

California State University San Marcos
College of Education
Fall 2003

EDMS 543 – Teaching Mathematics in the Elementary School (3 units)

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COLLEGE OF EDUCATION MISSION STATEMENT

The mission of the College 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.

REQUIRED MATERIALS

- California Department of Education (2000). Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve. Sacramento, CA: author. This document can be found on the WWW at: <http://www.cde.ca.gov/standards/> The Web site contains both HTML versions and a downloadable PDF file. (I highly encourage students to purchase this publication). There are copies in the library for check out.
- National Council of Teachers of Mathematics (2000). Principles and standards for school mathematics. Reston, VA: author. Can be found on the WWW at: <http://standards.nctm.org/>
- Star Test Blueprints for Standards Items (2-7) - <http://www.cde.ca.gov/statetests/star/resources/blueprints.html>.
- Van de Walle, John A. (2004). Elementary and middle school mathematics: Teaching developmentally (Fifth Edition). Boston: Pearson Education, Inc.
The text has a companion Web site at: http://wps.ablongman.com/ab_vandewalle_math_5.

COURSE DESCRIPTION

Learning to teach mathematics well is difficult and, therefore, you must expect that this course will only begin your education in learning how to teach mathematics. This course is but one stage in what is hoped will be a continuing evolution of you as a mathematics teacher. The focus of this course will be on (1) developing an understanding of the current practices in mathematics, (2) learning to teach content specific concepts using effective and appropriate strategies, and (3) practicing how to teach for mathematical understanding. Enfolded into this course will be curriculum development, developing an understanding of children's content specific thinking, creating a classroom environment that promotes the investigation and growth of mathematical ideas, and developing strategies to ensure the success of all students in multi-cultural settings.

Standards Alignment:

The course objectives, assignments, and assessments have been aligned with the CTC standards for Multiple Subjects Credential. The following standards are a primary emphasis in this course:

- Standard 3: Relationship between Theory and Practice
- Standard 4: Pedagogical Thought and Reflective Practice
- Standard 5: Equity, Diversity and Access to the Core Curriculum for All Children
- Standard 8A(a): Pedagogical Preparation for Subject-Specific Content Instruction by MS Candidates (Mathematics)

Teacher Performance Expectation (TPE) Competencies:

This course is designed to help teachers seeking the Multiple Subjects Credential to develop the skills, knowledge, and attitudes necessary to assist schools and district in implementing an effective program 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. The following TPE's are addressed in this course:

Primary Emphasis:

- TPE 1a-Subject Specific Pedagogical Skills for MS Teaching (Mathematics)

Secondary Emphases:

- TPE 2-Monitoring Student Learning During Instruction
- TPE 3-Interpretation and Use of Assessments
- TPE 4-Making Content Accessible
- TPE 5-Student Engagement
- TPE 6a-Developmentally Appropriate Practices in Grades K-3
- TPE 6b-Developmentally Appropriate Practices in Grades 4-8
- TPE 6d- Developmentally Appropriate Teaching Practices for Special Education: Teaching the Special Education Population in the General Education Environment
- TPE 7-Teaching English Learners
- TPE 8-Learning About Students
- TPE 9-Instructional Planning
- TPE 10-Instructional Time
- TPE 11-Social Environment
- TPE 13-Professional Growth
- TPE 14-Educational Technology in Teaching and Learning

ASSIGNMENTS

Detailed assignment sheets (course packet) will be provided for every assignment below. The assignment sheets and the course calendar are attached to this syllabus.

Reading Reflections

(20%) - Each week students will write a "meaningful" reflection on the material assigned to be read for that week. These reflections should be one page in length (use an "11" font, spacing of 1.5, with **only** your name and class session number as a heading), and should clearly articulate your thoughts **on the assigned readings** and how you might **specifically apply** what you learned from the articles as a teacher in the classroom. Please do not repeat verbatim from the readings.

Student Interviews (Critical Assessment Task - CATs)

(20%) - You and one of your classmates will conduct a series of three different student interviews based on questions provided in class. For each interview, you will pose mathematical problems to any one student at a predetermined grade level. The purpose is to get you to begin thinking about students' mathematical understanding, to learn how to effectively pose questions and interpret the meaning of students' answers, and to provide you with an opportunity to interact with students.

Mathematical Resources & Lesson (Critical Assessment Task - CATs)

(35%)— Working in small groups, your team will first compile resources on a predetermined mathematical topic (20%) and then design a lesson that you will present in an elementary class (or ours as if we were your students) (15%). The purpose of this activity is to help you learn how to design effective mathematical activities, to provide you with an opportunity to begin compiling mathematical resources, and to provide an opportunity for you to practice teaching mathematics.

Curriculum Assignment (Critical Assessment Task – CATs)

(20%)– Students will review the mathematics curriculum currently being used in your classroom (e.g., a textbook) at one grade level and write a short paper that investigates the curriculum alignment with the CA Content Standards and current high stakes assessments. Students will also provide their general thoughts and concerns related to the curriculum (e.g., how the curriculum might need to be altered to make strong connections between mathematical concepts and procedures).

Active Participation and Collaboration (5%) – Defined as **actively** engaging in **all** class discussions and activities, students will be evaluated daily. A positive attitude is an important component for establishing the definition for active participation and collaboration. All 5 points or no points are earned in this category.

Assignment details and scoring rubrics described above are attached to this syllabus.

INFUSED COMPETENCIES

CLAD

In 1992, the College of Education voted to infuse Cross-cultural, Language and Academic Development (CLAD) competencies across the curriculum. The CLAD competencies are attached to the syllabus and the competencies covered in this course are highlighted.

Authorization to Teach English Learners

This 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

Special Education

Consistent with the intent to offer a seamless teaching credential in the College of Education, this course will demonstrate the collaborative infusion of special education competencies that reflect inclusive educational practices.

Technology

This course infuses technology competencies to prepare our candidates to use technologies, emphasizing their use in both teaching practice and student learning.

ATTENDANCE POLICY

The attendance policy of the College of Education: Due to the dynamic and interactive nature of courses in the COE, 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. If you miss two class sessions or are late (or leave early) more than three sessions, you cannot receive a grade of "A". If you miss three class sessions, your highest possible grade is a "C+". Should you have extenuating circumstances, contact the instructor as soon as possible. Please discuss with me any extenuating circumstances that will cause you to miss class prior to your absence. Attendance will be taken at each class session. Furthermore, grades on assignments turned in late will be lowered unless prior arrangements have been made with the instructor.

PLAGIARISM AND CHEATING

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.

Students with Disabilities Requiring Reasonable Accommodations

Students are approved for services through the Disabled Student Services Office (DSS). This office is located in Craven Hall 5205 and can be contacted by phone (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.

GRADING SCALE: Grades for this course will be based on the following grading scale:

A.....	93% - 100 %
A-.....	90% - 92%
B+.....	88% - 89%
B.....	83% - 87 %
B-.....	80% - 82%
C+.....	78% - 79%
C.....	73% - 77 %
C-.....	70% - 72%

Remember! You are required to maintain a B average (3.0 GPA) in your teacher education courses to receive a teaching credential in the State of California.

SB 2042 – Authorization to Teach English Learners Competencies

TEST 1: LANGUAGE STRUCTURE AND FIRST- AND SECOND-LANGUAGE DEVELOPMENT	TEST 2: METHODOLOGY OF BILINGUAL, ENGLISH LANGUAGE DEVELOPMENT, AND CONTENT INSTRUCTION	TEST 3: CULTURE AND CULTURAL DIVERSITY
I. Language Structure and Use: Universals and Differences (including the structure of English)	I. Theories and Methods of Bilingual Education	I. The Nature of Culture
A. The sound systems of language (phonology) *	A. Foundations	A. Definitions of culture
B. Word formation (morphology) *	B. Organizational models: What works for whom?	B. Perceptions of culture
C. Syntax *	C. Instructional strategies *	C. Intragroup differences (e.g., ethnicity, race, generations, and micro-cultures)
D. Word meaning (semantics) *	II. Theories and Methods for Instruction In and Through English	D. Physical geography and its effects on culture
E. Language in context *	A. Teacher delivery for <u>both</u> English language development <u>and</u> content instruction *	E. Cultural congruence
F. Written discourse *	B. Approaches with a focus on English language development *	II. Manifestations of Culture: Learning About Students
G. Oral discourse *	C. Approaches with a focus on content area instruction (specially designed academic instruction delivered in English) *	A. What teachers should learn about their students *
H. Nonverbal communication *	D. Working with paraprofessionals *	B. How teachers can learn about their students *
II. Theories and Factors in First- and Second-Language Development	III. Language and Content Area Assessment	C. How teachers can use what they learn about their students (culturally responsive pedagogy)*
A. Historical and current theories and models of language analysis that have implications for second-language development and pedagogy	A. Purpose	III. Cultural Contact
B. Psychological factors affecting first- and second-language development	B. Methods *	A. Concepts of cultural contact
C. Socio-cultural factors affecting first- and second-language development	C. State mandates	B. Stages of individual cultural contact
D. Pedagogical factors affecting first- and second-language development *	D. Limitations of assessment *	C. The dynamics of prejudice
E. Political factors affecting first- and second-language development	E. Technical concepts *	D. Strategies for conflict resolution

STUDENT INTERVIEWS GRADING RUBRIC: EDMS 543

How are the interview reflections to be completed?

For each of three interviews, write a meaningful reflection (no more than 2 pages) on:

- 1) the interview process and the results of your interview, as well as
- 2) specific, prescriptive recommendations that you would give your interviewee in light of his/her current level of mathematical understanding. Develop the reflection with an eye to helping your interviewee in terms of making effective instructional decisions for him/her.

Although the reflection should not exceed two pages, it **MUST** answer the following two questions:

1. **What specifically did you learn about this child's mathematical understanding?** You should provide ample evidence of knowledge gained from this experience. Be very specific about what it is that your interviewee understands or does not understand and how he/she demonstrated this understanding or lack of understanding.
2. **What specifically would you do for this child if you were his/her teacher?** This part of the reflection is clearly related to what was learned about the child by way of the interview. Be very specific and clear about what you would recommend as a follow-up.

For specific details on both of these two discussion points, please refer to "Student Interviewing Guidelines" in your course packet.

- **As you format your reflection, please bullet the two questions above you are responding to very clearly.**

How are the assignments assessed?

Each interview will be assessed using a generic 5-point scoring rubric and should:

- reflect good depth of understanding of the child's current mathematical level based on the interview problems.
 - give specific and clear instructional recommendations for the child.
 - be free of grammatical or typographical errors.
 - be word processed
- 5 – Reflection shows good depth of understanding as well as clear, specific recommendations. The reflection is free of grammatical or typographical errors. Both sections reflect the criteria stated above.
- 4 – Reflection shows general depth of understanding and clear, specific recommendations. There may be a very minor grammatical or typographical error. One of the sections is slightly weak on one of the criteria listed above.
- 3 - Reflection shows moderate depth of understanding and recommendations are adequate. There may be few grammatical or typographical errors. Both sections are slightly weak or one is very weak.
- 2 - Reflection shows little depth of understanding and recommendations are not specific and clear. There may be considerable grammatical or typographical errors. Both sections are substantially weak.
- 1 – An attempt at a reflection was submitted. Your name is on the paper.
- 0 - No assignment was turned in.

WEEKLY READINGS GRADING RUBRIC: EDMS 543

How are the weekly assignments that are readings to be completed?

Write a meaningful one-page reflection on the assigned readings for the week based on two ideas that impressed you from the readings. Develop that reflection with an eye to demonstrating that you both read and understood the readings. Do not quote or explain the readings; paraphrase and critically analyze only. Do not write a separate reflection for each idea! Occasionally a reading may be assigned from a source other than the course textbook.

Although the reflection should not exceed one page, it **MUST** answer the following two questions:

- 1. What did I learn from the readings?** This paragraph is in your own words and is clearly written with a distinct description of two important/impressive ideas that you learned from the readings. It provides ample evidence that you both read and synthesized the material.
- 2. How am I going to use what I learned in teaching children mathematics?** This paragraph is clearly related to what was learned in the articles to classroom practice. The relationship of your two chosen ideas to the classroom should be evident in the description of teaching practice, curriculum, classroom management, and/or developing students' mathematical thinking.

**** As you format your reflection, please bullet the two questions above you are responding to very clearly.**

How are the readings assignments assessed?

The weekly assignments that are readings will be assessed using a generic 5-point scoring rubric and should:

- reflect good depth of understanding of the two chosen ideas from the assigned material as well as application to the classroom.
 - be free of grammatical or typographical errors.
 - be word processed according to specific directions given in the course syllabus under "Weekly Assignments".
- 5 – Reflection shows good depth of understanding of the two chosen ideas from the assigned material as well as application to the classroom. The reflection is free of grammatical or typographical errors. Both sections reflect the criteria stated above.
 - 4 – Reflection shows general depth of understanding of the two chosen ideas from the assigned material as well as application to the classroom. There may be a very minor grammatical or typographical error. One of the sections is slightly weak on one of the criteria listed above.
 - 3 – Reflection shows moderate depth of understanding of the two chosen ideas from the assigned material as well as application to the classroom. There may be few grammatical or typographical errors. Both sections are slightly weak or one is very weak.
 - 2 – Reflection shows little depth of understanding of the two chosen ideas from the assigned material as well as application to the classroom. There may be considerable grammatical or typographical errors. Both sections are substantially weak.
 - 1 – An attempt at a reflection was submitted. Your name is on the paper.
 - 0 – No assignment was turned in.

STUDENT INTERVIEWING GUIDLINES

EDMS 543 – Fall 2003

These assignments are designed to give you an opportunity to focus on a single child's thinking about mathematics. It will also help you to improve your use of inquiry for assessment purposes and to better understand elementary level students with different understandings.

I recommend that you have a partner for interviewing. **One** partner would be especially helpful for note-taking and additional insights into the child's thinking. As a pair, you would interview one child. Each person would then be responsible for writing up his/her own follow-up reflection. Papers should be submitted together, **along with the student work** (no names on the work, please).

Interviews will be directed toward primary (K-2) or upper elementary (3-5) students. Therefore, if possible, students who are observing/student teaching in a K-2 classroom might want to pair with a student observing/ student teaching in a 3-5 classroom in order to be able to access students in these grade bands.

Be aware that each interview option is grade band specific and your interviewee should be in that grade range. You will turn in a non-optional "Practice Interview" due September 22. The next two interviews are left to your choice from among seven mathematical content areas. By the end of the course, you should have turned in 3 interviews in all. Interviews are due according to a predetermined schedule attached to the syllabus.

Prior to the interview

- You should arrange with a teacher (or parent of a child you know) to interview one child for 20-30 minutes in a quiet place outside of the classroom, if possible (or at his/her home).
- Ask the teacher (or parent) what manipulatives the child has experience using and see if it is possible to have these materials available during the interview. You will always want paper and pencil and the appropriate manipulatives for each interview. Be considerate of the type of manipulative you give the child for each interview. For example, you would not want to give the child marbles as the manipulative if the interview questions deal with "pizza". Or you would not want to give the child coins if the interview questions deal with sharing cookies. **Do not give food items such as gum, cookies or candy for manipulatives, as these may be distracting to the child as well as prohibited in his/her diet or culture. You can always, however, make construction paper cut-outs of these items if they are referred to in the interview questions. Be creative and discriminating about manipulatives for each interview!**
- Develop a list of questions you may want to use if the child is not forthcoming with a response. For example, if the child says, "I just knew it", you might respond with, "What did you think about first?" or, "If you were helping a friend, how would you explain what you did?"

During the interview

Work with the child individually. Begin the interview by informing the child that you will be giving him/her a series of math problems to solve and that you are interested in his/her thinking process and in the strategies s/he uses to solve these problems. Tell the child that s/he can solve the problems in any way s/he wants. Introduce the child to the manipulatives available and inform him/her that s/he may use them if s/he wishes.

You should provide the child with a written copy of each problem from the interviews you received in class--only give the child one written problem at a time (not the entire interview). Orally read each problem along with the child and provide him/her with sufficient time to complete each problem.

After the child answers each problem, you should ask a variety of probing questions that will help you to better understand the child's thinking and to assess his/her mathematical understanding.

You will want to note the questions you ask and the child's responses, and it may be necessary to ask the child to wait while you are writing--it is OK to ask the child to wait. **You should not tape-record/video-tape the interview without parental permission.**

During the interview, be sure to consider the following:

- The best thing you can be is genuinely curious. Remember, the point of the interview is to discover how the child thinks--**NOT** to guide the child to the correct answer.
- Be careful to respond similarly to correct and incorrect answers. Be curious about all solution strategies-not just the ones leading to incorrect solutions.
- Your primary role is to listen. Make sure you allow enough "wait time"--children need time to think before answering.
- **THE FOLLOWING STRATEGIES ARE RECOMMENDED TO PRESERVE THE DIGNITY OF THE LEARNER:**
 1. Attempt to first find out if the child can solve a given problem on his/her own without support.
 2. If the child is having difficulty with a given problem, provide support such as saying "how might drawing a picture of this problem help you?" or "how might these manipulatives help you think through this problem?"
 3. If after providing support the child is still unable to solve the problem, it is very important to provide the child with a follow-up question that still relates but that the child will be able to solve. This might entail making the numbers in the problem smaller or more manageable.

These strategies also provide you with determining if the child can solve the problem on his/her own, with support, or not at all, and the child still feels good about his/her ability.

If you end an interview early for any reason, be sure to discuss your reasoning in your write-up.

After the interview

You (and your partner) should each write a reflection (with line spacing of 1.5, 11-font, and no more than two pages in length) that includes a clear discussion on **each** of the two bulleted points under the "Grading" section that follows.

NOTE: PLEASE ANSWER THESE QUESTIONS THOROUGHLY!! FULL CREDIT WILL NOT BE GIVEN UNLESS BOTH QUESTIONS ARE ADDRESSED!!

Grading:

Each interview will be graded according to a 5-point scoring rubric. **The grading rubric will detail and describe the grading criteria and levels 0 - 5.** Specifically, I will be looking for nicely written papers that clearly and specifically express what you learned about:

- What specifically did you learn about this child's mathematical understanding? Here you will want to make claims about the mathematics your student understands or doesn't understand. I am looking for more of an explanation than just your student could or couldn't solve a particular problem. You should briefly explain what the child said and did for each interview question.
- What specifically might you do for this child if you were his/her teacher? Here you might want to include discussions about such issues as curriculum, instructional strategies, etc. You **must give at least 2 examples of problems or tasks you would give this child as a follow-up to your assessment of this child's current level of mathematical understanding in relation to the interview questions.** For example, it is not enough to say that you would give your interviewee more fraction word problems, or would add manipulatives to this child's mathematical activities. Write out specific fraction word problems and the specific manipulative(s) you would use and in what context you would use them if these are your recommendations for your interviewee.

***NOTE:** When you turn in your write-up, you should also **include the child's written work** (if it exists) with the child's name removed. If it does not exist, please explain why. For all interviews, submit your reflection together with your partner's reflection and the child's work. Paper-clip (do not staple) this packet together.

****Interviews are due the class session that relates to the given content area in the interview (refer to syllabus).**

*****Please see me if you need clarification on any aspect of the interview assignments.**

CLASSROOM PRESENTATION GUIDELINES: EDMS 543 (Spring 2003)

Purpose

The purpose of this activity is to assess your ability to create and teach a **reform-minded** mathematics lesson designed for a stated grade or grade-level span, e.g. K-2, 3-4, etc. (your choice). That is, students will participate in the design, construction, and presentation of a **reform-minded mathematical activity** which focuses on **children's mathematical thinking**. In class we will collectively determine some of the key elements to reform-minded teaching methods which enhance children's mathematical thinking. **For this assignment, your goal should be to merge theory and practice in order to enable students to understand a mathematical topic and make connections among ideas related to this topic. In addition, your activity should promote student engagement, curiosity, flexibility, and persistence in solving mathematical problems.**

Goals related to your participation in this activity include learning how to distinguish reform-minded lessons from traditional approaches, becoming acquainted with resources to support your teaching of mathematics and where to access those resources, and exploring the decision-making teachers experience when developing lessons for their students. You will be provided with an opportunity to practice teaching mathematics while you are learning about reform-minded mathematics in class. In addition, you will receive copies of your peers' lessons in an effort to begin a mathematics resource file.

Who?

Students will work in small groups of approximately three individuals on a particular mathematical topic (options for topics and group member decisions will be determined in class Session #2).

Select a group you can easily meet with after/before class. It is often desirable to select people who bring different talents to a group. Sometimes it is necessary to determine who lives close to you, as you may decide that on occasion it is best to get together other than at the CSUSM campus. These suggestions may help your group in dividing the work equitably as well as take advantage of group members' expertise.

Plan of Action:

When planning your activity, you should try to be **CREATIVE** while effectively incorporating the key components of the reform ideas into the activity. Your group should consider creating an integrated lesson that incorporates another content area such as language arts, social studies, science, etc. This integrated approach to teaching is very effective both in terms of student learning and classroom time considerations. **Warning:** Be careful not to lose sight of the mathematical issues in your fun activity!

Your group should:

- Decide on a specific mathematical objective you want your students to learn. You must create a **unique activity** on which to base your lesson plan. It should not be taken directly from a textbook or any other elementary mathematics resource. **It should be the group's original creation and design.**
- Find an equitable way to divide up the work load so that everyone participates fully in the design and implementation of your activity. At the conclusion of your activity, you will each be asked to evaluate each group member's participation and contribution. In addition, your peers may assess your activity and make recommendations and comments on a scoring template.

- Be certain that your activity does not lose sight of your mathematical objective. Continually ask,

“What will all students be able to learn from this activity?” The answer to this question should be in alignment with your objective.

- Make certain that your lesson is in concert with *The California Mathematics Content Standards* document. (You certainly need to make good use of this document when you design your lessons. As future educators, all your mathematics lessons **must** always align with these standards.)
- Meet with me at least two weeks prior to the date of your presentation (this is not to say that you can only meet once!). **Your group must decide on and set a date to meet with me for this purpose. This meeting can be either after class or during my office hours or by appointment.** One of the primary purposes of this meeting is to provide me with an opportunity to work with each of you on a more individual basis so that I can help you learn to design effective mathematical activities. Consulting with me in advance gives your group an advantage in knowing you are on the right path. Please feel free to discuss ideas with me at any time (I will be happy to provide you with ideas/suggestions after you have thought about the ideas on your own). I will expect you to have prepared ideas for your presentation and to show me some of the resources you have identified for your lesson plan packet during this meeting.
- Prepare and rehearse to feel comfortable teaching your lesson in advance so that you might modify your presentation based on what you learn from rehearsal. You should always keep in mind that your **lesson should be grade appropriate**. Furthermore, you will want to practice your activity with others so that you know how long the lesson will take. Since your audience (your peers) are often pre-occupied, stressed out and tired, you should make sure that your anticipatory set or introductory motivator is very good.

ABOUT INSTRUCTIONAL RESOURCES FOR YOUR LESSON TOPIC... (worth 20%)

- **Investigate what information is available that relates to your topic. You are required to compile a thorough, effective list of such resources to demonstrate evidence that you are able to provide students with access to a balanced and comprehensive mathematics curriculum. A balanced program of mathematics instruction consists of interrelated components that promote and enhance student learning and understanding: conceptual understanding of the logic and structure of mathematics, problem-solving skills in mathematics, and computational and procedural mathematical skills. A balanced mathematics curriculum also purports to interrelate ideas and information within and across mathematics and other subject area.**
- For example, you might begin by investigating what the National Council of Teachers of Mathematics (NCTM) *Teaching Children Mathematics* or *Arithmetic Teacher* journals can offer in the way of providing you with suggestions. The CSUSM library carries *Teaching Children Mathematics* (look under the “mathematics” section of the journals rather than education). The NCTM also has numerous publications and resources that would be helpful to you as you design your activity. **Be certain to seek out other mathematics education journals that would be relevant to your assignment.** You are also **required** do a thorough search on the **Internet** to locate other resources, including but not limited to, elementary mathematics journal articles related to your topic.

- **Technology resources that may facilitate the teaching and learning process are also to be researched and analyzed.** These include but are not limited to relevant software, multimedia, computer-assisted instruction, and productivity and presentation tools. You may want to consult with your master teacher for ideas regarding technologies that would add value to teaching your elementary mathematics lesson.
- You will learn about and begin to use appropriate computer-based technology to facilitate the teaching and learning process. Your goal as a professional educator is to consider the content you will teach and be able to select the appropriate technological resources to support and enhance learning for all students in relation to their prior experiences and level of academic accomplishment.
- **Children’s literature** relating to mathematical ideas is very abundant and may be accessed in libraries, teacher supply store, bookstores, and on-line (Amazon.com, etacuisenaire.com, matholutions.com, e.g.). Don’t forget your master teacher! Your resources page should list several examples of children’s literature related to your topic.
- **Teacher reference books and support materials** include mathematics textbooks and other books relating to elementary mathematics content areas.
An example is *Navigating Through Geometry in Grades 3-5* by M. K. Gavin et al (NCTM).
- Critically and carefully analyze any and all resources accessed, including those from the Internet. Keep in mind that you want to align your lesson with reform-minded mathematics methods and resources which reflect those attributes of effective teaching and learning as discussed in class.
- Other sources to gather ideas from: the San Diego County Office of Education, teacher supply stores, and of course, your master teacher.

ABOUT YOUR PRESENTATION DAY...(WORTH 15%)

- Each group will present their activity to the class which should last no more than 40 minutes including closure. Each group member should have some role in the presentation.
- On the day of your presentation, your group will need to turn in one nicely prepared document which will include the lesson plan for your activity. Your lesson plan packet must include a separate **“RESOURCES” page(s)** consisting of all teacher support materials, children’s literature, journal articles, software, multimedia, etc., that relate to your topic. **These must be in bibliographic citation format:** author, date, title, city, and publisher. If citing journal articles, also include journal title, volume, journal article title, author, and page numbers.
 1. Teacher support materials/reference books
 2. Children’s literature
 3. Relevant journal or research-related articles
 4. Annotated WWW sites which you used or which would be of interest to your peers
 5. Children’s mathematical software and/or support technologies
 6. Manipulatives or learning tools (if possible) that you could identify and recommend to your peers as useful in enhancing the content area and concepts presented in your lesson.

- Include any useful information that you found when researching your topic so that your colleagues can learn from your work (Do not include duplicated pages from teacher workbooks; rather, provide

citations). If each group prepares a packet of materials that is filled with important information, and we share that information in class, then you will each have a wealth of information on some of the important mathematical topics for use when you teach! Your support materials must be complete enough to support replication of the lesson you present.

Grades:

In this assignment, which will be worth 35% of the total grade for the course, I am as interested in the process your group goes through as much as the final product. I really want this to be an opportunity for you to learn and grapple with such things as where to go for mathematics resources, how to prepare lesson plans and what to consider when writing a lesson plan, the challenges of teaching your mathematics lesson, etc. **The 5-point grading rubric for this assignment will be based on the degree that the following criteria are met:**

1. Your lesson plan and activity should reflect reform-minded teaching and learning methods whereby **all** children learn mathematical concepts and procedures with understanding, and reflect and communicate their knowledge as they engage in interesting and problematic tasks. In addition, your lesson must adhere to The California Mathematics Content Standards. The California standards addressed by your lesson plan and activity should be listed by number and annotation in your lesson plan.
2. A complete, detailed, informative lesson plan packet which should specify grade level, content area, state specific goals, learning objectives, time frame, materials used, activity procedures, provide for closure or debriefing, and assessment methods. In addition, all resource components must be included as discussed above.
3. **The lesson plan should follow SDAIE methods of instruction, including accommodation for cultural and linguistic diversity (second language learners) as well as special needs learners (learning and physically challenged students as well as GATE students). You lesson plan should provide for differentiated teaching strategies to meet the mathematical needs of special populations.**
4. A clear presentation of the lesson plan that **focuses on children's mathematical thinking** wherein they can build new mathematical knowledge through problem solving, provide rationales for their solutions, make connections among and between mathematical ideas, and eventually are able to apply and generalize what they have learned to new situations.
5. A plan for student assessment/evaluation must be included in your activity and lesson plan. Be specific as to how you will determine that each student has "arrived" to his/her intended destination--your goals and objectives for them in the lesson. You should also include formative (ongoing) assessment during your activity/lesson. Therefore, both formative and summative assessment methods must be included in your activity and lesson plan.

Your lesson should be creative and unique, should make good use of what we know about how students think (within the context of your chosen topic), is grade appropriate, is well thought out and prepared, is sensitive to the needs of all students, and reflects reform-minded teaching methods. This is a time for you to try things out and to make mistakes in the execution of your lesson plan activity. Your classmates may provide you with feedback for your information only.

**** YOUR PRESENTATION IS DUE THE DATE THAT THE INTERVIEW FOR THAT TOPIC IS DUE (REFER TO SYLLABUS)**

NOTE: See assignment sheet for details

Presenters:

Date:

Grade:

Start Time:

End Time:

General Comments

Scoring Rubric

Score	Scoring Element
	A. Mathematics Reform in Alignment with CA Mathematics Content Standards -
	B. Support Materials and Lesson Plan -
	C. Diversity -
	D. Student Thinking -
	E. Assessment -

Document Check

1. Lesson Plan

2. Resources

- a) Children's Literature
- b) Journal/Research Articles
- c) Teacher Reference Books and Support Materials
- d) Annotated Web sites
- e) Support Technologies

Commendations/Recommendations

CURRICULUM ASSIGNMENT (Due in class no later than October 22, 2003)

EDMS 543 (Fall 2003)

Purpose

This assignment should reflect and weave what you have learned in this course during the semester regarding mathematics standards, reform-minded mathematics ideas, as well as constructivist teaching and learning methods which enhance how children think and problem solve within a mathematical context.

This assignment is designed to give you an opportunity to closely examine a mathematics curriculum currently being used in schools. As an educator, you must closely examine the curriculum from which you teach in order to determine if it aligns with state standards as well as to follow the development of mathematics content and processes for the given grade you are teaching. In addition, you will most likely in the future participate in school curriculum committees for the analysis and subsequent selection of curricula which are, it is hoped, coherent, focused on important mathematics, and well articulated across the grades.

What?

- 📖 You will select the mathematics curriculum (textbook or program) that is currently being used in the elementary classroom in which you are currently observing.
- 📖 You will be required to turn in the name of the curriculum, the grade level, the school and school district in which it is being used by the end of the third week of school.
- 📖 You will specifically analyze and report on a **unit** (e.g., the geometry unit, or the fractions unit, or the measurement unit) within the curriculum that you have chosen to analyze. Examine/analyze the entire textbook/curriculum/program holistically as the framework for the **unit**. Your analysis of the **unit** should reflect the characteristics of the entire curriculum in general.
- 📖 You will be required to write a 6-7 page paper (7 max. and 1.5 line spacing) focused on your analysis of the **unit**. Your paper must clearly state the curriculum title, the grade level, and the **unit** at the top of the paper. **Failure to focus your analysis on a specific unit will result in a low grade.**

Following are some key questions to consider as you begin your analysis of the curriculum. These questions are to help you focus your analysis, and are inclusive but not exhaustive! The 5 main points for discussion are under the heading, “Grading”.

- ↔ Is this curriculum compatible with the California Mathematics Content Standards?
- ↔ Does this curriculum develop students’ procedural knowledge, conceptual knowledge, or does it provide a “bridge” between the two?
- ↔ What are the greatest strengths and weaknesses of this curriculum?
- ↔ What concerns do you have about this curriculum?
- ↔ What kind of instructional practices are encouraged?
- ↔ Does this curriculum focus on children’s mathematical thinking?
- ↔ How does this curriculum accommodate cultural and linguistic diversity as well as special needs students (learning and physically challenged students as well as GATE students)?
- ↔ Does the unit have any mathematical connections (or no connections) to previous and to subsequent units in the textbook you have chosen to analyze?

This assignment will be graded on a 5-point rubric and is worth 20% of the total grade for the course. I will be looking for papers that are insightful and deep, thorough, and nicely written. I am particularly interested in your personal analysis of the curriculum based on what you learned from class this semester in regards to what constitutes effective teaching for all learners. **Be specific and give examples to support all discussion points.**

The grading rubric for this assignment will be based on the degree that the following five criteria are met in your discussion/analysis. You MUST address ALL points for discussion in each criteria. Even if the criteria are not present in your curriculum, in the last point (#5), you should discuss how you intend to alter, correct, and remediate the omissions in order to make strong connections between important mathematical concepts and procedures. Please be sure to clearly bullet and identify in your paper each of the 5 main points for discussion, Failure to do so will result in a low grade for this assignment.

1. The compatibility/incompatibility of this curriculum with California Mathematics Content Standards.

You must state **ALL** California Mathematics Content Standards that are addressed and met in the unit. These must be stated by number and annotation. The standards in your discussion should be ALL California Mathematics Content Standards that are addressed, not only the content standards specifically indicated in the unit. Your discussion must address **how** the standards are met and implemented in the unit activities. This means giving specific and clear examples of how EACH of the standards is implemented. That is, for each standard listed, give at least one example of an activity or task that reflects that standard. If the standards are not listed in the curriculum unit, list and annotate the standards that would be met for the mathematical content contained in the unit. Be sure to give specific examples of activities or tasks that reflect each standard.

2. Instructional practices of the curriculum unit in general, including how cultural, linguistic, and special needs are addressed to create an inclusive classroom.

This section deals with how the curriculum influences and dictates classroom procedures and student behavior. **Prompts:** the roles of the teacher and students; clearly stated learning objectives; how lessons are structured; how manipulatives and other concrete learning tools are used; classroom norms; how active learning vs. passive learning is implemented; child-centered vs. teacher-centered practices; the inclusion of alternative teaching and learning methods; the integration of other content areas to the unit mathematics content; connections of unit concepts to previous and subsequent unit concepts; vocabulary development; the type of SDAIE methods used; how students with disabilities are accommodated; the use of differentiated design of lessons to accommodate all learning abilities and styles; the use of home and parent connections; the types of student grouping configurations used in unit activities; the use of math activity centers or other physical learning configurations; if and how math is used to start the school day; connections of unit activities to students' everyday life experiences (for example, how is "school math" tied to "outside of school math"?). These discussion points are intended to be inclusive but not exhaustive.

3. The extent to which the curriculum unit focuses on children's mathematical thinking.

This section should reflect the focus of this course based on what you have learned in the readings, class activities, and in class discussions: relational understanding and constructivist learning should be emphasized through a diversity of concrete and multi-sensory experiences. How does this curriculum (unit) give children opportunities to make mathematical connections, extend and apply their mathematical knowledge, reflect about their mathematical experiences, articulate mathematical ideas they know, and identify with their mathematical knowledge? How is prior knowledge activated? How are classroom mathematical ideas connected to real world experiences? It is not enough to say that these ideas exist in the unit. You should give clear, specific examples of how they are met to provide ample evidence that you recognize the essential aspects of a constructivist classroom. These discussion points are intended to be inclusive but not exhaustive.

4. The assessment methods/components of the curriculum unit.

You must list the types of assessment methods used in the unit and give specific examples of these methods. Some curricula employ several types of assessments, while others do not. Remember to include both formative (on-going) as well as summative (formal) assessment methods. Assessments are used, among other purposes, for student journal entries, to evaluate performance tasks, to determine prior knowledge, for test preparation (review), to assess and monitor daily progress, for student self-assessment, for completing open-ended tasks, to evaluate how well learning objectives have been met by the student, to evaluate teaching effectiveness, and to include in student portfolios. Be certain to give clear, specific examples for each type of assessment contained in the unit. These discussion points are intended to be inclusive but not exhaustive.

5. Discussion of the overall strengths and weaknesses of the curriculum (unit) and recommendations.

Based on your development of the previous four criteria/discussion points, this section will address your overall opinion of the strengths and weaknesses of the curriculum (unit). This section will contain specific suggestions for the remediation and/or supplementation of those areas which are lacking in any significant degree. **You should couch your discussion in relation to what extent this curriculum:**

- a) aligns with the California Mathematics Content Standards.
If the unit is lacking any California Mathematics Content Standards alignment, list those standards, and give clear, specific examples of activities that would align with those standards. In other words, how would you supplement this unit so that the standards that must be addressed by the mathematical content in the unit are properly reflected in the activities?
- b) promotes instructional practices that support inclusive teaching and learning
If the curriculum is lacking any of the areas listed in this discussion point, you are to suggest how these areas could be defined and implemented. Give clear, specific examples for each area that is lacking. It is not enough to say that they are lacking, because as a teacher in a California public school, you will have to determine to what extent these areas are addressed and make alterations accordingly.
- c) encourages children's mathematical thinking
If children's mathematical thinking is not emphasized in the curriculum or is not emphasized to any significant degree, then you should discuss how you would alter, modify, or deliver the mathematical content in the unit so that it does place emphasis on constructivist learning and relational understanding.
- d) reflects good assessment methods to effectively assess and evaluate student thinking and achievement
If the assessment components are not nearly inclusive of those listed under this discussion point, then discuss how you would provide assessment methods to be able to adequately evaluate student learning. Be sure to provide specific examples for each type of assessment method/category.

NOTE!!! If you find that you have identified both strengths and weaknesses (or only strengths) in this curriculum (unit), then your discussion under each criteria should reflect those strengths and weaknesses (or only strengths as the case may be).

Reminders:

- **Don't forget to specify and focus on a curricular unit.**
- **Please CLEARLY bullet all five points for discussion.**
- **Include in your discussion all points under each criteria.**
- **Provide clear, specific examples to support your statements at all times!!!**
- **Please see me if you need further clarification for this assignment.**

Curriculum Review Assignment

EDMS 543

	Developing	Nearly Meets	Meets	Exceeds
TPE 1, 1a Subject Specific Pedagogical skills for MS Teaching Assignment (Teaching Mathematics in a MS Assignment)	Candidate's analysis of the curriculum will demonstrate little to no understanding of how to teach the state adopted academic content standard in mathematics.	Candidate's analysis of the curriculum will demonstrate some understanding of how to teach the state adopted academic content standard in mathematics.	Candidate's analysis of the curriculum will demonstrate considerable understanding of how to teach the state adopted academic content standard in mathematics.	Candidate's analysis of the curriculum will demonstrate exceptional understanding of how to teach the state adopted academic content standard in mathematics.
TPE 4 Making Content Accessible	Candidate's analysis of the curriculum will demonstrate little to no understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum.	Candidate's analysis of the curriculum will demonstrate some understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum	Candidate's analysis of the curriculum will demonstrate considerable understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum	Candidate's analysis of the curriculum will demonstrate exceptional understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum
TPE 6, 6a, 6b Developmentally Appropriate Teaching Practices in Grades K-3 & 4-8	Candidate's analysis of the curriculum will demonstrate little to no understanding in the use of developmentally appropriate teaching practices.	Candidate's analysis of the curriculum will demonstrate some understanding in the use of developmentally appropriate teaching practices	Candidate's analysis of the curriculum will demonstrate considerable understanding in the use of developmentally appropriate teaching practices	Candidate's analysis of the curriculum will demonstrate exceptional understanding in the use of developmentally appropriate teaching practices

Secondary TPE's for this Assignment

- TPE 9 – Instructional Planning
- TPE 10 – Instructional Time

Lesson Presentation Assignment

EDMS 543

	Developing	Nearly Meets	Meets	Exceeds
TPE 1, 1a Subject Specific Pedagogical skills for MS Teaching Assignment (Teaching Mathematics in a Multiple Subject Assignment)	Candidates' lesson plan and presentation demonstrates little to no understanding of how to teach the state adopted academic content standard in mathematics	Candidates' lesson plan and presentation demonstrates some understanding of how to teach the state adopted academic content standard in mathematics	Candidates' lesson plan and presentation demonstrates considerable understanding of how to teach the state adopted academic content standard in mathematics	Candidates' lesson plan and presentation demonstrates exceptional understanding of how to teach the state adopted academic content standard in mathematics
TPE 4 Making Content Accessible	Candidates' lesson plan and presentation will demonstrate little to no understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum	Candidates' lesson plan and presentation will demonstrate some understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum	Candidates' lesson plan and presentation will demonstrate considerable understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum	Candidates' lesson plan and presentation will demonstrate exceptional understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum
TPE 6, 6a, 6b Developmentally Appropriate Teaching Practices – Grades K-3 & 4-8	Candidates' lesson plan and presentation will demonstrate little to no understanding in the use of developmentally appropriate teaching practices.	Candidates' lesson plan and presentation will demonstrate some understanding in the use of developmentally appropriate teaching practices.	Candidates' lesson plan and presentation will demonstrate considerable understanding in the use of developmentally appropriate teaching practices.	Candidates' lesson plan and presentation will demonstrate exceptional understanding in the use of developmentally appropriate teaching practices.

Secondary TPE's for this Assignment

- TPE 2 – Monitoring Student Learning During Instruction
- TPE 5 – Student Engagement
- TPE 9 – Instructional Planning
- TPE 10 – Instructional Time
- TPE 11 – Social Environment

Lesson Resources Assignment

EDMS 543

	Developing	Nearly Meets	Meets	Exceeds
TPE 4 Making Content Accessible	Candidates' resources and descriptions will demonstrate little to no understanding of how instructional resources can help provide all students with access to a balanced and comprehensive curriculum.	Candidates' resources and descriptions will demonstrate some understanding of how instructional resources can help provide all students with access to a balanced and comprehensive curriculum.	Candidates' resources and descriptions will demonstrate considerable understanding of how instructional resources can help provide all students with access to a balanced and comprehensive curriculum.	Candidates' resources and descriptions will demonstrate exceptional understanding of how instructional resources can help provide all students with access to a balanced and comprehensive curriculum.

Secondary TPE's for this Assignment

- TPE 1a – Subject-Specific Pedagogical Skills for MS Teaching Assignments (Teaching Mathematics in a MS Assignment)
- TPE 5 – Student Engagement

Student Interview Assignment

EDMS 543

	Developing	Nearly Meets	Meets	Exceeds
TPE 1, 1a Subject Specific Pedagogical skills for MS Teaching Assignment (Teaching Mathematics in a Multiple Subject Assignment)	Candidate's assessment and recommendations from the student interview demonstrates little to no understanding of how to teach the state adopted academic content standard in mathematics	Candidate's assessment and recommendations from the student interview demonstrates some understanding of how to teach the state adopted academic content standard in mathematics	Candidate's assessment and recommendations from the student interview demonstrates considerable understanding of how to teach the state adopted academic content standard in mathematics	Candidate's assessment and recommendations from the student interview demonstrates exceptional understanding of how to teach the state adopted academic content standard in mathematics
TPE 2 Monitoring Student Learning During Instruction	Candidate's assessment and recommendations from the student interview demonstrates little to no understanding of how to monitor student learning and how to effectively make use of this information when teaching.	Candidate's assessment and recommendations from the student interview demonstrates some understanding of how to monitor student learning and how to effectively make use of this information when teaching.	Candidate's assessment and recommendations from the student interview demonstrates considerable understanding of how to monitor student learning and how to effectively make use of this information when teaching.	Candidate's assessment and recommendations from the student interview demonstrates exceptional understanding of how to monitor student learning and how to effectively make use of this information when teaching.
TPE 3 Interpretation and Use of Assessments	Candidate demonstrates little to no understanding of how to effectively assess students' content knowledge through the use of student interviews.	Candidate demonstrates some understanding of how to effectively assess students' content knowledge through the use of student interviews.	Candidate demonstrates considerable understanding of how to effectively assess students' content knowledge through the use of student interviews.	Candidate demonstrates exceptional understanding of how to effectively assess students' content knowledge through the use of student interviews.
TPE 4 Making Content Accessible	Candidate's recommendations from the student interview demonstrates little to no understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum	Candidate's recommendations from the student interview demonstrates some understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum	Candidate's recommendations from the student interview demonstrates considerable understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum	Candidate's recommendations from the student interview demonstrates exceptional understanding in the use of pedagogical strategies that will provide all students access to the mathematics curriculum

Secondary TPE's for this Assignment

- TPE 5 – Student Engagement
- TPE 6, 6a, 6b – Developmentally Appropriate Practices in Grades K-3 & Grades 4-8.
- TPE 8 – Learning about Students
- TPE 9 – Instructional Planning

DATE	EDMS 543 COURSE TOPICS	Van De Walle text chapters
09/03/03	Course Introduction Why do we do mathematics? (Big picture) Conceptual vs. procedural knowledge Characteristics of Effective Classrooms: Overview of Instructional Practices	1- Teaching Mathematics in the Context of the Reform Movement 2 - Exploring What It Means to do Mathematics
09/08/03	Developing understanding—How do kids learn? Teaching through problem solving Discussion of Cognitively Guided Instruction	3 -Developing Understanding in Mathematics 4 -Teaching Through Problem Solving
09/10/03	Interviews Assessment – Discussion of how kids learn through problem solving development	5 -Building Assessment into Instruction 6 - Planning in the Problem-Based Classroom
09/15/03	Mathematics Content Standards for California Public Schools Group presentations of assigned standards CA Mathematics Standards Star Test Blueprint	This document is available on: http://www.cde.ca.gov/standards/
09/17/03	Special Populations: Creating Inclusive Classrooms Multiple Representations and meeting the needs of all students	7 - Teaching All Children Mathematics
09/22/03	Number Sense I: PRACTICE INTERVIEW DUE What it means and how we can help children develop it.	9 - Developing Early Number Concepts and Number Sense
09/24/03	Number Sense II: Classification of word problems for addition, subtraction, multiplication, and division. How all children can construct efficient mental tools for fact mastery.	10 -Developing Meanings for the Operations 11 - Helping Children Master the Basic Facts
09/29/03	Number Sense III: Developing understanding of place value Place Value Interview due	12 - Whole-Number Place-Value Development
10/01/03	Number Sense IV: Developing flexible methods of computation, mental strategies, and estimation. Building estimation skills Add/Subtraction OR Multip/Division classroom presentation Addition/Subtraction OR Multiplication/Division interview due (turn in only one interview)	13 - Strategies for Whole Number Computation 14 – Computational Estimation with Whole Numbers
10/06/03	Fractions I: Constructing understanding of fractions; fraction computation Fraction classroom presentation #1 (grades K-4 lesson choice)	15 -Developing Fraction Concepts 16 - Computation with Fractions
10/08/03	Fractions II: Decimals and Percents Developing proportional reasoning Fraction classroom presentation #2 (grades 5-8 lesson choice) Fraction interview due	17 - Decimal and Percent Concepts and Decimal Computation 18 - Developing Concepts of Ratio and Proportion
10/13/03	Measurement - Customary and metric system Measurement classroom presentation Measurement interview due	19 -Developing Measurement Concepts
10/15/03	Geometry – Developing geometric reasoning and spatial sense Geometry classroom presentation Geometry interview due	20 - Geometric Thinking and Geometric Concepts
10/20/03	Probability & Data Analysis – Developing meaningful experiences in gathering and displaying statistical data. Exploring concepts of chance, simple and independent events. Probability & Data Analysis classroom presentation Probability & Data Analysis interview due	21 - Exploring Concepts of Probability and Data Analysis
10/22/03	Algebraic Reasoning and Function – Exploring patterns, variables, and equations. Developing function concepts. Algebra classroom presentation; Algebra interview due LAST DAY TO TURN IN CURRICULUM ASSIGNMENT!!!	22- Algebraic Reasoning 23 – Exploring Functions
**NOTE	Technology – This competency will be infused throughout the course. Use this chapter as an ongoing reference.	8 – Technology and School Mathematics

