Criterion Referenced Test (CRT)

CRT Test Design

The MSA Criterion-Referenced Test is composed of *TerraNova* items that are closely aligned with the Maryland content standards, plus custom selected-response (SR) and constructed-response (CR) items written to measure performance on the Maryland content standards. The Mathematics tests in Grades 7 and 8 also contain student-produced-response (SPR) items, sometimes referred to as "gridded response" items. *TerraNova* Form D was administered in Grade 6; *TerraNova* Form C was administered in all other grades.

Table 18 shows the number of items, by item type, in each test form. The column "SR from NRT" in that table shows the number of NRT items that contribute to CRT scores. For the Mathematics tests, Forms A, C, and E contain the same operational items and are designated as Form 1; similarly, Forms B and D contain the same operational items and are designated as Form 2.[2] As can be seen in Table 18, the total number of operational items and score points was the same for all test forms within a grade.

Table 19 shows the number of items by item function (anchor items, common items, unique items, and field test items). Anchor items were used for placing the 2006 scale on the 2005 scale. Common items (which included many, but not necessarily all, of the anchor items) were used for linking alternate forms.

Tables 20 to 25 present the number of items and score points by Maryland content reporting standards. There are five reporting standards for Mathematics across grades. For all grades, the number of items and score points for each reporting standard were identical across forms within each grade. The actual values shown in Tables 20 to 25 align with the target values (shown in Table 1) for all grades and the sums in these tables are identical to the values shown in Table 18.

[2] The forms designated as operational Form 1 contain the same operational items in the same item positions, and are identical to one another except for the field test items included in Section 5 of each form. This is also true of the forms designated as operational Form 2. Although Forms 1 and 2 are distinct operational forms, they also share some common items.

Table 18
The Number of Items by Item Type

Grade Content	Form	CRT				Total CRT Items	Total CRT Score Points
		SR from NRT	SR	CR	SPR		
MA3	1	11	40	14	-	65	72
	2	11	40	14	-	65	72
MA4	1	10	40	14	-	64	71
	2	10	40	14	-	64	71
MA5	1	13	36	16	-	65	74
	2	13	36	16	-	65	74
MA6	1	5	43	14	-	62	70
	2	5	43	14	-	62	70
MA7	1	6	30	14	12	62	72
	2	6	30	14	12	62	72
MA8	1	11	25	16	12	64	75
	2	11	25	16	12	64	75

- For all grades, Form 1 consists of Forms A, C, & E and Form 2 consists of Forms B & D.
- For all grades, counts are without field test items.

Table 19
The Number of Items by Function

Content Grade	Form	Total Items*	Anchor Items	Common Items	Unique Items	Field-Test Items
MA3	A	83	26	39	26	18
	B	83	26	39	26	18
	C	83	26	39	26	18
	D	83	26	39	26	18
	E	83	26	39	26	18
MA4	A	82	26	32	32	18
	B	82	26	32	32	18
	C	82	26	32	32	18
	D	82	26	32	32	18
	E	82	26	32	32	18
MA5	A	85	27	40	25	20
	B	85	27	40	25	20
	C	85	27	40	25	20
	D	81	27	40	25	16
	E	81	27	40	25	16
MA6	A	77	27	31	31	15
	B	77	27	31	31	15
	C	78	27	31	31	16
	D	78	27	31	31	16
	E	78	27	31	31	16
MA7	A	78	23	34	28	16
	B	76	23	34	28	14
	C	79	23	34	28	17
	D	79	23	34	28	17
	E	79	23	34	28	17
MA8	A	81	22	38	26	17
	B	79	22	38	26	15
	C	80	22	38	26	16
	D	80	22	38	26	16
	E	78	22	38	26	14

- * Total = Common + Unique + Field Test
- For all grades, common items are items that appear both on Form 1 (Forms A, C, & E) and Form 2 (Forms B, & D).

Table 20
The Number of Items and Score Points by Maryland Content Standard for Grade 3

	Forms A, C & E							Forms B & D						
	NRT	Custom		Total				NRT	Custom		Total			
Standards	SR	SR	CR	Items	%	Points	%	SR	SR	CR	Items	%	Points	%
01	1	11	1	13	20	13	18	1	11	1	13	20	13	18
02/03	4	9	2	15	23	15	21	4	9	2	15	23	15	21
04/05	1	12	1	14	22	14	19	1	12	1	14	22	14	19
06	5	8	3	16	25	16	22	5	8	3	16	25	16	22
07	0	0	7	7	11	14	19	0	0	7	7	11	14	19
Sum	11	40	14	65	100	72	100	11	40	14	65	100	72	100

Table 21
The Number of Items and Score Points by Maryland Content Standard for Grade 4

	Forms A, C & E							Forms B & D						
	NRT	Custom		Total				NRT	Custom		Total			
Standards	SR	SR	CR	Items	%	Points	%	SR	SR	CR	Items	%	Points	%
01	0	13	1	14	22	14	20	0	13	1	14	22	14	20
02/03	2	10	2	14	22	14	20	2	10	2	14	22	14	20
04/05	0	13	2	15	23	15	21	0	13	2	15	23	15	21
06	8	4	2	14	22	14	20	8	4	2	14	22	14	20
07	0	0	7	7	11	14	20	0	0	7	7	11	14	20
Sum	10	40	14	64	100	71	100	10	40	14	64	100	71	100

Table 22
The Number of Items and Score Points by Maryland Content Standard for Grade 5

	Forms A, C & E							Forms B & D						
	NRT	Custom		Total				NRT	Custom		Total			
Standards	SR	SR	CR	Items	%	Points	%	SR	SR	CR	Items	%	Points	%
01	2	11	2	15	23	15	20	2	11	2	15	23	15	20
02/03	4	8	2	14	22	14	19	4	8	2	14	22	14	19
04/05	2	9	2	13	20	13	18	2	9	2	13	20	13	18
06	5	8	2	15	23	15	20	5	8	2	15	23	15	20
07	0	0	8	8	12	17	23	0	0	8	8	12	17	23
Sum	13	36	16	65	100	74	100	13	36	16	65	100	74	100

Table 23
The Number of Items and Score Points by Maryland Content Standard for Grade 6

Standards	Forms A, C & E							Forms B & D						
	NRT	Custom		Total				NRT	Custom		Total			
	SR	SR	CR	Items	%	Points	%	SR	SR	CR	Items	%	Points	%
01	1	11	2	14	23	14	20	1	11	2	14	23	14	20
02/03	1	11	2	14	23	14	20	1	11	2	14	23	14	20
04/05	0	12	1	13	21	13	19	0	12	1	13	21	13	19
06	3	9	2	14	23	14	20	3	9	2	14	23	14	20
07	0	0	7	7	11	15	21	0	0	7	7	11	15	21
Sum	5	43	14	62	100	70	100	5	43	14	62	100	70	100

Table 24
The Number of Items and Score Points by Maryland Content Standard for Grade 7

Standards	Forms A, C & E								Forms B & D							
	NRT	Custom			Total				NRT	Custom			Total			
	SR	SR	CR	GR	Items	%	Points	%	SR	SR	CR	GR	Items	%	Points	%
01	0	9	2	3	14	23	14	19	0	9	2	3	14	23	14	19
02/03	1	7	2	3	13	21	13	18	1	7	2	3	13	21	13	18
04/05	0	8	3	3	14	23	14	19	0	8	3	3	14	23	14	19
06	5	6	0	3	14	23	14	19	5	6	0	3	14	23	14	19
07	0	0	7	0	7	11	17	24	0	0	7	0	7	11	17	24
Sum	6	30	14	12	62	100	72	100	6	30	14	12	62	100	72	100

Table 25
The Number of Items and Score Points by Maryland Content Standard for Grade 8

Standards	Form A, C & E								Form B & D							
	NRT	Custom			Total				NRT	Custom			Total			
	SR	SR	CR	GR	Items	%	Points	%	SR	SR	CR	GR	Items	%	Points	%
01	2	6	3	4	15	23	15	20	2	6	3	4	15	23	15	20
02/03	2	6	2	3	13	20	13	17	2	6	2	3	13	20	13	17
04/05	1	7	3	3	14	22	14	19	1	7	3	3	14	22	14	19
06	6	6	0	2	14	22	14	19	6	6	0	2	14	22	14	19
07	0	0	8	0	8	13	19	25	0	0	8	0	8	13	19	25
Sum	11	25	16	12	64	100	75	100	11	25	16	12	64	100	75	100

Classical Item Analysis

Tables A1- A18 of Appendix A present item-level descriptive statistics for each of the test forms. These tables contain the following information: item function (common or unique), item type (SR, CR, or SPR), item *p*-value (P_VAL), item correlation with the total test score (R_ITT), and correlation between each item choice and the total test score (P_BIS1, etc.). The *p*-value for an SR item represents the proportion of students who answered the item correctly. The *p*-value for a CR item represents the mean raw score for the item divided by the number of points possible for the item. A point-biserial correlation between the item score and the total score on the test was also computed for the SR items. For the CR items, a Pearson product-moment correlation between the item score and the total score on the test was computed. For the item analysis, the studied item was excluded from the computation of the total score so as to not inflate the correlation artificially. This effect would be most noticeable for CR items worth several points. For the correct answer choice, the correlation between item choice and total score is the same as the point-biserial correlation of the item. A similar formula was applied to compute the correlation between each distracter and the total score. In general, negative correlations are expected for all distracters when an item is good.

Note that items were evaluated using the following criteria: a *p*-value below 0.30 for SR items and 0.20 for CR and SPR items, and a point-biserial below 0.15. Items flagged for any of these criteria were referred to CTB's content specialists for further review to ensure that each item was measuring the intended construct(s), that the scoring key or scoring rubric was correct, and (for multiple-choice items) that there was one and only one correct answer to the item.

Rater Agreement

All CR items were scored by at least two raters. If the scores assigned by the raters differed by one point, the student received the higher of the two scores. Discrepancies of more than one point were resolved by a third expert rater.

Rater agreement was assessed using only the scores assigned by the first two raters. Indices of rater agreement and consistency were obtained using the scores from the first two raters. Appendix tables B1-B6 present rater agreement statistics for the CR items across all grades. These tables provide the percentages of pairs of raters' scores that did not differ (i.e., perfect agreement) and the percentages of pairs of raters' scores that differed by one point (i.e., adjacent agreement) for all CR items over all test forms.

When rater agreement was defined as the percentage of same scores plus adjacent scores, rater agreement across all grade levels ranged from 97.6% to 100% for the Mathematics items. The percentage of perfect agreement (i.e., identical scores assigned by rater 1 and rater 2) ranged from 77.4% to 99.8% in Grade 3, from 68.6% to 99.1% in Grade 4, from 75.5% to 99.6% in Grade 5, from 73.7% to 99.5% in Grade 6, from 77.1% to 99.7% in Grade 7, and from 69.8% to 99.4% in Grade 8.

Note that each CR item for Mathematics consists of two parts, A and B. Because Part A is dichotomously scored (1 point for a correct response), the percentage of perfect agreement for part A was usually higher than for part B, ranging from 96.1% to 99.8% in Grade 3, 94.9% to 99.1% in Grade 4, 93.9% to 99.6% in Grade 5, 96.2% to 99.5% in Grade 6, 94.3% to 99.7% in Grade 7 and 94.8% to 99.4% in Grade 8.

In addition to the percentage of agreement, the tables present the mean item score and item standard deviation of the item scores assigned by each rater group. The mean score points awarded by the two rater groups are very close. The product moment correlations between first and second ratings are also included in these tables.

Appendix Tables B7-B12 show the distributions of scores on the CR items. In these tables, ITEMNO represents item number in test book. "Omit" denotes the number of student cases that did not respond to the item. Code B is an answer that cannot be scored. Each number, 0, 1, 2, 3, represents a score of 0, 1, 2, and 3, respectively. "%_omit" represents the percent of omits. Note that parts A and B of the Mathematics items were treated as independent items and were separately scored.

Differential Item Functioning (DIF)

An item flagged for differential item functioning (DIF) is more difficult for a particular group of students than would be expected based on their total test scores, compared to the performance of the other group. The groups compared in the DIF analyses were female and male students, and African–American, Hispanic, and white students. Male and white were reference groups.

The statistical procedures used by CTB to identify items thought to exhibit substantial DIF are the same procedures used by the Educational Testing Service (ETS) and the National Assessment of Educational Progress (NAEP). For SR items, the Mantel-Haenszel (χ^2_{MH}) statistic was used to evaluate potential DIF items. In this procedure, the "C" - level DIF items are flagged, where a "C" item indicates a large amount of DIF and has an absolute value of the Mantel-Haenszel (Δ_{MH}) that is significantly greater than zero (at the .05 level) and $|\Delta_{MH}|$ exceeds 1.5. Also, the "B" - level DIF items are flagged, where a "B" item indicates DIF and has an absolute value of the Mantel-Haenszel (Δ_{MH}) that is significantly greater than zero (at the .05 level) and $-1.5 \le \Delta_{MH} \le -1$ or $1 \le \Delta_{MH} \le 1.5$ (Zwick, Donoghue, & Grima, 1993).

For the CR items, an effect size (ES) statistic based on Mantel χ^2 was used. ES is obtained by dividing the standardized mean difference (SMD) statistics by the standard deviation of the item. A detailed description of these procedures can be found in Zwick, et al., (1993).

Tentative flagging criteria followed the same rules as are used in NAEP:
BB: If the Mantel statistic is significant ($p < .05$) and the |ES| is between 0.17 and 0.25
CC: If the Mantel statistic is significant ($p < .05$) and the $|ES| \ge 0.25$

Appendix tables C1-C6 show items flagged based on the above criteria. In the column "Focal", for those items flagged for ethnicity, AA represents African American and Hisp represents Hispanic. Positive values in the "DIF" column mean that the item favors the focal group, while negative values imply that the item disadvantages the focal group.

Item Fit Assessment

Item fit was assessed using the *Q1* statistic described by Yen (1984). *Q1* is a Pearson chi-square statistic,

$$Q1_j = \sum_{i=1}^{I} \frac{N_{ji}(O_{ji} - E_{ji})^2}{E_{ji}} + \sum_{i=1}^{I} \frac{N_{ji}[(1 - O_{ji}) - (1 - E_{ji})]^2}{1 - E_{ji}}$$

where N_{ji} is the number of examinees in cell *i* for item *j*, and O_{ji} and E_{ji} are the observed and expected proportion of examinees in in cell *i* obtaining the maximum possible score on item *j*.

Because *Q1* is influenced by sample size and by the number of possible score points for an item, this statistic was transformed to a Z-statistic,

$$Z_j = \frac{(Q_{1j} - DF_j)}{\sqrt{2DF_j}}$$

where Q_{1j} is the item chi-square statistic defined above,

j is an item, and

DF is the degrees of freedom for a given item *j*.

The *Z*-statistic is an index of the degree to which obtained proportions of students with each item score are close to the proportions that would be predicted by the estimated student ability and item parameters. These values, along with the associated chi-squares (Q_1) are computed for ten intervals corresponding to deciles of the ability distribution. Because the expected value of Z increases as the sample size increases, critical values for *Z* were established using the following equation (Yen, 1991a):

$$Z_{crit,j} = \frac{4N_j}{1500}$$

where $Z_{crit,j}$ is critical value of *Z* for item *j* and

N_j is the number of students who responded to item *j*.

In the 2006 calibration of the Mathematics items, several items exhibited moderate misfit. Across all operational test forms, one misfitting item was identified at Grade 3, five items at Grade 4, two at Grade 5, four at Grade 6, two at Grade 7, and nine at Grade 8. The figures in Appendix D show the estimated and observed item characteristic curves (ICC's) of these items. No items were dropped from scoring because of model misfit. Appendix D contains the plots of the field test items flagged for misfit as well.

Calibration and Equating

IRT Model

Student item responses were calibrated using the combination of two IRT models. The three-parameter logistic model (3PL) was used to scale the SR items, and the two-parameter partial credit (2PPC) model was employed to scale the CR items. A brief explanation of the models is provided below.

Two types of IRT models have most commonly been used to scale large-scale education assessments containing mixed item types or formats. For SR items, the 3PL model has been employed. The 3PL model (Lord & Novick, 1968; Lord, 1980) defines a SR item in terms of three item parameters: item difficulty or location, item discrimination, and probability of a student with very low ability answering the item correctly (guessing parameter). In this model, the probability that a student with scale score θ responds correctly to item j is

$$p_j(\theta) = c_j + \frac{(1 - c_j)}{1 + \exp[-1.7a_j(\theta - b_j)]},$$

where a_j is the item discrimination, b_j is the item difficulty, and c_j is the probability of a correct response by a very low-scoring student.

The 2PPC model defines a CR item in terms of item discrimination as well as location parameter for each score point. The 2PPC model is a special case of Bock's (1972) nominal model. Bock's model states that the probability of an examinee with ability θ having a score at the kth level of the jth item is

$$P_{jk}(\theta) = P(x_j = k - 1 | \theta) = \frac{\exp Z_{jk}}{\sum_{i=1}^{m_j} \exp Z_{ji}}, k = 1, \ldots, m_j,$$

where m_j is the number of score levels, and

$Z_{jk} = A_{jk}\theta + C_{jk}$,

$A_{jk} = \alpha_j(k-1)$, $k = 1, 2, \ldots m_j$, and

$C_{jk} = -\sum_{i=0}^{k-1} \gamma_{ji}$, where $\gamma_{j0} = 0$,

where A_{jk} is the discrimination parameter of the kth category of item j, C_{jk} is the intercept parameter of the nonlinear response function associated with the kth category of item j, α_j and γ_{ji} are the parameters to be estimated from the data.

For each item there are $m_j - 1$ independent γ_{ji} parameters and one α_j parameter; a total of m_j independent item parameters are estimated.

Calibration and Equating Procedure

In this report, **common items** indicate items that appear across all alternate forms and are used for Form-to-Form equating. **Anchor items** indicate items used for Year-to-Year equating. Most anchor items are common items. No constructed response (CR) items or student-produced response (SPR) items were used as anchor items. As in previous years, each Mathematics CR item is composed of two parts, A and B. Each part is considered one item.

The following procedures were applied to calibrate and equate the 2006 MSA CRT items:

Calibration and Form-to-Form equating

Only items that contribute to the CRT score were calibrated. The following two steps were applied for Form-to-Form equating.

Step 1: Stability of equating items was checked using following the procedure.

(1) Each of the two operational forms for each grade was separately calibrated. Plots of the Form 1 vs. Form 2 item parameters (*a* parameters (using log of *a*) and *b* parameters) were produced. These plots were examined to identify items that were not behaving consistently across forms. For the 2006 assessments, there was only one item (Grade 3, item #33) with inconsistent parameters across the two forms. On 5/3/06, MSDE approved the suppression of this item for the 2006 administration.

Step 2: Thus, all of the shared items other than grade 3, item #33 were treated as common items for purposes of calibration and equating, and the two alternate Forms 1 and 2 at each grade level were calibrated together.

Year-to-Year Equating

The following two steps were applied for Year-to-Year equating.

Step 1: Stability of anchor items was checked using the following procedure.

(1) Item parameters for the 2006 test forms were transformed to the MSA CRT reporting scale using the test characteristic curve procedure suggested by Stocking and Lord (1983).
(2) The original *a* and *b* parameters of the anchor items were plotted against the recalibrated parameters from the 2006 calibration. Item p-values were also plotted.

Step 2: Results were evaluated to determine whether or not all of the anchor items were stable enough across years to use for year-to-year equating. For the 2006 tests, all of the anchor items were judged to be sufficiently stable, an all were used as equating anchors. Item parameters for the 2006 tests were transformed to the MSA CRT reporting scale using these anchor items and Stocking and Lord's transformation procedure.

Calibration and Equating Results

The untransformed (theta metric) item parameters for all items are contained in Appendix E. Stability of common items was checked using the method described above in Step 1 of the Form-to-Form equating procedures. Figures F1-F6 in Appendix F show the alignment of "a" parameters (using the log of a) and the alignment of "b" parameters. Note that only selected response (SR) items were used for common items. Based on these plots, all items were judged to be sufficiently stable to serve as common items for calibration and equating purposes. Please note that grade 3, item #33 had already been removed.

Figures F7-F24 show the item parameters and p-values by grade and test form. Figures F25-F30 show test characteristic curves (TCC) and standard errors of measurement (SEM) curves based on the final item parameters. TCCs and SEMs for alternate forms were similar across all grades.

Distribution of the Maryland Score Scale

Table 26 presents the lowest obtainable scale scores (LOSS) and the highest obtainable scale scores (HOSS). For the 2006 assessments, MSDE requested that the LOSS and HOSS values remain at a LOSS of 240 and HOSS of 650 across all grades.

Table 26
LOSS and HOSS

Grade	LOSS	HOSS
MA3	240	650
MA4	240	650
MA5	240	650
MA6	240	650
MA7	240	650
MA8	240	650
RD10	240	650

The 2006 item parameters were placed on the MSA CRT reporting scale using previously calibrated items from the 2004 and 2005 tests as anchors in a Stocking and Lord test-characteristic curve equating procedure (Stocking & Lord, 1983). Student scores were computed using IRT pattern scoring with the transformed parameters. As shown in Table 27, and 28, distributions of raw scores and scale scores were similar across forms. Due to relatively long test lengths for every grade, reliability (Cronbach's alpha) was high for all grades. Reliability coefficients ranged from 0.92 to 0.96 across grades.

Tables 29 and 30 show the scale score statistics (means and standard deviations) for ethnic and gender subgroups on each test form. Across grades, white students generally performed better than African American and Hispanic students. The scale score differences ranged from about 30 to 40 scale score points. Female students performed slightly better than male students across all grades.

Figures G1-G18 in Appendix G show histograms for the distribution of scale scores for the total population and for subgroups defined by gender and ethnicity.

Table 27
CRT Raw Score Descriptive Statistics

Grade Content	Form	N Count	Mean	Mean P-Value	SD	Min	Max	Alpha	SEM
MA3	1	36268	52.54	0.73	11.23	0	72	0.92	3.11
	2	24120	52.89	0.73	11.51	0	72	0.93	3.05
	Total	60388	52.68	0.73	11.35	0	72	.	
MA4	1	37011	45.35	0.65	13.68	0	70	0.94	3.41
	2	24774	44.53	0.63	13.93	0	71	0.94	3.48
	Total	61785	45.02	0.64	13.79	0	71	.	
MA5	1	38101	45.82	0.62	14.25	0	74	0.94	3.49
	2	25372	45.20	0.61	14.31	0	74	0.94	3.51
	Total	63473	45.58	0.62	14.28	0	74	.	
MA6	1	38922	39.18	0.56	15.28	0	70	0.95	3.53
	2	25828	39.50	0.56	14.67	0	69	0.94	3.53
	Total	64750	39.31	0.56	15.04	0	70	.	
MA7	1	39533	36.54	0.51	16.88	0	72	0.96	3.54
	2	26296	36.67	0.51	17.35	0	72	0.96	3.59
	Total	65829	36.59	0.51	17.07	0	72	.	
MA8	1	40707	35.07	0.47	16.89	0	75	0.95	3.73
	2	27033	34.02	0.45	17.24	0	75	0.95	3.71
	Total	67740	34.65	0.46	17.04	0	75	.	

Table 28
CRT Scale Score Descriptive Statistics

Grade Content	Form	N Count	Mean	SD	MIN	MAX
MA3	1	36268	410.21	43.99	240	650
	2	24120	412.33	43.07	240	650
	Total	60388	411.06	43.64	240	650
MA4	1	37011	410.04	43.68	240	650
	2	24774	411.10	43.33	240	650
	Total	61785	410.47	43.54	240	650
MA5	1	38101	414.38	44.82	240	650
	2	25372	415.71	45.61	240	650
	Total	63473	414.91	45.14	240	650
MA6	1	38922	405.65	49.64	240	650
	2	25828	407.19	46.43	240	553
	Total	64750	406.27	48.39	240	650
MA7	1	39533	401.35	50.85	240	650
	2	26296	403.02	51.00	240	650
	Total	65829	402.02	50.92	240	650
MA8	1	40707	408.50	46.94	240	650
	2	27033	407.51	48.92	240	650
	Total	67740	408.10	47.74	240	650

Table 29
CRT Scale Score Descriptive Statistics by Ethnicity

Grade Content	Test Form	White					African American					Hispanic				
		N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
MA3	1	17339	424.30	40.33	240	650	13613	391.94	41.84	240	568	3050	396.98	40.27	240	568
	2	11526	426.41	39.35	240	650	9088	394.34	40.63	240	650	2071	399.47	39.91	240	551
	Total	28865	425.14	39.96	240	650	22701	392.90	41.38	240	650	5121	397.99	40.14	240	568
MA4	1	18044	423.57	39.01	240	650	13770	391.63	42.05	240	554	3073	396.73	42.64	240	546
	2	11979	425.17	38.05	240	650	9279	392.44	41.81	240	541	2068	397.45	43.11	240	525
	Total	30023	424.21	38.64	240	650	23049	391.95	41.95	240	554	5141	397.02	42.83	240	546
MA5	1	18485	427.56	39.82	240	650	14391	396.10	43.46	240	540	3047	401.47	45.17	240	546
	2	12304	429.24	40.30	240	650	9755	396.51	44.41	240	553	1891	404.96	44.03	240	564
	Total	30789	428.23	40.02	240	650	24146	396.27	43.85	240	553	4938	402.81	44.77	240	564
MA6	1	18442	421.64	41.70	240	650	15379	384.68	50.55	240	528	2897	393.07	49.35	240	502
	2	12346	422.58	39.86	240	553	10212	387.16	45.83	240	519	1909	395.44	45.25	240	553
	Total	30788	422.02	40.97	240	650	25591	385.67	48.73	240	528	4806	394.01	47.77	240	553
MA7	1	19064	419.51	42.75	240	650	15597	377.83	49.78	240	530	2817	384.97	50.63	240	515
	2	12610	421.71	43.15	240	650	10421	378.62	49.16	240	650	1816	388.61	48.66	240	516
	Total	31674	420.39	42.92	240	650	26018	378.14	49.53	240	650	4633	386.39	49.89	240	516
MA8	1	19836	425.18	40.21	240	650	15996	386.31	44.70	240	556	2734	394.31	45.90	240	528
	2	13323	425.34	41.04	240	650	10501	382.32	47.04	240	519	1766	396.29	45.44	240	549
	Total	33159	425.25	40.54	240	650	26497	384.73	45.68	240	556	4500	395.09	45.73	240	549

Table 30
CRT Scale Score Descriptive Statistics by Gender

Grade Content	Test Form	Male					Female				
		N	Mean	SD	MIN	MAX	N	Mean	SD	MIN	MAX
MA3	1	18665	408.89	44.44	240	650	17600	411.62	43.47	240	650
	2	12353	412.15	42.83	240	650	11764	412.53	43.33	240	650
	Total	31018	410.19	43.83	240	650	29364	411.99	43.42	240	650
MA4	1	18953	409.18	45.27	240	650	18055	410.96	41.93	240	650
	2	12524	410.10	44.75	240	650	12247	412.14	41.77	240	650
	Total	31477	409.55	45.07	240	650	30302	411.44	41.87	240	650
MA5	1	19554	412.78	46.69	240	650	18543	416.09	42.66	240	577
	2	12922	414.80	47.75	240	650	12447	416.67	43.26	240	650
	Total	32476	413.59	47.12	240	650	30990	416.32	42.90	240	650
MA6	1	20249	403.32	52.25	240	650	18663	408.23	46.45	240	569
	2	13257	405.54	48.91	240	553	12565	408.98	43.51	240	553
	Total	33506	404.20	50.96	240	650	31228	408.53	45.29	240	569
MA7	1	20293	398.74	53.75	240	650	19233	404.11	47.45	240	555
	2	13473	399.81	53.85	240	650	12820	406.41	47.56	240	650
	Total	33766	399.17	53.79	240	650	32053	405.03	47.51	240	650
MA8	1	20939	406.14	50.06	240	650	19761	411.03	43.21	240	650
	2	13948	404.51	52.28	240	650	13080	410.70	44.85	240	650
	Total	34887	405.49	50.97	240	650	32841	410.90	43.87	240	650

The Relationship between NRT and CRT

Each of the 2006 MSA tests included both NRT and CRT items. Even though the specific content standards for the NRT and CRT assessments are somewhat different, the two tests are designed to measure similar knowledge, skills, and abilities. To examine how much these two tests measure the same performance, the correlation between scale scores on the NRT and scale scores on the CRT were produced and are presented in Table 31. The correlation was relatively high and similar across alternate forms within grade. The correlations ranged from 0.80 to 0.85 in Mathematics.

Table 31
Correlation between NRT and CRT

CRT Form	Content/Grade					
	MA3	MA4	MA5	MA6	MA7	MA8
Total	0.81	0.82	0.85	0.82	0.82	0.83
1	0.81	0.82	0.85	0.81	0.82	0.83
2	0.80	0.82	0.85	0.82	0.82	0.82

The Score Distributions and Correlations of Content Standards

Scale scores based on total test performance were reported to students, schools, and LEAs. Scale scores based on content standards were reported only to MSDE. These content-standard scale scores were estimated using a maximum-likelihood IRT pattern scoring procedure with item parameters estimated from performance on the total test form. Tables 32 and 33 show the raw score and scale score results for each content standard.

Tables 34 and 35 show the raw score Pearson product-moment and Spearman Rho correlations among the content standards at each grade level. Tables 36 and 37 show the scale score Pearson product-moment and Spearman Rho correlations among the content standards at each grade level. At every grade level, the Pearson raw score correlations are higher than the scale score correlations. This result is to be expected, given the differences between the raw score and scale score distributions.[3] Because of the properties of the scale score distributions, a nonparametric correlation procedure such as the Spearman Rho is more appropriate than the Pearson product-moment correlation. Indeed, when the Spearman Rho scale score correlations are compared with either the Pearson or Spearman Rho raw score correlations, the differences are negligible.

[3] Because a perfect raw score on any of the content standards is assigned the highest obtainable scale score on the total test, regardless of the difficulty or number of items included in the content standard, there tend to be very large gaps between the HOSS and the penultimate scale score. In addition, the scale score distributions differ substantially from one content standard to another. Given these distributions, a nonparametric correlation procedure such as the Spearman Rho seems more appropriate than the Pearson product-moment correlation.

Table 32
Distribution of Raw Scores on Content Standards

Grade	Form	Content Standard	N	Maximum Possible	Mean	SD	Minimum	Maximum
3	1	1	36268	13	10.09	2.39	0	13
		2&3	36268	14	11.76	2.18	0	14
		4&5	36268	14	10.76	2.72	0	14
		6	36268	16	12.68	2.81	0	16
		7	36268	14	6.61	2.82	0	14
	2	1	24120	13	10.15	2.31	0	13
		2&3	24120	14	11.44	2.38	0	14
		4&5	24120	14	11.26	2.68	0	14
		6	24120	16	12.67	2.79	0	16
		7	24120	14	6.71	2.98	0	14
4	1	1	37011	14	9.27	2.92	0	14
		2&3	37011	13	8.74	2.88	0	13
		4&5	37011	15	10.24	3.55	0	15
		6	37011	14	10.35	2.78	0	14
		7	37011	14	6.76	3.31	0	14
	2	1	24774	14	9.56	3.11	0	14
		2&3	24774	14	8.94	2.97	0	14
		4&5	24774	15	10.00	3.64	0	15
		6	24774	14	10.44	2.70	0	14
		7	24774	14	5.60	3.34	0	14
5	1	1	38101	15	10.80	3.23	0	15
		2&3	38101	14	8.75	2.88	0	14
		4&5	38101	13	9.16	2.74	0	13
		6	38101	15	9.95	3.59	0	15
		7	38101	17	7.16	3.60	0	17
	2	1	25372	15	10.72	3.21	0	15
		2&3	25372	14	8.23	3.10	0	14
		4&5	25372	13	8.97	2.84	0	13
		6	25372	15	9.88	3.45	0	15
		7	25372	17	7.40	3.47	0	17

Table 32 (cont.)
Distribution of Raw Scores on Content Standards

Grade	Form	Content Standard	N	Maximum Possible	Mean	SD	Minimum	Maximum
6	1	1	38922	14	9.11	3.44	0	14
		2&3	38922	14	7.52	3.41	0	14
		4&5	38922	13	7.71	3.04	0	13
		6	38922	14	8.58	3.55	0	14
		7	38922	15	6.26	3.53	0	15
	2	1	25828	14	8.92	3.20	0	14
		2&3	25828	14	7.84	2.91	0	14
		4&5	25828	13	7.94	3.02	0	13
		6	25828	14	8.11	3.58	0	14
		7	25828	15	6.69	3.67	0	15
7	1	1	39533	14	7.51	3.81	0	14
		2&3	39533	13	5.57	3.69	0	13
		4&5	39533	14	7.97	3.63	0	14
		6	39533	14	7.51	3.54	0	14
		7	39533	17	7.98	3.83	0	17
	2	1	26296	14	7.51	4.02	0	14
		2&3	26296	13	6.43	3.57	0	13
		4&5	26296	14	7.68	3.63	0	14
		6	26296	14	7.82	3.54	0	14
		7	26296	17	7.24	4.14	0	17
8	1	1	40707	15	7.69	3.75	0	15
		2&3	40707	13	6.13	3.11	0	13
		4&5	40707	14	7.08	3.36	0	14
		6	40707	14	6.39	3.47	0	14
		7	40707	19	7.79	4.89	0	19
	2	1	27033	15	7.27	3.88	0	15
		2&3	27033	13	6.41	3.24	0	13
		4&5	27033	14	7.20	3.55	0	14
		6	27033	14	6.58	3.55	0	14
		7	27033	19	6.57	4.74	0	19

Table 33
Distribution of Scale Scores on Content Standards

Grade	Form	Content Standard	N	Maximum Possible	Mean	SD	Minimum	Maximum
3	1	1	36268	650	436.09	91.80	240	650
		2&3	36268	650	454.12	112.77	240	650
		4&5	36268	650	436.04	92.97	240	650
		6	36268	650	434.71	91.98	240	650
		7	36268	650	396.27	55.90	240	650
	2	1	24120	650	437.16	91.26	240	650
		2&3	24120	650	452.40	108.08	240	650
		4&5	24120	650	450.77	104.54	240	650
		6	24120	650	436.09	91.71	240	650
		7	24120	650	403.38	51.21	240	650
4	1	1	37011	650	417.74	66.61	240	650
		2&3	37011	650	423.03	81.26	240	650
		4&5	37011	650	424.47	79.53	240	650
		6	37011	650	432.52	89.49	240	650
		7	37011	650	402.66	53.68	240	650
	2	1	24774	650	425.12	80.20	240	650
		2&3	24774	650	418.21	71.66	240	650
		4&5	24774	650	426.38	81.20	240	650
		6	24774	650	433.23	89.86	240	650
		7	24774	650	399.27	59.22	240	650
5	1	1	38101	650	434.11	85.77	240	650
		2&3	38101	650	420.18	68.16	240	650
		4&5	38101	650	431.80	82.64	240	650
		6	38101	650	428.75	81.61	240	650
		7	38101	650	402.95	53.64	240	650
	2	1	25372	650	432.46	85.32	240	650
		2&3	25372	650	420.58	66.88	240	650
		4&5	25372	650	430.85	82.38	240	650
		6	25372	650	426.40	76.24	240	650
		7	25372	650	408.28	51.27	240	650

Table 33 (cont.)
Distribution of Scale Scores on Content Standards

Grade	Form	Content Standard	N	Maximum Possible	Mean	SD	Minimum	Maximum
6	1	1	38922	650	419.28	80.99	240	650
		2&3	38922	650	406.77	74.68	240	650
		4&5	38922	650	411.92	74.69	240	650
		6	38922	650	414.40	82.20	240	650
		7	38922	650	398.17	57.22	240	650
	2	1	25828	650	413.73	69.67	240	650
		2&3	25828	650	410.18	63.42	240	650
		4&5	25828	650	414.77	74.69	240	650
		6	25828	650	411.08	83.29	240	650
		7	25828	650	400.87	54.43	240	650
7	1	1	39533	650	402.40	84.61	240	650
		2&3	39533	650	392.27	87.41	240	650
		4&5	39533	650	405.98	75.78	240	650
		6	39533	650	407.71	73.08	240	650
		7	39533	650	394.70	52.44	240	650
	2	1	26296	650	403.31	90.88	240	650
		2&3	26296	650	404.94	78.95	240	650
		4&5	26296	650	406.25	74.03	240	650
		6	26296	650	413.64	78.40	240	650
		7	26296	650	396.45	56.78	240	650
8	1	1	40707	650	411.93	68.48	240	650
		2&3	40707	650	408.58	62.61	240	650
		4&5	40707	650	408.28	62.34	240	650
		6	40707	650	398.92	83.58	240	650
		7	40707	650	402.96	54.60	240	650
	2	1	27033	650	410.01	71.11	240	650
		2&3	27033	650	412.24	65.57	240	650
		4&5	27033	650	410.77	69.93	240	650
		6	27033	650	400.68	85.96	240	650
		7	27033	650	396.66	60.05	240	650

Table 34
Raw Score Correlations (Pearson Product-Moment) between Content Standards

Mathematics

Grade	Content Standard	Mean	SD	1	2&3	4&5	6	7
3	1	10.12	2.36	1.00	0.69	0.73	0.74	0.63
	2&3	11.63	2.27		1.00	0.70	0.72	0.63
	4&5	10.96	2.72			1.00	0.76	0.66
	6	12.68	2.80				1.00	0.68
	7	6.65	2.88					1.00
4	1	9.38	3.00	1.00	0.72	0.74	0.72	0.70
	2&3	8.82	2.92		1.00	0.73	0.70	0.71
	4&5	10.14	3.59			1.00	0.71	0.76
	6	10.38	2.75				1.00	0.69
	7	6.29	3.37					1.00
5	1	10.77	3.22	1.00	0.69	0.74	0.76	0.74
	2&3	8.54	2.98		1.00	0.72	0.72	0.71
	4&5	9.09	2.78			1.00	0.75	0.74
	6	9.92	3.54				1.00	0.77
	7	7.26	3.55					1.00
6	1	9.04	3.35	1.00	0.73	0.75	0.78	0.80
	2&3	7.65	3.23		1.00	0.70	0.72	0.77
	4&5	7.80	3.03			1.00	0.74	0.75
	6	8.39	3.57				1.00	0.79
	7	6.43	3.59					1.00
7	1	7.51	3.89	1.00	0.78	0.80	0.82	0.81
	2&3	5.91	3.67		1.00	0.76	0.78	0.77
	4&5	7.86	3.63			1.00	0.78	0.83
	6	7.63	3.55				1.00	0.76
	7	7.68	3.97					1.00
8	1	7.52	3.81	1.00	0.77	0.77	0.77	0.85
	2&3	6.24	3.17		1.00	0.74	0.73	0.79
	4&5	7.12	3.44			1.00	0.74	0.80
	6	6.47	3.51				1.00	0.76
	7	7.30	4.87					1.00

Table 35
Raw Score Correlations (Spearman Rho) between Content Standards

Mathematics								
Grade	Content Standard	Mean	SD	1	2&3	4&5	6	7
3	1	10.12	2.36	1.00	0.64	0.68	0.70	0.62
	2&3	11.63	2.27		1.00	0.64	0.67	0.62
	4&5	10.96	2.72			1.00	0.70	0.64
	6	12.68	2.80				1.00	0.67
	7	6.65	2.88					1.00
4	1	9.38	3.00	1.00	0.72	0.73	0.71	0.70
	2&3	8.82	2.92		1.00	0.73	0.70	0.72
	4&5	10.14	3.59			1.00	0.70	0.76
	6	10.38	2.75				1.00	0.70
	7	6.29	3.37					1.00
5	1	10.77	3.22	1.00	0.70	0.73	0.76	0.75
	2&3	8.54	2.98		1.00	0.72	0.72	0.71
	4&5	9.09	2.78			1.00	0.75	0.75
	6	9.92	3.54				1.00	0.78
	7	7.26	3.55					1.00
6	1	9.04	3.35	1.00	0.73	0.75	0.78	0.80
	2&3	7.65	3.23		1.00	0.69	0.73	0.77
	4&5	7.80	3.03			1.00	0.74	0.75
	6	8.39	3.57				1.00	0.79
	7	6.43	3.59					1.00
7	1	7.51	3.89	1.00	0.77	0.81	0.82	0.82
	2&3	5.91	3.67		1.00	0.77	0.78	0.78
	4&5	7.86	3.63			1.00	0.79	0.83
	6	7.63	3.55				1.00	0.77
	7	7.68	3.97					1.00
8	1	7.52	3.81	1.00	0.75	0.77	0.75	0.84
	2&3	6.24	3.17		1.00	0.74	0.71	0.78
	4&5	7.12	3.44			1.00	0.73	0.80
	6	6.47	3.51				1.00	0.73
	7	7.30	4.87					1.00

Table 36
Scale Score Correlations (Pearson Product-Moment) between Content Standards

Mathematics

Grade	Content Standard	Mean	SD	1	2&3	4&5	6	7
3	1	436.51	91.58	1.00	0.51	0.51	0.54	0.54
	2&3	453.43	110.92		1.00	0.49	0.52	0.54
	4&5	441.93	98.02			1.00	0.51	0.55
	6	435.26	91.87				1.00	0.57
	7	399.11	54.19					1.00
4	1	420.70	72.46	1.00	0.57	0.57	0.56	0.62
	2&3	421.10	77.59		1.00	0.57	0.56	0.63
	4&5	425.24	80.21			1.00	0.54	0.63
	6	432.81	89.64				1.00	0.59
	7	401.30	55.99					1.00
5	1	433.45	85.59	1.00	0.60	0.59	0.61	0.66
	2&3	420.34	67.65		1.00	0.60	0.61	0.67
	4&5	431.42	82.53			1.00	0.60	0.66
	6	427.81	79.51				1.00	0.68
	7	405.08	52.77					1.00
6	1	417.07	76.72	1.00	0.61	0.62	0.62	0.69
	2&3	408.13	70.42		1.00	0.60	0.60	0.69
	4&5	413.06	74.70			1.00	0.61	0.67
	6	413.08	82.65				1.00	0.66
	7	399.25	56.14					1.00
7	1	402.76	87.17	1.00	0.64	0.68	0.68	0.73
	2&3	397.33	84.36		1.00	0.65	0.66	0.70
	4&5	406.09	75.09			1.00	0.68	0.75
	6	410.08	75.31				1.00	0.69
	7	395.40	54.22					1.00
8	1	411.17	69.55	1.00	0.68	0.69	0.61	0.74
	2&3	410.04	63.83		1.00	0.67	0.59	0.71
	4&5	409.27	65.48			1.00	0.60	0.74
	6	399.62	84.54				1.00	0.60
	7	400.44	56.92					1.00

Table 37
Scale Score Correlations (Spearman Rho) between Content Standards

Mathematics

Grade	Content Standard	Mean	SD	1	2&3	4&5	6	7
3	1	436.51	91.58	1.00	0.66	0.70	0.71	0.64
	2&3	453.43	110.92		1.00	0.66	0.68	0.63
	4&5	441.93	98.02			1.00	0.72	0.66
	6	435.26	91.87				1.00	0.68
	7	399.11	54.19					1.00
4	1	420.70	72.46	1.00	0.73	0.74	0.73	0.75
	2&3	421.10	77.59		1.00	0.74	0.71	0.75
	4&5	425.24	80.21			1.00	0.71	0.78
	6	432.81	89.64				1.00	0.73
	7	401.30	55.99					1.00
5	1	433.45	85.59	1.00	0.72	0.74	0.77	0.76
	2&3	420.34	67.65		1.00	0.73	0.75	0.74
	4&5	431.42	82.53			1.00	0.76	0.76
	6	427.81	79.51				1.00	0.80
	7	405.08	52.77					1.00
6	1	417.07	76.72	1.00	0.75	0.77	0.80	0.82
	2&3	408.13	70.42		1.00	0.72	0.75	0.79
	4&5	413.06	74.70			1.00	0.77	0.78
	6	413.08	82.65				1.00	0.82
	7	399.25	56.14					1.00
7	1	402.76	87.17	1.00	0.80	0.83	0.84	0.84
	2&3	397.33	84.36		1.00	0.79	0.80	0.81
	4&5	406.09	75.09			1.00	0.81	0.84
	6	410.08	75.31				1.00	0.79
	7	395.40	54.22					1.00
8	1	411.17	69.55	1.00	0.79	0.80	0.77	0.86
	2&3	410.04	63.83		1.00	0.77	0.73	0.82
	4&5	409.27	65.48			1.00	0.75	0.83
	6	399.62	84.54				1.00	0.75
	7	400.44	56.92					1.00

Factor analysis of the MSA Assessments

Exploratory factor analysis was used to examine the structure of the 2006 MSA assessments. At each grade, principal axis factor analysis was applied to extract factor(s) from each of the two operational forms (Form 1 and Form 2), with varimax rotation of the extracted factors. For each test, the number of factors extracted was equal to the number of reported content standards (i.e., 5 factors for each of the Mathematics assessments). Squared multiple correlations (SMC) were used as prior communality estimates (Harman, 1976). The results of these analyses are shown in Appendix H, Tables H1 to H24.

Each test form had between 9 and 16 initial eigenvalues greater than 1.0, with one dominant factor accounting for approximately 17 to 27 percent of the variance, with each additional factor accounting for less than 4 percent of the total variance. After extraction and rotation of 5 factors for each of the Mathematics tests, the variance explained by the factors ranged from 7.6 to 12.1 percent for the first factor, 4.9 to 10.4 percent for the second factor, 1.9 to 6.2 percent for the third factor, 1.3 to 5.1 percent for the fourth factor, and 1.1 to 3.0 for the fifth factor.

While these analyses did yield multifactorial solutions for all of the tests, there was generally no clear relationship between the content standards and the loadings on the extracted factors.

Percent At or Above Cut (PAC)

At the Bookmark standard-setting workshops in 2003 and 2004, performance level cut scores were established for three proficiency levels: Basic, Proficient, and Advanced. Table 38 shows the resulting scale score ranges for each performance level. Note that the Maryland scale was not constructed as a vertical scale, so meaningful comparisons can not be made between performance cut scores at different grades.

Table 39 shows the percentages of students at each performance level on the 2006 MSA assessments. The last column "Proficient + Advanced" represents the percent at or above the cut (PAC) that will be reported for the NCLB act. The 2006 PAC for Mathematics showed a steady decline from grade 4 to grade, 8 dropping from approximately 82 percent in Grade 4 to approximately 55 percent in Grade 8. Tables 40 and 41 show the PAC classified by ethnicity and gender group. Tables 42 to 47 present the PAC by local education agencies (LEA) for each grade. Figures 2 to 7 show changes in the PAC between 2004 and 2005 for each LEA.

Table 38
Scale Score Ranges for Each Performance Level
Based on 2003 and 2004 Standard Setting

Grade	Basic	Proficient	Advanced
3	240-378	379-440	441-650
4	240-373	374-432	433-650
5	240-391	392-452	453-650
6	240-395	396-446	447-650
7	240-395	396-450	451-650
8	240-406	407-443	444-650

Table 39
Percentages of Students at Each Performance Level

Grade Content	Form	N	Basic	Proficient	Advanced	Proficient +Advanced
MA3	1	36268	21.48	54.33	24.19	78.52
	2	24120	20.53	53.94	25.52	79.47
	Total	60388	21.10	54.17	24.72	78.90
MA4	1	37011	18.37	49.87	31.76	81.63
	2	24774	17.87	49.68	32.45	82.13
	Total	61785	18.17	49.79	32.04	81.83
MA5	1	38101	27.14	54.12	18.74	72.86
	2	25372	26.40	53.83	19.77	73.60
	Total	63473	26.84	54.00	19.15	73.16
MA6	1	38922	34.28	47.28	18.44	65.72
	2	25828	35.02	46.00	18.98	64.98
	Total	64750	34.57	46.77	18.66	65.43
MA7	1	39533	40.29	44.35	15.36	59.71
	2	26296	39.97	43.50	16.53	60.03
	Total	65829	40.16	44.01	15.83	59.84
MA8	1	40707	45.20	32.44	22.36	54.80
	2	27033	44.90	32.48	22.62	55.10
	Total	67740	45.08	32.46	22.46	54.92

Table 40
Percentages of Students at Each Performance Level by Ethnicity

Grade Content	Ethnicity	N	Basic	Proficient	Advanced	Proficient +Advanced
MA3	White	28865	11.05	53.87	35.07	88.95
	African American	22701	34.02	54.73	11.25	65.98
	Hispanic	5121	28.88	57.88	13.24	71.12
	Others	3701	9.46	47.99	42.56	90.54
MA4	White	30023	9.04	46.88	44.07	90.96
	African American	23049	30.14	54.22	15.64	69.86
	Hispanic	5141	25.60	55.24	19.16	74.40
	Others	3572	6.94	37.82	55.24	93.06
MA5	White	30789	16.28	56.61	27.11	83.72
	African American	24146	41.07	51.56	7.37	58.93
	Hispanic	4938	35.30	54.46	10.25	64.70
	Others	3600	10.22	47.44	42.33	89.78
MA6	White	30788	20.69	51.56	27.76	79.31
	African American	25591	52.47	41.23	6.30	47.53
	Hispanic	4806	43.32	48.00	8.68	56.68
	Others	3565	14.22	43.56	42.22	85.78
MA7	White	31674	24.04	51.73	24.22	75.96
	African American	26018	60.80	34.81	4.39	39.20
	Hispanic	4633	52.15	41.87	5.98	47.85
	Others	3504	16.81	45.35	37.84	83.19
MA8	White	33159	27.76	38.76	33.48	72.24
	African American	26497	68.14	25.05	6.82	31.86
	Hispanic	4500	56.82	31.44	11.73	43.18
	Others	3584	20.12	30.19	49.69	79.88

Table 41
Percentages of Students at Each Performance Level by Gender

Grade Content	Gender	N	Basic	Proficient	Advanced	Proficient +Advanced
MA3	Male	31018	21.45	54.38	24.17	78.55
	Female	29364	20.74	53.95	25.31	79.26
MA4	Male	31477	19.37	48.28	32.35	80.63
	Female	30302	16.92	51.36	31.72	83.08
MA5	Male	32476	28.02	52.48	19.51	71.98
	Female	30990	25.60	55.61	18.79	74.40
MA6	Male	33506	36.70	44.04	19.25	63.30
	Female	31228	32.26	49.72	18.03	67.74
MA7	Male	33766	42.36	41.83	15.81	57.64
	Female	32053	37.84	46.31	15.85	62.16
MA8	Male	34887	46.73	30.61	22.66	53.27
	Female	32841	43.31	34.43	22.26	56.69

Table 42
Percentages of Students at Grade 3 Performance Levels by LEA

LEA #	N	Basic	Proficient	Advanced	Proficient +Advanced
1	682	22.43	51.91	25.66	77.57
2	5241	11.85	53.60	34.55	88.15
3	7417	22.56	53.89	23.55	77.44
4	1208	9.02	47.68	43.29	90.98
5	421	19.00	60.81	20.19	81.00
6	1969	12.04	60.18	27.78	87.96
7	1153	19.51	63.92	16.57	80.49
8	1871	22.02	56.01	21.97	77.98
9	332	37.95	51.20	10.84	62.05
10	2879	18.27	60.40	21.33	81.73
11	297	14.14	68.35	17.51	85.86
12	2931	14.71	60.35	24.94	85.30
13	3577	12.30	51.19	36.51	87.70
14	168	8.33	54.17	37.50	91.67
15	9644	16.05	48.51	35.44	83.95
16	9171	30.96	56.18	12.87	69.04
17	515	13.01	61.75	25.24	86.99
18	1147	14.91	54.49	30.60	85.09
19	181	25.41	61.88	12.71	74.59
20	303	16.50	54.79	28.71	83.50
21	1573	14.62	57.41	27.97	85.38
22	1125	19.02	56.09	24.89	80.98
23	449	8.91	44.54	46.55	91.09
30	5818	39.81	51.55	8.65	60.19
31	270	45.56	49.63	4.81	54.44
55	46	23.91	69.57	6.52	76.09

Table 43
Percentages of Students at Grade 4 Performance Levels by LEA

LEA #	N	Basic	Proficient	Advanced	Proficient +Advanced
1	666	17.57	46.70	35.74	82.43
2	5358	9.26	45.61	45.13	90.74
3	7636	15.89	51.91	32.20	84.11
4	1270	8.11	42.36	49.53	91.89
5	354	14.69	54.52	30.79	85.31
6	2086	10.16	55.94	33.89	89.84
7	1171	22.80	55.76	21.43	77.20
8	1840	19.35	52.07	28.59	80.65
9	306	30.07	52.29	17.65	69.93
10	2974	14.53	51.61	33.86	85.47
11	339	12.68	58.11	29.20	87.32
12	2965	13.32	54.74	31.94	86.68
13	3679	10.52	43.08	46.40	89.48
14	148	10.14	48.65	41.22	89.86
15	10008	13.58	43.90	42.52	86.42
16	9521	28.35	54.13	17.52	71.65
17	577	15.25	51.13	33.62	84.75
18	1173	13.30	49.87	36.83	86.70
19	213	13.62	68.08	18.31	86.39
20	300	19.00	42.67	38.33	81.00
21	1574	10.42	51.65	37.93	89.58
22	1057	13.91	49.20	36.90	86.09
23	443	14.00	43.57	42.44	86.00
30	5809	37.51	51.20	11.29	62.49
31	282	34.40	51.42	14.18	65.60
55	35	22.86	51.43	25.71	77.14

Table 44
Percentages of Students at Grade 5 Performance Levels by LEA

LEA #	N	Basic	Proficient	Advanced	Proficient +Advanced
1	659	29.59	52.96	17.45	70.41
2	5496	16.94	56.60	26.46	83.06
3	7917	27.80	54.96	17.24	72.20
4	1301	12.99	58.19	28.82	87.01
5	390	25.90	61.28	12.82	74.10
6	2114	15.42	62.25	22.33	84.58
7	1222	23.00	63.34	13.67	77.00
8	1923	25.53	55.23	19.24	74.47
9	308	39.61	52.60	7.79	60.39
10	3047	22.68	57.24	20.09	77.32
11	367	29.97	57.49	12.53	70.03
12	3053	22.21	61.42	16.38	77.79
13	3901	13.00	51.50	35.50	87.00
14	158	30.38	56.33	13.29	69.62
15	10182	19.36	51.11	29.53	80.64
16	9786	40.82	50.50	8.68	59.18
17	538	15.99	63.01	21.00	84.01
18	1202	23.79	54.83	21.38	76.21
19	179	27.93	62.57	9.50	72.07
20	314	19.43	59.24	21.34	80.57
21	1514	25.30	57.27	17.44	74.70
22	1075	26.98	54.70	18.33	73.02
23	450	20.44	59.33	20.22	79.56
30	6032	46.52	48.13	5.35	53.48
31	304	50.33	45.39	4.28	49.67
55	40	35.00	57.50	7.50	65.00

Table 45
Percentages of Students at Grade 6 Performance Levels by LEA

LEA #	N	Basic	Proficient	Advanced	Proficient +Advanced
1	669	32.59	46.94	20.48	67.41
2	5468	27.82	48.96	23.23	72.18
3	7832	36.43	47.70	15.87	63.57
4	1345	25.80	51.60	22.60	74.20
5	399	29.57	53.13	17.29	70.43
6	2238	20.69	54.65	24.66	79.31
7	1289	32.74	50.58	16.68	67.26
8	2011	31.68	52.11	16.21	68.32
9	350	55.14	39.14	5.71	44.86
10	2988	21.75	54.45	23.80	78.25
11	365	29.59	55.07	15.34	70.41
12	3081	30.61	50.73	18.66	69.39
13	3774	16.72	49.63	33.65	83.28
14	178	45.51	49.44	5.06	54.49
15	10015	23.96	46.99	29.05	76.04
16	10480	45.13	46.82	8.04	54.87
17	578	23.70	51.73	24.57	76.30
18	1293	26.99	47.33	25.68	73.01
19	255	42.35	44.31	13.33	57.65
20	318	34.28	51.89	13.84	65.72
21	1597	19.66	53.48	26.86	80.34
22	1022	37.48	43.25	19.28	62.52
23	497	18.91	49.50	31.59	81.09
30	6393	68.79	27.73	3.47	31.21
31	274	58.39	37.96	3.65	41.61
55	41	46.34	43.90	9.76	53.66

Table 46
Percentages of Students at Grade 7 Performance Levels by LEA

LEA #	N	Basic	Proficient	Advanced	Proficient +Advanced
1	744	31.05	54.70	14.25	68.95
2	5565	30.58	44.65	24.76	69.42
3	8149	42.25	43.40	14.35	57.75
4	1384	29.12	54.55	16.33	70.88
5	403	36.97	53.10	9.93	63.03
6	2299	28.93	51.98	19.10	71.07
7	1348	37.54	51.41	11.05	62.46
8	2111	39.32	49.64	11.04	60.68
9	337	58.75	37.98	3.26	41.25
10	3048	26.71	51.44	21.85	73.29
11	419	27.45	62.53	10.02	72.55
12	3014	35.63	49.87	14.50	64.37
13	3959	19.30	49.84	30.87	80.70
14	176	50.00	41.48	8.52	50.00
15	10286	29.36	46.44	24.20	70.64
16	10376	54.68	39.02	6.29	45.32
17	598	23.58	59.36	17.06	76.42
18	1208	34.93	47.27	17.80	65.07
19	236	51.27	39.41	9.32	48.73
20	361	38.78	45.98	15.24	61.22
21	1586	23.14	55.42	21.44	76.86
22	1089	42.42	43.99	13.59	57.58
23	492	21.14	54.47	24.39	78.86
30	6596	75.46	22.42	2.12	24.55
55	44	61.36	36.36	2.27	38.64

Table 47
Percentages of Students at Grade 8 Performance Levels by LEA

LEA #	N	Basic	Proficient	Advanced	Proficient +Advanced
1	751	37.82	42.21	19.97	62.18
2	5790	31.00	36.86	32.14	69.00
3	8481	43.26	35.34	21.40	56.74
4	1398	37.27	38.98	23.75	62.73
5	440	41.14	37.27	21.59	58.86
6	2341	37.98	38.19	23.84	62.02
7	1332	38.89	41.59	19.52	61.11
8	2105	45.08	36.34	18.57	54.92
9	360	65.56	26.94	7.50	34.44
10	3154	29.14	37.86	33.01	70.86
11	357	28.57	44.82	26.61	71.43
12	3181	38.60	36.50	24.90	61.40
13	3935	23.63	38.55	37.81	76.37
14	187	56.15	30.48	13.37	43.85
15	10618	33.58	32.04	34.39	66.42
16	10791	66.29	24.83	8.89	33.71
17	611	30.93	42.88	26.19	69.07
18	1261	46.79	35.61	17.61	53.21
19	258	56.59	32.95	10.47	43.41
20	349	49.00	35.53	15.47	51.00
21	1641	25.47	38.57	35.95	74.53
22	1087	50.78	36.43	12.79	49.22
23	547	21.94	35.28	42.78	78.06
30	6717	78.53	17.79	3.68	21.47
55	43	60.47	30.23	9.30	39.53

Figure 2
Percent at or Above Proficiency Cut Score (PAC) by LEA for Mathematics Grade 3

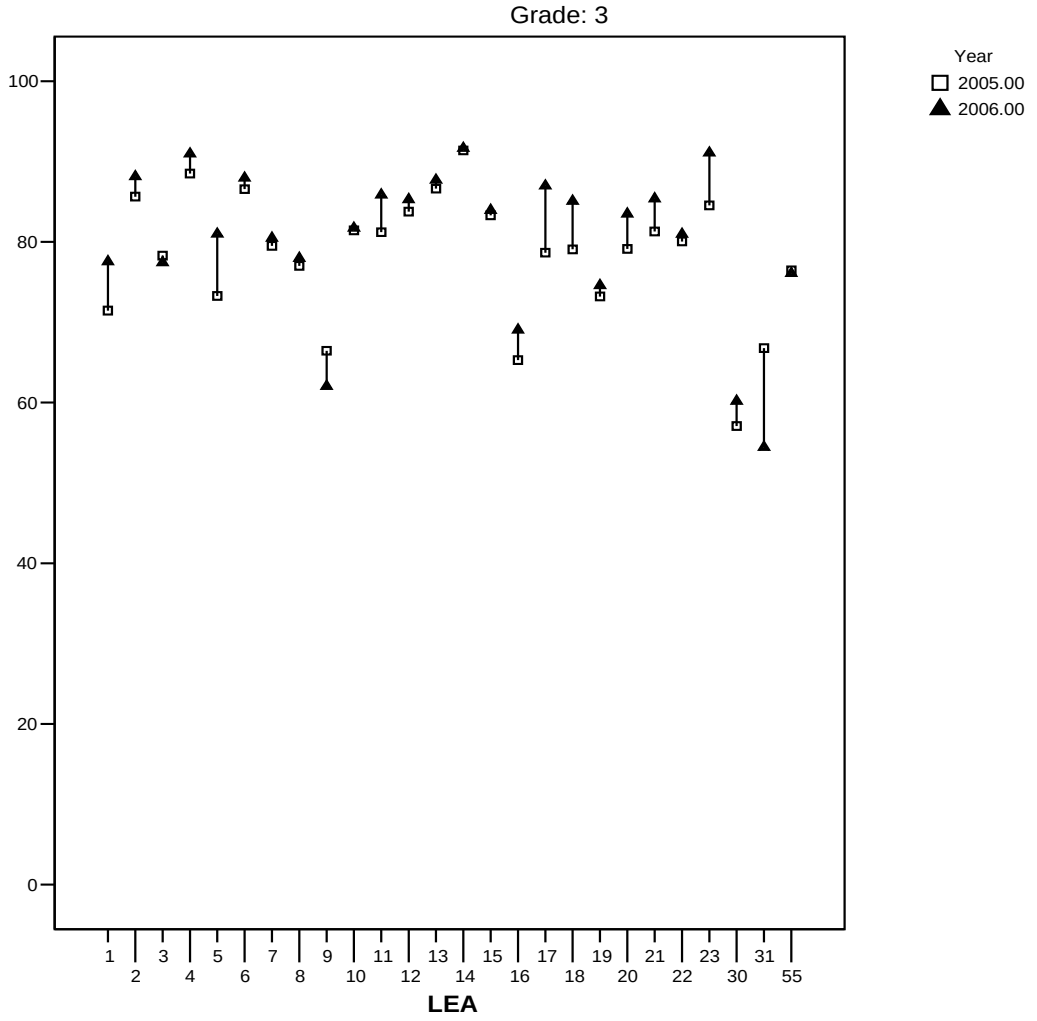

Figure 3
Percent at or Above Proficiency Cut Score (PAC) by LEA for Mathematics Grade 4

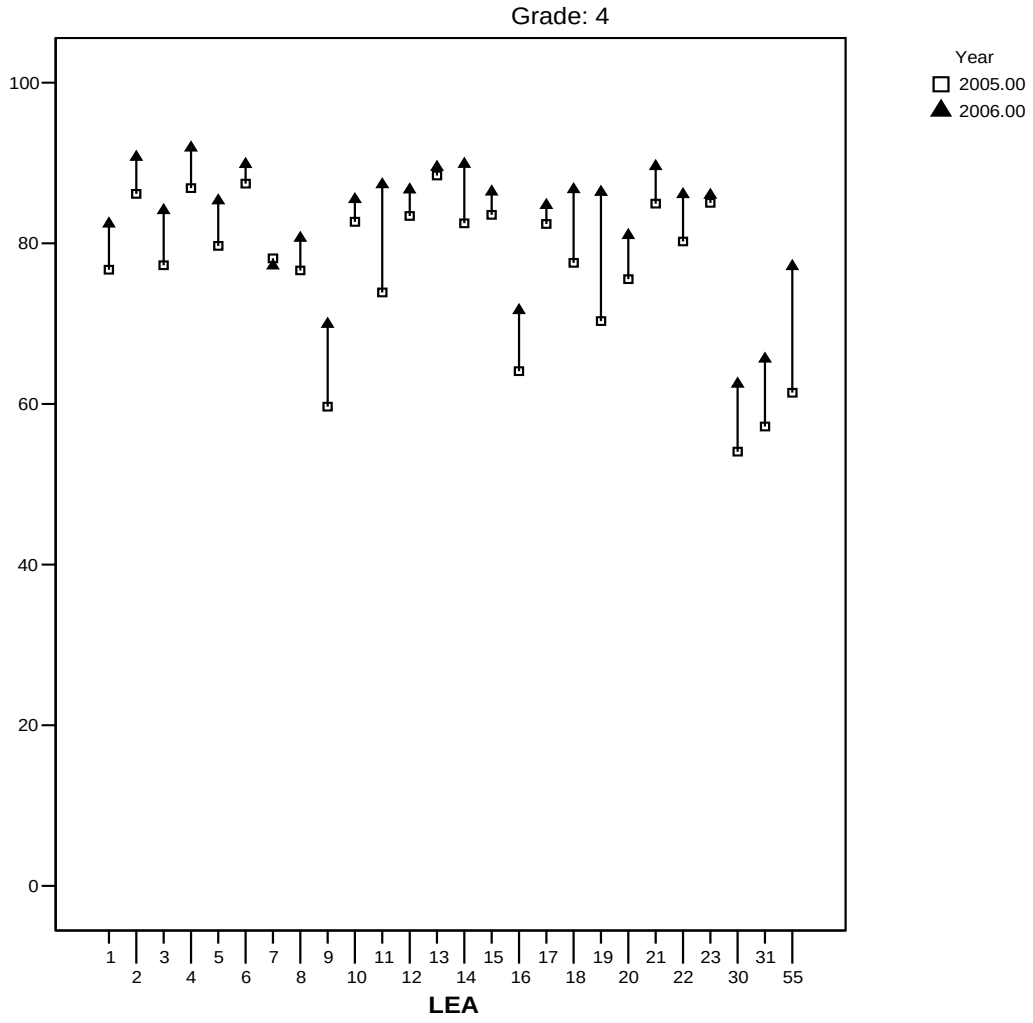

Figure 4
Percent at or Above Proficiency Cut Score (PAC) by LEA for Mathematics Grade 5

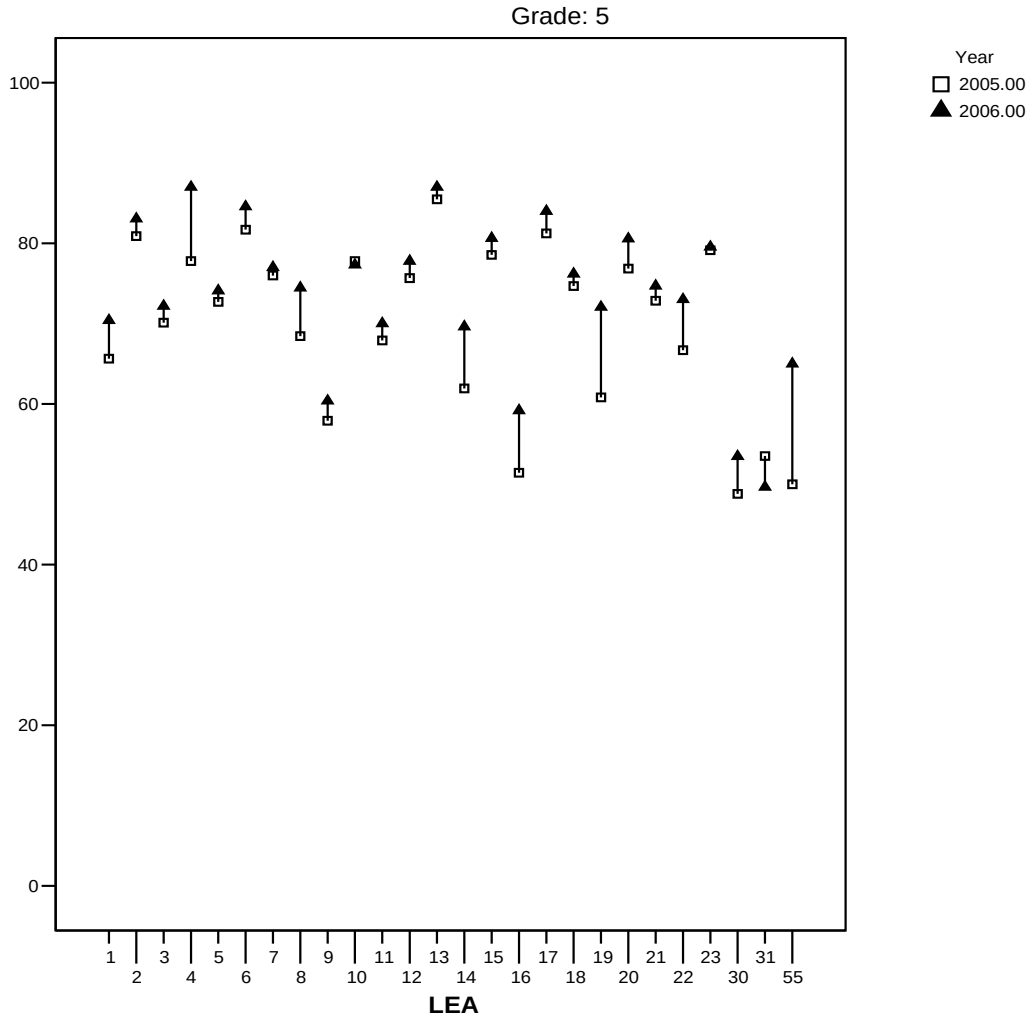

Figure 5
Percent at or Above Proficiency Cut Score (PAC) by LEA for Mathematics Grade 6

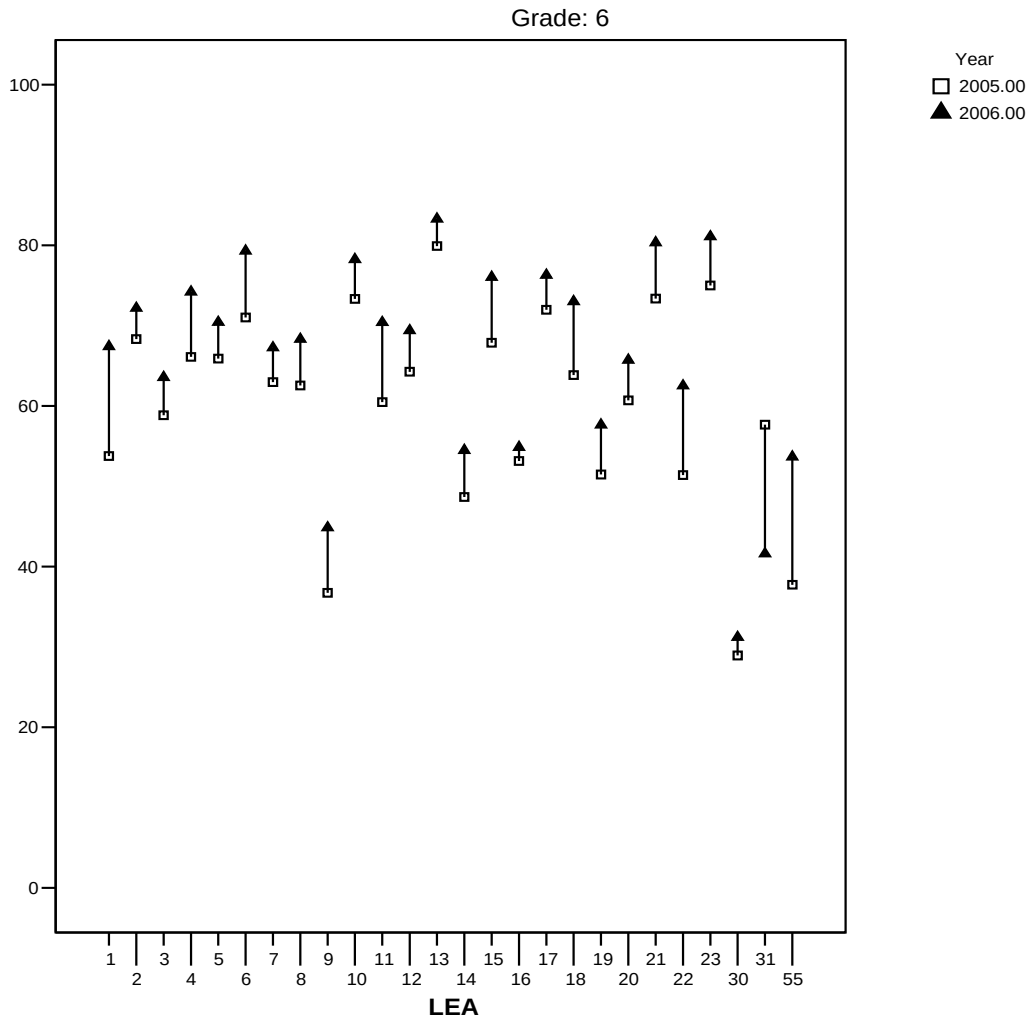

Figure 6
Percent at or Above Proficiency Cut Score (PAC) by LEA for Mathematics Grade 7

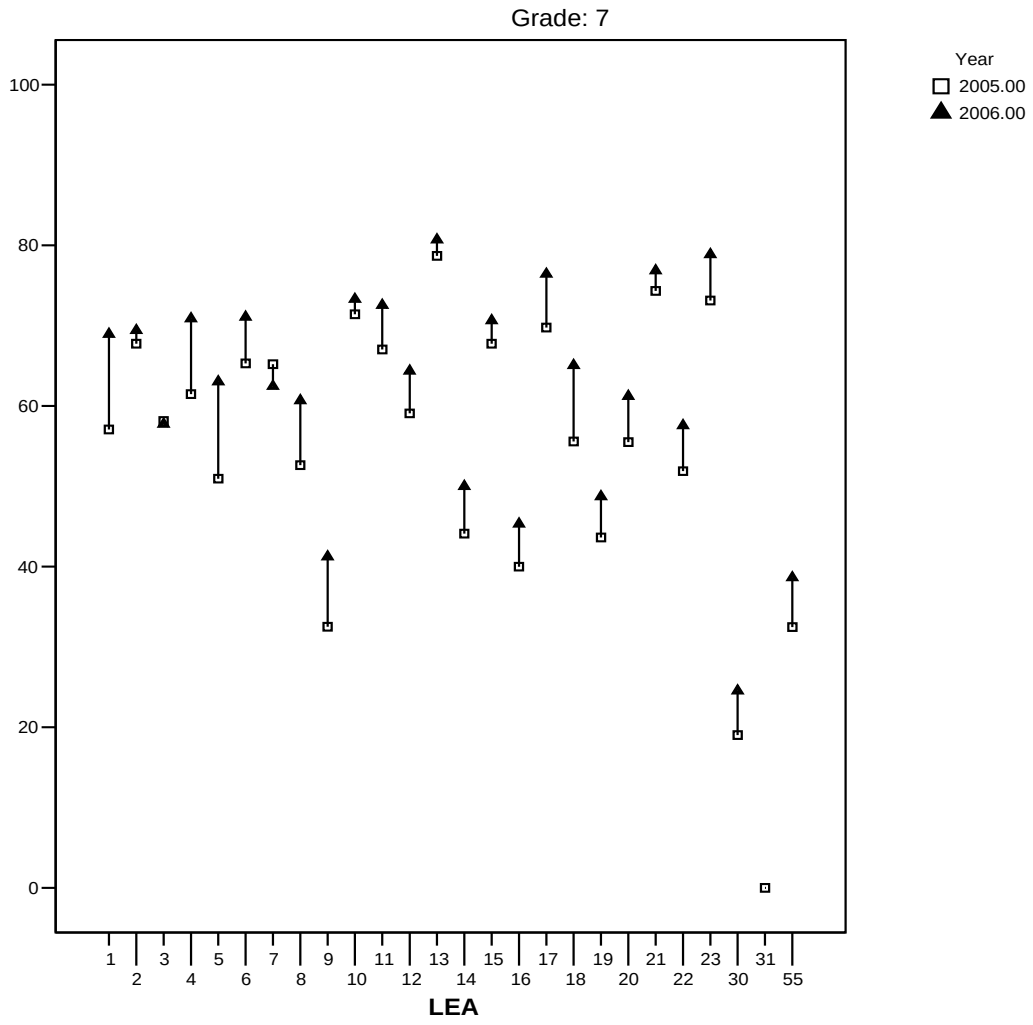

Figure 7
Percent at or Above Proficiency Cut Score (PAC) by LEA for Mathematics Grade 8