Mathematics Education in Elementary Schools
EDMS 543   Fall, 2001

<u>**Instructor:**</u>   <u>**Class Meets**</u>:
    Cathy Bullock   Tuesdays
    University Hall 321   7:00 — 9:45 p.m.
    760-750-4299   Room: ACD 302
    email: cbullock@csusm.edu   Section:
    Office Hours: Tuesdays 6:00 - 7:00 p.m.

<u>**Required Texts:**</u>

    Burns, Marilyn. (2000). <u>About Teaching Mathematics, Second Edition</u>.   Sausalito, CA:
        Math Solutions Publications.
    Coggins, Debra, (Ed.). (1999). <u>A Mathematics Source Book for Elementary and Middle</u>
        <u>School Teachers.</u> Novato, CA: Arena Press.
    Richardson, Kathy. (1997). <u>Math Time, The Learning Environment</u>. Norman, OK:
        Educational Enrichment, Inc.

    Articles on reserve in the library

<u>**Optional Texts:**</u>
    Kaplan, Andrew. (1998). <u>Math on Call.</u> Wilmington, MA: Great Source Education Group,
        Inc.

<u>**Course Description:**</u>
This class focuses on ways to understand children's mathematical thinking and learning and how to facilitate mathematics instruction so that all children are successful. Topics that will be addressed include mathematics curriculum, instructional theory and techniques, materials, and assessment approaches.

Learning to teach mathematics well is difficult. This course will not complete your education in learning how to teach mathematics; it is but one stage in your continuing development as a mathematics teacher. The goal of this course is to help you gain an understanding of the answers to the focus questions and to become familiar with the resources available to you as a teacher.

The instructional content of this course and the assignments are organized to reflect the following dimensions identified as critical to understanding effective mathematics instruction:

- The Role of the Teacher
- The Nature of the Learning Tasks
- The Culture of the Classroom
- Mathematical Tools and Technology
- Equity and Accessibility for All Students

Focus Questions:

These focus questions will serve as a guide throughout the course. They will direct our thinking and study as we learn more about teaching children mathematics. When you complete this course, you should have knowledge, understanding, and experiences that will help you answer these questions.

1. **How do children develop mathematical understanding, competence, and confidence?**

2. **How does the culture of the classroom affect mathematical communication and learning?**

3. **How does the teacher help all children become successful in learning mathematics?**

4. **How will you continue to develop your mathematical understanding, confidence, and competence?**

COURSE REQUIREMENTS:

Attendance and Participation:

Punctual attendance and active participation are essential in this class, not only for you to learn, but so that others may benefit from your input. Your final grade in this course will be lowered one half of one letter grade for every absence after your first. Four or more absences may result in a failing grade for this course. Since it is expected that everyone will actively participate in all class sessions, final grades will be lowered for lack of participation. Arriving late or leaving early will be interpreted as lack of participation.

Note: If you have extraordinary circumstances in your life that will impact your assignments or attendance, please let me know. Absences for illness and other critical or emergency situations may be excused and will be evaluated on a case-by-case basis. Make-up assignments may be required.

Assignments:

All written assignments must be typed and double-spaced. Each assignment is due on the date indicated on the syllabus. Grades on assignments will be lowered by at least one point for each day the assignment is late. After two weeks, the assignment will not be accepted. Please be sure to read and understand the university policy on plagiarism and cheating as it will be strictly enforced. Academic dishonesty will not be tolerated and will result in a failing grade for this course and will be reported to the university. Assignments (other than reading reflections) may be revised and resubmitted for re-grading up to one week after the assignment has been returned. After one week, no revisions will be accepted.

Reading Reflections (20 points)   Due: Each class beginning

Ten 1-2 page reading reflections are required for this course and are due at the beginning of each class meeting. The purpose of this assignment is to prepare you for class discussions by giving you an opportunity to reflect on the reading scheduled for that day. ***Therefore, no late reflections will be accepted.*** Since there are thirteen readings assigned, you may skip writing up to three reflections to complete the 20 points. Each reflection is worth 2 points. You are still expected to complete all of the assigned readings. For each set of readings, respond to the main ideas of the literature by writing about your ideas, opinions, and experiences as they relate to the topic. Do not summarize the reading; reflect on the issues.

Mathematics Web Sites (10 points)   **Due: Tuesday, September 11**
This assignment will give you the opportunity to explore web sites in the area of elementary mathematics education. You will describe three different sites, give your opinion in connection with our class readings and discussions of the information on each, and print an example of what you locate for each site.

Teacher Interview Reflection (12 points)   **Due: Tuesday, September 25**
This assignment will provide you the opportunity to interview a classroom teacher as to his or her goals and methods for establishing an effective classroom culture for learning mathematics. Questions for the interview will be discussed in class. After the interview, you will write a paper summarizing and reflecting on the interview and drawing connections to class readings and discussions.

Classroom Observation Reflection (15 points)   **Due: Tuesday, October 9**
This assignment is designed to give you an opportunity to observe an elementary classroom in action and make connections to our class discussions and readings.   You will make arrangements to visit a local elementary school and observe two mathematics lessons in the same classroom. After your observations, you will write a paper reflecting on the culture of the classroom.

Student Interview Reflection (15 points)   **Due: Tuesday, November 6**
This assignment will give you an opportunity to focus on individual children's thinking about mathematics. You will arrange to visit a local elementary school and interview two students about their thinking in mathematics. After the interview, you will write a paper describing the children's ideas and strategies. You should also consider what you would do next in order to continue the children's learning experiences. Based on what you learned in the interview, what would the next steps be for each child? Be sure to make connections to our class readings and discussions.

Planning and Teaching a Lesson Reflection (18 points)
                                        Due: Lesson Plan: Tuesday, October 16
                             Due: Lesson Plan/Teaching Reflection: Tuesday, November 20
You will plan a mathematics lesson including the key components, which you will teach to a small group of students in an elementary class. You will share your lesson plan with a few members of your cohort group in a class discussion and consider the feedback you receive. You will also discuss the lesson plan with the classroom teacher so that you can be sure that it is appropriate to the students and so that arrangements can be made for you to teach the lesson. After teaching the lesson, you will write a reflection on the experience and turn in both the lesson plan and the reflection. Be sure to make connections to our class readings and discussions.

Literature Connection (10   points)   **Due: Tuesday, November 27**
This assignment is designed to help you begin thinking about children's literature as a resource for teaching mathematics in context. You will select one children's book that you think makes interesting links to mathematics and would enhance students' learning. You will write a brief description of the book, indicate appropriate grade level(s), explain the mathematics connections, and how you would use it. During class you will give a brief presentation to the cohort of your book and the application you suggest. The write up is worth 7 points and the oral presentation is worth 3 points. Bring 30 copies.

Grading Scale:
Grades will be based on the following grading scale. You must maintain a B average in your teacher education courses to receive a teaching credential from the state of California.

A = 90-100%
B = 80-89%
C = 70-79%
D = 60-69%
F = Below 60%

Writing Requirement:
CSUSM has adopted an all-university writing requirement. In each course, students are required to write at least 2500 words (approximately 10 pages) in essays, exercises, papers or examinations. CSUSM has a free writing center to assist students with their writing projects.

College of Education Mission Statement
The mission of the College of Education Community is to transform public education by preparing thoughtful educators and advancing professional practice. We are committed to the democratic principles of educational equity and social justice for all learners, exemplified through reflective teaching, learning, and service. We value diversity, collaboration, professionalism, and shared governance.

CLAD Emphasis: In 1992, the College of Education voted to infuse Crosscultural, Language and Academic Development (CLAD) competencies across the curriculum. The CLAD competencies, which are appropriate, are covered in this course.

COURSE PLAN for FALL, 2001

Note: Readings are to be completed by the day they are scheduled.

1: Tuesday, August 28, 2001: Introduction: Developing
                                          Understanding, Competence, and Confidence

    Due: Survey

2: Tuesday, September 4, 2001:   **The Role of the Teacher**

    Reading: About Teaching Mathematics, pp. 139-160
                          Math Time, Part 1, pp. 3-37
                          Article: Burns, M. (February, 1985). The role of questioning.
                          Arithmetic Teacher. 14-16.

    Due: Reading Reflection #1

3: Tuesday, September 11, 2001:   **Nature of Learning Tasks**

    Reading: About Teaching Mathematics, pp. 29-42, 125-135, 297-308
                          A Mathematics Source Book, pp. 2-13
                          Article: Richardson, K. (April, 1997). Too easy for kindergarten and
                          just right for first grade. Teaching Children Mathematics. 432-437.

    Due: Reading Reflection #2   **Mathematics Web Sites**

4: Tuesday, September 18, 2001:   **Children's Mathematical Thinking**

    Reading: About Teaching Mathematics, pp.3-28
                          Math Time, Part 2, pp. 39-52
                          Article: Kamii, C., Lewis, B., Livingston, S.J. (December, 1993).
                          Primary arithmetic: Children inventing their own procedures.
                          Arithmetic Teacher. 200-203.

    Due: Reading Reflection #3

5: Tuesday, September 25, 2001:   **Communication in a Mathematics Classroom**

    Reading: A Mathematics Source Book, pp. 37-47
                          Math Time, Part 3, pp. 53-72
                          Article: Mumme, J.,Shepard, N. (1990). Communication in
                          mathematics. Arithmetic Teacher, 18-22.
                                              and
                          Wickett, M.S. (May, 1997). Serving up number sense and problem
                          solving: *Dinner at the Panda Palace*. Teaching Children Mathematics.
                          476-480.

    Due: Reflection #4   **Teacher Interview**

6: Tuesday, October 2, 2001:   **The Culture of the Classroom**

Reading: A Mathematics Source Book, pp. 14-26, 99-108
Article: Jacobs, V.R., Bennett, T.R., Bullock, C.R. (May, 2000). Selecting books in Spanish to teach mathematics. Teaching Children Mathematics. 582-587.
                and
Vacc, N.N. (December, 1993). Teaching and learning mathematics through classroom discussion. Arithmetic Teacher. 225-227.

Due: Reading Reflection #5

7: Tuesday, October 9, 2001:   **Assessment in Mathematics**

Reading: About Teaching Mathematics, pp.161-172
Math Time, Part 4, pp. 73-104
Article: Huniker, D.M. (1993). Interviews: A window to students' conceptual knowledge of the operations. In N.L. Webb (Ed.) Assessment in the mathematics classroom: 1993 Yearbook. 80-86.

Due: Reading Reflection #6   **Classroom Observation**

8: Tuesday, October 16, 2001:   **Mathematics: Number and Place Value**

Reading: About Teaching Mathematics, pp. 173-222
A Mathematics Source Book, pp. 48-58, 109-114
Article: Carroll, W.M., Porter, D. (March, 1997). Invented Strategies can develop meaningful mathematical procedures. Teaching Children Mathematics. 370-374.

Due: Reading Reflection #7   **Lesson Plan**

9: Tuesday, October 23, 2001:   **Mathematics: Algebra, Patterns, and Functions**

Reading: About Teaching Mathematics, pp. 112-124, 292
A Mathematics Source Book, pp. 79-87
Article: Ferrini-Mundy, J., Lappan, G., Phillips, E. (February, 1997). Experiences with patterning. Teaching Children Mathematics. 282-288.

Due: Reading Reflection #8

10: Tuesday, October 30, 2001:   **Fieldwork**

11: Tuesday, November 6, 2001:   **Mathematics: Fractions, Decimals, and Percents**

Reading: About Teaching Mathematics, pp. 223-252
A Mathematics Source Book, pp. 59-70, 71-78, 88-98

Due: Reading Reflection #9   **Student Interview**

12: Tuesday, November 13, 2001:   Mathematics: Measurement

Reading: About Teaching Mathematics, pp. 45-58, 253-260
A Mathematics Source Book, pp. 27-36
Math Time, Part 5, pp. 105-111

Due: Reading Reflection #10

13: Tuesday, November 20, 2001:   Mathematics: Probability and Statistics

Reading: About Teaching Mathematics, pp. 59-78, 261-271
Article: Seidel, J. D. (December, 1996). Gender, Ninja Turtles, and pizza: Using a classroom database for problem solving. Teaching Children Mathematics. 192-199.

Due: Reading Reflection #11   **Lesson Plan/Teaching Reflection**

14: Tuesday, November 27, 2001   Mathematics: Geometry and Art

Reading: About Teaching Mathematics, pp. 79-99, 272-283
Article: Battista, M., Clements, D.H. (January, 1998). Finding the number of cubes in rectangular cube buildings. Teaching Children Mathematics. 258-264.
            and
Article: Ball, D.L. (Summer, 1992). Magical hopes: Manipulatives and the reform of math education. American Educator. 14-18, 46-47.

Due: Reading Reflection #12   **Literature Connection**

15: Tuesday, December 4, 2001   Logic and Discrete Mathematics

Reading: About Teaching Mathematics, pp. 100-111, 285-291
A Mathematics Source Book, pp. 115-120
Math Time, pp. 113, 117-125

Due: Reading Reflection #13