



Achievement Gap  
Ranking Business  
Rules

2015-16

## Summary of Changes

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# Achievement Gap Ranking Business Rules

## Overview

The Michigan School Accountability **Achievement Gap Ranking** is a list of schools rank ordered by the size of the combined performance gap between high- and low- performing students in mathematics and ELA. A gap metric is computed for each appropriate content area and grade range and then combined into a single overall achievement gap index.

All public schools that meet the selection criteria are rank ordered to create the Achievement Gap Ranking list. Schools must meet a minimum size restriction and certain schools that serve specialized populations of students will be excluded. Please see school inclusion rules below for more details.

School-level values are calculated by aggregating student performance on statewide tests, including general assessments and those based on alternate standards. All valid tests are included, provided that students are eligible for being included in accountability. Please see score eligibility rules below for more details.

**Subjects** are academic content areas that are tested on standardized state tests. For purposes of the School Ranking, subjects taught at the presecondary (elementary/middle school) and secondary (high school) levels are treated as distinct. The subjects tested in years prior to 2014-15 were reading, mathematics, science, social studies, and writing. The subjects tested beginning in 2014-15 are English Language Arts (ELA), mathematics, science, and social studies. A small school may have as few as two subjects (for instance, a K-3 school may have only math and ELA at the elementary/middle level) while a larger school may have up to 8 (e.g., a large K-12 building may have math, ELA, science, and social studies at both elementary/middle and high school level). For purposes of this document, the term *subject* is considered to refer to a given content area and the grade level at which it is taught. Thus, “EM Math” is a distinct subject from “HS Math.” Only mathematics and ELA are used in achievement gap rankings.

## Narrative Description

The Achievement Gap Ranking list is generated through a series of aggregations and rankings. First, subject test scores for all eligible students (see score eligibility rules below for more details) are converted into Z-Scores (Help with Z-scores<sup>1</sup>), so that all scaled scores (and points, for some tests) are transformed into a value indicating the distance from the statewide mean. By ranking the Z-Scores within a single building, each eligible score is assigned to an achievement grouping: the Top 30%, Middle 40%, or Bottom 30% of scores within that subject. The achievement gap for that subject is calculated by subtracting the mean student Z-Score for the Top 30% group from the mean student Z-Score for the Bottom 30% group.

Next, the aggregated gap scores are converted into Z-Scores and compared against all other eligible buildings to put each building's score value on the same scale. These scores are then combined into a

**Weighting Subjects by FAY Counts: Example**

- Happy Valley School has:
  - **600 total tests given across all grades/subjects**
  - ELA: 200 students were tested
  - Math: 200 students were tested
  - Science: 150 students were tested
  - Social Studies: 50 students were tested
- Relative weights for FAY tested are:
  - ELA: 33.3% (200/600)
  - Math: 33.3% (200/600)
  - Science: 25.0% (150/600)
  - Social Studies: 8.3% (50/600)

building score. The number of students tested in each subject is used as a weighting factor for that subject when the building score is calculated (See Figure 1 – Example).

Buildings are then ranked by their overall building score. The ranking is converted into a percentile rank, which is the final Achievement Gap Ranking value reported.

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<sup>1</sup> Go to [www.michigan.gov/ttb](http://www.michigan.gov/ttb) and click on the [Help with Z-Scores](#) under the [Support and Documentation](#) section

## Eligibility Rules

### Score eligibility rules

In order to be included in the overall Achievement Gap Ranking calculation, a score must meet several requirements:

- It must be from a general or alternate summative assessment. English Language Proficiency assessments, while valid for participation credit in certain circumstances, do not count toward achievement on the Achievement Gap Ranking. MEAP, MI-Access, MEAP-Access, MME, and M-STEP have all counted for Achievement Gap Ranking purposes.
- The score must be valid. (i.e., all rules for completing a test must be met; there must be no prohibited behavior, misadministration of test, etc.).
- The test must have been completed by a public school/public school academy student. No scores from private school or home schooled students are included.
- The test must have been completed by a student who has attended the school for a Full Academic Year (FAY student). Scores from students who were enrolled for less than FAY will not be assigned to the school.
- The test must have been completed by a student who is not primarily educated by a Shared Educational Entity (SEE). Scores from SEE students are not included.
- The rules used for determining whether a score is eligible for inclusion are the same as those used for the Accountability Scorecard.

Scores are attributed to the school designated as the Feeder school. In general terms, this is the school where the student was enrolled and the school responsible for teaching the content standards being assessed on the test. (Business rules for the Full Academic Year Students<sup>2</sup>)

### Subject eligibility rules

In order to be included in a school's overall Achievement Gap Ranking, at least 30 FAY students must have been tested in the subject.

Only mathematics and ELA scores are used to calculate the Achievement Gap Ranking.

### School eligibility rules

In order to be included in the ranking, a school must meet the following eligibility requirements:

- Must have at least 30 FAY students, in two subjects, for the two most recent school years. The subjects need not necessarily be the same in both years, but there must be at least two.
- Must not be identified as a Center-Based Program serving exclusively special education populations. CBP's (buildings with 100% SE enrollment) are not eligible for ranking.
- Must be open as of September 30<sup>th</sup> of the accountability year. If the building closes in the interim, an active flag in the School Ranking results indicates this, although the building does get a ranking.

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<sup>2</sup> [https://www.michigan.gov/documents/mde/Achievement\\_Gap\\_Ranking\\_Business\\_Rules\\_548639\\_7.pdf](https://www.michigan.gov/documents/mde/Achievement_Gap_Ranking_Business_Rules_548639_7.pdf)



## Calculation Steps

This procedure assumes that student Z-Scores have been generated and are available for use. When used for Achievement Gap Ranking purposes, student Z-Scores are 1) calculated for FAY students only; 2) have a van der Waardens transformation applied to put them into a more nearly normal distribution; 3) are capped at a maximum of +2 and a minimum of -2.

This procedure assumes that the classification of each score into Top 30%, Middle 40%, or Bottom 30% (“Ntile”) for that subject has been completed.

### I. Initial student score aggregation

Using the score eligibility rules outlined above, calculate the following aggregates, split out by year, school, and subject:

- a. The number of FAY students with valid test scores
- b. The mean of the Z-Scores in the Top 30% group
- c. The mean of the Z-Scores in the Bottom 30% group
- d. The gap value (difference between I.c above and I.b above)

### II. Subject-level records

- a. Create a row for each building and subject indicating
  - i. The number of FAY tested
  - ii. The gap value

For the current and previous year.

### III. Subject-level calculations

- a. Determine subject eligibility for achievement using the subject eligibility rules outlined above (i.e., the value calculated in II.a.i above is  $\geq 30$  for both years)
- b. Calculate the total number of FAY tested for both years by summing both years of the number calculated in II.a.i above
- c. Calculate the weighted two-year averages for II.a.ii
  - i. Each calculation will take the form of:

$$\frac{(Val_{Current} * FAY_{Current}) + (Val_{Prior} * FAY_{Prior})}{(FAY_{Current} + FAY_{Prior})}$$

Where Val is the value of interest, FAY is the count of FAY tested students, and Current and Prior refer to each of the two years of interest leading up to the running of the ranking

- d. Calculate the Z-Score for the two-year average
  - i. Find the statewide average and standard deviation for mean gap, using only eligible subjects as described above.
  - ii. Calculate the achievement gap Z-Scores for each subject using the following formula:

$$\frac{(\hat{\mu}_{zj} - \hat{\mu}_z)}{\hat{\sigma}_z}$$

Where  $\hat{\mu}_{zj}$  is the two-year weighted average of the value of interest for school j,  $\hat{\mu}_z$  is the statewide average, and  $\hat{\sigma}_z$  is the standard deviation.

- e. Calculate the weighting of each subject in the final score.
  1. Sum the total number of tests taken by eligible students in eligible subjects
  2. The subject weight is:

$$\frac{n_j}{n_t}$$

Where  $n_j$  is the count of tests taken by eligible students in the subject and  $n_t$  is the total number of tests taken by eligible students across all subjects.

- f. Apply the subject weight by multiplying the gap Z-Score by the subject weight.

#### IV. Building-level calculations

- a. Determine building eligibility using the building eligibility rules outlined above.
- b. Calculate the overall combined gap index
  - i. Sum the weighted values of each eligible subject gap index for each eligible building
- c. Rank the buildings on the combined gap index, with a rank of 1 corresponding to the highest index value.
- d. Convert the ranking into a percentile rank using the following function:

$$100 * \frac{R - r_j}{R}$$

Where R is the maximum rank value obtained in V.c and  $r_j$  is the ranking of school j.

- e. Discard any decimals, leaving only the whole number. Note that this is not a rounding function; truncate any decimals.