Teaching Middle School Mathematics and Science
Math/Science 323, 3 credits, Winter 2014

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Meeting Time: Fri., 8:00 am to 9:50 am

Meeting Place: Science 115

Office Hours (additional by appointment)

Teri – 11:00 to 11:50 am, M – Th
Tim – 9:00 to 11:00 am, Tu & Th

1st Important Notice: Admission to and continuation in the *Middle Level Math and Science Minor Program* requires that you purchase LiveText. You must present "proof of purchase" to the Certification Office, Black 228.

2nd Important Notice: You must have your background check and fingerprinting done before you can work in classrooms!

3rd Important Notice: Check your email regularly for latest class information!

4th Important Notice: You are required to spend time in classrooms outside of the meeting time of the class. Please be prepared to organize your schedule accordingly. Schools we will work at meet between 8 am and 4 pm.

Course Description: As a prospective teacher, you 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, problem solving, cooperative learning, and communication.

Prerequisites: The prerequisites are Math 324 or EDEL 323 and SCED 324 or SCED 322 or permission of the instructors.

Course Rationale: To meet the expectations for mathematics and science teachers, a shift in content, instructional and assessment practices is crucial. The *Curriculum and Evaluation Standards for School Mathematics* (NCTM, 2000) and the *National Science Education Standards* outline the specific changes needed in pre-service mathematics and science education. "The experiences that mathematics teachers have while learning mathematics have a powerful impact on the education they provide their students." (NCTM) To become an effective mathematics teacher, you must learn a variety of teaching strategies including discovery, experiments, cooperative learning, and technology, in addition to direct instruction. To become an effective science teacher, you must learn how to teach science using inquiry-based lessons and learning communities. Therefore, you as students need to experience mathematics and science instruction in a way that will influence you positively as a teacher. This course employs the constructivist model of learning in which you will, with your interactions with your physical and social environments, individually construct and socially co-construct knowledge.

Part of our mission is to accommodate for your differences in learning styles in order to help all of you achieve a higher level of understanding. Excellent assessment practices are stressed; all assessment and instructional activities are integrated and used to promote better communication between you and your instructors. Part of the lesson plan includes choosing appropriate assessment strategies, such as questions and observation, which reflect student achievement in an unbiased manner. After the lesson is taught in an authentic teaching environment, you will get feedback through self-reflection, peer evaluation, and constructive comments from the supporting practicum

teachers and course instructors. Through these practicum experiences, you are both introduced and encouraged to participate as a member of the professional community of mathematics and science educators. You are also encouraged to do this on a state and national level by becoming familiar with and joining a professional teaching organization such as National Council of Teachers of Mathematics, Washington State Mathematics Council, National Association for Research in Science Teaching, along with a content specific organization such as the American Chemical Society, American Institute of Biological Sciences, and American Physical Society, just to name a few.

Course Materials: Your "textbook" will consist of handouts from the course instructors that you will receive throughout the quarter. These handouts will be part of your resource notebook. In addition, you will need to do the following.

1) Create a student Blackboard account so that you may access your in MATH/SCED323**.**
2) Purchase a LiveText account for creating a Math/SCED 323 Portfolio. (http://livetext.com)
3) Access the Washington State Essential Academic Learning Requirements for Science and for Mathematics at http://www.k12.wa.us/CurriculumInstruct/default.aspx). *(You will be supporting your lesson plans with appropriate state science and mathematics standards.)*
4) Access the National Science Education Standards for Teachers and Students at http://www.nap.edu/readingroom/books/nses/. *(You will be supporting your lesson plans with appropriate national science standards.*)
5) Access the National Council of Teachers of Mathematics (NCTM) website for viewing the Curriculum and Evaluation Standards for School Mathematics and the Professional Standards for School Mathematics (http://www.nctm.org – you can sign up for a free 90–day membership to view these documents or you can join). *(You will be supporting your lesson plans with appropriate national mathematics standards*.)
6) Access to the Common Core Standards for mathematics at http://www.corestandards.org/math .
7) Obtain supplies – a calculator and a 3-ring binder for class handouts/lessons/foldable/etc.
8) *Innumeracy* by John Allen Paulos. You can buy this book cheaply on the Internet. We did not order it through the bookstore for this class.

Learner Outcomes and Assessment Strategies: (Updated to 2007 WA-Comp)

You will demonstrate your ability to perform the following outcomes through the assigned assessments. By the end of the course, you will:

Outcomes	Assessment/Artifact	Standards
Develop and teach lessons to middle level students using effective methods and appropriate measurement technology that support student inquiry.	Math, Science, and Integrated Teaching Lesson Plans, Science Notebook, Teaching Practicum, and Teaching Observation Journal.	NSES A, B, E, F CTL 1.1-1.5 WA Comp M.L. Math 3.1, 3.5, 10.2, 11.2, 12.3, 13.1, 13.3, WA Comp M.L. Science 4.1, 4.2, 4.3.1, 4.7, 5.1, 5.3, 5.4,
Prepare an electronic portfolio of your progress toward becoming an excellent middle school math and science teacher.	SCED/MATH 323 Portfolio	NSES C, D, CTL 1.2-1.5 WA Comp M.L. Math 1.4, 1.3, 4.3, 5.1-5.3, 19.1-19.12, 20.1-20.2 WA Comp M.L. Science 6.1-6.119.1-9.2, 12.1-12.12, 13.1-13.2
Use safe practices when teaching "hands-on" science and mathematics by ▪ Having awareness when developing, presenting, and participating in	Math, Science, and Integrated Teaching Lesson Plans, Teaching Practicum,	NSES D, E WA Comp M.L. Science 7.1-7.4

science and mathematics activities; ▪ Listing appropriate safety precautions that students should take before performing a science and/or mathematics activity. ▪	and Teaching Observation Journal	
Adapt existing curricula and resources AND originate new curricula and resources into age-appropriate lessons using best teaching practices by researching curricula and resources related to specific WA EALRs, NSES, NCTM, WA-COMP Math and WA-COMP Science benchmarks and adapting these materials to specific learning needs.	Math, Science, and Integrated Teaching Lesson Plans and SCED/MATH 323 Portfolio	NSES A, B CTL 1.1-1.4, 1.7-1.10 WA Comp M.L. Math 1.1-1.4, 9.1, 9.8, 14.1-9, 15.1-15.4, 16.1, 16.2, 17.1-17.4, 19.1-19.12, 20.1-20.2 WA Comp M.L. Science6.1-6.11, 7.1-7.4, 8.1-8.4, 12.1-12.12, 13.1-13.2
Demonstrate effective questioning techniques to both assess and guide students in "hands-on" exploration and constructing knowledge by developing questions that guide students from observations to experimental results to logical conclusions through inquiry and critical thinking.	Teaching Practicum, Teaching Observations, Math, Science, and Integrated Teaching Lesson Plans, and Science Notebook	NSES A, B, D, E CTL 1.2-1.4 WA Comp M.L. Math 14.1-14.9, 19.1-19.12, 20.1, 20.2 WA Comp M.L. Science 4.1-4.13, 6.1-6.11, 12.1-12.12, 13.1, 13.2
Demonstrate knowledge of the WA EALRs by aligning curricular materials to specific WA EALR benchmarks	SCED/MATH 323 Portfolio and Math, Science, and Integrated Teaching Lesson Plans	NSES A, D CTL 1.1-1.3 WA Comp M.L. Math 19.1 WA Comp M.L. Science 12.1

National Standards: In this class, you will become familiar with national and state mathematics and science standards for teaching and learning by reading, discussing, and applying those standards. The standards specifically addressed 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**

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 the performance outcomes.

Assignments*

Assignments	Type	Points
1. Draft Team Lesson Plan with all components including assessment	Group	**50**
2. Final Team Lesson Plan with all components including handouts, organizer, assessment, etc. – Total Package including Reflection on Assessment	Group/Individual	**150**
3. Team teach one lesson one time (with possible follow–up at Excel school) with Excel School	Group	**50**
4. "Quantitative Literacy Report" based upon *Innumeracy*	Individual	**100**
5. Middle school classroom observations (10 hours minimum x 25)	Individual	**250**
6. Completion of LiveText Math/Science 323 Portfolio ***(This portfolio must be completed to pass the course.)***	Individual	**100**
7. Professionalism – discretion of instructors/classroom teachers	Individual	**100**
Total Points		**800**

* Complete descriptions of the assignments and/or rubrics for grading the assignments will be handed out at appropriate times.

Grading: Grades will be determined by the following percents:

93-100% A	90-92% A-	87-89% B+	83-86% B	80-82% B-	77-79% C+	73-76% C	70-72% C-	67-69% D+	63-66% D	60-62% D-	<60% F

Professionalism:

Point 1: Remember you will be working with students at area schools, so as a teaching professional you must be dressed professionally, on time, and well–prepared. It is very important to be at a school before classes start. Your professionalism will be assessed by your university instructors and classroom teachers, as appropriate. (See #7 above.) Remember that your behavior is a reflection on Central Washington University. All of us in the education field depend upon area schools and teachers for support. Please make positive contributions so we can maintain a great relationship with area schools and teachers. For more information, refer to the handout with subject "Student Observations in the Field" and to guideline sheets given by each school.

Point 2: Some of the grades in this class are "Group Grades." If it becomes apparent that some member(s) are not participating appropriately in the completion of a group assignment, the instructors will take action that will probably result in individual grading. Please do not let this happen in your group. In addition, on the day of your lesson presentation your group must have all materials set up prior to 8 am.

Schedule/Rules:

The class calendar is 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.

How to succeed:

Take the responsibility for your own achievement. If you have questions regarding any of the assignments, ask the instructors.
If you have special needs or disabilities that may affect your ability to access information and/or material presented in this course, you are encouraged to contact the office of student assistance on campus 963-2171.

ADA Statement:

Students with disabilities who wish to set up academic adjustments in this class should give me a copy of their "Confirmation of Eligibility for Academic Adjustments" from the Disability Support Services Office as soon as possible so we can meet to discuss how the approved adjustments will be implemented in this class. Students with disabilities without this form should contact the Disability Support Services Office, Bouillon 205 or dssrecept@cwu.edu or 963-2171 immediately.