TEACHING MATHEMATICS IN THE ELEMENTARY SCHOOL
EDMS 543 – Fall 2006 CRN 42642

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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 on-going 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/ci/ma/cf/index.asp (I highly encourage students to purchase this publication).
- 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: http://www.cde.ca.gov/ta/tg/sr/blueprints.asp
- Van de Walle, John A. (2004). Elementary and middle school mathematics: Teaching developmentally (6th ed.). Boston: Pearson Education, Inc.

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 I hope 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.

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 Emphasis:

- 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 Practices for Special Education
- 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

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.

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

KEY ASSIGNMENTS:

Reading Reflections - Each week students will write a "meaningful" reflection on the articles assigned to be read for that week. These reflections should clearly articulate your thoughts **on the articles** and discuss how you might **specifically apply** what you learned from the articles as a teacher in the classroom. Web CT will be used for the purpose of discussion. This will be explained in class. (35 points)

Student Interviews - You and one of your classmates(optional) will conduct a series of four 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. (4 interviews/ 40 points)

Mathematical Resources & Lesson – Working in small groups, your team will compile resources on a predetermined mathematical topic design a series of connected lessons that you will present in class . 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. (40 points total)

GRADING SCALE:

Grades will be based on the following grading scale:

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

ATTENDANCE POLICY:

The attendance policy of the College of Education: Due to the dynamic and interactive nature of course 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 dishonestly 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 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.

SB2042 – 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
		IV. Cultural Diversity in U.S. and CA
		A. Historical perspectives
		B. Demography
		C. Migration and immigration

Date	Session Number and Topic	Assignment to be Completed BEFORE Class Session
Mon 8-28-06	1. Introduction to Mathematics Education	
Mon 9-4-06	2. Developing Mathematical Understanding	No class
Mon 9-11-06	3. Problem Solving	Van de Walle ch. 2,3,4 (written reflection)
Mon 9-18-06	4. Standards	
Mon 9-25-06	5. Lesson Study & Working Groups	Assigned Readings: (http://www.lessonresearch.net)
Mon 10-2-06	6. Instructional Practices	Van de Walle ch. 5, 7
Mon 10-9-06	7. Assessment & Conducting Student Interviews	Van de Walle ch. 6
Mon 10-16-06	8. Technology	Van de Walle ch. 8
Mon 10-23-06	9. Addition and Subtraction	Van de Walle ch. 9, 10 *Student Interview #1 Due
Mon 10-30-06	10. Multiplication and Division	Van de Walle ch. 11,13 Number Concepts Interview Due
Mon 11-6-06	11. Number Concepts	Van de Walle ch. 12, 14 *Multip. Interview Due
Mon 11-13-06	12. Fractions, Decimals, Percents, Ratio & Proportion	Van de Walle ch. 16, 17, 18 *Algebra Interview Due
Mon 11-20-06	13. Algebraic Thinking	Van de Walle ch. 15
Mon 11-27-06	14. Measurement & Geometry	Van de Walle ch. 19, 20,21 *Fraction Interview Due
Mon 12-4-06	15. Data Analysis & Probability	Van de Walle ch. 22,23 *Data Anal/Prob Interview Due
Mon 12-11-06	16. Wrap-up	*Measurement/Geometry Interview Due

STUDENT INTERVIEW GUIDELINES
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Student interviews are designed to provide students with opportunities to focus on a single child's thinking about mathematics. It will also help students to improve their use of inquiry for assessment purposes and to better understand elementary level students with different understandings.

I recommend that students work together with a partner on these interviews. As a pair, you would interview one child for each content interview and together write up your evaluation of the student (please also submit the child's written work attached to your paper).

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 the classroom, if possible.

- Provide the teacher with some understanding of what the interview will contain and see if he/she has any thoughts about how this child will do on the assessment.

- 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. Inform the child that s/he can solve the problems in any way s/he wants. Please remind the child that the interview is voluntary and that s/he can end the interview at any time (if a student does end early then please find another willing student). Do everything you can to help make the child comfortable.

Orally provide the child with each problem, posing them one at a time, you received from class and provide him/her with sufficient time to complete each problem. You may also want to provide the child with a written copy of each problem.

After the child answers each problem you should ask a variety of 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 (try to fight the urge to be "teacher").

- 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.

- Make sure the child feels comfortable during the entire interview. If the child clearly cannot answer a problem, move on to the next problem. If you feel that the child is really struggling and frustrated, you may want to end the interview or give the child a problem you are fairly certain s/he can solve and then end the interview. If you cut an interview short because of student difficulty, be sure to discuss your reasoning in your write-up.

After the interview

You (and your partner) should **together** write no more than a two page reflection that includes a brief discussion on each of the following two points:

- What specifically did you learn about this child's mathematical understanding? Here you will want to make some 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.

- 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.

Grading:

Each interview will be worth a total of 10 points. More specifically, I will be looking for nicely written papers that clearly and specifically express what you learned about: 1) the child's mathematical understanding and 2) what you would do next for this child if you were his/her teacher (again be specific here). For example, you might recognize that this student lacks a conceptual understanding of multiplication – so as this child's teacher you might want to pose meaningful problems related to multiplication, etc.

*NOTE: When you turn in your write-up, you should also include the child's written work (if it exists) and without the student's "actual" name listed.

MATHEMATICAL RESOURCES ASSIGNMENT
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In preparation for your Classroom Presentation Assignment, your "content group" will construct an Annotated List of Resources that your fellow colleagues will find helpful when teaching your mathematical topic to students. Your list should include resources that directly relate to your mathematical topic (e.g., algebra, geometry, etc.). For example, you should include such things as children's literature, teacher support materials, manipulatives, WWW locations, research articles, videos or movies, software, etc. Please include any useful information that you find when researching your topic so that your colleagues can learn from your work (but do not include duplicated pages from teacher workbooks, rather provide citations along with short descriptions of your resources). I will be looking to find well- constructed packets of information. If you partition the workload it should not be an overwhelming task. If each group prepares a packet of materials that is filled with important resources, and we share that information in class, then you will each have a wealth of information on some of the important mathematical resources for use when you teach! A general "rule of thumb" might be for your group to try and find 10 resources in each of the areas mentioned. Some topics will naturally have more resources than other topics.

Your group will need to turn in one nicely prepared copy of your List of Resources in on the day of your group presentation. Your group should also be prepared to make a 5 minute presentation that highlights some of the resources you found (consider bringing in a few of the items that you found most helpful when planning your presentation and resources for these materials).

This project is purposefully open-ended in the hopes that you will go out and find some great resources for your mathematical topic and for your presentation. You should talk with your master teachers, use the internet, and make use of materials I provide. However, if you have any questions or challenges finding resources, please be sure to ask (I am happy to provide support…I want these to be good so they are good resources)!

Mathematical Lessons:

Working in small groups, students will present a series of connected lessons that would help students understand a mathematical concept. Groups of four will work together to prepare lessons in a given strand of the elementary math curriculum. Each member must present a mini-lesson to demonstrate a strategy to teach the concept that has been assigned to the group. A written summary of the methods presented needs to be turned in on the day of the presentation.