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StriveTogether[®]

Cradle-to-Career Outcomes Data Guides: *Middle Grade Math*

Developed in
partnership with





Middle Grade Math

StriveTogether's recommended middle-grade math indicator is percentage of eighth graders scoring proficient or higher on the state math assessment. This guide provides information on why middle-grade math matters, recommended indicators, data sources for indicators, detailed data specifications, how to calculate this outcome, data disaggregation, frequently asked questions, learning resources and data sharing. This guide also recommends data collection strategies, sources and methods for building data practices that can be used to better serve communities.



Why this outcome matters

Key takeaways:

- **Proficiency in middle-grade math increases the likelihood of high school graduation and positively influences later life outcomes.**
- **A strong mathematics foundation can increase enrollment in more rigorous math courses and create pathways to STEM-related fields.**
- **The pandemic increased the gap in middle-grade math proficiency between Black and Latine students and white students.**

A wide body of evidence demonstrates that early life test scores are correlated with a range of later life outcomes for individuals, including educational attainment, teenage childbearing and illegal behaviors ([Heckman, Stixrud, and Urzua 2006](#)). Middle-grade math is a predictor of high school graduation ([Balfanz, Herzog, and Douglas 2007](#)), and achievement in eighth-grade math is associated with later life outcomes such as income, educational attainment, declines in teen motherhood, incarceration and arrest rates ([Kane et al. 2022](#)).

Middle-grade math is crucial in creating pathways to STEM-related fields, as well as enhancing critical thinking, reasoning and problem solving ([Su, Ricci, and Mnatsakanian 2016](#)). Students need a strong mathematics foundation to succeed in STEM fields and STEM-related topics in their daily lives ([NCSM](#)). Access to more challenging math courses in middle school is linked to later enrollment and success in more rigorous math courses. Demonstrating proficiency in middle-grade math is highly predictive of enrollment in later math courses such as Algebra I — a course that can act as a “gatekeeper” for access to upper-level math courses ([Mathematica](#)).

A 2022 national assessment of math achievement shows substantial declines in proficiency for students in the fourth and eighth grades ([NAEP](#)). Compared to 2019 pre-pandemic scores, math proficiency dropped by five percentage points for fourth grade and an unprecedented seven percentage points for eighth grade. The pandemic increased inequities in academic outcomes across most racial ethnic groups. Math score gaps among fourth-grade Black and Latine students compared with white students grew in 2022 ([NAEP](#)). Research also shows that white students are more likely than Black and Latine students to take Algebra I earlier and pass the course ([Mathematica](#)).



Recommended indicators

Since No Child Left Behind ([NCLB](#)) was signed in 2002, and more recently under the Every Student Succeeds Act ([ESSA](#)), state education agencies (SEAs) have been federally required to create state accountability systems; administer state-created assessments in reading, math and science; and report achievement data to the U.S. Department of Education. Students must be assessed annually in third through eighth grades and at least once in high school.

Federal law also requires states to establish the performance levels students must reach in order to be classified as “proficient.” Although this is a federal rule, states can establish their own tests and set their own proficiency standards. States must report data such as the number of students taking the assessment or an alternate assessment and the percentage of students attaining grade-level or above proficiency on the state’s reading and math assessments ([Department of Education](#)). For accountability, achievement data must be reported in aggregate as well as disaggregated by student demographics to measure differences among traditionally underserved students.

Middle-grade math outcomes can be operationalized as the percentage of eighth graders scoring proficient or higher on their state’s

math assessment. If eighth-grade scores are unavailable, we suggest using scores from seventh grade, or sixth grade if seventh is not available.

The following are examples Cradle to Career Network members have used. These examples indicate the number of eighth graders meeting or exceeding individual state standards using individual state assessments. Many states indicate that this level of performance can be referred to as “proficient,” and some network members use different terminology to describe the same thing.

1. All Hands Raised: Percentage of students meeting or exceeding eighth-grade math standards.
2. Cradle to Career Cincinnati: Percentage of eighth-grade students who scored proficient or better on math test.
3. ImpactTulsa: Percentage of eighth-grade students scoring proficient or advanced on math test.
4. South Bronx Rising Together: Percentage of eighth-grade students achieving proficiency or above.
5. UP Partnership: Percentage of students passing eighth-grade mathematics test.



Data sources for indicators

District data:

School- and district-level data on math proficiency are reported on district websites. Districts without websites are permitted to make report cards available in another format.

Availability: This data is often available via school district websites with a one-year lag.

State data:

States vary in their collection and reporting approaches. States may update their websites on different schedules than they use to report to the U.S. Department of Education, but they also vary by the content the state has determined appropriate for that grade and subject. More information on individual state reporting can be found [here](#).

Availability: This data is available on each state's [State Report Card website](#), including school- and district-level data, with about a one-year lag. StriveTogether also maintains a list of state report card sites that can be found [here](#).

Individual SEAs can determine their statewide assessments, academic standards and thresholds for proficiency, meaning that changes in any of these factors can lead to discrepancies across time.

Additionally, because assessments, standards and proficiency thresholds are not consistent across states, cross-state comparisons are not recommended. See FAQs for additional resources on cross-state comparisons.

Lastly, because of the COVID-19 pandemic, several states waived their assessment requirements ([CEP](#)).

Federal data:

There are multiple sources of federal data, with varying formats, described below.

EDFacts

The U.S. Department of Education's EDFacts initiative collects, analyzes and centralizes data provided by SEAs on various topics. Raw data documents (in CSV form) from EDFacts contain math achievement and participation data at the school and local education agency (LEA) or district level. This data has an estimated one-year lag. For example, the math achievement and participation data for the 2018-2019 school year was updated in September 2020.

The Urban Institute's Education Data Portal

The Urban Institute centralizes and compiles data from school- and district-level achievement assessments in math from EDFacts through the [Education Data Portal](#). Achievement scores are provided by race, ethnicity and other disaggregated classifications. The math assessment score is reported as a percentage, with the magnitude of the range indicating a higher score. As noted above, EDFacts data has a one-year lag, and the portal makes the data available the following quarter. For example, the math scores for 2018-2019 were made available in September 2020.

Note on federal data identifiers

To use federal data sources, it is necessary to use district identifiers (searchable through NCES's [Search for Public Districts Tool](#) or [Search for Public Schools Tool](#)). School districts are also known as local education agencies (LEAs). Each LEA is assigned a seven-digit ID by the National Center for Education Statistics (NCES) called the NCES LEA identification number. The first

two digits make up a unique state ID called the American National Standards Institute state code, which adhere to Federal Information Processing Standards codes, and the last five digits are unique within that state for the LEA. Each school is also

assigned a unique ID by the NCES. School IDs are twelve digits. The first seven digits make up the NCES LEA identification number for the LEA the school belongs to, and the remaining five digits are unique to that school within the LEA, but those five

Detailed data specifications

Definitions

Percentage of eighth graders scoring proficient or higher

The percentage of eighth-grade students scoring proficient or higher on the SEA's mathematics assessment. It uses the total number of students with assessment participation data and the total number of students scoring proficient or higher.

Assessment participation in mathematics

The unduplicated number of students who were enrolled during the period of the state assessment in math ([EDFacts documentation](#)).

Academic proficiency in mathematics

The unduplicated number of students who completed the state assessment in math for whom a proficiency level was assigned ([EDFacts documentation](#)).

Target population

The target population for this metric includes students who attend schools in the districts that overlap with your cradle-to-career partnership's geographic scope. For some, the target population will be all of the eighth graders in the school district. If, however, your geographic focus is different from the school district, it may be necessary to collect this data at the school level.

>>>>> Example

Formula for calculating the percentage of eighth graders scoring proficient or higher in a given school year

$$\frac{\text{Number of eighth graders scoring proficient or higher on the SEA math assessment}}{\text{Total number of eighth graders that participated in the SEA math assessment}} \times 100$$

>>>>> Data disaggregation

States provide academic achievement data on the number of students taking each type of assessment by proficiency status (e.g., “Attained proficiency” and “Not proficient”) by subject and grade. States also provide assessment participation data — or the number of students enrolled during the state assessment testing window — by whether the students participated in or did not participate in the state assessment and by subject and grade ([EDFacts](#)). For privacy reasons, under the Family Educational Rights and Privacy Act, some demographics may be too small to report. Both achievement and participation data

are reported in the following demographics, when possible, as required by law:

- Each major racial and ethnic group
- Economically disadvantaged students (economically disadvantaged status)
- Children with disabilities (disability status)
- English learners (English learner status)
- Children who are experiencing homelessness (homeless enrolled status)
- Children who are in foster care (foster care status)
- Students who identify as male or female (sex [membership])



Frequently asked questions

What if my community crosses state lines?

Because every state uses different assessments and proficiency standards or thresholds to measure math achievement, we recommend collecting the aggregated share of eighth graders scoring proficiently or meeting standards separately by state.

What if I want to compare my community's proficiency rates with the rates in another state?

The [Stanford Education Data Archive](#) normalizes proficiency rates across states using underlying ED Facts data. But data is not available at the school level and is sometimes limited. You can also use National Assessment of Academic Progress to make cross-state comparisons.

How do I collect math scores for multiple schools or multiple districts?

Take the individual school or district proficiency and assessment participation rates and find their average, weighting by the total number of students in each cohort (each individual denominator).

Are there examples of what we could use to measure eighth-grade math achievement?

Yes. See section two, Recommended indicators, for examples StriveTogether network members use.

What if eighth-grade scores on the state assessment are unavailable?

It is possible that states do not report eighth-grade scores for several reasons, including a statewide waiver in extreme circumstances such as the COVID-19 pandemic or other natural disasters that took place at the time when the test would typically be administered. In these instances, we recommend using seventh-grade scores. If seventh-grade scores are unavailable, we recommend using sixth-grade scores.

When are state assessments typically administered?

States generally administer their statewide assessments in the spring. A few states administer their assessments in the fall. Students who test in the fall are assessed on academic content from the previous school year. See state websites for detailed information about the timing of statewide assessments ([ED Facts documentation](#)).

What if my state changes assessments? Can I still compare the results?

Sometimes states create new tests with new performance standards. If your state changes assessments, we recommend making geographic comparisons within a particular year rather than comparisons over time.



Learning resources

National Assessment of Education Progress:

<https://nces.ed.gov/nationsreportcard/mathematics/>

NCES Long-term trends in reading and mathematics achievement:

<https://nces.ed.gov/fastFacts/display.asp?id=38>

IES: Regional Educational Laboratory Program — Mathematics:

<https://ies.ed.gov/ncee/rel/topics?topics=Mathematics&page=1>

A Model for Community Partnerships in Mathematics:

<https://files.eric.ed.gov/fulltext/EJ1120325.pdf>

National Council of Teachers in Mathematics: Building, Enlarging, and Empowering the Mathematics Community:

<https://www.nctm.org/News-and-Calendar/Messages-from-the-President/Archive/Trena-Wilkerson/Building,-Enlarging,-and-Empowering-the-Mathematics-Community/>

Education Commission of the State — ESSA: Quick Guides on Top Issues:

<https://www.ecs.org/wp-content/uploads/ESSA-Quick-guides-on-top-issues.pdf>



Data sharing

The StriveTogether [Guide to data sharing](#) provides important information about requesting, storing and working with data. It is important that cradle-to-career partnerships work with local school districts to obtain achievement and assessment participation data. This may involve

entering into a data-sharing agreement with local schools, districts or the state. In some cases, it may be possible to access student-level data for this outcome as part of a request for district- or state-level data. The data sharing guide provides important information for doing that responsibly.

StriveTogether[®]

StriveTogether is a national movement with a clear purpose: help every child succeed in school and in life from cradle to career, regardless of race, ethnicity, zip code or circumstance. In partnership with nearly 70 communities across the country, StriveTogether provides resources, best practices and processes to give every child every chance for success. The StriveTogether Cradle to Career Network reaches more than 14 million students, including more than 7 million children of color and over 7 million children experiencing poverty. The network spans 29 states and Washington, D.C.

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