

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

EDMX 543 – Mathematics Education in Inclusive Classrooms

3 Units, CRN 41659, Fall 2012

Tuesday 7:30 AM – 3:15 PM, Room 37, Twin Oaks Elementary School

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Office Hours: Before/after class or by appt.

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 on-going service. Our practices demonstrate a commitment to student-centered education, diversity, collaboration, professionalism, and shared governance. *(Adopted by COE Governance Community, October, 1997).*

COURSE INFORMATION

Course Description

This course focuses on the scope and sequence of mathematics in the K-12 curriculum, mathematics, instructional methods, materials, and assessment. Additional emphasis is provided on assessing student mathematical thinking and developmentally appropriate instructional practices. Methods of cross-cultural language and academic development and strategies for accommodating learners with special educational needs in assessment and instruction are integrated into the course. *Requires participation and observation in public school programs.*

Course Objectives

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) increase our skills at listening to students and asking questions, (b) develop an understanding of children’s content specific thinking, (c) 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, (d) 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, (e) develop an understanding of the current issues and best practices in mathematics education, (f) develop a familiarity with the NCTM, Common Core, and California learning standards, and (g) understand the nature, purposes, and application of mathematics assessment and its relationship with curriculum, teaching, and learning.

Course Prerequisites

Admission to the Multiple Subject/Special Education Program

Required Materials

- Van de Walle, J. A., Karp, K. M., & Bay-Williams, J. M. (2013). *Elementary and middle school mathematics: Teaching developmentally* (8th ed.). Boston: Allyn & Bacon.

- California Department of Education (2010). *Common core state standards for mathematics*. Sacramento, CA: Author. <http://www.cde.ca.gov/ci/cc/>
- California Department of Education (2005). *Mathematics framework for California public schools: Kindergarten through grade twelve*. Sacramento, CA: Author. <http://www.cde.ca.gov/ci/ma/cf/index.asp>.
- 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>
- Star Test Blueprints for Standards Items (grades 2-7) <http://www.cde.ca.gov/ta/tg/sr/documents/math1105.doc>

Recommended Materials

- Burns, M. (2007). *About teaching mathematics: A K-8 resource* (3rd Ed.). Sausalito, CA: Math Solutions Publications.
- 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.
- Empson, S. B., & Levi, L. (2011). *Extending children's mathematics: Fractions and decimals*. Portsmouth, NH: Heinemann.
- Lampert, M. (2001). *Teaching problems and the problems of teaching*. New Haven, CT: Yale University Press.
- Turnbull, A., Turnbull, R., & Wehmeyer, M. (2010). *Exceptional lives: Special education in today's schools* (6th ed). Upper Saddle River, NJ: Merrill Pearson.

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)
- TPE 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, School of Education (SoE) 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/CalTPA.html>

CSUSM AND SOE POLICIES & REQUIREMENTS

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) 750-4905, 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.

Assessment of Professional Dispositions

Assessing a candidate's dispositions within a professional preparation program is recognition that teaching and working with learners of all ages requires not only specific content knowledge and pedagogical skills, but positive attitudes about multiple dimensions of the profession. The School of Education has identified six dispositions – social justice and equity, collaboration, critical thinking, professional ethics, reflective teaching and learning, and life-long learning—and developed an assessment rubric. For each dispositional element, there are three levels of performance - *unacceptable*, *initial target*, and *advanced target*. The description and rubric for the three levels of performance offer measurable behaviors and examples.

The assessment is designed to provide candidates with ongoing feedback for their growth in professional dispositions and includes a self-assessment by the candidate. The dispositions and rubric are presented, explained and assessed in one or more designated courses in each program as well as in clinical practice. Based upon assessment feedback candidates will compose a reflection that becomes part of the candidate's Teaching Performance Expectation portfolio. Candidates are expected to meet the level of *initial target* during the program.

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 class sessions 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. Note: A day has two sessions. See schedule below.

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.

ASSIGNMENTS AND REQUIREMENTS

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

Assignment	Points	Due Date
Reading responses	10	ongoing
Math history	5	9/4
Math standards presentation	5	9/11
Math learning activity (MLA)	20	varies
Lesson design	15	9/25
Assessment of problem solving	10	10/9
Clinical student interview	10	10/19
Online modules	15	varies
Professional dispositions/participation	10	ongoing

Detailed information about the assignments will be given in class and/or on the course Moodle (Cougar Courses). You need to submit the assignments (except drawings and children's work) at the course Moodle. You are responsible for ensuring that assignments are submitted correctly and on time. Late assignments may receive a reduction in points unless prior arrangements have been made with the instructor.

Reflection Responses

You are expected to carefully read and reflect on the course texts. The focus will be on how you make sense of the information rather than a summary. The expression of your reflection can take several forms: written paper, concept map, blog post, forum discussion, game, Presi presentation, etc. Detailed information will be given in class and on Cougar Courses.

Math History

- (a) Make a drawing of what comes to mind when you think about mathematics (i.e., what mathematics is to you?). Provide a caption for your drawing. (1 point)
- (b) Write a brief explanation of your drawing. (0.5 points)
- (c) Define a mathematician. Write a one-paragraph definition. **USE YOUR OWN WORDS AND DEFINITION.** Do not use a dictionary or Wikipedia. (0.5 points)
- (d) Write a 2 page reflection (double-spaced) on your experience as a mathematics student (you can start at Kindergarten if you wish!). Position yourself concerning how "good" you are in math. Discuss your feelings about math and your perception of yourself as a math learner. Did you feel you were an active participant in your math classes, or you felt that you were mostly an outsider? Did you see personal meanings/purposes in math or just to get a grade and move on? You can also mention those who were important in your "math learning history" - they can be ex-teachers, family, friends, and they may have impacted you positively or negatively. (3 points)

Math Standards Presentation

In a group, you will analyze the Common Core Standards in both your grade level and the Standards for Mathematical Practice. You will then present your findings to the class. Requirements for the activity will be discussed in class.

Math Learning Activity (MLA)

The purpose of this assignment is to provide you with opportunities to (1) experience teaching a math activity in a small group setting, (2) reflect on student learning, (3) set up learning centers in a classroom and rotate students through various activities.

Part I. Group work

This portion of the assignment will be completed with a small group of 4-5 members. 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.

Each member in the group will select an activity from the assigned chapters to teach to a small group in the 543 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** (no bingo games!)

For example, if your group has 5 members, there will be 5 math activities. Your group will set up 5 learning centers. Each of you will do your activity at a learning center. The rest of the class will form into 5 groups, and they will rotate through the 5 learning centers/activities. It means that you have the opportunity to do your activity 5 times, and chances are you will modify the activity to meet the participants' needs.

Part II. Individual work

You will implement and videotape your MLA to the students (may range from a small group to entire class) in your practicum/clinical practice class. Be prepared to discuss modifications made to your activity based on your "experience" teaching it in the 543 class. You will review the video and submit a reflection on student learning.

You need to submit the video and a **two-page reflection** on the implementation of your MLA. A few prompts are:

- What went well and what could be done differently? Did students learn what they were supposed to learn? What evidence of learning do you have? What does the evidence tell you?
- What were the strengths and weaknesses of your MLA? What difficulties in learning did you observe? What did you do to overcome such difficulties? If manipulatives or technology tools were used, were they effective? Why or why not? If you put students in groups, how did group members interact? If a worksheet was given, how did it help or fail to facilitate learning? If you allowed student presentations, how did students share their ideas? How did other students respond to the presentations?
- Why did you make particular moment-to-moment decisions in your teaching moves? What were the effects of these moves? For example, you planned to encourage Jason to talk, but Cassidy raised a question in the middle of the lesson. You decided at that moment to pursue Cassidy's question instead of asking Jason to share his ideas. Why did you change your mind and take a "detour"? It is not sufficient to just say that Cassidy's question was important. You need to explain why the question was important and how the class responded to it.

MLA reflection grading rubric:

Approaching (0-5 points)	Meets (6-8 points) (includes the criteria for Approaching)	Exceeds (9-10 points) (includes the criteria for Approaching & Meets)
reflects on what works and what does not work...	& includes an in-depth analysis of students' learning outcomes; evaluates the effectiveness of major teaching strategies and instructional moves...	& provides specific and effective strategies for improving the lesson.

* You need to submit the video to receive credit. The content of the video will not be graded. Your performance in the MLA will not be graded either. The grade will be based on the depth of reflection.

Part III. Sharing and collective reflection

You will share your MLA implementation by means of an oral presentation. You will show the video, discuss student learning, and answer questions from the audience.

Assessment of Problem Solving

This assignment is intended for group work. We will form inquiry groups. We will also practice the following protocol in the 543 class.

Stage One: Collecting Students' Problem Solving Strategies

There are three options. I encourage you to take option 1, as it provides the most meaningful contextual information about students' problem solving activities.

Option 1: DIY

- Find a classroom where you will implement the assessment task. Obtain information about the students and math curriculum. Arrange a time for the implementation.
- Design or select a math problem/task with high cognitive demand (requiring higher-order thinking). You can find a problem in Van de Walle et al.'s text. Another good source is Marilyn Burns' book (2007)—*About Teaching Mathematics: A K-8 Resource* (3rd Ed.).
- Prepare how to launch the problem and how to collect student work. *The assessment task will require written/drawing work from all students in the class.*
- Send your math problem and plan to the instructor for feedback. This may be done by means of e-mail or a conference during the 543 class.
- Revise the math problem and/or plan if necessary.
- Implement the problem in the classroom identified before. During launch, ensure students understand the problem *without suggesting any methods to solve it*. Collect student work.
- If your mathematical learning activity (MLA) is problem-based and involves all students in the class, you can collect students' solution strategies during MLA implementation.

Option 2: Obtaining students' problem solving strategies from your cooperating teacher.

If your cooperating teacher has implemented a problem-based lesson and collected students' solution strategies in writing (similar to the above procedures), you can use the existing data.

Option 3: If neither of the above two options works for your group, you can use the assessment data provided by the instructor, which will be posted on Cougar Courses.

Stage Two: Interpreting Students' Understanding & Problem Solving Skills

Now that you have students' solution strategies to a math problem, you will find that they show different levels of understanding of the concepts in the problem and different approaches to solving the problem. Your group will:

- Analyze and sort students' solution strategies into 3 to 4 levels of understanding and effectiveness of strategies. Identify students who may present unique thinking.
- According to Van de Walle's three phases of teaching through problem solving, teachers will provide opportunities for students to share their solution strategies and discuss ideas, during the "AFTER" phase. For the purpose of classroom discussion (a follow-up that you will think about but are not required to do), select 3 to 4 students (or groups of students) whose work represents different levels of understanding, different approaches to solving the problem, and/or unique ideas. You can choose a student who shows promising ideas even if he or she didn't get the "correct" answer. Because the chosen students are supposed to present their solution strategies in the follow-up lesson (optional), do not choose a student that shows no understanding.
- Reflect on your rationale for selecting students or groups.

Stage Three: Reporting

- Your group will write and submit a report containing: (1) the problem; (2) an overall summary of student performance; (3) categories or levels of student work, including unique thinking; (4) which 3 or 4 students or groups will you choose to present; (5) why do you choose these students? (6) a concluding remark on the assessment process: what worked and what could be done differently? The report should not exceed 3 pages.
- Attach copies/scans of the chosen students' work.
- You may be asked to present your assessment process and findings in the EDMS/X 543 class.
- You are encouraged to share your findings with the cooperating teacher.

Note for Option 1: The primary purpose of this assignment is for you to try the above protocol. The most important thing is for your group to experience the assessment task, learn about student thinking, and reflect on the assessment and student learning. Your performance in launching the problem will not affect your grade. You will not be penalized should you make some unsuccessful attempts. Students' performance will not affect your grade either. I will look for a genuine and honest reflection on the whole process.

Clinical Student Interview

Conduct a clinical interview to assess a student's understanding of mathematics. The purpose is to gain insight into students' mathematical thinking and understanding, to learn how to effectively pose questions and interpret the meaning of students' responses, and to provide you with an opportunity to interact with students. Sample interview questions will be provided, but you are encouraged to use your own invention with instructor approval. You will submit a reflective report, including the student's written work if available. 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. See the Student Interview Guidelines and a sample interview report at Cougar Courses. Reports should not exceed 2 pages, double-spaced.

Mathematics Lesson Design

You will work with peers and collaboratively design a problem-based math lesson. The lesson needs to be aligned with Van de Walle's "teaching through problem solving" framework. You are encouraged but not required to implement the lesson in your practicum/clinical teaching classroom. A lesson template and grading rubric will be available on Cougar Courses.

Online Modules

There will be three online sessions. You need to complete an online module for each online session. The online modules will be posted on Cougar Courses.

Professional Dispositions & Participation

You are expected to actively participate in in-class and online discussions, group work, presentations, and hands-on activities throughout the course. 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).

The California State University San Marcos School of Education fosters the development of the following professional dispositions among our students:

- *Social Justice and Equity*: Candidates appreciate the languages, communities, and experiences learners bring to the classroom. Candidates advocate for and support marginalized communities and individuals.
- *Collaboration*: Candidates learn and practice the skills of collaboration in their coursework and use them in their professional interactions with students, colleagues, parents, caregivers and those in the wider community.
- *Critical Thinking*: Candidates analyze various professional contexts, resulting in more informed decision-making about professional practice.
- *Professional Ethics*: Candidates learn to make and act on well-reasoned, principled judgments.
- *Reflective Teaching and Learning*: Candidates critically review their professional practice and the impact it has on student success.
- *Life-Long Learning*: Candidates are committed to actively seeking new knowledge, skills and experiences throughout their career.

(adopted by the COE Governance Community on January 19, 2007)

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		

Failure to complete this course with a grade of C+ or higher will prohibit a teacher candidate from doing clinical practice.

TENTATIVE SCHEDULE

The dynamic nature of teaching and learning makes it hard to establish a set schedule. Please note that modifications will likely to occur at the discretion of the instructor.

Date	Session, Topics, & Essential Questions	Reading & Assignments Due
8/28	1. Building a math learning community - Course overview & group formation - Characteristics of an effective math classroom 2. Challenging students with rich math tasks - Different levels of cognitive demand of math tasks - Learning centers	Syllabus
9/4	3. Unpacking math standards - Common Core State Standards - Mathematics Framework for California Publish Schools Plan time for math standards activity—bring your laptop or tablet. 4. Teaching through problem solving (1) - The art of listening to students and asking good questions - Designing and selecting math tasks for higher-order thinking Lesson plan workshop: Bring ideas & materials	Van de Walle et al. ch 2, 3 Reading response 1 Math history
9/11	5. Teaching through problem solving (2) - Designing problem-based lessons Math standards presentations	Van de Walle et al. ch 4, 5

	<p>MLA- group 1 presentation</p> <p>6. Assessment of students' thinking in mathematics (1) - Assessment strategies and their purposes - Rubrics and scoring MLA group 2 presentation</p>	<p>Reading response 2</p> <p>Math standards PPT</p>
9/18	<p>7. Assessment of students' thinking in mathematics (2) - Case study of an assessment plan Clinical assessment workshop</p> <p>8. Introduction to Cognitively Guided Instruction (CGI) What are some types and structures of math problems? How do students solve problems? How do we help children develop number sense? MLA group 3 presentation Lesson Design Workshop</p>	<p>Van de Walle et al. ch 8, 9, 10</p> <p>Reading response 3</p> <p>MLA (if ready)</p>
9/25	<p>9. Using models for teaching & learning whole numbers How do we provide opportunities for hands-on explorations of mathematics? How can manipulatives help or fail to help children construct math ideas? MLA group 4 presentation</p> <p>10. Students as young mathematicians - Developing number sense - Affective factors in math learning MLA group 5 presentation</p>	<p>Van de Walle et al. ch. 11, 12, 13</p> <p>Reading response 4</p> <p>Lesson design</p> <p>MLA (if ready)</p>
10/2	<p>11. Online session Complete the <i>differentiation module</i> on Cougar Courses by October 2nd.</p> <p>12. Online session Complete the <i>fraction module</i> on Cougar Courses by October 8th.</p>	<p>Van de Walle et al. ch. 15, 16</p> <p>Reading response 5</p>
10/9	<p>13. Using models for teaching & learning fractions What are some models for fractions? How do we help students understand operations on fractions? What are the strengths and limitations of manipulatives for fraction concepts? Lesson design showcase</p> <p>14. Online session Complete the online module (topic TBD) on Cougar Courses by October 12th.</p>	<p>Van de Walle et al. ch 6, 7</p> <p>Assessment of problem solving</p> <p>MLA</p>
10/16	<p>15. Teaching for conceptual understanding: the case of algebraic thinking Children's understanding and misunderstanding of the equal sign. How can we improve children's relational understanding?</p> <p>16. Summary</p>	<p>Van de Walle et al. ch 14</p> <p>Student interview due on 10/19</p>