Formative measures will include mathematics problems, reading and writing assignments, and work related to your STEP 363 experience. You are allowed and encouraged to work with others during formative events, unless indicated otherwise.

Summative measures will include two written exam, and a position paper outlining your views on the appropriate content of a mathematics curriculum, best teaching practices in mathematics, and your role as a mathematics educator.

Explorations in teaching are related to "real life" professional experiences. Although they can be approached disjointly, it is beneficial to select and stick with one approved content area for the teaching-related assignments. The following explorations, detailed extensively on another handout, include a number of activities that will help you initiate and develop your work sample:

- A two-week unit plan 150 points
- Work Sample 300 points
- Textbook evaluation 50 points
- Equity presentation 50 points

Course Requirements and Values: There will be five components to the course grade.

(1) Regular, daily attendance (5% of course grade)
(2) Participation in group discussions (5% of course grade)
(3) Formative measures (25% of course grade)
(4) Summative measures (30% of course grade)
(5) Explorations in teaching (35% of course grade)

Course grades will be assigned as follows: A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%.

STEP OBSERVATIONS: During the semester, I will observe one of your STEP 363 teaching experiences. This observation will not affect your MED 441 grade. However, you are expected to use one or more of your STEP 363 teaching experiences as a basis for your work sample. Please complete and return your “Notice of Teaching a Lesson” form (in your STEP 363 packet) as early as possible so I can coordinate these visits. When you are observed, please provide me with an observation form, a copy of your lesson plan, and any handout materials that you plan to give your students.
Course Objectives:
1. To prepare you for student teaching high school or middle school mathematics.
2. To acquaint you with recent developments in the secondary mathematics curriculum.
3. To prepare you for planning, teaching, and evaluating.
4. To acquaint you with the professional organizations in Mathematics Education.
5. To help you prepare to cope with day-to-day classroom situations and problems.
6. To help you become familiar with your strengths and weaknesses so you can grow as a teacher.
7. To prepare you to use the latest manipulatives and technologies in teaching secondary mathematics.
8. To help prepare you to teach in a standards-based school system (NCTM standards, Colorado’s Content Standards in Mathematics, and Colorado Standards for Teachers).
9. To encourage you to develop, assess, and reflect upon your own teaching skills.

Required Text and Materials:
(1) Johnson, David R. (1994); Motivation Counts: Teaching Techniques that Work; Dale Seymour Publications.

(2) “Starter Kit” from the National Council of Teachers of Mathematics or join NCTM immediately at the student rate of $32.50. You may apply via the Internet, or by calling 1-800-235-7566.

Optional Text and Materials:

Graphics Calculator: You will need a graphics calculator; if purchasing one, consider a TI-83 Plus.
<table>
<thead>
<tr>
<th>Week of:</th>
<th>Topics of Class Sessions</th>
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| August 27     | Course Overview; Clinical-Methods Connection; NCTM and State Math Standards  
|               | NCTM's Principles and Standards for School Mathematics (PSSM)  
|               | Colorado Mathematics Standards an Introduction  |
| Sept. 3       | Mathematics Standards: Colorado and NCTM  
|               | NCTM's PSSM  
|               | Examples (Online at "www. cde.state.co.us" from Colorado Mathematics Standards  
|               | Begin on Work Sample (Section I: "Planning Process")  |
| Sept. 10      | Classroom Management, Reading and Writing in Mathematics  
|               | "Manage classroom time effectively."  
|               | Identify and describe five (of your own) keys to classroom management.  
|               | "Handle discipline problems effectively."  
|               | One paper from the Mathematics Teacher (or similar professional journal). The paper is a description and critique of any article. (Please hand in typed, two or three pages in length, and double-spaced.)  |
| Sept. 17      | Planning a Daily Lesson and a Unit of Study:  
|               | Guest Speaker from the public schools this week, if possible  
|               | Choose a topic (concept) and develop at least three different ways to teach it in class, submit paper.  
|               | Complete Section 2: "Description of the Setting" of your Work Sample  |
| Sept. 24      | Small Group or Cooperative Learning:  
|               | One class meeting only this week - attend CCTM Conference as second class.  
|               | Friday, September 28 -- Attend CCTM Conference in Denver. The Friday sessions are mandatory; Saturday is optional. Write up a synopsis of three sessions you attended.  
|               | Exploring content area of your own interest.  
|               | Begin Section III: "Colorado Model Content Standards, Unit Goals and Lesson Objectives" of your Work Sample  |
| Oct. 1        | Motivation Counts and Library Videos  
|               | Understanding ways to improve performance and interest for students who have been traditionally underrepresented in mathematics classes, especially at the higher level.  
|               | One paper from the Mathematics Teacher (or similar journal). This is a description of how you would use the article's content in teaching a particular lesson. (Please hand in typed, two or three pages in length, & double spaced.)  
|               | Teaching Students with Special Needs  
|               | Begin Section IV: "Lesson Plans with Supporting Materials" of your Work Sample  |
| Oct. 8        | Using the Graphics Calculator in the Mathematics Classroom  
|               | Construct 10 Exam Questions (high quality) from content of this course.  
|               | Begin Section VIII: "References" of your Work Sample  |
Week of: Topics of Class Sessions

Oct. 15 Questioning and Your Belief System
- Share experiences in teaching your first one or two lessons from STEP 363.
- Exam 1

Oct. 22 Using Computer Software in the Mathematics Classroom
- TWO-WEEK UNIT PLAN with Assessment instrument is due this week

Oct. 29 Using Manipulative at the Middle School Level
- Also, Using Manipulatives at the High School Level

Nov. 5 Assessment on Course Content (and aligning with instruction)
- Develop a test containing different levels of thought. Identify the level for each question. You can use a mathematics course you are involved with in your STEP 363 course.
- Begin Section V: "Pre and Post Assessment" of your Work Sample
- Assessment of Course, Instructor, and Teaching Methods
- TEXTBOOK EVALUATION is due this week

Nov. 12 The Constructivist Classroom and Assigning Homework
- How can homework assignments be more meaningful, eventful, beneficial, and exciting for students? How important is homework?

Nov. 19 Mathematics and the Internet
- Research for Teachers
- Paper on "What constitutes quality teaching in mathematics."
- EQUITY PRESENTATIONs will be this week

Nov. 26 Share Teaching Lesson
- Emulate one of your best teaching lessons from STEP 363 to share with our class. Also, share your lesson plan with our class.
- Complete Section V: "Pre and Post Assessment" of your Work Sample

Dec. 3 Share Teaching Lesson(continued)
- Emulate one of your best teaching lessons from STEP 363 to share with our class. Also, share your lesson plan with our class.
- Construct 10 Final Exam Questions (high quality) from content of this course.
- Complete Section VI: "Analysis of Pre and Post Assessment" of your Work Sample
- Complete Section VII: "Reflective Essay" of your Work Sample

Dec. 10 Final’s Week
- Final Exam
- Work Sample to be completed
  FINAL POSITION PAPER is due
TWO-WEEK/WORK SAMPLE UNIT PLAN (150 pts)  DUE: 10/22

Design and plan your work sample (a two-week mathematics unit):
- Define the course by title and describe pertinent student demographics
- Choose a content area that can be successfully covered in two weeks
- You may select a source text (must be published 1995 or later)
- Do not choose topical material currently taught in your STEP 363 classroom

The completed work sample plan will include:
1. A unit title indicating the content area to be covered
2. An overall learning goal for the unit
3. The (five lesson) unit is to contain:
   - Cooperative learning
   - Use of technology
   - Writing in mathematics
4. A lesson plan for each day, closely following this or another standard format:
   a. Topic
   b. Objective(s)
   c. State Standard(s) Addresses
   d. Materials/Special Notes
   e. Procedures
      - INTO: Warmup/Review/Connections
      - THROUGH: Teacher/Student Activities
      - BEYOND: Closure/Extension
   f. Homework/Assignment
5. A summative assessment component (test, project, or combination)
6. Classroom-ready material from at least three outside sources (other texts, resource books, journals, WWW)
Your assessment instrument.

1. Construct assessment (pre-test and post-test) instruments appropriate for the two-week Work Sample you have designed

2. Create an answer key, including point values, partial credit, and an analytic or holistic rubric for appropriate assessment

3. If possible, have someone try the assessment and offer a critique of instructions, procedures, time factor, etc. (write notes on the test as they take it)

4. Submit a blank test, a key, and a rationale (2 pages) addressing the following questions.
   • Is the assessment aligned with the teaching and learning strategies I’ve promoted during the unit?
   • Does the assessment address the learning goal and objectives that guided the unit?
   • Are the type, number, and value of the tasks weighted according to the emphasis placed on various objectives and mathematical concepts?
   • Can the assessment tasks be completed in the time I allow?
   • Am I assessing at levels of cognition beyond knowledge and comprehension?
   • Have I included a variety of ways for students to demonstrate their knowledge?
   • Have I made it clear how technology will be used during the assessment?
   • Have I included items of varying difficulty? Will any items challenge my advanced students?
   • Am I prepared to efficiently score the assessment? How will grades be assigned (strict percentage, subjective visual inspection, other means)? What will constitute “success” on the assessment?

Include any significant observations made by the person who tried and critiqued your assessment.

Your assessment must include:

• Any needed data tables, readings, or other materials (except for manipulatives available in your classroom)

• Clear instructions regarding use of calculators and computers, notes/textbook/homework, or other aids.

• A description of your grading rubric in order to help students understand what is valued in their responses.
TEXTBOOK EVALUATION (50 pts)  DUE: 11/5

As a teacher, you will occasionally work with your school or district to select textbook series and materials. This doesn’t happen every year (or even every five years in many districts), but at some point you’ll have to decide whether to keep a current text, update to a new edition, or adopt a whole new series. The question of whether to go with a “reform” or traditional curriculum is major in itself; then you must choose between a number of well-known publishers’ products.

For this assignment, you are to examine two textbooks, covering the same basic course material but published by different companies. Consider the following questions, and create your own, as you examine the texts. Compare your two choices; note advantages and disadvantages of each; and “select” one. Then summarize your evaluations and final decision in a 2-page paper (preferably typed) addressing the issues described below:

**APPEARANCE**
(3) Is the text compelling and easy to read? Is it attention-grabbing or distracting? Does the layout enhance the presentation of the mathematics, or does it add confusion?

**STANDARDS**
(4) Does the mathematics covered adequately meet the NCTM/CO content standards?
(5) Do the activities and assignments adequately address the NCTM/CO process standards?

**COVERAGE**
(6) How do your two texts differ in their coverage of topics? How do the texts differ in what is left out, included, and/or emphasized?
(7) How is problem solving treated in the text?

**COMPLETENESS**
(8) What supplemental materials, teacher resources, software, etc. are provided with the text? How much of your own additional material will have to be created?

**INCLUSIVENESS**
(9) Do opportunities exist for advanced work by gifted students? On the other side, will the text appeal to below-average students?

**PHILOSOPHY**
(10) What “reform”-based teaching and learning activities does the text support as an alternative to traditional lecture?

One of the books may be from your STEP classroom, but to be comparable it should have a 1990s publication date. The other (or both) may be chosen from the books in Ross 3000.

Your success will be determined by how thoroughly you discuss these issues for each text, and how clearly you compare, contrast, and critique them against each other. NOTE: Cost is a major consideration in textbook adoption, but for this exercise assume that cost is not an issue.
EQUITY PRESENTATION (50 points)  DUE: 11/19

You and a partner will be assigned one of these topics to research and present:

Gender Equity...  Andy Lindblad & Kristy Schreibeis
Multicultural Equity...  Natasza Kozaczynski & Shandra Wiese
Socioeconomic Equity...  Jackie Plankis & April Griffith
Gifted Students...  Amanda Nilsen, Gretchen Dreszen & Kelly Morris
Special Needs Students...  Carrie Dorr, Lisa Rogers & Tamara Maldonado
Parental Involvement...  Travis McCarty & Lars Thorgesen
...in the Secondary Mathematics Classroom

These are very rich topics—you are to synthesize what you learn into checklists (e.g. a series of “Dos and Don’ts”) or some other form of useful information to share with your classmates. You do not have to write a paper, but you should have substantial materials and resources to support an in-depth 20-minute presentation.

a) Synthesize information from at least three referenced sources.
b) Create at least two take-home resources to share with the class—these could be checklists, reference lists, a great article, or a summary of ideas.
c) Prepare and present a summary of highlights, tips, resources, and ideas. You may mix “telling” with relevant activities, videos, discussion, etc.
d) Submit one set of resource materials, a bibliography of references, and an outline of your presentation to me.

References
Check out the Web sites for articles, ideas, and information. In addition, you should seek out:
• NCTM Professional Standards has several excerpts about equity and diversity.
• Eisenhower National Clearinghouse and many other Web sites—see resource list.
• NCTM Yearbook 1997 is all about equity—I can loan you a copy if interested.
• Library: Math Ed publications are in the QA100 area (third floor).
This assignment is worth ten percent of your grade and is intended as a final reflection to establish your views on the content and pedagogy of secondary mathematics instruction and on your role as a mathematics teacher. To receive full credit, you must thoroughly address each task. Completed position papers are due at our scheduled final exam time.

1. **Position on the “content” of secondary mathematics.**
   The NCTM Principles and Standards present a global vision of an “ideal” secondary mathematics curriculum, and in your STEP 363 experience, you’ve become acquainted with one school’s unique vision of an appropriate and effective curriculum. Now assume you’ve been hired by a small school and charged by the administration with designing a new mathematics program for grades 9-12. Students at this school are required to take two years of mathematics, but about 50% of them go on to complete four years. What do you consider essential for all students to learn in the first two years? What courses would you require? What subjects would you emphasize? Should subjects be sequenced or integrated? Avoiding excessive detail, describe your “ideal” secondary mathematics program.

2. **Position on secondary mathematics pedagogy.**
   In writing this portion, you should reference and reflect on the teaching recommendations stated and implied in the various documents we’ve studied: Standards 2000, the Professional Standards, the Colorado Standards and others. Outline your position on what constitutes effective mathematics instruction. How will the NCTM process standards be incorporated into your lessons? How will you engage students in the learning process? Include a description of at least four teaching/learning strategies that characterize effective mathematics teaching. Justify your selections.

3. **Position on your role as a secondary mathematics teacher.**
   Describe how you view your role in the classroom. What are your most important goals for your students? For yourself? How do you plan to develop mathematical discourse and a positive learning environment? How will you help students achieve mathematical power? What responsibilities do you have for ongoing professional development and involvement? Identify (1) what you’ve learned either about your role as a teacher or about the profession itself, (2) your strengths as a teacher, and (3) areas where you seek to improve. Conclude with a summary reflection based on this class and your teaching experiences to date.
References from Michener Library
(Excellent Resources)


Teaching Math: A Video Library 9-12 Guidebook; with 20 video lesson of 15-20 minutes each plus pre- and post-video explorations and discussions; from The Annenberg/CPB Math and Science Collection in Michener Instruction Video Center (3073: Tape 1 - Tape 9)