

# Review and Validation of ISAT Performance Levels for 2006 and Beyond

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Champaign, IL

# Objectives for State Testing Review Committee

- Review cut score validation process
- Review modifications to grade 8 mathematics cut scores
- Review grade 5 mathematics cut score proposal
- Review new ISAT reporting scale proposal

# Purpose of the Validation Panel

- Review cutoff values in relationship to
  - Performance definitions
  - Assessment frameworks
  - Representative item difficulties
  - District/school performance profiles
- Judge the reasonableness of the proposed cutoffs

# Process

- Review development of ISAT performance levels
- Review equating process to SAT-10 vertical scale
- Consider proposed cutoffs in relationship to frameworks, definitions, data
- Evaluate the reasonableness of the outcomes

# Constraints

- NCLB requirements for continuity in school/district accountability
- Grades 3, 5, 8 frame possibilities for grades 4, 6, 7

# Outcome

Overall, how reasonable a level of difficulty does the **BELOW STANDARDS/MEET STANDARDS** cut represent?

NOT VERY REASONABLE ----- VERY REASONABLE

Grade 4	1	2	3	4	5	6	7	8	9	10
Grade 6	1	2	3	4	5	6	7	8	9	10
Grade 7	1	2	3	4	5	6	7	8	9	10

# ISAT/SAT-10 Bridge Study

# Bridge Study Purposes

- SAT-10 will be the basis for the enhanced ISAT vertical scales
- Vertical scale will be the basis for establishing intermediate grade performance levels (reading/math grades 4, 6, 7)

# Description of the Equating Sample

- 9793 SAT-10 Records
- 9 districts
- 47 schools
- grades 3, 4, 5, 7, 8

# ISAT/SAT-10 Data Record Match

<b>Grade</b>	<b>SAT-10 Level</b>	<b>Total ISAT Records</b>	<b>TOTAL SAT-10 Records</b>	<b>Matched</b>	<b>Unmatched ISAT Records</b>	<b>Unmatched SAT-10 Records</b>
3	05	2099	2040	1376	723	664
4	06	2026	2012	1559	467	453
5	07	2103	1599	1180	923	419
7	09	1334	1284	1016	318	268
8	10	1278	883	842	436	41

# Descriptive Statistics for Matched Samples: Reading Tests

	SAT-10			ISAT		
	Grade 3	Grade 5	Grade 8	Grade 3	Grade 5	Grade 8
Mean	609.16	635.43	668.02	156.00	153.72	153.47
Std. Deviation	41.282	34.247	34.057	13.487	13.204	10.888
Minimum	513	514	559	122	121	125
Maximum	758	754	820	211	217	203

# Descriptive Statistics for Matched Samples: Mathematics Tests

	SAT-10			ISAT		
	Grade 3	Grade 5	Grade 8	Grade 3	Grade 5	Grade 8
Mean	607.11	634.54	674.90	160.63	162.04	155.09
Std. Deviation	41.495	35.430	33.087	13.281	15.871	15.041
Minimum	488	526	561	124	119	123
Maximum	744	795	848	205	225	239

# Descriptive Statistics for Matched Samples: Science Tests

	SAT-10		ISAT	
	Grade 4	Grade 7	Grade 4	Grade 7
Mean	607.90	648.32	160.50	160.40
Std. Deviation	28.835	26.333	15.899	15.346
Minimum	497	559	119	123
Maximum	766	772	236	219

# Statistical Comparison of Matched Sample SAT-10 Means With SAT-10 Spring Norms

	Grade 3	Grade 5	Grade 8
<b>Reading Comprehension</b>			
Sample Mean	609.16	635.43	668.02
Population Mean	621.2	643.1	672.5
Population SD	41.8	38.2	38.2
z	-0.29	-0.20	-0.12
<b>Mathematics Problem Solving</b>			
Sample Mean	607.11	634.54	674.9
Population Mean	612.4	639	679.4
Population SD	44	37.5	36.4
z	-0.12	-0.12	-0.12
<b>Science</b>			
	Grade 4	Grade 7	
Sample Mean	607.9	648.32	
Population Mean	623.9	657.9	
Population SD	36.1	34.1	
z	-0.44	-0.28	

# Statistical Comparison of Matched Sample ISAT Means With ISAT 2005 Test Population

	Grade 3	Grade 5	Grade 8
<b>Reading</b>			
Sample Mean	156.00	153.72	153.47
Population Mean	161.52	158.65	158.02
Population SD	15.189	13.729	11.799
z	-0.36	-0.36	-0.39
<b>Mathematics</b>			
Sample Mean	160.63	162.04	155.09
Population Mean	165.7	168.22	164.75
Population SD	15.342	17.106	18.477
z	-0.33	-0.36	-0.52
<b>Science</b>			
Sample Mean	160.50	160.40	
Population Mean	162.92	161.31	
Population SD	15.18	15.411	
z	-0.16	-0.06	

# Correlation Between Corresponding ISAT/SAT-10 Ability Estimates

		Total Matched Sample		Sample With Outliers Removed	
Grade	Subject	N	r	N	r
3	Reading	1362	.731	1240	.823
5		1170	.721	1083	.801
8		815	.741	759	.812
3	Mathematics	1362	.745	1266	.807
5		1171	.775	1083	.846
8		810	.831	633	.895
4	Science	993	.640	919	.778
7		603	.767	581	.819

# Equating Methods

- Rasch (outliers included)
- Rasch (outliers excluded)
- Equipercentile
- Equipercentile with linear smoothing

# Equating Outcomes

- Rasch/Equipercentile results similar with respect to cut points
  - Rasch: 635.6
  - Equipercentile: 635.3
- Outlier impact
  - Tended to eliminate higher ISAT/lower SAT-10 scores
  - Inconsistent with past practice

# Constants For Transforming ISAT Scales to the SAT-10 Vertical Scales

<b>Subject</b>	<b>Grade</b>	<b>a</b>	<b>b</b>
<b>Reading</b>	<b>3</b>	181.471	2.736
	<b>5</b>	188.703	2.906
	<b>8</b>	193.056	3.097
<b>Math</b>	<b>3</b>	190.576	2.585
	<b>5</b>	266.052	2.272
	<b>8</b>	305.595	2.383
<b>Science</b>	<b>4</b>	254.615	2.287
	<b>7</b>	305.010	2.207

# Table for Transforming ISAT Scores to SAT-10 Vertical Scales

ISAT	READING			MATH			SCIENCE	
	3	5	8	3	5	8	4	7
120	510	537	565	501	539	592	529	570
121	513	540	568	503	541	594	531	572
122	515	543	571	506	543	596	534	574
123	518	546	574	509	546	599	536	576
124	521	549	577	511	548	601	538	579
125	523	552	580	514	550	603	540	581
126	526	555	583	516	552	606	543	583
127	529	558	586	519	555	608	545	585
128	532	561	589	521	557	611	547	588
129	534	564	593	524	559	613	550	590
130	537	566	596	527	561	615	552	592
131	540	569	599	529	564	618	554	594
132	543	572	602	532	566	620	556	596

# Transformation of the Performance Level Cut Scores

# ISAT Performance Category Score Ranges on the Current Scales

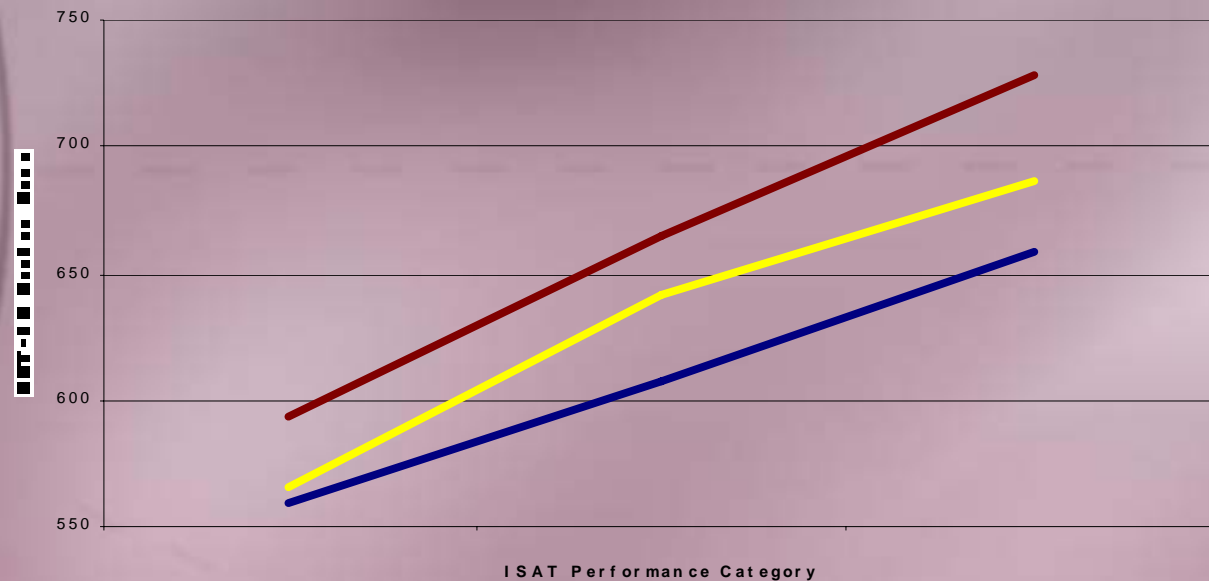
<b>READING</b>		<b>Academic Warning</b>	<b>Below Standards</b>	<b>Meets Standards</b>	<b>Exceeds Standards</b>
	3	120-137	138-155	156-173	174-200
	5	120-129	130-155	156-170	171-200
	8	120-128	129-151	152-172	173-200
<b>MATHEMATICS</b>					
	3	120-141	142-152	153-172	173-200
	5	120-137	138-157	158-190	191-200
	8	120-137	138-161	162-184	185-200
<b>SCIENCE</b>					
	4	120-138	139-153	154-178	179-200
	7	120-141	142-150	151-174	175-200

# ISAT Cut Scores Expressed on the SAT-10 Vertical Scales (Lower Bounds)

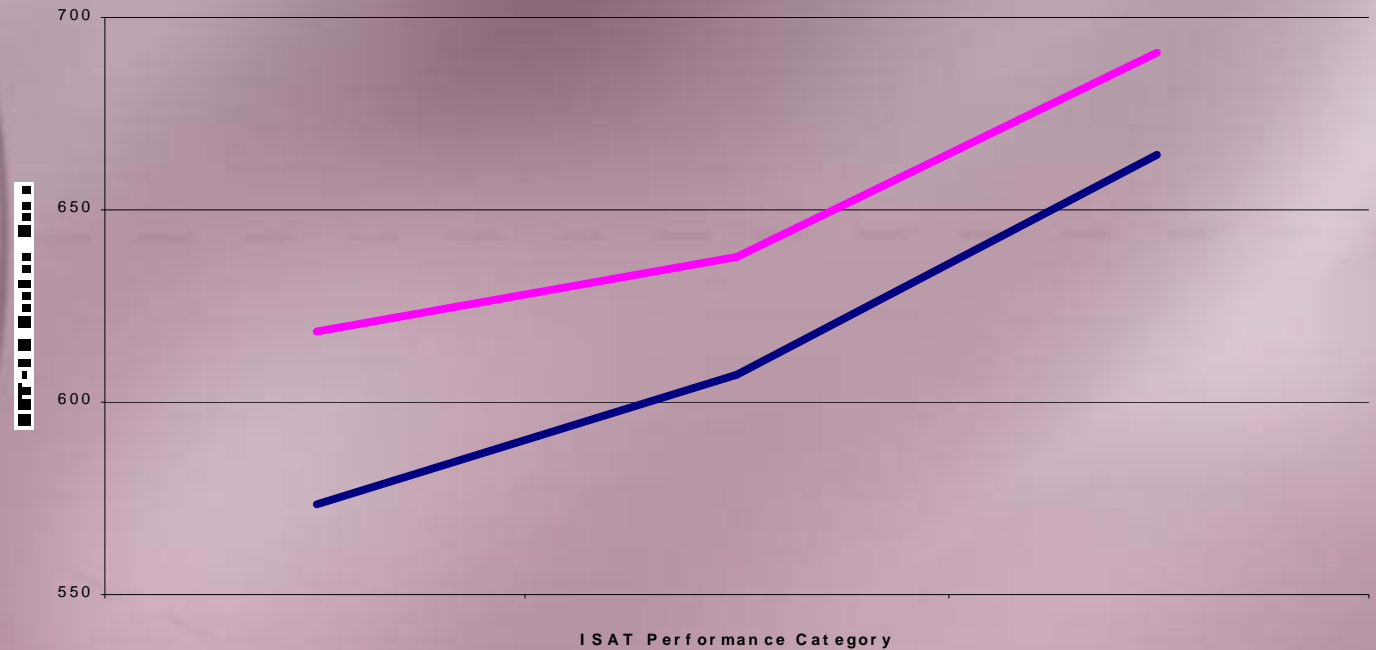
<b>Subject</b>	<b>Grade</b>	<b>Below Standards</b>	<b>Meets Standards</b>	<b>Exceeds Standards</b>
<b>Reading</b>	<b>3</b>	559	608	658
	<b>5</b>	566	642	686
	<b>8</b>	593	664	729
<b>Math</b>	<b>3</b>	558	586	638
	<b>5</b>	580	625	700
	<b>8</b>	634	692	746
<b>Science</b>	<b>4</b>	573	607	664
	<b>7</b>	618	638	691

Note: Grade 8 values are before adjustment

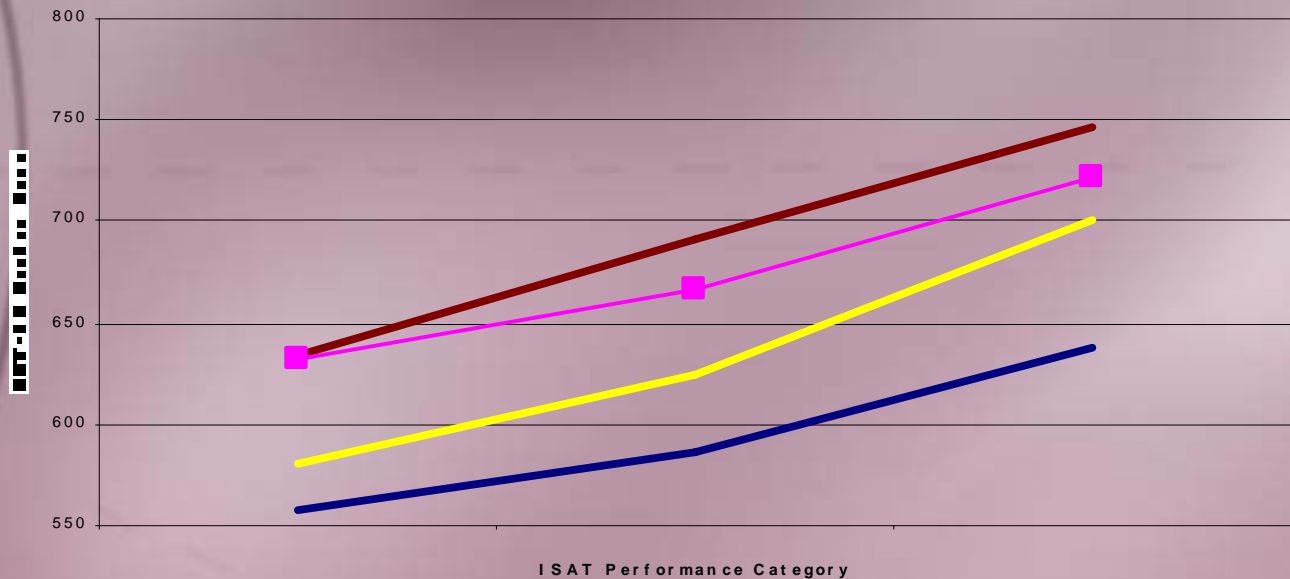
# Reading Cut Scores Expressed on the SAT-10 Vertical Scale



# Science Cut Scores Expressed on the SAT-10 Vertical Scale



# Mathematics Cut Scores Expressed on the SAT-10 Vertical Scale



# Adjustment to the Grade 8 Mathematics Cut Scores

# Reasons for Reexamining the Cut Scores

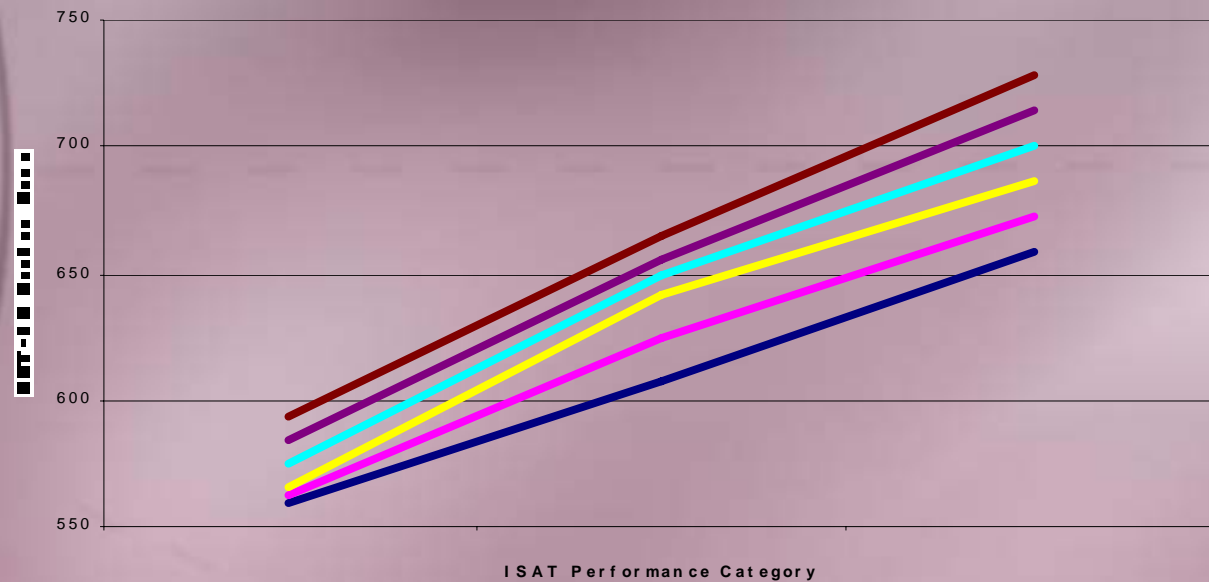
- **Large Discrepancies Across Grades**  
(Grade 3: 79%; Grade 5: 73%; Grade 8: 54%)
- **Multiple Panels Used in the Original Derivation (162, 149)**
- **Discrepancies in National Percentile Ranks**

# National Percentile Ranks Corresponding to Each ISAT Cut Score

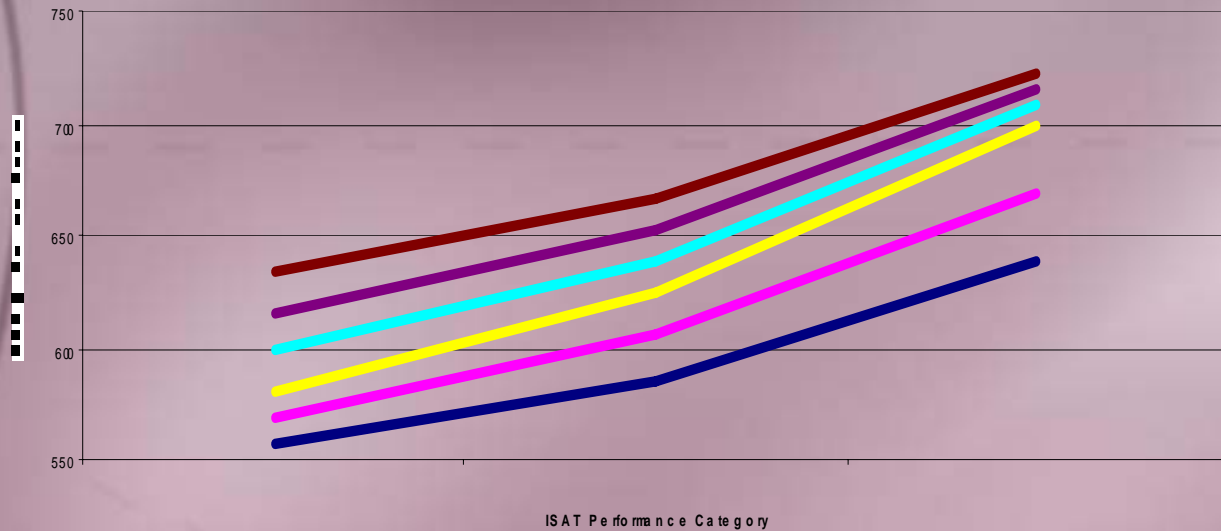
Subject	Grade	Below	Meets	Exceeds
Reading	3	7	38	79
	5	3	49	86
	8	3	40	93
Mathematics	3	10	28	73
	5	4	37	93
	8	8	67	94
Science	4	8	32	85
	7	12	29	83
Median		8	38	86

# Estimating Performance Level Cut Scores for Intermediate Grades

# Reading Cut Scores With Interpolations for All Grades



# Mathematics Cut Scores With Interpolations for All Grades



# The Evaluation Process

- Review performance definitions and assessment frameworks
- Review difficulty-ordered item booklets
- Review district/school performance profiles
- Make initial judgments
- Large group discussion
- Final judgments

# Difficulty-Ordered Item Booklets

- Represent a range of probable performances by students at different levels
- Primarily represent the Below Standards/ Meets Standards performance range

# Difficulty-Ordered Reading Booklets

## Pages Associated With Reading Performance Ranges

<b>Grade</b>	<b>Academic Warning</b>	<b>Below Standards</b>	<b>Meets Standards</b>	<b>Exceeds Standards</b>
<b>3</b>	<b>7-13</b>	<b>14-30</b>	<b>31-36</b>	
<b>4</b>	<b>7-9</b>	<b>10-26</b>	<b>27-36</b>	
<b>5</b>	<b>7</b>	<b>8-29</b>	<b>30-36</b>	
<b>6</b>	<b>7</b>	<b>8-32</b>	<b>33-36</b>	
<b>7</b>	<b>7</b>	<b>8-26</b>	<b>27-35</b>	<b>36</b>
<b>8</b>	<b>7-9</b>	<b>10-28</b>	<b>29-36</b>	

# Difficulty-Ordered Mathematics Booklets

## Pages Associated With Math Performance Ranges

<b>Grade</b>	<b>Academic Warning</b>	<b>Below Standards</b>	<b>Meets Standards</b>	<b>Exceeds Standards</b>
<b>3</b>	<b>1-6</b>	<b>7-18</b>	<b>19-30</b>	
<b>4</b>	<b>1-4</b>	<b>5-18</b>	<b>19-28</b>	<b>29-30</b>
<b>5</b>	<b>1-2</b>	<b>3-14</b>	<b>15-30</b>	
<b>6</b>		<b>1-11</b>	<b>12-30</b>	
<b>7</b>		<b>1-6</b>	<b>7-29</b>	<b>30</b>
<b>8</b>		<b>1-5</b>	<b>6-30</b>	

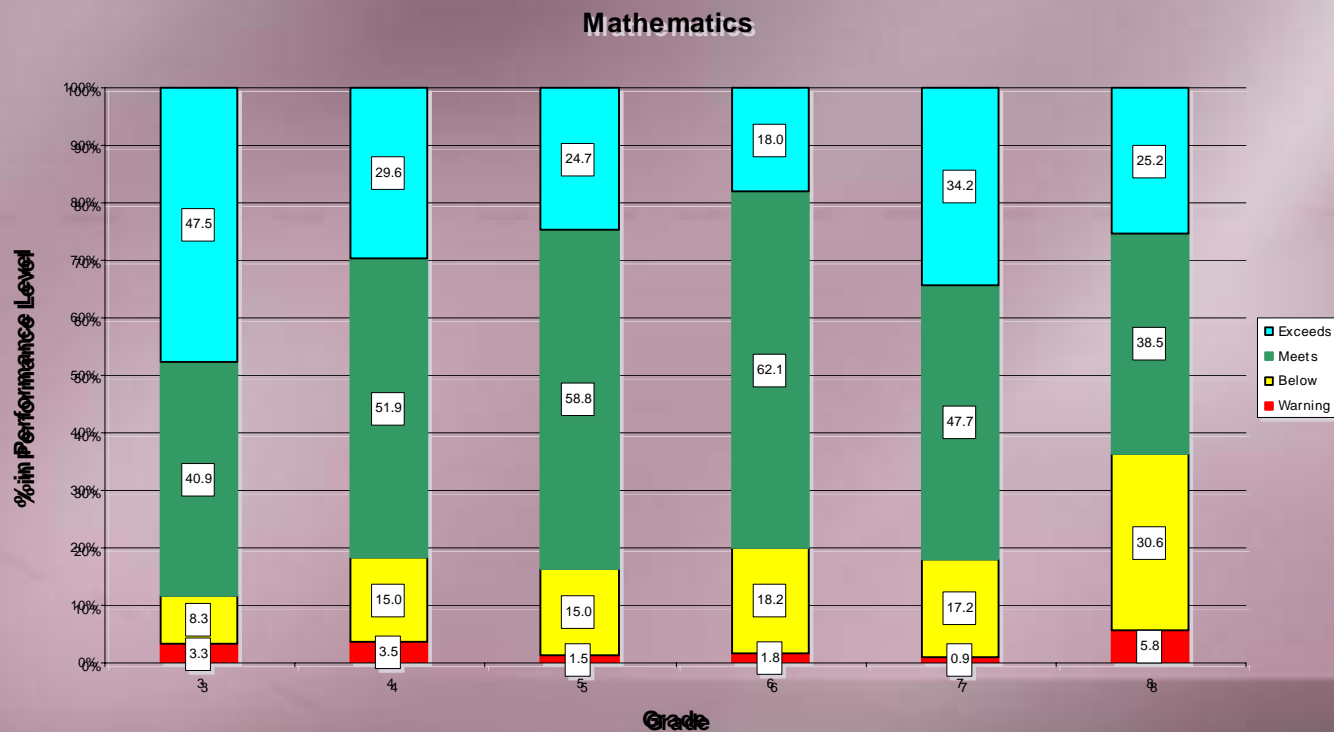
# District 1 Performance Profile

	State	District
% Drop Out	4.0	
% Low Income	40.0	16.3
% LEP Enrollment	6.6	1.2
% Attendance	93.9	95.7
% Mobility	16.1	8.5
% Chronic Truant	2.2	0.1
% White	56.7	55.6
% Black	20.3	29.8
% Hispanic	18.3	3.9
% Asian	3.7	3.6
% Native American	0.2	0.1
% Multiracial	0.4	6.9
Total Enrollment	2062912	4,969
% Parental Contacts	95.7	99.7
% Emgcy Teachers	1.9	0.3
% Class NoHighQ Teacher	1.9	0.0

# District 1 Performance Profile



# District 1 Performance Profile



# District 1 Performance Profile



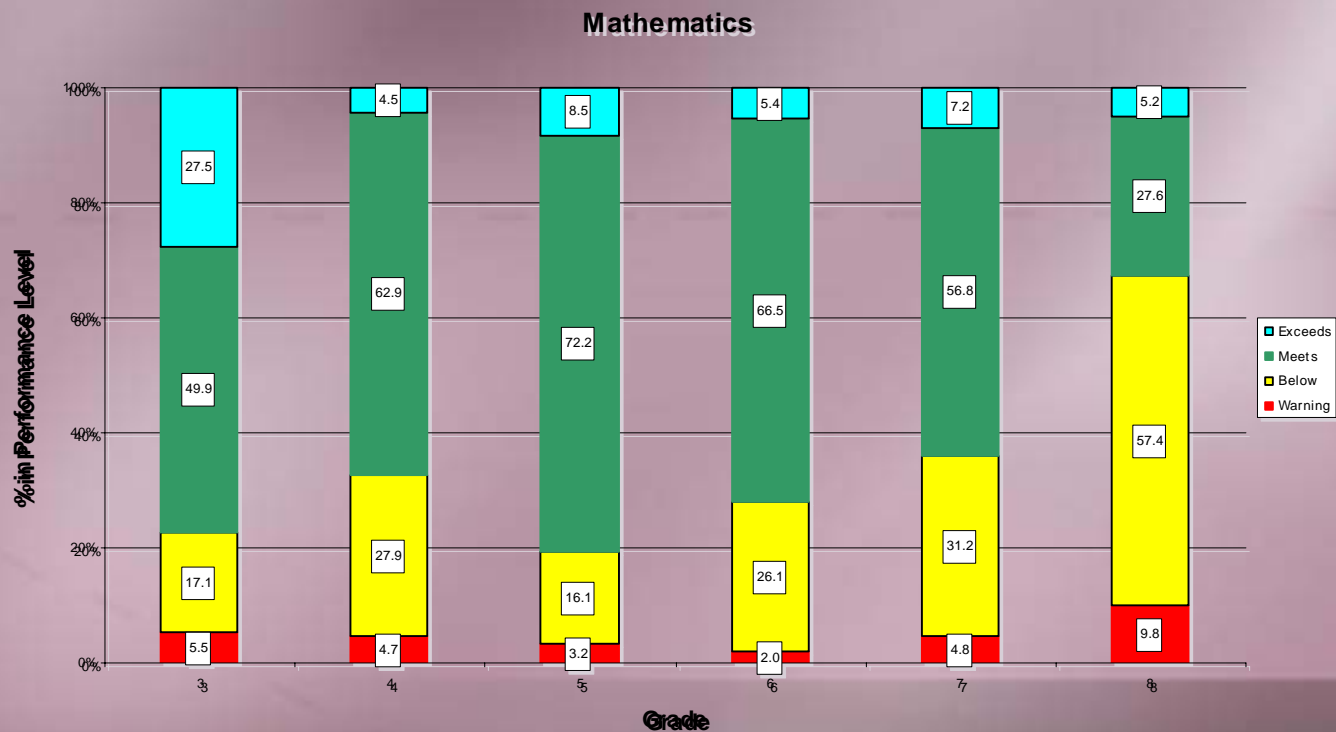
# District 2 Performance Profile

	State	District
% Drop Out	4.0	1.9
% Low Income	40.0	38.8
% LEP Enrollment	6.6	0.0
% Attendance	93.9	95.3
% Mobility	16.1	14.7
% Chronic Truant	2.2	0.1
% White	56.7	98.5
% Black	20.3	0.5
% Hispanic	18.3	0.4
% Asian	3.7	0.5
% Native American	0.2	0.0
% Multiracial	0.4	0.1
Total Enrollment	2062912	789
% Parental Contacts	95.7	94.8
% Emgcy Teachers	1.9	0.0
% Class NoHighQ Teacher	1.9	0.0

# District 2 Performance Profile



# District 2 Performance Profile



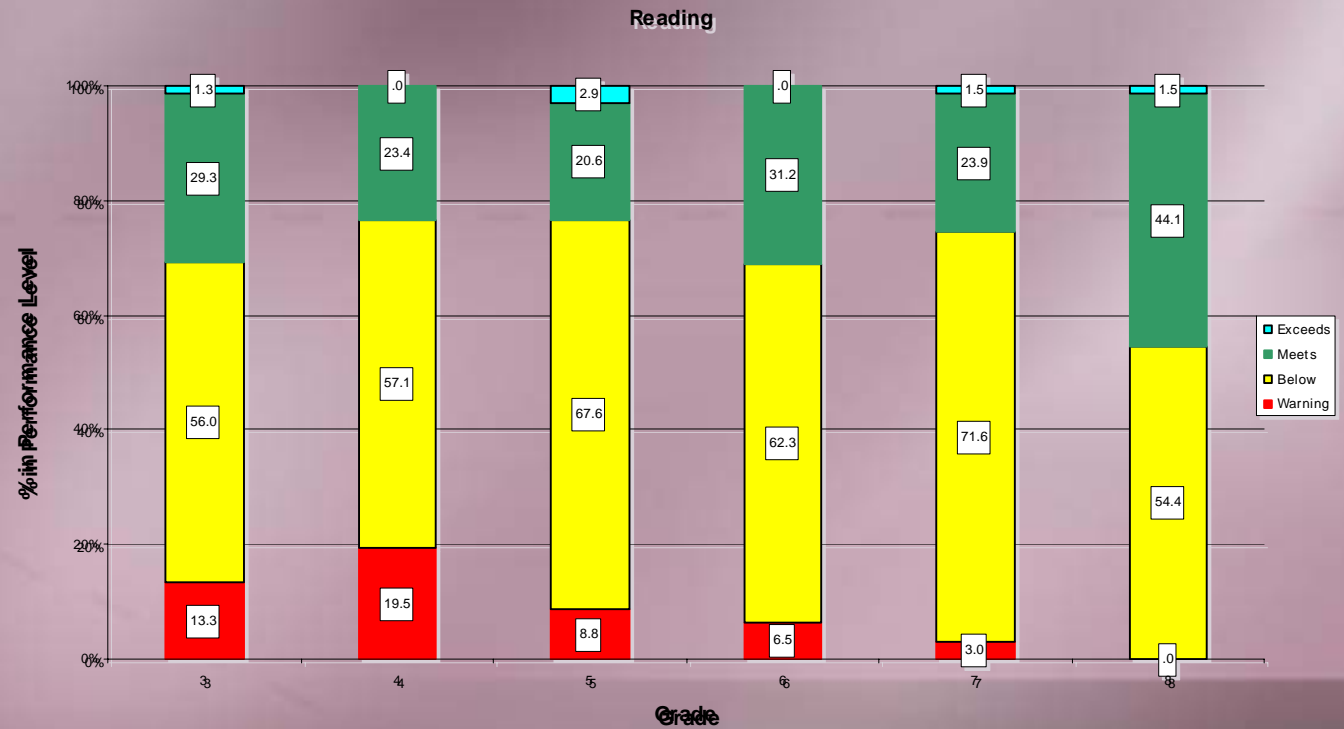
# District 2 Performance Profile



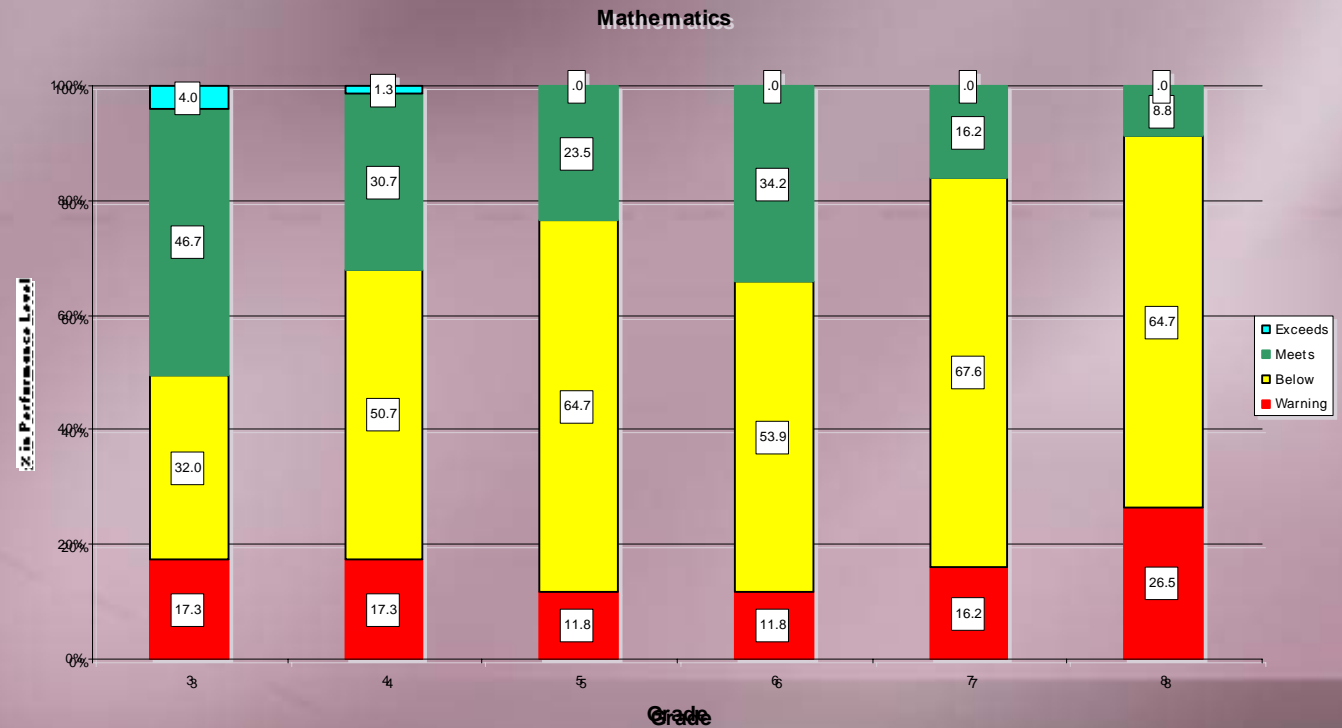
# School 1 Performance Profile

	State	School
% Drop Out	4.0	
% Low Income	40.0	94.4
% LEP Enrollment	6.6	0.2
% Attendance	93.9	91.4
% Mobility	16.1	29.4
% Chronic Truant	2.2	
% White	56.7	0.0
% Black	20.3	99.8
% Hispanic	18.3	0.2
% Asian	3.7	0.0
% Native American	0.2	0.0
% Multiracial	0.4	0.0
Total Enrollment	2062912	659
% Parental Contacts	95.7	
% Emgcy Teachers	1.9	4.1
% Class NoHighQ Teacher	1.9	

# School 1 Performance Profile



# School 1 Performance Profile



# School 1 Performance Profile



# Evaluation Worksheet

## ISAT CUT SCORE REVIEW PANEL EVALUATION WORKSHEET

Overall, how reasonable a level of difficulty does the BELOW STANDARDS/MEET STANDARDS cut represent? Please circle a number from 1 through 10.

NOT VERY REASONABLE ----- VERY REASONABLE

Grade 4	1	2	3	4	5	6	7	8	9	10
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Notes: Comments \_\_\_\_\_

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# Evaluation Outcomes

## READING

	Academic Warning/Below Standards			Below Standards/Meets Standards			Meets Standards/Exceeds Standards		
	4	6	7	4	6	7	4	6	7
Grade									
Mean	7.48	8.76	8.95	7.71	8.57	8.67	8.05	9.00	9.10
SD	2.06	1.00	0.97	1.59	1.16	1.24	1.50	0.92	0.89
Low	1	7	7	5	5	5	5	7	7
High	10	10	10	10	10	10	10	10	10

# Evaluation Outcomes

## MATHEMATICS

	Academic Warning/Below Standards			Below Standards/Meets Standards			Meets Standards/Exceeds Standards		
	4	6	7	4	6	7	4	6	7
Grade									
Mean	9.00	8.71	9.04	7.92	8.61	8.75	8.83	8.82	8.78
SD	0.78	1.46	1.33	1.38	1.23	1.29	0.96	0.96	0.85
Low	8	4	4	4	5	5	7	7	7
High	10	10	10	10	10	10	10	10	10

# Panel Recommendations for Grade 5 Exceeds Cut Score in Mathematics

- **Large Discrepancies Across Grades—** Grade 3: 34%; Grade 5: 12%; Grade 8: 17% (before adjustment, but about 29% after adjustment)
- **Multiple Panels Used in the Original Derivation** —Current cut score uses higher of two panels' recommendations. Other panel would have about 33%.
- Exceeds items in the meets performance range
- Discrepancies in National Percentile Ranks

# National Percentile Ranks Corresponding to Each ISAT Cut Score

Subject	Grade	Below	Meets	Exceeds
Reading	3	7	38	79
	5	3	49	86
	8	3	40	93
Mathematics	3	10	28	73
	5	4	37	93
	8	8	38	86
Science	4	8	32	85
	7	12	29	83
Median		8	38	86

# Options to Consider

- Anchor existing grade 3 and adjusted grade 8. Interpolate intermediate grades
- Anchor on adjusted grade 3 and adjusted grade 8.

# Defining the 2006 ISAT Reporting Scales

# Enhanced ISAT Vertical Scale

- Linear transformation of the SAT-10 vertical scale
- Unit size
- Range consideration

# Scenario

- Unit size approximately twice that of the current scale
- Anchor lower end of grade 3 (reading, mathematics) or grade 4 (science) scale at 120
- How would things have looked in 2005 if the new reporting scale were used?

# Reading

<b>GRADE</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
<b>3</b>	<b>137309</b>	<b>120</b>	<b>278</b>	<b>202.05</b>	<b>30.04</b>
<b>5</b>	<b>148635</b>	<b>140</b>	<b>308</b>	<b>221.04</b>	<b>28.79</b>
<b>8</b>	<b>154944</b>	<b>160</b>	<b>338</b>	<b>244.63</b>	<b>26.34</b>

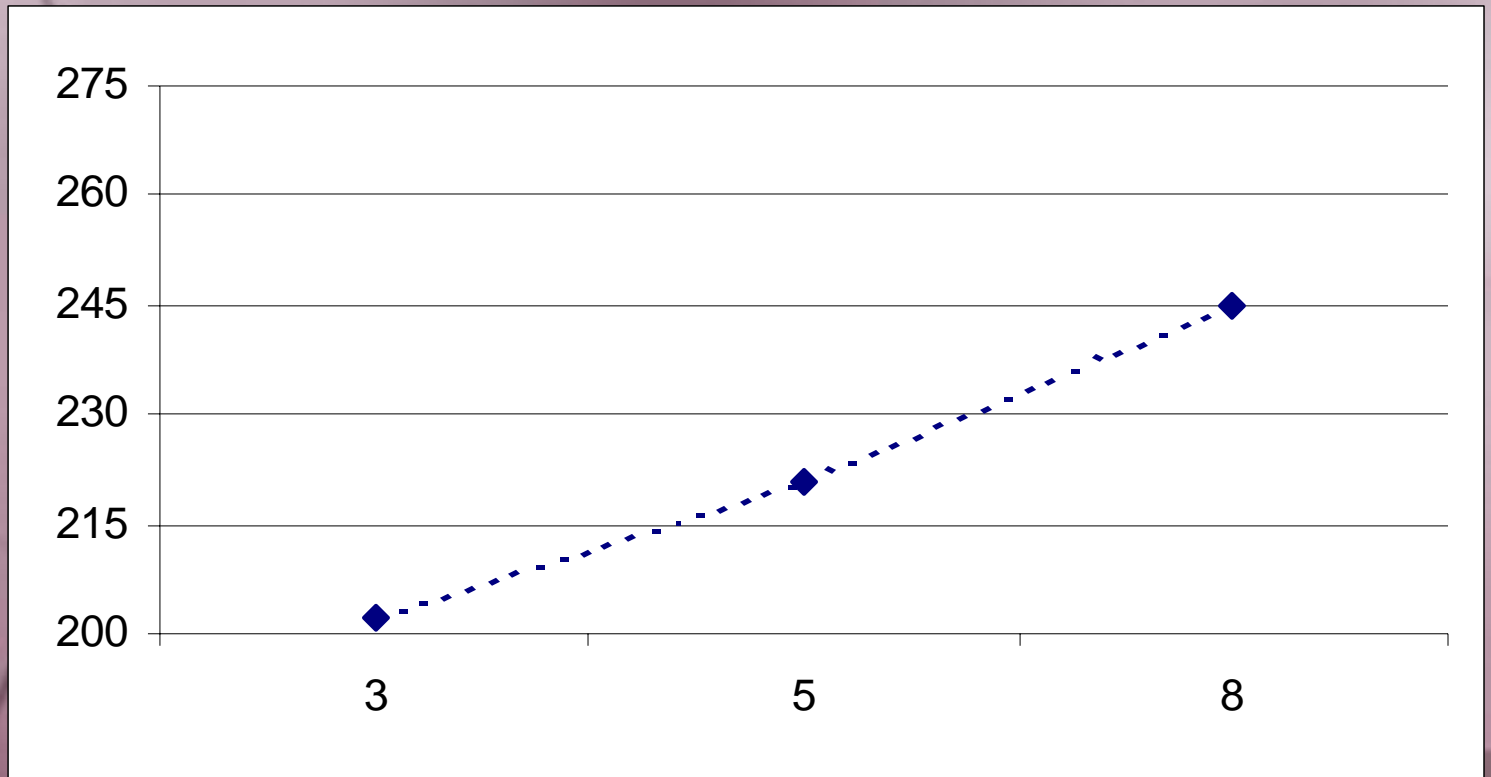
# Mathematics

<b>GRADE</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
<b>3</b>	<b>137562</b>	<b>120</b>	<b>276</b>	<b>209.36</b>	<b>30.00</b>
<b>5</b>	<b>148816</b>	<b>149</b>	<b>286</b>	<b>231.53</b>	<b>29.36</b>
<b>8</b>	<b>155190</b>	<b>189</b>	<b>333</b>	<b>269.32</b>	<b>33.29</b>

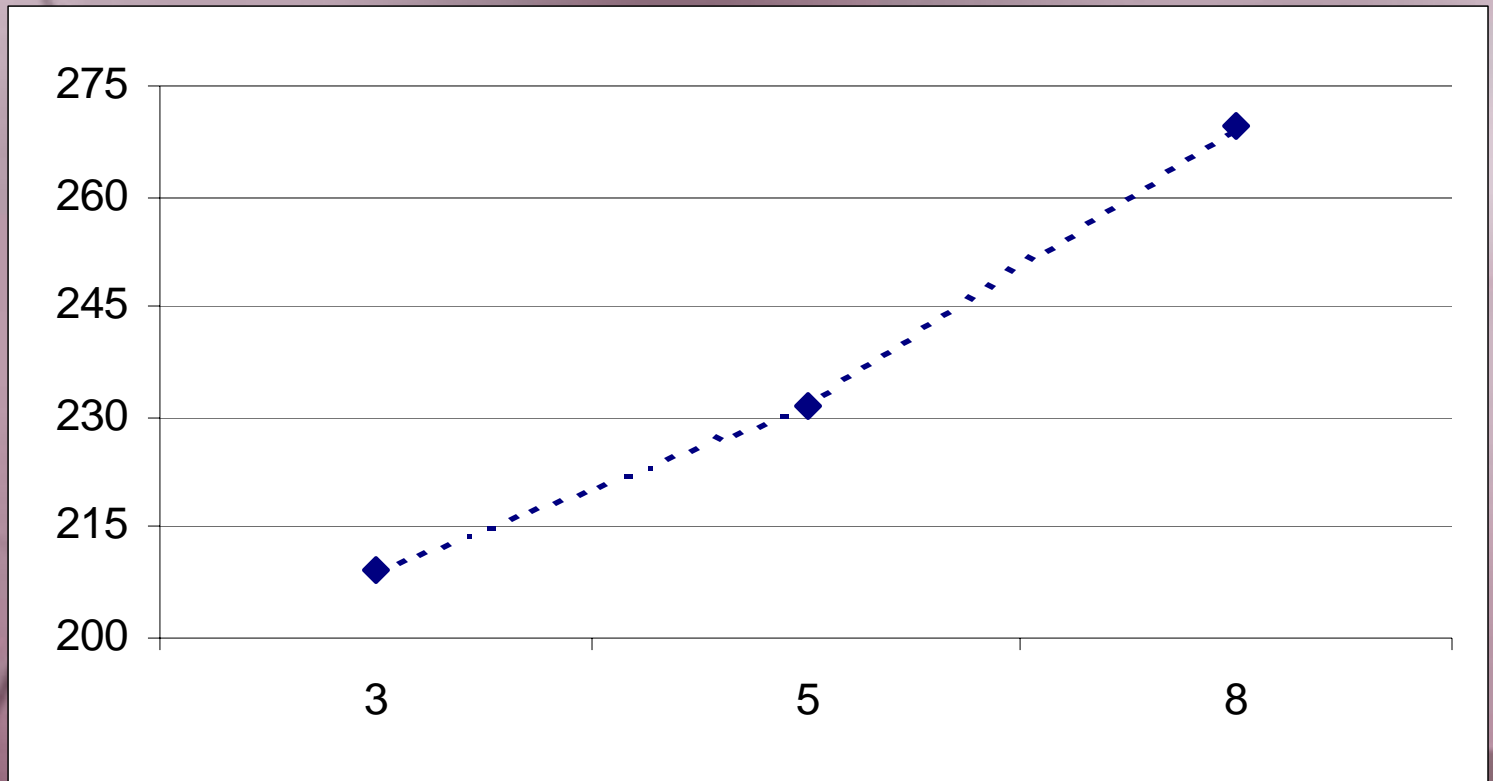
# Science

<b>GRADE</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
<b>4</b>	<b>144479</b>	<b>120</b>	<b>278</b>	<b>204.83</b>	<b>30.07</b>
<b>7</b>	<b>155270</b>	<b>155</b>	<b>308</b>	<b>234.04</b>	<b>29.42</b>

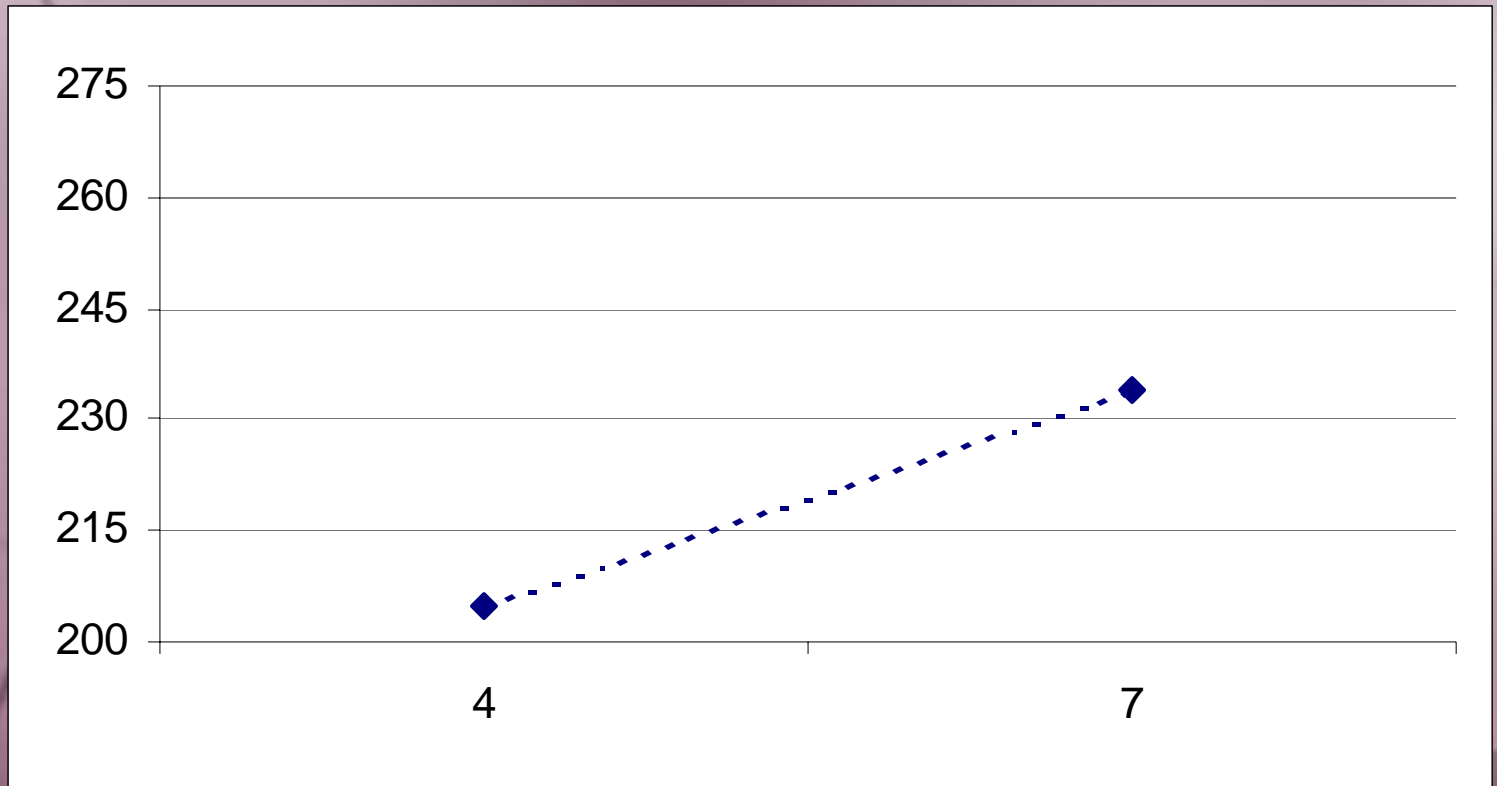
# Reading Means



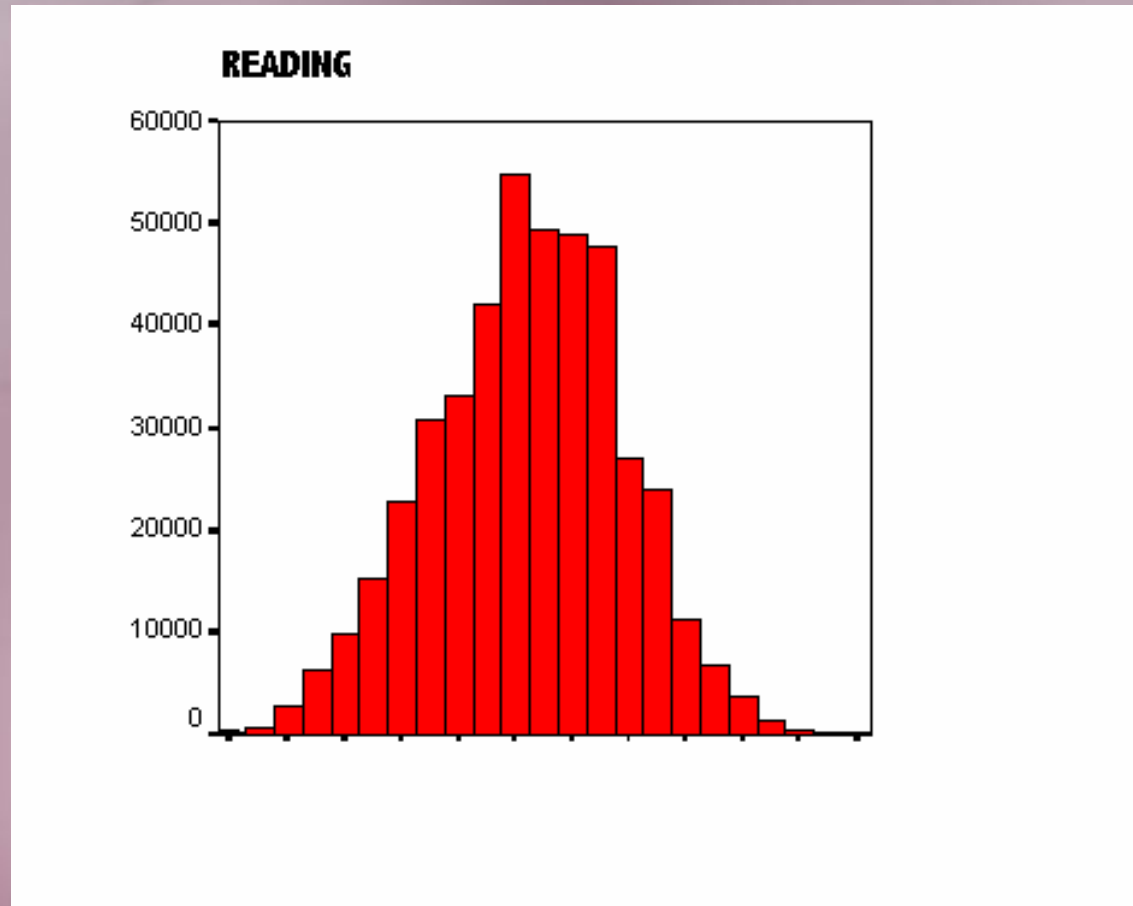
# Mathematics Means



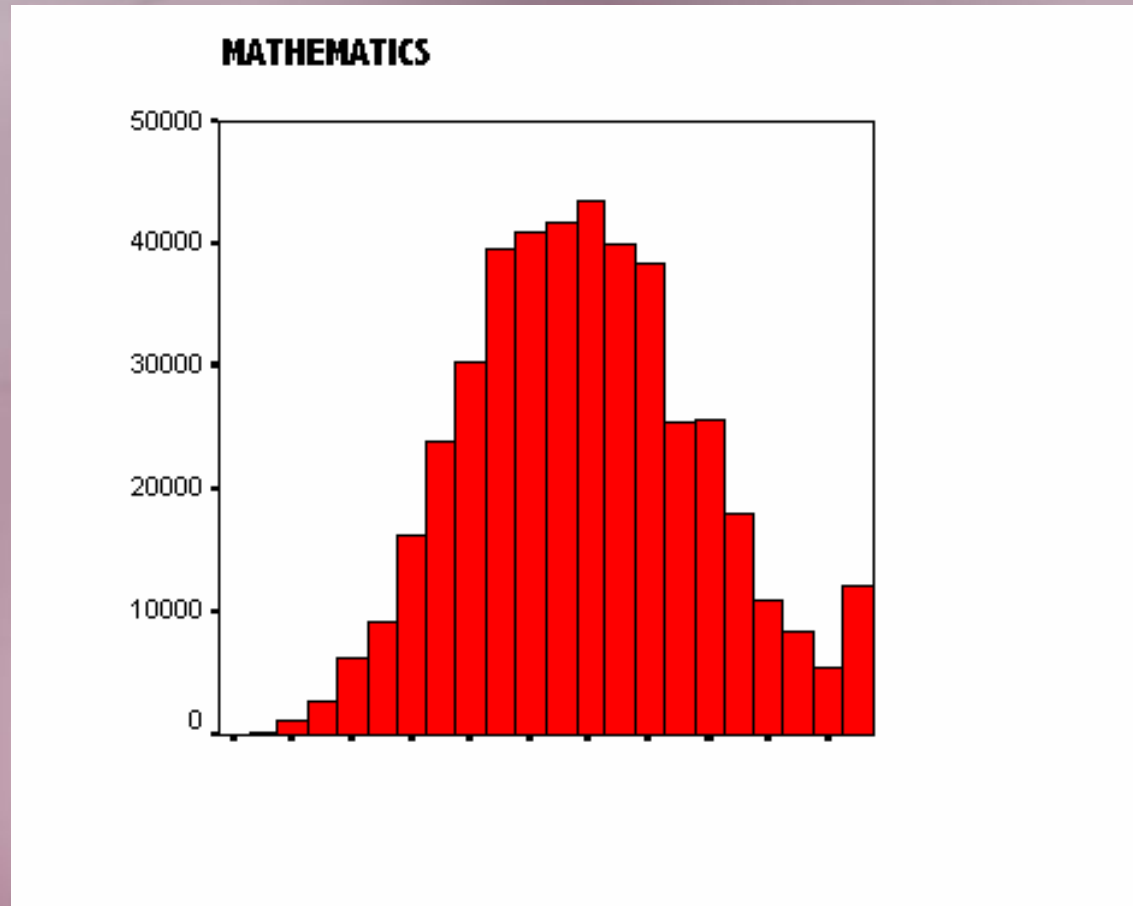
# Science Means



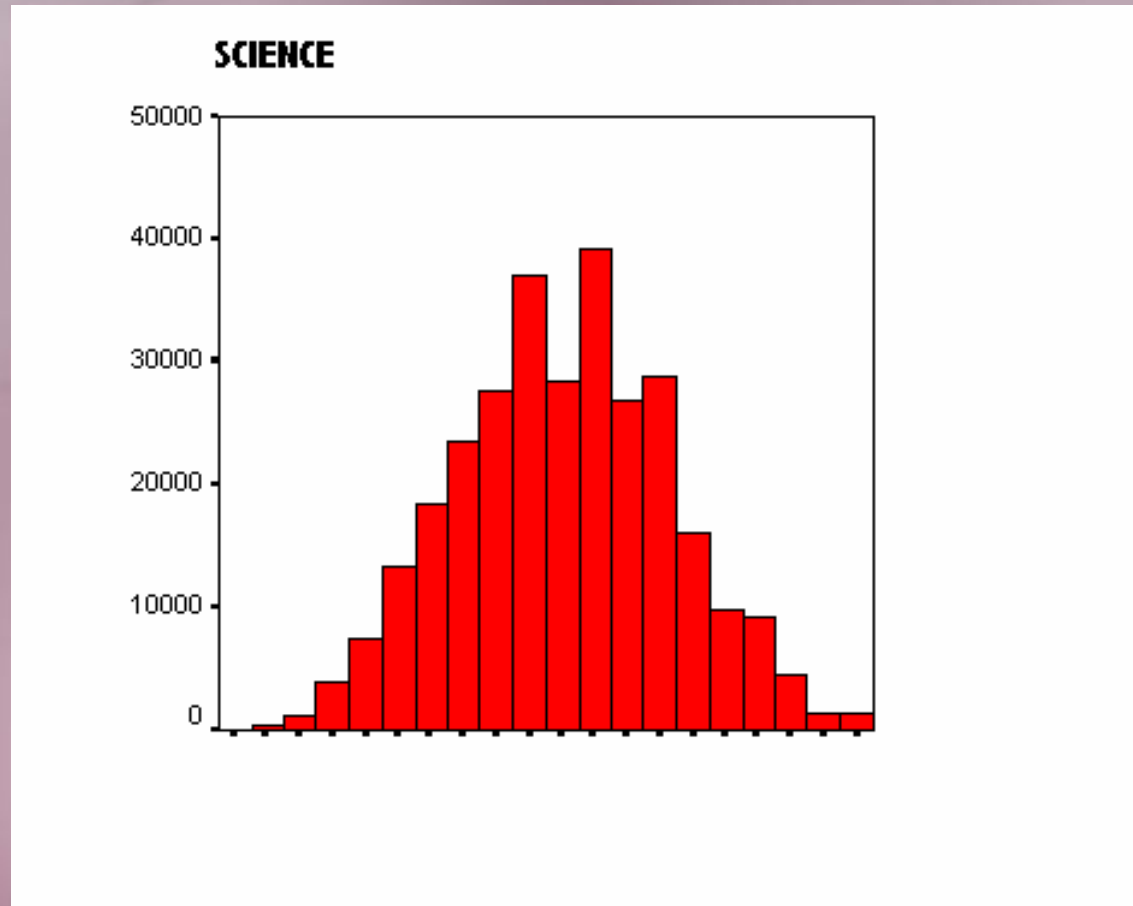
# Score Distribution (3, 5, 8)



# Score Distribution (3, 5, 8)



# Score Distribution (4,7)



# Constants for Transforming SAT-10 Scales to New ISAT Reporting Scales

	<b>b</b>	<b>a</b>
<b>Reading</b>	<b>0.72192</b>	<b>-248.02832</b>
<b>Mathematics</b>	<b>0.75644</b>	<b>-258.80700</b>
<b>Science</b>	<b>0.86411</b>	<b>-337.16252</b>

# Constants for Transforming Existing (1999) ISAT Scales to New (2006) ISAT Reporting Scales

		<b>b</b>	<b>a</b>
<b>Reading</b>	<b>3</b>	<b>1.97762</b>	<b>-117.37829</b>
	<b>5</b>	<b>2.09714</b>	<b>-111.67795</b>
	<b>8</b>	<b>2.23257</b>	<b>-108.16121</b>
<b>Mathematics</b>	<b>3</b>	<b>1.95511</b>	<b>-114.59396</b>
	<b>5</b>	<b>1.71617</b>	<b>-57.15633</b>
	<b>8</b>	<b>1.80163</b>	<b>-27.49055</b>
<b>Science</b>	<b>4</b>	<b>1.98082</b>	<b>-117.88502</b>
	<b>7</b>	<b>1.90911</b>	<b>-73.92062</b>

