



## Missouri Department of Elementary and Secondary Education

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**TO: School Administrators**

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**School Improvement and Accountability**

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**SUBJECT: Growth Model for Adequate Yearly Progress**

I am pleased to announce that Missouri recently received approval from the U.S. Department of Education (USED) to implement a growth model for use in determining Adequate Yearly Progress (AYP) as required by the No Child Left Behind Act of 2001 (NCLB). As part of the USED's growth model pilot project, nine states were approved for implementation in the 2006-2007 school year, and Missouri is one of only two states approved for the 2007-2008 school year.

The growth model will provide an additional opportunity for districts and schools to meet AYP by incorporating a method for measuring individual student growth over time. The new growth model calculations will be applied to 2006-2007 and 2007-2008 Missouri Assessment Program (MAP) data for the purpose of making 2008-2009 AYP determinations this fall.

The details regarding the growth model implementation and calculations are provided throughout this document. This is our first opportunity to share this information with the public, so please feel free to provide us with feedback.

### **Background on Accountability Models**

The NCLB requirement for states to implement grade level assessments in grades 3-8 provided us with the opportunity to measure individual student growth from year to year. Prior to the implementation of grade level assessments our state and federal accountability systems were typically status and/or improvement models. Since discussion around the implementation of our growth model began, there has been some confusion over accountability models, including: improvement versus growth and growth versus "value-added." There are typically four types of statistical models recognized in school accountability: Status, Improvement, Growth, and Value-Added Model (VAM). Below is a brief description of each model and how the model is implemented in Missouri.

*Status* – A status model takes a snapshot of a subgroup, school, or district's proficiency level (often at one point in time) and compares it with an established target. AYP is a status model.

Status is one component of the Missouri School Improvement Program's (MSIP) accountability model.

*Improvement* – An improvement model measures the change between different groups of students using their proficiency status in each year (e.g. the performance of this year's fourth graders compared with the performance of last year's fourth graders). Improvement (progress) is the second component of the MSIP accountability model.

*Growth* – Growth models generally track the achievement of the same group of students from year to year (e.g. last year's third graders compared with this year's fourth graders). The AYP growth model tracks the achievement of an individual student compared with the student's established growth target. (See more information in the "Student Growth Targets" section.)

*Value Added-Models* – Value added-models (VAMs) are growth models that use student background information and prior achievement results in order to isolate the effects a particular teacher, school, or program had on student achievement. VAMs are statistically complex. The most well-known type of VAM is the Tennessee Value-Added Assessment System.

In summary, MSIP currently uses a status and improvement model while NCLB uses a status and growth model. MSIP plans to incorporate a growth model (different than that defined under NCLB) component in Fifth Cycle.

### **Missouri's NCLB Growth Model Basics**

- Missouri will first calculate AYP using the current status model to determine the percent of students that are proficient. The growth model calculations will be applied to provide an additional opportunity for schools and districts to make AYP.
- The first time a student is assessed on a MAP or MAP-A assessment in either Mathematics or Communication Arts, individual growth targets will be established to determine if each student is Proficient or "On Track to be Proficient" (On Track) within four years or by grade 8.
- The growth model adds the number of students who are "On Track" to the number of students who are Proficient to determine the percent of students meeting the Proficiency target. ( $\# \text{ Proficient or above} + \# \text{ On Track} / \text{Total number of students reportable} = \% \text{ Proficient or "On Track"}$ ).
- Districts and schools must provide parents with information about individual student growth. DESE will provide a report to be shared with parents via Crystal Reports.
- Uniform subgroup cell size of 30 (no longer 50 for IEP and LEP) will be in place beginning with the 2007-2008 data. This change was required of all states by NCLB.

### **Student Growth Targets**

- Student growth targets will be established using the student's first MAP grade level assessment data (baseline) beginning with the 2006-2007 school year.
- Growth trajectories will be established for all students (Proficient or not Proficient).
- Students will have four years or until grade 8 to become Proficient.

- DESE will calculate growth targets for each student and provide districts with the data via Crystal Reports.
- Students who transfer among Missouri school districts will retain their original growth targets.
- For students who transfer into Missouri from another state, their first MAP grade level assessment will be used to establish a baseline for calculating growth.
- Growth targets will be recalculated for students who score below Proficient after scoring Proficient. Such students will have four years or until grade 8 to become Proficient.
- Students assessed in grade 3 and in high school (end-of-course assessments) will be included in the percent Proficient, but will not be evaluated for growth.

## Calculating Growth

### *Example 1:*

To determine each student's growth trajectory, the student's baseline score is compared with the proficiency cutpoint required in four years or by grade 8. For example, a student who is assessed in grade 3 has until grade 7 to become Proficient. The student's grade 3 score is compared with the grade 7 Proficiency cutpoint to determine how much growth is expected over the four years. If the student has a 477 scale score on the grade 3 MAP mathematics assessment and the Proficiency cutpoint for grade 7 is 685, the student has to grow 208 points by grade 7 in order to be Proficient. The student's total growth trajectory is divided by the number of years the student has to become Proficient to determine the amount of growth required each year to be considered "On Track" (208 points divided by 4 years = 52 scale score points). The student must improve 52 scale score points each year in order to become proficient. In this case, 52 points are added to the student's baseline score of 477 to determine the scale score required to be Proficient in grade 4 ( $52 + 477 = 529$ ). If the student scores 529 or higher in grade 4, the student will be considered "On Track." The same process is used to determine growth in successive years.

### **Grade 3 Mathematics**

2007 Baseline Score = 477

Proficiency Cutpoint Grade 7 = 685

Total Growth =  $685 - 477 = 208$

Annual Growth =  $208 / 4 \text{ years} = 52$

2008 Growth Target Grade 4 =  $477 + 52 = 529$

2009 Growth Target Grade 5 =  $529 + 52 = 581$

2010 Growth Target Grade 6 =  $581 + 52 = 633$

2011 Growth Target Grade 7 =  $633 + 52 = 685$  Proficient \*

### *Example 2:*

A student who is assessed in grade 6 has until grade 8 to become Proficient. The student's grade 6 score is compared with the grade 8 Proficiency cutpoint to determine how much growth is expected over the two years. If the student has a 650 scale score on the grade 6 MAP mathematics assessment and the Proficiency cutpoint for grade 8 is 696, the student has to grow 46 points by grade 8 in order to be Proficient. The student's total growth trajectory is divided by the number of years the student has to become Proficient to determine the amount of growth required each year to be considered "On Track" (46 points divided by 2 years = 23 scale score

points). The student must improve 23 scale score points each year in order to become proficient. In this case, 23 points are added to the student's baseline score of 650 to determine the scale score required to be Proficient in grade 7 ( $23 + 650 = 673$ ). If the student scores 673 or higher in grade 7, the student will be considered "On Track." The same process is used to determine growth in successive years.

### **Grade 6 Communication Arts**

2007 Baseline Score = 650

Proficiency Cutpoint Grade 8 = 696

Total Growth =  $696 - 650 = 46$

Annual Growth =  $46 / 2 \text{ years} = 23$

2008 Growth Target Grade 7 =  $650 + 23 = 673$

2009 Growth Target Grade 8 =  $673 + 23 = 696$  Proficient\*

### **AYP Calculations**

Current AYP Calculations:

1. Participation Rates
2. Cell Size
3. Percent Proficient
4. Confidence Interval
5. Additional Indicator
6. Safe Harbor
7. Growth

Growth:

1. Participation Rates
2. Cell Size
3. Percent Proficient and "On Track" See calculation below\*
4. Additional Indicator

\*For the growth model calculation, the following calculation is used to determine if the district, school, or subgroup meets AYP:

*$(\# \text{ of Proficient or above students} + \# \text{ of students "On Track"}) / \# \text{ of students reportable} = \% \text{ Proficient and "On Track"}$*

### District Example

		Status	Growth
<i>Overall Status</i>		2008	2008
Communication Arts Status		Not Met	Met
Attendance Rate		Met	Met
Graduation Rate		Met	Met
<b>COMMUNICATION ARTS</b>		2008	2008
<b>Annual Proficiency Target</b>		<b>51.0</b>	<b>51.0</b>
School Total (All Kids)	PROF	52.1 * Y	75.0 * Y
	LND/PR	1.4	1.4
Black	PROF	47.3 * NP	58.0 * Y
	LND/PR	2.3	2.3
Hispanic	PROF	38.2 * NP	51.1 * Y
	LND/PR	0	0
White	PROF	53.2 * Y	55.9 * Y
	LND/PR	1.2	1.2
F/R Lunch	PROF	30.5 * NP	52.0 * Y
	LND/PR	2.2	2.2
IEP	PROF	45.2 * NP	68.0 * Y
	LND/PR	5.2	5.2

### MAP-A

- Students taking the MAP-A will be included in the growth model in a similar manner as students taking the regular MAP assessment.
- MAP-A proficiency cutpoints are based on raw scores rather than scale scores. Students whose raw scores fall below the Proficient cutpoint for either MAP-A communication arts or mathematics will enter the growth model at that point.
- Growth trajectories will be established based on raw scores. Students that achieve Proficient scores, and those that are determined to be “on-track to be proficient” based on their growth trajectories will be counted as Proficient in determining AYP.
- To calculate the growth trajectory, the numeric difference between the student’s raw score in the baseline year and the raw score cutpoint that defines proficiency at the end of the target grade level will be determined (see chart on page 6). The following example illustrates the growth modeling process for MAP-A students.

**Sample Student Growth Targets and Determination  
MAP-A Mathematics**

<b>Year</b>	<b>Grade</b>	<b>Proficiency Cutpoint</b>	<b>Growth Target</b>	<b>Actual Score</b>	<b>Determination</b>
<b>2006</b>	<b>3</b>	<b>32</b>		<b>33</b>	<b>Proficient</b>
<b>2007</b>	<b>4</b>	<b>32</b>		<b>29</b>	<b>Not Proficient</b>
<b>2008</b>	<b>5</b>	<b>32</b>	<b>30.75</b>	<b>31</b>	<b>“On Track”</b>
<b>2009</b>	<b>6</b>	<b>36</b>	<b>32.5</b>	<b>33</b>	<b>“On Track”</b>
<b>2010</b>	<b>7</b>	<b>36</b>	<b>34.25</b>	<b>35</b>	<b>“On Track”</b>
<b>2011</b>	<b>8</b>	<b>36</b>	<b>36</b>	<b>37</b>	<b>Proficient</b>

The student in the above example received a raw score of 32 on the grade 3 MAP-A mathematics assessment. The Proficient cutpoint for the grade 3 to grade 5 range is 32. The student received a score of 29 on the grade 4 MAP-A mathematics assessment, falling below the Proficient level. Therefore, a baseline for a growth trajectory is established in grade 4. This student will be monitored for four years, with the expectation that, if the student meets growth targets, he will reach the proficiency cutpoint of 36 by grade 8. The annual growth expected will be  $(36-29)/4 = 1.75$ . The growth target for the first year will be  $29+1.75 = 30.75$ . The growth target for the second year will be  $29+3.5 = 32.5$ . The growth target for the third year will be  $29+ 5.25 = 34.25$ . The final growth target will be  $29+7 = 36$ . In the first year the student scored below Proficient, the student was evaluated for status only. In the first year of growth monitoring (grade 5), the student scored 31, which was below Proficient, but higher than the growth target, so the student was counted as “on-track”. Likewise, in years two and three of growth monitoring, the student scored below Proficient, but above the growth target, and was counted as “on-track”. In the final year, the student scored 37 on the grade 8 test, achieving Proficiency. In this scenario, if the student scored below 36 in grade 8, he/she would have been evaluated for status as “Not Proficient.”

**Definitions**

**Annual Growth** – Amount of scale score growth required each year for an individual student to be considered “On Track”. (For example: 25 scale score points each year.)

**Baseline Score** – A student’s first MAP grade level assessment scale score. This score is used to determine the point from which growth is measured. (For example: If a student scores 600 on the MAP mathematics grade level assessment in grade 3, the student’s baseline score is 600.)

**Growth Target** – Annual scale score required to be “On Track.” (For example: Scale score of 600 in Grade 3 Math)

**Growth Trajectory** – The scale score required each year over the period of time the student has to become Proficient. (For example: The student’s growth trajectory is 25 points per year for four years.)

***On Track*** – A student is considered “On Track to be Proficient” or “On Track” when his or her individual growth target is met.

***Proficiency Target*** – The percent of students required to be Proficient for AYP purposes.

***Total Growth*** – The amount of growth expected from the students baseline score to the Proficiency target. (For example: If the student’s baseline score is 600 in grade 3 mathematics and the Proficiency target for grade 7 mathematics is 711, the total growth required is 111.)