

## **Procedures for Developing the Texas Projection Measure Equations for TAKS–M**

Modified in Spring 2011

### **Background**

In 2008, a pilot study was conducted to evaluate the use of the Texas Projection Measure (TPM) as an indicator of student progress. Texas proposed using the TPM as a means to assist campuses in meeting Adequate Yearly Progress (AYP) for federal accountability and as a means for evaluating campuses in the state accountability system. The TPM is an estimate of whether a student is likely to meet the standard (pass) and/or achieve commended performance (obtain the highest performance level) on tests at a future grade. The results of the 2008 pilot study provided evidence to support the accuracy and reliability of the TPM for students taking the general assessments (see "[Procedures for Developing the Texas Projection Measure Equations](#)" for the results). In January 2009, Texas received approval from the United States Department of Education (USDE) to implement the TPM to assist campuses in meeting AYP for federal reporting purposes. In spring 2009, the TPM was used for the first time with the general assessments, Texas Assessment of Knowledge and Skills (TAKS) and TAKS (Accommodated).

The TPM was also approved for use with one of the state's alternate assessments, the Texas Assessment of Knowledge and Skills–Modified (TAKS–M). TAKS–M is an alternate assessment based on modified academic achievement standards designed for students receiving special education services who meet participation requirements. Students who take TAKS–M have a disability that significantly affects academic progress in the grade-level curriculum. TAKS–M is a modified version of the TAKS test. It covers the same grade-level content as TAKS, but the TAKS–M tests have been changed in format (larger font, fewer items per page, etc.) and test design (fewer answer choices, simpler vocabulary and sentence structure, etc.).

In October 2009, the Texas Education Agency (TEA) convened a group of district representatives to offer advice on the feasibility of using the TPM for TAKS–M. After considering information about the TAKS–M assessment and the population of students who take TAKS–M, the group advised that the implementation of the TPM for TAKS–M should be as similar as possible to the implementation of the TPM for TAKS and TAKS (Accommodated). In addition, it was recommended that the accuracy and reliability of the TPM for students taking TAKS–M be evaluated in the same way they are evaluated for the general assessments. The accuracy of the TAKS–M projections will be evaluated once sufficient data are available. Two years of data are needed to calculate the projection equation, and a third year of data is needed to evaluate the accuracy of the projection. Once those results become available, TEA can then evaluate whether adjustments need to be made to the TPM for TAKS–M in order to increase its projection accuracy.

### **Procedures**

Two sets of analyses were conducted to assist in determining the feasibility of the TPM for TAKS–M. The first set of analyses used the available TAKS–M operational data to determine whether Texas had sufficient numbers of students to develop TPM equations for TAKS–M. The minimum sample size required to develop stable projections is 1,000 students per projection equation. Table 1 illustrates the data needed in order to develop TPM equations.

Table 1. Data Needed to Develop Projection Equations

Projection	Grade in 2009	Valid Scores Needed to Develop Equations
Grade 3 to 5	5	Grade 5 student cohort with valid grade 3 Mathematics and Reading scores
Grade 4 to 5	5	Grade 5 student cohort with valid grade 4 Mathematics and Reading scores
Grade 4 to 7	7	Grade 7 student cohort with valid grade 4 Mathematics, Reading, and Writing scores
Grade 5 to 8	8	Grade 8 student cohort with valid grade 5 Mathematics, Reading, and Science scores
Grade 6 to 8	8	Grade 8 student cohort with valid grade 6 Mathematics and Reading scores
Grade 7 to 8	8	Grade 8 student cohort with valid grade 7 Mathematics and Reading scores
Grade 8 to 11	11	Grade 11 student cohort with valid grade 8 Mathematics, Reading, Science, and Social Studies scores
Grade 9 to 11	11	Grade 11 student cohort with valid grade 9 Mathematics and Reading scores
Grade 10 to 11	11	Grade 11 student cohort with valid grade 10 Mathematics, ELA, Science, and Social Studies scores

Before analyzing the data, an implementation plan was created to determine when a TPM equation could be implemented for a specific grade and subject for TAKS–M. For the TPM to be implemented, two conditions must be met. First, two years of data are needed on a cohort of students. These data would include the year *from which* projections are made as well as the year *to which* projections are made. Second, the equation development must occur prior to the first year the TPM is implemented, meaning that the cohorts on which equations will be developed must have two years of data the year *before* the equations are to be used. After creating an implementation plan based on the two conditions above, it was determined that the TPM could be implemented in 2010 for seven subjects and grades of TAKS–M: mathematics and reading/ELA 4, 7, and 10 and science 10. These were the only subjects and grades in which two years of data were available in 2009, which is the year before the TPM would be implemented. The full TPM implementation plan for TAKS–M can be found in Appendix A.

The data for these subjects and grades were then analyzed to determine whether there were sufficient numbers of students in grades 5, 8, and 11 in 2009 with valid TAKS–M scores who also had valid TAKS–M scores in grades 4, 7, and 10 in 2008 in order to develop projection equations. Match rates (or the percentage of students with scale scores that can be matched over subjects and years) were used to determine sufficient sample size. All students in the analyses took a TAKS–M test for mathematics, reading/ELA, and science. After evaluating the match rates, it was determined that there were sufficient numbers of students to develop TPM equations for the seven subjects and grades in which a TPM could be implemented in 2010. The match rates across subjects and years can be found in Table 2.

Table 2. Match Rates Across Subjects and Years for Projection Equation Development

Subject Projected To in 2009	Grade Projected From in 2008	Grade Projected To in 2009	Number Available in 2008*	Number Available in 2009*	Number Matched†	Percentage Matched
Mathematics	4	5	10,073	15,131	7,767	51
	7	8	10,537	16,514	8,053	49
	10	11	8,727	13,204	5,863	44
Reading/ELA	4	5	10,073	15,082	7,817	52
	7	8	10,537	14,329	7,670	54
	10	11	8,727	10,740	5,710	53
Science	4	5	–	–	–	–
	7	8	–	–	–	–
	10	11	7,958	11,939	5,289	44

\*The Number Available is the number of students who have valid TAKS–M scores in that year in all the necessary subjects in order to calculate a TPM.

†The Number Matched is the number of students who have valid TAKS–M scores in 2008 and 2009 in all the necessary subjects in order to calculate a TPM.

The data were also analyzed to determine if there were sufficient numbers of students to develop a TPM for students who took assessments across programs. For example, a student may take TAKS or TAKS (Accommodated) for one subject and TAKS–M for another subject. After evaluating the data for all possible assessment combinations, the analyses indicated that there were not enough students who took different assessments within a school year to develop stable projection equations. As a result, a TPM will not be reported for students who take TAKS or TAKS (Accommodated) for one subject and TAKS–M for another subject.

The second set of analyses to assist in determining feasibility of the TPM for TAKS–M used the 2009 TAKS–M operational data to determine the number of campuses that had at least 30 students who took TAKS–M in a grade and subject area. The current TPM procedure used for the general assessments requires a minimum of 30 students at a campus when developing the campus mean predictor in the TPM equation for a subject and grade. Research has indicated that creating the campus mean predictor with 30 or more students leads to more stable projections. However, analysis of the TAKS–M data found that few campuses had a minimum of 30 students taking TAKS–M in a subject and grade. But when the data were aggregated at the district level, the majority of districts did have the minimum number of students to develop a statistically significant mean predictor. As a result, TAKS–M will use a district mean predictor when developing the TPM equations rather than a campus mean predictor.

After the TPM equations have been developed and applied to current year data to obtain projected scale scores, the final step of the process will be to evaluate the accuracy of the projections. Projection accuracy will be evaluated in two ways. First, the accuracy of the Met Standard and Commended Performance classifications will be analyzed by comparing the 2010 projected classifications to the 2011 observed results. Second, average projection scores from 2010 will be compared to the average observed scores in 2011.

### **Summary**

The TPM for TAKS–M was implemented in spring 2010. As with TAKS and TAKS (Accommodated), it was used as a measure to assist campuses in meeting AYP for federal

reporting purposes and as a criterion for evaluating campuses in the state accountability system. Because TAKS–M was not implemented for the first time until 2008, the TPM was only implemented for the following subjects and grades in 2010: mathematics and reading/ELA 4, 7, and 10 and science 10. Analysis of the data indicated that there were sufficient numbers of students who took a TAKS–M assessment in these subjects and grades to develop a TPM for use in 2010. There were not sufficient numbers of students who took a combination of TAKS or TAKS (Accommodated) and TAKS–M in these same subjects and grades to develop a TPM for TAKS–M across assessment programs. A district mean predictor, rather than a campus mean predictor, will be used to develop the TPM equations for TAKS–M. Once sufficient data become available, the projection accuracy of the TPM will be evaluated annually for every subject and grade to determine if the model should be adjusted to improve projection accuracy for students taking TAKS–M.

Appendix A

Texas Projection Measure Implementation Plan for TAKS–M

Grades and Subjects Tested for the First Time in Spring 2008	Grades and Subjects Tested for the First Time in Spring 2009	Spring 2010 TPM Grades and Subjects	Spring 2011 TPM Grades and Subjects	Spring 2012* TPM Grades and Subjects	Spring 2013* TPM Grades and Subjects
3 Reading	9 Reading	4 to 5 Reading	⇒ ⇒ ⇒	⇒ ⇒ ⇒	⇒ ⇒ ⇒
4 Reading	11 ELA	4 to 5 Mathematics	⇒ ⇒ ⇒	⇒ ⇒ ⇒	⇒ ⇒ ⇒
5 Reading	9 Mathematics	7 to 8 Reading	⇒ ⇒ ⇒	⇒ ⇒ ⇒	⇒ ⇒ ⇒
6 Reading	11 Mathematics	7 to 8 Mathematics	⇒ ⇒ ⇒	⇒ ⇒ ⇒	⇒ ⇒ ⇒
7 Reading	4 Writing	10 to 11 ELA	⇒ ⇒ ⇒	⇒ ⇒ ⇒	⇒ ⇒ ⇒
8 Reading	7 Writing	10 to 11 Mathematics	⇒ ⇒ ⇒	⇒ ⇒ ⇒	⇒ ⇒ ⇒
10 ELA	11 Science	10 to 11 Science	⇒ ⇒ ⇒	⇒ ⇒ ⇒	⇒ ⇒ ⇒
3 Mathematics	8 Social Studies		3 to 5 Reading	⇒ ⇒ ⇒	⇒ ⇒ ⇒
4 Mathematics	10 Social Studies		3 to 5 Mathematics	⇒ ⇒ ⇒	⇒ ⇒ ⇒
5 Mathematics	11 Social Studies		6 to 8 Reading	⇒ ⇒ ⇒	⇒ ⇒ ⇒
6 Mathematics			6 to 8 Mathematics	⇒ ⇒ ⇒	⇒ ⇒ ⇒
7 Mathematics			10 to 11 Social Studies	⇒ ⇒ ⇒	⇒ ⇒ ⇒
8 Mathematics				5 to 8 Reading	⇒ ⇒ ⇒
10 Mathematics				5 to 8 Mathematics	⇒ ⇒ ⇒
5 Science				5 to 8 Science	⇒ ⇒ ⇒
8 Science				9 to 11 ELA	⇒ ⇒ ⇒
10 Science				9 to 11 Mathematics	⇒ ⇒ ⇒
				8 to 11 Reading	⇒ ⇒ ⇒
				8 to 11 Mathematics	⇒ ⇒ ⇒
				8 to 11 Science	⇒ ⇒ ⇒
					8 to 11 Social Studies
					4 to 7 Writing

⇒ ⇒ ⇒ The arrows indicate that a TPM is reported for the subject and grade.

\* Because of the introduction of STAAR Modified assessments starting in 2011–2012, the plans for these years are subject to change.