Math 221 Fall 2013

2:30-3:50 pm MWF C-1-112 MAK Aug 26 - Dec 6, 2013, Section 05	Office Hours: Mon 4-5, Wed 12-1 always willing to schedule
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web: http://mathhombre.blogspot.com Full contact info & schedule: http://bit.ly/mhinfo	Course Page http://bit.ly/221F13CP Syllabus http://bit.ly/221F13syl Course Facebook Page http://bit.ly/221F13FB

Information:
Dates: Withdrawal deadline Oct 25; Finals week meeting Dec 9, 2 pm. No class 9/2, 11/27,29
Communication: we will post class information on the Facebook page, you will occasionally post for discussions, and class information will be recorded on the course Google doc. If you do not already have a blog, I'm going to ask you to start a Weebly for the semester.

Book: Pick one of (your choice):

- *What's Math Got to Do with It?: How Parents and Teachers Can Help Children Learn to Love Their Least Favorite Subject*, Jo Boaler (preview; buy)
- *How to Solve It*, Georg Polya (preview; buy)
- *Knowing and Teaching Elementary Mathematics*, Liping Ma (preview; buy)
- *Making Sense: Teaching and Learning Mathematics with Understanding*, Hiebert, Carpenter, Fennema, Fuson et al (amazon)

Description: Exploration of the teaching and learning of geometry, measurement, patterns and functions, probability, and statistics in elementary school mathematics, emphasizing the development of mathematical representations and communication. Concepts are developed through hands-on experiences exploring mathematical models, strategies, relationships, and problem solving.

This course is the first of a two-course sequence required of all prospective elementary school teachers. Math 221 does not count towards a major or minor in mathematics. General education course – Foundations: Mathematical Sciences. (4 credits)

Course Objectives:

- Learners will understand key mathematical concepts, be able to problem solve, identify state standards, and communicate in the areas of geometry, measurement, statistics, and patterns.
- Novice teachers will explore what it means to learn and teach for mathematical understanding in the elementary school.

Essential Questions:

- what is math?
    - how do I *do* math?
        - what are the big ideas? how do I find them?
        - what are the processes?
- what is good teaching?
    - what does the nature of math and doing math mean about learning it?
        - how does that compare with how I was taught?
        - how does that connect with modern content standards?

Grading: Standard Scale

:-) ≥98%	A ≥93%	93% > A- ≥90%
90% > B+ ≥88%	88% > B ≥83%	82% > B- ≥80%
80% > C+ ≥78%	78% > C ≥73%	72% > C- ≥70%
70% > D+ ≥68%	68% > D ≥63%	62% > F .

Elements:

Participation	% time at class participating, having requested work ready	10%
Daily Work	% of daily assignments attempted. Keep in an organized binder for checking with an index or table of contents.	20%
Reading	documented reading of assigned books and articles	10%
Creating	weekly piece evaluated on 5 C's; scored 2 exemplars for doing & teaching	20%
Family Math Project	game & reflection	10%
Content	averaged scores on content objectives evaluated with standards based grading	30%

Participation: be at class, work with your colleagues, try to be engaged by reducing your distractions or not being distracting. If you have a laptop, tablet or smart phone you are allowed and encouraged to bring it to class. If you have to miss class, please let me know ahead of time if possible. You can recover participation by making up the class work and sharing the results with me. If you miss class, you are responsible for homework, assignments and information. Graded on % complete.

Daily Work: I'm asking you for 1 hour per class. Document what you did somehow and keep in a binder. It is not evaluated on correctness, but on percent completed. Keep an index/table of contents for which days you have work for. This work should either be doing math or learning about the teaching of math. It is okay to double dip - use daily time for Family Math or weekly work. Just keep track of getting in your hours. I will offer suggestions, but this is your responsibility. It's a good opportunity to practice generating ways to meaningfully work, which will be an important part of your work as a teacher.

Reading: in addition to reading your chosen book (starting week 4 of the semester), we will have some articles to read about the teaching and learning of math. Keep notes on your reading in a way that you can share them with classmates or instructor. Physical notes, on your blog or a Google doc.

Creating: from our work each week I am asking you to put an additional hour or two into deeper work of your choice. Revise or extend a daily work, play or make a math game, make some math art, find and read something in an area of interest, work on a math problem of interest or create a mathematical task… there is so much different work that teachers do. If you can connect it to our course work, it's probably okay. Each week's work will get feedback in terms of our rubric and qualitative. But those aren't grades. At the end of the semester this weekly work will be evaluated ⅓ on completion (did you complete work for each week) and ⅔ on exemplars. You will pick two examplars of your doing math, and two examples of your preparing to teach math.

Family Math Project: we will be going as a class to Griffin Elementary School, K-4, Grand Haven one evening (November 14, 6:30-8 pm) to help put on a Family Math Night. Towards this end you will (in pairs) develop an activity/game to run for the night, then reflect on how it went, on student interaction, and how you might adapt the game for a classroom environment. You do NOT have to create an activity from scratch. Teachers need to be able to find good resources and adapt them to their purposes. Of course, if you have an idea, you may want to create from scratch. (Teachers do that, too.)

5 C's Rubric

Letter	%	Rubric
	0	NC
	45	0
F	55	1
D	65	2
C	75	3
B	85	4
A	95	5
A+	100	5.5

Rubric grading: Writing in this class will be evaluated using a 5Cs communication rubric. Work that receives full marks is:

- clear (clear),
- coherent (follows a sensible direction, shows assignment made sense),
- complete (attends to all aspects or covers full time expected),
- and consolidated (includes effective reflection or exhibits a planned structure).
- Work is also evaluated for content (understanding of relevant mathematical or pedagogical concepts); this does not mean Correct, but rather demonstrating understanding.

Each C is worth 1 point of the 5. 5.5 is rare and for going above and beyond.

Content:

Standards Based Grading: SBG is a relatively new way to assess students that seeks to get a higher correlation between grade and understanding. On each of the objectives below, you will have opportunities to demonstrate your understanding. These objectives are a bit broader than you would expect in a secondary classroom, since we are seeing content from four years of schooling. In an

elementary classroom, the teacher identifies the standard demonstrated, but in this preservice teacher preparation course you will also be trying to identify which of your work is evidence of which standard. (I'll help.)

Scores do not mean an answer is right/wrong, but are meant to reflect how much understanding was demonstrated. It is possible to demonstrate good understanding of a concept without even finishing a particular problem. The score for each category is the average of the 2 highest scores. If there is only one score it is discounted by 1; a single A becomes a B, etc. You can reassess on specific objectives during office hours or at arranged times.

A+	complete understanding and can extend on your own (generally something extra or creative; infrequently given)
A	complete understanding, can apply when appropriate, explained thoroughly
B	some small difficulty applying or missing a small point of understanding, basic explanation
C	significant difficulty in application or missing a major point of understanding, unclear or insufficient explanation
D	mechanical application of ideas without understanding, no explanation or communicates misunderstanding
F	little to no understanding or evidence of understanding

Content Standards: Based on Common Core State Standards for mathematics K-5

Algebra	**Statistics**
Key ideas: pattern, variable Patterns: identify, extend Rules: use to make a pattern, find to identify a pattern, use to answer questions Representation: to & from table, context, symbolic	collect data measures: central tendency, range representations: make and interpret picture graph, bar graph, line plots

Geometry (counts as two categories)	**Measurement**
Analyze & classify shapes (triangles, quadrilaterals, polygons) by property (side properties, angle properties, symmetry) Analyze & classify solids (cylinders, cones, prisms, pyramids) by property/feature (base, face, edge, vertex, symmetry) Solve problems by composing and decomposing shapes Find and apply concepts of perimeter, area, and volume Coordinate geometry: plotting, reading, using as a representation for geometry problems	Key ideas: iteration, unit, additivity Measuring tools & techniques: length, area, volume, angle Units: use & conversion Estimation: length, area, volume, angle Solve contextual problems involving measurement ideas Time

Honesty and Attribution: it is of vital importance in any information discipline (like teaching) to cite well and explicitly. Share your sources and make clear what came from where. I encourage research and collaboration, just be open about it.

Special Assistance or Accommodation - GVSU seeks to ensure that its programs are accessible to all persons. Students in need of special assistance or an accommodation regarding any of the course requirements as outlined in this syllabus, the course objectives, and/or course evaluation and assessment criteria, are advised to notify the instructor and Disability Support Services (200 STU, 616-331-2490) within the first two weeks of class. Confidentiality will be maintained regarding your special needs.

Math Education Resources: to get started

- NRICH - sorted & searchable problems & articles from a British math society
- The Math Forum - some behind a paywall, but a lot of math resources
- My Reading & Viewing Recommendations, chock full of free teacher blogs & more
- NCTM - U.S. math teacher organization. Their elementary journal Teaching Children Mathematics is a great resource. Annual e-student membership is $35 for full access. Illuminations , Calculation Nation (online games), and Figure This! are free; other elementary resources.

College of Education Mission and Goals

College of Education Philosophy - Believing that schools function as social and political entities as

well as for the growth of individuals, the College of Education prepares teachers and leaders a) to enhance the academic and personal potential of their students, and b) to evaluate the social and ethical implications of educational policies and practices.

Mission: “Teaching, Leading and Learning in a Democratic Society”
The College of Education prepares candidates who enhance the individual growth of their students while working to establish policies and practices that promote the principles of democratic education. The College articulates this mission as Teaching, Leading, and Learning in a Democratic Society.
Values: “Expertise, Equity, Liberal Education, Social Responsibility”
The College of Education values expertise to guide our practice, equity to guide our interactions, liberal education to guide our perspectives, and social responsibility to guide our commitment to democratic education. We value these ideals in our preparation of candidates, our development of faculty, and our relationships with the larger community we serve.

Mission	**Values**	**Dispositions**	**Knowledge**	**Skills**
Teaching and Leading	**Expertise and Equity**	Believes that all students can learn and that society is best served by the development of individual potential	Understands the theoretical and research base of meaningful teaching, learning and leadership	Demonstrates effective teaching and assessment, responsible leadership and professional vitality
Learning	**Liberal Education**	Values diverse traditions, varied forms of expression, intellectual honesty, and multiple modes of instruction	Understands that knowledge evolves, crosses disciplinary lines, and relies on skills of critical thinking and ethical judgment	Prepares students for engaged citizenship by seeking varied perspectives and solutions based on knowledge rather than opinion
Democratic Society	**Social Responsibility**	Believes that educators can shape the direction of schools in a democratic society	Understands that educational policies and practices can foster or impede democratic principles	Collaborates professionally in promoting schools that contribute to free inquiry and democratic citizenship

General Education This course is part of GVSU's General Education Program. The goal of the program is to prepare you for intelligent participation in public dialogues that consider the issues of humane living and responsible action in local, national, and global communities. The program is designed to increase your knowledge and skills in the following areas:

Knowledge Goals:

1. The major areas of human investigation and accomplishment—the arts, the humanities, the mathematical sciences, the natural sciences, and the social sciences.
2. An understanding of one's own culture and the cultures of others.
3. An understanding of how academic study connects to issues in the world.

Skills goals:

1. Written communication is the practice of creating and refining messages that educated readers will value.
2. Oral communication is the practice of effectively communicating verbally with a public audience across a variety of contexts.
3. Critical and creative thinking uses systematic reasoning to examine and evaluate ideas, leading to new ways of thinking or doing.
4. Information Literacy is the process of locating, evaluating, and using multiple forms of information.
5. Quantitative literacy is a competency and comfort in working with numbers.
6. Ethical reasoning is a decision-making process based on defining systems of value.
7. Collaboration is the process of working together and sharing the workload equitably to progress toward shared objectives.
8. Problem solving is the process of designing and evaluating strategies to answer open-ended questions or achieve desired goals.
9. Integration is the process of synthesizing and applying existing knowledge, past experiences, and other perspectives to new, complex situations.

Ensuring that undergraduate students receive a broad general education has been a primary goal of colleges and universities since their inception. In this era of increasing specialization and growing demand for professional expertise, it is vital that we continue to emphasize the value of general learning. GVSU maintains that a complete education involves more than preparation for a particular career. A career occurs in the context of a life, and a sound general education helps one "make a life" as well as "make a living." The university is committed to ensuring that all undergraduate students, regardless of academic major, receive a broad education rooted in the arts and sciences. Teaching in the liberal tradition is at the heart of Grand Valley's identity, and this focus is critical in our General Education Program. Liberal education transcends the acquisition of information; it goes beyond the factual to ask important evaluative and philosophical questions. Liberal learning holds the fundamental principles and suppositions of a body of knowledge up to inquiry, question, and discussion. It helps a person recognize the assumptions under which he or she operates and encourages the examination and questioning of those assumptions. Liberal learning begins in the General Education Program and continues through the more specialized studies comprising each student's major and minor areas of study.

Grand Valley State University educates students to shape their lives, their professions, and their societies.