

**Math 353: Methods and Materials in the Teaching of Elementary School Mathematics
Fall Semester, 2004**

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Brief Description of the Course:

This is a course designed to acquaint prospective elementary teachers with contemporary methods and materials employed in the teaching of mathematics in the elementary school. We do this by exploring methodologies for teaching a variety of topics. Topics and methodologies are consistent with those of the *Michigan Curriculum Frameworks* and the National Council of Teachers of Mathematics' *Principles and Standards for Teaching Mathematics*.

A few minutes reflection will make it obvious that this course cannot teach you how to teach each and every topic in the K-8 math curriculum. The goal is to help you develop the ability to use various curricular materials to plan lessons that you will teach using methods you deem appropriate. Naturally, I have views on ways to teach. These views are based on the documents listed above. The course will rely on such methods.

For most of the semester, on Wednesdays you will be in a classroom at Sandy Knoll (SK) or Graveraet (G) School. (It will be 2 to 3 weeks before we start visiting the schools. Until then, we will meet on-campus on both Wednesdays and Thursdays.) You will be assigned to a classroom in one of the two schools for the semester. I will try to alternate weekly visits to the two schools. When I am at your school, you will check in with me & then go to your assigned classroom. There, you will be expected to participate in the manner the teacher specifies. This may mean observing and taking notes, helping a specified child or group, helping whoever needs help, etc. This will be negotiated between yourself and the teacher and may change from week-to-week. My expectation is that you will have opportunities to: observe your Collaborating Teacher (CT) teach the whole class, interact with small groups of students around mathematics, and discuss with your CT content and pedagogical decisions. You should not be treated as a clerical aide (i.e., making copies, cutting out designs for posters, etc.). **If you have concerns about your role in the classroom at any time during the semester, see me immediately.**

On Thursdays we will: explore some mathematics in a way consistent with the *MI Frameworks* & the NCTM *Standards*; discuss readings from the text; watch videos; discuss our experiences at SK & G; and engage in other appropriate activities.

Prerequisite: **Admission to the methods phase of teacher education; MA 150 and MA 151.**

Text: Van de Walle (2004). *Elementary and Middle School Mathematics*, 5th Edition. Longman

General Requirements:

- Professional behavior and attitude at all times:
 - Ask questions rather than pass judgments
 - Have a spirit of cooperation and support with your peers, CT, and me
 - Show a genuine interest in learning the subject matter
 - Demonstrate a sincere interest in the needs of elementary students
 - Make every effort to be a valuable member of both our class and that of your CT
 - Use clear, grammatically and mathematically correct language
 - Respect others' privacy
 - Reflect excitement about teaching and learning
 - Be involved in *our* class—not writing papers or studying for another class. (With the advent of wireless computing, some students have started abusing the use of laptops in classes by emailing, surfing the web, etc. This will not be tolerated. Each such action will result in loss of a grade in participation points.)

- Professional attire in the elementary schools. At minimum, this means no shorts or blue jeans, Also, you will wear a badge (that I will supply) identifying you & your affiliation at all times in the schools (if not, you will lose participation points).
- Attendance at all class sessions.
- Participation will be an important part of your grade. This means that you must be on time and prepared (read assignments, prepared materials, completed reflections, etc.) for all class sessions. There will be times when we work individually, in small groups, or as a whole class. You will be expected to participate in all types of work to help develop all of our understanding of teaching mathematics in the elementary school.

Assessment (further details will be provided in class as necessary):

- Attendance and participation. (50 pts)
- A set of reflections on your elementary classroom experience across the semester. Reflections will be collected **without notice** once or twice during the semester. The complete set of reflections will be collected Thursday, Dec. 2. (50 pts—see attached assignment for details on first, general, and after-teaching reflections)
- Teaching of at least two lessons observed by your cooperating teacher and myself (though, I will not always be present for the complete lesson). At least 2 weeks prior to teaching, you will submit a draft lesson plan for which I will give you feedback. Grading will be on the plan (revised from your draft as necessary depending on feedback) not the actual teaching. I will set certain dates on which you may teach. These will be near the end of the semester. (50 pts each lesson plan (100 total)--see attached assignment for details)
- Production of a “trade book” that you will write and illustrate. Due: Thursday, Nov. 18. (50 pts--see attached assignment for details)
- You will be assigned readings from the text, preparation of materials, and various other out-of-class work. For most of these, you will be required to write up some kind of analysis or reaction. (10 pts ea--80 pts total)

All written assignments are to be typed and submitted in hard copy form. When you refer to a book, article, or other source, you must provide a full citation. (If you are unsure what to include, look at the citations of our author.)

[Note: You may design any assignment to double-count with another course in the block—but it is *your* responsibility to make sure it meets the criteria of the instructors of both courses.]

Feel free to contact me (in my office, via e-mail, before/after class, etc.) when you feel you need help. I am happy to discuss assignments before they are due and have resources that I am willing to share. Do **NOT** wait till the last minute (e.g., the day before you will teach or a major assignment like the trade book is due) to seek help! Contact me if you do not understand the way I am grading assignments or if you are concerned about the grades you are receiving. If something becomes an issue, contact me immediately—do not wait till the last week of the semester.

Grades will be on the following scale:

A	93-100 percent	A-	90-92 percent		
B+	88-89 percent	B	83-87 percent	B-	80-82 percent
C+	77-79 percent	C	70-76 percent	C-	67-69 percent
D	60-66 percent	E	below 60 percent		

Note: If you have a need for disability-related accommodations or services, please inform the Coordinator of Disability Services in the Disability Services Office at 2001 C. B. Hedgcock (227-1700; TTY 227-1543). Reasonable and effective accommodations and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state and University guidelines.

MA 353 Reflections Assignments

Complete set (including those with my comments) Due Dec. 2, 2004

You will write a reflection after each observational class period at SK or G. My expectation is that these will be completed over night (i.e., before our Thursday on-campus class). Below, I spell out minimum expectations for the first, post-teaching, and general reflections. These are to be typed and observation dates included for each entry. You need not keep them in any fancy binder but, if you turn in loose pages, at least paper clip them together & make sure your **name** and **date of observation** is on each sheet. You will turn in your reflections at least once during the semester. I will make comments & return them. Based on my comments, I expect you to make appropriate adjustments or improvements in your subsequent reflections. Your grade for the set will be reflective of the evidence your subsequent reflections are responsive to my comments.

I will collect your entire set of reflections (including those on which I have already written comments) at the end of the semester. When I grade the set, I will look for evidence of your growth in “thinking like a teacher.”

The purpose of these reflections is NOT to provide a record of attendance or merely be a diary. The goal is for you to use them as a place to think—and hence, learn—about teaching. Early in the semester, there will be a reading assignment on reflections—keep it in mind as you reflect.

First Day Observation Guide

(These need not be answered in a particular order.)

1. Document the atmosphere in the classroom the moment you arrived. Did the students seem happy? Tense? Comfortable? Other? There may not be one atmosphere that you feel prevails over the whole room. The atmosphere may change across the time you are there. Try to note all this. **Provide evidence** for your observations—give examples of behaviors that made you think this.
2. Briefly describe the room and note evidence of mathematical activities. Note arrangement of student tables/desks. What is on the walls, chalkboard, etc? What posters, if any, are up? Etc.
3. What is your impression of the students’ attitudes about math? Not all students may fit any particular category—try to get a sense of where *all* the students are attitudinally. **Provide evidence** for your observations.
4. Write about the math lesson itself. What did the teacher do? What did the students do? {These should be more than “teach” & “learn.” Did the teacher do examples? Did she give the students a “big” problem to work on in groups? Did she do all the talking? Did students talk—about math—with their peers or did they only answer the teacher’s questions? Were their answers limited to one word or number or did they describe *how* they solved problems? Etc.) Think in terms of the NCTM Process Standards.
5. What was the mathematical content? Be more specific than, say, “Geometry” or even, “triangles.” What math could the students learn? Think in terms of the NCTM Content Standards.

6. What did this experience start/continue you thinking about teaching?
7. What questions about teaching did the observation trigger for you? Did the teacher do anything that (surprised, pleased, disturbed, ...) you? Why do you think s/he did that? What might s/he have done instead? (or) How might you have (re)acted in his/her place? Etc.

Later Reflections

At minimum, these should address questions 4, 5, 6, & 7 above.

Reflection for post-teaching (to be turned in when I collect the rest of your reflections)

Describe what happened. That is, walk through how the lesson actually went. E.g., what you did, what students did, etc. **Write this as if I was not there.** (I may not be for all of it.)

Point out how this differed from your lesson plan. Explain why it differed. This is not meant as a requirement to chastise yourself. Rather, it is meant to think through carefully what happened & to learn from it. Some of the changes from the plan may have been positive, after all.

Critique the lesson—again, critique, not criticize. This means, analyze what happened: what students learned, what they did not (but was intended—reference your LP goals/objectives), positives, negatives, etc. Try to describe the experience from the **students'** perspective.

(Teaching is about what students learn, not about how the teacher feels.)

If you were to teach the lesson again, what would you do? Go beyond (but you may include) the obvious & vague generalities (such as plan better, have more time, know students better, etc.).

Be as specific as possible. How would such changes affect what students learn?

What would you have needed to know before the lesson for it to be even better than it was?

Any other comments or thoughts you feel appropriate.

MA 353 Lesson Plan Assignment

Late in the semester, you will teach at least two whole class lessons. (Some cooperating teachers (CTs) may have you teaching additional lessons or small group activities. Please keep me informed of what they are asking of you. If they are over-burdening you or pushing you too fast, let me know right away.) I expect that you will teach as a pair (or triad). Each person must play a significant and distinct role in each lesson.

I encourage you to start talking with your CT early in the semester about your teaching. I will provide a list of days on which you may teach which will be filled on a first come, first served basis. (Since I cannot be in multiple places at once, I will have at most two of you teaching (at the same school) on any one day so I can observe as much as possible.

Most CTs will have you teach content that fits with their class' ongoing lessons. **Your lesson is NOT to be review or practice!! You are to teach NEW content.** For example, suppose the class has been working on single digit addition. You might introduce single digit plus double digit addition with trading (carrying), or double digit plus double digit addition without trading, or subtraction, or ... **The particular content should be negotiated with your CT & affirmed by me. If your CT seems resistant to letting you teach new content or teach in a reform-oriented way, SEE ME RIGHT AWAY. We'll figure out a way to work it out.** (This has not been an issue to date.)

You are not expected to re-invent the wheel. Feel free to make use of resources for planning your lesson. However, provide references for resources you have used. Also, do not assume that, because a lesson plan is on the web (or anywhere else), it is necessarily a quality or reform-oriented lesson plan.

First draft of Lesson Plans is **Due at least 2 weeks before date of teaching!**

The draft will not be graded (but MUST include ALL of the items listed below or *points will be deducted* from the revised (& graded) version). I will provide a response (comments, suggestions, etc.) the next week. You are expected to act upon these, to revise your plan accordingly or discuss with me (try to convince me) why you should not follow my suggestions!

The revised LP, the one to be graded, is

Due the morning you teach—give it to me BEFORE you teach.

You may use any lesson plan format but it must include (& I must be able to identify) the following (order is not important):

- What will the teacher do? What will the teacher say? What will the teacher ask?
 - Don't say things like, "The teacher will explain the concept." This is completely generic & does not tell me what you are thinking.
 - Don't say, "I will ask the students if they understand." Think about yourself as a student when teachers ask this question; few students willingly admit they do not understand—esp. when the rest of the class answers yes.
 - Indicate which of you will be leading for each part (or, if you will co-lead, how you will do this) & what the other does at the same time. If you are doing centers, indicate who will be at each station. Indicate how often & how you will know when to rotate stations.

- What will the students do? (If the lesson has multiple parts, you should provide this information for each part.)
 - What will be the classroom arrangement?
 - Will they be in their desks, at the board, writing, drawing, etc?
 - Will they be using manipulatives? How will they obtain them?
- What are your mathematical goals?

This should be about learning goals—what will the students (hopefully) understand after the lesson that they did not before. Learning goals are not about what the students will do. I.e., not “They will solve problems.” not “They will measure shapes.” not “They will be able to add two digit numbers.” etc.
- What is the mathematics available from the activity?

What areas of math does the lesson address?—recall our in-class conversations about math in (a) our in-class activities, (b) various lessons the class has been observing, & (c) the NCTM *Standards & MI Frameworks*. This is to be much more specific than, say, “Geometry.” or “Measurement.” or “Area & perimeter.”
- How will you assess your students?

Make sure you include information on how you will assess students. This does NOT need to be a worksheet but you must be clear about how you will tell if students are meeting your learning goals. [Completing a worksheet in & of itself is not such an indicator. I am sure many of you have done worksheets without having understood the concepts—I know I have.]
- If you will use any worksheets, include them with both your draft and revised versions.
- Approximate time for each part of the lesson. How long will the intro take? Dividing up the students (if necessary)? Passing out materials? Etc.
- What materials do you need to have or prepare before the lesson?
- Feel free to utilize the Selection & Evaluation criteria & the problem solving goals we discussed in class.
- Any other info you deem important & necessary.

MA 353 Trade Book Assignment
Due Nov, 18, 2004

Trade books are books that CHILDREN may read in or out of school. Trade books are titles of general interest, as opposed to technical books or textbooks. They are not aimed solely at “students” but at “children” (which, of course, may include students). Make sure your book fits this description. (Recall the examples I read in class.)

The book may be fiction or non-fiction.

It must be in book form: cover, title, table of contents, page numbers, etc. (Think about what books usually contain.)

There are to be at least 12 activities related to geometry. These activities may be relatively simple but should be targeted for children in the 10-12 year old (4th to 6th grade) range. They should be part of a story. That is, do not make your book a series of things like: (Page 1) “What is the shaded part of this square?” (Page 2) “What fraction of the circle is left if you remove the shaded part?” This is not a story! BE CREATIVE.

In an introduction for parents, indicate your goals for readers of the book and who might enjoy it. (You may also include other info in the introduction.)

At the back of the book, provide a list of solutions. Think about what has—and has not--been helpful to you in terms of solutions at the back of books. Often, merely numerical solutions are unhelpful.

Illustrate the book. Illustrations may be freehand drawings, pictures, clip art, etc.

Grading will be based on:

- Accuracy of the mathematics
- Integrating math with literature
- Grammar & spelling (yes, I expect correct grammar & spelling—these are what usually result in the most lost points)
- Book & story form
- Creativity
- At least 12 activities

I **strongly** urge you to have a friend (or, better yet, a child) read the book out loud in your presence. This is a good way to find: typos, misspellings, awkwardly worded sentences, etc.