EMAT 3410–Mathematics Teaching & Curriculum PreK-5

Instructor: Patti Huberty
Office: Alps Road Elementary School
e-mail: pattihuberty@charter.net

Overview: This course will concentrate on data analysis, money, fractions, decimals, geometry, measurement and time. We will also work on translating the ideas about children's mathematical thinking from EMAT 3400 to small group and whole class settings.

Objectives: The objectives of this class are for you to:

- Understand how children think about data analysis, money, fractions, decimals, geometry, measurement and time
- Strengthen your own mathematics background in the areas of data analysis, money, fractions, decimals, geometry, measurement and time
- Learn to make decisions about content selection and modification of instructional activities based on theories of mathematical learning and current educational reform efforts;
- Use knowledge of how children learn mathematics to plan appropriate instruction for small and large groups.
- Develop critical view of mathematics curriculum, textbooks, and other instructional materials
- Develop a repertoire of alternative (differential) instruction and assessment strategies to meet the intellectual and cultural needs of diverse students.
- Examine the nature of schooling, including teaching, grouping, testing, and policy issues, and its impact on the mathematics education of diverse students.

Required Course Materials:

1. Course Text: *About Teaching Mathematics:* A K-8 Resource 2nd Edition by Marilyn Burns
Publisher: Math Solutions Publications; 2nd edition (August 2000)
Paperback version

ISBN-10: 094135525X
ISBN-13: 978-0941355254

2. You are responsible for going to the Georgia Department of Education web site (http://www.georgiastandards.org/math.asp) and printing a complete copy of the Georgia Performance Standards for Grades Kindergarten through 5 and the Executive Summary. I will send to you via email a copy of the Georgia Performance Standards organized by topic. (I will also make a hard copy available in case you have trouble receiving the email attachment.) You are responsible for getting your own printed copy of this document. I will provide photocopies of other articles or materials that we will read for class.
You will also need a journal style notebook for the lesson reflections (i.e. mathematics journal) that you will be using throughout this course.

Attendance: Attendance and participation are essential in this class, both for you to learn and so that others may benefit from your input. Attendance is expected because most of class time will be spent on group discussions and activities. The ideas and concepts presented cannot easily be transmitted through class notes. You are responsible for all announcements made in class even if you are not there. It is important that you arrive promptly. Absences and tardiness will affect your professionalism grade. Any exceptions to attendance and punctuality should be discussed with me ***in advance*.**

Assignments: I will try to make the purpose of each assignment clear. If you have questions about the purpose of the assignment or what is expected of you, please ask. The requirements for all major assignments are detailed on the following pages. Late assignments will be assessed a penalty of 10% of the grade unless there are extenuating circumstances that are discussed with me ***in advance*.** You are expected to demonstrate correct use of the English language with regard to grammar, punctuation, and spelling. I do grade on technical writing skills as well as content. Please proofread your work before turning it in to me. If you have weaknesses in the area of grammar, punctuation, or spelling, find someone who will proofread your work for you and/or use the capabilities of your word processor before you turn it in to me. ***Written work will be assessed on the quality of your writing as well as your interpretation and understanding of course content.*** It is expected that you will do your assignments on a word processor unless I indicate that an assignment may be handwritten. Any other exceptions must be cleared with me in advance. **Assignments that are not typed will be returned without a grade**.
Additionally, I would prefer that you send me your assignments as an e-mail attachment. Label each assignment with your last name and the assignment number.

Lesson Reflections/ Mathematics Journal:

You will be expected to keep a journal style notebook where you will record your impressions, suggestions, interpretations, and general opinions about specific assigned lessons plans. This notebook needs to be separate from your binder so you can turn it in on designated dates.

Course grades: Grades will be based on total points earned, and a 90-80-70-60 scale will be used to assign final grades. Grades will be based on the following:

Assignments (see following pages)	240 points
*Professionalism	60 points
TOTAL	**300 points**

Your grade for Professionalism will be based on arriving on time and being prepared for class (having read the assigned lessons), class participation (which includes both your contributions and your reactions to the contributions of others), your response to constructive feedback in the classroom and on written work, completing lesson reflections/journal assignments, and exhibiting a professional demeanor (language, attitude) toward others.

University policies: All university policies with regard to withdrawals, academic honesty, etc. will be strictly followed. It is your responsibility to be familiar with these policies.

Tentative Schedule

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Date	Topic	Assignment due
Jan 8	Data Analysis	
Jan 10	Data Analysis	
Jan 15	**No Class – MLK Day**	
Jan 17	Data Analysis	**Glyph**
Jan 22	Data Analysis	
Jan 24	Fractions	**Video Analysis**
Jan 29	Fractions	
Jan 31	Fractions/Decimals/Percents	
Feb 5	Fractions/Money/Time	
Feb 7	Money/Time	
Feb 12	Time/Measurement	**Money/Time Tasks**
Feb 14	Measurement	
Feb 19	Measurement- Group work day	
Feb 21	Measurement	**Measurement Lesson**
Feb 26-Mar 30	**FIELD EXPERIENCE**	
April 2	*Tales from the field*	
April 4	Textbooks & Curriculum	**All 3 Field Assignments**
April 9	Assessment	
April 11	Assessment/Geometry	
April 16	Geometry	**Assessment Items**
April 18	Geometry	
April 23	Geometry	**Geometry Presentations**
April 25	Geometry	**Geometry Presentations**
April 30	Problem Solving	**Final Paper**

Assignment Overview

Assignment	Points	Date Due
1. Glyph	20	January 17
2. Data Analysis	20	January 24
3. Money tasks	20	February 12
4. Time tasks	20	February 12
5. Measurement lesson plan	20	February 21
6. All 3 Field Assignments	30 (10 points each)	April 4
7. Assessment items	20	April 16
8. Geometry Presentation	30	April 23/25
9. Final Paper	60	April 30
10. Professionalism	60	All Semester ☺

Assignment Descriptions

Glyph

Read the article distributed in class that further defines what a glyph is and then construct a brief explanation of how you would use this type of assignment in your classroom. Please include an example of what you expect the glyph to look like. There will be example glyph assignments in class for you to view if needed.

DATA ANALYSIS

For this assignment, you will write a paper about the classroom discourse that occurs in the *Lady Bugs* videotape that we will watch in class. You may complete this assignment individually **or** in groups of 2, 3 or 4 people. If you choose to work with a group, you should turn in one paper with all of your names on it, and you will all receive the same grade for the assignment.

In your paper, you should describe and evaluate the manner in which the lesson meets the standards for teaching identified by the National Council of Teachers of Mathematics. I will distribute a copy of these standards in class. In addition, you should describe and evaluate the extent to which this is an equitable classroom.

TIME & MONEY

LESSON PLAN CRITIQUE

Find one activity for time and one activity for money. You may get your lesson plan on the internet, from a book, or from a teacher. For each activity, modify the original activity so that the new one is more student-centered/more interactive and at a higher cognitive level. Your new activity should address the same mathematical content as the original. In other words, if the original activity is about making change, the new activity should also be about making change. Explain why your new activity meets the criteria above. Finally, develop a list of 3-5 hints/scaffolds you would provide for students who are struggling with this new activity. The hints/scaffolds should be specific to the activity. In other words, do not say you will allow students to work in pairs as a scaffold.

MEASUREMENT

This is a group work assignment

I will read the book *Spaghetti and Meatballs for All* by Marilyn Burns in class. Together we will write a plan for a measurement lesson that includes this book. Then, working in groups, your task will be to select a children's book that addresses a measurement topic. Your group will then write a lesson plan using this book. The plan should be prepared for a 3rd grade class of heterogeneously grouped students and thorough enough that a substitute teacher could pick it up and implement it successfully. Instead of writing objectives for your lesson plan, include the following:

- What should students *know* at the end of this lesson? (e.g., facts, vocabulary)
- What should students *understand* at the end of this lesson? (e.g., concepts, ideas)
- What should students *be able to do* at the end of this lesson? (e.g., skills)

FIELD EXPERIENCE

During your field experience I hope that you will take advantage of every opportunity you have to observe mathematics being taught, to teach lessons yourself, to run math centers, and to assist individual children with mathematics. You will be asked to select 3 of the following 8 tasks to complete and turn in for a grade. **It is important to begin thinking about and discussing these choices with your mentor teacher on your Friday visits.** All 3 assignments will be due the week you return from your field experience (April 4th).

Option #1: Write a 500-word paper describing and critiquing the mathematical environment of your field experience classroom. Things on which you might comment include but are not limited to: visual displays in the classroom related to mathematics, learning materials available to students and how they are used, technology related to mathematics and how it is used, how students are grouped for mathematics instruction, how cooperation and competition are used during mathematics instruction, and when mathematics instruction takes place during the day. Compare and contrast this classroom environment with that of the classroom in which you interned in the fall.

Option #2: Teach a mathematics lesson (whole class, small group, center, calendar time). Turn in your written lesson plan and a 500-word reflection on the lesson. In the reflection include responses to the following questions:

- Was this a teacher-centered or student-centered lesson? (Some parts of the lesson may have been teacher-centered while others were student-centered. Articulate where these changes occurred.) Provide evidence to support your answer. (What happened in the lesson that was teacher-centered or student-centered?) Why was the lesson this way? (What obstacles or opportunities did you have in planning and implementing this lesson?)
- What would you do differently if you could teach this lesson again…
    a. In the same classroom? b. In a different classroom?

Option #3: Write a case about a pedagogical dilemma you have or you see your mentor teacher have during mathematics instruction.

Option #4: Prepare an activity for students to do at home with their families. The activity should relate to a topic your teacher is addressing during mathematics instruction or a topic on which the

students need additional work. If at all possible, you should actually send the activity home with children and encourage them to do it with their families. Then talk informally with children who have done the activity at home. Turn in a copy of the activity and write a 500-word paper on how and why you designed the activity and any student reactions you were able to gather.

Option #5: Read a children's literature book related to mathematics to your students. Use good instructional practices, such as reading with inflection, asking questions as you read, engaging students in predicting what will happen next, etc. Write a 500-word paper explaining why you selected the book, what mathematics you hoped to highlight, what happened during the discussion, and what you see as the value of using children's literature in mathematics.

Option #6: Review student work from a particular lesson or activity. Provide copies of one piece of student work that shows a high level of understanding, one piece that shows a moderate level of understanding, and one piece that shows a low level of understanding. Explain how you selected these pieces of student work and why you classified them as you did. (Remove students' names from the work before turning it in.)

Option #7: Talk with your teacher about a mathematics topic that he/she believes to be a difficult concept for students to grasp, or a topic that the teacher has difficulty with/does not like teaching. Find a series of lesson plans that address this mathematics topic (you may get your lesson plans on the internet, from a book, or from a teacher) and discuss them with your teacher. Following the discussion write a 500-word critique about the lessons you chose. Include why the teacher believes this topic is so difficult and whether you think the lessons you selected addressed the concerns.

Option # 8: Negotiate an alternative assignment with me if these assignments do not work in your field experience classroom or if you have a unique opportunity to do a different type of assignment.

ASSESSMENT

This assignment is to be completed with either one or two partners

Go to the Georgia Department of Education web site and the section for released CRCT items (http://www.doe.k12.ga.us/curriculum/testing/crct_items.asp). Select 5 items and copy and paste them into a word processing file. For each item, identify the mathematical idea that is being assessed and write an open-ended version of the problem to assess *the same idea*. Your items should reflect the characteristics of open-ended assessment that we discuss in class. In other words, do not simply take a multiple-choice computational item (such as 27 + 54) and take away the choices to make it open-ended. You may not use items from the web site that I demonstrate in class for this assignment. You should make up your own open-ended version of the assessment items. In addition, for **one** of the items that you develop you should create an assessment rubric that describes what work that does not meet standards would look like, what work that meets the standard would look like, and what work that exceeds the standard would look like.

GEOMETRY

This assignment will be completed in small groups/teams and will conclude with a presentation of some of the lessons you compile

The teams will be decided in class. Once the grade level teams have been established then each team will select three geometry topics to explore. Your team will need to design a sequence of four activities/tasks for each of the three topics (you will compile a total of 12 activities). Each sequence should show a clear progression in the knowledge, skills, and understanding needed to successfully complete the tasks. Describe each activity in narrative form and in enough detail that a substitute teacher could conduct the activities successfully. If you adapt any activities from other sources (e.g., books, the web, articles), provide a citation for the original source. **Each group will need to make copies of the activities/lesson plans to be distributed to all students in class.**

****The Group Presentation***

*Select one activity from **each** of the **three topics** to teach to the class.*

FINAL REFLECTION PAPER

Consider your learning across MATH 5001, 5002, 5003, EMAT 3400, and 3410. (In other words, you are not restricted to what you have learned in this course.) Select one of the following ways to demonstrate what you have learned thus far:

- Select an assignment from an EMAT or MATH course that you would do differently today than when you did it initially. Redo the assignment and describe how/why it is different from your first attempt.

- Select 2 assignments from EMAT or MATH courses that show a contrast in your thinking (mathematical or pedagogical). Describe the contrast and what might have led to the change.

- Select a topic or an issue in mathematics education that you disagree with, find confusing, have questions about, or are unsure how you feel about. Carefully and thoroughly articulate your views, making reference to materials, texts, or experiences from courses as appropriate.

- **In detail**, explain how you used each component of the Reflective Teaching Model during your field experience. Include feedback about whether or not you thought it was an effective model, how you made modifications to it (or ones you would suggest making to it), and what aspects of it you will carry into your own classroom teaching.