Grade 8			Social Studies
	Reading	Math	Writing	Reading	Math	Science	
0	263	275	Not Tested In 2010	262	281	253	Not Tested In 2010
1	285	297		284	301	276	
2	307	319		306	321	299	
3	321	333		319	334	313	
4	331	343		328	343	323	
5	339	350		336	350	332	
6	347	357		342	357	339	
7	353	363		348	362	345	
8	358	368		353	367	351	
9	363	372		357	372	356	
10	368	376		361	376	361	
11	372	380		365	380	365	
12	377	384		369	384	369	
13	380	387		372	388	373	
14	384	390		375	391	377	
15	388	393		378	395	381	
16	391	396		381	398	384	
17	394	400		384	401	388	
18	397	402		387	404	391	
19	400	405		390	407	394	
20	403	407		392	410	397	
21	406	410		395	413	400	
22	409	412		397	416	404	
23	412	415		400	418	407	
24	415	417		402	421	410	
25	417	420		405	424	413	
26	420	423		407	427	415	
27	423	425		410	430	418	
28	425	428		413	433	421	
29	428	430		415	436	424	
30	432	433		418	439	427	
31	434	436		421	442	431	
32	436	439		423	445	434	
33	439	441		426	448	437	
34	442	444		429	451	440	
35	445	448		432	454	445	
36	449	451		436	459	447	
37	452	454		439	462	451	
38	456	458	443	466	455		

**Table 14 - Raw Score to Scaled Score Conversion Grades 7 and 8,
May 2010 Administration. (continued)**

Scaled Scores Corresponding to Raw Score Points for Each Grade and Subject							
Raw Score	Grade 7			Grade 8			
	Reading	Math	Writing	Reading	Math	Science	Social Studies
39	460	461	Not Tested In 2010	447	470	459	Not Tested In 2010
40	464	465		451	475	464	
41	469	470		456	482	469	
42	475	475		462	489	475	
43	481	480		468	499	482	
44	490	486		476	514	490	
45	502	492		486	538	500	
46	522	500		499	563	514	
47	542	510		521		536	
48		524		543		559	
49		546					
50		569					
51							
52							