

The Colorado Growth Model

Frequently Asked Questions

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If you have a question that is not answered here, please send your question to growth.questions@cde.state.co.us

Resources for the Colorado Growth Model, including the Training Video, Technical Report and state, district and school results are available at www.cde.state.co.us/growthmodel.asp.

1. What is the Colorado Growth Model?

The Colorado Growth Model is a statistical model to calculate each student's progress on state assessments, and is also a tool for displaying student, school, and district results to educators and to the public.

2. What does the Colorado Growth Model tell us?

The Colorado Growth Model shows us:

- how individual students (and groups of students) progress from year to year toward state standards. Each student's progress is compared to the progress of other students in the state with a similar score history on CSAP in that subject area.
- among which students greater and lower growth is observed.
- schools and districts that produce the highest sustained rates of growth in academic achievement. (These schools or districts may not be ones with the highest test scores every year.)

3. What is growth?

For an individual student, growth is a measure of progress in academic achievement. For some states, this measure might simply be a change (a gain or a loss) in test scores from one year to the next. For Colorado, growth is not expressed in test score point gains or losses, but in percentiles of gain. An individual's gain or loss in test score points is used as the basis for a growth calculation, using a statistical model called *quantile regression*. The calculations use all available test scores to estimate a student growth percentile for each student. The student growth percentile score tells us how a student's test score change from one year to the next compares with that of other similar students (members of his or her academic peer group). So, Colorado's measure of growth is a *normative* rather than an *absolute* one.

For example, observing that an animal gains X number of pounds in its first year of life indicates the magnitude of weight increase but not whether the magnitude is deficient, typical, or excessive. In the same way, test score increases, given as a number of scale score points, lack a context capable of indicating whether their growth is normal or abnormal. In Colorado, students with the same achievement history are compared to each other placing their test score changes in a context capable of indicating whether growth is high, typical, or low.

4. What is a student growth percentile?

A ***student growth percentile*** defines how much relative growth a student made. The Colorado Growth Model serves as a way for educators to understand how much growth a student makes from one year to the next relative to a student's "academic peers." More specifically, the Colorado Growth Model compares each student's current achievement to students in the same grade throughout the state who had similar CSAP scores in past years. The model then produces a student growth percentile, much like children's height and weight percentiles that pediatricians share with parents. Percentile scores have a relatively straightforward interpretation: A child that is in the 76th percentile in weight is as heavy or heavier than 76% of other children of the same age.

In terms of Colorado Growth Model, a student growth percentile of 60 indicates the student grew as well or better than 60 percent of her academic peers. The test score data underlying these student growth percentiles are not perfectly precise, because they contain measurement error, so the growth percentiles themselves are in turn also not perfectly precise. A student with a growth percentile of 63 may not be growing much faster than another student with a 60. In a similar way, even though you might not be able to reliably discern a 63-decibel sound from a 60-decibel one, you can still easily categorize different sounds as soft, normal, or loud - finer-grained comparisons can be hard to make. For this reason, student growth percentiles are categorized by "low", "typical," or "high" growth - we can be pretty sure about these large differences, even if small differences may not be reliable or meaningful.

5. What is an academic peer?

Academic peers are defined as students in a particular grade with a similar CSAP score history.

The concept of similar score history is discussed in the Colorado Growth Model Technical Report available [on CDE's website](#). The CSAP score history examined includes all past scores available for a given student. So, for a student who has had low CSAP scores (consistently at the Unsatisfactory level) for the last few years, his or her growth is compared to students who have scored similarly.

This method of using academic peer groups also means that the Colorado Growth Model is fair in its estimation of growth percentiles for all students, because the model is blind to differences such as race, ethnicity, gender, and other demographic characteristics. The growth of students in traditionally at-risk groups, such as those from families with low income, is estimated only using prior test scores - these students don't get more credit for making strong academic progress and being a member of an at-risk group.

6. What is a median growth percentile?

The *median growth percentile* summarizes student growth rates by district, school, grade level, or other group of interest. The median is calculated by taking the individual student growth percentiles of all the students in the group being analyzed, ordering them from lowest to highest, and identifying the middle score, which is the *median*. The median may not be as familiar to people as the *mean* or average, but is similar in interpretation. Medians are more appropriate to use than averages when summarizing a collection of percentile scores.

7. What is considered typical growth?

The answer depends on whether you are referring to student growth percentiles (individual-level scores) or median growth percentiles (group-level scores).

As defined by a Colorado State Board of Education rule, a student growth percentile for a single child that falls within the 35th-65th percentile range reflects Typical Growth.

When referring to median Growth Percentiles, such as for a school or demographic group, the Colorado Department of Education (CDE) considers a median of 50 to be typical growth for school or group. The statewide median growth percentile in each subject and grade is the 50th percentile. When examining medians for schools, grades, subjects or groups, it is useful to look for differences from 50 when investigating growth. These data are particularly useful for benchmarking purposes and to understand how other schools or grades are doing in addressing problems in the educational system, such as the frequently observed achievement gap between white and black students. Comparing median growth percentiles for these two groups within a school or district can tell us whether existing achievement gaps will be closing. There is no single "rule of thumb" for deciding what are low, typical, or high growth median growth percentiles.

8. What is considered low growth?

As defined by Colorado State Board of Education rule, a student growth percentile for a single child that falls below the 35th percentile reflects low growth. For example, a student growth percentile of 20 indicates that 80% of similar students made higher gains than this student.

9. What is considered high growth?

As defined by Colorado State Board of Education rule, a student growth percentile for a single child that is above the 65th percentile reflects High Growth. For example, a student growth percentile of 80 indicates that 20% of similar students made higher gains than this student.

10. How much growth is required?

Colorado's goal, expressed in the Education Accountability Act of 2009, is for all children to be on track to proficiency within three years or by 10th grade, whichever comes first. We need to be able to clearly show the progress necessary to reach this goal each year, and evaluate whether each student's progress is adequate or not. CDE reports to each district their individual student growth percentiles, and a variety of related pieces of data, including whether the student is on track to catch up, keep up, or move up within the official time frame used by CDE.

11. What does it mean for a student to be *catching up*?

Catching Up indicates that a student previously scoring Unsatisfactory or Partially Proficient demonstrated enough growth in the past year to reach Proficient or Advanced within three years or by 10th grade (to be on track to "catch up" to the state's proficiency goal).

12. What does it mean for a student to be *keeping up*?

Keeping Up indicates that a student previously scoring Proficient or Advanced demonstrated enough growth in the past year to maintain proficiency over three years or until 10th grade (to be on track to “keep up” with the state’s proficiency goal over time).

13. What does it mean for a student to be *moving up*?

Moving Up indicates that a student previously scoring Proficient demonstrated enough growth in the past year to reach the level of Advanced within three years or by 10th grade (to be on track to “move up” to the state’s highest proficiency goal).

14. What are the Colorado Growth Model data display tools?

Colorado has invested a great deal of time and effort into providing informative and interactive internet-based data displays for parents, educators, and other stakeholders in the public education system. These web-based tools show district, school, and student results from the Colorado Growth Model to facilitate use by educators and members of the public at large. Interested parties can access the Colorado Growth Model software at https://cdeapps.cde.state.co.us/growth_model_public/. Additional information about the growth model is available on CDE's website at www.cde.state.co.us/growthmodel.asp.

Anyone can use the public-level [Colorado Growth Model website](http://www.cde.state.co.us/growthmodel.asp). It provides a summary-level view of schools' and districts' growth and achievement results. Users simply need a relatively up-to-date version of a web browser, equipped with a plug-in to display Adobe "Flash" content, and an active internet connection. At this website users can explore and compare schools and districts on growth and achievement levels.

District and school users with a need for access to student-level data can use the more complete [Colorado Growth Model website](http://www.cde.state.co.us/growthmodel.asp). This site allows users to explore all the Colorado Growth Model data in their district or school. Access to this site is protected by a password so that confidential individual student data are not available to the general public.

15. What is the “average” student growth at our school or district?

The median growth percentile for the school or district summarizes the growth percentiles for all students in the school or district providing a measure of “average” student growth for a school or district. These values are made publicly available by the Colorado Department of Education and can be accessed at <http://www.schoolview.org/>, either by using the interactive Colorado Growth Model application, or by consulting data and reports on every school and district at <http://www.schoolview.org/performance.asp>

It is important to note that averages cannot be calculated for student growth percentiles - medians must be used instead. Most computer programs for organizing data will have a median calculation function.

16. How does student growth in our school compare with other schools, or how does student growth in our district compare with other districts?

The median growth percentile can be used for comparison purposes. These values are made publicly available by the Colorado Department of Education and can be accessed at <http://www.schoolview.org/performance.asp>.

17. How does student growth differ between groups of students?

The median growth percentile for a group can be used for comparison purposes. These values are made publicly available by the Colorado Department of Education and can be accessed at https://cdeapps.cde.state.co.us/growth_model_public/. You can currently compare students in different districts and schools in the [public data Colorado Growth Model website](#). In the future you will also be able to compare groups' median growth percentiles, such as ethnic groups or genders.

18. What percentage of students are making growth adequate to reach proficiency within three years? How much extra growth do our students need to reach proficiency?

You can find the percentage of students Catching Up, Keeping Up, and Moving Up within the district elementary, middle and high school levels behind the "District & School Diagnostic Performance Reports" link on <http://www.schoolview.org/performance.asp>

19. Do we see especially high or low growth in certain grades, content areas, instructional programs or classrooms in our district or school?

Some of these comparisons can currently be made using [the public data Colorado Growth Model website](#). Other comparisons can be explored behind the "District & School Diagnostic Performance Reports" link on <http://www.schoolview.org/performance.asp>.

This information is currently available to districts and schools through their individual-level Colorado Growth Model software, as well as in raw data provided by CDE.

20. How are the different schools in our district doing? Are there any patterns?

The median growth percentile can be used for comparison purposes. Look at the schools' median growth percentiles, as shown in the public data Colorado Growth Model, as well as at the tutorial videos in the [SchoolView Learning Center](#), which can assist you in understanding and exploring the data.

21. Does successfully moving from one achievement level to a higher one necessarily produce a higher growth percentile than moving up within an achievement level?

No. student growth percentiles are calculated on the basis of overall growth, not with reference to movement between achievement levels. For example, a student can have a higher growth percentile and stay within the Unsatisfactory level of achievement than a student moving from Unsatisfactory to Partially Proficient. Growth percentiles describe growth anywhere along the score scale, not just as achievement levels are crossed.

22. Is there an established minimum group size for creating a median growth percentile for a school, disaggregated group, classroom, etc?

Yes - the District and School Growth Summary Reports available [here](#), and the [Colorado Growth Model](#) only display medians when data for a minimum of 20 students are available and should be included in this group's summary median. This is done for two reasons. First, the privacy of individual students must be protected at all times. It is very important not to release data to the public that are not adequately anonymous, and with small numbers of students in a given group, it might be possible to deduce exactly who each person is and what their data were.

Second, groups that have fewer than 20 members are not fairly characterized by a single number like the median because just a few unusually high or low numbers can have a big influence on it. The data for groups that have fewer than 20 members can be better understood by looking at the complete set of numbers, rather than by attempting to capture them in a single summary statistic. Districts and schools may need to do this as they evaluate their programs and plan for the future, but the public has no need for such detailed private student-level information.

23. Which students get growth percentiles, and which student growth percentiles are included in a school or district's median?

In order to receive a growth percentile score in a CSAP content area, a student needs to have valid scores in that content area from two consecutive years, following a normal grade progression.

To be included at the:

- School Level: Growth percentile scores are included in school summary calculations only for those students whose growth scores reflect two consecutive years continuously enrolled in the same school (or in the next school level up within the same district, such as from a middle school to a high school), and who were not expelled in the second of those two years.
- District Level: Growth percentile scores are included in district summary calculations only for those students whose growth scores reflect two consecutive years continuously enrolled in the same district.
- State Level: All growth percentile scores are included in calculations.

Accountability and Improvement

24. How is the growth model included in School Accountability, District Accreditation, and Adequate Yearly Progress under No Child Left Behind?

The Education Accountability Act of 2009 tasks CDE with creating a method for bringing these three accountability systems into alignment, and the Colorado Growth Model is an integral piece of this planned alignment. The state has already obtained approval from the U.S. Department of Education for the purpose of using data from its growth model for the calculation of Adequate Yearly Progress. In 2009-2010, the State Board of Education will adopt the rules necessary for full implementation of this law.

25. How will the growth ratings be reported in the SAR (School Accountability Report)?

The Education Accountability Act of 2009 did away with the SAR and replaced it with a [web portal](#) containing school, district, and state growth and achievement data. The SAR

will no longer be produced as it has been until 2008, but much of the data previously reported on the SAR will be available in the [new CDE portal](#).

26. How can I help my school get a higher median growth percentile?

For a school to have a higher median growth percentile, the students in the school need to have higher student growth percentiles. This means students' growth rates in that school need to be raised. One of the overall goals of the effort to design and implement the Colorado Growth Model was to focus educators' attention on the improvement of all students' growth rates, not just those of students near the boundaries of achievement levels.

27. In what ways can schools set goals around growth for individual students?

Schools and districts can set goals based on information provided by the Colorado Growth Model in several ways. These include goals such as:

- Increasing the percentage or number of students making at least typical (50th percentile) growth.
- Increasing the percentage or number of students making high growth (above the 65th percentile).
- Decreasing the percentage or number of students making low growth (below 35th percentile).
- Increasing the median growth percentile for a group of students, a grade, a subject, or a school.
- Increasing the percentage or number of students on track to Catch Up, Keep Up, and Move Up.

28. What if I have a question that is not answered here?

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