Kansas Assessment Program Technical Manual Addendum 2018

University of Kansas Achievement & Assessment Institute

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This technical manual addendum is an update of 2017 KAP technical manual. It provides statistical information based on the spring 2018 administration of ELA, mathematics, science, and HGSS. For more details, refer to the previous year's technical manual.

I. Test Sample

Table I-1. *Test Sample for 2018 Administration*

Grade	ELA	Mathematics	Science	HGSS
3	37,579	37,641		
4	38,440	38,493		
5	38,374	38,413	38,458	
6	37,447	37,487		37,448
7	36,754	36,784		
8	36,832	36,870	36,934	36,815
HS	35,651	35,658	34,314	34,248

II. Item Analysis

II-1. Classical Item Statistics

Table II-1. *Classical Item Difficulties for ELA*

Grade	No. of items	M	SD	Min.	P_{25}	Median	P_{75}	Max.
3	83	0.51	0.16	0.14	0.40	0.53	0.61	0.85
4	79	0.51	0.17	0.16	0.39	0.49	0.63	0.92
5	77	0.52	0.14	0.15	0.46	0.53	0.63	0.78
6	85	0.53	0.18	0.14	0.41	0.55	0.66	0.88
7	74	0.54	0.17	0.22	0.44	0.50	0.65	0.94
8	80	0.55	0.17	0.10	0.47	0.57	0.66	0.81
10	65	0.55	0.17	0.02	0.44	0.56	0.65	0.86

Table II-2. *Classical Item Difficulties for Mathematics*

Grade	No. of items	M	SD	Min.	P_{25}	Median	P_{75}	Max.
3	88	0.53	0.2	0.09	0.38	0.53	0.68	0.91
4	80	0.54	0.17	0.07	0.42	0.57	0.66	0.86
5	87	0.48	0.17	0.09	0.37	0.49	0.60	0.81
6	85	0.47	0.16	0.07	0.39	0.48	0.56	0.82
7	80	0.48	0.14	0.10	0.38	0.47	0.58	0.77
8	83	0.46	0.18	0.02	0.34	0.49	0.59	0.89
10	83	0.46	0.18	0.05	0.35	0.47	0.57	0.95

Table II-3. *Classical Item Difficulties for Science*

Grade	No. of items	M	SD	Min.	P_{25}	Median	P_{75}	Max.
5	50	0.56	0.17	0.24	0.42	0.56	0.70	0.90
8	58	0.51	0.12	0.26	0.43	0.51	0.60	0.77
11	55	0.49	0.14	0.18	0.40	0.52	0.58	0.78

Table II-4. *Classical Item Difficulties for HGSS*

Grade	No. of items	M	SD	Min.	P_{25}	Median	P_{75}	Max.
6	10	0.49	0.17	0.22	0.43	0.51	0.58	0.75
8	8	0.54	0.17	0.23	0.50	0.59	0.67	0.70
11	11	0.56	0.12	0.31	0.49	0.58	0.64	0.71

Table II-5. *Classical Item Discrimination for ELA*

Grade	No. of items	*M*	*SD*	Min.	P_{25}	Median	P_{75}	Max.
3	83	0.37	0.09	0.11	0.31	0.37	0.41	0.57
4	79	0.35	0.09	0.09	0.30	0.36	0.41	0.58
5	77	0.34	0.09	0.10	0.29	0.35	0.40	0.53
6	85	0.36	0.08	0.18	0.30	0.37	0.43	0.56
7	74	0.33	0.08	0.15	0.27	0.32	0.39	0.56
8	80	0.33	0.11	-0.05	0.24	0.34	0.42	0.53
10	65	0.37	0.12	0.14	0.30	0.36	0.44	0.64

Table II-6. *Classical Item Discrimination for Mathematics*

Grade	No. of items	*M*	*SD*	Min.	P_{25}	Median	P_{75}	Max.
3	88	0.39	0.10	0.16	0.32	0.39	0.46	0.58
4	80	0.40	0.09	0.23	0.34	0.39	0.48	0.61
5	87	0.38	0.09	0.14	0.32	0.39	0.46	0.59
6	85	0.39	0.09	0.16	0.33	0.38	0.45	0.57
7	80	0.36	0.10	0.13	0.30	0.36	0.42	0.56
8	83	0.37	0.09	0.10	0.32	0.39	0.43	0.56
10	83	0.36	0.10	0.05	0.30	0.38	0.43	0.56

Table II-7. *Classical Item Discrimination for Science*

Grade	No. of items	*M*	*SD*	Min.	P_{25}	Median	P_{75}	Max.
5	50	0.36	0.09	0.09	0.31	0.38	0.43	0.51
8	58	0.33	0.08	0.08	0.28	0.33	0.40	0.49
11	55	0.34	0.11	0.09	0.26	0.37	0.43	0.53

Table II-8. *Classical Item Discrimination for HGSS*

Grade	No. of items	*M*	*SD*	Min.	P_{25}	Median	P_{75}	Max.
6	10	0.48	0.08	0.33	0.46	0.47	0.53	0.60
8	8	0.49	0.06	0.37	0.48	0.51	0.52	0.54
11	11	0.45	0.08	0.29	0.41	0.44	0.49	0.59

II-2. IRT Item Statistics

Table II-9. *IRT Item Difficulty for ELA*

Grade	No. of *b* parameters	*M*	*SD*	Min.	Q1	Median	Q3	Max.
3	98	-0.33	1.30	-4.80	-1.08	-0.37	0.40	2.50
4	92	-0.64	1.27	-3.87	-1.56	-0.71	0.13	3.15
5	88	-0.31	1.29	-4.69	-0.98	-0.50	0.50	2.58
6	105	-0.85	1.55	-4.27	-1.89	-0.92	0.13	3.48
7	97	-0.21	2.03	-5.03	-1.26	-0.64	0.82	7.94
8	101	-0.48	1.47	-5.55	-1.18	-0.52	0.35	2.92
10	99	-0.41	1.51	-3.86	-1.39	-0.51	0.42	4.26

Note. b = difficulty parameter; Q1 = first quartile; Q3 = third quartile.

Table II-10. *IRT Item Difficulty for Mathematics*

Grade	No. of *b* parameters	*M*	*SD*	Min.	Q1	Median	Q3	Max.
3	101	-0.02	1.36	-3.21	-0.96	0.02	0.74	3.38
4	114	-0.10	1.39	-3.45	-1.00	-0.10	0.81	4.08
5	109	-0.01	1.32	-3.65	-0.65	0.04	0.96	3.38
6	96	0.07	1.43	-6.60	-0.54	0.06	0.91	6.02
7	107	0.00	1.73	-4.98	-0.78	0.19	1.11	4.55
8	115	-0.02	2.02	-6.28	-0.90	0.10	1.31	5.00
10	107	0.38	1.73	-4.29	-0.52	0.30	1.35	5.54

Note. b = difficulty parameter; Q1 = first quartile; Q3 = third quartile.

Table II-11. *IRT Item Difficulty for Science*

Grade	No. of *b* parameters	*M*	*SD*	Min.	Q1	Median	Q3	Max.
5	53	-0.59	1.49	-5.10	-1.32	-0.54	0.32	2.91
8	68	-0.54	1.87	-6.09	-1.02	-0.18	0.40	3.04
11	56	0.34	2.51	-4.50	-0.66	-0.23	1.12	15.09

Note. b = difficulty parameter; Q1 = first quartile; Q3 = third quartile.

Table II-12. *IRT Item Discrimination for ELA*

Grade	No. of *a* parameters	*M*	*SD*	Min.	Q1	Median	Q3	Max.
3	83	1.04	0.36	0.26	0.77	1.00	1.31	1.92
4	79	0.99	0.34	0.34	0.76	0.91	1.22	1.99
5	77	0.91	0.33	0.40	0.70	0.90	1.06	2.43
6	85	1.00	0.34	0.36	0.78	0.96	1.14	2.01
7	74	0.89	0.41	0.26	0.59	0.80	1.18	2.11
8	80	0.91	0.35	0.29	0.67	0.91	1.08	2.00
10	73	0.96	0.32	0.35	0.73	0.95	1.14	2.21

Note. a = discrimination parameter; Q1 = first quartile; Q3 = third quartile.

Table II-13. *IRT Item Discrimination for Mathematics*

Grade	No. of *a* parameters	*M*	*SD*	Min.	Q1	Median	Q3	Max.
3	88	1.17	0.36	0.51	0.92	1.14	1.40	2.11
4	80	1.15	0.35	0.64	0.85	1.09	1.34	2.02
5	87	1.20	0.31	0.38	1.01	1.17	1.41	1.97
6	85	1.17	0.44	0.36	0.86	1.11	1.44	2.36
7	80	0.99	0.34	0.32	0.76	0.94	1.21	1.93
8	83	1.02	0.36	0.41	0.75	0.96	1.19	2.04
10	83	1.01	0.38	0.33	0.77	0.91	1.26	2.17

Note. a = discrimination parameter; Q1 = first quartile; Q3 = third quartile.

Table II-14. *IRT Item Discrimination for Science*

Grade	No. of *a* parameters	*M*	*SD*	Min.	Q1	Median	Q3	Max.
5	48	0.83	0.30	0.27	0.66	0.81	1.03	1.51
8	54	0.70	0.22	0.19	0.54	0.70	0.86	1.19
11	52	0.81	0.39	0.10	0.50	0.77	0.97	1.82

Note. a = discrimination parameter; Q1 = first quartile; Q3 = third quartile.

II-3. Cognitive Complexity

Table II-15. *Items by DOK Level*

| | ELA | | | | | Mathematics | | | | | Science | | | | | HGSS | | | | |
| | | DOK (%) | | | | | DOK (%) | | | | | DOK (%) | | | | | DOK (%) | | | |
G	TI	1	2	3	4	TI	1	2	3	4	TI	1	2	3	4	TI	1	2	3	4
3	83	27	65	8	0	88	39	59	2	0										
4	79	23	65	13	0	80	31	63	5	1										
5	77	26	58	16	0	87	39	61	0	0	50	12	42	46	0					
6	85	38	47	15	0	85	40	59	1	0						11	18	36	36	9
7	74	12	70	18	0	80	44	54	3	0										
8	80	25	64	11	0	83	29	65	6	0	58	9	41	48	2	9	22	56	11	11
HS	65	23	72	5	0	83	34	59	7	0	55	2	55	40	4	12	25	42	25	8

Note. G = grade; TI = total number of items.

III. Test Analysis

III-1. Operational Test Results

Table III-1. *Scale-Score Descriptive Statistics for ELA*

Grade	*M*	*SD*	Min.	P_{10}	P_{25}	P_{50}	P_{75}	P_{90}	Max.
3	294.0	29.1	220	257	272	293	313	332	380
4	299.3	27.8	220	264	279	298	318	334	380
5	295.8	29.7	220	257	273	295	316	335	380
6	290.1	29.2	220	252	268	290	310	327	380
7	289.0	31.2	220	250	265	287	310	330	380
8	283.0	28.5	220	247	262	282	302	321	380
10	284.0	29.8	220	245	261	282	304	323	380

Note. P_{10}, P_{25}, P_{50}, P_{75}, and P_{90} = 10th, 25th, 50th, 75th, and 90th percentiles, respectively.

Table III-2. *Scale-Score Descriptive Statistics for Mathematics*

Grade	*M*	*SD*	Min.	P_{10}	P_{25}	P_{50}	P_{75}	P_{90}	Max.
3	302.6	28.0	220	267	282	302	321	339	380
4	292.7	28.3	220	257	271	289	311	330	380
5	290.5	27.5	220	258	269	287	308	328	380
6	290.6	27.0	220	260	271	287	306	327	380
7	287.5	27.6	220	255	267	284	304	326	380
8	283.9	29.4	220	250	262	280	300	325	380
10	285.2	28.6	220	256	265	279	299	325	380

Note. P_{10}, P_{25}, P_{50}, P_{75}, and P_{90} = 10th, 25th, 50th, 75th, and 90th percentiles, respectively.

Table III-3. *Scale-Score Descriptive Statistics for Science*

Grade	*M*	*SD*	Min.	P_{10}	P_{25}	P_{50}	P_{75}	P_{90}	Max.
5	299.0	30.6	220	262	278	297	318	339	380
8	287.5	29.8	220	250	266	285	305	327	380
11	291.2	29.4	220	256	269	287	309	330	380

Note. P_{10}, P_{25}, P_{50}, P_{75}, and P_{90} = 10th, 25th, 50th, 75th, and 90th percentiles, respectively.

Table III-4. *Scale-Score Descriptive Statistics for HGSS*

Grade	*M*	*SD*	Min.	P_{10}	P_{25}	P_{50}	P_{75}	P_{90}	Max.
6	296.7	24.7	236	264	278	296	316	331	359
8	298.0	24.2	227	268	280	297	315	331	362
11	287.9	23.4	225	257	270	287	305	320	340

Note. P_{10}, P_{25}, P_{50}, P_{75}, and P_{90} = 10th, 25th, 50th, 75th, and 90th percentiles, respectively.

Table III-5. *Percentage of Students in Each Performance Level for ELA and Math*

	ELA (%)					Mathematics (%)				
Grade	1	2	3	4	CCR	1	2	3	4	CCR
3	29	31	27	14	**41**	17	30	35	17	**52**
4	16	35	39	10	**49**	18	43	29	10	**39**
5	25	30	29	16	**45**	29	38	22	12	**34**
6	34	27	34	5	**39**	28	40	23	10	**33**
7	34	31	25	9	**34**	22	49	25	4	**29**
8	28	44	23	5	**28**	42	33	19	6	**25**
10	33	37	24	5	**29**	44	32	17	8	**25**

Note. CCR = college and career ready.

Table III-6. *Percentage of Students in Each Performance Level for Science and HGSS*

	Science (%)					HGSS (%)				
Grade	1	2	3	4	CCR	1	2	3	4	CCR
5	23	30	30	16	**46**					
6						12	42	32	13	**45**
8	36	32	22	10	**32**	9	45	41	5	**46**
11	36	28	24	12	**36**	21	47	30	3	**33**

Note. CCR = college and career ready.
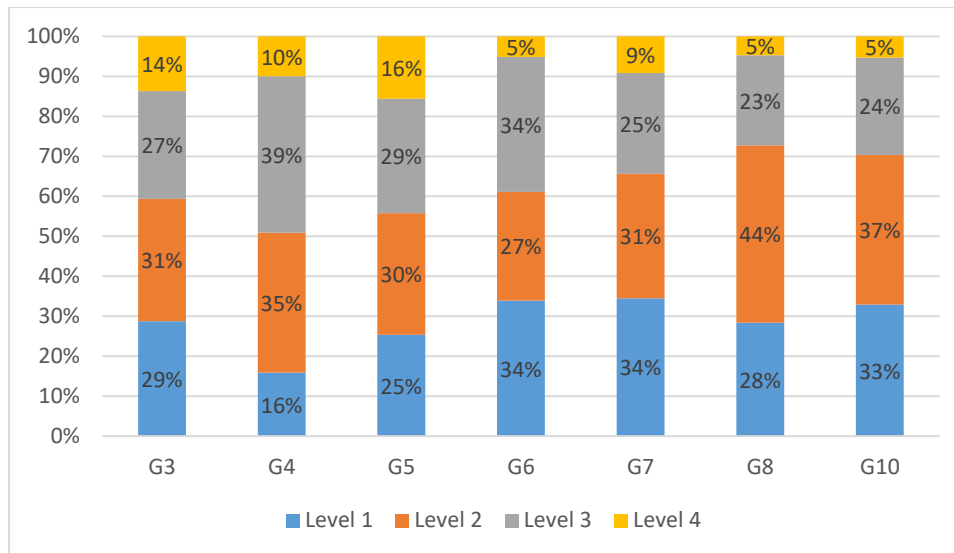
Figure III-1. Performance-level results for ELA.
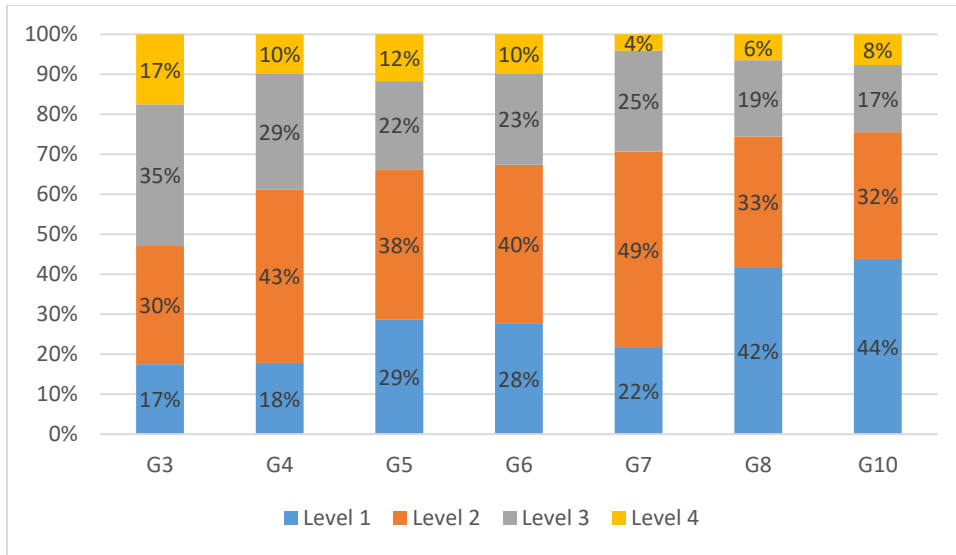
Figure III-2. Performance-level results for mathematics.
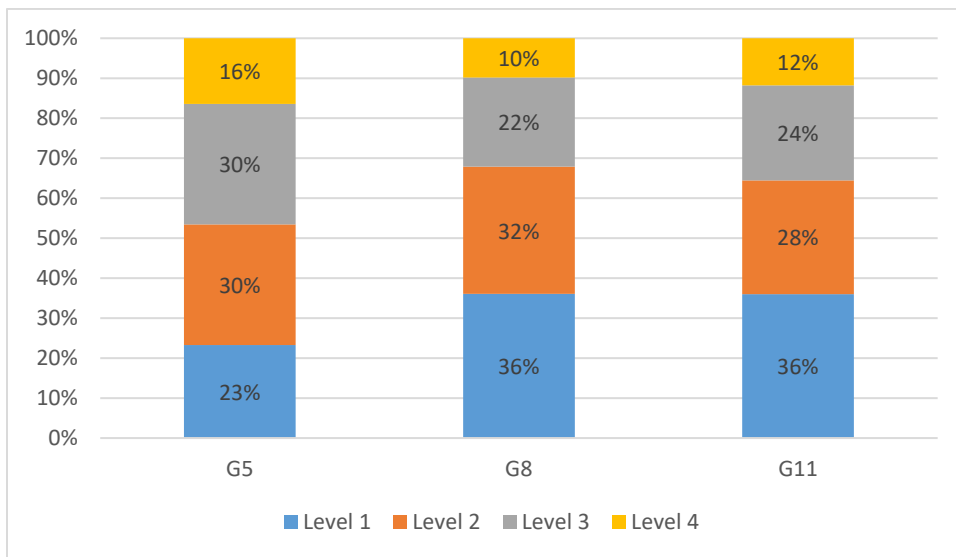
Figure III-3. Performance-level results for science.
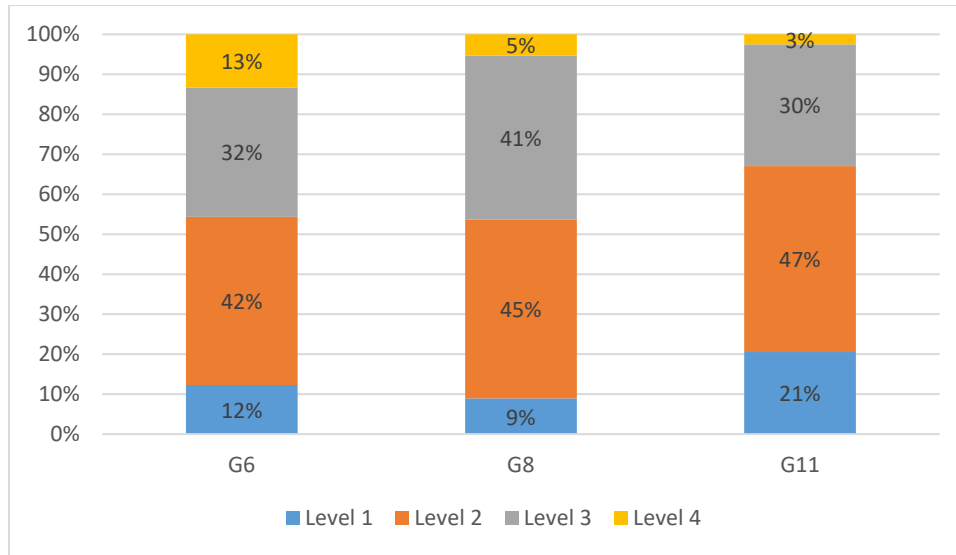
Figure III-4. Performance-level results for HGSS.

III-2. Test Result Trends

Table III-7. *Longitudinal Scale-Score Trend for ELA*

	2016			2017			2018		
Grade	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*
3	298.7	28.0	38,370	295.4	28.8	38,340	294.0	29.1	37,579
4	303.0	29.3	37,366	300.5	28.0	38,424	299.3	27.8	38,440
5	298.2	29.3	36,803	297.0	29.9	37,526	295.8	29.7	38,374
6	293.1	28.4	36,732	291.1	28.9	36,858	290.1	29.2	37,447
7	292.7	27.9	36,589	289.7	30.7	36,863	289.0	31.2	36,754
8	286.7	28.5	36,193	284.0	28.4	36,695	283.0	28.5	36,832
10	285.3	29.6	35,653	284.8	29.8	35,673	284.0	29.8	35,651

Table III-8. *Longitudinal Scale-Score Trend for Mathematics*

	2016			2017			2018		
Grade	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*
3	304.3	27.8	38,343	303.2	27.5	38,438	302.6	28.0	37,641
4	293.3	28.2	37,448	293.9	28.2	38,514	292.7	28.3	38,493
5	292.2	27.4	36,806	291.1	27.6	37,608	290.5	27.5	38,413
6	292.2	27.2	36,657	291.3	26.8	36,923	290.6	27.0	37,487
7	289.4	28.4	36,583	288.4	27.7	36,910	287.5	27.6	36,784
8	285.5	28.4	36,169	284.7	29.1	36,758	283.9	29.4	36,870
10	285.0	28.2	36,831	285.6	28.5	35,653	285.2	28.6	35,658

Table III-9. *Longitudinal Scale-Score Trend for Science*

	2017			2018		
Grade	*M*	*SD*	*N*	*M*	*SD*	*N*
5	298.5	30.2	37,619	299.0	30.6	38,458
8	288.4	29.6	36,774	287.5	29.8	36,934
11	291.7	29.1	34,161	291.2	29.4	34,314

Table III-10. *Longitudinal Scale-Score Trend for HGSS*

	2016			2018		
Grade	*M*	*SD*	*N*	*M*	*SD*	*N*
6	296.8	24.7	36,463	296.7	24.7	37,448
8	292.7	24.7	35,851	298.0	24.2	36,815
11	280.3	24.9	33,230	287.9	23.4	34,248
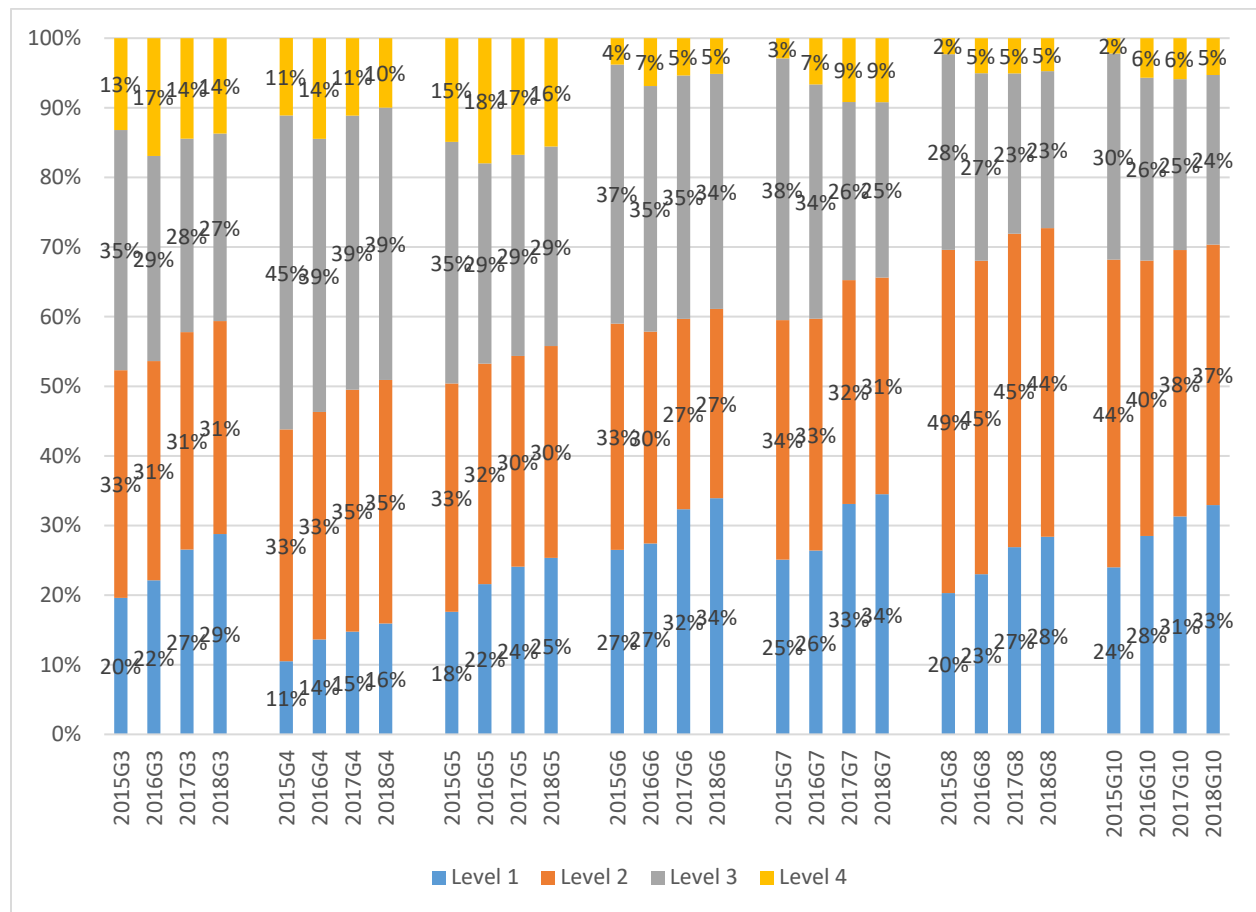
Figure III-5. Performance-level trend for ELA. Column percentages may not total to 100% due to rounding. G = grade.
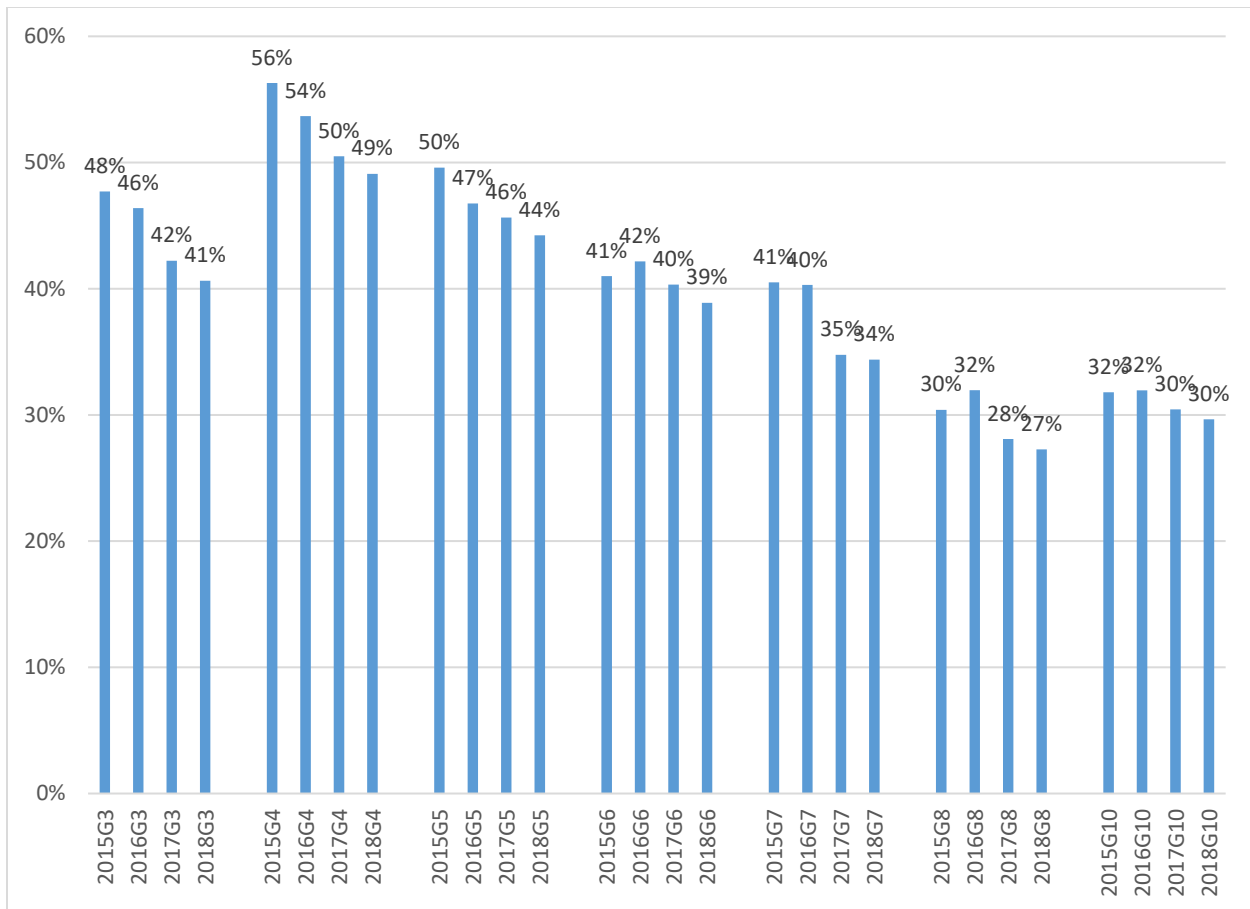
Figure III-6. College-and-career readiness trend for ELA. Students who score at or above the Level 3 cut score are considered to be on target for postsecondary success. G = grade.
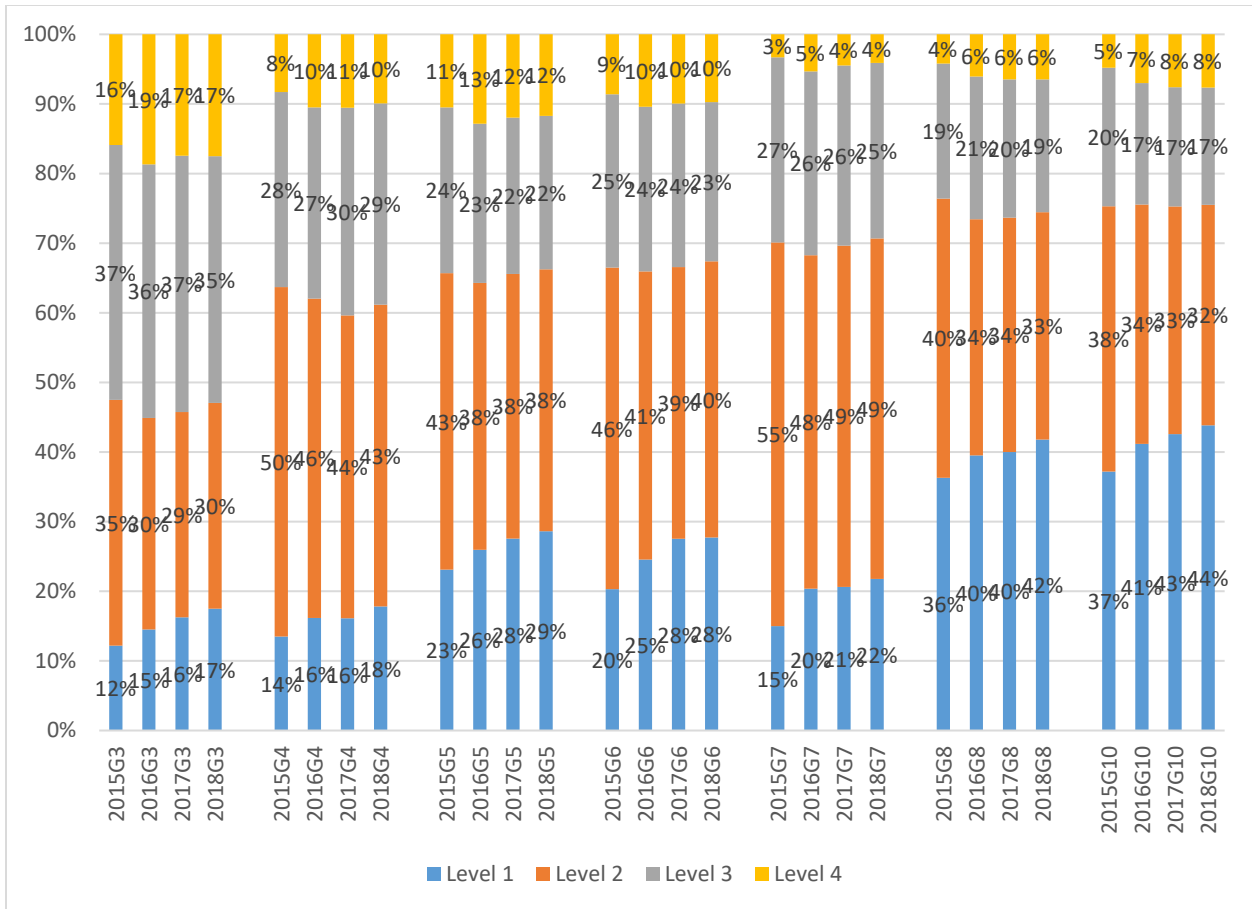
Figure III-7. Performance-level trend for mathematics. Column percentages may not total to 100% due to rounding. G = grade.
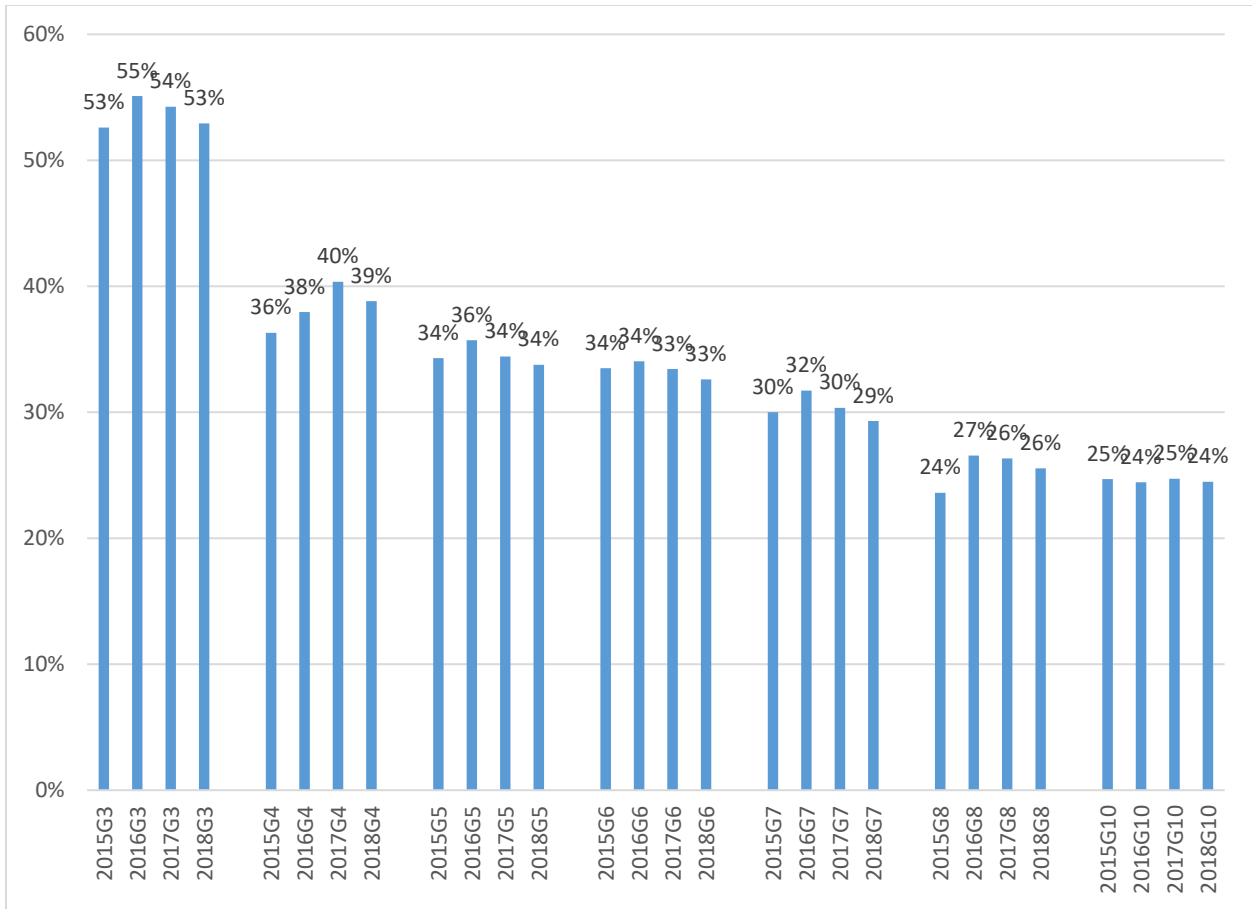
Figure III-8. College-and-career readiness trend for mathematics. Students who score at or above the Level 3 cut score are considered to be on target for postsecondary success. G = grade.
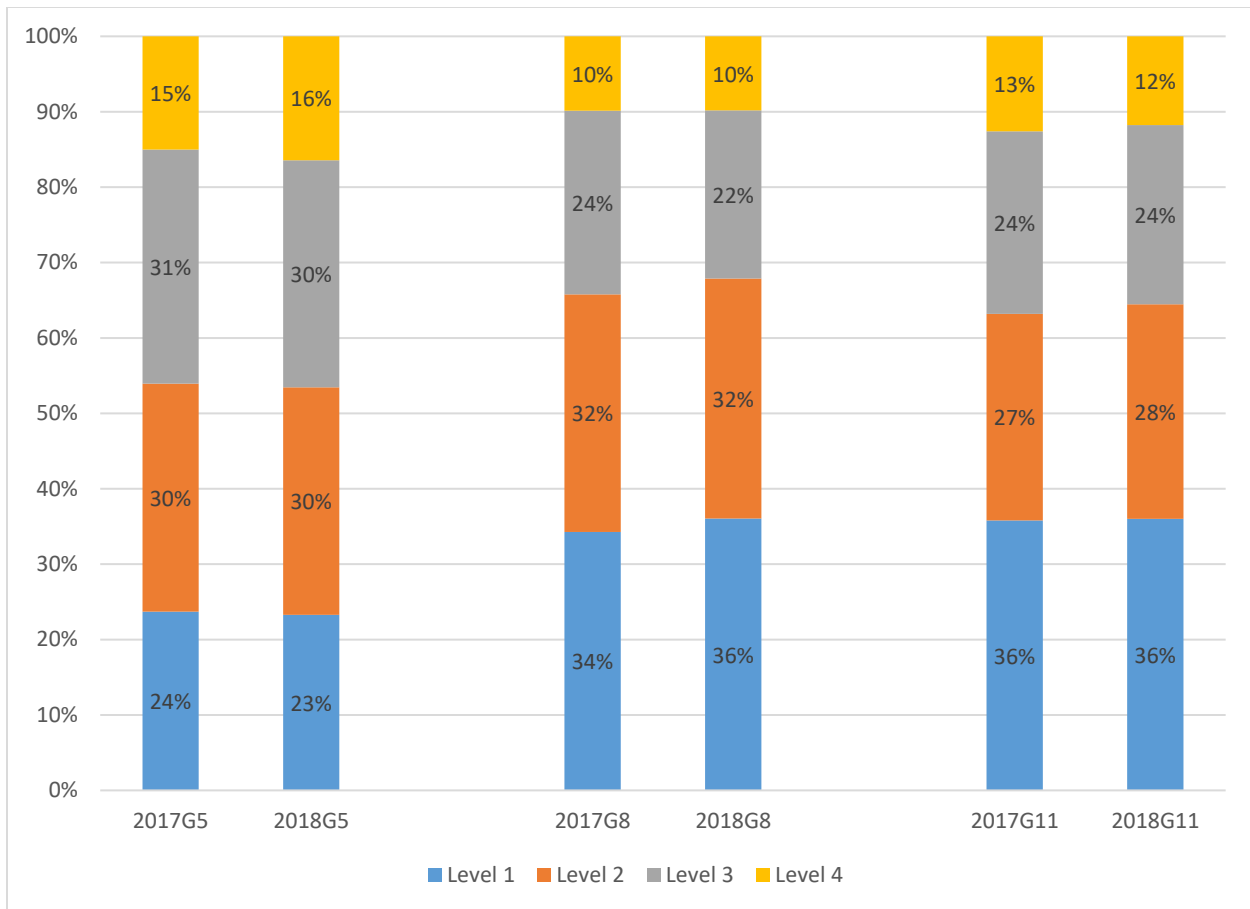
Figure III-9. Performance-level trend for science. Column percentages may not total to 100% due to rounding. G = grade.
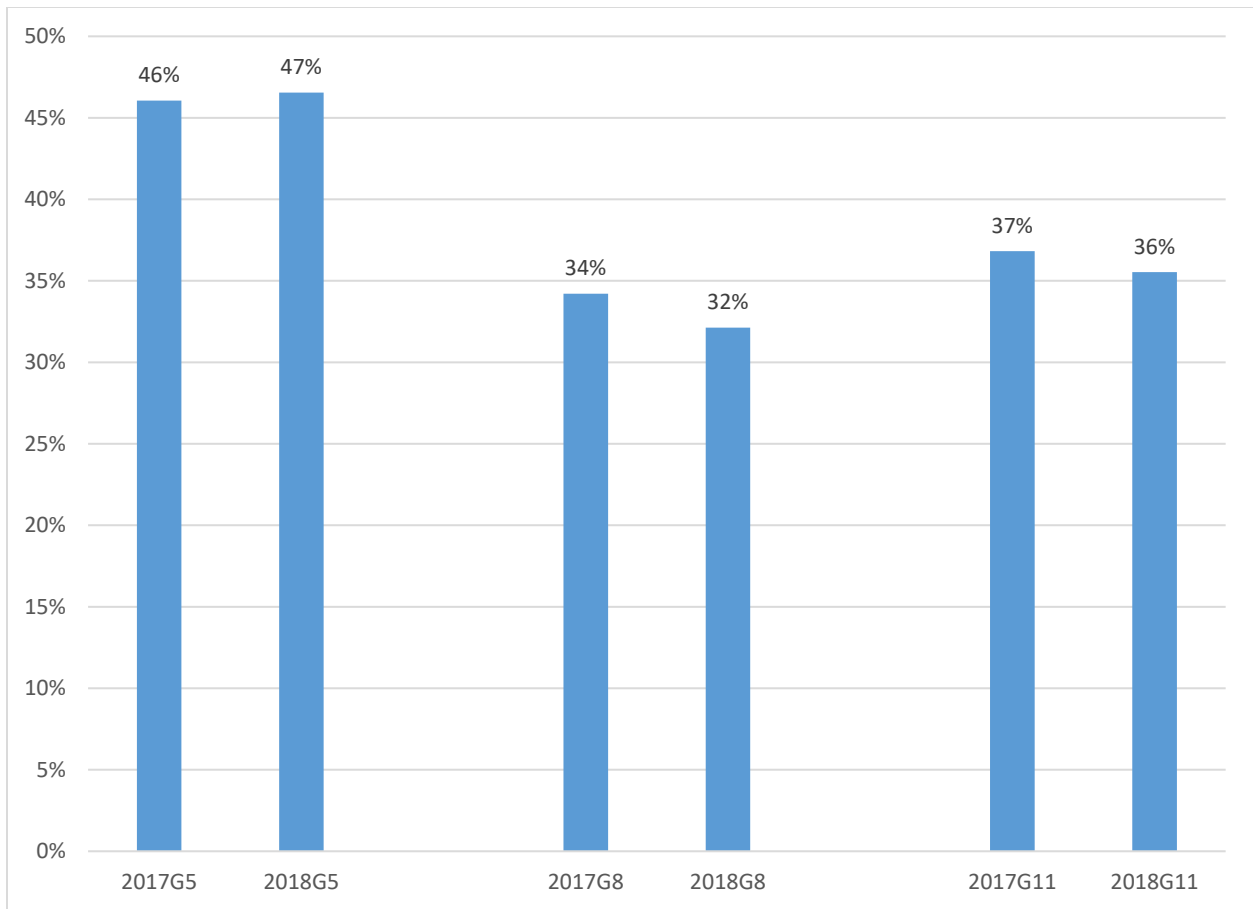
Figure III-10. College-and-career readiness trend for science. Students who score at or above the Level 3 cut score are considered to be on target for postsecondary success. G = grade.
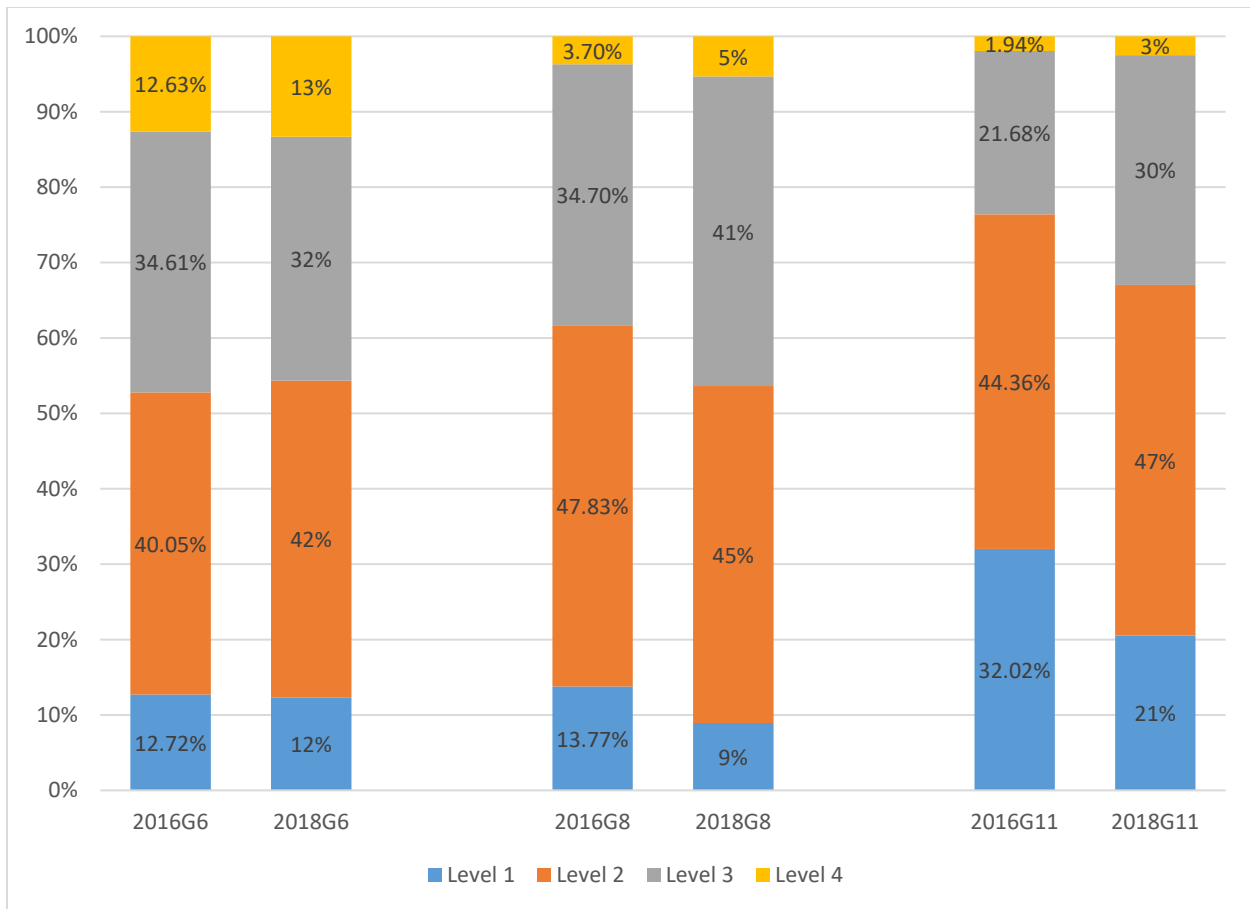
Figure III-11. Performance-level trend for HGSS. Column percentages may not total to 100% due to rounding. G = grade.
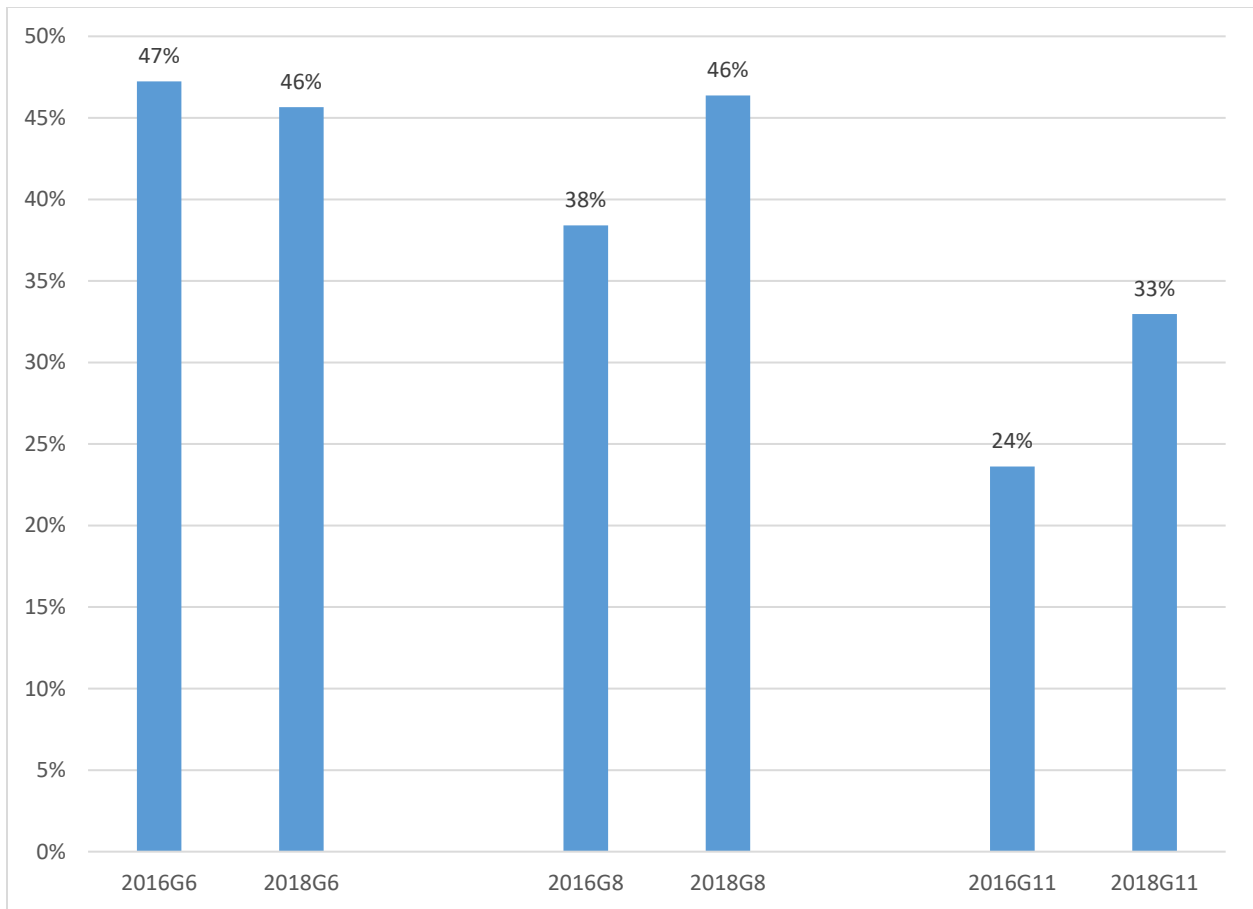
Figure III-12. College-and-career readiness trend for HGSS. Students who score at or above the Level 3 cut score are considered to be on target for postsecondary success. G = grade.

IV. Reliability

For all tables in Section IV, NHPI = Native Hawaiian and Pacific Islander; SWD = students with disabilities; and EL = English learners.

Table IV-1. *Test Reliability*

Grade	Subject			
	ELA	Mathematics	Science	HGSS
3	0.93	0.94		
4	0.90	0.94		
5	0.91	0.94	0.84	
6	0.91	0.94		0.61
7	0.91	0.92		
8	0.90	0.93	0.84	0.51
HS	0.92	0.93	0.86	0.59

Table IV-2. *Classification Consistency and Accuracy*

Grade	Overall		1 vs. 2, 3, 4		1, 2 vs. 3, 4		1, 2, 3 vs. 4	
	C	A	C	A	C	A	C	A
					ELA			
3	0.62	0.8	0.74	0.92	0.78	0.92	0.75	0.95
4	0.57	0.79	0.61	0.93	0.73	0.90	0.69	0.95
5	0.57	0.77	0.70	0.92	0.75	0.91	0.72	0.94
6	0.59	0.79	0.73	0.92	0.74	0.91	0.62	0.96
7	0.59	0.79	0.72	0.91	0.75	0.92	0.69	0.96
8	0.59	0.80	0.69	0.91	0.72	0.92	0.61	0.98
10	0.62	0.81	0.74	0.92	0.74	0.92	0.65	0.98
					Mathematics			
3	0.64	0.81	0.67	0.93	0.80	0.93	0.79	0.96
4	0.65	0.83	0.62	0.93	0.81	0.94	0.78	0.97
5	0.65	0.82	0.72	0.92	0.81	0.94	0.79	0.97
6	0.63	0.82	0.67	0.90	0.82	0.94	0.80	0.98
7	0.60	0.82	0.60	0.90	0.78	0.93	0.72	0.98
8	0.65	0.83	0.75	0.91	0.81	0.95	0.76	0.98
10	0.63	0.82	0.72	0.90	0.82	0.95	0.79	0.98
					Science			
5	0.43	0.69	0.54	0.88	0.67	0.88	0.66	0.93
8	0.45	0.71	0.61	0.88	0.67	0.89	0.62	0.95
11	0.48	0.72	0.60	0.87	0.71	0.90	0.69	0.95
					HGSS			
6	0.27	0.15	0.25	0.89	0.55	0.84	0.35	0.88
8	0.15	0.61	0.05	0.92	0.29	0.74	0.14	0.94
11	0.30	0.66	0.39	0.86	0.47	0.83	0.17	0.97

Note. C = consistency; A = accuracy.

Table IV-3. *Subgroup Reliability and Performance for ELA Grade 3*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	35,193					
Black		2,798	8.0	0.93	277.6	25.7
American Indian		856	2.4	0.93	281.6	24.3
Asian		1,055	3.0	0.92	302.9	30.7
NHPI		102	0.3	0.93	284.8	26.5
White		30,382	86.3	0.93	295.8	28.9
Hispanic	37,566					
Yes		7,680	20.4	0.93	282.2	25.6
No		29,886	79.6	0.93	297.0	29.1
SWD	37,566					
Yes		4,883	13.0	0.93	274.2	26.0
No		32,683	87.0	0.93	296.9	28.3
EL	37,566					
Yes		4,978	13.3	0.93	277.8	23.6
No		32,588	86.7	0.93	296.5	29.0
Gender	37,566					
Male		19,138	50.9	0.93	291.8	29.2
Female		18,428	49.1	0.93	296.2	28.8

Table IV-4. *Subgroup Reliability and Performance for ELA Grade 4*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	35,936					
Black		2,856	7.9	0.91	283.4	25.5
American Indian		995	2.8	0.91	287.9	25.8
Asian		1,069	3.0	0.89	308.7	30.6
NHPI		83	0.2	0.91	294.2	27.5
White		30,933	86.1	0.90	300.9	27.4
Hispanic	38,422					
Yes		7,843	20.4	0.91	288.4	25.0
No		30,579	79.6	0.90	302.0	27.8
SWD	38,422					
Yes		4,905	12.8	0.91	277.9	25.7
No		33,517	87.2	0.90	302.4	26.7
EL	38,422					
Yes		4,884	12.7	0.91	282.8	23.3
No		33,538	87.3	0.90	301.7	27.6
Gender	38,422					
Male		19,466	50.7	0.90	296.8	27.8
Female		18,956	49.3	0.90	301.8	27.6

Table IV-5. *Subgroup Reliability and Performance for ELA Grade 5*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	*SD*
Race	35,912					
Black		2,739	7.6	0.92	279.0	27.1
American Indian		979	2.7	0.92	282.7	25.1
Asian		1,138	3.2	0.90	306.7	32.2
NHPI		101	0.3	0.91	284.9	30.7
White		30,955	86.2	0.91	297.6	29.3
Hispanic	38,360					
Yes		7,615	19.9	0.92	283.9	25.9
No		30,745	80.1	0.91	298.8	29.8
SWD	38,360					
Yes		4,707	12.3	0.92	271.2	24.6
No		33,653	87.7	0.91	299.3	28.7
EL	38,360					
Yes		4,699	12.2	0.92	278.1	24.2
No		33,661	87.8	0.91	298.3	29.5
Gender	38,360					
Male		19,632	51.2	0.91	292.8	29.4
Female		18,728	48.8	0.91	299.0	29.7

Table IV-6. *Subgroup Reliability and Performance for ELA Grade 6*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	*SD*
Race	35,050					
Black		2,721	7.8	0.92	270.1	25.8
American Indian		1,122	3.2	0.92	278.4	26.7
Asian		1,093	3.1	0.90	299.3	30.2
NHPI		87	0.2	0.92	281.6	27.3
White		30,027	85.7	0.91	292.3	28.7
Hispanic	37,440					
Yes		7,520	20.1	0.92	277.9	26.6
No		29,920	79.9	0.91	293.1	29.0
SWD	37,440					
Yes		4,525	12.1	0.92	264.1	25.0
No		32,915	87.9	0.91	293.7	27.8
EL	37,440					
Yes		4,376	11.7	0.92	271.0	25.0
No		33,064	88.3	0.91	292.6	28.7
Gender	37,440					
Male		18,989	50.7	0.91	287.3	29.4
Female		18,451	49.3	0.91	293.0	28.6

Table IV-7. *Subgroup Reliability and Performance for ELA Grade 7*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	*SD*
Race	34,399					
Black		2,559	7.4	0.92	272.2	27.3
American Indian		1,302	3.8	0.92	276.3	27.1
Asian		1,051	3.1	0.89	301.1	33.4
NHPI		83	0.2	0.91	283.2	32.1
White		29,404	85.5	0.91	290.8	30.9
Hispanic	36,743					
Yes		7,209	19.6	0.92	276.9	27.4
No		29,534	80.4	0.90	292.0	31.3
SWD	36,743					
Yes		4,018	10.9	0.93	260.7	24.2
No		32,725	89.1	0.90	292.5	30.2
EL	36,743					
Yes		4,265	11.6	0.93	270.6	25.5
No		32,478	88.4	0.90	291.4	31.0
Gender	36,743					
Male		18,689	50.9	0.91	285.4	31.6
Female		18,054	49.1	0.90	292.8	30.3

Table IV-8. *Subgroup Reliability and Performance for ELA Grade 8*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	*SD*
Race	34,515					
Black		2,541	7.4	0.91	266.2	24.4
American Indian		1,411	4.1	0.91	271.2	25.4
Asian		1,127	3.3	0.89	294.5	31.3
NHPI		110	0.3	0.91	270.8	24.8
White		29,326	85.0	0.90	284.8	28.2
Hispanic	36,821					
Yes		7,205	19.6	0.91	272.3	25.4
No		29,616	80.4	0.90	285.6	28.6
SWD	36,821					
Yes		4,094	11.1	0.92	255.0	20.9
No		32,727	88.9	0.90	286.5	27.4
EL	36,821					
Yes		4,119	11.2	0.91	265.6	23.3
No		32,702	88.8	0.90	285.2	28.4
Gender	36,821					
Male		18,916	51.4	0.91	279.3	28.2
Female		17,905	48.6	0.90	286.9	28.3

Table IV-9. *Subgroup Reliability and Performance for ELA Grade 10*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	*M*	*SD*
Race	33,513					
Black		2,516	7.5	0.93	266.0	26.1
American Indian		1,409	4.2	0.93	271.1	26.2
Asian		1,140	3.4	0.91	290.2	32.5
NHPI		87	0.3	0.92	275.7	29.3
White		28,361	84.6	0.92	286.1	29.5
Hispanic	35,645					
Yes		6,542	18.4	0.93	272.7	27.0
No		29,103	81.6	0.91	286.5	29.8
SWD	35,645					
Yes		3,774	10.6	0.93	255.8	21.6
No		31,871	89.4	0.91	287.3	28.9
EL	35,645					
Yes		3,792	10.6	0.93	264.1	23.6
No		31,853	89.4	0.92	286.3	29.6
Gender	35,645					
Male		18,155	50.9	0.92	279.5	29.9
Female		17,490	49.1	0.91	288.6	29.0

Table IV-10. *Subgroup Reliability and Performance for Mathematics Grade 3*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	*M*	*SD*
Race	35,265					
Black		2,806	8.0	0.94	285.5	23.7
American Indian		861	2.4	0.95	292.1	23.6
Asian		1,085	3.1	0.92	315.2	32.6
NHPI		102	0.3	0.94	293.9	25.6
White		30,411	86.2	0.94	304.4	27.7
Hispanic	37,635					
Yes		7,728	20.5	0.94	291.6	23.8
No		29,907	79.5	0.94	305.4	28.3
SWD	37,635					
Yes		4,877	13.0	0.94	283.6	26.1
No		32,758	87.0	0.94	305.4	27.1
EL	37,635					
Yes		5,083	13.5	0.94	288.8	23.4
No		32,552	86.5	0.94	304.7	28.0
Gender	37,635					
Male		19,177	51.0	0.94	303.6	29.2
Female		18,458	49.0	0.94	301.5	26.6

Table IV-11. *Subgroup Reliability and Performance for Mathematics Grade 4*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	35,999					
Black		2,866	8.0	0.95	274.9	23.4
American Indian		1,000	2.8	0.95	283.1	25.6
Asian		1,084	3.0	0.93	306.8	34.1
NHPI		84	0.2	0.95	287.1	27.7
White		30,965	86.0	0.94	294.5	27.9
Hispanic	38,486					
Yes		7,898	20.5	0.95	281.7	23.9
No		30,588	79.5	0.94	295.5	28.6
SWD	38,486					
Yes		4,901	12.7	0.95	273.3	25.2
No		33,585	87.3	0.94	295.5	27.6
EL	38,486					
Yes		4,980	12.9	0.95	278.1	23.3
No		33,506	87.1	0.94	294.8	28.3
Gender	38,486					
Male		19,493	50.6	0.94	294.2	29.5
Female		18,993	49.4	0.95	291.1	26.8

Table IV-12. *Subgroup Reliability and Performance for Mathematics Grade 5*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	35,964					
Black		2,747	7.6	0.94	274.1	21.7
American Indian		979	2.7	0.95	279.4	22.0
Asian		1,158	3.2	0.93	306.5	33.2
NHPI		101	0.3	0.94	281.7	26.3
White		30,979	86.1	0.94	292.0	27.2
Hispanic	38,408					
Yes		7,652	19.9	0.95	279.6	22.6
No		30,756	80.1	0.94	293.2	28.0
SWD	38,408					
Yes		4,700	12.2	0.94	269.7	21.9
No		33,708	87.8	0.94	293.3	27.0
EL	38,408					
Yes		4,778	12.4	0.94	277.0	22.3
No		33,630	87.6	0.94	292.4	27.7
Gender	38,408					
Male		19,653	51.2	0.94	291.8	29.1
Female		18,755	48.8	0.95	289.0	25.7

Table IV-13. *Subgroup Reliability and Performance for Mathematics Grade 6*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	35,095					
Black		2,716	7.7	0.94	274.6	20.5
American Indian		1,125	3.2	0.94	280.9	21.8
Asian		1,118	3.2	0.92	304.6	34.3
NHPI		88	0.3	0.94	281.7	20.2
White		30,048	85.6	0.94	292.3	26.8
Hispanic	37,484					
Yes		7,564	20.2	0.94	280.3	22.2
No		29,920	79.8	0.94	293.2	27.5
SWD	37,484					
Yes		4,508	12.0	0.94	270.1	19.7
No		32,976	88.0	0.94	293.4	26.7
EL	37,484					
Yes		4,456	11.9	0.94	276.4	21.0
No		33,028	88.1	0.94	292.5	27.2
Gender	37,484					
Male		18,995	50.7	0.93	291.1	28.0
Female		18,489	49.3	0.94	290.1	26.0

Table IV-14. *Subgroup Reliability and Performance for Mathematics Grade 7*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	34,440					
Black		2,555	7.4	0.92	271.0	20.5
American Indian		1,312	3.8	0.93	277.1	21.7
Asian		1,060	3.1	0.91	305.4	34.8
NHPI		82	0.2	0.93	280.0	22.2
White		29,431	85.5	0.92	289.1	27.3
Hispanic	36,776					
Yes		7,267	19.8	0.93	276.9	22.3
No		29,509	80.2	0.92	290.1	28.1
SWD	36,776					
Yes		4,006	10.9	0.92	264.8	19.9
No		32,770	89.1	0.92	290.3	27.1
EL	36,776					
Yes		4,357	11.8	0.92	273.7	22.1
No		32,419	88.2	0.92	289.4	27.7
Gender	36,776					
Male		18,712	50.9	0.92	287.9	28.9
Female		18,064	49.1	0.93	287.1	26.1

Table IV-15. *Subgroup Reliability and Performance for Mathematics Grade 8*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	34,559					
Black		2,530	7.3	0.93	266.3	22.1
American Indian		1,417	4.1	0.93	272.0	23.2
Asian		1,140	3.3	0.92	304.9	38.4
NHPI		109	0.3	0.93	273.8	24.9
White		29,363	85.0	0.93	285.5	29.1
Hispanic	36,861					
Yes		7,257	19.7	0.93	273.1	24.3
No		29,604	80.3	0.93	286.5	30.0
SWD	36,861					
Yes		4,087	11.1	0.93	258.9	19.2
No		32,774	88.9	0.93	287.0	29.0
EL	36,861					
Yes		4,198	11.4	0.93	269.1	23.1
No		32,663	88.6	0.93	285.8	29.6
Gender	36,861					
Male		18,936	51.4	0.93	283.5	30.8
Female		17,925	48.6	0.93	284.3	27.9

Table IV-16. *Subgroup Reliability and Performance for Mathematics Grade 10*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	33,525					
Black		2,510	7.5	0.93	268.9	21.7
American Indian		1,408	4.2	0.93	273.3	21.3
Asian		1,150	3.4	0.92	303.5	37.3
NHPI		88	0.3	0.93	277.1	26.7
White		28,369	84.6	0.93	286.7	28.4
Hispanic	35,653					
Yes		6,573	18.4	0.93	274.2	22.5
No		29,080	81.6	0.93	287.6	29.3
SWD	35,653					
Yes		3,762	10.6	0.93	262.9	17.3
No		31,891	89.4	0.93	287.8	28.6
EL	35,653					
Yes		3,858	10.8	0.93	269.6	20.2
No		31,795	89.2	0.93	287.0	28.9
Gender	35,653					
Male		18,166	51.0	0.93	285.3	29.9
Female		17,487	49.0	0.93	285.0	27.2

Table IV-17. *Subgroup Reliability and Performance for Science Grade 5*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	*M*	*SD*
					Scale score	
Race	35,991					
Black		2,755	7.7	0.87	280.8	26.1
American Indian		981	2.7	0.87	285.0	26.0
Asian		1,158	3.2	0.81	308.6	32.7
NHPI		101	0.3	0.86	285.1	30.5
White		30,996	86.1	0.83	301.1	30.3
Hispanic	38,438					
Yes		7,660	19.9	0.86	286.8	26.7
No		30,778	80.1	0.83	302.1	30.7
SWD	38,438					
Yes		4,713	12.3	0.86	278.1	28.2
No		33,725	87.7	0.83	302.0	29.7
EL	38,438					
Yes		4,781	12.4	0.87	281.8	25.7
No		33,657	87.6	0.83	301.5	30.4
Gender	38,438					
Male		19,672	51.2	0.83	300.3	32.0
Female		18,766	48.8	0.84	297.8	29.0

Table IV-18. *Subgroup Reliability and Performance for Science Grade 8*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	*M*	*SD*
					Scale score	
Race	34,608					
Black		2,547	7.4	0.85	268.2	23.7
American Indian		1,422	4.1	0.85	273.3	25.4
Asian		1,140	3.3	0.83	296.0	32.3
NHPI		110	0.3	0.85	274.3	26.2
White		29,389	84.9	0.84	289.9	29.6
Hispanic	36,913					
Yes		7,280	19.7	0.85	275.1	26.0
No		29,633	80.3	0.84	290.6	29.8
SWD	36,913					
Yes		4,097	11.1	0.84	264.6	24.5
No		32,816	88.9	0.84	290.4	29.1
EL	36,913					
Yes		4,212	11.4	0.85	268.9	23.6
No		32,701	88.6	0.84	289.9	29.6
Gender	36,913					
Male		18,967	51.4	0.84	289.9	31.4
Female		17,946	48.6	0.85	285.1	27.7

Table IV-19. *Subgroup Reliability and Performance for Science Grade 11*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	*SD*
Race	32,389					
Black		2,193	6.8	0.89	271.2	22.0
American Indian		1,277	3.9	0.89	276.9	23.1
Asian		1,145	3.5	0.84	296.1	33.1
NHPI		79	0.2	0.89	279.0	21.9
White		27,695	85.5	0.86	293.6	29.3
Hispanic	34,306					
Yes		6,058	17.7	0.88	278.4	24.3
No		28,248	82.3	0.86	294.0	29.7
SWD	34,306					
Yes		3,221	9.4	0.88	269.3	22.6
No		31,085	90.6	0.86	293.5	29.1
EL	34,306					
Yes		3,180	9.3	0.89	271.4	21.3
No		31,126	90.7	0.86	293.2	29.4
Gender	34,306					
Male		17,433	50.8	0.85	292.9	31.5
Female		16,873	49.2	0.87	289.5	27.0

Table IV-20. *Subgroup Reliability and Performance for HGSS Grade 6*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	*SD*
Race	35,006					
Black		2,710	7.7	0.58	286.3	22.0
American Indian		1,122	3.2	0.56	291.7	22.2
Asian		1,094	3.1	0.63	306.5	23.8
NHPI		87	0.2	0.57	294.9	23.8
White		29,993	85.7	0.60	301.0	23.4
Hispanic	37,392					
Yes		7,510	20.1	0.56	291.6	22.3
No		29,882	79.9	0.61	301.6	23.6
SWD	37,392					
Yes		4,496	12.0	0.60	283.3	21.4
No		32,896	88.0	0.59	301.4	23.2
EL	37,338					
Yes		4,318	11.7	0.54	287.6	21.3
No		33,020	88.3	0.61	301.1	23.5
Gender	37,392					
Male		18,950	50.7	0.64	299.6	24.1
Female		18,442	49.3	0.58	299.6	23.2

Table IV-21. *Subgroup Reliability and Performance for HGSS Grade 8*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	34,452					
Black		2,522	7.3	0.45	288.6	21.8
American Indian		1,408	4.1	0.40	292.2	20.7
Asian		1,123	3.3	0.59	310.4	24.9
NHPI		108	0.3	0.51	291.3	20.9
White		29,291	85.0	0.50	301.9	23.0
Hispanic	36,747					
Yes		7,192	19.6	0.46	292.7	21.4
No		29,555	80.4	0.51	302.6	23.2
SWD	36,747					
Yes		4,074	11.1	0.39	282.4	19.5
No		32,673	88.9	0.50	302.6	22.8
EL	36,702					
Yes		4,073	11.2	0.40	288.9	20.5
No		32,629	88.8	0.51	302.2	23.1
Gender	36,747					
Male		18,871	51.4	0.50	300.6	22.9
Female		17,876	48.6	0.52	300.8	23.5

Table IV-22. *Subgroup Reliability and Performance for HGSS Grade 11*

Subgroup	Grade (*N*)	Group (*n*)	%	Reliability	Scale score *M*	Scale score *SD*
Race	32,176					
Black		2,168	6.7	0.56	280.5	20.8
American Indian		1,270	3.9	0.55	282.5	20.2
Asian		1,108	3.4	0.64	297.2	23.1
NHPI		78	0.2	0.62	282.7	19.5
White		27,552	85.6	0.58	291.8	21.3
Hispanic	34,071					
Yes		5,990	17.6	0.55	283.8	20.7
No		28,081	82.4	0.59	292.2	21.5
SWD	34,071					
Yes		3,201	9.4	0.52	272.1	17.7
No		30,870	90.6	0.57	292.5	21.1
EL	34,066					
Yes		3,102	9.1	0.49	279.0	19.8
No		30,964	90.9	0.58	291.9	21.4
Gender	34,071					
Male		17,319	50.8	0.62	288.7	21.7
Female		16,752	49.2	0.56	292.8	21.2

Table IV-23. *Path Reliability for ELA*

Grade	Path	Stage 1	Stage 2	N	%	Reliability
3	1	Medium	Easy	20,839	55.5	0.96
3	2	Medium	Hard	16,697	44.5	0.95
4	1	Medium	Easy	8,002	20.8	0.80
4	2	Medium	Hard	30,389	79.2	0.76
5	1	Medium	Easy	19,527	50.9	0.86
5	2	Medium	Hard	18,804	49.1	0.80
6	1	Medium	Easy	7,613	20.4	0.88
6	2	Medium	Hard	29,774	79.6	0.86
7	1	Medium	Easy	19,653	53.6	0.95
7	2	Medium	Hard	17,033	46.4	0.91
8	1	Medium	Easy	18,864	51.3	0.91
8	2	Medium	Hard	17,903	48.7	0.87
10	1	Medium	Easy	17,216	48.5	0.92
10	2	Medium	Hard	18,299	51.5	0.87

Table IV-24. *Path Reliability for Mathematics*

Grade	Path	Stage 1	Stage 2	N	%	Reliability
3	1	Medium	Easy	29,431	78.3	0.96
3	2	Medium	Hard	8,179	21.8	0.94
4	1	Medium	Easy	30,399	79.1	0.88
4	2	Medium	Hard	8,057	21.0	0.81
5	1	Medium	Easy	25,368	66.1	0.87
5	2	Medium	Hard	13,004	33.9	0.84
6	1	Medium	Easy	24,975	66.8	0.94
6	2	Medium	Hard	12,437	33.2	0.92
7	1	Medium	Easy	29,049	79.1	0.98
7	2	Medium	Hard	7,662	20.9	0.98
8	1	Medium	Easy	24,749	67.3	0.86
8	2	Medium	Hard	12,030	32.7	0.84
10	1	Medium	Easy	27,732	78.2	0.91
10	2	Medium	Hard	7,743	21.8	0.87

Table IV-25. *Subscore Reliability, Classification Consistency, and Accuracy*

Subject	No. of subscores	*M*	*SD*	Min.	P_{25}	P_{50}	P_{75}	Max.
Reliability								
ELA	63	0.60	0.09	0.23	0.57	0.62	0.65	0.75
Mathematics	46	0.62	0.08	0.47	0.55	0.61	0.67	0.77
Science	9	0.59	0.02	0.57	0.58	0.59	0.6	0.63
Consistency								
ELA	63	0.32	0.10	-0.14	0.30	0.34	0.37	0.47
Mathematics	46	0.36	0.09	0.20	0.30	0.35	0.41	0.54
Science	9	0.33	0.03	0.28	0.33	0.33	0.34	0.38
Accuracy								
ELA	63	0.72	0.08	0.61	0.67	0.70	0.76	1.00
Mathematics	46	0.73	0.08	0.42	0.71	0.73	0.77	0.86
Science	9	0.71	0.04	0.65	0.70	0.72	0.74	0.76

Note. P_{25} = 25th percentile; P_{50} = 50th percentile; P_{75} = 75th percentile.

V. Validity

1. Differential Item Functioning (DIF)

Large DIF has a Nagelkerke R^2 change greater than 0.070. Moderate DIF has a Nagelkerke R^2 change between 0.035 and 0.070.

Table V-1. *ELA DIF*

Grade	No. of items	Gender DIF		Race DIF	
		Moderate	Large	Moderate	Large
3	83	0	0	0	0
4	79	0	0	0	0
5	77	2	0	0	0
6	85	0	0	0	0
7	74	0	0	0	0
8	80	0	0	0	0
10	65	0	0	0	0

Table V-2. *Mathematics DIF*

Grade	No. of items	Gender DIF		Race DIF	
		Moderate	Large	Moderate	Large
3	88	0	0	0	0
4	80	0	0	0	0
5	87	0	0	0	0
6	85	0	0	0	0
7	80	0	0	0	0
8	83	0	0	0	0
10	83	0	0	0	0

Table V-3. *Science DIF*

Grade	No. of items	Gender DIF		Race DIF	
		Moderate	Large	Moderate	Large
5	50	0	0	0	0
8	58	0	0	0	0
11	55	0	0	0	0

Table V-4. *HGSS DIF*

Grade	No. of items	Gender DIF		Race DIF	
		Moderate	Large	Moderate	Large
6	10	0	0	0	0
8	8	0	0	0	0
11	11	1	0	0	0

Relationships to Other Variables

Table V-5. *Correlations Between Scores in ELA, Mathematics, Science, and HGSS*

Grade	ELA vs. mathematics	ELA vs. science	Mathematics vs. science	HGSS vs. ELA	HGSS vs. mathematics	HGSS vs. science
3	.78					
4	.76					
5	.75	.76	.73			
6	.76			.72	.66	
7	.73					
8	.74	.73	.70	.69	.62	.61
10	.70					
11						.54

Table V-6. *Correlations Between Scores on KAP and ACT (*N = 5,369*)*

	ACT				
	Composite[a]	English	Reading	Mathematics	Science
KAP ELA	.78	.76	.73		
KAP Mathematics	.80			.85	.74

[a]The ACT composite score is the average of scores on the four subjects (English, mathematics, reading, and science).
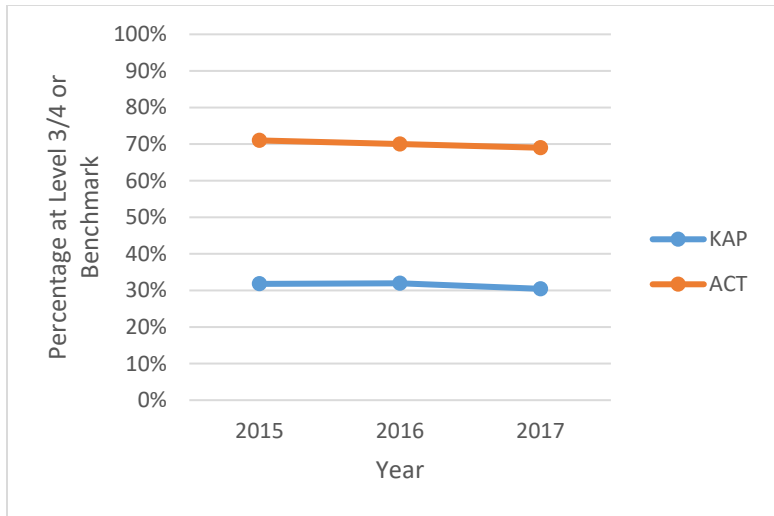
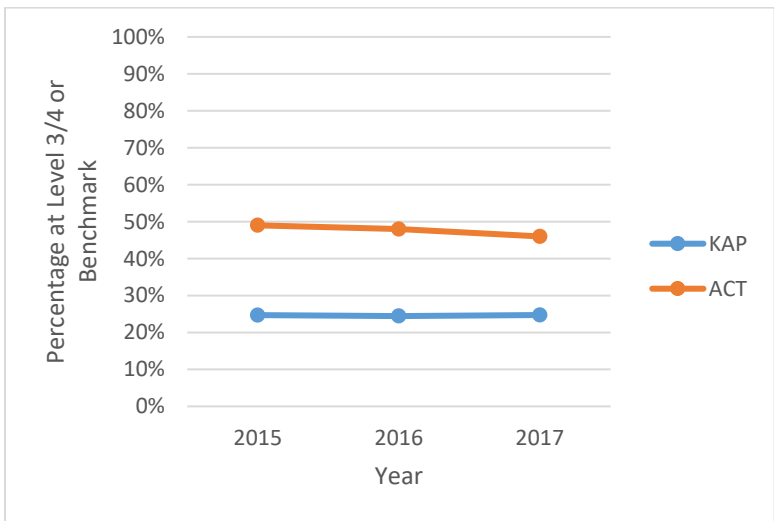*Figure V-1.* Grade 10 ELA trends for KAP and ACT.

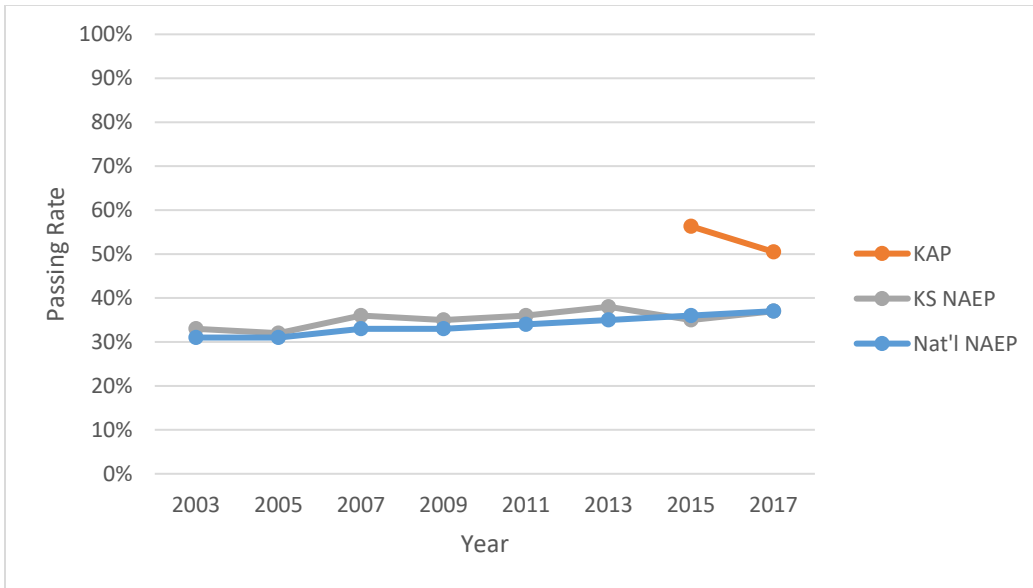*Figure V-2.* Grade 10 mathematics trends for KAP and ACT.

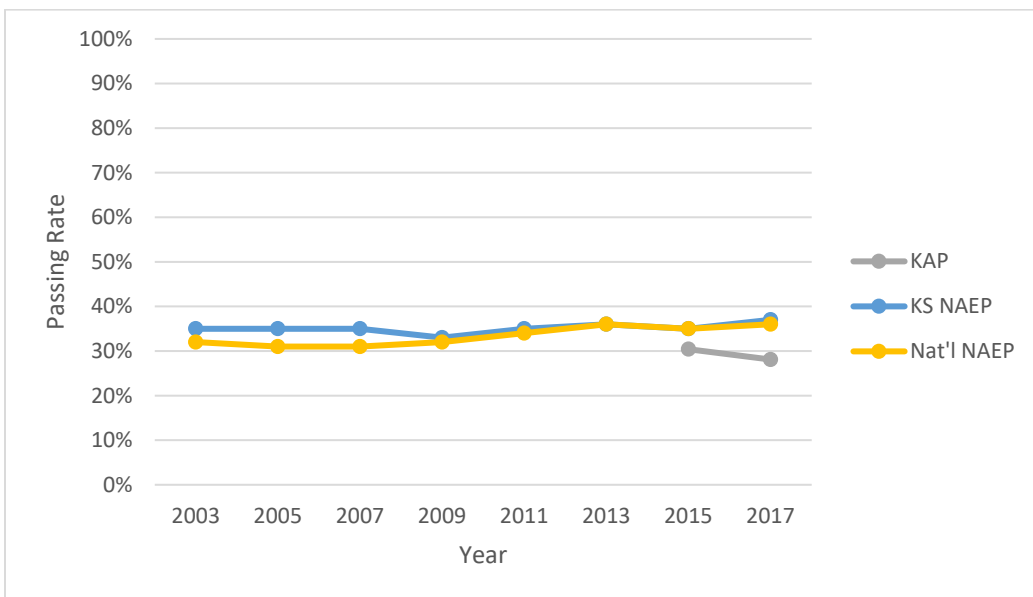*Figure V-3.* Grade 4 ELA trend for KAP and NAEP.

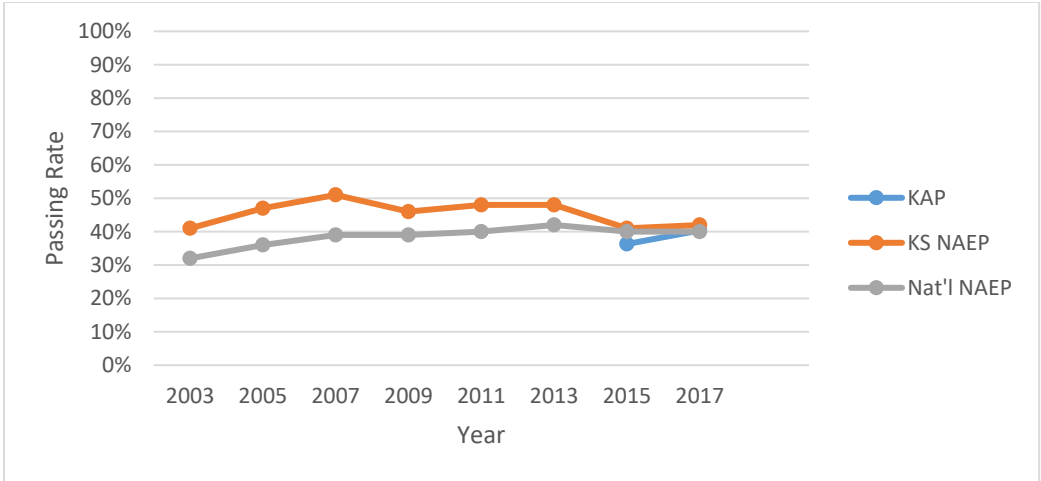*Figure V-4.* Grade 8 ELA trend for KAP and NAEP.
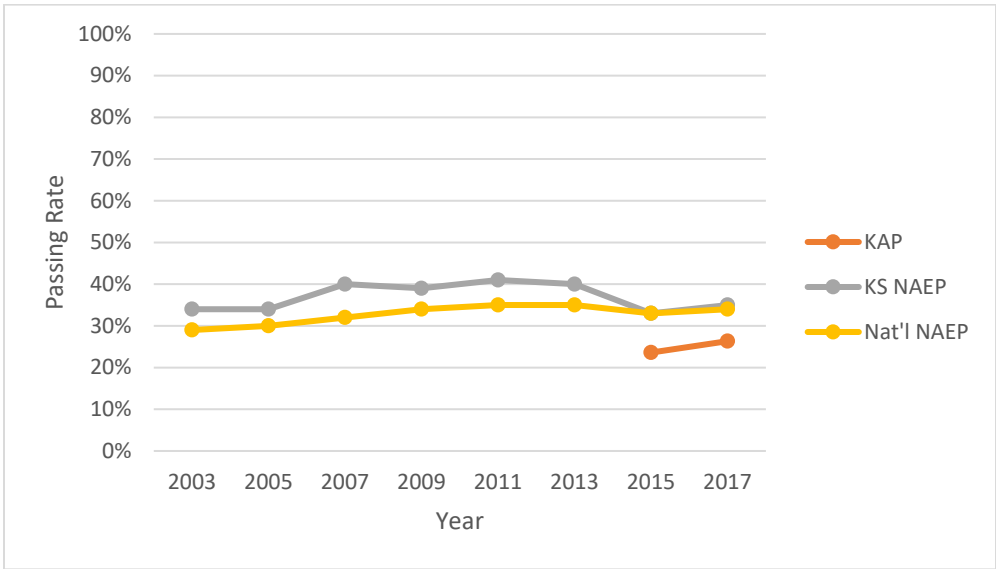
Figure V-5. Grade 4 mathematics trend for KAP and NAEP.

Figure V-6. Grade 8 mathematics trend for KAP and NAEP.