

MATHEMATICAL LEARNING IN PREK-GRADE 5
Fall 08 EMAT 6410 Syllabus
Andrea Knapp

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Class times: Tuesday 5:30-8:15
Office hours: After class; by appointment

Description: This course is designed for participants to become familiar with theories on how PreK-5 children come to learn mathematics and on how PreK-5 children should be taught.

COURSE MATERIALS

Carpenter, Fennema, Franke, Levi, & Empson (1999). *Childrens' Mathematics*. Portsmouth, N.H.: Heinemann
Kilpatrick, J., Martin, W., Schifter, D. (Eds.). (2003). *A research companion to principles and standards for school mathematics*. Reston, VA: NCTM.

COURSE GOALS AND OBJECTIVES

1. To study theories which inform the teaching and learning of PreK-Grade 5 mathematics.
2. To examine the research basis for the K-2 and 3-5 grade bands in *Principles and Standards for School Mathematics*.
3. To view mathematics education in light of current and historical theories and theorists.
4. To identify the theories upon which students' own beliefs and practices for teaching and learning mathematics are based.
5. To compare and contrast current theoretical trends in mathematics education with students' teaching materials and school, district, and state climates.
6. To consider the implications of mathematics education research on classroom practice.

Grading: See UGA grading system at <http://bulletin.uga.edu/bulletin/acad/Grades.html>. More specifically,
A=93, A-=90
B+=87, B=83, B-=80
C+=77, C=73, C-=70
D+=67, D=63, D-=60

Attendance: Attendance and constructive participation are expected for all classes. In the event you need to miss a class, you will be required to make up the time with additional reading and/or writing on campus.

University Policies:

Students are required to meet the standards of "A Culture of Honesty." In addition, students must abide by the University Honor Code and Academic Honesty Policy. Students are responsible for informing themselves about such standards before performing any academic work. See <http://www.uga.edu/ovpi/honesty/acadhon.htm>.

This syllabus is subject to change at the discretion of the instructor.

COURSE ASSIGNMENTS

- (5-10 points each) Reading Quizzes- Announced or unannounced quizzes will be given over the readings.
- (20) CGI Reflection #1(3 pgs)- Write a reflection about the child interview you conducted. Describe the child's grade level, strategies, and dispositions while solving the CGI problems. Include your thoughts about the process in relation to your practice.
- (20) Reflection #2 (3 pgs)- Choose a chapter from the Research Companion that is not assigned in the tentative course schedule. Reflect deeply about several aspects of the chapter. This assignment may be substituted by attending the GCTM conference and presenting about your experience.
- (50 points) Theorist Paper- You will sign up for an educational theory or theorist to research. Write a paper explaining the theory. In addition, provide a biographical description of the accompanying theorists and their work. Discuss how the theory has been implemented, and implications for current classroom practice. The last page should be a reflection about aspects of the theory you agree and/or disagree with and why. If you do this assignment with a partner, compare and contrast the two theories. This assignment may be done alone (6 pgs) or with a partner (10 pgs).
- (15 points) Theorist Presentation and Discussion- Present the information you learned from your Theorist Paper to the class. A polished presentation is expected; however, you may be creative in how you choose to explain your theory to the class. After your presentation, you should lead a class discussion about your presentation topic. Prepare discussion questions in advance. During the discussion, the instructor may add to your presentation. Your presentation should not exceed 45 minutes.
- (20 points) Textbook Theory Reflection #3 (3 pgs)- Write a reflection on what theory/theories your current mathematics textbook could be based on. Justify your reasoning. Look to your classmates for sources on theories you may want to investigate.
- (5 points) Textbook Theory Presentation- Prepare a 5-minute presentation of your Textbook Theory Reflection. Power point is not required.
- (10 points) Theorist Timeline- Throughout the course, you will keep a log of theorists and their accomplishments. Turn in a neat, organized version of your timeline.
- (50 points) Final Exam- The final exam will be composed of questions from the reading quizzes and/or classroom discussion questions.

Papers may be $\frac{1}{2}$ page longer or shorter than assigned. All papers and reflections should be double-spaced with 12 pt. font and 1-inch margins. Use APA 5th ed. style for writing (See writing rubric).

Point Totals:

Reading Quizzes	30
3 Reflections	60
Theorist Paper	50
Presentations	20
Timeline	10
<u>1 Exam</u>	<u>50</u>
Total	210

TENTATIVE COURSE SCHEDULE

Date/Topic	Course Activities	Homework	Due Dates
Aug 19 Contemporary Theorists	Theory Presentation (Dr. Knapp): Realistic Mathematics Education Freudenthal Rebound, Discussion Questions Syllabus, Presentation sign-up	Read Research Companion (RC) Chapter 6 Whole Numbers	
Aug 26 Levels Theory	Discuss RC Ch 6 Theory Presentation (Dr. Knapp) Piaget, Pendulum CGI Video I	Read Warfield & Yttri (1996), Review Children's Math. (CM) Chapters 1-3, Bring children's book.	
Sept 2 Cognitively Guided Instruction	Discuss Warfield & Yttri Video V, Appendix B Write problems from children's book. Identify problem types.	Review CM Chapters 4-6 Start Carpenter et al. (1989) Memorize Problem Types.	
Sept 10, 11 Cognitively Guided Instruction	Service Learning Project Meet at Anne St. Elementary Sept 10, 4-6 PM or Sept 11, 5-7 PM Read books to groups of 3-5, ask CGI questions, take detailed notes. Use white boards, manips., base 10 blocks.	Review CM Chapters 7-Appendix. Finish Carpenter et al (1989)	
Sept 16 Cognitively Guided Instruction	Video II, p. 49 Identify strategies used by children. Relative difficulty worksheets. Discuss readings.	Write Reflection 1	
Sept 23 Behaviorism	Shea's #'s Video Theory Presentation: Thorndike Skinner	Read RC Ch 16 Communication	Reflection 1 Due
Sept 30 Behaviorism Cont./ Gestalt Theory	Discuss RC Ch 16 Theory Presentation: Watson (Behaviorism) Gestalt Theory	Research Companion (RC) Ch 7? Fractions & Multiplicative Reasoning	
Oct 7 Away from Behaviorism	Discuss RC Ch 7 Theory Presentation Dewey Brownell	Attend GCTM *Read additional RC chapter and write 3-pg reflection. Also prepare a 5-10 min. presentation.	
Oct 14 GCTM	*If not attending GCTM, RC chapter presentations	Read RC Ch 12- Measurement	Reflection 2 Due
Oct 21 Radical Constructivism	Discuss RC Ch 12 GCTM Reports Theory Presentation Von Glasersfeld	Write Theory Paper	

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Oct 28 Social Constructivism, Individualized Learning	Theory Presentation Vygotsky (Dr. Knapp) Bloom (Dr. Knapp) Edit each other's papers	Read RC Ch 11-part I Geometry	Theory paper Due-1 st draft
Nov 4 Levels Theory	Discuss RC Ch 11 Logo Turtle Geometry Theory Presentation Van Hiele (Dr. Knapp)	Read RC Ch 11-part II Geometry	
Nov 11 Developmental Theory, Understanding	Discuss RC Ch 11 Theory Presentation Bruner (Developmental) Skemp (Relational/Instrumental)	Read RC Ch 18 Representation	Theory paper Due
Nov 18 Structuralists	Discuss RC Ch 18 Theory Presentation Gattegno Dienes	Write Reflection 3	
Dec 2 Situated Learning, Contemporary	Theory Presentation Lave and Wenger (Situated) Bishop (Contemporary) Begin Textbook Presentations	Read RC Ch 23-will be divided into sections	Reflection 3 Due
Dec 9 Course Summary	Finish Textbook Presentations Discuss RC Ch 23 Synthesize theories Finalize timelines	Study for final	Timeline Due
Dec 16 Final Exam			