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C&I 402.01: Teaching Mathematics K-8

Georgia Cobbs
University of Montana, Missoula, georgia.cobbs@umontana.edu

C & I 402 Teaching Mathematics K-8

Georgia A. Cobbs, Ph.D.
105 Education, 243-6052
georgia.cobbs@mso.umt.edu
Office hours as posted or by appointment

"Technology is an essential tool for teaching and learning mathematics effectively; it extends the mathematics that can be taught and enhances students' learning."
NCTM Position Statement on Technology

Overview This course is an opportunity to build a conceptual and pedagogical framework for mathematics education, K-8. Throughout the course, the student will get acquainted with elementary and middle school mathematics topics, methods, and materials. In addition to content, other areas to be explored include: curriculum changes, current research in mathematics education, professional organizations, including the National Council of Teachers of Mathematics (NCTM), School Science and Mathematics (SSMA), and other professional organizations.

Goals of this course:

1. Gain a good view of mathematics
2. Learn about and how to construct problem-based, student- centered approaches to learning.
3. Mathematics is intrinsically rewarding to learn and to teach!

Student Objectives

1. Learn NCTM Standards (2000) for teaching of mathematics K-8. They will become acquainted with topics within these standards, especially the Focal Points (2007) for their field grade level and an appropriate methodology for different development levels.
2. Develop worthwhile tasks centered on the six Professional Standards for Teaching Mathematics of the NCTM Standards (1991) using a variety of teaching methods and/or materials.
3. Become aware of the different learning styles, individual, multicultural and gender differences in children and make applications to their lessons.
4. Learn different ways to assess and evaluate students' progress in a mathematics curriculum. We will evaluate ways to assess and discuss different rubrics.
5. Become acquainted with professional organizations and various research activities that support and influence the teaching of mathematics. (NCTM, SSMA, MCTM, MEA/MFT)

Required: Van De Walle, J. (2007) *Elementary and middle school mathematics: Teaching developmentally.* White Plains, NY: Pearson Education, Inc. http://wps.ablongman.com/ab_vandewalle_math_6

Enzensberger, H. E. (1997) *The Number Devil: A Mathematical Adventure.* New York: Metropolitan Books Henry Holt & Company.

Welchman-Tischler, R. (no date). *Start with Manipulatives*. Vernon Hills, IL: ETA/Cuisenaire.

On reserve in TRC:

Texas Instruments (2005). *Uncovering Mathematics with Manipulatives and Calculators.* Jacksonville, TX: Author. (There are 2 levels: K-2 and 2-6)

Assignments

Attendance/Participation (15%): Attendance and participation is very important on a daily basis. Journal entries will be included as your participation grade. Many pertinent ideas are discussed and covered only in class. Being present and *actively participating* are aspects of your grade. Communication in class is important. If you need to miss, please email or leave a message, this is **a professional courtesy. No more than 2 absences will be permitted.** If you are absent more than 2 times, you may drop a letter grade. Please be professional in your presence and interactions on campus. You are building a professional profile now, let us all collect the data you want to project!

Quizzes (20%) There will be 2 quizzes early in the semester. Please read the assigned chapters from the Van De Walle text.

Teaching I (15%): Prepare a hands-on, minds-on lesson (over 2 days) introducing a concept using a problem based lesson you will teach in your field placement. You learn by following up with the students. *The DRAFT will be reviewed* by me. Sign up for a conference. Afterwards, set up a time to be observed by your mentor. *Reflect as a team* or you may choose to reflect individually, using the Professional Standards. See appendix B in text. Final Lesson Plan & Reflection due **October 14.**

Mathematical Manipulative Project (M & M) (15%) As a team of 4, you will develop a problem-based activity (teaching a mathematical concept) with a manipulative from your kit. One pair will teach at the K-3, the other 4-6. For instance: Base 10 Blocks: Addition of whole numbers (K-3), addition with decimals (4-6). Watch a video from the list below (like on Base 10 Blocks). Then each pair will present in small groups how to use the manipulative to teach the concept. Then, as a group, write a brief 3-5 page paper, including each level, K-3, 4-6. Your paper will address teaching in a conceptual manner, a specific NCTM content standard, specifically the focal point at that grade level, how your method compares with the same concept presented in an elementary text compares to Van De Walle text describes how to teach the concept. How would you address cultural differences in the teaching of this? Especially address culturally relevant curriculum ideas such as Native American and/or any minority represented in your class. Get to know your class before you write this paper. See Blackboard for a sample outline. **Presentations start Sept 20, paper due by 27th.**

Marilyn Burns Videos

VT 04265	Base-Ten Blocks
VT 04266	Color Tiles
VT 04267	Cuisenaire Rods
VT 04268	Geoboards
VT 04269	Pattern Blocks

Kay Toliver Videos

Fractions
The Counting Principle
Decimals
Volume

MEA/MFT (5%): Attend a MATH session at MEA and post your reflection on Blackboard. What did you learn? What may you use in your future classroom? Anything else you learned at MEA? Post thoughts on your general impression of this conference. **Due Oct 21st**.

Assessment of Mathematical Teaching (AMaTe) (15%): Work with a student who is struggling with some mathematical concept. Meet with me once with your partner (if your students are in the same class). Let's talk about what the student is struggling with. I can provide more individual comments and you more help for the student. Then, you will interview the student about perspectives on teaching and learning math. Write a summary of student's comments and reflection of the sessions. See handout for more info. **Due Nov 1.**

Integrated Unit (15%): Adhere to Unit Outline given in seminar. Any questions, please ask. **Due Dec 4th.**

Evaluation Grading Scale

A	95-100
A-	92-94
B+	90-91
B	87-89
B-	84-86
C+	81-83
C	78-80
C-	76-77
D	68-75
F	<68

All written assignments must be printed with a letter quality printer and are due at class time of the assigned day. **Late assignments are not accepted.**

Graduate Students- Select and research a mathematics educational issue of interest (e.g. use of calculators, ethnomathematics, same gender classes). Prepare a 20-minute powerpoint (ppt) that supports a class discussion you lead! PPT should include: clear introduction, well-organized progression of topic, at least 3 points for a class discussion; purposeful connections to the mathematics education community; recommendations; annotated bibliography of resources. This project is worth an additional 40 points; but follow the same grading system as listed below (95-100% A; 92-94% A-, etc.) Please notify me by the end of the second week of class to discuss your interest in the graduate increment.

All students must practice **Academic Honesty**. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at http://www.umt.edu/SA/VPSA/index.cfm/page/1321

Evacuation Action Plans

Primary Route: Nearest exit
Outdoor Rally Points South of Ed Bldg…at least 300 Feet from the building!!
Indoor Rally Point: McGill Hall
Always assume the emergency is real. Take valuables, building may be closed for some time!

Informative WEBSITES

http://wps.ablongman.com/ab_vandewalle_math_6 This supports this course & your text.

http://del.icio.us/Georgia.Cobbs: my favorite websites!

C & I 402 Dynamic Calendar
Fall 2008

Week	Topic	Readings, Assignments
1 Aug 26	Course Overview: Activities & Standards	Journal daily Chap 1
Aug 28	Activities & Standards	Chap 2 & 3, Number D. Ch 1-2
2 Sept 2	Reform in mathematics, NCTM Standards	Review for quiz, ND3
Sept 4	Kamaii video, types of teaching Toliver Tape: Welcome to Mathematics	**Quiz 1: Chap 1-3**
3 Sept 9	Types of texts: **Meet in Mansfield Level 2**	Chapter 4, ND 4
Sept 11	Field Info; prep for MM	Chapter 5, ND 5
4 Sept 16	Equity Teaching, Lesson Planning	Chapter 7
Sept 18	**M & M project presentations:** Base Ten; C-Rods Assessment http://www.4teachers.org/	TIMSS, MontCas Grade Billy's test, Ch 6
5 Sept 23	**M & M project presentations:** Pattern Blks, C-tiles	**Quiz 2: Ch 4-7**
Sept 25	**M & M project presentations:** Volume & Geoboards	**M & M Due**
6 Sept 30	Fraction Article posted in Blackboard Technology: Websites, CBLs & calculators, Labquest	**Fraction Article** Read & Discuss in class
Oct 2	No formal class, bring draft of lesson plan	Sign up with me
7 Oct 7	**TEACHING IN THE FIELD**	Sign up with mentor
Oct 9	**TEACHING IN THE FIELD**	
8 Oct 14	Sailing**: Integrated theme, Build Skimmer (SAE)**	**Teaching I Due**
Oct 16	**MEA/MFT Missoula , MT**	**Attend MEA!! Post BB**
9 Oct 21	AMaTE & Technology: Websites, CBLs & calculators	Chapter 8
Oct 23	Ethnomathematics	**Resources!**
10 Oct 28	Literature & Mathematics http://sci.tamucc.edu/%7Eeyoung/literature.html	Various books!
Oct 30	Literature & Mathematics	**AMaTe Due**
11 Nov 4	No Class, please VOTE	VOTE
Nov 6	Lab Gear	
12 Nov 11	**Veteran's Day**	Sign up with mentor
Nov 13	**Work on units**	
13 Nov 18	**TEACHING IN THE FIELD**	*Technology lesson in*
Nov 20	**TEACHING IN THE FIELD**	*Unit!*
14 Nov 25	**TEACHING IN THE FIELD**	
Nov 27	Thanksgiving break	
15 Dec 2	Mathematics, maps, & mountains using Excel	materials
Dec 4	Mathematics Community: Environment, Manipulatives, Classroom management & Cost	**Units Due Dec 4th!** Catalogs, websites
Finals	Final/closure Time Section 1	Tues 9th Dec 8-10 am
week	Final/closure Time Section 2	Tues 9th Dec 1-3 pm