

## **Making Sense of the Vertical Scales: An Alternative View of the Connecticut Mastery Test Results**

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*There is still another ground for hope. It arises out of a comparison of our past condition with our present one.*<sup>1</sup>  
-Frederick Douglass

### Introduction

Each summer the State Department of Education reports the results of its standardized tests, the Connecticut Academic Performance Test (CAPT) and Connecticut Mastery Test (CMT), by showing what percent of students scored at five different levels: below basic, basic, proficient, goal, and advanced. These types of “standards-based” levels, or status indicators, are used because they quickly sort students into five distinct categories and can be easily understood as students meeting a particular level. The five levels are the most widely cited measures of educational progress in Connecticut and will take on increasing importance in the Governor and General Assembly’s recent education law.<sup>2</sup> Nevertheless, standards-based levels have several limitations for analysis of trends in performance on the CMT.<sup>3</sup>

In Connecticut, as elsewhere, standards-based reporting may miss improvement that occurs within “attainment” levels and does not explain improvement over time on different grade-level tests within a subject area.<sup>4</sup> Therefore, the State Department of Education developed an additional improvement indicator in 2007 – the vertical scale score -- for the math and reading assessments.

Vertical scale scores place students on a scale with a range of 200 to 700 each year that they take the Connecticut Mastery Test in reading and in math.<sup>5</sup> Vertical scales allow us to understand how students perform on a math test, for example, in one year compared to the next year despite more difficult and different math content.<sup>6</sup> This report explains the utility and limitations of vertical scale scores in helping policymakers evaluate one purpose of the public education system: improvement in basic academic skills as measured by the Connecticut Mastery Test (CMT).

### Definition of Vertical Scale Scores

In short, vertical scale scores are a **rough** indicator of improvement on the standard CMT from one year to the next. The purpose of the vertical scale scores is to explain how students perform on the state tests of math or reading in one grade compared to the next grade even though the tests each year are different and contain content that is progressively more difficult.<sup>7</sup> Vertical scales are a diagnostic tool for educators to “monitor and evaluate” growth in basic academic skills on the Connecticut Mastery Test.<sup>8</sup>

The State Department of Education used sample tests and statistical techniques to create these continuous, equal interval scales that compared tests in one grade to those of later years.<sup>9</sup> The result was the two vertical scales on the CMT in grades three to eight: one vertical scale for the CMT in math and another for the CMT in reading.

For instance, students in a statewide third grade cohort in 2009 scored, on average, at 430 on a scale of 700 on the standard CMT in reading.<sup>10</sup> The next year in 2010, the students in that cohort who were still enrolled in Connecticut schools and took the fourth grade standard CMT scored, on average, 457 out of 700 on the standard CMT in reading. The vertical scale analysis report identifies, or matches, all students that took both the 2009 and 2010 tests and posted a valid score. Then the report shows how this matched cohort of students experienced 28 units (the State Department of Education rounded up in this instance) of change or improvement on the standard CMT in reading on the vertical scales from March of 2009 to March of 2010.<sup>11</sup> State reports call this improvement “matched ‘N’ (cohort) growth”.

### **The Value of Vertical Scale Scores**

In compliance with the No Child Left Behind Act of 2001, the Federal government judges public schools primarily on one measure: the percent of students scoring at or above the proficient level in math and reading.<sup>12</sup> According to Dr. H. Swaminathan, who helped design the vertical scales in Connecticut, the status indicators (i.e. percent at or above the proficient level) were seen by school administrators as limited in showing children’s academic progress, particularly “for districts with large proportions of low-income students.”<sup>13</sup> On the other hand, Connecticut’s vertical scale score reports can assist educators and policymakers by:

- Identifying where students and groups **begin** on the standard CMT vertical scale,
- Providing a rough indicator of individual **improvement** on the standard CMT math and reading,
- Enabling a **matched cohort**, or group, analysis from one grade to the next grade,
- Comparing the results on different grade-level tests in the same subject—math or reading—from **year to year**.<sup>14</sup>

A preliminary review of average vertical scale scores in the state can also help inform the current debate over test-score disparities between various demographic groups. Vertical scale reports provide information beyond what is provided on standards-based level reports. This new information may help our understanding of trends in the acquisition of basic academic skills and knowledge on the Connecticut Mastery Test. For example, the vertical scales demonstrate that Black and Latino students and low-income students of all racial and ethnic groups **start out** at much lower points on the scales in grade three.

### **What Vertical Scales Tell Us About Learning on the Connecticut Mastery Test**

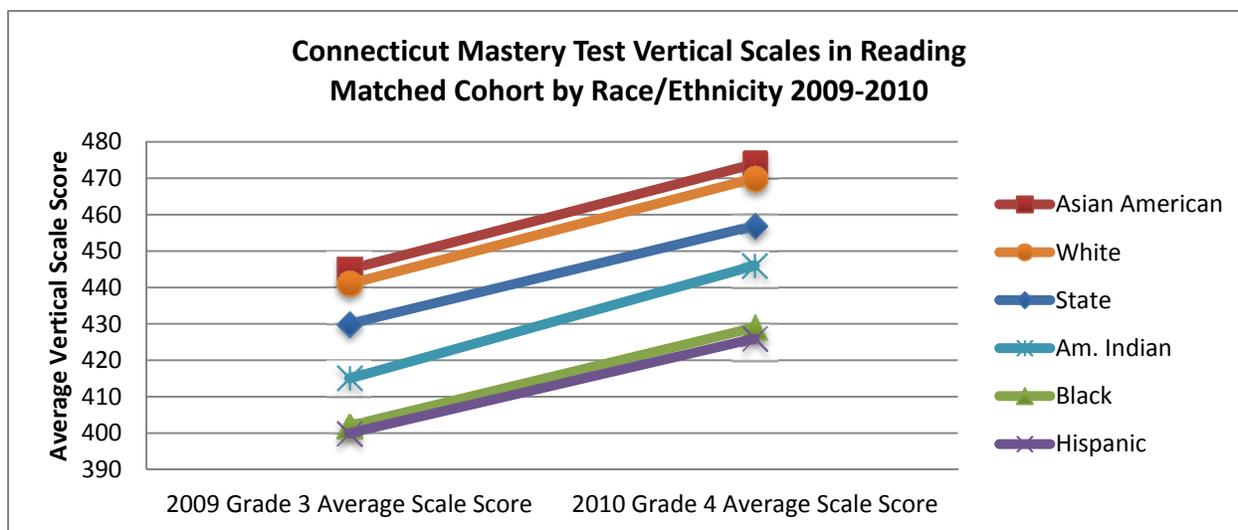
There are at least **four** important observations worth noting about the 2009 -- 2010 “CMT Vertical Scale Score Analysis Report.” These are as follows:

**First: Racial and ethnic minority and low-income students had lower vertical scale scores, on average, than white and more affluent students in grade 3 math and reading,** the first year that the standard Connecticut Mastery Test is administered to students.<sup>15</sup>

**Second:** Despite different starting points, **Black, Latino, ELL students, and students with disabilities on average experienced a comparable amount of growth or improvement on the standard CMT in math and reading** from one year--grade 3 in 2009--to the next--grade 4 in 2010--compared to the statewide average.<sup>16</sup> (See figure 1 and results in Appendix A & B.) In some instances, these subgroups exhibited *slightly* less improvement than the state average.<sup>17</sup> This trend is diminished by the fact that students that are eligible for free or reduced price meals in each racial or ethnic group start out lower on the vertical scale and average slightly less improvement (See Appendix A and B).

This general pattern of comparable improvement for subgroups from one year to the next, but with differential starting points, appeared for all grade pairs with several variations (grades 3-4, 4-5, 5-6, 6-7, and 7-8) in both the standard CMT in math and reading.<sup>18</sup> This pattern on the CMT vertical scale analysis report corroborates the substantial body of evidence that suggests a great part of disparities in test results can be explained by disparities in student knowledge and skills that exist in the early years, before students even begin school and then persist, or in some cases worsen.<sup>19</sup>

Figure 1



Source: eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation.*

Similarly, while emerging bilingual, or “English Language Learner” (ELL), students started out at much lower points than their non-ELL counterparts, they showed comparable or slightly below average matched cohort improvement on the standard CMT in math; and slightly higher improvement on the standard CMT in reading at all grades from 2010-2011.<sup>20</sup>

**Third: Within racial and ethnic groups, children from lower-income families (eligible for free and reduced price meals)<sup>21</sup> tend to score lower on the vertical scale scores in third grade.** Notably, Black and Latino students that were not eligible for free or reduced price meals in the 2009-2010 matched cohort started out in third grade, on average, at a substantially higher point

than low-income students in their same racial and ethnic minority group.<sup>22</sup> (See Appendix A and B) For example, in 2009 Hispanic/Latino students in grade three that paid full price for meals (not eligible for FRPM) averaged 425 on the standard CMT reading vertical scale, while Hispanic/Latino students eligible for free or reduced priced meals averaged 393.<sup>23</sup>

Additionally, students of all racial and ethnic minority groups who were eligible for free or reduced price meals had slightly lower average matched cohort growth or improvement when compared to students in the same racial or ethnic group paying full price meals (not eligible for FRPM) on the standard CMT in reading from grade 3 in 2009 to grade 4 in 2010.<sup>24</sup> However, students eligible for free and reduce price meals and those not qualifying had similar improvement on the standard CMT in reading from grade 3 in 2010 to grade 4 in 2011.<sup>25</sup>

**Fourth: On average, students are making progress on the vertical scales on the standard CMT in math and reading even though this growth may not be reflected on the standards-based level reports.** The average student in the state experienced 44 units of growth in math and 28 units in reading from 3<sup>rd</sup> grade to 4<sup>th</sup> grade between 2009 and 2010 on the vertical scales, but remained at the “goal” level in both years according to the standards-based reports.<sup>26</sup> Researchers at the State Department of Education recently wrote that vertical scale, “*Achievement could also increase, yet never be enough to help students rise to proficiency or to the state goal.*”<sup>27</sup> The State Department of Education report then showed several hypothetical students’ steady improvement on vertical scales over the years and the stagnant movement on the standards-based levels. In other words, the State Department of Education has recognized that vertical scale score data demonstrates that students can improve from year to year in math and reading, as measured by the CMT, but remain within the same “standards-based” level over time. The State recognizes that students are improving on the standard CMT in reading; but many children that are acquiring new skills and knowledge remain within the same level, such as “basic,” each year because of the structure of the test system. This finding on the vertical scales indicates a **major structural limitation of standards-based reporting** for the standard Connecticut Mastery Test.

### **Limitations of Vertical Scale Scores**

Before drawing conclusions about programs, schools, and districts, it is important to confront the other limitations of average vertical scale scores. First, the vertical scales come from the results of the standard Connecticut Mastery Tests in math and reading. These tests are the primary metrics used to decide whether schools make “Annual Yearly Progress” and the assignment of sanctions and rewards under the No Child Left Behind Act of 2001.<sup>28</sup> In other words, the educators across Connecticut have been required by Federal and State law to “teach to the test” on the same tests that we use to calculate the vertical scales.

It is also critical to note that the percent and number of all of students taking the standard CMT dropped substantially from 2008-2011 because many students with disabilities were assigned to instead take the Modified Assessment System (MAS) in math and reading, removing many lower-scoring students from the standard CMT testing sample.<sup>29</sup> In other words, this apparent parity in

average matched cohort growth or improvement came at the same time as larger percentages of students with disabilities were excluded from standard CMT participation and reporting in math and reading.<sup>30</sup> As a smaller percentage of students with disabilities take the standard CMT in reading and math, the cohorts of students taking these tests are altered. Therefore, the matching of students from year to year on the standard CMT is impossible for those students with disabilities that no longer take the standard CMT over consecutive years.

Furthermore, the modified assessment (MAS) dramatically altered the conditions under which students were taught and tested because students with disabilities shifted from taking a high-stakes standard CMT to the low-stakes assessment (MAS). Students taking the modified assessment (MAS) took an entirely different test from the standard CMT in a different format.<sup>31</sup> For example, between three and four percent of all students in the state in the 3<sup>rd</sup> through 8<sup>th</sup> grade shifted from taking a traditional high-stakes test on paper and pencil to a low-stakes, computer-based modified assessment in reading with substantially altered features.<sup>32</sup> In some districts, the percentage of students taking the modified assessment exceeded 10 percent of all students in a particular grade.<sup>33</sup>

Students taking the modified assessment (MAS) were identified by districts as unable to meet the proficient level.<sup>34</sup> However, it is impossible with the available data to determine whether their individual vertical scale growth on the standard CMT would have depressed or improved the average matched growth statistics for the state. The increasing exclusion of students with disabilities from the standard CMT and the vertical scale data highlights the limitations of this indicator.

Additional limitations of the vertical scale score reports include:

- Average vertical scale data are only from the **standard tests** in **math** and **reading**.
- Vertical scale score reports for schools and districts can be skewed by changes in test participation or student demography that alter the matched cohorts (i.e. students that frequently leave or enter new schools or districts, but student scores are matched at the state level if children receive a valid score on the standard CMT from year to year.)<sup>35</sup>
- The design of the vertical scales should be further reviewed by independent statisticians to assess its reliability and validity.<sup>36</sup>
- Changes in school conditions like narrowing curriculum to tested subjects, exclusions of particular student groups, or other changes in test conditions limit the conclusions that can be drawn from vertical scale scores.<sup>37</sup>
- Vertical scale score increases may be generated more through test preparation rather than quality instruction, curriculum, and community support.

According to the State Department of Education, vertical scale scores, like proficiency rates, *should never be used as the sole basis* for making important educational decisions without taking into account additional classroom or school-based information.<sup>38</sup> Nor should vertical scale score increases or improvement *alone* be conflated with educational progress, school, or district performance. Importantly, Professor Daniel Koretz, an expert in mass testing systems and test-score inflation at

Harvard University advises, “a sensible rule of thumb is to treat these scales as approximate and to be increasingly skeptical as the grade range they cover grows larger.”<sup>39</sup>

Multiple sources of evidence and indicators must be used to evaluate the broad goals of education. These goals can include acquisition of basic academic skills, critical thinking, participation in the arts and literature, preparation for skilled work, social skills and work ethic, citizenship, and emotional health.<sup>40</sup> Furthermore, it is important to understand that achievement, as measured by test scores, is a summary indicator of school, home, individual student, and community characteristics.<sup>41</sup>

### **Examples in Bridgeport and Darien: A Tale of Two Schools**

While this study compares average matched cohort growth or improvement on the CMT vertical scales, we caution that our purpose is not to rank and sort schools. Rather, these illustrative examples are meant to point out the limitations of the “standards-based” level reporting, the proficient level metric, and the need to use a variety of quantitative and qualitative indicators when assessing whether children are learning and their well-being is supported. Vertical scale scores and reports have significant limitations too, but they offer several advantages compared to “standards-based” levels and reporting. We offer two examples below and additional schools in our appendices.

Luis Muñoz Marin Elementary School is an elementary school in Bridgeport, Connecticut. At Muñoz Marin, there were no white students, 23.2% of students were Black, 76.8% of students were Latino, and 91% of families were eligible for **free** meals.<sup>42</sup> (In 2010-2011, a family of four had to earn less than \$28,665 a year to be eligible.)<sup>43</sup> Additionally, 27% of all students, or 231 out of 855, were considered English Language Learners at the school.<sup>44</sup>

On average, students at Muñoz Marin start at a much lower point on the vertical scales than the state average in the standard CMT in third grade reading and math. Yet vertical scale score reports suggest that students and the school demonstrated comparable improvement in reading and math, as measured by the standard CMT, when compared to students statewide.

If we only use “standards-based” level indicators, such as percent at or above the proficient level, to evaluate Muñoz Marin, then it would appear there was little improvement in basic academic skills in reading. Comparing indicators from 2010 to 2011 illustrates this problem. According to the “standards-based” level reports, 20.3% of the fifth grade students taking the standard CMT in reading were at or above the proficient level at Luis Muñoz Marin in 2010.<sup>45</sup> Under the current (and flawed) method, fifth grade students from 2010 would be compared with fifth grade students from 2011.<sup>46</sup> Accordingly, it would appear that there was no improvement in the standard CMT results because 20.3% of (a different group of) fifth graders were at or above the proficient level in reading in 2011.<sup>47</sup>

However, the vertical scale report provides greater insight into improvement at Muñoz Marin between these years. In this example, we compare fourth grade in 2010 to fifth grade the following year in 2011. In 2010, a matched cohort of fourth grade students taking the standard CMT in

reading at Muñoz Marin scored, on average, at 380 out of 700 on the vertical scales, far below the state average of 457.<sup>48</sup> On the standard CMT in fifth grade reading in 2011, this matched cohort of students (including only the students from the 2010 4<sup>th</sup> grade group still in the school and receiving a valid score on the standard CMT) at Muñoz Marin scored, on average, at 409 out of 700 compared to 481 at the state level.<sup>49</sup> Between these two years, the average growth or improvement of this matched cohort of students in the school was 29 units, which was slightly more than the state average matched cohort growth (23 units) over the same period on the standard CMT in reading.

In contrast, Hindley Elementary School is a school in Darien, Connecticut. In 2010-2011, 92.2% of students at Hindley were white, there were no Black students, 5.6% were Latino students, and 1.0% of students were eligible for free or reduced price meals.<sup>50</sup> (A family of four needed to receive less than \$40,793 to be eligible, so virtually all families at Hindley were above this income point.)<sup>51</sup> Additionally, only 0.7% of all students, or 4 out of 575, were considered English Language Learners at the school.<sup>52</sup>

Under the current system, students in fifth grade in 2010 would be compared with students in fifth grade at Hindley in 2011. At Hindley, 97.1% of students taking the standard CMT in fifth grade were at the proficient level or above in 2010.<sup>53</sup> In 2011, 98.9% of students taking the standard CMT in fifth grade were at the proficient level or above.<sup>54</sup> When fifth grade students from 2010 are compared with fifth grade students from 2011, there was an apparent slight increase in the percent at or above the proficient level.

Examining the vertical scales shows an alternate view of improvement from one year to the next at Hindley elementary. A matched cohort of fourth grade students in 2010 was, on average, at 488 out of 700 on the standard CMT in reading vertical scale, far above the state average.<sup>55</sup> The matched cohort of fifth grade students that continued at Hindley were, on average, at 508 out of 700 on the standard CMT in reading vertical scales.<sup>56</sup> The average matched cohort growth for this group of students at Hindley was 20 units.<sup>57</sup>

Therefore, the students in this group began and ended at higher points than the state average from the fourth to fifth grade standard CMT, but they made less vertical scale growth, on average, than the state average (23 units) and the matched cohort average at Luis Muñoz Marin elementary.<sup>58</sup> The comparison between Hindley and Muñoz Marin simply highlights the fact that vertical scales can be a useful tool when “standards-based” levels are insufficient to explain improvement in basic academic skills.

## **Conclusion**

The vertical scale results can be a better indicator when compared to “standards-based” reporting because they can show learning or improvement in basic academic skills in a different way from the typical reporting of percent at or above a particular level. This is particularly true when students are acquiring basic skills on the CMT, but remain within the same level from one year to next, a scenario that can falsely indicate a lack of improvement. Accordingly, vertical scale score reports might show

that labeling schools as “low-performing” or “high-performing” based simply on percentage of students meeting the “standards-based” levels on the standard CMT’s could be misleading, incomplete, and harmful.<sup>59</sup>

Our analysis of vertical scale results shows that, in Connecticut, **low- and higher-income students (as measured by free and reduced price meal eligibility), as well as racial and ethnic minority and white students, start at vastly different points in third grade but are acquiring basic skills at roughly the same rate, on average, on the standard CMT in math and reading. This trend was diminished for students eligible for free or reduced price meals.** Using vertical scale results might assist educators and policymakers in understanding trends on the standard CMT in math and reading at the district and school-level that “standards-based” levels do not explain.

**Importantly, students are making growth on the standard CMT in math and reading, but this improvement is not always indicated by the changes in the standards-based level reports. This represents a major structural limitation of the standards-based reporting system that sorts students into five performance levels.** As the State recognizes, students can make growth for several years in a row and never move out of a particular standards-based level such as “basic” or “goal”.

In its application for a waiver from parts of the No Child Left Behind Act, the Connecticut State Department of Education has indicated that it would use vertical scale data as part of a new management system.<sup>60</sup> Used skillfully and wisely, the consideration of vertical scales could be a positive step for Connecticut’s public schools. The CT State Department of Education, however, has also indicated that it will continue to rely on a status or “standards-based” levels method to evaluate districts and schools based entirely on the results of the CMT and CAPT (high school evaluation would also include graduation rates).<sup>61</sup>

In conclusion, first, we recommend placing a greater emphasis on indicators of academic improvement over time rather than simply status measures. Second, the State and districts should focus resources for early intervention to support children’s learning and family well-being before third grade, when standard CMT testing begins.

Furthermore, policymakers should identify more balanced ways of defining school and district success -- both quantitative and qualitative -- that acknowledge the fact that students start at different points on standardized tests, that the CMTs are not designed to evaluate schools or educators, and that test-based accountability by itself is not capable of ensuring the multi-faceted goals of public education. The vertical scales are a helpful diagnostic tool to monitor basic skill acquisition in math and reading. Assessing public education in a fair, valid, and holistic way to fulfill our broad educational goals will remain a challenge, even with skilled use of the instructive, but limited, vertical scale information.

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**CMT Reading**


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**Matched-Cohort Vertical Scale Scores  
by Race and Free/Reduced-Price Meal Status**

Universe: CT students enrolled in Grade 3 in 2009 and Grade 4 in 2010

	<b>Grade 3 Average Scale Score</b>	<b>Grade 4 Average Scale Score</b>	<b>Matched Average “Growth”</b>
All Students:			
State	430	457	28
Asian American	445	474	29
Black	402	429	27
Hispanic	400	426	26
Am. Indian	415	446	31
White	441	470	28
F/R Meals:			
State	401	428	27
Asian American	417	444	27
Black	396	422	26
Hispanic	393	418	25
Am. Indian	388	417	29
White	417	445	28
Full Price:			
State	444	472	28
Asian American	454	483	30
Black	420	449	29
Hispanic	425	453	28
Am. Indian	433	465	32
White	446	474	28

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Source: eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation.*

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**CMT Math**


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**Matched-Cohort Vertical Scale Scores  
by Race and Free/Reduced-Price Meal Status**

Universe: CT students enrolled in Grade 3 in 2009 and Grade 4 in 2010

	<b>Grade 3 Average Scale Score</b>	<b>Grade 4 Average Scale Score</b>	<b>Matched Average “Growth”</b>
All Students:			
State	457	500	44
Asian American	472	521	49
Black	431	471	40
Hispanic	435	476	40
Am. Indian	445	490	44
White	466	511	45
F/R Meals:			
State	435	475	40
Asian American	457	503	46
Black	425	464	39
Hispanic	430	470	40
Am. Indian	421	463	42
White	448	489	40
Full Price:			
State	468	513	45
Asian American	476	526	50
Black	447	490	43
Hispanic	455	497	42
Am. Indian	463	509	46
White	469	515	45

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Source: eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*

Appendix C: Vertical Scale, Percent at Proficient, and Demographic Data for Selected Schools

Subject	District	School Name	CMT Vertical Scale Scores			CMT Proficiency Scores		Racial/Ethnic Makeup			Free/Reduced Price Lunch Eligibility		
			Matched N "Growth" 2010-2011	Matched N Average 2010 (4 <sup>th</sup> grade)	Matched N Average 2011 (5 <sup>th</sup> grade)	%At/Above Proficient 2010 (4 <sup>th</sup> grade)	%At/Above Proficient 2011 (5 <sup>th</sup> grade)	% White	% Black	% Latino	% Paid Lunch (2010)	% Free Lunch (2010)	% Reduced Lunch (2010)
Mathematics	State		31	501	532	85.2%	87.6%	61.7%	13.0%	18.5%	65.3%	28.9%	5.8%
	Darien	Hindley	26	527	553	98.9%	100.0%	92.2%	0.0%	5.6%	99.0%	0.7%	0.3%
	Westport	Coleytown	43	527	570	100.0%	100.0%	90.5%	1.4%	5.4%	97.9%	1.8%	0.4%
	Windsor	Clover Street School	11	500	511	79.3%	83.9%	23.7%	61.0%	10.2%	60.4%	29.9%	9.7%
	Windsor	Oliver Ellsworth	38	501	539	87.1%	92.1%	40.8%	36.7%	17.3%	67.0%	24.2%	8.8%
	Bridgeport	Luis Munoz Marin	22	441	463	38.8%	36.1%	0.0%	23.2%	76.8%	3.4%	91.1%	5.5%
	New Haven	Nathan Hale School	19	508	527	88.7%	90.2%	55.8%	9.6%	30.8%	57.4%	31.1%	11.5%
Reading	State		23	457	481	72.9%	75.1%	61.7%	13.0%	18.5%	65.3%	28.9%	5.8%
	Darien	Hindley	20	488	508	96.7%	98.9%	92.2%	0.0%	5.6%	99.0%	0.7%	0.3%
	Westport	Coleytown	34	483	517	94.4%	95.8%	90.5%	1.4%	5.4%	97.9%	1.8%	0.4%
	Windsor	John F Kennedy School	17	444	461	64.4%	63.1%	13.0%	58.0%	21.7%	66.5%	23.1%	10.5%
	Windsor	Oliver Ellsworth	35	465	500	82.8%	84.8%	40.8%	36.7%	17.3%	67.0%	24.2%	8.8%
	Bridgeport	Luis Munoz Marin	29	380	409	9.9%	20.3%	0.0%	23.2%	76.8%	3.4%	91.1%	5.5%
	New Haven	Nathan Hale School	8	463	471	81.1%	70.0%	55.8%	9.6%	30.8%	57.4%	31.1%	11.5%

Source: eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation* and Connecticut State Department of Education.

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<sup>1</sup> Douglass, Frederick. *Life and Times of Frederick Douglass: Written By Himself. HIS EARLY LIFE AS A SLAVE, HIS ESCAPE FROM BONDAGE, AND HIS COMPLETE HISTORY.* With A New Introduction by Rayford W. Logan. Reprinted from the revised edition of 1892. The Cromwell-Collier Books, New York, New York: 1962, 1971. The quotation reads, “There is still another ground for hope. It arises out of a comparison, of our past condition with our present one—the immeasurable depth from which we have come, and the point of progress already attained.

<sup>2</sup> Senate Bill No. 458, Public Act No. 12-116, “An Act Concerning Educational Reform.” Connecticut General Assembly. 29 May 2012. <<http://www.cga.ct.gov/2012/ACT/PA/2012PA-00116-R00SB-00458-PA.htm>>. See Section 18, 34, and 88 for the use of the five performance levels in the management of districts and schools and Section 51 discusses staff management procedures. Also see Cotto, Jr., Robert. “Understanding Connecticut’s Application for a Waiver from the No Child Left Behind Act.” Apr. 2012.

<sup>3</sup> Koretz, Daniel. *Measuring Up: What Educational Testing Really Tells Us.* Cambridge, MA: Harvard University Press, 2009. Print. See pages 65-67 for a discussion on the background, benefits, and drawbacks of standards-based reporting.

<sup>4</sup> See Koretz pages 65-69 where he explains the drawbacks of standards-based reporting and states, “Standards-based reporting provides a very coarse and in some cases severely distorted view of achievement, and it can create the undesirable incentive to focus most on kids who are nearest the standard that counts, to the detriment of others.” Also see Ho, Andrew Dean. “The Problem With “Proficiency: Limitations of Statistics and Policy Under No Child Left Behind.” *Educational Researcher*, Vol. 37, No. 6 (2008): pp. 351-360. Web. 27 Sept. 2011. Testing experts such as Dr. Koretz have noted that the method of comparing percent proficient from one year to the next in the same grade with different cohorts has been used for its simplicity, but it has had many shortcomings. For example, sudden demographic changes can change the percent at or above proficient rates. Dr. Ho notes that using the “proficient” level also has shortcomings for educational statistics, reporting, and management.

<sup>5</sup> The vertical scales are not the same as the subject test scales that are on a range of 0 to 400.

<sup>6</sup> When parents and students receive their individual CMT report each summer, they are provided information on the results and improvement on the vertical scales in math and reading over the course of several years. Students receive vertical scale score reports if they have taken the standard CMT in math and reading in previous years and received a valid score.

<sup>7</sup> Connecticut State Department of Education. “Connecticut Mastery Test Vertical Scales 2009 Interpretive Guide.” 2009. Web. <<http://solutions1.emetric.net/cmtpublic/UI/Guides/VSIInterpretiveGuide.pdf>>. The guide states, “The CMT vertical scales are designed to measure change or growth across grades (i.e., from Grade 3 to Grade 4, from Grade 4 to Grade 5, etc.) on tests that have different characteristics and items, but have similar content. The vertical scales were constructed so that each vertical scale score represents the same theoretical achievement level whether derived from a Grade 3, Grade 4, Grade 5, Grade 6, Grade 7, or Grade 8 CMT scale score. Each grade-level CMT scale score (range 100 - 400) in mathematics or reading corresponds to a specific value on a common mathematics or reading vertical scale score (range 200 - 700).”

<sup>8</sup> *Ibid.*

<sup>9</sup> See Swaminathan, Hariharan. “Developing the Vertical Scale for the Connecticut Mastery Test.” 7 May 2009. PowerPoint on Web. <[http://www.education.uconn.edu/assessment/docs/Swaminathan\\_05072009.pdf](http://www.education.uconn.edu/assessment/docs/Swaminathan_05072009.pdf)>. Also see Connecticut State Department of Education. “Connecticut Mastery Test Vertical Scales Frequently Asked Questions - 2009.” 2009. Web. <<http://solutions1.emetric.net/cmtpublic/UI/Guides/VSFAQ.pdf>>. The document states, “During the 2007 CMT administration, a linking study was conducted that involved both common students and common test items in the content areas of mathematics and reading. Groups of Connecticut students were administered the on-grade level CMT along with one session of an off-grade level CMT. For example, groups of Grade 5 students took sections of the Grade 4 CMT (one grade-level below) or sections of the Grade 6 CMT (one grade-level above) as well as the complete Grade 5 CMT. The end result is that students in different grades taking different tests, have the same vertical scale score which represents the same level of achievement as defined by the new vertical scale.” Also see Koretz Chapter 8: “Reporting Performance” and pages 211-213 for an explanation of developmental scales, interval scales, and developmental standard scores. Sinclair, Norma. “Correspondence.” State Department of Education. 15 May 2012. Sinclair states, “The scales are continuous and they are interval level developmental scales. Accordingly, 25 units of growth are numerically the same across grades. However, it is important to note that the rate of achievement growth and development changes as students age. Therefore, students in the lower grades (e.g. grades 3 and 4) in Connecticut experience a faster rate of achievement growth, especially in English/Language Arts, than students in higher grades (e.g., 7 and 8 grades); hence the curvilinearity that’s notable in the vertical scales.”

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<sup>10</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 3, 2009 – Grade 4, 2010-Mathematics and Reading.” Disaggregated by Ethnicity and F/R Meals. CT Department of Education, 2011. Web. 6 January 2012. <<http://solutions1.emetric.net/cmtpublic/Default.aspx>>. Originally published by Connecticut Voices for Children as Appendix A and B in “Testimony in Response to the Achievement Gap Task Force Call for High-Leverage Strategies to Address the Opportunity Gap in Connecticut” on 9 Jan. 2012. See Appendix A and B in this report for reading and math vertical scale scores for this matched cohort of students. We begin with data from 2009 to 2010 because the categories of racial and ethnic identification changed beginning in 2011. Therefore, data from racial and ethnic subgroups cannot be compared and does appear from 2010-2011 on the vertical scale analysis report.

<sup>11</sup> See Appendix A.

<sup>12</sup> See Section 1116(a)(1)(A) and (B) of the *No Child Left Behind Act of 2001*. The section states, “(1) IN GENERAL- Each local educational agency receiving funds under this part shall (A) use the State academic assessments and other indicators described in the State plan to review annually the progress of each school served under this part to determine whether the school is making adequate yearly progress as defined in section 1111(b)(2); (B) at the local educational agency's discretion, use any academic assessments or any other academic indicators described in the local educational agency's plan under section 1112(b)(1)(A) and (B) to review annually the progress of each school served under this part to determine whether the school is making adequate yearly progress as defined in section 1111(b)(2), except that the local educational agency may not use such indicators (other than as provided for in section 1111(b)(2)(I) if the indicators reduce the number or change the schools that would otherwise be subject to school improvement, corrective action, or restructuring under section 1116 if such additional indicators were not used, but may identify additional schools for school improvement or in need of corrective action or restructuring...” Also see Section 1111(b) of the No Child Left Behind Act of 2001 for an explanation of AYP and measurable objectives. The section on measurable objectives connects Annual Yearly Progress and the percent at or above the proficient level. The section states, “(G) MEASURABLE OBJECTIVES- Each State shall establish statewide annual measurable objectives, pursuant to subparagraph (C)(v), for meeting the requirements of this paragraph, and which-- (i) shall be set separately for the assessments of mathematics and reading or language arts under subsection (a)(3); (ii) shall be the same for all schools and local educational agencies in the State; (iii) shall identify a single minimum percentage of students who are required to meet or exceed the proficient level on the academic assessments that applies separately to each group of students described in subparagraph (C)(v);(iv) shall ensure that all students will meet or exceed the State's proficient level of academic achievement on the State assessments within the State's timeline under subparagraph (F); and (v) may be the same for more than 1 year, subject to the requirements of subparagraph (H).”

<sup>13</sup> See Swaminathan page 9.

<sup>14</sup> See “Connecticut Mastery Test Vertical Scales 2009 Interpretive Guide.”

<sup>15</sup> See Appendix A and B.

<sup>16</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 3, 2009 – Grade 4, 2010-Mathematics and Reading.” Disaggregated by Ethnicity, Gender, Special Education, F/R Meals, ELL. CT Department of Education, 2011. Web. 6 January 2012. <<http://solutions1.emetric.net/cmtpublic/Default.aspx>>. Also see Appendix A and B. See Swaminathan 2009 beginning on page 75 where he explains the problem of exaggerated raw scale score growth at both ends of the distribution and how he solved this problem by adjusting the vertical scales.

<sup>17</sup> For example, Black students in this cohort experienced on average 27 units of improvement while the state and white students averaged 28 units of improvement on the standard CMT in reading from 3<sup>rd</sup> grade in 2009 to 4<sup>th</sup> grade in 2010.

<sup>18</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 3, 2009 – Grade 4, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 4, 2009 – Grade 5, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 5, 2009 – Grade 6, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 6, 2009 – Grade 7, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 7, 2009 – Grade 8, 2010-Mathematics and Reading.” Disaggregated by Ethnicity, F/R Meals, Ethnicity, Gender, Special Education, and ELL. CT Department of Education, 2011. Web. 6 Jan. 2012. <<http://solutions1.emetric.net/cmtpublic/Default.aspx>>.

<sup>19</sup> Harris, Angel L. *Kids Don't Want To Fail: Oppositional Culture and the Black-White Gap*. Harvard University Press; Cambridge, MA; 2011.” *Kindle* edition. See location 2204 of 3588, Figure 9.1 *Kindle* edition. Also see Kaushal, Nearaj, Magnuson, K. and Waldfogel, J. “How is Family Income Related to Investments in Children’s Learning.” *Whither Opportunity?* Greg J. Duncan and Richard J. Murnane, editors. Russell Sage Foundation; New York, New York: 2011. Print. 193. Also see Reardon, Sean F. “The Widening Academic Achievement Gap Between the Rich and The Poor: New Evidence and Possible Explanations.” *Whither Opportunity?* Greg J. Duncan and Richard J. Murnane, editors. Russell Sage Foundation; New York, New York: 2011. Print. As we will discuss later, there is a significant span of time between pre-natal care to grade 3 CMT’s (children are roughly 8 years old in grade 3) that we must focus our attention and

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resources towards. The vertical scale scores do not provide insight on basic skills in each year from kindergarten to third grade because these young children do not take Connecticut Mastery Tests in those years.

<sup>20</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 3, 2010 – Grade 4, 2011-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 4, 2010 – Grade 5, 2011-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 5, 2010 – Grade 6, 2011-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 6, 2010 – Grade 7, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 7, 2010 – Grade 8, 2011-Mathematics and Reading.” Disaggregated by ELL. CT Department of Education, 2011. Web. 1 Apr. 2012. <<http://solutions1.emetric.net/cmtpublic/Default.aspx>>.

<sup>21</sup> See Cotto, Jr., Robert. “The Limits of Data on Free and Reduced Price Lunch in Connecticut.” Connecticut Voices for Children; New Haven, CT; Mar. 2012. Web. <<http://www.ctvoices.org/sites/default/files/edu12limitsFRPM.pdf>>. The free and reduced price meal eligibility (FRPM) statistics have substantial limitations. FRPM status is a rough proxy for family income either above or below the eligibility points. In particular, the aggregated FRPM obscures income differences between the free and reduced meals category requirements and families may not elect to participate in the National School Lunch Program. While it has been demonstrated that FRPM status is an imperfect measure of family income, it is the only measure of socioeconomic status by which CMT results can be disaggregated at this time.

<sup>22</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 3, 2009 – Grade 4, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 4, 2009 – Grade 5, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 5, 2009 – Grade 6, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 6, 2009 – Grade 7, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 7, 2009 – Grade 8, 2010-Mathematics and Reading.” Disaggregated by Race and Filter for Free/Reduce Price Meals. CT Department of Education, 2011. Web. 6 Jan. 2012. <<http://solutions1.emetric.net/cmtpublic/Default.aspx>>. Also see Appendix A and B.

<sup>23</sup> See Appendix A.

<sup>24</sup> See Appendix A and B.

<sup>25</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 3, 2010 – Grade 4, 2011-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 4, 2010 – Grade 5, 2011-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 5, 2010 – Grade 6, 2011-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 6, 2010 – Grade 7, 2010-Mathematics and Reading,” “Vertical Scale Analysis Report-Grade 7, 2010 – Grade 8, 2011-Mathematics and Reading.” Disaggregated by Free/Reduced Price Meal eligibility. CT Department of Education, 2011. Web. 1 Apr. 2012. <<http://solutions1.emetric.net/cmtpublic/Default.aspx>>.

<sup>26</sup> Connecticut State Department of Education. “Connecticut Mastery Test Vertical Scales Frequently Asked Questions - 2009.” 2009. Web. <<http://solutions1.emetric.net/cmtpublic/UI/Guides/VSFAQ.pdf>>. See pages 7 and 8 for the “2009 Reading Performance Level Cut Points on the Vertical Scale” and the “2009 Mathematics Performance Level Cut Points on the Vertical Scale”. The grade 3 vertical scale range in math was between 450-483 for the goal level and the grade 4 vertical scale range in reading was between 484-528 for the goal level. The matched “n” average for grade 3 in 2009 was 457 and grade 4 in 2010 was 500. Thus, on average, students in Connecticut on the standard CMT in math appear as being in the goal level for both years. The grade 3 vertical scale range in reading was between 425 and 477 for the goal level and the grade 4 vertical scale range was between 449 and 505. Students in the statewide third grade cohort in 2009 scored, on average, at 430 on a scale of 700 on the standard CMT in reading. The next year in 2010, the students in that cohort who were still enrolled in Connecticut schools and took the fourth grade standard CMT scored, on average, 457 out of 700 on the standard CMT in reading. This means that, on average, students were at the “goal” level on the standard CMT for two years in row.

<sup>27</sup> See Dirir and Sinclair page 6. The entire quotation reads, “Achievement could also increase, yet never be enough to help students rise to proficiency or to the state goal; the growth in Figure 5 would leave the student at the basic level after three years.”

<sup>28</sup> See *No Child Left Behind Act of 2001*, Title I, Part A: Sec. 1111(b)(2)(B) and (C). Also see subsection 3 on “Academic Assessments.”

<sup>29</sup> Cotto, Jr. Robert. “Addition through Subtraction: Are Rising test scores in Connecticut related to the exclusion of students with Disabilities?” Connecticut Voices for Children. New Haven, CT. Jan. 2012. Web. <<http://www.ctvoices.org/sites/default/files/edu12addthrusubtract.pdf>>. Also see Viana Turcios-Cotto and Robert Cotto, Jr., “Recalculating School Reform in Hartford, CT,” Working Paper Presented at Harvard Graduate School of Education Alumni of Color Conference (March 4, 2011).

<sup>30</sup> See eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “2009-2011 Connecticut Mastery Test Participation Rate Report.” CT Department of Education, 2012. Web. 1 Jul. 2012. Also see eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 3, 2009 – Grade 5, 2011-Mathematics and Reading” and “Vertical Scale Analysis Report-Grade 6, 2009 – Grade 8, 2011-Mathematics and Reading.” Disaggregated by

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students with disabilities. CT Department of Education, 2012. Web. 6 July 2012. Participation rates following an unmatched cohort-grade 3 in 2009 to grade 5 in 2011-have declined for students with disabilities after the MAS began in 2009. For example, 60% of students with disabilities in the third grade took the standard CMT in reading in 2009, and then two years later 55% of students with disabilities in the fifth grade took the standard CMT in reading in 2011. However, this unmatched cohort saw an increase in the absolute number of students with disabilities and an overall decline in total enrollment. Alternatively, 60.1% of students with disabilities in the sixth grade took the standard CMT in reading in 2009, and then two years later 58.9% of students with disabilities in the eighth grade took the standard CMT in reading in 2011. This unmatched cohort experienced a decrease in the absolute number of students with disabilities, but an increased in overall enrollment.

<sup>31</sup> *Ibid.* See Connecticut State Department of Education. *PPT Process and IEP Forms*. “CMT/CAPT (Modified Assessment System-MAS) PPT Eligibility Worksheet.” Connecticut State Department of Education. Web. 15 Aug. 2011. <[http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/MAS\\_eligibility\\_worksheet.pdf](http://www.sde.ct.gov/sde/lib/sde/PDF/DEPS/Special/MAS_eligibility_worksheet.pdf)> Along with the worksheet, districts needed to provide evidence that a student would not meet or exceed the proficient level on the standard CMT in math and/or reading. IEP goals had to align to grade-level academic content. The MAS has important differences from the standard CMT. For example, the CMT MAS in reading is taken online with a computer rather than the traditional paper and pencil test. Other modifications on the MAS include: different typefaces, distractors removed, fewer items on a page, graphic organizers, key text underlined and/or bolded, larger font size, simplified graphics, and simplified language. See Hodgson, J. R., Lazarus, S. S., & Thurlow, M. L. (2010). “Characteristics of states’ alternate assessments based on modified academic achievement standards in 2009-2010.” Synthesis Report 80. Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes. Web. 27 Sept. 2011. See Table B2 and B5, pg. 35. <<http://www.cehd.umn.edu/NCEO/onlinepubs/Synthesis80/Synthesis80.pdf>>.

<sup>32</sup> *Ibid.* see eMetric. *Connecticut Adequate Yearly Progress*. “Disclaimer.” CT State Department of Education, 2011. Web. 26 Sept. 2011. 1 Oct. 2011. The disclaimer discloses that there may be differences in calculations between the State and Federal Department of Education. <<http://ctayp.emetric.net/Disclaimer>>. Also see the Connecticut Department of Education, “CMT/CAPT (Modified Assessment System-MAS) PPT Eligibility Worksheet.” The disparate calculation methods allowed some schools, districts, and the state to meet the 95% participation rate required by NCLB even though in many instances fewer than 95% of students took the standard CMT. Furthermore, two percent of all students taking the modified assessment (MAS) and scoring at the proficient level or better on that alternate test counted favorably towards Annual Yearly Progress calculations. Effectively, students taking the modified assessment (MAS) disappeared from the accountability system because they never counted against ratings, but could marginally improve them.

<sup>33</sup> See Cotto 2012 pages 10-11. Also see Appendix F and G in Cotto 2012.

<sup>34</sup> *Ibid.*

<sup>35</sup> Students taking a CMT in math or reading in one school or district in one year, then leaving a school or district during the next year would not appear in the later year’s matched cohort for the school or district. However, if they stayed in Connecticut and participated on the standard CMT in reading or math, these students would appear in the statewide Vertical Scale Analysis Reports if they received a valid score on the standard CMT in math or reading in at least two successive years.

<sup>36</sup> See Dirir, Mohamed and Sinclair, Norma. “The Development of Connecticut’s Vertical Scale and Growth Model.” Connecticut State Department of Education. 2011. The authors state on page 3, “Using Item Response Theory, and in consultation with the student assessment’s Technical Advisory Committee, vertical equating procedures were performed to construct a single scale for mathematics grades 3-8 and a separate one for reading. The results were cross-validated by Hariharan Swaminathan and Jane Rogers of the University of Connecticut.” In short, the vertical scales have been constructed and evaluated by the same team of people-Professors at the University of Connecticut and staff at the Connecticut State Department of Education. As of this writing, there has not been an independent analysis of the methodology, validity, and reliability by outside psychometricians and/or statisticians.

<sup>37</sup> See Connecticut State Department of Education. *Connecticut Education Data and Research (CEDaR) Data Tables*. “Hours of Instruction by Subject Area-Grade 2.” CT Department of Education, 2011. Web. 1 Dec. 2011. <[http://sdeportal.ct.gov/Cedar/WEB/ct\\_report/DTHome.aspx](http://sdeportal.ct.gov/Cedar/WEB/ct_report/DTHome.aspx)>. From 2002-2009, Connecticut’s second graders have had on average fewer hours of instruction in Computer Education, Health, Language Arts, and Social Studies and more hours in mathematics and foreign language.

<sup>38</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Connecticut Mastery Test Vertical Scales 2009 Interpretive Guide.” 30 Dec. 2011. <<http://solutions1.emetric.net/cmtpublic/UI/Guides/VSIInterpretiveGuide.pdf>>. The guide states, “Note: Vertical scale scores (like all other CMT scores) are based on the performance of individual students on the day of testing. When interpreting growth, care should be taken not to base important educational

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decisions solely on vertical scale results. CMT results can best be used in conjunction with classroom assessments and classroom work to identify potential strengths and needs of students in the content areas assessed.

<sup>39</sup> See Koretz page 213.

<sup>40</sup> Rothstein, Jacobsen, and Wilder. *Grading Education: Getting Accountability Right*. Economic Policy Institute; Washington, D.C. Teachers College Press; New York, NY: 2008. See Chapter 2 on “Weighting the public education.”

<sup>41</sup> See Harris location 2144 of 3588. *Kindle Edition*.

<sup>42</sup> See Appendix C.

<sup>43</sup> See Cotto 2012, “The Limits of Data on Free and Reduced Price Lunch in Connecticut.”

<sup>44</sup> *Connecticut Education Data and Research (CEDaR) Data Tables*. “English Language Learners: Number of Language Learners-ELL. Bridgeport School District, Luis Muñoz Marin School, 2010-2011.” CT Department of Education, 2012. Web. 6 Jun. 2012.

<sup>45</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Performance Level Summary; Grade 5, 2009-2011, Luis Munoz Marin Elementary, Bridgeport, CT.” CT Department of Education, 2011. Web. 15 Mar. 2011. Also see Appendix C.

<sup>46</sup> See Glazerman, Steven M. and Potamites, Liz. “False Performance Gains: A critique of successive cohort indicators.” Mathematica Policy Research. Working Paper on Web. Dec. 2011. [http://www.mathematica-mpr.com/publications/pdfs/Education/False\\_Perf.pdf](http://www.mathematica-mpr.com/publications/pdfs/Education/False_Perf.pdf). Glazerman and Potamites critique the comparison of successive cohorts in the same grade and state in their abstract, “We argue that average gain indicators potentially can provide useful information, but differences across successive cohorts, such as grade trends, which are commonly cited in the popular press and used in the Safe Harbor provision of Federal school accountability laws, are flawed and can be misleading when used for school accountability or program evaluation.”

<sup>47</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Performance Level Summary; Grade 5, 2009-2011, Luis Munoz Marin Elementary, Bridgeport, CT.” CT Department of Education, 2011. Web. 15 Mar. 2011. Also see Appendix C.

<sup>48</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 4, 2010 – Grade 5, 2011-Mathematics and Reading.” Data selected for Luis Muñoz Marin Elementary School in Bridgeport, CT. CT Department of Education, 2011. Web. 6 January 2011. Also see Appendix C.

<sup>49</sup> *Ibid*. See Appendix C.

<sup>50</sup> See Appendix C.

<sup>51</sup> See Cotto 2012, “The Limits of Data on Free and Reduced Price Lunch in Connecticut.”

<sup>52</sup> *Connecticut Education Data and Research (CEDaR) Data Tables*. “English Language Learners: Number of Language Learners-ELL. Darien School District, Hindley Elementary School, 2010-2011.” CT Department of Education, 2012. Web. 6 Jun. 2012.

<sup>53</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Performance Level Summary: Percent of Students in Each Performance Level: Hindley Elementary Grade 5, 2010 and Grade 5, 2011.” CT Department of Education, 2012. Web. 6 Jun. 2012. Also see appendix C.

<sup>54</sup> *Ibid*.

<sup>55</sup> eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “Vertical Scale Analysis Report-Grade 4, 2010 – Grade 5, 2011-Mathematics and Reading.” Data selected for Hindley Elementary School in Darien, CT. CT Department of Education, 2011. Web. 6 January 2011. Also see Appendix C.

<sup>56</sup> *Ibid*.

<sup>57</sup> *Ibid*.

<sup>58</sup> Note the size of the 4<sup>th</sup> to 5<sup>th</sup> grade cohorts decreased from 2010 to 2011 at Hindley and Luis Muñoz Marin. The number of students taking the standard CMT in reading at Muñoz Marin decreased from 81 4<sup>th</sup> grade students to 69 5<sup>th</sup> grade students. The whole group began with 87 students in 2010, but ended with 82 students in 2011. In addition to the smaller overall groups, 4 additional students took the modified assessment in 5<sup>th</sup> grade reading and 3 additional students were ELL exempt in 2011 compared to 2010. At Hindley elementary school the number of students taking the standard CMT in reading decreased from 91 4<sup>th</sup> grade students to 88 5<sup>th</sup> grade students. The whole group started at 91 students in 2010, and then was 90 students in 2011. One student at Hindley took the modified assessment in 5<sup>th</sup> grade reading and one student had “No Valid Score” grade 5 in 2011. See eMetric. *Data Interaction for Connecticut Mastery Test, 4<sup>th</sup> Generation*. “2010 and 2011 Connecticut Mastery Test Participation Rate Report, Grade 4 in 2010 and Grade 5 in 2011 at Hindley Elementary School in Darien, CT and Luis Muñoz Marin Elementary School in Bridgeport, CT.” CT Department of Education, 2012. Web. 18 June 2012.

<sup>59</sup> See Ladd pages 304-305. The use of “standards-based” reporting under NCLB is an example of a status model that looks at how many, or what percent of students, are achieving at particular levels such as proficient. About these models,

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Clotfelter and Ladd (1996) state that, “status models are not well designed to promote an equity agenda because they inevitably favor the schools with the most advantaged students. This pattern emerges because of the high positive correlation across schools between the socioeconomic status of the students and their achievement.”

<sup>60</sup> Connecticut Department of Education. *Elementary and Secondary Education Act Flexibility Request*. Web. <[http://www.sde.ct.gov/sde/lib/sde/pdf/nclb/waiver/connecticut\\_flexibility\\_request\\_022812.pdf](http://www.sde.ct.gov/sde/lib/sde/pdf/nclb/waiver/connecticut_flexibility_request_022812.pdf)>. 7 Feb. 2012. See “ESEA Flexibility Request” pages 84-86 for the section on “Vertical Scale Growth: Measuring Individual Student Growth. Also see Cotto, Jr., Robert. “Understanding Connecticut’s Application for a Waiver from the No Child Left Behind Act.” Apr. 2012. Web. Also see Dirir and Sinclair for an explanation of the state’s proposed statistical model to predict and judge students’ vertical scales based on past vertical scale scores.

<sup>61</sup> See “ESEA Flexibility Request” pages 66–67 on “Setting Annual Measurable Objectives (AMO’s)” in Part I. Also see pages 79-82 on “The SPI: Measuring Student Achievement At All Levels.” Also see Cotto 2012, “Understanding Connecticut’s Application for a Waiver from the No Child Left Behind.”