

Technology in Teaching Elementary School Mathematics: Geometry and Measurement
EMAT 6200 Summer 2009
Andrea Knapp

Class Dates and time: June 4-18 MTWR; 8:00 AM-1:00 PM
Office Hours: 1:00-1:30, 4:15-4:45 M,T,W,R, by appointment
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Website: <http://math.coe.uga.edu/Alternative/Knapp/Knapp.html>
E-Learning Commons: www.elc.uga.edu

COURSE MATERIALS AND RESOURCES

NCTM. *Navigating through Geometry in K-2, 3-5; Navigating through Measurement in K-2, 3-5.*
Ma, L. (1999). *Knowing and teaching elementary mathematics: Teachers' understanding of fundamental mathematics in China and the United States.* Mahwah, N. J.: Lawrence Erlbaum Associates.
Stigler, J.W., & Hiebert, J. (1999). *The teaching gap.* New York, NY: THE FREE PRESS.
Georgia Performance Standards- <https://www.georgiastandards.org/resources/pages/Videos/math.aspx>

COURSE GOALS AND OBJECTIVES

1. To become familiar with the NCTM and GPS Geometry, Measurement, and Process Standards.
2. To gain facility with the NCTM Technology Principle and National Education Technology Standards.
3. To improve mathematical knowledge for teaching related to elementary school mathematics, particularly in the domains of comparing, ordering, shapes, units, measurement tools, systems of measurement, transformations, spatial visualization, and modeling (See Navigations Series). Constructs of shape, position, size and motion will be investigated with technology. In addition, the course will examine measurement with statistics.
4. To examine standards-based, constructivist methods for teaching geometry and measurement.
5. To become familiar with curricular materials, manipulatives, and technologies that support the standards-based teaching of geometry and measurement in a diverse environment.
6. To develop the mathematics education leadership skills of professional speaking and grant writing.

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 scheduled classes. In the event you need to miss a scheduled class, you will be required to make up the time on campus as well as complete additional reading and writing.

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>.

If you have a disability and require classroom accommodations, please see me after class or make an appointment during office hours. If you plan to request accommodations for a disability, please register with the Disability Resource Center through the Office of Student Affairs, 105 Flynt Building, 770-229-3464. Please note: Weather cancellations on the main UGA website may not apply to the Griffin Campus. Listen for cancellations on 1320 AM, 1450 AM, 88.9 FM, or 92.5 FM.

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

COURSE ASSIGNMENTS

(10 pts.) *Reflections (1.5 pgs. minimum)*- Reflections are designed for you to relate what you are learning in class to your own practice or experience. You do not need to summarize the readings. Choose one aspect that was of interest to you, and discuss it in depth. You may want to reflect in light of the standards. Your writing should be clear, concise, and show that you thought critically about the topic with respect to your practice. You will not be graded on your opinions but rather on whether you have thought critically about issues within mathematics education in light of the course material and your practice. (Individual)

(5-10 pts. each) *Reading Quizzes*- Unannounced quizzes will be given over the readings. (Individual)

(10 pts.) *GCTM Speaker Proposal*- Prepare a speaker proposal for the Georgia Council of Teachers of Mathematics Conference.

(30 pts.) *Standards-Based Lesson Presentation and Article Review*

Locate a standards-based lesson on Geometry or Measurement from a NSF curriculum, a GPS Video, or the Navigations Series. You will teach it to your colleagues in this class (10). The lesson should last ~30 minutes. There will be a 15 minute discussion afterwards (10). Try to anticipate student areas of difficulty with the mathematics content, and be prepared to lead the discussion about the lesson. Find at least one related article to inform your decisions. Your discussion at the end of the lesson should include a review of the article. Prepare a handout that includes the lesson plan and both the NCTM standards and GPS you covered (10).

Book Report (40 pts.)

Read either *The Teaching Gap* or *Knowing and Teaching Elementary Mathematics*. Write a 4 page paper summarizing the book. At the end, include a reflection about your reaction to the book with respect to your experience and practice. You will report on the book you read to students who read the other book. (Individual)

(30 pts.) *Technology Grant Proposal*

Prepare a grant proposal for a technology that your school does not own. Discuss specifically how you plan to use the technology in your classroom. Reference at least one article related to the research or practice of that technology in mathematics education. Turn in the application requirements with your proposal. (Individual)

(20 pts.) *Software Demonstration*

Select an educational software that can be used as a tool for teaching geometry or measurement in your classroom. Demonstrate the software for the class, and explain the GPS and NCTM standards you addressed.

(100 pts.) *Culminating Activity: Develop a Geometry and/or Measurement Unit*

Prepare a Standards-based Geometry and/or Measurement Unit that will cover the Geometry/Measurement standards for your grade level. You will present this unit to the class. This assignment is your final exam.

*Papers may be ½ 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. The instructor will read and comment on papers before grading them if you submit them a week before the due date.

Reading Quizzes	20
Reflections	40
Speaker Proposal	10
Standards-Based Lesson	30
Book Report	40
Grant Proposal	30
Software Demonstration	20
<u>Geometry Unit</u>	<u>100</u>
Total:	290

*Equal participation is expected on group projects. The instructor reserves the right to reduce scores based on unequal participation.

*Membership in NCTM and GCTM are encouraged.

TENTATIVE COURSE SCHEDULE

Date	Class Activities	Homework Assignment	Due Dates
June 4 Geometry & Measurement Standards Van Hiele levels	1. Unpack NCTM, GPS, NETS standards, Focal Points, CRCT content, Technology Principle. 2. GPS Videos, Web-Based Software 3. Exploring Measurement- Knapp 4. Form groups, and search for standards-based lessons. 5. GCTM Speaker proposals	Read Navigating Introduction and Chapter 1 Write reflection Write GCTM speaker proposal Read book Bring a grocery item.	
June 8 Shapes Comparing & Ordering Weight & Liquid Capacity	Navigations Discussions Standards-Based Lesson Geometer's Sketchpad/Shape Makers Grocery Package contents	Read Navigating Chapter 2, Navigating Article Write reflection Read book	Chapter 1 Reflection, GCTM speaker proposal
June 9 Location and Position Using Units & Tools Two Systems	Navigations Discussions Standards-Based Lesson Logo Paths Mapping 100 Meters	Read Navigating Chapter 3, Navigating Article Write reflection Read book	Chapter 2 Reflection
June 10 Transformations & Symmetry Angle Measure, Circles	Navigations Discussions Standards-Based Lesson Sketchpad-transformations, tessellations Zany Tessellations	Read Navigating Chapter 4, Navigating Article Write reflection Read book	Chapter 3 Reflection
June 11 Spatial Visualization and Modeling Area & Volume	Navigating Discussions Standards-Based Lesson The Packing Factory, Which is Bigger- Noah's Ark or the Titanic? JavaBars Puzzles with Pizzaz	Write Book Report	Chapter 4 Reflection
June 15 International Curricula Probability & Statistics	Standards-Based Lesson Book Talks/Tchg Gap Area Prob Guest Speaker- Xianwei Yuan TinkerPlots Grant Search	Locate a Grant Application Read Technology Article Work on Geometry Unit	Book Report
June 16 Time, Temperature Grant Writing	Standards-Based Lesson Celcius vs. Fehrenheit-TI Nspire Grant Writing Work on Grant Proposal	Write technology grant proposal.	
June 17 Justification vs. Proof	Standards-Based Lesson Rethinking Proof-Triangular Island Work on Geometry Unit	Write Geometry Unit Prepare Software Demonstration	Technology Grant Proposal
June 18 Final Exam	Standards-Based Lesson Web-based software demonstrations Geometry Unit Presentations	Submit technology grant	Software Demonstration Geometry Unit