California State University SAN MARCOS | School of Education

333 South Twin Oaks Valley Road San Marcos, California 92096-0001
Tel: 760.750.4300 Fax: 760.750.3160 www.csusm.edu/education

EDMS 543
Elementary Mathematics Education
CRN 48830
Mondays
8:30 am – 3:00 pm
Bonsall Elementary School (BES)
Fall 2014

Conceptual Framework Theme: Engaging diverse communities through leading and learning for social justice.

Professor:	Ingrid M. Flores, Ed. D.
Phone:	760.750.8527
E-Mail:	iflores@csusm.edu
Office:	University Hall 462
Hours:	Mondays: at BES after class Or By Appointment

School of Education Mission & Vision Statement
(Adopted by SOE Governance Community, January 2013)

Vision
To serve the educational needs of local, regional, and global communities, the School of Education advances innovative practice and leadership by generating, embracing, and promoting equitable and creative solutions.

Mission
The mission of the School of Education community is to collaboratively transform education. We:

- Create community through partnerships
- Promote and foster social justice and educational equity
- Advance innovative, student-centered practices
- Inspire reflective teaching and learning
- Conduct purposeful research
- Serve the School, College, University, and Community

Basic Tenets of our Conceptual Framework

- Student centered education
- Research and theory specific to the program field inform practice
- Connections and links between coursework and application
- Strong engagement between faculty and candidates
- Co-teaching clinical practice
- Culturally responsive pedagogy and socially just outcomes

COURSE DESCRIPTION

Focuses on curriculum development, methods, techniques, materials, planning, organization, and assessment in various elementary school curricula, and curriculum integration in mathematics. Methods of cross-cultural language and academic development will be integrated into the course. *Requires participation/observation in the public schools.*

Course Prerequisites

Admission to the Multiple Subject Teacher Credential Program is a prerequisite.

Course Objectives

1. Using differentiated reading response formats, teacher candidates will demonstrate ongoing evidence of good depth of understanding and application to the classroom of elementary mathematics content from weekly assigned readings and/or responses to prompts provided by the instructor related to assigned readings and/or current issues in mathematics.
2. Using the interview process to apply the pedagogical content knowledge that is being learned in the course, teacher candidates will provide evidence of their ability to use inquiry for assessment purposes by focusing on students' thinking about mathematics to better understand elementary level students with different understandings.
3. By merging theory and practice in order to enable their future students to understand a mathematical topic and make connections among ideas related to this topic, teacher candidates will participate in the design, construction, and presentation of a student-centered mathematical lesson plan activity that is: reform-minded, hands-on, cognitively challenging, contains differentiated instruction, and focuses on students' mathematical thinking.
4. By engaging in problem-solving contexts and assessing student problem solving, candidates will learn about, identify, and select quality-learning experiences for all children that promote mathematical I inquiry and conceptual development.
5. Candidates will demonstrate understanding and application of the Common Core State Standards for Mathematics and the varieties of expertise that mathematics educators at all levels should seek to develop in all their students including English Learners, struggling learners, and learners with special needs.
6. Teacher candidates will participate in coursework that leads to preparation for engaging in and completing Teaching Performance Assessment (TPA) and Teaching Performance Expectations (TPEs) tasks.

Unique Course Requirements

Students will be required to have access to children in a grade K-6 for the purpose of conducting a series of math interviews to learn about how children think and problem solve and for implementing and videotaping a math learning activity.

Required Texts

- Van De Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2013). *Elementary and middle school mathematics: Teaching developmentally* (8th ed). Boston: Pearson. ISBN: 978-0-13-261226-5

- Web site for Blackline Masters suggested in the course text: http://wps.ablongman.com/ab_vandewalle_math_6/54/13858/3547876.cw/index.html

Required Course Resources

- California Department of Education (2010). *California's Common Core State Standards for Mathematics*.
  Sacramento. CDE: Author
  http://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardaug2013.pdf

- California Department of Education (2013). Draft *mathematics framework for California public schools, kindergarten through grade twelve*. Sacramento, CA: Author.

http://www.cde.ca.gov/ci/ma/cf/draft2mathfwchapters.asp

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. Candidates successfully completing this program receive a credential with authorization to teach English learners.
(Approved by CCTC in SB 2042 Program Standards, August 02

STUDENT LEARNING OUTCOMES

Teacher Performance Expectation (TPE) Competencies

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

Teacher Performance Expectation (TPE) Competencies:

Primary Emphases:

- TPE 1a-Subject Specific Pedagogical Skills for MS Teaching (Mathematics)
- TPE 2-Monitoring Student Learning During Instruction

Secondary Emphases:

- 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

California Teacher Performance Assessment (CalTPA)

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

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

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

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

GENERAL CONSIDERATIONS

Assessment of Professional Dispositions

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

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

School of Education Attendance Policy

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

For this class, if you miss one class session or are late (or leave early) more than two sessions, you cannot receive a grade of "A" and your highest possible grade is a "B". If you miss two class sessions, your highest possible grade is a "C+". **Attendance will be taken at each class session.**

If possible, please discuss with the instructor any extenuating circumstances that will cause you to miss class prior to your absence. Absence is no excuse for not turning in assignments, as they may be sent electronically (e-mail) to the instructor if an absence arises or is anticipated. Please ensure that e-mailed assignments are sent by the start of the class session that the assignment is due. **NOTE: With very few exceptions, late assignments will not be accepted.**

Students with Disabilities Requiring Reasonable Accommodations

Candidates with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disable Student Services (DSS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Candidates 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.

All University Writing Requirement

In keeping with the All-University Writing Requirement, all 3-unit courses must have a writing component of at least 2,500 words (approximately 10 pages), which can be administered in a variety of ways. Writing requirements for this course will be met as described in the various assignments. A lesson plan, a mathematical learning activity write-up, reading responses, and a student math case study will be used to meet the writing requirement in this course.

CSUSM Academic Honesty Policy

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

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

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

Plagiarism:

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

Use of Technology

Candidates are expected to demonstrate competency in the use of various forms of technology (i.e. word processing, electronic mail, Moodle, use of the Internet, and/or multimedia presentations). Specific requirements for course assignments with regard to technology are at the discretion of the instructor. Keep a digital copy of all assignments for use in your teaching portfolio. All assignments will be submitted online, and some will be submitted in hard copy as well. Details will be given in class. You must use your

Moodle and campus email accounts for this class. The best way to contact me is by e-mail.

Electronic Communication Protocol

Electronic correspondence is a part of your professional interactions. If you need to contact the instructor, e-mail is often the easiest way to do so. It is my intention to respond to all received e-mails in a timely manner. Please be reminded that e-mail and on-line discussions are a very specific form of communication, with their own nuances and etiquette. For instance, electronic messages sent in all upper case (or lower case) letters, major typos, or slang, often communicate more than the sender originally intended. With that said, please be mindful of all e-mail and on-line discussion messages you

send to your colleagues, to faculty members in the School of Education, or to persons within the greater educational community. All electronic messages should be crafted with professionalism and care. Things to consider:

- Would I say in person what this electronic message specifically says?
- How could this message be misconstrued?
- Does this message represent my highest self?
- Am I sending this electronic message to avoid a face-to-face conversation?

In addition, if there is ever a concern with an electronic message sent to you, please talk with the author in person in order to correct any confusion.

Computer Use During Class Sessions

You are welcome to use a laptop computer in class when working on class assignments, for example. However, you will need to save checking email or other personal computer use for time outside of class. Most students find it disruptive when they are focusing on class activities or listening to presentations and can hear keyboarding in the classroom. When the instructor or your cohorts are speaking or when class activities are in proceeding, your computer will not be in use. Your kind consideration is greatly appreciated by all!

Cell Phones

Please turn off your cell phone before the start of each class. In addition, there will be no texting during class. It is unprofessional for teachers to use their cell phone during meetings with peers or during professional development activities (our class is considered professional development!)

Person-First Language

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

COURSE REQUIREMENTS

Each written assignment is expected to have a clear organizational presentation and be free of grammar, punctuation and spelling errors. There will be a reduction in points for the above-mentioned errors. Late assignments will not be accepted, unless extenuating circumstances can be properly substantiated. Prepare carefully for class, be ready to discuss readings and assignments thoughtfully, and actively participate in all class activities. Note the Description of Exemplary Students in this syllabus (p. 8).

	Total % of Course
1. Active Participation and Collaboration (all or nothing credit given)	5%
2. Math Book Club: Reading Accountability based on differentiated responses Also, online forums, reflections, and other class activities	25%
3. Student Mathematics Case Study	25%
4. Mathematical Lesson Design	25%
5. Mathematics Learning Activity and Implementation	20%

Descriptions of Assignments

The relative weight for each assignment is indicated as a percentage of the total course grade.
Detailed assignment guidelines and scoring rubrics will be provided. The course calendar/topics schedule is attached to this syllabus and provides assignment due dates.

Active Participation and Collaboration (5%) - Individual
Defined as actively engaging and contributing in all class discussions and activities, students will be evaluated daily. You are expected to actively participate in discussions, group work, presentations, and hands-on activities throughout the course. A positive professional disposition includes a willingness to consider and discuss new ideas objectively and to exhibit curiosity, perseverance and seriousness about improving oneself as a teacher. All students are expected to exhibit professional behavior and demeanor at all times. All or nothing credit is given for this course component.

Reading Accountability/Book Club: Demonstrating Evidence of Understanding (25%) – Individual
Each week students will :

1. Choose one chapter each week from the assigned readings and provide evidence of having read and understood the content of the chosen chapter. You may choose to demonstrate your knowledge of **ALL** the Big Ideas contained in the reading by preparing a graphic organizer, a concept map, a bulleted list, drawings, or another method of your choice. The complete list of choices is located in a Moodle course folder to be highlighted by the course instructor. Note: regardless of which method you choose to represent your learning, **ALL** key concepts in the reading must be represented.

2. Reflection papers will also be related to self-assessment and other course-related activities and assignments designed for students to demonstrate their understanding of the text and other readings per the instructor's guidelines.

Student Mathematics Case Study (25%) - Individual
The purpose of this assignment is for you to learn how to assess an elementary student's initial mathematical level of understanding by conducting short diagnostics tests, determining interventions that could support the student's mathematics achievement, and documenting the student's progress over a six-week period. You will conduct the mathematics case study on an elementary student in your practicum classroom or in your tutoring classroom during the duration of this course. Please consult with the teacher and explain the assignment so that he/she can designate a student for you to assess. The student's name and descriptive information will remain anonymous throughout the case study. More details and guidelines will be provided in class and on Moodle.

Mathematical Lesson Design: Teaching Through Problem Solving (25%) – In Small Collaborative Groups
The purpose of this assignment is to help you learn how to design effective problem-based mathematical activities and lessons and to provide an opportunity for you to practice teaching mathematics. Working in small groups of 2-3 members, your team will design one **student-centered** standards-based lesson (approximately 25-30 minutes in length) that you will present in your cohort class according to the course schedule of topics located in this syllabus. Please avoid teacher directed lessons.

In your lesson, you must focus on problem-based activities, and the lesson must be differentiated. Your lesson activity must be reform-minded, hands-on, cognitively challenging, contain differentiated instruction, focus on students' mathematical thinking, AND provide the opportunity for you to gather evidence of student learning (i.e., student work that you can assess) if you were to implement the lesson in a practicum classroom. Pease ensure that your lesson design is based on problem-solving strategies and **not** on procedural mechanics or math "worksheets".

NOTE: NO Bingo games or candy manipulatives for your lesson activity! ***You will present your lesson to the cohort according to the course*** **schedule.** More specific details and guidelines will be given in class. The lesson design template is attached to this syllabus.

Mathematics Learning Activity/Learning Centers- In Small Collaborative Groups: (20%)

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

You will be assigned to a group of 3-4 class members, and the group will choose a specific chapter in the course text as well decide **which grade level each member** will concentrate on. **Each member** will select **one** activity from the chapter to teach to small groups in our class in the form of learning centers. Choose activities that help the class understand the big ideas in the chapter and that demonstrate various instructional strategies.
Once you have written your MLA, you should practice it with at least 2 elementary students before presenting it to your peers. This practice will help you make any needed adjustments/amendments before allowing access of your lesson to your peers. Presentation to peers will be according to the Course Schedule in this syllabus (pp. 12-13).

On the day of presentation to your peers **(5%)**, each individual activity should take about 10 minutes. If the activity in the text is too short or too long, you need to adapt it to fit the timeframe. The activity should be planned and/or adapted to show evidence of higher-order thinking and conceptual understanding. Your goal is to engage your peer teacher candidates in advancing their understanding of the key ideas, frameworks, and effective teaching strategies in the chapters.

A detailed write-up of the activity (10%) should include your name, an activity title, grade level, grade-level state content standards, learning objective(s), materials, a description of the activity, teaching tips for your activity, and instructional differentiation for: one EL, one SPED, and one accelerated learner. Post your write-up to the appropriate forum link on Moodle (TBA) where all of your cohorts' MLA will be available for your future teaching.

This assignment has 2 additional components and will be completed with your group members:

1. Chapter Presentation: Your group will put together a *10-minute* PPT presentation about the chapter, highlighting instructional strategies, models, sample types of problems, and the features that you will be demonstrating in your learning center activities. Give an overview presentation—do not present every piece of information. You must adhere to your 10-minute time limit!

2. Each member will write a one-page reflection (due 1 week after you have taught your activity to a small group of elementary students). The reflection should describe the effectiveness of your individual math activity. To what extent were all of your learners able to complete the activity (making content accessible) and how did you know? What worked and what didn't (student engagement)? In what ways did you modify the activity and why? What was the level of thinking in the activity? How were you able to assess their understanding? How would you modify the activity the next time? *Please submit a hard copy of your reflection to the course instructor.* **(5%).**

Grading Standards

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

A = 93% - 100 % A- = 90% - 92% B+ = 87% - 89% B = 83% - 86 % B- = 80% - 82%

C+ = 77% - 79% C = 73% - 76 % C- = 70% -72% D = 60% - 69% F = below 60

Exemplary "A" Students:

- Demonstrate serious commitment to their learning, making full use of the learning opportunities available and searching out the implications of their learning for future use.
- Complete all assignments thoroughly and thoughtfully toward the goal of developing in-depth math projects.
- Make insightful connections between all assignments and their developing overall understanding of mathematical concepts; they continually question and examine concepts in a genuine spirit of inquiry.
- Show a high level of achievement of course goals.

"B" Students:

- Simply comply with the course requirements and expectations.
- Complete all assignments, usually thoroughly and thoughtfully.
- Usually connect assignments to their developing overall understanding of mathematical concepts; may be satisfied with accepting their learning as it is received without deeply examining concepts or seeking a higher level of understanding.
- Show reasonable achievement of course goals.

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.

SCHEDULE/COURSE OUTLINE

DATE	EDMS 543 COURSE TOPICS & ASSIGNMENTS	READINGS (Text and Other Sources)
Session 1 8/25/14	Introduction to Mathematics Education What does it mean to "do mathematics"? (Big picture) Characteristics of Effective Classrooms: Overview of Instructional Practices Developing understanding—How do kids learn? Problem solving in the mathematics classroom **Unpacking the standards:** **Common Core Content Standards (CCCS) for Mathematics** **Mathematics Framework for CA Public Schools (Draft)**	1. Teaching Mathematics in the 21st Century 2 - Exploring What It Means to Know and Do Mathematics
Session 2 9/08/14	Building a Math Learning Community Lesson Planning - Conceptual vs. procedural knowledge - Introduction to Cognitively Guided Instruction (CGI) - Assessment – Connecting instruction to assessment **Student Math Interviews: Assessing Student Learning** **Student Mathematics Case Study Assignment Overview** **Group presentations of assigned CCCS for Mathematics**	3 -Teaching Through Problem Solving 4 - Planning in the Problem- Based Classroom 5 - Building Assessment into Instruction **Book Club 1**
Session 3 9/15/14	**Math and Special Populations: Creating Inclusive Mathematics Classrooms** Number Sense I: What it means and how we can help children develop it. Technology in Mathematics: NCTM	6 - Teaching Mathematics Equitably to All Children 8 **-** Developing Early Number Concepts and Number Sense **Book Club 2**
Session 4 9/22/14	Number Sense II: Classification of word problems for addition, subtraction, multiplication, and division. Constructing efficient mental tools for fact mastery. Number Sense III: How do we promote understanding of place value? **Math Learning Activities x 3 (Presentations in class)**	9 - Developing Meanings for the Operations 10 - Helping Children Master the Basic Facts 11 – Developing Whole-Number Place-Value Concepts **Book Club 3**

DATE	EDMS 543 COURSE TOPICS & ASSIGNMENTS	READINGS (Text and Other Sources)
Session 5 9/29/14 ***1 ***2	Number Sense IV: Developing flexible methods of computation/mental strategies/estimation. Error Patterns in Computation **Classroom Lesson Presentation: Number and Operations in Base-10 (grades 1, 2, 3, or 4)** Algebraic Reasoning and Functions – Exploring patterns, variables, and equations. **Classroom Lesson Presentation: Operations and Algebraic Thinking (grades 1, 2, or 3)** **Math Learning Activities x 3 (Presentations in class)**	12 – Developing Strategies for Addition and Subtraction Computation 13 - Developing Strategies for Multiplication and Division Computation 14 - Algebraic Thinking: Generalizations, Patterns, and Functions **Book Club 4**
Session 6 10/06/14 ***3 ***4	**Lesson Classroom Presentation: Operations and Algebraic Thinking (grades 4 or 5)** Fractions I: Constructing understanding of fractions; fraction computation **Classroom Lesson Presentation: Number and Operations: Fractions (grades 3, 4, or 5)** **Math Learning Activities x 3 (Presentations in class)**	15 - Developing Fraction Concepts 16 – Developing Strategies for Fraction Computation 17 – Developing Concepts of Decimals and Percents **Book Club 5**
Session 7 10/13/14 ***5 ***6	Measurement - Customary and metric system **Classroom Lesson Presentation: Measurement and Data (grades K, 1, 2, 3, 4, or 5)** Geometry – Developing geometric reasoning and spatial sense **Classroom Lesson Presentation: Geometry (grades K, 1, 2, or 3)** **Math Learning Activities x 3 (Presentations in class)**	18 – Proportional Reasoning 19 - Developing Measurement Concepts 20 - Geometric Thinking and Geometric Concepts **Book Club 6**

DATE	EDMS 543 COURSE TOPICS & ASSIGNMENTS	READINGS (Text and Other Sources)
Session 8 10/20/14 ***7	Probability & Data Analysis – Developing meaningful experiences in gathering and displaying statistical data. Exploring concepts of chance, simple and independent events. **Classroom Lesson Presentation: Geometry (grades 4 or 5)**	21 – Developing Concepts of Data Analysis 22 – Exploring Concepts of Probability **DUE: Student Mathematics Case Study Written Report**
	Assessment - This competency will be infused throughout the course. Use this chapter as one reference for planning instruction. **Technology** – This competency will be infused throughout the course. Use this chapter as an ongoing reference.	5 - Building Assessment into Instruction 7 – Using Technological Tools to Teach Mathematics

*** * NOTE: While this syllabus is carefully planned, it may be modified or adjusted at any time in response to the learning needs of the class.**

Color Coding Legend:
Blue = Mathematical Content and Course Topics
Orange = Mathematical Learning Activities

LESSON DESIGN ELEMENTS

Elements of the learning experience

Lesson Title: What is the title of your lesson?

Grade Level:

Content Area: *Mathematics*

Subject Matter: *Number Sense, Measurement and Geometry, Algebra and Functions, Statistics, Data Analysis and Probability, Mathematical Reasoning*

Time period for the learning experience:

California Mathematics Content Standards: *State-adopted content standards*

Lesson objective(s) based on the content standards: What do you want students to be able to do as a result of active engagement and learning in your lesson? What do you want students to know when the lesson investigation is finished? Write in complete sentences. Use an action verb and explain how students will demonstrate their new knowledge and understanding.

Example: "The student will demonstrate understanding of _____." Or, "The student will be able to _____".

Mathematical Concept(s): What are you trying to teach? What big idea(s) is/are the focus of your lesson? Do not say, "The students will _____." (That is an objective, not a concept.)

Example: In the set model for fractions, the whole is understood to be a set of objects and subsets of the whole make up fractional parts.

Class Description - For the purpose of this assignment, the class description must include English Learners, Special Education students, and GATE students. Individualize this section base on your own assigned classroom.

Type of class (self contained, subject specific), time of year, general background of students learning in relationship to new learning (challenges and prior learning)

English Learners:
Special education:
GATE student:
Regular education:

Developmental needs of the students at this age

Learning needs and developmental, age-appropriate skills needed by your students based on grade level.

Student Groupings: *How will you group students for instruction?*

Materials/Resources/Technology: *What does the teacher need? What do the students need? Materials should include lists of supplies that will be needed to present this lesson.*

Assessment Plan

Note: Goals/objectives that will be assessed are based on the content standards and are tied to the Big Idea(s) (concepts) in your lesson.

Types of assessment: Prior knowledge (pre assessment), Formative (progress monitoring), Summative (final product)

Description and Purpose of each Assessment Type listed above

Feedback strategies: How students will be informed of specific successes and challenges?

*Description & Purpose of Differentiated/Adapted Assessment Methods **for ONE** of the following students:*

- *English Learner*
- *Learner with Special Needs*
  - *Learning Disability*
  - *Physical Disability*
- *GATE Student/Advanced Learners/Accelerated Learner*

How general assessment results will be used to inform instruction:

Criteria for Assessment

What benchmark criteria will you use to grade the assessment? How will you know if a student has successfully completed the assessment and accomplished the learning goals? What will they do to show you they have succeeded?

NOTE: Criteria are based on the science content standards and the learning goals/objectives in your lesson.

Lesson Activities: Address the subject matter lesson objectives (tied to math content standards and developmental needs of the students described.

*** Please refer to the PROBLEM-BASED THREE-PART LESSON INSTRUCTIONAL MODEL at the end of this syllabus before you begin writing this part of your lesson design**

Instructional Strategies- *What the <u>teacher</u> does during the instruction.*	**Student Activities –** *What the <u>students</u> do during the lesson and independent practice.*
<u>LAUNCH</u>: **Opening the Lesson/ *INTO = Before the Lesson*** Anticipatory Set - How will you motivate and focus students? What prior knowledge do students need?	What will the students do?
<u>EXPLORE</u>: **Process/Steps of Instruction/ *THROUGH = During the Lesson*** ***Please ensure that the following GUIDING QUESTIONS are addressed in this area of your lesson design.*** 1. How will you describe and model skills/tasks required for the lesson? 2. How will you ensure that the mathematical concept(s) are clear and explicit? 3. How will support the lesson objective(s)? 4. How will you actively involve <u>all</u> students? 5. How will you structure opportunities for the students to apply their learning in class with support? 6. How will you check for students' understanding? 7. How will you structure opportunities for the students to apply their learning in class independently? 8. How will you ensure that the independent practice is at the appropriate level of difficulty for the various students? 9. How will you assess that students have met the learning objectives? 10. What will your interventions consist of if the learning objectives are not being met?	For each of the steps of instruction (what the teacher does), describe what the <u>students</u> will do
<u>SUMMARY:</u> Closure: How will you have students summarize their learning to provide closure?	How will the students summarize their learning?
***BEYOND* = *After* the Lesson = Extending Learning** **Transfer:** How will you structure opportunities for students to continue learning/practice and transfer learning after the lesson?	What will the students do?

Description & Purpose of Differentiated/Adapted Instructional Methods for ONE of the following students:

- *English Learner*
- *Learner with Special Needs*
  - *Learning Disability*
  - *Physical Disability*
- *GATE Student/Advanced Learners/Accelerated Learner*

Rationale for Instructional Strategies:

Why are the instructional strategies, student activities and resources appropriate for this class, (based on content and student development)?

***PROBLEM-BASED THREE-PART LESSON INSTRUCTIONAL MODEL**

Problem-centered teaching opens the mathematics classroom to exploring, conjecturing, reasoning, and communication. This model is very different from the "transmission" model in which teachers tell students facts and demonstrate procedures and then students memorize the facts and practice the procedures. This model looks at instruction in three phases: launching, explore, and summary.

Launch (Before)

In the first phase, the teacher launches the problem with the whole class. This involves helping students understand the problem setting, the mathematical context, and the challenge. The following questions can help the teacher prepare for the launch:

- What are students expected to do?
- What do the students need to know to understand the context of story and the challenge of the problem?
- What difficulties can I foresee for students?
- How can I keep from giving away too much of the problem?

The launch phase is also the time when the teacher introduces new ideas, clarifies definitions, reviews old concepts, and connects the problem to past experiences of the student. It is critical that, while giving students a clear picture of what is expected, the teacher leaves the potential of the task intact. He or she must be careful not to tell too much and lower the challenge of the task to something routine or to cut off the rich array of strategies that may evolve from an open launch of the problem.

Explore (During)

In the explore phase, students work individually, in pairs, in small groups, or occasionally as a whole class to solve the problem. As they work, they gather data, share ideas, look for patterns, make conjectures, and develop problem-solving strategies. It is inevitable that students will exhibit variation in their progress. The teacher's role during this phase is to move about the classroom, to observe individual performance, and to select specific student work samples to be shared during the summary phase. The teacher helps students persevere in their work and differentiate their work by asking appropriate questions and providing confirmation and redirection where needed. For students who are interested in and capable of deeper investigation, the teacher may provide additional challenges related to the problem. Although it is imperative that all students be given enough time and opportunity to thoroughly work on the problem, it is not always necessary for every student to finish the problem at this time.

The following questions can help the teacher prepare for the explore phase:

- How will I organize the students to explore this problem? (Individuals? Pairs? Groups? Whole class?)
- What materials will students need?
- How should students record and report their work?
- What different strategies can I anticipate they might use?
- What questions can I ask to encourage student conversations, thinking, and learning?
- What questions can I ask to focus their thinking if they become frustrated?
- What questions can I ask to challenge students if the initial question is "answered"?

Summary (After)

The summary phase of instruction begins when students have gathered sufficient data or made sufficient progress toward solving the problem. In this phase, students discuss their solutions as well as the strategies they used to approach the problem, organize the data, and find the solution. During the discussion, the teacher helps students enhance their understanding of the mathematics in the problem and guide them in refining their strategies into efficient, effective problem-solving techniques.

Although the summary discussion is led by the teacher, who has collected specific student work samples he or she would like shared, students play a significant role. Ideally, they should pose conjectures, question each other, offer alternatives, provide reasons, refine their strategies and conjectures and make connections. As a result of the discussion, students should become more skillful at using the ideas and techniques that come out of the experience with the problem.

During the summary phase, content goals of the problem, investigation, and unit can be addressed, allowing the teacher to assess the degree to which students are developing their mathematical knowledge. At this time, teachers can make additional instructional decisions that will enable all students to reach the mathematical goals of the activities.

The following questions can help the teacher prepare for the summary:

- How can I help the students make sense of and appreciate the variety of methods that may be used?
- How can I orchestrate the discussion by choosing specific student work samples that will help students summarize their thinking about the problems?
- What concepts or strategies need to be emphasized?
- What ideas do *not* need closure at this time?
- What definitions or strategies do we need to generalize?
- What connections and extensions can be made?
- What new questions might arise and how do I handle them?
- What will I do to follow-up, practice, or apply the ideas after the summary?

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