
**Mighty Mathematicians (P-4): Teaching and Learning P-4
Mathematics Content through the NCTM Process Standards**

EDG 659-041/042

June 10-14, 2002

September 3, 24, October 8, 29, November 19, 2002 & April 1, 2003



"Providing for the educational needs of all students"

The College of Education will prepare exemplary educators who demonstrate the knowledge, skills, and professional dispositions necessary to provide for the educational needs of all students in a diverse and technological society.

This model on which the College of Education has built its teacher preparation program represents the effort to prepare teachers and instructional leaders for ever-changing roles and continuous personal and professional self-improvement. These professionals know how to evaluate and modify current teaching approaches to meet emerging student needs. This ability is grounded in a thorough knowledge of current theory and the ability to evaluate these theories and beliefs in light of new information and circumstances. The College of Education places particular emphasis on the themes of diversity, technology, assessment, evaluation, intellectual vitality, and professional community.

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Textbook: Mokros, J., Russell, S., Economopoulos, K. (1995). *Beyond arithmetic: Changing mathematics in the elementary classroom*. Palo Alto, CA: Dale Seymour Publications.

Course Description and Rationale:

The general goal of the course/institute is for you to learn to teach mathematics in such a way that your students develop what the [National Council of Teachers of Mathematics](http://www.nctm.org) (NCTM) call "mathematical power". Mathematical power includes both ability (to conjecture, reason logically, solve non-routine problems, and communicate about mathematics) and attitude (self-confidence and a disposition to question, explore, and engage significant mathematical problems). The underlying theme of this course/institute will focus on the process standards outlined in the *Principles and Standards for School Mathematics* (2001, NCTM). These standards

(problem solving, reasoning and proof, communication, connections, and representation) refer to the mathematical processes through which students should acquire and use mathematical knowledge. The process standards should direct the methods of doing all mathematics and therefore should be viewed as integral parts of all mathematics learning and teaching. Against that background, one of five content standards (number and operations, algebra, geometry, measurement, and data analysis and probability) will be addressed each day of the course/institute. The mathematics sections of Kentucky's Program of Studies and Core Content for Assessment will simultaneously be addressed during the course/institute as they are aligned with the process and content standards from NCTM.

EDG 659-042/042 specifically addresses the [Experienced Teacher Standards](#) identified below (means of assessment noted in boldface).

Standard 1: *The teacher provides professional leadership within the school, community, and education profession to improve student learning and well-being.*

Performance criteria:

1.4 Writes and speaks effectively.

**Peer Outreach
Curriculum Evaluation**

1.5. Contributes to the profession knowledge and expertise about teaching and learning.

Peer Outreach

1.6. Guides the development of curriculum and instructional materials.

Curriculum Evaluation

Standard 2: *The teacher demonstrates content knowledge within own discipline(s) and in application(s) to other disciplines.*

Performance criteria:

2.2. Communicates a current knowledge of discipline(s) taught.

Examination

2.6 Plans lessons and develops instructional material that reflect knowledge of current constructs and principles of the discipline(s) being taught.

Teaching/Analysis

Standard 3: *The teacher designs/plans instruction that develops student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.*

Performance Criteria:

3.1 Focuses instruction on one or more of Kentucky's Learning Goals and Outcomes.

Teaching/Analysis

3.4. Creates and utilizes learning experiences that challenge, motivate and actively involve the learner.

Teaching/Analysis

3.9 Develops and implements appropriate assessment strategies and processes.

Teaching/Analysis

Standard 4: *The teacher creates a learning climate that supports the development of student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.*

Performance Criteria:

- 4.6. Encourages and supports individual and group inquiry.

Teaching/Analysis

- 4.9 Works with colleagues to develop an effective learning climate within the school.

Peer Outreach

Standard 5: *The teacher introduces/implements/manages instruction that develops student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.*

Performance Criteria:

- 5.4. Uses and develops multiple teaching/learning strategies that are appropriate to student developmental levels and actively engages students in individual and cooperative learning experiences.

Teaching/Analysis

Standard 6: *The teacher assesses learning and communicates results to students and others with respect to student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.*

Performance Criteria:

- 6.3 Assesses student performance using the established criteria and scoring guides consistent with Kentucky's assessment program.

Teaching/Analysis

Standard 7: *The teacher reflects on and evaluates teaching/learning.*

Performance criteria:

- 7.1 Assesses and analyzes the effectiveness of instruction.

Teaching/Analysis

- 7.2 Assesses programs and curricula; proposes appropriate recommendations and needed adjustments.

Curriculum Evaluation

Standard 8: *The teacher collaborates with colleagues, parents, and other agencies to design, implement, and support learning programs that develop student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.*

Performance Criteria:

- 8.1 Initiates collaboration with others and creates situations where collaboration with others will enhance student learning.

Peer Outreach

Standard 9: *The teacher evaluates own overall performance in relation to Kentucky's learner goals and implements a professional development plan.*

Performance Criteria:

- 9.4. Applies to instruction the knowledge, skills, and processes acquired through professional development.

Teaching/Analysis

Standard 10: *The teacher uses technology to support instruction; access and manipulate data; enhance professional growth and productivity; communicate and collaborate with colleagues, parents, and the community; and conduct research.*

Performance criteria:

10.6 Uses the computer to do word processing, create databases and spreadsheets, access electronic mail and the Internet, make presentations, and use other emerging technologies to enhance professional productivity and support instruction.

Teaching/Analysis

Peer Outreach

Curriculum Evaluation

Course Requirements:

This course is part of an accredited preparation program that leads to professional certification. As a result, you are required to demonstrate behavior consistent with a professional career. In particular, you are expected to:

- Attend all class meetings. Absences will affect your final course grade and may require the completion of make-up assignments.
- Prepare carefully and completely for class. You must be ready to discuss all readings thoughtfully.
- Complete all assignments on time.
- Interact professionally with classmates.

Assignments: (More detailed information about each assignment will be discussed in the seminar.)

1. Readings: The seminar textbook, *Beyond Arithmetic: Changing Mathematics in the Elementary Classroom* should be read prior to the first day of the seminar. Your reflective journal from this reading will also be due the first day of class.

DUE: June 10

2. Teaching/Analysis: You will develop, teach, and analyze one inquiry-based mathematics lessons.

DUE: Lesson Plan-September 4; Final plan with analysis-October 29

3. Peer Outreach: You will conduct some sort of professional development focusing on the ideas from the seminar for other teachers. There are several options available that will be discussed in the seminar.

DUE: October 29

4. Curriculum Evaluation: You will conduct an analysis of one of the standards-based reform curriculum for elementary mathematics.

DUE: October 8

5. Exam: The final exam will cover material from the text, readings, and class sessions.

DATE: November 19

6. Class/online Participation: Actively participate in class discussions and the online discussion board for the seminar.

Evaluation:

Your grade will be calculated on a percentage basis (number of points earned out of total number possible).

- 10% of the original point value of an assignment will be deducted for assignments that are up to two days late. Additional points will be deducted for assignments turned in later than two days after the due date. Assignments will not be accepted one week past the due date.
- Cheating, plagiarism, and illegal copying of software will not be tolerated.
- If an exam is missed due to an unavoidable situation, the instructor may allow a make-up. It may be different than the original exam. You must contact the instructor before the next class period if an exam is missed.
- If you are not satisfied with a grade on an assignment, you may redo the assignment for a maximum grade of 91%. This policy only applies to assignments handed in on time.

Assignment	Points	≈ %
Readings/reflections	100	15
Lesson plan/Teaching	235	35
Peer Outreach	100	15
Curriculum Evaluations	100	15
Class/Online Participation	35	5
Final Exam	100	15
Total	670	100%

Grading Scale		
100%-92%	A	670 - 614 pts.
92%-85%	B	613 - 567 pts.
85%-75%	C	566 - 500 pts.
Below 75%	F	below 500 pts.

Note: The instructor reserves the right to make changes in the syllabus and/or class calendar if circumstances so dictate.