CONNECTICUT STATE BOARD OF EDUCATION
Hartford

TO BE PROPOSED:
June 28, 2006

RESOLVED, That the State Board of Education approves the achievement standards for the Fourth Generation Connecticut Mastery Test (CMT4).

Approved by a vote of _____ this twenty-eighth day of June, Two Thousand Six.

Signed: _____
Betty J. Sternberg, Secretary
State Board of Education

CONNECTICUT STATE BOARD OF EDUCATION
Hartford

TO: State Board of Education

FROM: Dr. Betty J. Sternberg
Commissioner of Education

SUBJECT: Achievement Standards for the Fourth Generation
Connecticut Mastery Test (CMT4)

To continue to comply with the *No Child Left Behind* (NCLB) accountability requirements, the Connecticut State Department of Education (CSDE) is carrying over from the third generation Connecticut Mastery Test (CMT3) to the fourth generation (CMT4) the previously adopted achievement standards: below basic, basic, proficient, goal and advanced. The CMT3 was last administered in fall 2004 to students in Grades 4, 6 and 8 in mathematics, reading and writing. The CMT4 was first administered in Grades 3 through 8, inclusive, in spring 2006 in the same three content areas.

The purpose of this report is to summarize the procedures used to accomplish the task of carrying over CMT3 standards to CMT4 and to recommend for approval the CMT4 achievement standards for each grade and content area. The recommendations take into consideration the results from a statistical intergenerational equating study, historical results from past CMT3 administrations, and input from our CMT Standards Review Panel composed of a diverse group of Connecticut educators. A list of panel members is included in Appendix A. All procedures were discussed with and approved by our Technical Advisory Committee (TAC) prior to implementation. The TAC is composed of nationally recognized experts in the measurement field. A list of the TAC members is included in Appendix B.

Current Standards for CMT3

In June 2002, the State Board of Education approved revisions to the standards for the CMT3 in Grades 4, 6 and 8. Standards were established based on scale scores (100-400) in three areas: mathematics, reading and writing. In all content areas, the standards define the different academic performance levels, denoted as below basic, basic, proficient, goal and advanced. The state goal has been an important benchmark for judging the quality of education in Connecticut for more than a decade. The proficient standard is used for accountability purposes as required by NCLB to make determinations about Adequate Yearly Progress (AYP) and schools in need of improvement.

Overview of the Development of the Fourth Generation CMT

A primary consideration in the development of the CMT4 was to maintain continuity with the CMT3 both in terms of content of the test and achievement standards. The CMT is a very

successful testing program that has a strong historic presence in Connecticut schools. It has had a powerful impact on the direction of education in the state and has been the primary indicator for measuring academic progress and need since 1985. Dramatic changes in the content or standards would adversely interrupt systems that are generally serving Connecticut students well and would also affect AYP calculations mandated for NCLB. Therefore, revisions were made to CMT content, test format, administration procedures, scoring methods, standards, etc., only when there was a strong justification to do so.

On the other hand, it was important to review the CMT in light of new educational developments as well as the change from fall to spring testing and the addition of three new grades for testing. For example, in CMT4 mathematics, the percentage of multiple-choice items decreases while the percentage of constructed-response items increases as grade level increases.

The most important steps in the process of designing and developing the CMT4 are presented below. These procedures are consistent with those previously used in the development of prior generations of the CMT.

- Curriculum experts and testing experts at the CSDE carefully reviewed potential test items in terms of the appropriateness of test content and the test structure for each grade. Special consideration was given to the test's alignment with the curriculum frameworks and to its relationship to the Connecticut Academic Performance Test (CAPT), which is administered to Connecticut tenth-graders.

- In each content area and at each grade level, CMT Content Advisory Committees, comprised of Connecticut educators, reviewed the test for both content and test structure and advised the work of the CSDE. Decisions were made through an iterative process with the advisory committees having several opportunities to provide input throughout the design phase.

- Based on input from various advisory groups, test specifications and item specifications were written to guide the test development process. The State Board of Education and the Connecticut education community have received information at key points in the development process.

- Items written according to the final specifications were reviewed by both curriculum and assessment staff at CSDE, by Content Advisory Committees and by a Fairness Committee (to ensure that all test items fairly assess all children). As a result of these extensive reviews, some test items were modified or eliminated as appropriate.

- Those items that survived the review process were then pilot tested with a sample of Connecticut students in the appropriate grades in spring 2003 through 2005. The data that resulted from the pilot were carefully examined to ensure that each test item was not misleading or confusing to students and had the appropriate psychometric qualities.

- CMT4 forms were constructed based on data from the pilot study and based on the test specifications.

Description of Fourth Generation CMT

The CMT4 includes mathematics, reading, and writing components. Each component is described below.

Mathematics: The mathematics test includes a combination of multiple-choice, grid-in, open-ended and extended-response items. The items are all mapped onto the state's mathematics content standards. The variety of test items reflects a balance between the assessment of basic mathematics skills and competencies, and the application of these skills to problem solving. For example, the fifth grade test is composed of 113 test items (80 multiple-choice items, 20 open-ended items, and 13 grid-in items). The fifth grade test will yield scores on 23 content strands as well as a total mathematics score. The standards for the five performance levels will be established using the total mathematics score.

Language Arts (Reading): The two subtests, Degrees of Reading Power (DRP) and Reading Comprehension, assess two critical components of reading: the process of reading (DRP) and the product of reading (Reading Comprehension).

Degrees of Reading Power: On the DRP, students read several informational passages from which some words have been deleted. Test items require students to choose the correct word for each deletion in the passage. Students must understand the sentence in the context of the rest of the passage in order to identify the correct deleted word. If a sentence with a deletion had been isolated from the text, all of the answer choices would have made sense. Students are demonstrating their ability to make sense of the passage, or construct meaning, as they respond to DRP items.

Reading Comprehension: The Reading Comprehension subtest is administered in two 45-minute sessions. In each session, students read two passages and answer related multiple-choice and open-ended questions that assess their comprehension. Reading passages represent three contexts for reading: Reading for Literary Experience, Reading for Information and Reading to Perform a Task (Grades 5-8 only). Each Reading Comprehension test item is designed to measure one of four reading content strands: 1) Forming a General Understanding, 2) Developing Interpretation, 3) Making Reader/Text Connections, and 4) Examining the Content and Structure. Student performance on each of these reading content strands will be compared to a mastery standard.

The CMT4 reading standards for the five performance levels will be established by combining the DRP and the Reading Comprehension subtests.

Language Arts (Writing): The two subtests, Direct Assessment of Writing and Editing & Revising, assess two critical aspects of writing: the ability to use written language to communicate a clear message (Direct Assessment of Writing) and the technical skills necessary for effective writing (Editing & Revising).

Direct Assessment of Writing: On the Direct Assessment of Writing subtest, students are given a 45-minute period to respond in writing to a prompt. Prompts for Grades 3-4 are designed to elicit narrative writing, prompts for Grades 5-6 elicit expository writing and prompts for Grades 7-8 elicit persuasive writing. Student responses to the Direct Assessment of Writing are scored

holistically with an emphasis on the response's overall development, organization and fluency. As in CMT3, student responses are considered first drafts, so errors in spelling, punctuation, grammar and usage do not detract from the score.

Editing & Revising: Editing & Revising is a 60-minute subtest that assesses the ability of students to recognize and correct errors in the conventions of written English (e.g., sentence structure, punctuation, grammar, usage, spelling). At each grade level, students read four passages with embedded errors and respond to multiple-choice questions to indicate the appropriate corrections. Student performance will be compared to mastery standards for two strands: Editing and Composing/Revising.

The CMT4 writing standards for the five performance levels will be established by combining the Direct Assessment of Writing and Editing & Revising subtests.

A summary of the CMT4 is presented in Table 1.

Table 1. Summary of CMT4 Content

Content Area	Grade	Multiple-Choice	Grid-In	Open-Ended 1 pt	Open-Ended 2 pt	Open-Ended 3 pt	Total Items	Total Points
Mathematics	3	76		8	8	2	94	106
	4	80		4	10	2	96	110
	5	80	13	3	15	2	113	132
	6	71	18	5	20	2	116	140
	7	70	19	7	22	2	120	146
	8	61	20	9	25	2	117	146
Reading Comprehension	3	22			9		31	40
	4	24			8		32	40
	5	22			9		31	40
	6	22			9		31	40
	7	20			10		30	40
	8	20			10		30	40
Degrees of Reading Power	3	42					42	42
	4	42					42	42
	5	49					49	49
	6	49					49	49
	7	49					49	49
	8	49					49	49
Editing & Revising	3	32					32	32
	4	32					32	32
	5	36					36	36
	6	36					36	36
	7	40					40	40
	8	40					40	40

Summary of Changes from the Third Generation to the Fourth Generation CMT

There are several significant administrative changes in test administration from CMT3 to CMT4. They are:

1. the testing window for the CMT has moved from a fall administration to an early spring administration;
2. the grades tested have expanded from Grades 4, 6 and 8 to Grades 3 through 8 to meet federal NCLB requirements; and
3. all CMT4 test booklets are consumable, meaning that students record their answers directly in the test booklets, rather than on separate answer documents.

Additionally, some changes have been made within the CMT4 content areas. These changes are summarized below:

- In mathematics, the total number and percentage of multiple-choice items decreases while the total number and percentage of constructed-response items increases as the grade level increases.

- In mathematics, reporting will be by strand organized under the four content standards:
  numerical and proportional reasoning;
  geometry and measurement;
  working with data: probability and statistics; and
  algebraic reasoning: patterns and functions.

- In CMT3, Reading Comprehension passages were written specifically for the CMT. In CMT4, most reading passages are authentic, published works, though some passages may still be written specifically for the test.

- The Reading Comprehension content strands have been revised to reflect changes to the National Assessment of Educational Progress (NAEP) reading framework. Most objectives that were assessed under the Demonstrating a Critical Stance strand in CMT3 are now measured under the Making Reader/Text Connections and Examining the Content and Structure strands in CMT4.

- The length and time of the Reading Comprehension subtest has been changed from one 75-minute session with three reading passages in CMT3 to two 45-minute sessions with two reading passages in each session in CMT4.

- The DRP has been reduced in length from 70-75 minutes (depending on grade) in CMT3 to 45 minutes for Grades 3-8 on CMT4. The number of passages on each DRP has been reduced accordingly. Touchstone Applied Science Associates (TASA), the publisher of the DRP, has examined the comparability of the new, shorter forms to the older (CMT3) forms to ensure consistent reliability from CMT3 to CMT4.

- There have been minimal changes to the Writing component of the CMT4. For the Direct Assessment of Writing, CMT4 prompts are similar to CMT3 prompts, with the exception of Grade 8. In Grade 8, students will be provided with some additional

background information that could be used to support their writing. This change was made to make the Grade 8 Direct Assessment of Writing prompt a step closer to the writing task presented on the CAPT in Grade 10. In Editing & Revising, passages will contain both editing and composing/revising items in CMT4. In CMT3, these strands were assessed in separate passages.

Establishment of Standards for Fourth Generation CMT

When standards were being established for first and second generation CMT, a judgmental standard setting process called a Modified Angoff, was employed. Through that process, groups of educators who were familiar with the performance of students at a particular grade level in a particular content area were asked to predict how students who just meet a particular standard (e.g., remedial standard) would perform on many different CMT items. Using the judgment of these groups of educators in consideration with other validity checks, appropriate state goal and remedial standards were recommended by the Department and adopted by the State Board of Education.

The third generation standards were developed through department staff working with a CMT3 Standards Advisory Panel composed of technical experts, district content experts and district research and testing specialists. The CMT3 standards were set to be as rigorous as the CMT2 standards and to be equivalent across grade levels and across content areas as much as possible.

The process of carrying over CMT3 standards to the CMT4 was based on an intergeneration linking study, consideration of historical results from the CMT3, and judgmental input from the CMT Standards Review Panel. The purpose of the linking study was to equate standards from Grades 3, 5 and 7 of CMT4 with Grades 4, 6 and 8 of CMT3 in order to maintain the same performance standards for NCLB purposes. The equating not only adjusted for differences in difficulty between CMT3 and CMT4, but also for differences due to the change in the testing window. The CMT4 standards for Grades 4, 6 and 8 were then derived through interpolation and extrapolation procedures by examining the previously established trends in standards across Grades 3, 5 and 7.

The Standards Review Panel assisted in the identification of acceptable and valid test standards for each content area of CMT4. Committee membership was broadly constituted to be representative of the state and to include a variety of stakeholders. The CMT Standards Review Panel was given an overview of the CMT3 including the content covered, score weighting, and reporting conventions. Differences between CMT3 and CMT4 were also discussed. Copies of the complete CMT4 were available for reference. In addition, the procedures for carrying CMT3 standards over to CMT4 were presented in detail so that committee members would better understand their role in the process. They reviewed data from several related analyses and discussed implications from both an educational perspective and a technical perspective. They were asked particularly to provide input in the following three areas:

- Review results from the intergenerational linking procedure to ensure that standards are reasonable and appropriate across grades and content areas,

- Provide subjective input about the effect of changing testing from fall to spring and

losing instructional time in March through June for CMT4 examinees, so that the CMT3 standards
are maintained across the two generations of testing, and

- Provide subjective input about the reasonableness and consistency of the standards for all grades and content areas.

Appendix C presents the projected percentages of students who will score at or above the CMT4 standards along with the comparative data from the 2004 CMT3 administration. Based on the best data that were available at the time the standards panel was convened, we are able to **estimate** the scale score cut points that correspond to the projected percentages. The estimated scale score cut scores for CMT4 along with those used with CMT3 are presented in Appendix D. When the data file from the 2006 CMT4 administration is complete and accurate, we will be able to determine the exact scale score cut points. The same scale score cut points established for the 2006 administration will be applied in all future CMT4 administrations.

Prepared by: _____
William Congero, Director
Office of Student Assessment

Reviewed by: _____
Barbara Q. Beaudin, Chief
Bureau of Research, Evaluation
and Student Assessment

Approved by: _____
Frances Rabinowitz, Associate Commissioner
Division of Teaching, Learning and Assessment

June 28, 2006

APPENDIX A

Standards Review Panel Members

Name	Current Position	Experience instructing ELLs	Experience instructing students with disabilities	Highest Degree
deNaclerio, Marlene	Assistant Principal New Haven	Yes	Yes	PhD
Green, Cecilia	Principal Hartford	Yes	Yes	Masters
Greenlaw, Mary	Director of Curriculum Suffield	Yes	Yes	EdD
Larson, Alvin	Meriden Board of Education	No	No	
McCain, Robert	Principal Norwalk	No	Yes	BS
Onofrio, Joseph	Director of Pupil & Professional Services Old Saybrook	Yes	Yes	
Skowronski, Mary	Assistant Principal Westport	No	Yes	Masters
Swaminathan, Hariharan	Professor UCONN	No	No	PhD
Tang, Huixing	eMetric LLC San Antonio, Texas	No	No	PhD
Wright, Joy	Assistant Principal East Hartford	No	No	BA

APPENDIX B

Technical Advisory Committee (TAC) Members

Dr. Peter Behuniak, Professor
University of Connecticut
Measurement, Evaluation, and Assessment Program
Department of Educational Psychology
NEAG School of Education

Dr. Robert Linn, Professor Emeritas
University of Colorado
Co-Director, National Center for Research on Evaluation, Standards, and Student Testing and former president of the American Educational Research Association and the National Council on Measurement in Education

Dr. William Mehrens, Professor Emeritas
Michigan State University

Dr. Huixing Tang, President
eMetric LLC

Dr. Joseph Ryan, Interim Dean
College of Teacher Education and Leadership
Arizona State University West

Dr. Hariharan Swaminathan, Department Chair
University of Connecticut
Measurement, Evaluation, and Assessment Program
Department of Educational Psychology
NEAG School of Education

APPENDIX C

Mathematics
Estimated Percentages At/Above Achievement Levels

Grade 4 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	89	79	57	19
Grade 3 - CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	88	78	56	21

Grade 4 - CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	89	79	58	21

Grade 6 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	90	80	61	21
Grade 5 - CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	90	80	59	21

Grade 6 - CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	90	79	58	23

Grade 8 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	89	76	56	19
Grade 7 - CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	89	77	56	24

Grade 8 - CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	89	78	57	23

APPENDIX C
(continued)

Reading
Estimated Percentages At/Above Achievement Levels

Grade 4 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	78	67	53	15
Grade 3 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	80	69	54	17

Grade 4 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	81	71	58	17

Grade 6 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	80	72	60	16
Grade 5 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	81	73	61	18

Grade 6 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	83	75	64	21

Grade 8 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	83	75	65	24
Grade 7 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	84	76	67	23

Grade 8 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	84	76	67	23

APPENDIX C
(continued)

Writing
Estimated Percentages At/Above Achievement Levels

Grade 4 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	96	81	63	21
Grade 3 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	93	82	61	22

Grade 4 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	94	84	64	23

Grade 6 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	92	82	61	21
Grade 5 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	95	85	65	23

Grade 6 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	84	83	63	22

Grade 8 – CMT3 Results				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2004	90	80	61	21
Grade 7 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	93	81	60	22

Grade 8 – CMT4 Estimated				
Year	% at/above basic	% at/above proficiency	% at/above goal	% at/above advanced
2006	93	82	62	22

APPENDIX D

CMT3 Achievement Levels
Scale Score Ranges

	Grade 4	Grade 6	Grade 8
Mathematics			
Below Basic	100-186	100-190	100-190
Basic	187-209	191-214	191-215
Proficient	210-241	215-244	216-245
Goal	242-287	245-292	246-289
Advanced	288-400	293-400	290-400
Reading			
Below Basic	100-208	100-207	100-202
Basic	209-224	208-221	203-217
Proficient	225-242	222-238	218-234
Goal	243-287	239-294	235-288
Advanced	288-400	295-400	289-400
Writing			
Below Basic	100-187	100-185	100-191
Basic	188-213	186-208	192-212
Proficient	214-239	209-237	213-238
Goal	240-294	238-283	239-283
Advanced	295-400	284-400	284-400

CMT4 Achievement Levels (Estimated)
Scale Score Ranges

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Mathematics						
Below Basic	100-186	100-193	100-190	100-189	100-190	100-190
Basic	187-209	194-214	191-214	190-213	191-215	191-213
Proficient	210-241	215-244	215-244	214-243	216-245	214-244
Goal	242-287	245-289	245-292	244-284	246-289	245-286
Advanced	288-400	290-400	293-400	285-400	290-400	287-400
Reading						
Below Basic	100-201	100-212	100-202	100-206	100-193	100-205
Basic	202-216	213-226	203-214	207-219	194-207	206-218
Proficient	217-234	227-243	215-229	220-235	208-221	219-231
Goal	235-278	244-294	230-278	236-288	222-272	232-281
Advanced	279-400	295-400	279-400	289-400	273-400	282-400
Writing						
Below Basic	100-187	100-184	100-185	100-184	100-191	100-188
Basic	188-211	185-208	186-208	185-210	192-212	189-211
Proficient	212-239	209-236	209-237	211-236	213-235	212-235
Goal	240-286	237-280	238-283	237-283	236-269	236-282
Advanced	287-400	281-400	284-400	284-400	270-400	283-400