Program Report for the Preparation of Secondary Mathematics Teachers National Council of Teachers of Mathematics (NCTM)

NATIONAL COUNCIL FOR ACCREDITATION OF TEACHER EDUCATION

C O V E R S H E E T

Institution: Keene State College **State:** New Hampshire

Date submitted _____

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Program documented in this report:

Name of institution's program BA in Mathematics: Secondary Teaching Option
Grade levels for which candidates are being prepared grades 7 - 12
Degree or award level) Bachelors of Arts in Mathematics

Is this program offered at more than one site? □ **Yes** **No**

If yes, list the sites at which the program is offered _____

_____

Title of the state license for which candidates are prepared

_____

Program report status:

Initial Review

- ¤ **Response to a Not Recognized Decision**
- ¤ **Response to National Recognition With Conditions**
- ¤ **Response to a Deferred Decision**

State licensure requirement for national recognition:

NCATE requires 80% of the program completers who have taken the test to pass the applicable state licensure test for the content field, if the state has a testing requirement. Test information and data must be reported in Section III. Does your state require such a test?

Yes □ **No**

GENERAL DIRECTIONS

To complete a program report, institutions must provide evidence of meeting NCTM standards based on data from 6-8 assessments. In their entirety, the assessments and data required for submission in this report will answer the following questions:

- Have candidates mastered the necessary knowledge for the subjects they will teach or the jobs they will perform?
- Do candidates meet state licensure requirements?
- Do candidates understand teaching and learning and can they plan their teaching or fulfill other professional education responsibilities?
- Can candidates apply their knowledge in classrooms and schools?
- Do candidates focus on student learning?

To that end, the program report form includes the following sections:

Section I. Context *(6-page maximum narrative, plus three attachments not to exceed 5 pages each)*
Provide general information on the program as specified by the directions for this section.

Section II. List of Assessments *(completion of chart)*
Using the chart included in this report form, indicate the name, type, and administration point for each of the 6-8 assessments documented in this report. (Note that Section IV of the report form lists examples of assessments that may be appropriate for each type of assessment that must be documented in the program report.)

Section III. Relationship of Assessments to Standards *(completion of chart)*
Using the chart included in this report form, indicate which of the assessments listed in Section II provide evidence of meeting specific program standards.

Section IV. Evidence for Meeting Standards *(attachments of the assessment, scoring guide/criteria, and data tables plus a 2-page maximum narrative for each of the 6-8 assessments)*
Attach assessment documentation plus a narrative statement for each assessment as specified by the directions for this section.

Section V. Use of Assessment Results to Improve Candidate and Program Performance *(3-page maximum narrative)*
Describe how faculty are using the data from assessments to improve candidate performance and the program, as it relates to content knowledge; pedagogical and professional knowledge, skills, and dispositions; and student learning.

Section VI. For Revised Reports Only
Describe what changes or additions have been made in the report to address the standards that were not met in the original submission. List the sections of the report you are resubmitting and the changes that have been made. Specific instructions for preparing a revised report are available on the NCATE web site at http://www.ncate.org/institutions/process.asp?ch=4.

Format and page limits for narrative sections and attachments:
Narrative: Sections I, IV, and V include narrative sections based on specific directions and page limits. Page limits are based on single-spaced text using 12-point type.
Attachments: Sections I and IV include attachments. In general, attachments should be no longer than the equivalent of five text pages.

- NCATE staff may require institutions to revise reports that do not follow directions on format and page limits. In addition, hyperlinks imbedded in report documentation will not be read by reviewers and cannot be used as a means of providing additional information.

Program report information on the web: http://www.ncate.org/institutions/process.asp?ch=10.
To download report forms: http://www.ncate.org/institutions/programStandards.asp?ch=4.

Specific Instructions for NCTM (Secondary)

Who Should Submit Program Reports:

Programs must submit reports for initial programs in middle school or secondary mathematics education. A report for elementary education must be prepared only if the program is specifically designed for the preparation of K-4 or 5-8 teachers of departmentalized programs. Self-contained elementary classroom teacher programs should respond to ACEI guidelines.

NCTM National Recognition Decision Rules:

There is no specific number of standards that must be met for National Recognition. However, 80% of all indicators must be addressed and at least one indicator must be addressed for each standard. Indicators can be found on the NCTM web site at http://www.nctm.org/about/ncate/

Additional Assessment Types (beyond the first 5 required types) required by NCTM:

None

Other specific information required by NCTM only:

NCTM expects programs to provide information in Section I to adequately demonstrate that the program meets Indicators 16.1 and 16.2.

Will NCTM accept grades as one of the assessments?

Yes, but if grades are used as an assessment or included in an assessment, the program report must provide information on the content-specific criteria for those grades and provide a clear rationale for how these grades align with specific NCTM standards and indicators.

Other resources are available on the NCTM web site at:
http://www.nctm.org/about/ncate/

SECTION I—CONTEXT

Provide the following contextual information:

1. Description of any state or institutional policies that may influence the application of NCTM standards.
2. Description of the field and clinical experiences required for the program, including the number of hours for early field experiences and the number of hours/weeks for student teaching or internships.
3. Description of the criteria for admission, retention, and exit from the program, including required GPAs and minimum grade requirements for the content courses accepted by the program.
4. Description of the relationship[1] of the program to the unit's conceptual framework.
5. Indication of whether the program has a unique set of program assessments and their relationship of the program's assessments to the unit's assessment system[2].

Attach the following contextual information:

1. A program of study that outlines the courses and experiences required for candidates to complete the program. The program of study must include course titles. (This information may be provided as an attachment from the college catalog or as a student advisement sheet.)
2. Chart with the number of candidates and completers (Attachment A at end of form).
3. Chart on program faculty expertise and experience (Attachment B at end of form).

(response limited to 6 pages, not including attachments)

[1] The response should describe the program's conceptual framework and indicate how it reflects the unit's conceptual framework

[2] This response should clarify how the key assessments used in the program are derived from or informed by the assessment system that the unit will address under NCATE Standard 2.

SECTION II— LIST OF ASSESSMENTS

In this section, list the 6-8 assessments that are being submitted as evidence for meeting the NCTM standards. All programs must provide a minimum of six assessments. If your state does not require a state licensure test in the content area, you must substitute an assessment that documents candidate attainment of content knowledge in #1 below. For each assessment, indicate the type or form of the assessment and when it is administered in the program.

Name of Assessment[3]	Type or Form of Assessment[4]	When the Assessment Is Administered[5]
Praxis II: Mathematics (0061)	State Licensure Examination	Prior to graduation and initial certification
Mathematics Department Content Knowledge Portfolio	Portfolio with Evaluation Rubric used by Mathematics Faculty	Two times during the candidate's program (End of year 2 and year 4)
Mathematics Department Pedagogical Knowledge and Field Experience Portfolio	Portfolio with Evaluation Rubric used by Mathematics Faculty	Completion of Student Teaching
Student Teaching Clinical Practice Observation Form	Evaluation Rubric used by Cooperating Teacher and College Supervisor	Four times during Student Teaching
Education Department Student Teaching Portfolio	Portfolio with Evaluation Rubric used by Secondary Education Faculty	Completion of Student Teaching
Mathematics Department Unit Plan Portfolio	Portfolio with Evaluation Rubric used by Mathematics Faculty	Completion of Student Teaching

[3] Identify assessment by title used in the program; refer to Section IV for further information on appropriate assessment to include.
[4] Identify the type of assessment (e.g., essay, case study, project, comprehensive exam, reflection, state licensure test, portfolio).
[5] Indicate the point in the program when the assessment is administered (e.g., admission to the program, admission to student teaching/internship, required courses [specify course title and numbers], or completion of the program).

SECTION III—RELATIONSHIP OF ASSESSMENT TO STANDARDS

For each NCTM standard on the chart below, identify the assessment(s) in Section II that address the standard. One assessment may apply to multiple NCTM standards.

NCTM STANDARD	APPLICABLE ASSESSMENTS FROM SECTION II
Mathematics Preparation for All Mathematics Teacher Candidates	
1. Knowledge of Problem Solving. Candidates know, understand and apply the process of mathematical problem solving. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
2. Knowledge of Reasoning and Proof. Candidates reason, construct, and evaluate mathematical arguments and develop an appreciation for mathematical rigor and inquiry. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	☐#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
3. Knowledge of Mathematical Communication. Candidates communicate their mathematical thinking orally and in writing to peers, faculty and others. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	☐#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
4. Knowledge of Mathematical Connections. Candidates recognize, use, and make connections between and among mathematical ideas and in contexts outside mathematics to build mathematical understanding. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
5. Knowledge of Mathematical Representation. Candidates use varied representations of mathematical ideas to support and deepen students' mathematical understanding. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
6. Knowledge of Technology. Candidates embrace technology as an essential tool for teaching and learning mathematics. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	☐#1 #2 #3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8

NCTM STANDARD	APPLICABLE ASSESSMENTS FROM SECTION II
7. Dispositions. Candidates support a positive disposition toward mathematical processes and mathematical learning. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	☐#1 ☐#2 #3 #4 #5 #6 ☐#7 ☐#8
8. Knowledge of Mathematics Pedagogy. Candidates possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	☐#1 ☐#2 #3 #4 #5 #6 ☐#7 ☐#8
Mathematics Preparation for Secondary Level Mathematics Teacher Candidates	
9. Knowledge of Number and Operations. Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and the meaning of operations. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 #3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
10. Knowledge of Different Perspectives on Algebra. Candidates emphasize relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
11. Knowledge of Geometries. Candidates use spatial visualization and geometric modeling to explore and analyze geometric shapes, structures, and their properties. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
12. Knowledge of Calculus. Candidates demonstrate a conceptual understanding of limit, continuity, differentiation, and integration and a thorough background in techniques and application of the calculus. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
13. Knowledge of Discrete Mathematics. Candidates apply the fundamental ideas of discrete mathematics in the formulation and solution of problems. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
14. Knowledge of Data Analysis, Statistics, and Probability. Candidates demonstrate an understanding of concepts and practices related to data analysis, statistics, and probability. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8
15. Knowledge of Measurement. Candidates apply and use measurement concepts and tools. [Indicators are listed at http://www.nctm.org/about/ncate/secondary_indic.htm]	#1 #2 ☐#3 ☐#4 ☐#5 ☐#6 ☐#7 ☐#8

NCTM STANDARD	APPLICABLE ASSESSMENTS FROM SECTION II
16.1 Field-Based Experiences Engage in a sequence of planned opportunities prior to student teaching that includes observing and participating secondary mathematics classrooms under the supervision of experienced and highly qualified teachers.	Information should be provided in Section I (Context) to address this indicator.
16.2 Field-Based Experiences Experience full-time student teaching secondary-level mathematics that is supervised by an experienced and highly qualified teacher and a university or college supervisor with elementary mathematics teaching experience.	Information should be provided in Section I (Context) to address this indicator.
16.3 Field-Based Experiences Demonstrate the ability to increase students' knowledge of mathematics.	☐#1 ☐#2 #3 #4 ☐#5 #6 ☐#7 ☐#8

SECTION IV—EVIDENCE FOR MEETING STANDARDS

DIRECTIONS: The 6-8 key assessments listed in Section II must be documented and discussed in Section IV. The assessments must be those that all candidates in the program are required to complete and should be used by the program to determine candidate proficiencies as expected in the program standards. In the description of each assessment below, the SPA has identified potential assessments that would be appropriate. Assessments have been organized into the following three areas that are addressed in NCATE's unit standard 1:

- Content knowledge[6]
- Pedagogical and professional knowledge, skills and dispositions
- Focus on student learning

For each assessment, the evidence for meeting standards should include the following information:

1. A brief description of the assessment and its use in the program (one sentence may be sufficient);
2. A description of how this assessment specifically aligns with the standards it is cited for in Section III.
3. A brief analysis of the data findings;
4. An interpretation of how that data provides evidence for meeting standards; and
5. Attachment of assessment documentation, including[7]:
   (a) the assessment tool or description of the assignment;
   (b) the scoring guide for the assessment; and
   (c) candidate data derived from the assessment.

*The narrative section for **each** assessment (1-4 above) is limited to two text pages. It is preferred that each attachment for a specific assessment (5a-c above) be limited to the equivalent of five text pages, however in some cases assessment instruments or scoring guides may go beyond 5 pages.*

#1 (Required)-CONTENT KNOWLEDGE: Data from licensure tests or professional examinations of content knowledge. NCTM standards addressed in this entry could include but are not limited to Standards 1-7 and 9-15. If your state does not require licensure tests or professional examinations in the content area, data from another assessment must be presented to document candidate attainment of content knowledge.

Provide assessment information (items 1-5) as outlined in the directions for Section IV

[6] In some disciplines, content knowledge may include or be inextricable from professional knowledge. If this is the case, assessments that combine content and professional knowledge may be considered "content knowledge" assessments for the purpose of this report.

[7] All three components of the assessment – as identified in 5a-c – must be attached, with the following exceptions: (a) the assessment tool and scoring guide are not required for reporting state licensure data, and (b) for some assessments, data may not yet be available.

#2 (Required)-CONTENT KNOWLEDGE: Assessment of content knowledge in mathematics. NCTM standards addressed in this entry could include but are not limited to Standards 1-7 AND 9-15. Examples of assessments include comprehensive examinations, GPAs or grades,[8] and portfolio tasks.[9]

Provide assessment information (items 1-5) as outlined in the directions for Section IV

#3 (Required)-PEDAGOGICAL AND PROFESSIONAL KNOWLEDGE, SKILLS, AND DISPOSITIONS: Assessment that demonstrates candidates can effectively plan classroom-based instruction. NCTM standards that could be addressed in this assessment include but are not limited to Standard 8. Examples of assessments include the evaluation of candidates' abilities to develop lesson or unit plans, individualized educational plans, needs assessments, or intervention plans.

Provide assessment information (items 1-5) as outlined in the directions for Section IV

#4 (Required)-PEDAGOGICAL AND PROFESSIONAL KNOWLEDGE, SKILLS, AND DISPOSITIONS: Assessment that demonstrates candidates' knowledge, skills, and dispositions are applied effectively in practice. NCTM standards that could be addressed in this assessment include but are not limited to Standard 8. The assessment instrument used in student teaching or an internship should be submitted.

Provide assessment information (items 1-5) as outlined in the directions for Section IV

#5 (Required)-EFFECTS ON STUDENT LEARNING: Assessment that demonstrates candidate effects on student learning. NCTM standards that could be addressed in this assessment include but are not limited to Standard 8. Examples of assessments include those based on student work samples, portfolio tasks, case studies, follow-up studies, and employer surveys.

Provide assessment information (items 1-5) as outlined in the directions for Section IV

#6 (Required): Additional assessment that addresses NCTM standards. Examples of assessments include evaluations of field experiences, case studies, portfolio tasks, licensure tests not reported in #1, and follow-up studies.

Provide assessment information (items 1-5) as outlined in the directions for Section IV

[8] If grades are used as the assessment or included in the assessment, provide information on the criteria for those grades and describe how they align with the specialty standards

[9] For program review purposes, there are two ways to list a portfolio as an assessment. In some programs a portfolio is considered a single assessment and scoring criteria (usually rubrics) have been developed for the contents of the portfolio as a whole. In this instance, the portfolio would be considered a single assessment. However, in many programs a portfolio is a collection of candidate work—and the artifacts included are discrete items. In this case, some of the artifacts included in the portfolio may be considered individual assessments.

#7 (Optional): Additional assessment that addresses NCTM standards. Examples of assessments include evaluations of field experiences, case studies, portfolio tasks, licensure tests not reported in #1, and follow-up studies.

Provide assessment information (items 1-5) as outlined in the directions for Section IV

#8 (Optional): Additional assessment that addresses NCTM standards. Examples of assessments include evaluations of field experiences, case studies, portfolio tasks, licensure tests not reported in #1, and follow-up studies.

Provide assessment information (items 1-5) as outlined in the directions for Section IV

SECTION V—USE OF ASSESSMENT RESULTS TO IMPROVE CANDIDATE AND PROGRAM PERFORMANCE

Evidence must be presented in this section that assessment results have been analyzed and have been or will be used to improve candidate performance and strengthen the program. This description should not link improvements to individual assessments but, rather, it should summarize principal findings from the evidence, the faculty's interpretation of those findings, and changes made in (or planned for) the program as a result. Describe the steps program faculty has taken to use information from assessments for improvement of both candidate performance and the program. **This information should be organized around (1) content knowledge, (2) professional and pedagogical knowledge, skill, and dispositions, and (3) student learning.**

(response limited to 3 pages)

SECTION VI—For Revised Reports Only

Describe what changes or additions have been made in the report to address the standards that were not met in the original submission. List the sections of the report you are resubmitting and the changes that have been made. Specific instructions for preparing a revised report are available on the NCATE web site at http://www.ncate.org/institutions/process.asp?ch=4

ATTACHMENT A

Candidate Information

Directions: Provide three years of data on candidates enrolled in the program and completing the program, beginning with the most recent academic year for which numbers have been tabulated. Report the data separately for the levels/tracks (e.g., baccalaureate, post-baccalaureate, alternate routes, master's, doctorate) being addressed in this report. Data must also be reported separately for programs offered at multiple sites. Update academic years (column 1) as appropriate for your data span. Create additional tables as necessary.

Program: Mathematics - Secondary Teaching Option		
Academic Year	**# of Candidates Enrolled in the Program**	**# of Program Completers[10]**
2004 - 2005	15	4
2003 - 2004	11	8
2002 - 2003	18	7

Program:		
Academic Year	**# of Candidates Enrolled in the Program**	**# of Program Completers**

Program:		
Academic Year	**# of Candidates Enrolled in the Program**	**# of Program Completers**

[10] NCATE uses the Title II definition for *program completers*. Program completers are persons who have met all the requirements of a state-approved teacher preparation program. Program completers include all those who are documented as having met such requirements. Documentation may take the form of a degree, institutional certificate, program credential, transcript, or other written proof of having met the program's requirements.

ATTACHMENT B

Faculty Information

Directions: Complete the following information for each faculty member responsible for professional coursework, clinical supervision, or administration in this program.

Faculty Member Name	Highest Degree, Field, & University	Assignment: Indicate the role of the faculty member	Faculty Rank	Tenure Track (Yes/ No)	Scholarship, Leadership in Professional Associations, and Service: List up to 3 major contributions in the past 3 years	Teaching or other professional experience in P-12 schools
Beverly J. Ferrucci	• EdD., Mathematics Education, Boston University • Ph.D. Testing, Evaluation, & Measurement, Boston College	Mathematics Education Courses	Professor	Yes	• President, New England Mathematics Teachers • KSC Faculty Award for Distinction in Research and College • Editor, *New England Mathematics Journal* • "Enhancing Critical Thinking with Manipulatives and Activities", NCTM Regional, Hartford, CT, 2005 • "Triangles and Their Special Points: Cabri Jr. for the Middle School Grades", NCTM Annual, Anaheim, CA, 2005 • "Exploring P1-P6 Maths with Hands-on Activities", Singapore Mathematics	• K-12 Mathematics/Computer District wide Coordinator • High School Math Department Chair & Teacher • Middle School Math Department Chair & Teacher • Inservice Training for Singapore Teachers

					Teachers Association, Keynote Speaker, National Mathematics Teachers' Meeting, Singapore, 2005. • Comparative Study of Arithmetic Problems in Singaporean and American Mathematics Textbooks (2006). In F.K.S. Leung, K.-D. Graf, and F.J. Lopez-Real, (Eds), *Mathematics Education in Different Cultural Traditions, A Comparative Study of East Asia and the West, The 13th International Commission on Mathematical Instruction Study*(pp. 213-226). NY, NY: Springer. • Technology-Active Mathematical Modelling (2003). *International Journal of Mathematical Education in Science and Technology* 34, 5, pp. 663-670. • A Modeling Approach for Enhancing Problem Solving in Middle Grades (2003). *Mathematics Teaching in the Middle School*, 8(9), pp. 470-75	

Anne Nichols	M.Ed., Mathematics, Plymouth State University	Student Teaching Supervisor	Adjunct Professor	No	• Workshop presenter on mentoring for Alternative IV and V • Director of Curriculum Coordinating Team for the district wide development of a cohesive k-12 curriculum • Director of workshops and in-service programs for the school system • Curriculum and Assessment Committee for the school evaluation • Chair of Administrative Committee for school evaluation	• High School Math Department Chair • Secondary Math Teacher • K-12 Curriculum Team Coordinator Team for School District