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Equipercentile Linking for the 2021 Alternate K-PREP

Final Report

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Equipercentile Linking for the 2021 Alternate K-PREP

Introduction

In Spring 2021, the Alternate Kentucky Performance Rating for Educational Progress (Alternate K-PREP) was administered as an operational field test. This administration replaced the field testing originally planned for spring 2020, which was cancelled due to the COVID-19 pandemic. The purpose of field testing is to gather student performance data on newly developed test items. New Alternate K-PREP items were developed to measure the Kentucky Academic Standards (KAS), specifically new Alternate Assessment Targets derived from the KAS.

Unlike typical field testing that is conducted separately or in addition to operational testing, an operational field test has the dual purpose of providing data to evaluate item quality as well as providing data on student performance on the content targets. Several states have recently administered operational field tests for alternate assessments (e.g., California Department of Education, 2021; Ohio Department of Education, 2021).

The 2020-2021 school year was atypical; all Kentucky students spent some portion of the school year participating in Non-Traditional Instruction (NTI) programs. Districts varied in terms of how (e.g., hybrid models combining NTI with in-person instruction, reduced in-person schedule) and when they returned to in-person instruction, and individual families had the option to continue NTI after schools had reopened to in-person instruction.

In planning for the 2021 Alternate K-PREP test administration, the Kentucky Department of Education (KDE) had to anticipate that not all students would participate in testing. Districts were instructed to test any student with whom they had in-person access during the testing window, assuming the test could be given by a certified test administrator and following social distancing guidelines. Students who chose not to return to in-person instruction would not be required to participate in testing, and districts would likely vary in their capacity to safely test all students who were in person.

Because participation rates were an unknown during planning, KDE made the decision to calculate number-correct raw scores rather than conducting item response theory (IRT) scaling, as is typical. This addressed the potential issue that final sample sizes would not be sufficient for accurately estimating IRT item parameters.

Although the scale on which student scores would be reported would be different from prior years, KDE still wanted to report student performance levels using the existing classification schema. Kentucky reports four student performance levels (Novice, Apprentice, Proficient, and Distinguished; NAPD). KDE also wanted stakeholders to have a point of comparison between spring 2021 performance level classifications with those of prior years.

Classification into performance levels requires a standard setting process for new tests. Standard setting establishes the minimum scores necessary to be classified into each performance level (i.e., cut scores). Because of previously described issues, along with the waiver of federal accountability requirements in 2020-2021, KDE decided to postpone formal standard setting until after the spring 2022 administration, at which time it can be expected that the full student population (with few exclusions) will be tested. This will ensure that the standards of student performance going forward are based on representative student data from a more typical school year.

To allow for the reporting of comparable proficiency level classifications in spring 2021, HumRRO proposed conducting an equipercentile linking process (Kolen and Brennan, 2004) to identify cut scores for classifying students into NAPD levels. This report describes the methods used and the linking results.

Method

Evaluating the Equating Sample

HumRRO proposed linking the 2021 Alternate K-PREP to the 2019 administration, since data from 2020 were not available. Given concerns that 2021 participation rates might yield a sample that is not comparable to prior years, we first compared the performance of 2019 students overall with the performance of 2019 students who also tested in 2021. This step informed whether the equipercentile linking method would need to include some sort of adjustment to account for differences in the two years' tested student populations.

We first merged student records from 2019 with their records, if available, in 2021. Because the test administrations were two years apart and tests are not administered in grade 9, we included 2019 students from grades 3-6 and 8 in this analysis. Across the grade levels, approximately 81%-88% of student records merged, indicating that a large percentage of students participated in testing both years. Next, we calculated the percentage of students at each performance level in 2019 for all students tested in 2019 and for the subset of 2019 students who also tested in 2021. Table 1 presents this comparison for grade 3 math.

Table 1. 2019 Performance Distributions in Grade 3 Math for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (n =482)	Merged Group (n = 410)
Novice	29.3	28.8
Apprentice	40.5	41.7
Proficient	26.4	25.4
Distinguished	3.9	4.2

Table 1 demonstrates that the performance distribution of students who tested in 2021 was similar enough to the performance distribution of students who tested in 2019 to warrant the application of equipercentile linking. Across the grades and subjects, NAPD distributions were similarly close, with percentage differences no greater than 3% for any performance level. This indicated that we could conduct the equipercentile linking without applying an adjustment. Tables presenting the performance distribution comparisons for all grades and subjects are presented in Appendix A.

Reviewing Item Quality

Following administration of the Alternate K-PREP, KDE provided HumRRO with student response data and an answer key. We applied the answer key to score items and then used these item scores to generate Classical Test Theory (CTT) item statistics. We then flagged potentially problematic items by applying a series of criteria. Table 2 presents the CTT statistics calculated, their interpretation, and the flagging criteria applied.

Table 2. CTT Statistics and Flagging Criteria

CTT Statistic	Interpretation	Flagging Criteria
P-value	Percentage of students answering item correctly	▪ If greater than 90% ▪ If less than 25%
Item-total correlation	Correlation between answering the item correctly and total test score	▪ If negative ▪ If less than .20
Distractor frequency	Percentage of students selecting an incorrect response option	▪ If less than 7% selected a distractor ▪ If more students selected distractor than correct response
Distractor discrimination	Correlation between selecting an incorrect response and total test score	▪ If correlation is positive ▪ If correlation is greater than that of correct response

The purpose of flagging items is to provide data about item quality. Items that were not flagged functioned as anticipated and are ready for operational use. Items that were flagged are not necessarily to be discarded but warrant scrutiny by content experts. Items may be kept as is, revised and re-field tested, or dropped completely from future use. Because spring 2021 employed an operational field test design in which student scores would be based solely on field test items, it was also important to evaluate whether any items should be excluded from overall score calculation.

KDE's Alternate K-PREP testing vendor convened panels of content experts to review flagged items for each grade/subject test. HumRRO provided an Item Flagging Guide (see Appendix B) to support content experts' understanding of why the items had been flagged. HumRRO staff was also on hand to answer questions during the item review sessions. Items were most frequently flagged for having a distractor that was selected more frequently than the correct response and/or for having a low, positive item-total correlation.

Equipercentile Linking

Following the item review sessions, HumRRO received a list of items that content experts thought should be removed from inclusion in the calculation of spring 2021 test scores. A separate list of items to be considered for revision prior to future use was shared with KDE. Table 3 presents the number of items that were removed from scoring for each grade/subject test. The largest number of items removed from scoring for any test form was five (writing grades 8 and 11).

HumRRO recalculated student test scores based on these final sets of items. We then calculated the distribution of total test scores. Students who had not provided responses to any items (i.e., all item response fields were blank) were removed from this calculation, based on the assumption that these students did not actually participate in the assessment.

The next step was to identify the cut scores that would divide students into an NAPD classification distribution that was as similar as possible to the NAPD distribution that was reported in 2019 (the most recent year that Alternate K-PREP scores were reported). This process created a "link" between the two testing years, as the identified cut scores for 2021 resulted in similar percentages of students being classified into each performance level.

Table 3. Number of Items Removed from Scoring

Subject/Grade	# of Items Flagged	# of Items Removed	Final # of Items	Subject/Grade	# of Items Flagged	# of Items Removed	Final # of Items
Math 3	20	1	29	Reading 3	18	1	29
Math 4	22	0	30	Reading 4	16	3	27
Math 5	20	1	29	Reading 5	14	2	28
Math 6	26	3	27	Reading 6	9	1	29
Math 7	25	2	28	Reading 7	19	2	28
Math 8	29	1	29	Reading 8	13	3	27
Math 10	25	1	29	Reading 10	18	4	26
Science 4	15	0	30	Social Studies 5	18	2	28
Science 7	22	1	29	Social Studies 8	21	4	26
Science 11	21	0	30	Social Studies 11	16	1	29
Writing 5	23	2	28				
Writing 8	10	5	25				
Writing 11	20	5	25				

Results

Table 4 presents the equipercentile linking results for grade 3 math. The second column from the right (2019 Percentage) presents the NAPD distribution reported in 2019 that we attempted to match. The second column from the left (Raw Score Range) presents the range of raw scores that yielded the percentages presented in the third column from the left (2021 Percentage). Ideally, the difference between the two percentages will be small. This would indicate that the cut scores applied in 2021 yielded an NAPD distribution that was very similar to that from the last test administration. For grade 3 math, the percentage differences ranged from 1% (Novice) to 3% (Apprentice). Similar tables for the remaining grades and subjects are presented in Appendix C. Across the grades and subjects, percentage differences ranged from 0% (grade 11 science Distinguished) to 6% (grade 5 writing Novice; grade 11 science Apprentice).

Table 4. Grade 3 Math Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	27.6	28.9	-1.3
Apprentice	9 to 13	43.7	40.6	3.1
Proficient	14 to 19	23.8	26.6	-2.8
Distinguished	20 to 29	4.9	4.0	0.9

The number of raw score points associated with each performance level is also important for equipercentile linking. The total points possible across grade/subject tests ranged from 25 to 30 (after items were removed based on the flagged item review). Ideally, multiple score points will

be associated with each performance level, to ensure that there are sufficient opportunities to be classified at each level. In grade 3 math, 9 raw score points were associated with the Novice level, 5 points with the Apprentice level, 6 points with the Proficient level, and 10 points with the Distinguished level. All NAPD levels across the grades and subjects were associated with at least three raw score points. The grade 8 math Apprentice level had the smallest raw score range.

Discussion

The purpose of this task was to implement a sound methodology for identifying performance level cuts scores on an operational field test. An equipercentile linking approach enabled us to use past statewide performance to determine cut scores that would result in a reasonable distribution of students across the four levels of student performance.

We took several precautions prior to implementing the linking process. We verified that the performance distribution of students who tested in 2021 was similar enough to the performance distribution of students who tested in 2019 to allow us to implement a straightforward linking process with no adjustments. We also used item-level statistics and content experts' review of items to ensure that students' spring 2021 Alternate K-PREP scores were based on items deemed by content experts to be high quality field test items measuring the KAS Alternate Assessment Targets.

It is a priority of KDE to provide assessment data that are as useful as possible to stakeholders. Using equipercentile linking was one way to ensure that 2021 Alternate K-PREP scores were reported using the NAPD levels that stakeholders are accustomed to and that they find meaningful. The process described here ensured that the meaning of those performance category scores was as consistent as possible between 2019 and 2021.

However, stakeholders should also use caution in interpreting spring 2021 test scores. The 2020-2021 school year was certainly not comparable to a typical school year. Federal accountability waivers were granted, in part, because of the unprecedented challenges that districts, schools, families, and students experienced during long-term NTI. While it is important to not let the gap in annual student performance data widen, stakeholders should keep in mind the limits to score comparisons.

References

California Department of Education (2021, July 13). *Alternate ELPAC*.
https://www.elpac.org/test-administration/alternate/

Kolen, M. J., & Brennan, R. L. (2004). *Test equating, scaling, and linking* (2nd ed.). St. Paul, MN: Assessment Systems Corporation.

Ohio Department of Education (2021, July 13). *Spring 2021 alternate assessment operational field-test administration window*. http://education.ohio.gov/Topics/Testing/K-8-District-Test-Coordinator-Bulletin/September-2020-1/Spring-2021-Alternate-Assessment-Operational-Field

Appendix A: Comparisons of Performance Level Distributions

Table A-1. 2019 Performance Distributions in Grade 3 Math for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =482)	Merged Group (*n* = 410)
Novice	29.3	28.8
Apprentice	40.5	41.7
Proficient	26.4	25.4
Distinguished	3.9	4.2

Table A-2. 2019 Performance Distributions in Grade 3 Reading for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =482)	Merged Group (*n* = 410)
Novice	17.2	15.1
Apprentice	42.7	46.1
Proficient	33.6	32.2
Distinguished	6.4	6.6

Table A-3. 2019 Performance Distributions in Grade 4 Math for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =575)	Merged Group (*n* = 489)
Novice	20.9	20.7
Apprentice	51.5	53.0
Proficient	24.2	23.5
Distinguished	3.5	2.9

Table A-4. 2019 Performance Distributions in Grade 4 Reading for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =575)	Merged Group (*n* = 489)
Novice	13.6	12.9
Apprentice	43.7	45.8
Proficient	33.9	34.0
Distinguished	8.9	7.4

Table A-5. 2019 Performance Distributions in Grade 4 Science for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =575)	Merged Group (*n* = 489)
Novice	19.3	19.0
Apprentice	49.7	51.7
Proficient	25.4	24.7
Distinguished	5.6	4.5

Table A-6. 2019 Performance Distributions in Grade 5 Math for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =571)	Merged Group (*n* = 474)
Novice	26.8	26.6
Apprentice	44.5	44.9
Proficient	24.2	24.1
Distinguished	4.6	4.4

Table A-7. 2019 Performance Distributions in Grade 5 Reading for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =571)	Merged Group (*n* = 474)
Novice	19.1	17.3
Apprentice	41.2	43.5
Proficient	34.7	34.4
Distinguished	5.1	4.9

Table A-8. 2019 Performance Distributions in Grade 5 Social Studies for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =571)	Merged Group (*n* = 474)
Novice	15.4	14.6
Apprentice	48.9	50.4
Proficient	28.4	28.1
Distinguished	7.4	7.0

Table A-9. 2019 Performance Distributions in Grade 5 Writing for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =571)	Merged Group (*n* = 474)
Novice	19.6	18.8
Apprentice	43.4	45.4
Proficient	30.8	30.2
Distinguished	6.1	5.7

Table A-10. 2019 Performance Distributions in Grade 6 Math for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =642)	Merged Group (*n* = 564)
Novice	24.3	22.2
Apprentice	46.9	48.8
Proficient	24.8	24.8
Distinguished	4.1	4.3

Table A-11. 2019 Performance Distributions in Grade 6 Reading for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =642)	Merged Group (*n* = 564)
Novice	25.6	23.2
Apprentice	35.2	37.8
Proficient	32.6	32.5
Distinguished	6.7	6.6

Table A-12. 2019 Performance Distributions in Grade 8 Math for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (*n* =595)	Merged Group (*n* = 483)
Novice	23.5	23.0
Apprentice	44.9	46.0
Proficient	29.4	29.4
Distinguished	2.2	1.7

Table A-13. 2019 Performance Distributions in Grade 8 Reading for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (n =595)	Merged Group (n = 483)
Novice	23.4	22.4
Apprentice	52.3	54.0
Proficient	19.5	19.1
Distinguished	4.9	4.6

Table A-14. 2019 Performance Distributions in Grade 8 Social Studies for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (n =595)	Merged Group (n = 483)
Novice	25.0	23.2
Apprentice	47.9	50.3
Proficient	22.0	22.2
Distinguished	5.0	4.4

Table A-15. 2019 Performance Distributions in Grade 8 Writing for All Students Tested in 2019 Compared to the Subset of Students who Tested in both 2019 and 2021

Performance Level	% All 2019 Students (n =595)	Merged Group (n = 483)
Novice	22.4	20.3
Apprentice	46.7	48.9
Proficient	24.9	25.5
Distinguished	6.1	5.4

Alternate K-PREP Item Flag Interpretation Guide

HumRRO calculated classical test theory (CTT) statistics and flagged items that failed to meet a series of criteria. An individual Item could be flagged more than once. Flagged items should not necessarily be dropped from the test but should be scrutinized by content experts to determine if an item should be dropped, kept intact, or possibly revised for subsequent field testing. The purpose of this document is to describe the flagging criteria applied.

CTT Item Flagging Criteria

Flag 1 (Easy). More than 90% of tested students answered the item correctly. This indicates that the item is relatively easy.

Flag 2 (Hard). Fewer than 25% of tested students answered the item correctly. This indicates that the item is relatively difficult.

Flag 3 (Low Discrimination). The correlation between answering the item correctly and total test score is less than .20. This indicates that the item does not relate well to the scale overall. This might occur if the item is measuring a different construct than the other items on the test.

Flag 4 (Negative Discrimination). The correlation between answering the item correctly and total test score (i.e., item total correlation) is less than 0. This indicates that students who did well on the assessment overall tended to answer the item incorrectly. This might occur if the item was written in an ambiguous or confusing way, have multiple correct answers, or no correct answer. This is the most serious of the flags; an item with negative discrimination may contribute only "noise" to the student ability estimate. We recommend removal of these items.

Flag 5 (More discriminating distractor). The correlation between selecting a distractor and total test score is greater than the correlation between answering the item correctly and total test score (i.e., item total correlation). This indicates that a distractor was more appealing to students who tended to do well on the test overall.

Flag 6 (More frequent distractor). More students selected a distractor than the correct response. This indicates that a distractor tended to be more appealing across all tested students.

Flag 7 (Low frequency distractor). Fewer than 7% of tested students selected a response option. This indicates that a response option may be obviously incorrect.

Flag 8 (Positively discriminating distractor). The correlation between selecting a distractor and total test score is positive and greater than .05. This is another indication that a distractor was more appealing to students who tended to do well on the test overall.

Appendix C: Equipercentile Linking Results

Table C-1. Grade 3 Math Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	27.6	28.9	-1.3
Apprentice	9 to 13	43.7	40.6	3.1
Proficient	14 to 19	23.8	26.6	-2.8
Distinguished	20 to 29	4.9	4.0	0.9

Table C-2. Grade 4 Math Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 9	21.9	18.9	3.0
Apprentice	10 to 13	47.3	52.8	-5.5
Proficient	14 to 20	25.5	24.8	0.7
Distinguished	21 to 30	5.4	3.6	1.8

Table C-3. Grade 5 Math Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	20.6	25.0	-4.4
Apprentice	9 to 13	49.1	45.5	3.6
Proficient	14 to 20	25.8	24.8	1.0
Distinguished	21 to 29	4.5	4.7	-0.2

Table C-4. Grade 6 Math Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	23.1	21.1	2.0
Apprentice	9 to 12	49.2	48.8	0.4
Proficient	13 to 19	24.0	25.9	-1.9
Distinguished	20 to 27	3.7	4.2	-0.5

Table C-5. Grade 7 Math Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	24.3	21.4	2.9
Apprentice	9 to 12	49.0	50.7	-1.7
Proficient	13 to 17	22.3	23.8	-1.5
Distinguished	18 to 28	4.4	4.1	0.3

Table C-6. Grade 8 Math Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	23.1	21.4	1.7
Apprentice	9 to 11	41.5	46.1	-4.6
Proficient	12 to 18	32.9	30.2	2.7
Distinguished	19 to 29	2.5	2.2	0.3

Table C-7. Grade 10 Math Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 9	23.5	21.1	2.4
Apprentice	10 to 14	54.8	57.7	-2.9
Proficient	15 to 19	19.8	18.3	1.5
Distinguished	20 to 29	2.0	2.9	-0.9

Table C-8. Grade 3 Reading Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	15.1	16.7	-1.6
Apprentice	9 to 13	44.1	42.9	1.2
Proficient	14 to 20	32.1	33.9	-1.8
Distinguished	21 to 29	8.7	6.5	2.2

Table C-9. Grade 4 Reading Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 5	14.2	11.6	2.6
Apprentice	6 to 11	45.6	44.6	1.0
Proficient	12 to 17	31.2	34.8	-3.6
Distinguished	18 to 27	9.0	9.1	-0.1

Table C-10. Grade 5 Reading Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 7	18.1	17.1	1.0
Apprentice	8 to 13	42.8	42.1	0.7
Proficient	14 to 21	33.0	35.6	-2.6
Distinguished	22 to 28	6.1	5.2	0.9

Table C-11. Grade 6 Reading Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 10	18.4	22.4	-4.0
Apprentice	11 to 15	38.7	36.6	2.1
Proficient	16 to 23	35.4	34.0	1.4
Distinguished	24 to 29	7.5	7.0	0.5

Table C-12. Grade 7 Reading Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	16.4	20.9	-4.5
Apprentice	9 to 13	51.2	46.4	4.8
Proficient	14 to 19	25.0	25.4	-0.4
Distinguished	20 to 28	7.4	7.3	0.1

Table C-13. Grade 8 Reading Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	17.8	21.2	-3.4
Apprentice	9 to 16	57.7	53.7	4.0
Proficient	17 to 21	18.4	20.0	-1.6
Distinguished	22 to 27	6.1	5.0	1.1

Table C-14. Grade 10 Reading Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	22.9	19.1	3.8
Apprentice	9 to 14	51.4	57.0	-5.6
Proficient	15 to 19	19.7	19.9	-0.2
Distinguished	20 to 26	6.0	4.0	2.0

Table C-15. Grade 4 Science Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 9	16.1	17.3	-1.2
Apprentice	10 to 15	50.2	51.0	-0.8
Proficient	16 to 22	28.7	26.0	2.7
Distinguished	23 to 30	5.0	5.7	-0.7

Table C-16. Grade 7 Science Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	14.0	15.7	-1.7
Apprentice	9 to 14	57.5	56.4	1.1
Proficient	15 to 21	25.1	24.7	0.4
Distinguished	22 to 29	3.4	3.2	0.2

Table C-17. Grade 11 Science Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	21.6	23.6	-2.0
Apprentice	9 to 14	55.1	49.0	6.1
Proficient	15 to 21	20.9	25.0	-4.1
Distinguished	22 to 30	2.4	2.4	0.0

Table C-18. Grade 5 Social Studies Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	11.4	13.3	-1.9
Apprentice	9 to 13	49.1	50.0	-0.9
Proficient	14 to 20	33.4	29.1	4.3
Distinguished	21 to 28	6.1	7.6	-1.5

Table C-19. Grade 8 Social Studies Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	24.1	23.0	1.1
Apprentice	9 to 12	46.0	49.2	-3.2
Proficient	13 to 19	23.9	22.6	1.3
Distinguished	20 to 26	6.0	5.2	0.8

Table C-20. Grade 11 Social Studies Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	20.2	23.0	-2.8
Apprentice	9 to 15	53.2	49.2	4.0
Proficient	16 to 21	20.9	22.6	-1.7
Distinguished	22 to 29	5.8	5.2	0.6

Table C-21. Grade 5 Writing Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 7	11.3	17.6	-6.3
Apprentice	8 to 11	48.0	44.4	3.6
Proficient	12 to 17	33.2	31.7	1.5
Distinguished	18 to 28	7.5	6.3	1.2

Table C-22. Grade 8 Writing Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 8	18.9	20.2	-1.3
Apprentice	9 to 14	51.9	48.0	3.9
Proficient	15 to 19	23.6	25.6	-2.0
Distinguished	20 to 25	5.6	6.2	-0.6

Table C-23. Grade 11 Writing Equipercentile Linking Results

Performance Level	Raw Score Range	2021 Percentage	2019 Percentage	Difference in Percentages
Novice	0 to 6	17.0	15.7	1.3
Apprentice	7 to 12	49.8	51.2	-1.4
Proficient	13 to 18	26.7	27.8	-1.1
Distinguished	19 to 25	6.6	5.3	1.3