**California State University San Marcos**
**College of Education**

# EDMS 543 – Teaching Mathematics in the Elementary School

**Fall 2004 Semester**
**Section 41456**
**Wednesday 8:00-2:15**

**Instructor:** *Patricia Beal*
**Office:** *University Hall*
**Office Phone:** *(760)750-8023*
**Office Hours:** *Friday (Before or after class)*
**Email:** *pbeal@csusm.edu*

## COLLEGE OF EDUCATION MISSION STATEMENT

The mission of the College of Education Community is to collaboratively transform public education by preparing thoughtful educators and advancing professional practices. We are committed to diversity, educational equity, and social justice, exemplified through reflective teaching, life-long learning, innovative research, and ongoing service. Our practices demonstrate a commitment to student centered education, diversity, collaboration, professionalism, and shared governance.

## REQUIRED MATERIALS

- California Department of Education (2000). Mathematics Content Standards for California Public Schools, Kindergarten Through Grade Twelve. Sacramento, CA: author. This document can be found on the WWW at: http://www.cde.ca.gov/board/mcs_intro.html (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/statetests/star/s2blueprt.html)
- Van de Walle, John A. (2001). Elementary and middle school mathematics: Teaching developmentally (4th ed.). New York: Addison Wesley Longman

## 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. A significant portion of this class will occur in actual classrooms K-8.

### Standards Alignment:

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

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

**Teacher Performance Expectation (TPE) Competencies:**

This course is designed to help teachers seeking the Multiple Subjects Credential to develop the skills, knowledge, and attitudes necessary to assist schools and district in implementing an effective program for all students. The successful candidate will be able to merge theory and practice in order to realize a comprehensive and extensive educational program for all students. The following TPE's are addressed in this course:

Primary Emphasis:

- TPE 1a-Subject Specific Pedagogical Skills for MS Teaching (Mathematics)
- TPE 2-Monitoring Student Learning During Instruction
- TPE 3-Interpretation and Use of Assessments
- TPE 4-Making Content Accessible
- TPE 6a-Developmentally Appropriate Practices in Grades K-3
- TPE 6b-Developmentally Appropriate Practices in Grades 4-8
- TPE 6d-Teaching Special Education Populations in General Education Environments
- TPE 8-Learning About Students

Secondary Emphasis:

- TPE 5-Student Engagement
- TPE 6d-Developmentally Appropriate Practices for Special Education
- TPE 7-Teaching English Learners
- TPE 9-Instructional Planning
- TPE 10-Instructional Time
- TPE 11-Social Environment
- TPE 13-Professional Growth
- TPE 14-Educational Technology

## ASSIGNNMENTS

Detailed assignment sheets will be provided for every assignment below. The assignment sheets will be attached to this syllabus. The course calendar will be distributed at the first class meeting.

**Reading Reflections**

(20%) - Each week students will write a "meaningful" reflection on the articles assigned to be read for that week. These reflections should be one page in length and should clearly articulate your thoughts **on the articles** and how you plan to apply what you learned from the articles as a teacher in the classroom.

**Student Interviews (Critical Assessment Task – CATs)**

(25%) - You and one of your classmates 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.

**Mathematical Resources & Lesson (Critical Assessment Tasks – CATs)**

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

**Curriculum Assignment (Critical Assessment Task – CATs)**

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

***Assignment details and scoring rubrics are found at the end of this document for each key assignment described above.***

## 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.

**Special Education**

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

**Technology**

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

## ATTENDANCE POLICY

The attendance policy of the College of Education: Due to the dynamic and interactive nature of 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 the instructor 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. **NOTE: Each full day class counts as 2class sessions.**

## 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.

## Crosscultural, Language, and Academic Development (CLAD) 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 both English language development and 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 |

# Curriculum Assignment

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**Purpose**

The purpose of this assignment is to simulate the experience you will have as a first year teacher in analyzing the materials provided to you by the school district. After completion of this activity, you should be able to articulate the strengths and weaknesses of the programs shared within your grade level group in terms of: (1) the extent to which they address the California Content Standards for Mathematics; and (2) How well they develop student mathematical thinking. Additionally, you should be able to make a plan for what you are going to do to remedy the weaknesses in the program.

**Steps to Completion**

1. Make arrangements with your master teacher or school library media specialist to obtain a copy of the Teacher's Manual to the program currently being used by the school district for your grade level. If you are currently under Emergency Contract, use your own teaching manual. If you do not have access to a classroom, first be creative about obtaining a teacher's manual. If all else fails, ask me for assistance.

2. Either download or obtain a copy of the California Content Standards in Mathematics for your grade level only. You may download the standards wither from www.cde.ca.gov or score.kings.k12.ca.us. As of fall, 2000, the SCORE site has a feature called, "Standards Matrix – Easy Access to Standards. Through this feature, you can easily print a PDF of your grade level standards.

3. Create a table in your word processor such as the one below on which you:
    a. List the standards for your grade level,
    b. Note in the program where the given standard is covered – including personal notes about the extent to which the standard has been addresses and supports the development of student thinking, and
    c. Rate the program's coverage of the standard by the scale listed below the example.

**EXAMPLE**

PROGRAM TITLE: *Scott Foresman*

*Grade: 2*

| STANDARD | PROGRAM LOCATION | RATING |
|---|---|---|
| 1.0 Students understand the relationship between numbers, quantities, and place value in whole numbers up to 1000 | | |
| 1.1 Count, read, write each place value | | |
| 1.2 Order and compare using <, =, > | | |

Rate the program's coverage on the following scale:

0 = Standard not addressed
1 = Standard is poorly developed and addressed
2 = Meets standard with moderate coverage but needs more
3 = Meets standard with appropriate coverage
* = Exceeds grade level standards

4. Conclude your tabled list with an analysis of the weaknesses of the program that you consider will require you to search for additional resources or adjust instruction to meet your students' needs. Be sure to think about what you have learned about creating high quality mathematics learning experiences that develop students' mathematical understanding. Consider yourself the instructional decision-maker for your students!

5. Following your analysis include a reflection on this individual portion of the assignment. What was valuable? What are your commendations, comments, and concerns?

6. Schedule a meeting with the others in your grade level group. Share your results and compare programs. At the conclusion of your discussion, complete a quick-write on your discussion. What did you learn? How fruitful was the discussion? Attach the quick-write to your analysis.

**Suggestions**

1. It is tempting to sit with others who have the same program to analyze as you. It is natural to want to "divide and conquer" the task. However, you are the teacher who must know about the program you are required to teach. Don't cheat yourself. Go through the exercise on your own first.

2. When you set your meeting time, agree that everyone will come to the meeting prepared with the analysis in at least draft form for the essential discussion to be completed for the benefit of all.

3. Structure the time you are going to allocate to the discussion. It may be a waste of your time to randomly share. Try starting as a round robin progressing standard by standard. Structure your time to help everyone understand the organization and expectations of each program. The program being shared by your colleague may be the one you are teaching next year. Listen carefully!

**Assessment**

This experience accounts for 25% of your grade in this course. Take the time to do a careful job. You will be assessed using the generic 5-point rubric on the extent to which your work addresses each of the following areas:

1. Quality of document submitted. – Including asking, "Did you follow the directions for the elements of the assignment?"
2. Quality and completeness of the analysis of the mathematics program in comparison to the standards.
3. Quality and completeness of the discussion of the weaknesses of the program
4. Depth of reflections – both the individual reflection and the group process experience quick-write.

**Checklist for Document**

___Standards analysis table

___Analysis of program weaknesses

___Reflection on individual experience

**___Quick-Write reflection on group experience**

# Student Interviews

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**How are the interview reflections to be completed?**

For each of four interviews, write a meaningful reflection (no more than 2 pages) on 1) the interview process and the results of your interview, as well as 2) specific, prescriptive recommendations that you would give in light of your interviewee's current level of mathematical understanding Develop that reflection with an eye to helping your interviewee in terms of making effective instructional decisions.

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

1. **What specifically did you learn about this child's mathematical understanding?** You should provide ample evidence of knowledge gained from this experience. Be very specific about what it is that your interviewee understands or does not understand and how he/she demonstrated this understanding/lack of understanding.

2. **What specifically would you do for this child if you were his/her teacher?** This part of the reflection is clearly related to what was learned about the child by way of the interview. Be very specific and clear about what you would recommend as a follow-up.

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

**How are the assignments assessed?**

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

- reflect good depth of understanding of the child's current mathematical level based on the interview problems.
- give specific and clear instructional recommendations for the child.
- be free of grammatical or typographical errors.
- be word processed

5 – Reflection shows good depth of understanding as well as clear, specific recommendations. The reflection is free of grammatical or typographical errors. Both sections reflect the criteria stated above

4 – Reflection shows general depth of understanding and clear, specific recommendations. There may be a very minor grammatical or typographical error. One of the sections is slightly weak on one of the criteria listed above.

3 - Reflection shows moderate depth of understanding and recommendations are adequate. There may be few grammatical or typographical errors. Both sections are slightly weak or one is very weak.

2 - Reflection shows little depth of understanding and recommendations are not specific and clear. There may be considerable grammatical or typographical errors. Both sections are substantially weak.

1 – An attempt at a reflection was submitted. Your name is on the paper.

0 - No assignment was turned in.

## Presentation Scoring Template

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NOTE: See assignment sheet for details

**Presenters:**

**Date:**
**Grade:**

**Start Time:**
**End Time:**

**General Comments**

## Scoring Rubric

| Score | | Scoring Element |
|---|---|---|
| | **A.** | **Mathematics Reform -** |
| | **B.** | **Support Materials -** |
| | **C.** | **Diversity -** |
| | **D.** | **Student Thinking -** |
| | **E.** | **Assessment -** |

## Document Check

1. **Lesson Plan**

2. **Resources**

3. **Children's Literature**

4. **Internet Resources and Use of Technology –**

## Commendations/Recommendations

# Reading Reflections

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**What is a weekly assignment?**

There can be many kinds of weekly assignments. Generally, the assignment follows the reading schedule outlined in the syllabus. However, additional assignment or project may be assigned as part of a class session or as a follow up to an activity. These assignments will be noted in the weekly assignment category for the purposes of determination of grades. The number of weekly assignments varies by each section of EDMS/X 543.

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

Write a meaningful one-page reflection on the assigned reading for the week. Develop that reflection with an eye to demonstrating that you both read and understood the reading. **Do not quote the articles.** Paraphrase and analyze only.

Although the reflection should not exceed one page, it must answer the following questions:

1. What did I learn from the reading?

2. How am I going to use what I learned in teaching children mathematics?

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

**How are the assignments assessed?**

The activities/readings that are part of the weekly assignments category as assessed using the generic 5-point rubric.

5 – Reflection shows depth of understanding as well as application. The reflection of grammatical or typographical errors

4 – Reflection shows general depth of understanding and application to the classroom. There may be a very minor grammatical or typographical error.

3 – Reflection shows moderate depth of understanding and application. There may be several grammatical or typographical errors.

2 – Reflections show little depth of understanding and application. There may be considerable grammatical and typographical errors.

1 – An attempt at a reflection was submitted.

0 – No assignment was turned in or the assignment was turned in late.

## Curriculum Review Assignment

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

Secondary TPE's for this Assignment

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

## Lesson Presentation Assignment

EDMS 543

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

Secondary TPE's for this Assignment

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

## Lesson Resources Assignment

EDMS 543

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

Secondary TPE's for this Assignment

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

## Student Interview Assignment

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

Secondary TPE's for this Assignment

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