

# Top-to-Bottom Ranking, Priority, Focus and Reward Schools Identification Business Rules

## Overview

**Top-to-Bottom Ranking:** List of schools, rank ordered by their performance. The ranking is based on *student achievement, student growth over time, school improvement over time* and *school achievement gaps* across all applicable tested subjects (mathematics, reading, science, social studies and writing), as well as graduation rate for schools that graduate students.

All public schools who meet the selection criteria are rank ordered to create the Top-to-Bottom (TTB) list using the following business rules:

- All students with test scores who are full academic year (FAY) are included.
- The school receives a ranking if at least 30 FAY students are tested in either the elementary/middle school span or the high school span (or both) for each year in two or more subjects.
- A student with a performance level of 1 or 2 is considered proficient.
- Schools are rank ordered using an *achievement index*, an *improvement (progress) index* and an *achievement gap index*. Schools with a graduation rate also have graduation rate and graduation rate improvement included in their ranking calculation.

Note: Achievement is weighted more heavily than improvement or achievement gaps. This is because the emphasis is on persistently low-achieving schools. Weighting achievement more heavily assures that the lowest performing schools, unless they are improving significantly over time, still receive the assistance and monitoring they need to begin improvement and/or increase their improvement to a degree that will reasonably quickly lead to adequate achievement levels.

**Priority Schools:** Schools in the bottom 5% of the Top-to-Bottom list are identified as *Priority Schools*.

**Focus Schools:** The 10% of schools with the largest achievement gaps according to the Top-to-Bottom list are categorized and treated for improvement as *Focus Schools*. The achievement gap is calculated as the distance between the average standardized scale score for the top 30% of students and the bottom 30% of students in each school. Any building that has a graduation rate less than 60% for three consecutive years is also included.

**Reward Schools:** The top 5% achieving schools as identified from the Top-to-Bottom ranking list, schools in top 5% in improvement composite index or a Beating the Odds school are identified as Reward schools. (The Beating the Odds business rules can be found at: [www.michigan.gov/reward](http://www.michigan.gov/reward).)

## Summary of changes for 2012--2013

*Changes in the business rules from the previous cycle to the current cycle are summarized on this page. Any of the changes that result in modifications to the calculations of the metrics are highlighted within the business rules (in blue italicized text).*

Removal of references to 'AYP' - replace with 'Accountability Scorecard'

Modification of graduation rate – Use the best of 4, 5 or 6 year graduation rate and the corresponding improvement

Normalizing of student test scores

Capping of student test scores and z-scores of -2 and +2

Definition of a Title I school for purposes of identifying Focus and Priority schools:

High Performing Bottom 30% Audit - Prohibit from appearing on the Focus list any schools whose bottom 30% group is relatively high performing as defined by:

- The school's bottom 30% group's proficiency rate is higher than the state average proficiency rate in at least two subject areas AND
- The school's Top-to-Bottom percentile rank is at least 75

Good-Getting-Great - Prohibit from appearing on the Focus list any schools whose bottom 30% group has a high rate of improvement as defined by:

- Remove any school that is at the 75th percentile on the Top-to-Bottom ranking or higher AND
- The school has gotten a "Green" (i.e. made safe harbor) in **every** subject/level combination for their bottom 30% subgroup on the Accountability Scorecard

Reward School Status: when a school reaches 85% proficient in each applicable subject (at least 30 FAY) and remains there for two years, it is awarded a "Green" status and given the opportunity to earn "Reward" status by continuing to show improvement. As long as the school remains above the 85% target for all students and any applicable subgroup, it will not drop below an overall "Green" rating. If the school does show improvement, it will be named a Reward School (starting in 2012-13, with 2013-14 being the first school year that any building could qualify).

All Priority schools (as determined in the lowest 5%) are to have an overall Accountability Scorecard color of red.

**Note:** If a school is red for participation for two consecutive years (or for three years out of five years), they are automatically named a Priority school and placed under the direction of the School Reform Officer (starting in 2012-13, with 2013-14 being the first school year that any building could qualify).

# Top-to-Bottom Ranking, Priority, Focus and Reward Schools Identification Business Rules

## Narrative

### Top-to-Bottom Ranking

*Datasets* to be included (if available)

- The most recent (up to) four years of published data for each officially adopted statewide achievement assessment<sup>1</sup>
  - There is no cap on the number of MI-Access or MEAP-Access proficient scores that can be counted toward proficiency
- The most recent four years of published data for four-year, five-year or six-year graduation rate (four years if four years are available)<sup>2</sup>
- Previous year PLA (or Priority school) list which includes identifiers for Tier 1 pool, Tier 2 pool and State Reform Office schools (2010 and 2011 only)
- Previous year SIG school list (2010)
- Title I status list; [Title I participating for the 2010-11 school year](#)

*School and Student criteria* for inclusion in the Top-to-Bottom calculations:

- Schools with at least 30 students defined as full academic year (FAY) over the two most recent years in at least two tested subjects will have the Top-to-Bottom ranking calculated
- [Building/School entities that are identified as special education center programs as determined by the MDE's Office of Special Education are exempted from receiving a ranking in the Top-to-Bottom ranking and any of the labels \(Priority, Focus and Reward\)](#)
- [Building/School entities that are identified as adjudicated youth programs as determined by the MDE's Office of Field Services are exempted from receiving a ranking in the Top-to-Bottom ranking and any of the labels \(Priority, Focus and Reward\)](#)
- Schools with fewer than 30 FAY tested students in any given subject will not have that subject included in their ranking. A building could be ranked with as few as two subject areas and as many as ten
- Closed schools:
  - If a school is active as of September 30 of the current school year AND has data from the current school year attributed to it, the school receives a ranking, even if they are closed at the time of the ranking
  - An indicator is added if the school is currently inactive at the time of list publication
- FAY tested rules are as follows:
  - Michigan has two semi-annual student count days, as provided in the State School Aid Act. These count days are the fourth Wednesday in September and the second Wednesday in February. These student count days are the basis of Michigan's definition of a full academic

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<sup>1</sup> The maximum number of years available (up to four) will be used for each assessment program.

<sup>2</sup> To account for graduation rate in the Top-to-Bottom ranking.

- year. In addition, school districts report student enrollment at the end of year on the Michigan Student Data System (MSDS)
- Documentation of full academic year is provided by enrollment in the school or district on the pupil count dates by MSDS records
  - Other documentation of student mobility is not used under the definition
  - The MSDS is used to look-up prior enrollment to determine if a student is considered full academic year
  - MSDS collections used for elementary and middle schools: Fall, Spring and End of Year at the feeder school, which is the school that the student attended during the school year
  - MSDS collections used for high schools: Spring, End of Year, Fall and Spring
  - If a student is not reported in an enrollment count in any Michigan school during one of the MSDS collections but is reported in the other two and the student's school reported data, that student will be considered non-FAY. If a school does not submit MSDS data (i.e. there are no data available for any students in one of the MSDS collections), all students enrolled in that school during the prior count and the following count will be considered FAY, even though they are missing data on one of the counts

*Student Assessment criteria* for inclusion in the Top-to-Bottom calculations:

- Top-to-Bottom ranking calculations are based on regular and alternate assessments (MEAP, MEAP-Access (if available), MME and MI-Access)
- All students with valid scores in the assessments are included
- All students with test scores who are FAY are included
- Only public school students are included (no homeschooled or private school students)
- The entity that is accountable for a student is based upon feeder school status
  - Feeder school for the 2011-2012 calculations points is the entity that had the student in the 2011-2012 school year
  - Feeder school for the 2012-2013 calculations points is the entity who had the student in the 2012-2013 school year

Note: The students for which a school is accountable are the same for both Accountability Scorecard and Top-to-Bottom ranking
- Ninth grade students who repeat ninth grade technically have a high school as their "feeder" school for their social studies test. This test reflects 8<sup>th</sup> grade content standards and 8<sup>th</sup> grade learning. For the ranking calculations, the high school is still considered the "feeder" but any school that does not include grade 8 as a grade/setting in the EEM will not receive an elementary/middle school social studies content area in their ranking, even if they have students who populate that field
- The same calculations as those used to determine the Accountability Scorecard student detail table (the base student-level table used in Accountability Scorecard calculations, including FAY and feeder rules). *This*

*means that the students for which a school is accountable are the same for both Accountability Scorecard and Top-to-Bottom ranking*

*Achievement (Two-Year Average)*

- Most recent two years of published data from fall MEAP, grades 3-9 in mathematics, reading, writing, science and social studies
- Most recent two years of published data from fall MEAP-Access, grades 3-9 in mathematics, reading and writing
- Most recent two years of published data from fall MI-Access, grades 3-9 in mathematics, science and English Language Arts (ELA) with ELA being treated as reading is for MEAP and MEAP-Access (Note: For Supported Independence and Participation, students receive an ELA score. For Functional Independence, they receive a reading score, but do not take writing. These scores are all treated as reading in the calculations.)
- Most recent two years of published data from spring MME, grade 11 in mathematics, reading, writing, science and social studies (with the addition of 12<sup>th</sup> graders who were FAY in the school but did not previously count toward either participation or proficiency for any school in a previous year)
- Most recent two years of published data from spring MI-Access, grade 11 in mathematics, ELA, science and social studies

*Improvement (Two-Year Average, Three-Year or Four-Year Slope)*

- Most recent two years of published Performance Level Change data from fall MEAP, grades 4-8 in reading and mathematics
- Most recent two years of published Performance Level Change data from fall MEAP-Access, grades 4-8 in reading and mathematics (will be included in the Fall 2013 list, when two years of MEAP-Access data are available)
- Most recent two years of published Performance Level Change data from fall MI-Access, grades 4-8 (Functional Independence only)
- Most recent four years of published data for all other grades, subjects and tests (to calculate three or four-year improvement slopes). If a school does not have four years of data to produce a slope, DO NOT produce a zero slope for that school
  - If the school has three years of data, generate the slope based on three years of data only
  - If the school has two years of data, calculate the change from the previous year to the current year as the slope

*Graduation Rate and Graduation Rate Improvement*

- Most recent two years of the [six-year](#), five-year and four-year cohort graduation rates
- Rate is based on a two-year average graduation rate (of the [six](#), five or four-year cohort rates)
- Improvement is based on a four-year improvement slope (of the [six](#), five or four-year cohort graduation rate). If the school does not have two years of data to produce a slope, DO NOT produce a zero slope for that school

- If the school has less than two years of data, make the slope n/a and produce the graduation index based *solely on graduation rate for the most recent year*
- If the school has three years of data, generate the slope based on three years of data only
- If the school has only two years of data, generate a simple change score based on those two years of data
- **The graduation rate will be based on the better of the four, five or six-year graduation rate.** The improvement rate used will correspond with the graduation rate (six, five or four cohort) used. (Starting with the 2012-13 cycle, six-year graduation rates are available for all years to calculate the improvement slope)

## Priority Schools Identification Calculations

Identify schools which are in the bottom 5% of the current Top-to-Bottom list

1. Using the Top-to-Bottom calculations and the percentile rank (variable name, spi.pr), identify all schools in the bottom 5<sup>th</sup> percentile
  - Calculate the number equal to five percent of the total number of [Title I participating schools in the 2010-11](#) school year
  - In rank order from lowest to highest, based on percentile rank (spi.pr), assign each school Priority status (excluding schools that are exempt) until that number of Title I buildings is met
  - Non-Title I buildings will be assigned Priority status based on rank, but will not count toward meeting the total number of Priority schools required
  - This number will be greater than the number of Title I buildings that receive a ranking, because some Title I buildings do not have enough students/data to receive a ranking
2. Create flag (named Priority) where 1=yes and 0=no
3. Indicator variable will be added to both the School Accreditation and School Performance Data tables
4. Label indicators for Priority schools: 1 = Yes and 0 = No
5. Closed schools:
  - If a school is active as of September 30 of the current school year AND has data from the current school year attributed to it, the school receives a ranking, even if they are closed at the time of the ranking
  - If a school receives an overall ranking, they are eligible for Priority school status
  - An indicator should be added if the school is currently inactive at the time of list publication

## Focus Schools Identification Calculations

1. Calculate achievement gap composite index for applicable (FAY at least 30) subjects for school j
  - a. Sum all applicable (FAY at least 30) subject achievement gap values for each individual educational entity
    - In the School Performance Data table, the columns that contain gap index values are those that begin with gapi (for gap index): gapi.zs.m.em, gapi.zs.r.em, gapi.zs.s.em, gapi.zs.t.em, gapi.zs.w.em, gapi.zs.m.h, gapi.zs.r.h, gapi.zs.s.h, gapi.zs.t.h, gapi.zs.w.h
  - b. Divide the sum of all available achievement gap values by total number of achievement gap values applicable (FAY at least 30) for each individual educational entity
    - Schools can have between 2 and 10 gap values
    - Create a new field that stores the number of achievement gap values used in the calculation
2. Sort schools by achievement gap composite index
3. Determine count of Focus schools to be identified
  - a. Number of schools must include 10% of Title I participating schools (include only [Title I participating](#) as determined in the **2010-11** school year) (Title I multiplied by 0.10 equals the target number).
    - In the ACCOUNTABILITY SCORECARD database, the Title I Buildings table
  - b. If the resultant is a decimal number, round down to the nearest whole number
  - c. Base this 10% number on the total population of Title I participating buildings, not only the number of Title I participating buildings that receive a ranking
  - d. Title I = Title I participating only, NOT Title I eligible but not receiving
  - e. High Performing Bottom 30% Audit - Prohibit from appearing on the Focus list any school whose bottom 30% group is relatively high performing as defined by:
    - The school's bottom 30% group's proficiency rate is higher than the state average proficiency rate in at least two subject areas AND
    - The school's Top-to-Bottom percentile rank is at least 75
  - f. Good-Getting-Great - Prohibit from appearing on the Focus list any school whose bottom 30% group has a high rate of improvement as defined by:
    - Remove any school that is the 75th percentile on the Top-to-Bottom ranking or higher AND
    - the school has gotten a "Green" (i.e. made safe harbor) in every subject/level combination for their bottom 30% subgroup on the Accountability Scorecard

4. Continue ranking until that number of Title I participating schools is achieved  
(Do not include Title I eligible beginning with 2013)
  - a. All schools with lower ranking (regardless of Title I status) are included in Focus schools
  - b. If a school is a Priority school, they cannot be a Focus school
    - Must get a number of schools equal to 10% of Title I participating schools that does not include schools also named as Priority schools
5. Add any schools who have a graduation rate below 60 for three years (variable grd60 in the School Performance Data table; if grd60=1 & Priority!=1, then Focus)
6. Create indicator variable named Focus, where 1=yes and 0=no
  - a. Populate the variable with 0 for all non-Focus schools, not NULL
7. If a school receives an overall ranking, the school is eligible for Focus school status
8. Update the School Accreditation and School Performance Data tables with the following fields:
  - a. Focus (indicator variable)
  - b. Composite gap index number
  - c. Number of gap indices that went into the composite gap index
  - d. The average z-scores for the top 30% and bottom 30% subgroup for the current and previous years
    - These fields are: bzs.3.av.em, bzs.2.av.em, bzs.3.av.h, bzs.2.av.h, tzs.3.av.em, tzs.2.av.em, tzs.3.av.h, tzs.2.av.h (for each subject)
  - e. Actual gap indices for each subject
    - Fields: gap.zs.em and gap.zs.h (for each subject)
9. All above fields should be populated for all schools, regardless of Focus or non-Focus status

## Reward Schools Identification Calculations

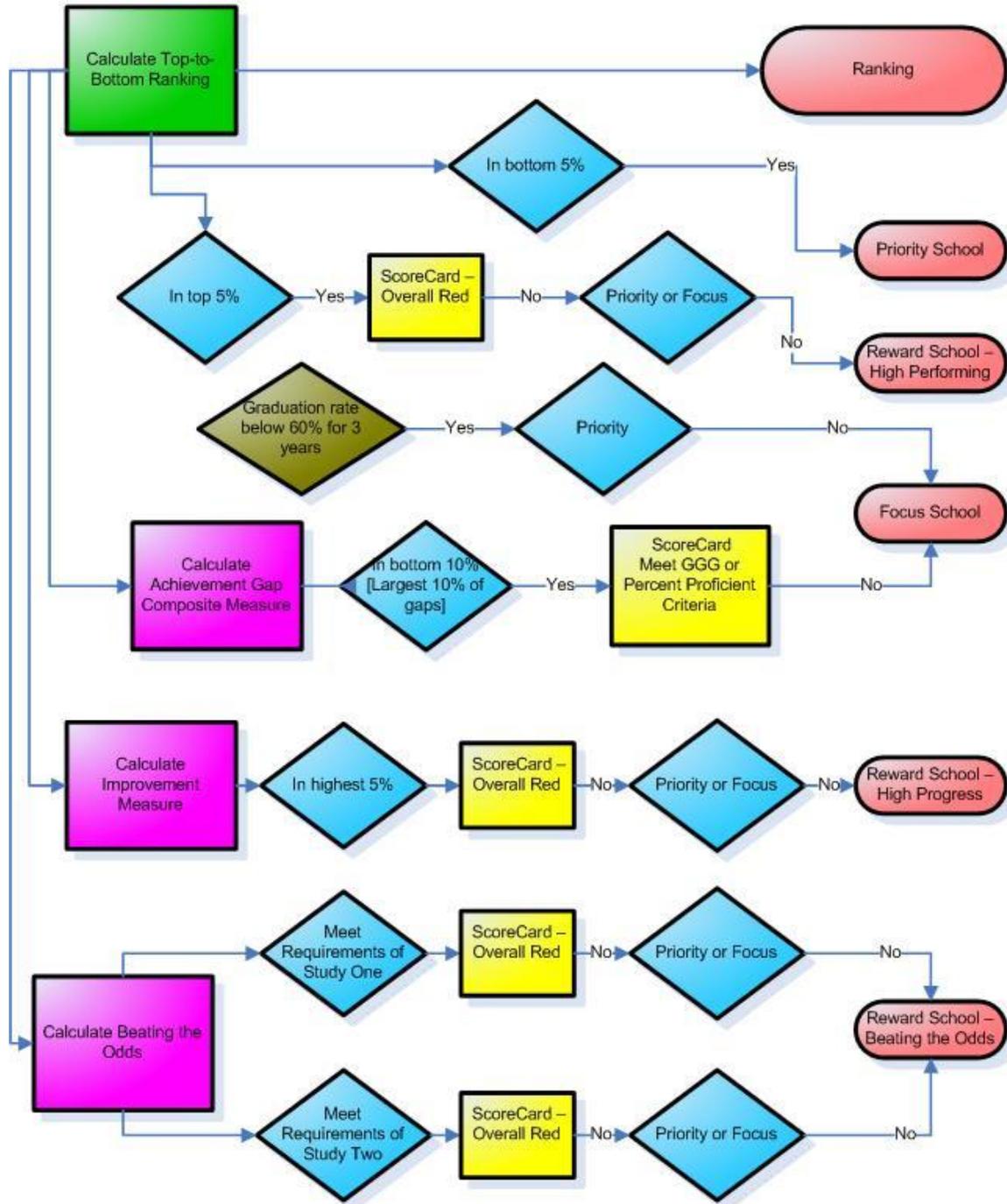
1. Identify any school which has already been identified as Priority, Focus or red in the Accountability Scorecard (beginning in 2013)
2. For the remaining schools only (i.e. those not Priority, not Focus nor red in the Accountability Scorecard beginning in 2013), complete the remaining steps
3. **Reward High Performing** - Identify top 5% of schools in overall Top-to-Bottom ranking
  - a. Of the remaining schools, identify the top highest performing by looking at the value in column "spi." For the top 5% of schools with the highest values of spi, then Reward = 1
  - b. Create indicator variable named RewardHighPerforming, where 1=yes and 0=no
4. Calculate improvement composite index for school j.
  - a. Sum applicable (FAY at least 30) subject improvement values for each individual educational entity
    - i. In the School Performance Data table, these variables are named with ci (for change index) or with zsi (for zscore improvement): ci.m, ci.r, zsi.b1.s.em, zsi.b1.t.em, zsi.b1.w.em, zsi.b1.m.h, zsi.b1.r.h, zsi.b1.s.h, zsi.b1.t.h, zsi.b1.w.h
  - b. Divide the sum of applicable (FAY at least 30) improvement values by total number of improvement values available for each individual educational entity
    - i. Create a field that stores the number of improvement values used in the calculation
5. Multiply .05 by total number of schools ranked in Top-to-Bottom list to determine count of Reward schools to be identified. If the resultant is a decimal number, round down to the nearest whole number
6. Sort schools by improvement composite index
7. Remove schools which are:
  - a. Priority
  - b. Focus
  - c. Overall red in the Accountability Scorecard (beginning in 2013)
  - d. Already identified as high performing Reward schools
8. Identify the remaining top 5% improvement composite index schools, where the number of these schools is equal to 5% of the total number of schools ranked in the overall Top-to-Bottom ranking
9. Create indicator variable named RewardHighProgress, where 1=yes and 0=no
10. Identify schools that have at least 85% proficient in each applicable subject (at least 30 FAY), where 1=yes and 0 = no
  - a. School must have 85% proficient in each applicable subject for both current and previous year
  - b. School must have a positive slope in all applicable subject areas
  - c. Create indicator variable named RewardHighProficient, where 1=yes and 0=no

11. Create overall Reward indicator variable, where Reward=1 if either RewardHighPerforming or RewardHighProgress or RewardHighProficient=1, and 0=neither
    - a. A school cannot be a Reward school if it is either a Priority or a Focus school
    - b. A school cannot be a Reward school if it is red in the Accountability Scorecard (beginning in 2013)
      - i. Determine Accountability Scorecard status from current school year, then remove all schools that are red in the Accountability Scorecard from eligibility for the Reward list
    - c. If a school would have been a Reward school but was removed from the Reward list for either reason (a or b), then set their RewardHighPerforming or RewardHighProgress indicators to 0
  12. If a school receives an overall ranking, the school is eligible for Reward school status
  13. Update both School Accreditation and the School Performance Data tables with the following fields:
    - a. Reward indicator
    - b. RewardHighPerforming indicator
    - c. RewardHighProgress indicator
    - d. RewardHighProficient
    - e. Composite improvement index
    - f. Number of improvement indices included in the overall improvement index
  14. Update Reward status to include Beating the Odds schools upon completion of the Beating the odds metric calculations.
    - a. RewardBTOSTudy1
    - b. RewardBTOSTudy2
- (Refer to the Beating the Odds business rules found here: [www.michigan.gov/reward](http://www.michigan.gov/reward))

Michigan's School Ranking system graphic:

## School Ranking Process Flow

2012 - 2013



# **Top-to-Bottom Ranking, Priority, Focus and Reward Schools Identification Business Rules**

## **Top-to-Bottom Technical Details**

### **Content Areas to be included (if available)**

- Reading
- Mathematics
- Science
- Social Studies
- Writing
- Graduation Rate (*see Graduation Rate Inclusion rules*)

### **Assessment Data Inclusion rules**

- Include only scores from students who are FAY
- Include fall scores in data for the previous year's school and previous grade using feeder codes
- Include spring scores for the current year's school and grade
- Calculate ranking for a school on a content area only if at least 30 FAY students were tested in the elementary/middle school span (3-8) **or** the high school span (9-12) **or** both for the most recent two years
- Include only public school students (no homeschooled or private school students)
- Calculate an overall ranking for schools only if they meet the 30 FAY threshold for at least two content areas
- Include schools only if they are not shared educational entities (SEEs) whose scores are returned to the sending districts for accountability purposes
- English Language Arts is used for MI-Access in place of Reading, since MI-Access does not offer a standalone reading test

### **Graduation Rate Inclusion rules**

- Include graduation rates if CEPI produces a graduation rate for a school. If a school does not qualify for the ranking based on 30 FAY students in at least two tested content areas, then their graduation data will not be included and used in generating statewide means and standard deviations for graduation rate
- While graduation rate is not a "content area," it will be treated similarly to all other content area measures in developing the scale for ranking schools

### **Definitions**

- Elementary/middle school = a school housing any of grades K-8
- High school = a school housing any of grades 9-12
- Secondary school = a school housing any of grades 7-12
- Full academic year (FAY) indicates that the student was claimed by the school on the previous two count days
- Comparable schools are defined for regular elementary/middle schools (i.e., schools with assessment data in grades 3-8) as all elementary/middle

schools, and as high schools (i.e., schools with assessment data for grades 9-12) as all other high schools

- Building/School entities that are identified as special education center programs as determined by the MDE's Office of Special Education are exempted from receiving a ranking in the Top-to-Bottom ranking and any of the labels (Priority, Focus and Reward)
- Building/School entities that are identified as adjudicated youth programs as determined by the MDE's Office of Field Services are exempted from receiving a ranking in the Top-to-Bottom ranking and any of the labels (Priority, Focus and Reward)

### Conventions

- A school classified as both elementary/middle and high school has ranks calculated for both sets of grades; final rank is an average of the two
- The definitive version is based on mathematical operations as performed by Microsoft SQL
- Overall school percentile ranks are truncated to the integer level (the decimal portion is deleted) to reflect that minor differences in percentile ranks are not practically important
- Schools that are currently inactive but have performance data attributed to them receive a ranking
  - Generate a Top-to-Bottom ranking for all schools that have sufficient performance data attributed to them based on the most recent two years
  - If a school was open as of September 30 of the current school year AND has data attributed to it from the most recent school year, the school receives a ranking (even if the school is inactive at the time of the ranking)
  - Add an indicator variable named "Active" where 1 = active at the time of list publication and 0 = inactive. This will be used in displays
  - Schools closed at the time of list publication are obviously not subject to the sanctions/consequences (as they have been closed) but still receive the designation and will be reported to USED and in other reporting requirements as such

### Steps in Calculations

1. For each test, grade, content area (including graduation rate where applicable) and year, calculate a **normalized and capped z-score<sup>3</sup>** for each student based on their scale score, calculated using the following steps:
  - a. Order unique observed scores in ascending order
  - b. Obtain the frequency of each unique observed score
  - c. Calculate the percentile rank of each unique observed score as

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<sup>3</sup> Calculating a z-score for each student within his or her context (the test taken, grade level, and content area) levels the playing field across tests taken, any differences in rigor of cut scores across grades, and any difference in rigor of cut scores across content areas. Using z-scores for individual students also makes the weighting impervious to changes in cut scores (recently enacted by the Michigan State Board of Education). Staying with percent proficient while raising cut scores significantly would result in significantly more than 5% of schools having zero percent proficient, and therefore, having more than 5% of schools in the "lowest 5%."

$$PR_j = 100 * \frac{F_{<j} + F_j}{2N}$$

where

$PR_j$  is the percentile rank of the  $j^{\text{th}}$  unique observed score,  
 $F_{<j}$  is the cumulative frequency of all unique observed scores with values less than the  $j^{\text{th}}$  unique observed score,  
 $F_j$  is the frequency of the  $j^{\text{th}}$  unique observed score, and  
 $N$  is the total number of observed scores.

This results in percentile ranks being in the (0, 100) range non-inclusive, which allows for step d to function appropriately.

- d. Calculate the normalized z-score of each unique observed score as

$$z_j^* = \varphi^{-1} (PR_j - 100)$$

where

$z_j^*$  is the normalized z-score of the  $j^{\text{th}}$  unique observed score, and  
 $\varphi^{-1}$  is the inverse of the standard normal cumulative frequency distribution.

Operationally, because Microsoft SQL does not have a built in function for  $\varphi^{-1}$ ,  $\varphi^{-1}$  is closely approximated by using a lookup table in which there are two columns: Percentile rank, and approximated  $\varphi^{-1}$ . The percentile ranks in the lookup table run from 0.005 to 99.995, with associated  $\varphi^{-1}$ s calculated to three decimals of precision. The lookup table is used by finding the percentile rank in the table nearest to  $PR_j$  and using the associated  $\varphi^{-1}$ .

- e. Replace any  $z_j^*$  with a value less than -2 with the value -2.  
 f. Replace any  $z_j^*$  with a value greater than 2 with the value 2.
2. [Repeat steps 3-7 separately for mathematics, reading, science, social studies and writing; and each grade range (elementary/middle versus high school) for each school with 30 or more FAY students tested in the grade and content area in the most recent two years for which data are available]
3. For each school, calculate an achievement index for the most recent two years in which data are available:
- Calculate the within-school average (mean) z-scores for the most recent (year 3) and next most recent (year 2) years tested for each school  $j$  ( $\mu_{zj3}$  and  $\mu_{zj2}$ , respectively)
  - Obtain the number of students tested in school  $j$  for the most recent year (year 3) and the next most recent year (year 2) for each school  $j$  ( $N_{tj3}$  and  $N_{tj2}$  for the most recent and previous year, respectively)
  - Calculate a weighted within-school average (mean) z-score over the most recent two years as  $\mu_{zj} = \frac{N_{tj3}\mu_{zj3} + N_{tj2}\mu_{zj2}}{N_{tj3} + N_{tj2}}$ .

- d. Calculate the achievement index for school  $j$  as  $ach_j = \mu_{zj} - \mu_z / \sigma_z$ , where  $\mu_z$  indicates the statewide mean of  $\mu_{zj}$  across all comparable schools,  $\sigma_z$  indicates the statewide standard deviation of  $\mu_{zj}$  across all comparable schools, and  $ach_j$  is a z-score delineating how many standard deviations above or below the statewide mean of comparable schools school  $j$  lies.
4. For each school, calculate a percent change index:
- Where adjacent year testing occurs (e.g., reading & math in elementary/middle school):
    - Obtain the numbers (in the table below) for the most recent year and for the previous year.

Previously Proficient	Performance Level Change									
	Most recent year					Previous year				
	SD	D	M	I	SI	SD	D	M	I	SI
No	$SD_{3n}$	$D_{3n}$	$M_{3n}$	$I_{3n}$	$SI_{3n}$	$SD_{2n}$	$D_{2n}$	$M_{2n}$	$I_{2n}$	$SI_{2n}$
Yes	$SD_{3y}$	$D_{3y}$	$M_{3y}$	$I_{3y}$	$SI_{3y}$	$SD_{2y}$	$D_{2y}$	$M_{2y}$	$I_{2y}$	$SI_{2y}$

Where "SD" indicates a significant decline in performance level from one year to the next, "D" indicates a decline in performance level, "M" indicates maintaining performance level, "I" indicates an improvement in performance level, and "SI" indicates a significant improvement in performance level. Previously proficient (yes/no) indicates whether the student was considered proficient on the test the year before

If a student had a previous performance level of 1, and a current performance level of 1, but had a PLC of D or SD, consider that student to have a PLC of M, and assign a value of 1

- Calculate the total number of FAY students with performance level change scores for the most recent year and the next most recent year as:

$$N_{PLC3} = SD_{3n} + SD_{3y} + D_{3n} + D_{3y} + M_{3n} + M_{3y} + I_{3n} + I_{3y} + SI_{3n} + SI_{3y},$$

and

$$N_{PLC2} = SD_{2n} + SD_{2y} + D_{2n} + D_{2y} + M_{2n} + M_{2y} + I_{2n} + I_{2y} + SI_{2n} + SI_{2y},$$

respectively. Note: If a school has 30 FAY students in a content area, but does not have 30 FAY students with performance level change scores, do not use performance level change for that school; use the slope calculations (described below)

- Calculate weighted improvement scores for each school using the weights given in the table below

Previously Proficient	Performance Level Change				
	SD	D	M	I	SI
No	-2	-1	0	1	2
Yes	-2	-1	1	1	2

Such that the two-year weighted performance level change for school  $j$  is calculated as the sum of the weighted improvement scores, divided by the weighted number of FAY students with improvement scores<sup>4</sup>

- d. The improvement index for school  $j$  is calculated as  $imp_j = PLC_j - \mu_{PLC} / \sigma_{PLC}$ , where  $\mu_{PLC}$  indicates the statewide mean of  $PLC_j$  across all comparable schools,  $\sigma_{PLC}$  indicates the statewide standard deviation of  $PLC_j$  across all comparable schools, and  $imp_j$  is a z-score delineating how many standard deviations above or below the statewide mean of comparable schools school  $j$  lies
- e. Where adjacent grade testing does not occur (i.e., for all calculations in high school [including graduation rate] and in science, social studies, and writing):
  - i. Obtain the school-mean z-score for a total of four years, including the present year and previous year ( $\mu_{zj3}$  and  $\mu_{zj2}$ , respectively), as well as the years two years and three years ago ( $\mu_{zj1}$  and  $\mu_{zj0}$ , respectively)
  - ii. Obtain the number of FAY students tested in the school ( $j$ ) for the four most recent years ( $N_{tj3}$ ,  $N_{tj2}$ ,  $N_{tj1}$  and  $N_{tj0}$ )
  - iii. Calculate the slope ( $\beta_j$ ) of the simple regression of school  $j$  mean z-scores on year (representing the annual change in school mean z-scores) if there are at least 20 FAY students tested in each of the years used for calculating slopes
  - iv. Special situations<sup>5</sup>
    - A. The improvement index should not be used to calculate a performance index for any content area where less than 20 FAY students were tested in any one of the years used to calculate slopes
    - B. Where there are only three years of data available for a given content area, calculate  $\beta_j$  as the three year simple regression of school mean z-scores on year
    - C. When there are only two years of data available,  $\beta_j$  for that content area will be as the simple gain in school mean z-scores over the past two years, or  $\beta_{1j} = \mu_{zj3} - \mu_{zj2}$ .
    - D. When there is only one year of data available, use the rate itself as the whole index
    - E. Use the improvement index slope for mathematics and reading in any elementary or middle school in which there are not 30 FAY students with performance level change data

<sup>4</sup> This change in the formula weights significant changes in performance level more heavily than smaller ones, weights changes in both directions more heavily for students who were not previously proficient to recognize that movement along the scale is more important for students that have not yet reached proficiency, and recognizes that maintaining a performance level below proficiency is inadequate.

<sup>5</sup> These special situations address the unavailability of four consecutive years of data to calculate a slope, such as would occur with the implementation of a new test or in the event that a school has opened or closed in the previous four years.

If a school does not have a grade 4 or higher, automatically use the improvement slope calculations, as opposed to performance level change, as no change data is available on students until at least fourth grade

- f. Calculate the improvement index for each school ( $j$ ) as  $imp_j = \frac{\beta_j - \mu_\beta}{\sigma_\beta}$  where  $\mu_\beta$  is the statewide mean improvement slope across all comparable schools (elementary/middle or high school),  $\sigma_\beta$  is the statewide standard deviation of improvement slopes across all comparable schools (E/MS or HS), and  $imp_j$  is a z-score indicating how far above or below the state average for comparable schools (E/MS or HS) the improvement slope for school  $j$  is
  - g. Compute average of improvement index for all schools for all available content areas
  - h. Identify 5 percent of all schools having the highest improvement index. These schools will be known as Reward schools (among others) if Accountability Scorecard is NOT red
5. Calculate an achievement gap index<sup>6</sup> for each school in each available subject using the following steps:
- a. Identify the top 30% and the bottom 30% of student z-scores in each school
  - b. Calculate the average z-score of the top 30% of student z-scores, and the average z-score of the bottom 30% of student z-scores
  - c. Calculate (combining across both the most recent and next most recent years) the average z-scores of the bottom 30% of z-scores in the school and subtracting from that the average of the top 30% of z-scores in the school. This gives a negative number which when compared to all schools in the state assures that schools with the highest achievement gap receive the lowest z-scores as intended
  - d. Calculate the achievement gap index for school  $j$   $gap_j$  as the z-score of that gap as compared to the statewide distribution across all comparable schools, such that the following quantities are produced

$$Gap_j = (z_j - u\text{-hat}) / (\sigma\text{-hat})$$

- e. Compute average of achievement gap index for all schools - for all available content areas
- f. Identify 10 percent of all schools having the lowest achievement gap index (bottom 10% of achievement gap index). These schools will be known as Focus schools. Follow rule for number of Title I participating schools

All schools with a sufficient number of students to meet the ranking criteria (30 in the current and most recent year in at least two content areas) receive a gap. The top and bottom subgroups do not need to be a certain size

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6 This addition to the business rules assures that schools with measurable achievement gaps retain a focus on achievement gaps.

6. Calculate the school performance index for each content area as  $Y_j = 2ach_j + imp_j + gap_j - 4$ , where  $Y$  represents a given content area (e.g., *math<sub>j</sub>*). The calculation described is to be carried out in all cases except in the following special situations:
  - a. Where achievement gap indices are not available, calculate the overall school performance index for each content area as  $Y_j = 2ach_j + imp_j - 3$ .
  - b. Where improvement indices are not available or the most recent year's proficiency rate is at or above 90%<sup>7</sup>, calculate the overall school performance index for each content area as  $Y_j = 2ach_j + gap_j - 3$ .
  - c. Where achievement gap indices are not available AND (improvement indices are not available OR the achievement index is or above 90% of students proficient), calculate the overall school performance index for each content area as  $Y_j = ach_j$ .
  - d. When calculating the school performance index for graduation rate, the two available components are the average graduation rate over the previous two years (*ach<sub>j</sub>*) and the graduation rate improvement (*imp<sub>j</sub>*). These two components are combined as  $Y_j = Grad_j = 2ach_j + imp_j - 3$ :  
Note: Graduation improvement is only considered if the school does not already have above a 90% graduation rate
7. Calculate the statewide school percentile rank on  $Y_j$  (for display purposes only), ranking within elementary/middle schools and within high schools at this point. This provides a content-area specific rank relative to other schools of the same level. This will be used only for display and will not figure into further calculations
8. For each content area, compare the content index (or grad rate index) to other elementary/middle schools or to other high schools. This creates a z-score ( $Y_jz$ ) for each content/grad index that compares the school's index in that content area or grad index to other schools of the same level
9. Calculate the overall school performance index (*spi*) across all content areas (including graduation rate where applicable) in which the school received a school performance index z-score (*spi* is calculated as the average of from 2 to 11  $Y_jz$ 's depending upon the grade configuration and enrollment). For schools without a graduation rate index, *spi* is calculated as the straight average of all  $Y_jz$ 's calculated for the school. For schools with a graduation rate index, the school performance index on graduation rate must account for exactly 10 percent of the overall school performance index. This is accomplished by multiplying the straight average of all other  $Y_jz$ 's calculated for the school by the value 0.9, and adding to that result the quantity *Grad<sub>j</sub>* multiplied by the value 0.1
10. Calculate the school's overall percentile rank (*pr*) across all content areas (including graduation rate as applicable) as the school percentile rank on *spi*.
11. Identify Priority Schools: 5 percent of all schools having the lowest school percentile rank on *spi* (bottom 5% of school performance index). These

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<sup>7</sup> This modification ensures that high performing schools are not penalized for being unable to demonstrate improvement of the same magnitude of lower performing schools, due to ceiling effects.

schools will be known as Priority schools (See Priority Schools Identification section for complete details)

12. Identify Focus Schools: The 10 percent of schools with the largest achievement gaps are *Focus Schools* (See Focus Schools Identification section for complete details on Focus schools).
13. Identify Reward Schools: The 5 percent of all schools having the higher school percentile rank (top 5% of school performance index). These schools will be known as Reward schools (among others) if Accountability Scorecard is NOT red, nor a Priority school, nor a Focus School (See Reward Schools Identification section for complete details on all types of Reward schools)