

**Sponsor:**  
Lamoille Area Professional Development Academy  
250 Main Street, Ste. 202  
Montpelier, VT 05602



**Course Prefix/Title: Multiplicative Reasoning: A Mathematics Lab School**

**Instructor:** Betsy Allen, M.Ed, C.A.S.  
3271 Bayley Hazen Rd.  
E. Hardwick, VT. 05836  
802-441-1014

**Credits:** 3 graduate

**Dates/Times:**

- August 8 ó 12, 8:00 ó 3:30
- June 14, 4:00 ó 8:00
- October 4, 4:00 ó 8:00

**Location:** Hardwick Elementary School, Hardwick, Vermont

**Seminar Abstract:** The Mathematics Lab School is a research-based professional development opportunity for teachers, which includes tutorial services for at risk students. The teachers work together to provide intensive multiplicative reasoning instruction for students during the morning tutorial sessions. Teachers observe one another daily and use these observations to continually refine instruction to meet each student's needs. The afternoon is content and pedagogy seminars and time to work collaboratively on developing a unit of instruction that uses strategies and methods that reflect current research in mathematics instruction.

**Topics:**

- Understanding by Design unit planning
- Additive to multiplicative reasoning progression
- Meaning of quantity in context/problem structures
- Multiplication and division
- Looking at student work to uncover misconceptions
- Assessments



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**Description:**

DATE	SEMINAR TOPIC	ASSIGNMENT
June 14	What does good instruction look like?	From Additive to Multiplicative Thinking ó the Big Challenge of the Middle Yearsö by D. Siemon, M Breed, & J. Virgona
August 8	What is multiplicative reasoning?	Teaching for Mastery of Multiplicationö by A. Wallace & S. Gurganus
August 9	What models develop conceptual understanding of multiplication and division ? How do strategies promote basic fact mastery?	<u>Young Mathematicians at Work</u> Chpts. 3-6, by C. Fosnot & M. Dolk
August 10	What are the underlying structures of word problems?	<u>Elementary and Middle School Mathematics</u> by Van DeWalle, pgs. 154-164
August 11	How can we use student work to uncover misconceptions?	OGAP Multiplicative Reasoning The Bridge from Additive Strategies to Multiplicative Strategiesö
August 12	How can we use backwards design to develop a mini-unit?	Math Lab Portfolio
October 4	What can we learn from each other?	Presentation of final project.

**Learning Outcomes & Competencies**

*\*deliverables in parentheses, grading criteria below.*

- Participants will learn current research and instructional strategies about developing multiplicative reasoning
- Participants will work directly with students in the lab school to determine levels of knowing and uncover misconceptions
- Participants will work in teams to implement, reflect, and revise lessons based on student needs
- Participants will create a unit of study based on current research following the Understanding by Design Framework
- Participants will implement their unit in the 2011-2012 school year and present to the class (*Article responses, math lab portfolio and unit of study*)

+seminar aligned with university outcome #2: Critical thinking and praxis (*Article responses, math lab portfolio, unit of study*)

Updated 8/13/09

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**Course Requirements:**

- Assigned readings (see list) and responses
- Lab School Portfolio
- Unit of Study
- Documentation of classroom implementation
- Presentation of classroom implementation
- Attendance

**Evaluation and Grading:**

- Article Responses 10%
- Math Lab Portfolio 30%
- Unit of Study 40%
- Attendance/Participation 20%

**Final Deadline for all work**

- October 4, 2011

**Readings & Resources**

- Fosnot, Catherine, Dok, Marteen, Young Mathematicians at Work: Constructing Multiplication and Division
- Van de Walle, Elementary and Middle School Mathematics, 2010, parts of Chapters 10 and 12
- Wiggins, Grant, McTighe, Jay. Understanding by Design, 2005.
- "From Additive to Multiplicative Thinking: the Big Challenge of the Middle Years", D. Siemon, M Breed, & J. Virgona
- "Teaching for Mastery of Multiplication", A. Wallace & S. Gurganus, Teaching Children Mathematics August 2005
- Sharma, Mahesh, Arithmetic Fact Sheets: How to Master Arithmetic Facts Easily, Center for Teaching/Learning Mathematics, 2004.

