

Teaching Middle School Mathematics and Science (MATH/SCED 323)

Winter 2007

General Information

Instructor(s): Mark Oursland/Ian Quitadamo

Meeting Time: F 1:00-3:00pm

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Location: Science 115

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Office Hours:

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Course Description

Prospective teachers will learn and use the methods and materials needed to teach middle school students mathematics and science with emphasis on the use of experiments, manipulatives, problems solving, cooperative learning, and communication.

Prerequisites

The prerequisites are Math 324 or EDEL 323 and SCED 322 or SCED 324 or instructor permission.

Course Rationale

Curriculum and Evaluation Standards for School Mathematics (NCTM, 2000) and the *National Science Education Standards* outline specific changes needed in pre-service mathematics and science education. To meet the expectations of national stakeholders, pre-service candidates must develop knowledge, skills, and dispositions that enable the best K-12 teaching and learning possible. This will be influenced by the latest brain research and the use of best practices in math and science. Since many teachers will teach as they were taught, it is crucial that pre-service training include both elements. In particular, effective learning will take place when student(s) (a) preconceptions are engaged, (b) they do activities consistent with professionals in the field, and (c) they are aware of how (and what) they learn. Research indicates the best learning is based on discovery via inquiry and collaborative problem solving in balance with direct instruction. Therefore, your training as future professional educators will emphasize these elements.

Required Course Materials

- Blackboard account with enrollment in MATH or SCED 323
- An active LiveText account
- Handouts provided by the instructors
- Access to Washington State Academic Learning Requirements for Math and for Science at <http://www.k12.wa.us/CurriculumInstruct/default.aspx>
- Access to the National Council of Teachers of Mathematics standards at <http://www.nctm.org> (free 90-day membership)
- Access to the National Science Education Standards for Students and Teachers at <http://www.nap.edu/readingroom/books/nses/>

Important Notice: Admission to and continuation in the Middle Level Math Science Minor Program requires that you purchase LiveText. You must present “proof of purchase” to the Certification Office, Black 228.

Learner Outcomes and Assessment

By the end of the course, students will:

Outcomes	Assessment	Standards
Develop and teach inquiry lessons to middle level students using effective methods and technology.	Science Lesson Plan, Math Lesson Plan, Integrated Lesson Plan, Teaching Practicum, Reflections, SCED/MATH 323 Portfolio	WA-MLM 13-20 WA-MLS 4 -13 NSES-T-A, B, C, D, E, F
Develop behaviors and skills consistent with professional middle level teaching.	Teaching Practicum, Reflections, SCED/MATH 323 Portfolio	WA-MLM 18 WA-MLS 11 NSES-T- D, E, F
Create safe, effective environments that	Science Lesson Plan, Math	WA-MLM 13, 14, 18, 19, 20

support inquiry and developmentally-appropriate learning.	Lesson Plan, Integrated Lesson Plan, Teaching Practicum, Reflections, SCED/MATH 323 Portfolio	WA-MLS 4 -13 NSES-T-A, B, C, D, E, F
Align instruction, student learning outcomes, and state standards.	Science Lesson Plan, Math Lesson Plan, Integrated Lesson Plan, Teaching Practicum, Reflections, SCED/MATH 323 Portfolio	WA-MLM 13-20 WA-MLS 4 -13 NSES-T-A, B, C, D, E, F
Apply appropriate technology and resources to promote inquiry and effective learning.	Science Lesson Plan, Math Lesson Plan, Integrated Lesson Plan, Teaching Practicum, Reflections, SCED/MATH 323 Portfolio	WA-MLM 13, 14, 18, 19, 20 MLS 4, 5, 6, 7 NCTM-2003.MID.6 and 8 NSES-T-A, B, C, D, E, F
Apply sufficient rigor and questioning to improve student engagement, motivation, and cognitive demand.	Science Lesson Plan, Math Lesson Plan, Integrated Lesson Plan, Teaching Practicum, Reflections, SCED/MATH 323 Portfolio	WA-MLM 13-20 WA-MLS 4 -13 NSES-T-A and E

National Standards

National and state mathematics and science standards for teaching will provide context for course activities. NCTM and NSES standards include:

Mathematics (NCTM)		Science (NSES)	
Standards for Student Learning		Standards for Student Learning	
Number and Operations		Unifying concepts and processes in science	
Algebra		Science as inquiry	
Geometry		Physical science	
Measurement		Life science	
Data Analysis and Probability		Earth and space science	
Problem Solving		Science and technology	
Reasoning and Proof		Science in personal and social perspectives	
Communication		History and nature of science	
Connections			
Representation			
Standards for Teaching: Teachers will		Standards for Teaching: Teachers will	
Support a positive disposition toward mathematical processes and mathematical learning. NCTM-2003.MID.7		Plan an inquiry-based program for their students. NSES-T-A	
Possess a deep understanding of how students learn mathematics and of the pedagogical knowledge specific to mathematics teaching and learning. NCTM-2003.MID.8		Guide and facilitate learning. NSES-T-B	
Candidates demonstrate computational proficiency, including a conceptual understanding of numbers, ways of representing number, relationships among number and number systems, and meanings of operations. NCTM-2003.MID.9		Engage in ongoing assessment of their teaching and of student learning. NSES-T-C	
Emphasize relationships among quantities including functions, ways of representing mathematical relationships, the analysis of change, spatial visualization, and geometry. NCTM-2003.MID.10 and 11		Design and manage learning environments that provide students with the time, space, and resources needed for learning science. NSES-T-D	
Demonstrate and apply an understanding of concepts, practices, and measurements related to data analysis, statistics, and probability with appropriate tools of technology. NCTM-2003.MID.14 and 15		Develop communities of learners that reflect the intellectual rigors of scientific inquiry and the attitudes and social values conducive to science learning. NSES-T-E	

Engage in a sequence of planned opportunities prior to student teaching that includes observing and participating in middle grades mathematics classrooms under the supervision of experienced and highly qualified teachers. NCTM-2003.MID.16	Actively participate in the ongoing planning and development of the school science program. NSES-T-F
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Assessment and Evaluation Guidelines

The instructional and assessment strategies for this course are designed to inform you of your progress in achieving the performance outcomes. The instructors will give you feedback on your progress in meeting performance outcomes.

Assignment	Points
Science and Math Autobiography (50) and Reflection (50)	100
Lesson Plans – 3 total (100 points each) 2 individual (Science, Math) and 1 collaborative (Integrated)	300
Field Observations (self, peer, instructor)	150
Teaching Reflections (3)	150
Summative Reflections (portfolio)	100
Portfolio	200
Total Points	1000

Grading Scale

930-1000 pts (A), 900-929 (A-), 870-899 (B+), 830-869 (B), 800-829 (B-), 770-799 (C+), 730-769 (C), 700-729 (C-), 670-699 (D+), 630-669 (D), 600-629 (D-) and 0-599 (F). Please see the CWU Catalog for the eligibility requirements for an incomplete (I).

Performance Expectations

Professionalism

When in public schools, students are expected to behave as competent and respectful teaching professionals. Professional dress (no heavy perfumes or cologne), timeliness, and being well prepared are minimum expectations. Be at your school well before classes begin. Professionalism will be assessed as part of your grade.

Schedule

The class calendar is tentative due to subject to change, but will be our tentative guideline for the course. If you miss a class, it is your responsibility to find out what was covered, announced, or assigned. In case of emergencies, it is your responsibility to contact the instructors as soon as possible. If a course deadline was missed, assessment alternatives are left up to the discretion of the instructors.

Suggestions for Success

Take responsibility for your own achievement. If you have questions regarding any assignment, ask the instructors. Communicate frequently.

ADA Statement

Students with special needs or disabilities who desire academic accommodation are encouraged to submit a copy of the 'Confirmation of Eligibility for Academic Adjustments' from the Disability Support Services office as soon as possible so a plan can be developed that best serves the learning needs of the student. Students without this form should contact the Disability Support Services office in Bouillon 205 at 963-2171 or dssreceipt@cwu.edu as soon as possible.

Tentative Schedule

Week	Topics	Assignment
Jan 4	Intro, syllabus, Bb and LT, CT, math/science literacy, STAR Protocol	Science Autobiography
Jan 11	STAR Protocol, 5E Learning Cycle, Teacher A/B	Lesson Planning, Practicum Assign
Jan 18	5E Math Lesson Plan, Assessment, and Standards	Lesson Plan 1

Jan 25	5E Science Lesson Plan, Assessment, and Standards	Field 1, Self 1, Lesson Plan 2
Feb 1	Integrated Math/Science Lesson Plan, Assessment, and Standards	Field 2, Self 2, Lesson Plan 3
Feb 8	Knowledge, Skills, and Disposition Evidence 1	Field 3, Self 3, KSD 1
Feb 15	Knowledge, Skills, and Disposition Evidence 2	KSD 2, Portfolio Intro
Feb 22	Knowledge, Skills, and Disposition Evidence 3	KSD 3
Feb 29	Professional Growth	Autobiography Reflection
Mar 7	Construction and Revision of Portfolio	Final Portfolio
Mar 10	Complete All Coursework	