Assessment 7 (optional): Additional assessment that addresses NAEYC initial teacher preparation standards
Section IV – Evidence for Meeting Standards
Math Unit

1. Description of the assessment and use in the program

The Math Unit is a curriculum project that demonstrates our candidates' ability to observe and assess children's development and learning, provide developmentally appropriate application of a math concept, and understand the role of mathematics education in the early childhood profession. Candidates research an appropriate math topic and the developmental characteristics and needs of the children they will teach, plan and implement a series of three sequentially related learning experiences, assess and document children's learning, write a self-reflection paper on each learning experience and on the entire unit, and present the project to peers. Candidates apply national (NCTM) and state curriculum standards to align instructional outcomes for this project. Candidates collaborate with cooperating teachers and the supervisor prior to teaching this unit. This assessment is completed during the Early Childhood Methods course in the K-3 field placement site.

2. A description of how this assessment specifically aligns with the standards it is cited for in Section III

This assessment focuses on the following four standards:

Standard 1: *Promoting Child Development and Learning* is evident due to candidates' research on the mathematics content and the characteristics, needs, and multiple influences on development and learning of the children they are teaching. Candidates design and implement three learning experiences and utilize age appropriate resources to challenge and support learning in this content area.

Standard 3: *Observing, Documenting and Assessing to Support Young Children and Families* is evident in our candidates' ability to successfully create an age appropriate assessment plan and document learning using appropriate tools and approaches. Candidates document and analyze children's learning through photos, checklists, work samples and anecdotal records.

Standard 4: *Teaching and Learning* is evident in our candidates' ability to plan how children will be guided and supported throughout this unit. Candidates research background knowledge of mathematics content, review their child development content knowledge, and utilize math manipulatives effectively to promote meaningful learning experiences.

Standard 5: *Becoming a Professional* is evident in this assignment by our candidates' ability to reflect on their practice after teaching each learning experience, consider best practices throughout the planning and implementation process, and apply NCTM and

state standards to unit outcomes. In addition, they demonstrate their growing ability to be advocates in planning meaningful math curriculum, collaborate with professionals, and present the entire project in a workshop format to peers.

3. A brief analysis of the data findings.

Our findings determine that 89% of our candidates meet or exceed the expectations of this assignment over the last three years. Candidates who need improvement have a basic understanding of planning age appropriate mathematical experiences with young children, but may not have the ability to organize all components of this assignment successfully, especially as related to determining the related national standards and researching the specific concept in order to design age appropriate learning experiences. As noted in Assessment #3, Learning Experience Plans, candidates are typically challenged with aligning objectives with assessment and utilizing appropriate assessment strategies. Candidates scoring below "meets expectations" are expected to utilize the KSC Writing Center for assistance with writing skills; the course instructor also meets with these candidates as they revise their work to improve the alignment of goals, objectives and assessment strategies with the appropriate NCTM standards.

4. Interpretation of how data provides evidence that NAEYC standards have been met.

Our findings demonstrate that candidates successfully meet Standards 1, 3, 4 and 5; key elements in this success include collaborating with the cooperating teacher in the selection of an appropriate math topic, receiving feedback from professionals prior to teaching, and the educational resources provided by the EC Methods course. Our concern is with the 11% of candidates who need improvement. This unit is the first our candidates design *and* implement in the Teacher Education Program; some candidates need time to learn this new skill. We will continue to work toward supporting them to understand the scope of the project and to practice the skill of curriculum development. The data from the Science Investigation Unit (Assessment #6), which follows the Math Unit in the sequence of the EC Methods course, demonstrate progress in candidates' ability to plan and implement developmentally appropriate units. The instructor will now teach content on aligning assessment with objectives earlier in the semester. Additionally, candidates in this course will now be required to purchase the NAEYC text *Developmental Screening in Early Childhood, A Guide (5th edition)* by Samuel J. Meisels and Sally Atkins-Burnett.

5. Assessment Documentation

5a. Assessment instrument

Math Unit
Early Childhood Methods

This assignment is designed to help you expand your own knowledge of mathematical concepts and to gain a deeper insight into children's construction of math knowledge so that you can facilitate your students' math learning in meaningful and appropriate ways. This project will be implemented in your K-3 placement.

The NAEYC standards addressed in this assignment are:
Standard 1: Promoting Child Development and Learning
Standard 3: Observing, Documenting, and Assessing to Support Young Children and Families
Standard 4: Teaching and Learning
Standard 5: Becoming a Professional

Directions

Step 1 **Choose** one math concept to study after speaking with your cooperating teacher about what math concepts and skills are being taught in your field placement classroom. Observe a math session, if possible. Refer to the Copley text for ideas as well and to class notes from the math workshop.

Step 2 **Research** the concept as an adult. You should make use of your Math 171 text as well as the Copley text. In addition, research adult and child resources at the CML, Keene Public Library and on the web.

Write up your findings in about two pages including the following:
• A brief introduction – Why did you choose this topic and how does it fit with your current placement?

• A summary of your research – Explain in your own words what you learned about the math concept. Include components or parts of the concept, possibly some historical facts, your math concept in relation to real life, and a brief description of math skills needed to be successful with this concept and how the concept is taught throughout the K-3 grades. Be sure to cite and document your sources of information.

Step 3 **Design** curriculum materials to teach the concept to the children in your field placement. This is to be done in the form of at least three **sequentially related activities**, one of which should to be a teacher-made game or activity. Activities and materials are to be neat, colorful and appealing to young children.

Write a detailed description of each activity using the Learning Experience Plan format. Be sure to include an extension plan detailing how you plan to support children to practice or enrich the concept for each lesson (i.e. a children's book, an art or movement activity, a song, etc.).

Step 4 **Implement** the activities in your classroom for the dual purpose of bringing added resources to your placement as well as observing children engaged in math curriculum.

Step 5 **Assess** children's math learning from the above activities. Be sure to ask questions like, "How did you get the answer?" or "How did you know that?" as well as needed guiding questions, depending on your specific activity. Note possible misconceptions and/or error patterns. (i.e. does the child think the rectangle is a square, or does the child count 28, 29, twenty-ten?) What do these misconceptions tell you about the child's thinking and understanding of the mathematical concept? Collect work samples of your activities. Include this documentation in your LEP reflections.

Step 6 **Present** your activities and math concept understanding to your peers as indicated in the course syllabus. The presentation will include a description of the project and all activities and a time to share what children did, including their responses and work samples. Be prepared to answer questions from the audience. Think of this as presenting an in-service workshop to your colleagues.

Step 7 **Write** a final reflection paper after the presentation. In at least two typed pages describe (1) how your activities relate to NCTM Standards, (2) what you have learned about children's construction of math knowledge and your assessment of their understanding, (3) the value of your activities and how you might modify them, and (4) how this process of researching a math concept, designing activities, and presenting to your peers has helped your own understanding of the math concept. This paper is to be typed and will include an **annotated bibliography** (APA format) of at least three adult and three children's resources you used.

Schedule:

Discuss project in class
Select concept/discuss with teacher
Math ideas to Deirdre
Draft Math LEPs and Research DUE
Implement math learning experiences
Math Presentation
Final project – includes write-up of your math research, your completed LEPs, including reflections, and your final reflection paper

5b. Scoring guide: Grading sheet

Math Unit Grading Sheet
EC Methods

Name: Concept (step 1):

Math Concept Research (step 2) _____/ 10 points
(NAEYC Standard 1 and 4)
- Introduction
- Summary of research
- Sources of information
- Length approximately 2 pages

3 sequential lessons on topic (step 3) _____/ 30 points
(NAEYC Standard 1 and 4)
- 3 LEPs
- Teacher-made material
- Related LEP extensions

Activity implementation (steps 4 & 5) _____/ 30 points
(NAEYC Standard 3 and 4)
- 3 LEP Reflections
- Assessment of children's math learning
- Work samples

Presentation of math activities in class (step 6) _____/ 10 points
(NAEYC Standard 1, 3, 4, and 5)
- Identify the math concept and briefly discuss NCTM standards.
- Present one activity to your peers and briefly describe the other activities/lessons you did in this unit.
- Describe how children participated and include their responses and work samples.
- Discuss what you learned about the math concept and your role as a teacher.
- Provide bibliography for participants.

Final reflection paper (step 7) _____/ 15 points
(NAEYC Standard 3 and 5)
- Connections to NCTM standards
- What you learned about children learning math
- What you learned from this process
- Length approximately 2 pages

Demonstrate evidence of research _____/ 5 points
(NAEYC Standard 5)
- 3 teacher resources
- 3 children's resources

APA format used and grammar, spelling, and mechanics acceptable

5b. Scoring guide (continued): Rubric

	Needs Improvement	Meets Expectations	Exceeds Expectations
STANDARD 1. PROMOTING CHILD DEVELOPMENT AND LEARNING **1a.** Knowing and understanding young children's characteristics and needs **1b.** Knowing and understanding the multiple influences on development and learning **1c.** Using developmental knowledge to create healthy, respectful, supportive, and challenging learning environments	Math content not thoroughly researched or explained; background knowledge of developmental needs of children not clearly explained. Plans are confusing, and/or do not provide appropriate objectives or adaptations for the developmental level.	Background knowledge is clearly expressed and includes both math content and child development knowledge. Objectives are age appropriate and accurate. Plan is coherent and based on DAP principles. Appropriate adaptations to support student learning are included.	Background knowledge is detailed and includes math content and knowledge of child development. Objectives are age appropriate and accurate based on the characteristics and needs of children in the class. Adaptations for student learning meet the needs of the specific children in the class.
	Needs Improvement	Meets Expectations	Exceeds Expectations
STANDARD 3. OBSERVING, DOCUMENTING, AND ASSESSING TO SUPPORT YOUNG CHILDREN AND FAMILIES **3a.** Understanding the goals, benefits, and uses of assessment **3b.** Knowing about and using observation,	Assessment strategies don't clearly align with objectives. Unit includes 1-2 items as documentation, but does not adequately explain them. Limited or no indication of consultation with cooperating teacher. Brief letter to families included.	Assessments align with objectives, several assessment strategies are identified and documentation is described. Evidence of documentation is presented. Consultation with cooperating teacher is evident in planning, goals, assessments, and documentation.	Assessments align with all objectives and diverse assessment strategies are identified. Documentation is provided through diverse methods, and includes description and analysis of student learning. Clear evidence of consultation with cooperating teacher. Multiple examples of

documentation and other appropriate assessment tools and approaches **3c.** Understanding and practicing responsible assessment **3d.** Knowing about assessment partnerships with families and other professionals		Evidence of family communication included (e.g. letters, posters, notes home, family involvement, etc.)	family communication and involvement included.
	Needs Improvement	Meets Expectations	Exceeds Expectations
STANDARD 4. TEACHING AND LEARNING **4a.** Knowing, understanding, and using positive relationships and supportive interactions **4b.** Knowing, understanding, and using effective approaches, strategies, and tools for early education **4c.** Knowing and understanding the importance, central concepts, inquiry tools, and structures of content areas or academic disciplines **4d.** Using own knowledge and other resources to design,	LEPs represent one approach to learning but don't clearly build on each other in a sequential fashion. Concept research and understanding of the mathematics appears limited; standards are not clearly referenced; and bibliography contains fewer than 3 children's and 3 adult resources. Reflection is descriptive but does not include analysis or areas for improvement. Reactive techniques for child guidance are listed. Limited repertoire of adaptations or extensions included.	LEPs are coherently designed and linked to each other, principles of DAP are clearly utilized and age appropriate teaching methodology is evident. Accurate knowledge of mathematics is apparent through research and explanation; national standards (NCTM) are referenced; bibliography includes 3 children's and 3 adult resources. Reflection focuses on successes and areas for improvement for each experience. Reactive and proactive techniques for child guidance listed, and several possible adaptations are included.	LEPs are coherently designed and sequentially developed; principles of DAP are utilized and appropriate methodology is detailed in outline of each experience. Plans provide opportunity for students to utilize teacher-made materials and manipulatives, extensions foster practice and provide enrichment. Research and explanation of mathematics content is very detailed and shows an advanced understanding of the math content; district, state and national standards are discussed and clear evidence of NCTM standards is included.

implement, and evaluate meaningful, challenging curriculum to promote positive outcomes		Extension plans provide next steps in unit.	Bibliography includes more than 3 children's and 3 adult resources. Reflection indicates use of effective approaches, strategies and tools and provides new directions and ideas for the unit. Reactive and proactive child guidance techniques are listed and individualized adaptations for effective support of specific children in group are included.
	Needs Improvement	Meets Expectations	Exceeds Expectations
STANDARD 5. BECOMING A PROFESSIONAL **5a.** Identifying and involving oneself with the early childhood field **5b.** Knowing about and upholding ethical standards and other professional guidelines **5c.** Engaging in continuous, collaborative learning to inform practice **5d.** Integrating knowledgeable, reflective, and critical perspectives on early education	Basic understanding of developmental approach to teaching mathematics expressed in reflection. No evidence of communication with cooperating teacher in preparation of unit. Presentation to peers demonstrates limited understanding of content and standards; 1-3 lessons presented. Limited evidence of understanding of personal growth as a math educator.	Solid understanding of the importance of developmental approach to teaching mathematics with reference to NCTM standards. Communication with cooperating teacher evident in planning. Presentation includes description of the math concept, 3 lessons, and NCTM standards. Reflection on what was learned about concept, the role of teacher, and how children responded is evident. Work samples and bibliography distributed. Value of mathematics education and	Solid understanding of the importance of developmental approach to teaching mathematics and application of NCTM standards. Communication and collaboration with cooperating teacher in developing and integrating concept and unit into math curriculum evident. Presentation includes description of concept, lessons, local and NCTM standards, what was learned about concept and the role of teacher, and how children responded. Work samples and bibliography

5e. Engaging in informed advocacy for children and the profession		personal growth indicated in summary.	distributed; presentation is interactive and involves peers. Reflections integrate knowledge about children, math content and the role of the teacher. Value of mathematics education and personal growth indicated in summary, discussion of ways in which mathematics education will be promoted in the future included.

5c. Data Table

Data Table: Math Unit

	Unacceptable	**Needs Improvement**	**Meets Expectations**	**Exceeds Expectations**
2003 - 2004 (9)			**2 (22%)**	**7 (78%)**
2004-2005 (13)		**1 (8%)**	**6 (46%)**	**6 (46%)**
2005-2006 (14)		**3 (21.4%)**	**9 (64.3%)**	**2 (14.3%)**
Total (N=36)		**4 (11%)**	**17 (47%)**	**15 (42%)**

NB: We recognize that this data is global; in the future we will collect data by standard.