# 2021-22 Growth Model Overview and Summary of Statewide Results

COLORADO
Department of Education

## Overview

Understanding individual student progress over time and the combined results for schools and districts has been a cornerstone of the Colorado accountability system. Growth is a strong indicator of student learning that is less likely to be influenced by student demographic characteristics than other performance indicators, such as achievement. The state has been using the Colorado Growth Model since 2009, annually providing individual student reports, public growth dashboards, School and District Performance Frameworks (SPF/DPF), and other files and visualizations incorporating growth data. The growth model provides a normative comparison of a student's academic progress in the current year against the progress of other Colorado students.

**Colorado Growth Model**
Information in this document builds from foundational information about the Colorado Growth Model. Additional background information, resources and technical documents can be found here.

While the state accountability system has been paused for 2021, the growth model can still provide important context about student learning during the COVID-19 pandemic. This year, the department has calculated two complementary variations of the growth model: cohort-referenced growth and baseline-referenced growth. Each approach provides a different lens on how students, schools, and districts are faring over time.

- ***Traditional cohort-referenced growth calculations:*** The statewide median growth percentile (MGP) resets each year to 50. This is the approach that the state has historically used. Because it is norm-referenced against the current cohort of students, major changes in statewide trends may be masked.
- ***New baseline-referenced growth approach:*** Compares current student progress against previous-year expectations so MGPs can vary above and below 50, indicating whether students made more or less progress than historical peers. This approach provides a comparison to past performance to detect statewide shifts. *This is the approach the department recommends for considering the impact of COVID; it is the department's approach for public reporting of growth.*

This document provides an overview and rationale for the baseline-referenced approach this year and also provides a summary of statewide growth results.

**Summary of Cohort and Baseline-Referenced Growth Approaches**

| | Cohort-Referenced Growth | Baseline-Referenced Growth |
|---|---|---|
| **Student Growth Percentile** | Individual student progress relative to current year academic peer group | Individual student progress relative to historical pre-pandemic academic peer group |
| **Median Growth Percentile** | Group level (e.g., disaggregated group, school, district) progress relative to the current tested student population | Group level (e.g., disaggregated group, school) progress in the current year relative to historical pre-pandemic growth expectations |
| **State Level Median Growth Percentile** | Average progress of students across the state in the current year. MGP is always around 50 | Average progress of current students across the state compared to historical pre-pandemic growth expectations. MGPs are likely to fall below 50 due to statewide performance declines in 2021 |

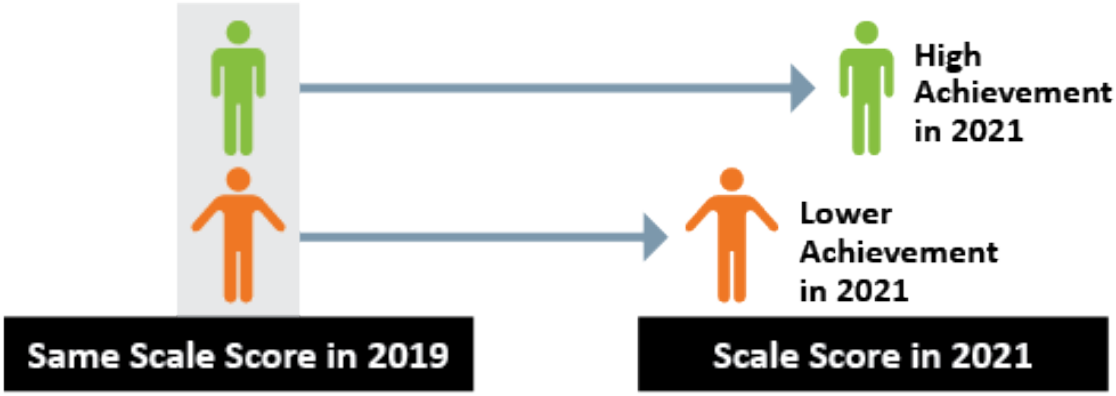
## Cohort-Referenced Growth (Traditional Approach)

In a normal year, growth calculations reflect the amount of progress a student has made from the prior year's state assessment result to the current year. This is done in comparison to students who started with similar academic achievement (i.e., academic peers). The norming group of academic peers resets each year reflecting the performance and progress trajectories of the current population. Therefore, the median student growth percentile (MGP) for the state is about 50 every year. This is illustrated below and on the next page. Because it is norm-referenced against the current cohort of students, major changes in statewide trends may be masked.

Growth is run for the state assessments of CMAS (English Language Arts and Mathematics), WIDA ACCESS (Overall Results), and PSAT/SAT (Evidence-based Reading and Writing and Math). Student progress is typically measured sequentially from one year to the next, and that is still true for WIDA ACCESS growth results from 2020 to 2021. However, the cancellation of state content assessments in 2020 necessitated a skip-year growth approach for CMAS and PSAT/SAT so that growth is calculated from 2019 to 2021.

# Cohort-Referenced Growth

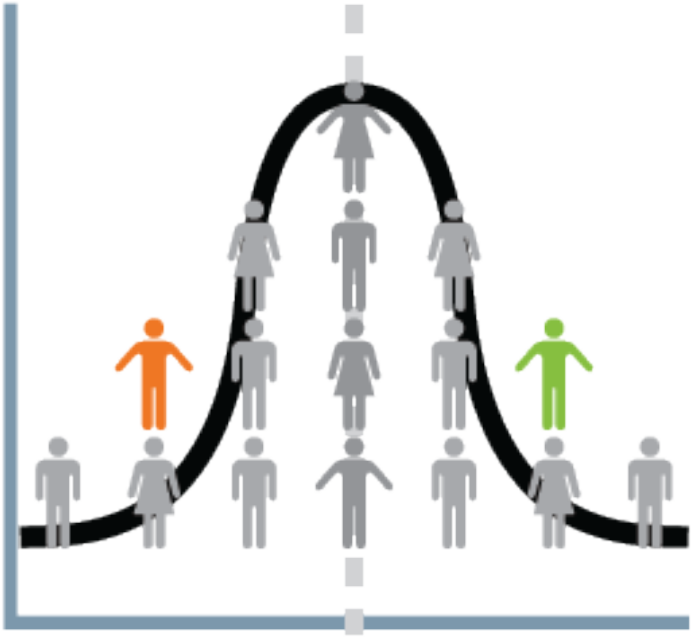
### Comparison of Academic Peers (CMAS)




**Students that had similar scale scores in 2019 (CMAS) are considered academic peers. Note: Because of the state assessment cancellation, 2020 was skipped.**

# Cohort-Referenced Growth (cont.)

## Establishing the 50th Percentile (CMAS)



**50th Percentile**

**Student Growth Percentiles (SGPs) are assigned by ranking students' 2021 scale score in comparison to their 2019 academic peers. The 50th percentile is the statewide median. However, this approach may mask potential statewide performance shifts.**

### Baseline-Referenced Growth (New Approach)

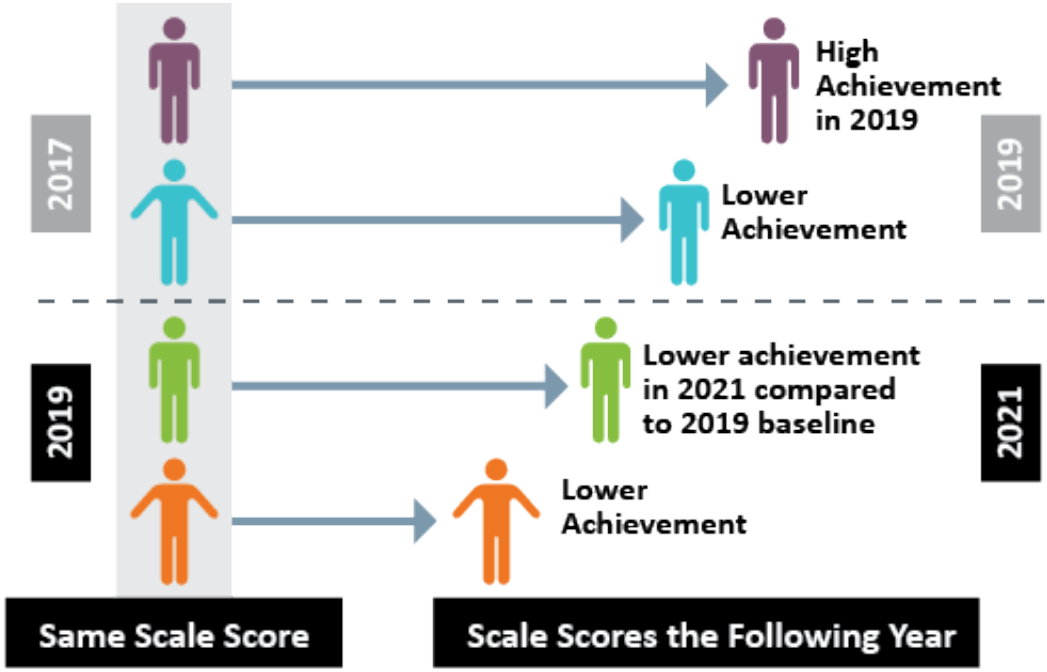
*Baseline-Referenced Growth is the approach the department recommends for considering the impact of COVID; it is the department's approach for public reporting of growth this year.*

The department, in collaboration with national experts (i.e., National Center for Improvement of Educational Assessment), added a new approach in light of statewide shifts in performance. Baseline-referenced growth enables direct comparison of current results against historical expectations of progress to detect shifts in statewide performance over time. The baseline growth metric is still a normative measure but relies on an historic academic peer group to contextualize current student progress. The norming group does not change each year, but consistently represents baseline (pre-pandemic) growth expectations that are then applied to the current year. Baseline growth could result in a state-level MGP for 2021 that is less (or more) than 50. The distance from 50 provides an estimate of the impact of conditions during the pandemic on student learning. The illustrations on the next page demonstrate these concepts.

For WIDA ACCESS, the historical baseline expectations were established from 2019 to 2020, and then applied to 2020 to 2021 student results. For CMAS, the skip-year baseline expectations were from 2017 to 2019, and then applied to 2019 to 2021 student results. The staggered roll-out of PSAT/SAT grade levels between 2016 and 2018 meant that historical academic peer groups are not available for the majority of grades and subject areas. The department is still investigating if and how these limited PSAT/SAT baseline growth results can be used to meaningfully characterize high school student progress over the past two years.

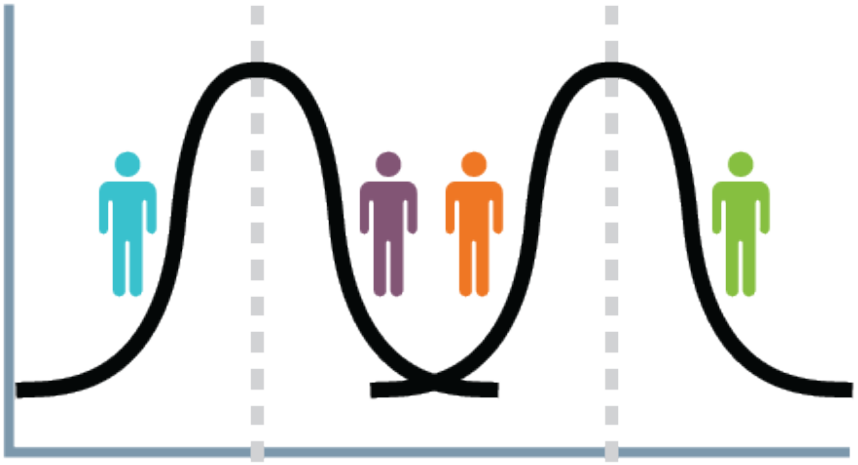
# Baseline-Referenced Growth

## Comparison of Academic Peers (CMAS)




Current students (2019-2021) are aligned to historical academic peers (2017-2019).

## Establishing the 50th Percentile (CMAS)



In the Baseline Growth approach, the historical SGPs anchor the percentiles and the 50th percentile stays firm. Then you can compare current performance to historical expectations and observe statewide shifts.

↑ 50th Percentile

Illustrations on how school level MGPs are developed are included in the appendix at the end of this document.

## Purposes of Reviewing Baseline Growth Data in 2021-22

The department recommends consulting the baseline-referenced growth results to help understand the impacts of the pandemic on student progress over the past eighteen months and to support recovery efforts. There are advantages at both the state and local levels for using growth data.

- State Level. These data are informing the department's response efforts to support the field and prioritize resources. State assessment data and analyses (like the growth data) are some of the few available data sources for policymakers to consider as they review the current policy landscape.
- Local Level. For many districts, there may be a strong understanding of current student performance and need based on local academic assessments. The state growth data may provide confirmation, or additional nuance of this understanding. In some districts, the state growth model is the only analysis that provides insights into student progress over time. The growth model can also provide awareness of district performance relative to other districts and student groups. The state-level data provides a comparison point to provide additional context to local results. High level insights gained from this data may be used to inform longer term planning and resource allocation.

## Cautions in Interpretations (Participation and Usage Considerations)

During the pandemic, the department will not be using the 2021 growth data to generate performance frameworks due to the accountability pause. Likewise, the department discourages using the state growth data for local accountability purposes. This data has been made available to support understanding and promote urgent action where needed. Members of the Technical Advisory Panel (TAP) and the COVID-19 Policy Implications Stakeholder Group have expressed concerns about the potential for misuse of this data given its complexity; the department encourages careful consideration of the current context when interpreting results.

Participation rates on the state assessments varied greatly by district and school and should be closely reviewed to determine if the tested student population is representative of the overall enrolled student population. If one or more student groups (e.g., English Learners, white students) were systematically over- or under-represented among those testing, the observed school or district results may not be an accurate reflection of the performance of the system as a whole. CDE has analyzed both current and historical data and found that participation rates above 85% generally ensure adequate representativeness for results to be interpreted with confidence. For schools and districts with participation rates under 85%, the performance data may not be representative of the full student population and should be interpreted with caution. CDE recommends that systems falling below this 85% threshold look more closely at their individual disaggregated group participation to determine if the tested student make-up is similar enough to the overall enrollment to support using performance results for informational and planning purposes. It is noted that some charter school authorizers may use this data for contract renewals depending upon participation rates and local context.

**Statewide Participation on State Assessments**

| State Assessment | Grade Level | 2019 Statewide Participation | 2021 Statewide Participation |
|---|---|---|---|
| CMAS Required Grades and Content Areas Only | Third - ELA | 96.9% | 76.2% |
| | Fourth - Math | 96.9% | 75.7% |
| | Fifth - ELA | 96.2% | 74.4% |
| | Sixth - Math | 94.9% | 68.6% |
| | Seventh - ELA | 92.4% | 63.7% |
| | Eighth - Math | 88.8% | 57.9% |
| | **EMH Level** | **2020 Statewide Participation** | **2021 Statewide Participation** |
| WIDA ACCESS for ELLs | Elementary | 99.1% | 86.0% |
| | Middle School | 99.0% | 77.5% |
| | High School | 94.5% | 64.4% |

## State Level Growth Trends

Overall, the state's growth results declined in 2021, consistent with national trends. The following describes high level observations for CMAS and WIDA ACCESS growth. Note that all percentiles refer to the baseline approach.

Summary of Statewide Growth Results for CMAS:

- For CMAS growth, all available grades experienced declines in growth as measured by baseline-referenced growth calculations. This indicates that students made less progress during the pandemic than would have been expected during a normal year. Note: Because of the absence of state assessments in 2020 and the requirement that students test in only one content area per grade for 2021, baseline growth scores are only available for English Language arts in grades 5 and 7, and grades 6 and 8 for math.
- For English Language arts, the observed declines in growth and anticipated long-term impacts can generally be described as modest or moderate. In contrast, the declines and anticipated long-term impacts for math are better described as moderate or large.
- Based on CDE's analysis, 2021 results are fairly representative of all Colorado students. There was a slight over-representation of white students among testers, which likely means the 2021 results may slightly over-estimate actual statewide performance.

**Statewide Baseline Growth Results for CMAS**

| Grade & Content Area | Cohort MGP | Baseline MGP | Difference |
|---|---|---|---|
| Grade 5 ELA | 50.0 | 46.0 | -4 |
| Grade 7 ELA | 50.0 | 40.0 | -10 |
| Grade 6 Math | 50.0 | 33.0 | -17 |
| Grade 8 Math | 50.0 | 37.0 | -13 |

- Greater declines were seen for some disaggregated student groups, including English learners, students eligible for free- or reduced-price meal programs, students on an IEP, and most minority students (American Indian or Alaskan Native, Black or African American, Hispanic or Latino, and Pacific Islander).

Summary of Statewide Results for WIDA ACCESS growth:

- Approximately 80% of eligible students participated in the 2021 WIDA ACCESS administration. This percentage, while lower overall then that of past years, showed no significant difference in demographic representation. This means 2021 results are likely representative of the overall state EL population.
- The observed 2021 WIDA ACCESS growth results are included in the table below. Overall, baseline-referenced MGPs were significantly lower than the cohort-referenced MGPs for elementary and middle school students. This indicates that K-8 students made less progress relative to previous years. The baseline MGP was similar to the cohort MGP for high school students, potentially indicating that high school ELs made similar progress during the pandemic as compared to a typical year. This finding should be interpreted with caution, as by high school, the majority of Colorado English Learner's have achieved fluency, exited from ELD programming, and no longer take WIDA ACCESS. ELs still in program at this point may have other factors influencing their progression, and the consistency in growth in and outside of a pandemic will need to be investigated further.

**Statewide Baseline Growth Results for WIDA ACCESS**

| School Level | Cohort MGP | Baseline MGP | Difference |
|---|---|---|---|
| All Students (55,032) | 51 | 36 | -15 |
| Elementary (N=34,676) | 51 | 32 | -19 |
| Middle (N=11,476) | 51 | 35 | -16 |
| High (N=8,879) | 51 | 50 | -1 |

- Growth for disaggregated student groups (e.g., student race/ethnicity, IEP status) indicate moderate to large impacts on students' progress in acquiring English language fluency.

## Additional Resources and Support

For additional information and support in understanding growth, the following resources are available:

**Growth in Colorado**. Resources, technical information, and report information.
https://www.cde.state.co.us/accountability/coloradogrowth

**Analyzing and Responding to State Assessment Data**. Considerations for state data use for planning given assessment conditions and participation rates.
https://www.cde.state.co.us/accountability/analyzingandrespondingtostatedata

**Unified Improvement Planning and Accountability Training**. Specific training opportunities
https://www.cde.state.co.us/uip/uip_training

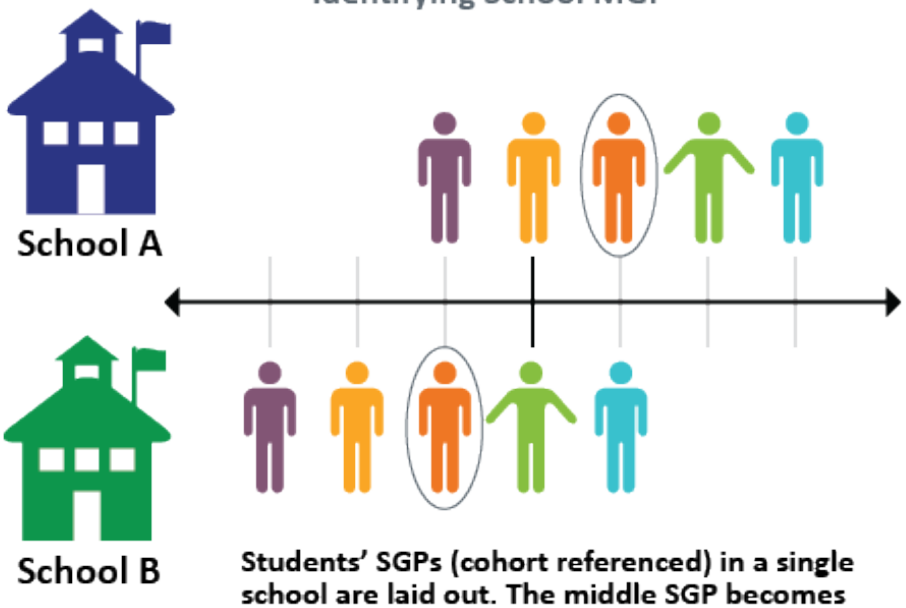
**State Accountability Data Tools and Reports**. As visualizations and additional reports are published, they can be accessed here https://www.cde.state.co.us/accountability/schoolviewdataandresults

For additional questions, contact the Accountability and Continuous Improvement Unit at accountability@cde.state.co.us.

# Appendix

## Cohort-Referenced Growth

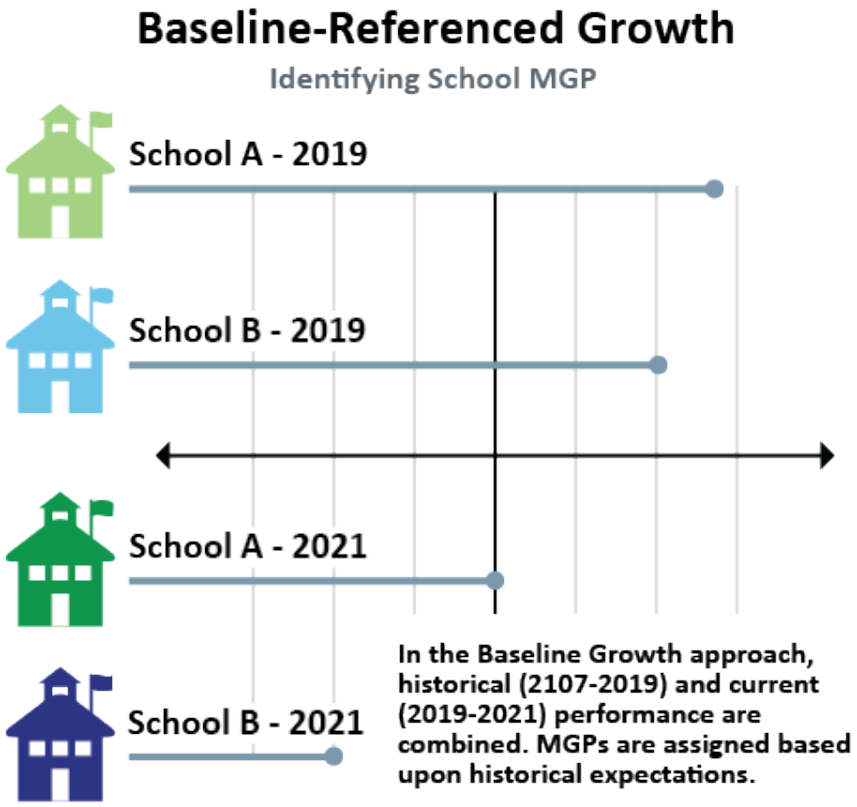
### Identifying School MGP



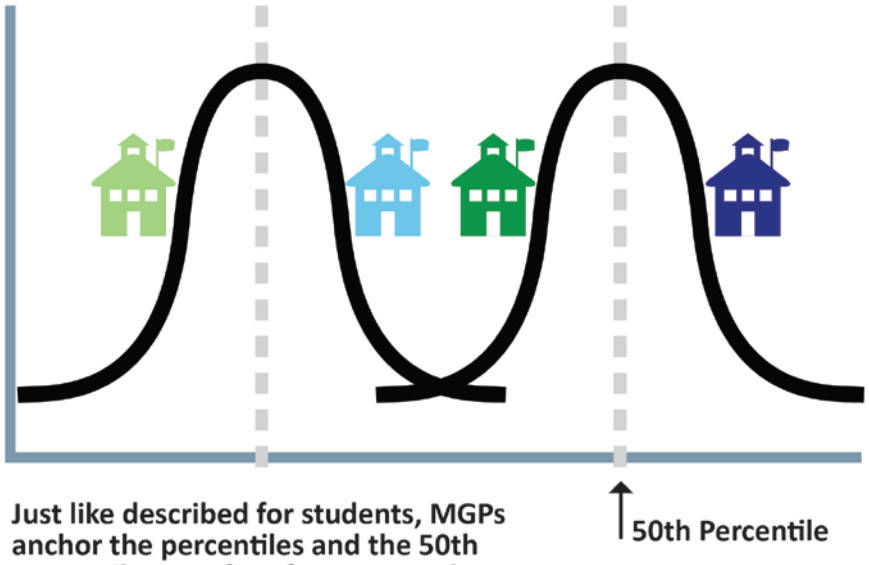

**Students' SGPs (cohort referenced) in a single school are laid out. The middle SGP becomes the schools' Median Growth Percentile (MGP) for that grade and content area.**

### Establishing the 50th Percentile (CMAS)


**The statewide 50th percentile for schools reflects the median for all schools in that grade and content area.**




## Establishing the 50th Percentile (CMAS)




Just like described for students, MGPs anchor the percentiles and the 50th percentile stays firm from 2019. Then you can compare current performance to historical expectation and observe statewide shifts.