

## **EDMS 4121: MATHEMATICS METHODS**

3 units

Instructor: Elmano M. Costa, Ed. D.	Spring 2005
Office: Demergasso Bava Hall. 334	3 Units
Tuesday, 9:15-12:15	C-131
Phone: (Dept.) 667-3357 (Office) 667-3638	Email: <a href="mailto:ecosta@csustan.edu">ecosta@csustan.edu</a>
Office Hours: Tues. 3:00-5:00. Also, call for any questions, special appointment times, etc. I will be available immediately after class to answer questions/meet with students.	

### **Our CONCEPTUAL FRAMEWORK**

#### **Our MOTTO**

Advocates for children  
and their communities.

#### **Our VISION**

The professional preparation programs in the College of Education have a shared vision: To prepare teachers and service personnel who impact positively and optimally on the achievement of all P-12 students in academic and non-academic areas. The attributes that undergird our school-based preparation programs are high standards, academic rigor, and intellectual integrity.

CSU Stanislaus, College of Education has an enduring commitment to the preparation of professionals who are:

- competent in their chosen areas,
- able to integrate subject-matter content with pedagogy appropriate to their field of study,
- culturally responsive and responsible, knowledgeable, and appreciative of the diversity among learners,
- committed to self-assessment and reflection,
- partners, educational advocates, and leaders at the school level and in the wider community, and,
- users of technology that enhances teaching and learning.

#### **Our MISSION**

The Mission of the College of Education is to undertake the professional preparation of teachers and school service professionals, as identified by state legislative and administrative law. The faculty of the College is committed to meeting the rightful expectations of the public regarding the education of effective and dedicated professionals and creating a student-centered learning paradigm. The College of Education is also committed to broadening and deepening the pool of educators to reflect the diversity of its school populations.

### **COURSE INFORMATION**

#### **I. Course Description**

Introduction to the methods and materials used in the teaching of mathematics in grades K-8. Emphasis is on instructional planning, concept development and the use of manipulatives for instruction as outlined in the California Mathematics Framework.

In this course students will examine the issues and the reform movement shaping mathematics education today. Emphasis will be placed on preparing teachers to work in diverse classrooms, and on using principles from the California Mathematics Framework and California Mathematics Content Standards to inform classroom practice and engage students in purposeful mathematics learning.

Prerequisite: Admission to the Multiple Subjects Credential Program

#### **II. Course Objectives:**

Students will grapple with the dilemmas, theories, the research (including research on child development and the influence of familial factors in development in math) and its application, and the reform movement currently reshaping mathematics education.

(Standard 3A, 3B, 8A, 10A (ii), 11A, 11B, 11C, 12A; TPEs 1a, 4, 5, 6, 7, 9, 10, )

Students will analyze instructional practices and alternative forms of assessment compatible with the goals outlined in the Framework and Content Standards and use assessment results to plan instruction (Standard 3C, 4F, 4B, 4D, 5A, 5B, 5F, 8A, 11C, 12A, 12C, 12D, 12E, TPEs 3, 4, 5, 6, 7, 8, 9, )

Students will become familiar with cooperative learning methods, and individual work approaches and when to use each approach. (Standard 3E, 5A, 5B, 8A, 11C, 12A, 12E; TPEs 1a, 4, 5, 6, 7, 9, 10, 11, )

Students will become familiar with a variety of instructional and classroom management formats including: whole class instruction, centers, and menu activities. (Standard 3C, 3E, 5A, 8A, 12A, 12E; TPEs 2, 4, 5, 6, 7, 9, 10, 11, )

Students will be able to teach three types of math lessons: direct instruction, investigation and problem solving (Standard 3C, 3E, 5A, 11A, 12A, 12E; TPEs 2, 4, 5, 6, 9, 10, )

- Students will gain experience working with a wide range of mathematics manipulatives used to develop conceptual understanding. (Standard 3E, 8A, 11C; TPEs 1a, 4, 5, 6, 7, 9, )
- Students will observe math lesson and reflect on what they observed and how it relates to the theories, methods and practices learned in the course and whether there was any bias in the lesson (Standard 3D, 4A, 5E, 8A, 11C, 12A, 15E; TPEs 2, 6, 7, 8, )
- Students will be actively engaged in selecting materials to use with K-8 students, designing lessons and other learning activities to support learning, including reading instruction, and to design a means of assessing the learning that has occurred as a result of teaching. (Standard 4D, 7A(b), 8A, 11C; TPEs 1a, 2, 3, 4, 5, 6, 7, 9, 10, )
- Students will become familiar with the forms of bias in math instruction, and identify ways to remove bias from math instruction. (Standard 5B, 5E, 8A, TPE 5, 6, 7, 9, 11, )
- Students will implement instructional practices designed to make math accessible to students with learning disabilities, gifted students, and students who are English learners (Standard 14A, 14E; TPEs 1a, 5, 6, 7, 8, 9, 10, 11, )
- Students will gain practical experience teaching lessons in classrooms and will reflect on these lessons. (Standard 3D, 4A, 5F, 8A, 11C, 12C, 15A, 17B; TPEs 1a, 2, 3, 4, 5, 6, 7, 9, 10, 11, )
- Students will become familiar with, learn, and practice the Teacher Performance Expectations as they apply to mathematics instruction. (Implement TPEs 1-4, 6-7, and 9; apply TPEs 5, 8, 10, 11) (Standard 6A, 15B)
- Students will prepare for the TPA task 2-4 and complete Task 1, Scenario 2 -(Standard 6A)
- Students will develop an understanding of the research on the use of technology in mathematics education and be able to use appropriate technologies and software in their lesson plans, their instruction, and for management tasks, including communicating via email and conducting searches of electronic databases. (Standard 9A, 9B, 9D, 9E, 9G, 9H; TPE 4, 5, 6, 7, 9,)
- Students will learn a variety of approaches to review reading assignments, and increase comprehension of reading (Standard 7A(b), 7A(c), 8A; TPEs 5, 9, )
- Students will develop an appreciation for math as a mode of thinking and strategy for inquiry. (Standard 12C; TPE 11)
- Students will gain confidence and a positive attitude in their ability to teach it to elementary school students. (Standard 12; TPE 11)

### III. Readings

#### Required

- Burns, Marilyn (1992). About teaching mathematics: A K-8 resource. White Plains, NY: Math Solutions Publications.
- California Department of Education (1999). Mathematics framework for California public schools, kindergarten through grade twelve. Sacramento: Author.
- Selected Readings from packet given out in class.

#### Highly Recommended Texts

- Baratta-Lorton, Mary (1995). Mathematics their way. Palo Alto: Addison-Wesley.
- Baratta-Lorton, Robert (1977). Mathematics... A way of thinking. Palo Alto: Addison-Wesley.
- Stenmark, Jean Kerr (1995). 101 Short Problems from EQUALS. . UC Berkeley: Lawrence Hall of Science.
- Stenmark, Jean Kerr; Thompson, Virginia; & Cossey, Ruth (1986). Family math. UC Berkeley: Lawrence Hall of Science.
- Nichols, Eugene and Schwartz, Sharon ( 1996) Mathematics Dictionary and Handbook: English-Spanish. Mexico City: Grupo Editorial Iberoamérical.

### IV. Other Resources

- Ashlock, Robert. B. (1998). Error patterns in computation. Upper Saddle River, New Jersey: Merrill.
- Burns, Marilyn (1991). Math by all means: Multiplication, Grade 3. New Rochelle, New York: Cuisenaire Company.
- California Department of Education (1991). Seeing fractions: A unit for the upper elementary grades. Sacramento: author.
- Johnson, David W. & Johnson, Roger T. (1991). Leaning mathematics and cooperative learning: Lesson plans for teachers. Edina, Minnesota: Interaction Book Company.
- Lawrence Hall of Science (1992). Frog math: Predict, ponder, play. Berkeley: Lawrence Hall of Science.
- TIMS Curriculum (1997). Math Trailblazers: A mathematical journey using science and language arts. Grades 1-3. Dubuque: Iowa: Kendall/Hunt Publishing Company.
- Stein, Marcy; Silbert, Jerry; & Carnine, Douglas (1997). Designing effective mathematics instruction: A direct instruction approach. Upper Saddle River, New Jersey: Merrill.
- Van de Walle, John ((1998). Elementary and middle school mathematics. Menlo Park, California: Longman.
- Willoughby, Stephen S. (1990). Mathematics education for a changing world. Alexandria, Virginia: ASCD.

### V. Evaluation/Grading

#### Criteria Used to Evaluate Student Learning (Standard 6c)

1. Class attendance and punctuality. Students who are absent for more than 2 class sessions will receive a failing grade. Students who are absent for more than 1 (one) class session can receive a grade no higher than a B.
2. Meeting due dates for assignments. No tardy/late papers, except in extreme emergencies and only with the permission of the instructor as per policy stated below.

3. All work must be typed.
4. Written work must be of graduate quality. Work that is not will be returned for re-doing.
5. Active and informed participation in classroom discussions and activities.
6. Engaging in out-of-class activities and readings from books, journals, periodicals, etc. and share your learning/discoveries with the class.
7. As this is a 3 unit class, students are expected to spend at least 9 hours per week in preparation.

**Assignments (Standard 6c)**

	<b><u>Points</u></b>
•1 Attendance and active, informed participation (2 points per day - punctuality is expected, Students who are absent for more than 1 (one) class session can receive a grade no higher than a B. Students who are absent for more than 2 class sessions will receive a failing grade)	28
•2 Eleven quizzes on reading OR weekly journal	32
•3 Report & reflection of observations (at least 2 lessons with one in primary & one in intermediate-one in primary Lang.)	20
•4 Lesson Plan, Teaching & Reflection: Direct Instruction Lesson to peers	20 (Due one week after lesson presentation)
•5 Mid-point quiz/exam	30
•6 Lesson Plan, Teaching & Reflection: Exploration/Discovery lesson to school students	20
•7 Lesson Plan, Teaching & Reflection Prob. Solv. Lesson Plan to Peers OR Extra Cred: Prob. Solv Lesson to school students	20  25
•8 Final quiz/exam	<u>30</u>
TOTAL	200
Total Possible with extra credit	205

**Grading\***

205	A+
187-204 points	A
180-186 points	A-
174-179 points	B+
167-173 points	B
160-166 points	B -
154-159 points	C+
147-153 points	C
140-146 points	C-
134-139 points	D+
127-133 points	D
120-126 points	D-
119 or less points	F

\*All written assignments except the quizzes/tests may be revised and resubmitted for a better grade if a student so chooses.

**Policy on late assignments**

- 1) Written assignments (except quizzes and exams) can be turned in late. For each week that an assignment is late (anytime after the due date and up to the next class meeting time), grades are reduced 6 points from what the assignment would have earned. However, no assignment will be accepted that is more than 2 weeks late. Also, no assignment will be accepted after the last day of class.
- 2) If a student chooses to redo an assignment or is told by the instructor to redo an assignment, the student has two weeks to turn the assignment in from the date it was returned to the class. After that, the assignment will not be accepted. No assignment will be accepted after the last day of class.
- 3) Assignments due the last two weeks of the semester cannot be turned in late

**DIRECTIONS FOR WEEKLY JOURNALS (for those who choose this option)**

- 1) Make an entry each week
- 2) Entries should be from 1 to 2 pages long total, **double-spaced**
- 3) Entries should be typed

- 4) Simply list the key points from the reading (summarize). NOTE: Don't just list section headings -actually list the key points from the body of the article/chapter, but don't list every detail. This is a summary. List enough so that I know you read.
- 5) You may then reflect on what you read
  - What did you learn about teaching math?
  - Any other thoughts raised by the reading assignment
- 6) If there is more than one reading assignment, make a separate entry for each reading. Usually the M. Burns reading section can be summarized in less than one page; the other may take 1.5 to 2 pages.
- 7) Bring your journals to class each week. At the beginning of each class, we will exchange journals, read each others, and write a quick response to what the person wrote (while those who chose quizzes take the quiz). **JOURNALS WILL BE TURNED IN EACH WEEK.**

### **SCHEDULE FOR THE SEMESTER**

Note: The following Schedule provides a preliminary outline of topics and assignments. This schedule may be modified by the instructor as necessary.

## **PART I: FOUNDATIONS OF MATHEMATICS EDUCATION, ARITHMETIC, AND DIRECT INSTRUCTION**

### **Session 1 – Feb. 15**

INTRODUCTION AND REVIEW OF THE COURSE; IMPORTANCE OF PATTERN IN MATH

Sorting and Pattern in math education

Developing classrooms rules/group norms

### **Session 2 - Feb. 22**

MATH AS WE KNEW IT: DIRECT INSTRUCTION; PLACE VALUE

Modeling: Direct Instruction Lesson

#### *Readings*

- 1) Good, T. L., Grouws, D.A., & Ebmeier, H. (1983). Active mathematics teaching. New York: Longman Inc. (Chapter 2 Conclusion & Chapter 3, pp. 29-55)
- 2) About Teaching Mathematics, Place Value (pp. 173-182)

*Due:* Contract of which grade you are working for. Write it on a full size sheet of paper and sign it. Be sure to state **1)** what grade you are working for, **2)** whether you will take quizzes or write journal and **3)** whether you will teach the problem solving lesson in a school for extra credit or to peers. We will have a sample quiz on this day to help you decide on whether to do journals or take quizzes.

**Note: Make contact with a school and arrange your observations.**

### **Session 3 – March 1**

TEACHING ADDITION

#### *Reading*

- 1) About Teaching Mathematics: Addition and subtraction (pp. 183-193).
- 2) California Math Framework (1999). Chapter 1 - Guiding Principles and Key Components of an Effective Mathematics Program, pgs. 5-16.

*Due:* 1) Be prepared to teach your lesson using direct instruction techniques ("A" contracts). Schedule will be as per the sign-up sheet completed in week 2.

REFLECTION AND LESSON PLAN DUE ONE WEEK AFTER YOUR PRESENTATION.

Turn in the following, when due:

- Lesson Plan
- **Type and attach your reflection of about 2-3 pages (2 pages minimum), double-spaced**
  - a. Describe what you and the students did (8 points) - about half to three fourths of a page
  - b. What did you learn about teaching math from this experience? (12 points) - about 1 to 2 pages
- Attach feedback forms from your peers

**Session 4 – March 8**

## TEACHING SUBTRACTION

Remedial approaches (including Touchmath) - Addition and Subtraction

*Reading*

- 1) About Teaching Mathematics: Introduction sections (pp. 3-11).
- 2) Lotan, R. & Benton, J. (1990). Finding out about complex instruction: Teaching math and science in heterogeneous classrooms. In N. Davidson (Ed.), Cooperative Learning in Mathematics. Addison-Wesley.

*Due* : Reflection of observation of mathematics lessons**Session 5 – March 15**

## TEACHING MULTIPLICATION; MULTIPLICATION MENU

*Reading*

- 1) About Teaching Mathematics: Multiplication (pp. 194-203).
- 2) Johnson, D.W. & Johnson, R.T. (1990). Using cooperative learning in math. In Neil Davidson Cooperative Learning in Mathematics. Menlo Park, CA: Addison-Wesley Publishing Co.

**Session 6 – March 22**

## TEACHING DIVISION

*Reading*

- 1) About Teaching Mathematics: Division (pgs. 204-222).
- 2) Phillips, D. et al. (1994). Beans, Blocks, and Buttons: Developing Thinking. Educational Leadership (Feb. 1994): 50-53.

**March 29 – Spring Break****Session 7 – April 5**

## TEACHING FRACTIONS, DECIMALS and PERCENTS

*Reading*

- 1) About Teaching Mathematics, Fractions , Decimals, and Percents (pg. 223-252)
- 2) Fractions and Interactions (This is in your reading packet - has no author). Read it for what not to do when you teach. How does she violate most of what we have learned so far about teaching math??

**Due: Bring the first reading article to class: Active mathematics teaching by Goode, T. & Grouws (Missouri Math).****PART II: THE MATHEMATICAL STRANDS; DISCOVERY/INVESTIGATION AND PROBLEM SOLVING LESSONS****Session 8 – April 12**

## MEASUREMENT

Discovery &amp; Problem Solving lessons

## MIDTERM EXAM

*Reading*

- 1) About Teaching Mathematics, Measurement (pp. 46-53)
- 2) Rowan, T. E. & Robles, J. (1998). Using questions to help children build mathematical power. Teaching Children Mathematics, pg. 504-509.

**Session 9 – April 19**

## GEOMETRY

Discovery &amp; Problem Solving lessons

*Reading*

- 1) About Teaching Mathematics: Geometry (pp. 79-99).
- 2) California Math Framework (1999). Chapt. 2: The California Mathematics Academic Content Standards (for grades K-6), pp. 17-63. Read intro on pgs. 17-21 and skim pgs. 22-63. BE SURE TO BRING THIS TO CLASS.

**Session 10 – April 26**

## PROBABILITY &amp; STATISTICS

Playing with Probability: Menu Activities & Rotating Centers

*Reading*

- 1) About Teaching Mathematics: Probability and Statistics (pp. 59-78) and Independent Problem Solving - The Menu (pp. 37-38)
- 2) California Math Framework (1999). Chapt. 4: Instructional Strategies, pp. 178-193.

**NOTE: BRING YOUR FIRST ARTICLE FROM THE READING PACKET FOR A CLASS ACTIVITY** (Good, T. L., Grouws, D.A., & Ebmeier, H. (1983). Active mathematics teaching. New York: Longman Inc. (Chapter 2 Conclusion & Chapter 3, pp. 29-55))

*Due:* Draft lesson plans for Discovery/Exploration Lesson and Problem Solving Lesson - they will not be graded, only reviewed so that I may give you suggestions. Note: If you fail to turn in the draft of the lessons on this date, your lesson will receive 5 points less for each lesson than you would have earned when you turn in the assignment later in the semester.

**Session 11 – May 3**

## PATTERNS &amp; FUNCTIONS

Menu video

*Reading*

- 1) About Teaching Mathematics: Patterns and functions (pp. 112-124)
- 2) About Teaching Mathematics: Word Problems, etc. (pp. 12-34)

**Session 12 – May 10**

## LOGIC; CURRICULUM MAPPING/PLANNING PROCESS

*Reading*

- 1) About Teaching Mathematics: Logic (pp. 100-111).
- 2) California Math Framework (1999). Chapt. 6: Universal Access, pp. 201-209.

*Due:* Lesson plan, proof of teaching, and reflection of exploration-type lesson  
BRING YOUR COPY OF THE FRAMEWORK CONTENT STANDARDS TO CLASS

**Session 13 – May 17**

## NUMBER; ASSESSMENT, GRADING, REPORT CARDS

*Reading*

- 1) About Teaching Mathematics: Number (pp. 125-135)
- 2) California Math Framework (1999). Chapt. 5: Assessment, pp. 194-200.

*Due:* Lesson Plan, Reflection, and Proof of Teaching of Problem Solving Lesson (for those who teach lesson in schools - for those who teach it to peers, it will be due one day after the final exam date)

**Session 14 – May 24**

FINAL EXAM - Same time as the regular class meeting.

Teaching problem solving lessons to peers - for those who chose not to teach it in a school.

## List of Resources

ORGANIZATION	PHONE	FAX	ADDRESS	EMAIL	INTERNET
Reading Rainbow Math	800-228-4630	800-306-2330	P. O. Box 80669 Lincoln, NE 68501-0669	gpn@unl.edu	gpn/unl.edu
California Department of Education	916-445-1260	916-323-0823	P. O. Box 271 Sacramento, CA 95812-0271		www.cde.ca.gov/publications/Pub.html
AIMS	888-259-8786	209-255-6396 (559)	P. O. Box 8120 Fresno, CA 93747-8120		www. AIMSedu.org/
Center for Innovation in Ed.- Math Their Way	888-442-3688 800-395-6088	408-741-6292	1510 A Dell Avenue Campbell, CA 95008		www.center.edu
National Council of Teachers of Mathematics NCTM	800-235-7566	703-476-2970	1906 Association Dr. Ralston, VA 20191-9988	nctm@nctm.org	www.nctm.org
Mid-Continent Regional Educational Laboratory-McREL					www.mcREL.org
Lawrence Hall of Science – U C Berkeley (EQUALS, Family Math)	510-642-1910	510-643-5757	University of California Berkeley, CA 94720		

**Math Books Available in the University Library**

These can be used to find lesson plans for lessons to teach to peers or in the classroom.

Writing in math class: a resource for grades 2-8

Math: facing an American phobia

50 problem-solving lessons: grades 1-6

M. Burns Units (as follows):

Math by all means: geometry grades 1-2

Math by all means: geometry grades 3-4

Math by all means: place value, grade 1-2

Math by all means: money, grades 1-2

Math by all means: area and perimeter

Math by all means: division grades 3-4

Math by all means: probability, grades 1-2

Math by all means: probability, grades 3-4



## CALIFORNIA STATE UNIVERSITY, STANISLAUS

Department of Teacher Education

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Elmano M. Costa, Ed. D.

Coordinator of Multiple Subject Credential Programs

Voice Mail (209) 667-3638 E-mail [ecosta@csustan.edu](mailto:ecosta@csustan.edu)

To the teacher:

This letter documents that the following CSUS student taught a lesson employing a problem solving strategy. Thank you for giving a student in *EDMS 4121, Mathematics Methods* an opportunity to teach in your class.

Sincerely,

*Elmano Costa*

Associate Professor

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### PROBLEM SOLVING LESSON

Name of CSUS student: \_\_\_\_\_

Lesson title: \_\_\_\_\_

Name of book/source in which lesson was found \_\_\_\_\_

Page of book, if applicable \_\_\_\_\_ Date Published, if applicable \_\_\_\_\_

School: \_\_\_\_\_ Grade: \_\_\_\_\_

Date taught: \_\_\_\_\_ Number of students to whom lesson was taught: \_\_\_\_\_

Print name of teacher \_\_\_\_\_ Teacher phone number \_\_\_\_\_

Teacher email address \_\_\_\_\_

Signature of teacher \_\_\_\_\_ Date \_\_\_\_\_

Student's signature \_\_\_\_\_ Date \_\_\_\_\_

Note: If you teach this lesson while substitute teaching, enter "Substituting" for "signature of teacher."

### **YOUR ASSIGNMENT IS COMPLETED IF IT INCLUDES THE FOLLOWING:**

- 1) Type and attach your reflection of about 2-3 pages (2 pages minimum).**
  - a. Describe what you and the students did (8 points) - about 1 page
  - b. What ideas were reinforced or what did you learn about teaching math from this experience? (12 points) - about 1-2 pages
- 2) Attach the 1) original lesson plan (even if you completely changed your plan) and the 2) revised lesson plan (attach the revised plan only if changes were made).**
- 3) ATTACH ALL STUDENT WORK AS PROOF THAT YOU TAUGHT THIS LESSON. If there was no student paperwork which can be attached, submit a video tape/pictures of the lesson. If no student work is included, there will be no credit for the assignment.**

## PROBLEM SOLVING LESSON PLAN

### CONSIDERATIONS / DIRECTIONS

A problem solving lesson is not a skill lesson with direct instruction, nor an exploration/investigation where the procedures are straightforward. Problem solving lessons have these three characteristics:

- a) There is no obvious answer
- b) There is no obvious way of going about finding the answer
- c) They require lots of thinking, usually in a "many heads together (group work)" format

Remember that the age of the children is an important consideration on what makes a good problem solving lesson. Generally, what may be problem solving for younger children is not a problem for older children.

**Two people may work together on a plan but each must teach it individually.**

**If you are teaching to a group of students instead of the whole class, this group should have at least 8 students.**

### WRITING THE LESSON PLAN

Your lesson plan should be typed and one to two pages (but no longer than three pages). It will be graded on appropriate choice of problem solving lesson, quality of writing, thoroughness and attention to both management and instructional detail. When reading your lesson plan I should have a clear sense of exactly what you and the children will be doing. It should be clear that you have thought of the management issues such as materials, grouping, time allocation, etc.

### PLEASE WRITE YOU LESSON PLAN USING THE FOLLOWING FORMAT

#### I. CONTENT STANDARD TO BE MET

Grade level? What Standard?

#### II. OBJECTIVE(S) - for you, the teacher

Specifically state what you want the students to learn from this lesson (usually to apply math skills to problem solving situations).

(Begin thinking of how will you assess whether they learned the objective?)

Good lessons have few objectives (generally only one objective).

#### III. THE LESSON PLAN TO BE TAUGHT IN THE CLASSROOM - THREE STEP LESSON PLAN

##### 1. INTRODUCTION/ANTICIPATORY SET

How will you introduce the lesson, capture the students interest, focus them on the problem to be solved? Do you need to do a review to connect this lesson to the students previous learning?

Will you demonstrate the activity, give directions, etc.??

What is the problem question they will need to solve? (YOU MUST INCLUDE A QUESTION)

##### 2. PROCEDURE / DEVELOPMENT (THE ACTIVITY)

Describe the problem solving activity in detail which the students will engage in.

Will they have manipulatives/props to help them work through the problem? Which?

How do you plan to manage it?

YOU MUST LIST AT LEAST FIVE QUESTIONS YOU WILL USE TO PROMPT THE STUDENTS, IF NEEDED.

##### 3. WRAP-UP/DEBRIEFING

How will you close the lesson and have students "pull together" what they have learned?

YOU MUST LIST FIVE KEY QUESTIONS YOU WILL ASK THE STUDENTS TO SUMMARIZE THE LESSON.

#### IV. ASSESSMENT

How will you assess student learning? (How will you KNOW if they met the objective?)

#### V. FOLLOW-UP PRACTICE

Will the students have any homework based on this lesson? (if yes, what?)

Will any pertinent activity follow this lesson? (if yes, what?)



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To the teacher:

This letter documents that the following CSUS student taught a lesson in which the students investigated a math concept.

Thank you for giving a student in *EDMS 4121, Mathematics Methods* an opportunity to teach in your class.

Sincerely,

*Elmano Costa*

Associate Professor

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### DISCOVERY/EXPLORATION/INVESTIGATION LESSON

Name of CSUS student: \_\_\_\_\_

Lesson title: \_\_\_\_\_

Name of book/source in which lesson was found \_\_\_\_\_

Page of book, if applicable \_\_\_\_\_ Date Published, if applicable \_\_\_\_\_

School: \_\_\_\_\_ Grade: \_\_\_\_\_

Date taught: \_\_\_\_\_ Number of students to whom the lesson was taught: \_\_\_\_\_

Print name of teacher \_\_\_\_\_ Teacher phone number \_\_\_\_\_

Teacher email address \_\_\_\_\_

Signature of teacher \_\_\_\_\_ Date \_\_\_\_\_

Student's signature \_\_\_\_\_ Date \_\_\_\_\_

Note: If you teach this lesson while substitute teaching, enter "Substituting" for "signature of teacher."

### **YOUR ASSIGNMENT IS COMPLETED IF IT INCLUDES THE FOLLOWING:**

- 1) **Type and attach your reflection of about 2-3 pages (2 pages minimum).**
  - a. Describe what you and the students did (8 points) - about 1 page
  - b. What ideas were reinforced or what did you learn about teaching math from this experience? (12 points) - about 1-2 pages
- 2) **Attach the 1) original lesson plan (even if you completely changed your plan) and the 2) revised lesson plan (attach the revised plan only if changes were made).**
- 3) **ATTACH ALL STUDENT WORK AS PROOF THAT YOU TAUGHT THIS LESSON. If there was no student paperwork which can be attached, submit a video tape/pictures of the lesson. If no student work is included, there will be no credit for the assignment.**

## DISCOVERY/INVESTIGATION/EXPLORATION LESSON PLAN

### CONSIDERATIONS/DIRECTIONS

A discovery lesson is not a skill lesson with direct instruction. It may have some direct instruction, but generally depends on the students to do their own investigation and discovery of mathematical principles. The most distinguishing characteristic of discovery lessons (in comparison to problem solving) is that the procedures are straightforward (all students do the same investigation) and the teacher has a predetermined concept that she/he wants the students to discover. There is not a problem to solve but rather an investigation to conduct and a principal to discover.

In investigation lessons, the teacher takes the students through a pre-determined experience with the hope that at the end they will get that "ah-ha!" and understand the math concept.

Remember that the age of the children is an important consideration on what makes a good discovery/investigation lesson.

**Two people may work together on a plan but each must teach it individually.**

**If you are teaching to a group of students instead of the whole class, this group should have at least 8 students.**

### PLEASE WRITE YOUR LESSON PLAN USING THE FOLLOWING FORMAT

#### I. CONTENT STANDARD TO BE MET

Grade level? Actual Standard?

#### II. OBJECTIVE(S) - in teacher terms

Specifically state what mathematical concept/principle/algorithm you want the students to discover from doing this investigation. (Begin thinking of how will you assess whether they discovered the concept?)

Good lessons have only one concise objective.

#### III. THE LESSON PLAN TO BE TAUGHT IN THE CLASSROOM - THREE STEP LESSON PLAN

##### 1. INTRODUCTION/ANTICIPATORY SET

How will you introduce the lesson, capture the students interest, focus them on the activity?

Do you need to do a review to connect this lesson to the students' previous learning?

What demonstration and/or explanation will you give the students to introduce the activity?

##### 2. PROCEDURE/DEVELOPMENT (THE ACTIVITY)

Describe in detail what the students will be doing in this activity stage (what investigation are they conducting?)

How do you plan to manage it?

**YOU MUST LIST 5 QUESTIONS YOU WILL ASK TO PROMPT THEM IF THEY NEED ASSISTANCE.**

##### 3. WRAP-UP/DEBRIEFING

How will you close the lesson and have students "pull together" what they have learned?

**YOU MUST LIST AT LEAST FIVE KEY QUESTIONS YOU WILL ASK THE STUDENTS TO HELP THEM GET THAT "AH-HA!" (TO SUMMARIZE THE LEARNING)**

#### IV. ASSESSMENT

How will you assess student learning? (How will you KNOW if they met the objective?)

#### V. FOLLOW-UP PRACTICE (OR INDEPENDENT PRACTICE)

Will the students have any homework based on this lesson? (if yes, what?)

Will any pertinent activity follow this lesson on another day? (if yes, what?)

## **DIRECT INSTRUCTION LESSON PLAN**

### I. CONTENT STANDARD TO BE MET

Grade level? Actual Standard?

### II. OBJECTIVE(S) - stated in teacher terms

Specifically state what you want the students to learn from this lesson. What will the students be able to do at the end of the lesson that they cannot do now?

(Begin thinking of how you will assess whether they learned it)

Good lessons have few objectives - usually 1 clear and concise objective - specifically related to math.

### III. THE LESSON PLAN TO BE TAUGHT IN THE CLASSROOM - FIVE STEP LESSON PLAN

#### 1. Introduction / Anticipatory Set

- a. - Tell students the objective in their terms
- b. - Tell students the purpose for learning this
- c. - What necessary prerequisite skills will you review?

To think about:

How will you introduce the lesson, capture the students interest, focus them on the activity?

How can you connect this lesson to the students' previous learning?

#### 2. Instruction

- a. How will you help the students learn the concept?
- b. What problems will you demonstrate for the students as they help you?
- c. What problems will the students do as you help them?

#### 3. Guided Practice

What will students do in a guided mode?

#### 4. Closure (Quickie Assessment)

How will you determine if the students are ready to work on their own?

(What quick assessment can you do to give you this information?)

#### 5. Independent Practice

What will you give the students to do to practice this new skill immediately following the guided practice?

### IV. ASSESSMENT (the in-depth assessment)

How will you assess whether the students mastered the objective for this lesson? (Assessment must measure objective.)

### V. HOMEWORK OR EXTENDED PRACTICE

What will you give the students as extended practice?

How do you know that they can do it without any assistance?

### VI. FOLLOW-UP

What will you do to follow-up this lesson in the next few days? Next few weeks?

### **YOUR ASSIGNMENT IS COMPLETED IF IT INCLUDES THE FOLLOWING:**

#### **1. Lesson Plan**

#### **2. Type and attach your reflection of about 2-3 pages (2 pages minimum), double-spaced.**

**a. Describe what you and the students did (8 points) - about 1 page**

**b. What ideas were reinforced or what did you learn about teaching math from this experience? (12 points) - about 1-2 pages**

#### **3. Attach feedback form from your peer (principal).**



## CALIFORNIA STATE UNIVERSITY, STANISLAUS

Department of Teacher Education

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Coordinator of Multiple Subject Credential Programs

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To the teacher:

This letter documents that the following CSUS student observed a math lesson in your classroom.

Thank you for giving a student in *EDMS 4121, Mathematics Methods* an opportunity to observe in your class.

Sincerely,

*Elmano Costa*

Associate Professor

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### OBSERVATION OF MATH LESSONS

Name of CSUS student: \_\_\_\_\_ Signature of student \_\_\_\_\_

#### OBSERVATION OF PRIMARY GRADE (K-3) LESSON

Title of Lesson Observed (What was being taught): \_\_\_\_\_

School: \_\_\_\_\_ Grade: \_\_\_\_\_

Date of observation : \_\_\_\_\_ Time of observation : \_\_\_\_\_

Print name of teacher \_\_\_\_\_ Teacher Phone number \_\_\_\_\_

Teacher email address \_\_\_\_\_

Signature of teacher \_\_\_\_\_

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#### OBSERVATION OF INTERMEDIATE GRADE (4-6) LESSON

Title of Lesson Observed (What was being taught): \_\_\_\_\_

School: \_\_\_\_\_ Grade: \_\_\_\_\_

Date of observation : \_\_\_\_\_ Time of observation : \_\_\_\_\_

Print name of teacher \_\_\_\_\_ Teacher Phone number \_\_\_\_\_

Teacher email address \_\_\_\_\_

Signature of teacher \_\_\_\_\_

#### YOUR ASSIGNMENT IS COMPLETED IF IT INCLUDES THE FOLLOWING:

**Type and attach your reflection of about 4-5 pages, as follows:**

- For EACH OBSERVATION Describe what each teacher and the students did (8 points) - about 1 page for each
- FOR EACH OBSERVATION, reflect on what ideas were reinforced and what you learned for the first time about teaching math from observing these lessons? (12 points) - about 1 full page FOR EACH OBSERVATION, double-spaced. NOTE: THIS IS MOST OF YOUR POINTS.
- You may describe and reflect on one observation and then the other, or describe both and then reflect on both - your choice. **You must have a minimum of 4 pages.**
- Attach the handwritten notes** from BOTH or your observations

## **GENERAL GUIDELINES FOR OBSERVATION OF MATHEMATICS LESSON**

### GENERAL INFORMATION

1. Make an appointment in advance. Stick to the schedule. Call in advance if you need to make a change.
2. Observe a whole lesson from beginning to end. In early primary grades, the lesson may last only 20 minutes. In upper elementary grades, it may last one hour.
3. Observe a lesson where the teacher is engaged with the students teaching a math concept (as opposed to a math lesson where the students are doing seatwork the whole time).
4. Remember that you are a guest. Introduce yourself when you enter. Ask where you may sit. You should avoid interacting with students or other adults while the lesson is taking place so as not to disrupt the flow of the lesson. Thank the teacher at the end of the lesson. Consider sending a thank you card to principal and teacher(s).
5. The following guidelines are only to get you started in the observation and your reflection. Add other questions and/or areas that you want to focus on.
6. When writing your reflection, do not simply answer these questions. Instead, write your reflection in essay or letter form, focusing on your personal reactions and questions that were generated from your observation.

### AREAS TO FOCUS DURING YOUR OBSERVATION

#### A. FOCUS ON THE TEACHING (TEACHER)

- Does the teacher follow the Five-Step Lesson Format?
- Did the teacher follow the Watch me, Help Me, etc format??
- Are manipulatives used in this lesson?
- Is this lesson at the correct level of difficulty for these students? (or is it too easy or too hard?)
- If this lesson is a review, or is the teacher actually re-teaching or just letting the students work on computations?
- What procedures does the teacher use to manage student behavior?
- What techniques does the teacher use to give directions/explanations?
- Is there another adult in the room (instructional aides or parents)? What are they doing at this time?
- How does the teacher assess the students during the lesson?
- Is the teacher modifying the lesson based on the feedback he/she gets from the students?
- Is the teacher differentiating instruction to meet the needs of all students (English learners, special needs, gifted?)

#### B. FOCUS ON THE STUDENT

- What are the students doing? Are they directly involved in the learning? Are they involved with the teacher? Are they involved with other students?
- How actively involved are the students? How do you know? What is their body language? Facial expressions? Are students' attention focused on other items?
- Are the students able to complete their assignment? Do students know how to ask for help?
- Are the students reacting positively or negatively to what they are doing? How do you know?
- Are any students unable to complete the assignment? How do you know?
- What are the students doing to complete their assignment? Paper-pencil computation? Group project?

#### C. FOCUS ON THE ENVIRONMENT

- What is the desk arrangement in the room? Groups? Rows?
- What do you notice is on the walls and bulletin boards? Student made work? Purchased materials? Posters?
- Where is the teacher's desk? Does the teacher sit at it during the math period?
- How does the room "feel"? Warm and caring? Controlling? Oppressive?
- Is there movement in the room? By teacher? By students?
- Is the instructional time used as effectively as it could be?

#### D. FOCUS ON THE MATH PROGRAM

- Do you notice math manipulatives anywhere in the room?
- How are the math books (if they have any)? Pages of computations? Explanations?
- Is there evidence that the program is aligned to the Content Standards?
- Does the teacher appear to base his/her lessons exclusively on the textbook? Is there evidence of use of other sources?
- Is the program focused on computational skills? Investigation and concept development? Problem solving?

#### E. YOUR OWN AREAS TO FOCUS ON

- Please indicate your own personal reactions as well as any questions.



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To Whom It May Concern:

\_\_\_\_\_ is currently enrolled in *EDMS 4121 Mathematics Method*. An essential goal in this course is for students to gain classroom experience in elementary mathematics education. As part of the course requirements, students are asked to both observe mathematics instruction and teach up to two lessons. These lessons include a lesson in which students discover a math concept, and one employing problem solving strategies and should be compatible with your existing curricular goals. They may be taught to the whole class or to a group of students (minimum 8), depending on what is best for you.

I hope that you will allow this student to observe and work with students at your school/classroom.

I believe our beginning teachers have tremendous potential, and I thank you for any assistance you can provide them in gaining the classroom experience so essential to becoming a skilled teacher. Please don't hesitate to call me at the Department of Teacher Education at 667-3357 (secretary) or 667-3638 (direct/voice mail) if you have any questions regarding this request.

Thank you so much.

Sincerely,

*Elmano Costa*

Associate Professor of Teacher Education