

**CALIFORNIA STATE UNIVERSITY SAN MARCOS
SCHOOL OF EDUCATION**

EDMS 543B – Mathematics Education in Elementary Schools

3 Units, CRN 21216, Spring 2012
Wednesday 1:00-3:45 p.m., UNIV 273

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School of Education Mission Statement

The mission of the School of Education community is to collaboratively transform public education by preparing thoughtful educators and advancing professional practices. We are committed to diversity, educational equity, and social justice, exemplified through reflective teaching, life-long learning, innovative research, and ongoing service. Our practices demonstrate a commitment to student-centered education, diversity, collaboration, professionalism, and shared governance. (Adopted by the COE Governance Community October, 1997)

Course Description and Objectives

EDMS 543B focuses on how children develop mathematical understanding; children's mathematical thinking, curriculum development; methods, materials, planning, organization and assessment in various elementary school curricula; and curriculum integration. Methods of cross-cultural language and academic development are integrated into the course.

Learning to teach mathematics well is challenging and, therefore, this course will only begin your education in learning how to teach mathematics. This course is but one stage in your process of becoming a mathematics teacher. We are expected to: (a) deepen our understanding of the mathematics taught at the elementary level, including such topics as place value, base systems, number theory, fractions, proportions, statistics, and algebra, (b) develop an understanding of the current issues and practices in mathematics education, (c) develop a familiarity with the NCTM and California learning standards, (d) develop an understanding of children's content specific thinking, (e) learn to teach content specific concepts using effective and appropriate strategies, including the educational use of technology, (f) practice how to teach for mathematical understanding, (g) understand the nature, purposes, and application of mathematics assessment and its relationship with teaching and learning, and (g) develop strategies to create a classroom environment that promotes the investigation and growth of mathematical ideas and to ensure the success of all students in multi-cultural settings.

Course Prerequisite

- Admission to the Integrated Credential Program (ICP)

Required Materials

- Van de Walle, J. A., Karp, K. M., & Bay-Williams, J. M. (2010). *Elementary and middle school mathematics: Teaching developmentally* (7th ed.). Boston: Allyn & Bacon.
- California Department of Education (2005). *Mathematics framework for California public schools: Kindergarten through grade twelve*. Sacramento, CA: Author. This document can be found at <http://www.cde.ca.gov/ci/ma/cf/index.asp> or you can purchase a hard copy.
- Several other readings may be required and will be available for download.

You are also required to access the following Web sites and materials for this course:

- National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA: Author. An overview of this document can be found at: <http://www.nctm.org/standards/content.aspx?id=16909>
- Common Core State Standards Initiative (2010). *Common Core Standards*. The standards should be downloaded from <http://www.corestandards.org/> and are available for mathematics and ELA.
- Star Test Blueprints for Standards Items (grades 2-7) <http://www.cde.ca.gov/ta/tg/sr/documents/math1105.doc>

Recommended Materials

- Carpenter, T. P., Fennema, E., Franke, M. L., Levi, L., & Empson, S. B. (1999). *Children's mathematics: Cognitively guided instruction*. Portsmouth, NH: Heinemann.
- Carpenter, T. P., Franke, M. L., & Levi, L. (2003). *Thinking mathematically: Integrating arithmetic & algebra in elementary school*. Portsmouth, NH: Heinemann.
- Lampert, M. (2001). *Teaching problems and the problems of teaching*. New Haven, CT: Yale University Press.
- Burns, M. (2007). *About teaching mathematics: A K-8 resource* 3rd Ed.). Sausalito, CA: Math Solutions Publications.
- Small, M. (2009). *Good Questions: Great Ways to Differentiate Mathematics*. New York, NY: Teachers College.

Notice from the CSUSM Faculty

The California Faculty Association is in the midst of difficult contract negotiations with the CSU administration. In response to the CSU's stance, it is possible that the faculty union will call for a one-day strike or other work stoppage. When a decision for such action has been reached, you will be informed about the decision and of any disruption to the posted schedule.

Authorization to Teach English Language Learners

The CSUSM credential program has been specifically designed to prepare teachers for the diversity of languages often encountered in California public school classrooms. The authorization to teach English learners is met through the infusion of content and experiences within the credential program as well as additional coursework. Students successfully completing this program receive a credential with authorization to teach English learners. (*Approved by CCTC in SB2042 Program Standards, August 2002*)

Teacher Performance Expectation (TPE) Competencies

The course objectives, assignments, and assessments have been aligned with the CTC standards for Multiple Subject Credential. This course is designed to help teachers seeking a California teaching credential to develop the skills, knowledge, and attitudes necessary to assist schools and district in implementing effective programs for all students. The successful candidate will be able to merge theory and practice in order to realize a comprehensive and extensive educational program for all students.

- Primary Emphases:
 - TPE 1a—Subject Specific Pedagogical Skills for MS Teaching (Mathematics)
 - TPA 2—Monitoring Student Learning during Instruction

California Teacher Performance Assessment (CalTPA)

Beginning July 1, 2008 all California credential candidates must successfully complete a state-approved system of teacher performance assessment (TPA), to be embedded in the credential program of preparation. At CSUSM this assessment system is called the CalTPA or the TPA for short.

To assist your successful completion of the TPA, a series of informational seminars are offered over the course of the program. TPA related questions and logistical concerns are to be addressed during the seminars. Your attendance to TPA seminars will greatly contribute to your success on the assessment.

Additionally, SoE (School of Education) classes use common pedagogical language, lesson plans (lesson designs), and unit plans (unit designs) in order to support and ensure your success on the TPA and more importantly in your credential program.

The CalTPA Candidate Handbook, TPA seminar schedule, and other TPA support materials can be found on the SoE website at <http://www.csusm.edu/education/CalTPA/ProgramMaterialsTPA.html>

CSUSM Writing Requirement

The CSUSM writing requirement of 2500 words is met through the completion of course assignments. Therefore, all writing will be looked at for content, organization, grammar, spelling, and format. For this class please use APA Manual, 6th edition—see a guide at <http://owl.english.purdue.edu/owl/section/2/10/> .

Students with Disabilities Requiring Reasonable Accommodations

Students with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disable Student Services (DSS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4300, or TTY (760) 750-4909. Students authorized by DSS to receive reasonable accommodations should meet with their instructor during office hours or, in order to ensure confidentiality, in a more private setting.

Attendance Policy

Due to the dynamic and interactive nature of courses in the School of Education, all students are expected to attend all classes and participate actively. At a minimum, students must attend more than 80% of class time, or s/he may not receive a passing grade for the course at the discretion of the instructor. Individual instructors may adopt more stringent attendance requirements. Should the student have extenuating circumstances, s/he should contact the instructor as soon as possible. (*Adopted by the COE Governance Community, December, 1997*).

Teacher education is a professional preparation program. Therefore, for this course: Students missing more than one class session cannot earn an A or A-. Students missing more than two class sessions cannot earn a B or B+. Students missing more than three classes cannot earn a C+. Arriving late or leaving early by more than 20 minutes counts as an absence. Notifying the instructor does not constitute an excuse. All assignments must be turned in on due date even in case of an absence.

CSUSM Academic Honesty Policy

Students will be expected to adhere to standards of academic honesty and integrity, as outlined in the Student Academic Honesty Policy. All written work and oral presentation assignments must be original work. All ideas/materials that are borrowed from other sources must have appropriate references to the original sources. Any quoted material should give credit to the source and be punctuated with quotation marks.

Students are responsible for honest completion of their work including examinations. There will be no tolerance for infractions. If you believe there has been an infraction by someone in the class, please bring it to the instructor's attention. The instructor reserves the right to discipline any student for academic dishonesty in accordance with the general rules and regulations of the university. Disciplinary action may include the lowering of grades and/or the assignment of a failing grade for an exam, assignment, or the class as a whole."

Incidents of Academic Dishonesty will be reported to the Dean of Students. Sanctions at the University level may include suspension or expulsion from the University.

Plagiarism

As an educator, it is expected that each student will do his/her own work, and contribute equally to group projects and processes. Plagiarism or cheating is unacceptable under any circumstances. If you are in doubt about whether your work is paraphrased or plagiarized see the Plagiarism Prevention for Students website <http://library.csusm.edu/plagiarism/index.html>. If there are questions about academic honesty, please consult the University catalog.

Computer/Cell Phone Use during Class Sessions

You are welcome to use a laptop computer in class when working on class assignments, for example. However, you will need to save checking email or other personal computer use for time outside of class. Please refrain from texting in class. Most students find it disruptive when they are focusing on class activities or listening to presentations. Your kind consideration is greatly appreciated by all!

Person-First Language

Use “person-first” language in all written and oral assignments and discussions (e.g., “student with autism” rather than “autistic student”). Disabilities are not persons and they do not define persons, so do not replace person-nouns with disability-nouns. Further, emphasize the person, not the disability, by putting the person-noun first.

Assignments and Requirements

Teacher education is a professional preparation program. It is expected students will come to class prepared to discuss the readings, submit required assignments, and participate in class activities. Students are expected to adhere to academic honesty and integrity, standards of dependability, confidentiality and writing achievement. Because it is important for teachers to be able to effectively communicate their ideas to students, parents, colleagues, and administrators, each written assignment is expected to have a clear organizational presentation and be free of grammar, punctuation, or spelling errors. There will be a reduction in points for the above mentioned errors. Late credit will be given to late assignments. Prepare carefully for class, be ready to discuss readings and assignments thoughtfully and actively participate in all class activities.

Here is a list of the assignments and requirements, followed by descriptions of each of them.

Assignment	Points	Assignment	Points
Participation & professionalism	10	Student interview	10
Reflection papers/activities	20	Mathematics lesson design	25
Learning center activity	10	Reflection on math lesson implementation	10
Math standards presentation	5	Reading responses/foldables	10

Detailed information about the assignments will be given in class and/or via Cougar Courses. All assignments should be submitted through Cougar Courses when possible. You are responsible for ensuring that assignments are submitted correctly and on time. Late assignments will receive a reduction in points.

Participation and Professionalism (10 points)

Students are expected to adhere to a professional code of ethics including: being in class on time and prepared with assignments and readings; actively participating in small and large group discussions and tasks; using computers during class time for note-taking or directed tasks; being respectful to peers and instructors; refraining from texting during class; demonstrating willingness to help all students succeed. A positive professional disposition includes a willingness to consider and discuss new ideas objectively, curiosity, perseverance, and seriousness about improving one’s self as a teacher. It can also include a sense of humor and social intelligence (e.g., the tact and ability to make others feel comfortable and to contribute).

Reflection Papers/Activities (20 points) – There are five reflection papers or activities. Detailed information will be given in class and via Cougar Courses.

Learning Center Activity (10 points) – The purpose of this assignment is to provide you with opportunities to (1) experience teaching a math activity in a small group setting, (2) practice questioning skills and strategies to engage all students, (3) reflect on student learning and adjust teaching accordingly.

Each group will select a math topic in K-8 curriculum and be responsible for presenting activities from the correspondent chapters in the textbook. Your goal is to engage your peer teacher candidates in advancing their understanding of the key ideas, frameworks, effective teaching strategies, and so on in the chapters.

This assignment has 3 components and will be completed with a small group of 4 members.

1. Chapter Presentation: Your group will put together a *10 minute* PPT presentation about the chapter, highlighting its instructional strategies, models, types of problems, and the features that you will be demonstrating in your learning center activities.
2. Learning Centers: You will put theory to practice. Each member will select an activity from the chapters to teach to a small group in class. Choose the activities that help the class understand the big ideas in the chapters and that demonstrate various instructional strategies. Each individual activity should take about 7-10 minutes. If the activity in the text is too short or too long, you need to adapt it to fit the time frame. **The activity should be planned and/or adapted to show evidence of higher-order thinking and conceptual understanding.**
3. After the presentation, each member will write a one-page reflection (due 1 week after you have taught your activity). The reflection should describe the effectiveness of your individual math activity. To what extent were all of your learners able to complete the activity (making content accessible) and how did you know? What worked and what didn't (student engagement)? In what ways did you modify the activity and why? What was the level of thinking in the activity? How were you able to assess their understanding? How would you modify the activity the next time? *Please submit a copy of your reflection via Cougar Courses.*

Learning Center Activity Grading Rubric

	Approaching (0-2 points)	Meets (3-4 points) (includes the criteria for Approaching)	Exceeds (5 points) (includes the criteria for Approaching & Meets)
Group: Presentation/ Learning Centers (5 points possible)	The presentation and activities were engaging and timely managed	& showed knowledge of the topic and used a variety of instructional strategies	& challenged students to think critically.
Individual: Activity Reflection (5 points possible)	Describes what worked and what did not work...	& provides an in-depth analysis of (1) the strengths of your teaching/presentation strategies and (2) the aspects of the math activity that worked well and why.	& provides an in-depth analysis of (1) the weaknesses of your teaching/presentation strategies and (2) the aspects of the math activity that did not work and why. What can be done differently to improve the effectiveness of the math activity?

Math Standards Activity (5 points) – In a group, you will analyze the standards in a given math strand for grades K–7. You will then present your findings to the class. Requirements for the activity will be discussed in class.

Student Interview (10 points) – Conduct a set of interviews to assess students' understanding of mathematics. In the set of interviews, you will interview one high performing student and one low performing student from the same class. The purpose is to gain insight into students' mathematical thinking and understanding, to evaluate the similarities and differences between the mathematical thinking of students, to learn how to effectively pose questions and interpret the meaning of students' responses, and to determine how to best support these students in improving their math abilities. Sample interview questions will be provided, but you are encouraged to use your own invention with instructor approval. For each set of interviews, you will choose a grade-appropriate mathematical topic from the following six areas: (1) number concepts, (2) addition/subtraction, (3) multiplication/division, (4) fraction, (5) measurement/geometry, and (6) algebraic thinking and will submit a reflective report, including the student's written work. You can work with a peer in the interviewing process, but each needs to write his/her own report. In addition, you will share/present your interview findings in class. Student Interview Guidelines will be provided. **Reports should not exceed 3 pages, double spaced.**

Mathematics Lesson Design (25 points) – You will design an inquiry-based math lesson (approximately 30-40 minutes) which incorporates ELA standards as well and teach it in an elementary school classroom. You will work with classmates, whose practicum is in your same grade level, in lesson planning and each of you will implement the lesson separately. Your teaching performance will not affect your grade; it is more the components of the lesson design and your reflection that will be assessed. Once you have taught the lesson, you will share your teaching experience in the 543 class. A lesson template and grading rubric will be available on Cougar Courses and the lesson plan will be due on March 5.

Reflection on Mathematics Lesson Implementation (10 points) – After you teach your mathematics lesson, you will reflect on your teaching. The reflection will be due after the implementation of the lesson in your practicum class on a date that you will specify in class. Cooperating teacher observation forms and student sample work must be submitted with your reflection. Writing prompts for the reflection will be given with the lesson template and grading rubric on Cougar Courses.

Reading Responses/Foldables (10 points) – To focus your reading, aid you in remembering the content, and assist you with meaningful class participation, you will summarize most chapters in a foldable (explained in class). The components of the foldable will be graded on their relevance to and importance of the chapter.

Overall Grading Scale

Final course grades will be based on the following grading scale:

A = 93% - 100% A- = 90% - 92% B+ = 87% - 89% B = 83% - 86% B- = 80% - 82%
 C+ = 77% - 79% C = 73% - 76% C- = 70% - 72% D = 60% - 69% F = below 60

Tentative Schedule

Please note that modifications may occur at the discretion of the instructor.

Date	Sessions and Topics	Readings & Assignments
1/25	1. BUILDING A MATH LEARNING COMMUNITY <ul style="list-style-type: none"> • Course introduction • Learning styles and multiple intelligences • Characteristics of an effective math classroom 	Read: <ul style="list-style-type: none"> • Syllabus Bring: <ul style="list-style-type: none"> • Learning Style and Multiple Intelligence Resources
2/1	2. UNPACKING THE MATH STANDARDS <ul style="list-style-type: none"> • National and California standards • Common Core Standards • Standards-based grading Math Standards presentations	Read: <ul style="list-style-type: none"> • Van de Walle et al. ch 1 Review: <ul style="list-style-type: none"> • Math Framework for California website Bring: <ul style="list-style-type: none"> • Math Common Core Standards Submit: <ul style="list-style-type: none"> • Math Standards Activity
2/8	3. THINKING CRITICALLY ABOUT MATH <ul style="list-style-type: none"> • Different levels of cognitive demand of math tasks • Challenging students using appropriate questions 	Read: <ul style="list-style-type: none"> • Van de Walle et al. ch 2 Review: <ul style="list-style-type: none"> • Bloom’s Taxonomy Bring: <ul style="list-style-type: none"> • Bloom’s Handouts (CC) Submit: <ul style="list-style-type: none"> • Chapter 2 foldable • Reflection 1
2/15	4. TEACHING THROUGH PROBLEM SOLVING <ul style="list-style-type: none"> • Benefits of “experience before label” 	Read: <ul style="list-style-type: none"> • Van de Walle et al. ch 3,4

	<ul style="list-style-type: none"> • Conceptual learning; why it's essential • How manipulatives help students construct math ideas 	<p>Review:</p> <ul style="list-style-type: none"> • Your grade level math standards <p>Bring:</p> <ul style="list-style-type: none"> • Textbook • Computer <p>Submit:</p> <ul style="list-style-type: none"> • Chapter 3, 4 foldable • Reflection 2
2/22	<p>5. ASSESSMENT OF STUDENTS' THINKING IN MATH</p> <ul style="list-style-type: none"> • Assessing students' understanding and misunderstanding of mathematics • Purposes of different types of assessment strategies 	<p>Read:</p> <ul style="list-style-type: none"> • Van de Walle et al. ch 5 <p>Bring:</p> <ul style="list-style-type: none"> • Textbook • Computer <p>Submit:</p> <ul style="list-style-type: none"> • Chapter 5 foldable
2/29	<p>6. DIFFERENTIATION</p> <ul style="list-style-type: none"> • Differentiating for varied ability levels • VAK and MI instructional strategies 	<p>Read:</p> <ul style="list-style-type: none"> • Small, ch. 2 (CC) <p>Review:</p> <ul style="list-style-type: none"> • VAK and MI strategies <p>Bring:</p> <ul style="list-style-type: none"> • VAK and MI handouts <p>Submit:</p> <ul style="list-style-type: none"> • Reflection 3
3/5	--	Submit: Lesson Design
3/7	<p>7. MAKING SENSE OF INTEGERS....CONCEPTUALLY</p> <ul style="list-style-type: none"> • How to help students understand why we use the rules we do when doing operations with integers <p>PLANNING TIME FOR LEARNING CENTER GROUPS</p>	<p>Read:</p> <ul style="list-style-type: none"> • Your LC Activity chapters <p>Bring:</p> <ul style="list-style-type: none"> • Textbook • Computer • Resources for LC activity <p>Submit:</p> <ul style="list-style-type: none"> • Your chapters' foldable • Reflection 4
3/14	<p>8. COGNITIVELY GUIDED INSTRUCTION (CGI).</p> <ul style="list-style-type: none"> • Types and structures of math problems • How students solve problems • How we help children develop number sense <p>MAKING SENSE OF DECIMALS...CONCEPTUALLY (1)</p> <ul style="list-style-type: none"> • How to help students understand why we use the rules we do when doing operations with decimals <p>LC activity- Group 1 presentation*-Number Sense</p>	<p>Read:</p> <ul style="list-style-type: none"> • Van de Walle et al.ch. 8,9 <p>Submit:</p> <ul style="list-style-type: none"> • Chapter 8, 9 foldable • Group 1 Learning Center Activity
3/28	<p>9. UNDERSTANDING MISCONCEPTIONS</p> <ul style="list-style-type: none"> • We can only help students when we truly understand their thinking • Common mistakes students make and why <p>MAKING SENSE OF DECIMALS...CONCEPTUALLY (2)</p> <ul style="list-style-type: none"> • How to help students understand why we use the rules we do when doing operations with decimals <p>LC activity- Group 2 presentation*-NS/Place Value</p>	<p>Read:</p> <ul style="list-style-type: none"> • Van de Walle et al. ch. 10-12 <p>Bring:</p> <ul style="list-style-type: none"> • Textbook <p>Submit:</p> <ul style="list-style-type: none"> • Chapter 10, 11, 12 foldable • Group 2 Learning Center Activity
4/4	<p>10. CREATING A BALANCED MATH PROGRAM</p> <ul style="list-style-type: none"> • How to fit everything in 	<p>Read:</p> <ul style="list-style-type: none"> • Van de Walle et al. ch. 15

	<ul style="list-style-type: none"> Models of elementary school math Importance of building vocabulary into math program <p>PROJECT-BASED TEACHING AND LEARNING</p> <ul style="list-style-type: none"> How can open-ended math tasks allow students to engage in higher-order thinking? <p>LC activity- Group 3 presentation*-Fractions</p>	<p>Bring:</p> <ul style="list-style-type: none"> Computer <p>Submit:</p> <ul style="list-style-type: none"> Chapter 15 foldable Group 3 Learning Center Activity
4/11	<p>11. TECHNOLOGY IN THE CLASSROOM</p> <ul style="list-style-type: none"> Online session: no class meeting Instructions will be given via Cougar Courses 	TBA
4/18	<p>12. MAKING SENSE OF FRACTIONS...CONCEPTUALLY</p> <ul style="list-style-type: none"> How to help students understand why we use the rules we do when doing operations with fractions 	<p>Read:</p> <ul style="list-style-type: none"> Van de Walle et al. ch.16 <p>Submit:</p> <ul style="list-style-type: none"> Chapter 16 foldable
4/25	<p>13. THE MEANING OF THE EQUAL SIGN: PATHWAY TO ALGEBRA</p> <ul style="list-style-type: none"> Students' understanding and misunderstanding of the equal sign and its implications How to improve their understanding <p>MAKING SENSE OF GEOMETRY...CONCEPTUALLY</p> <ul style="list-style-type: none"> How to help students understand how the areas of various shapes are related <p>LC activity- Group 4 presentation*-Meas./Geom.</p>	<p>Read:</p> <ul style="list-style-type: none"> Van de Walle et al. ch. 19,20 (levels 0 & 1 only) <p>Bring:</p> <ul style="list-style-type: none"> Reflection 5 <p>Submit:</p> <ul style="list-style-type: none"> Chapter 19, 20 foldable Reflection 5 Group 4 Learning Center Activity
5/2	<p>14. PUTTING THEORY TO PRACTICE</p> <ul style="list-style-type: none"> Creating effective lessons that engage all students Classroom management strategies <p>LC activity- Group 5 presentation*-Algebraic Thinking</p>	<p>Read:</p> <ul style="list-style-type: none"> Van de Walle et al. ch. 14 <p>Bring:</p> <ul style="list-style-type: none"> Textbook Computer <p>Submit:</p> <ul style="list-style-type: none"> Chapter 14 foldable Group 5 Learning Center Activity
5/9	<p>15. CLOSURE</p> <ul style="list-style-type: none"> Lesson design discussions Review and reflect 	<p>Bring:</p> <ul style="list-style-type: none"> Lesson Design Info. <p>Review:</p> <ul style="list-style-type: none"> Course topics <p>Submit:</p> <ul style="list-style-type: none"> Student interview Course Foldable (in-class assignment)

Notes: * Presentation of Learning Center Activities: after the presentation, you will submit the reflection within a week. For example, if you conduct an activity on 4/4, your paper is due on 4/11.