



MONTANA MATHEMATICS

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TEACHERS OF MATHEMATICS

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Standards Based Teaching

As I was reading the book “Total Instructional Alignment: From Standards to Student Success” by Lisa Carter a light bulb went off in my head and finally tied together a complex idea into a simpler one. The book talks about aligning standards, curriculum and assessment and how this impacts instruction.

What is “Total Instructional Alignment”? Lisa Carter (2007, pg. 22) states “Total Instructional Alignment means making sure that what we teach, how we teach, and what we assess are congruent.” This does not mean teaching to a test. It is a process of three interconnected steps. These steps include:

1. Alignment of the system
2. Alignment of standards, curriculum, and assessments
3. Alignment of instructional practices in the classroom

Alignment of the system or systemic alignment is one of the most important but receives the least attention. Our current system of education has been entrenched in education for at least 100 years and was never designed to educate all students. However, the necessary curriculum and classroom change that must occur to educate all students needs the support of the larger educational system to be successful. The current system is set up for teachers to talk about each other rather than talk to each other. We must have strong and courageous education leaders at the district and school level to make the necessary changes happen. The systemic issues will bring difficult challenges that we can get through with support.

Alignment of standards, curriculum and assessments is a collaborative process. “Two questions must be addressed immediately: Is the curriculum teachers use aligned to existing standards? And do teachers have a very clear

understanding of exactly what students are supposed to learn and how it will be assessed?” (Carter, 2007, pg. 27) Often teachers follow their textbook or the district pacing guide to give them clarity on what students are expected to learn. The way one teacher interprets a standard or benchmark may be completely different than another. This can lead to repetition of concepts from one grade to the next. Teachers need to work together to define and clarify standards and benchmarks and then ensure the assessments are aligned. If we are going to hold students accountable for learning the content with assessments we must first give them the opportunity to learn through our instruction. “Alignment of instructional practices in the classroom requires that teachers understand and deliver instruction in a manner that includes standards, curriculum, and assessment in their daily lessons” (Carter, 2007, pg. 29) Teachers need to be able to develop clear and measurable learning objectives for each lesson they teach. They must break down broad standards and

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MONTANA MATHEMATICS

President's Message

Wow!! Is it May already? Now, I am not complaining, I am just amazed at the speed with which this year has passed. This is my last President's Message as I will be turning the office over to David Erickson on June 12th at approximately 3 pm! :) I am excited about David's term as President of MCTM as I know what a wonderful job he will do. Now, down to business, this summer we are providing three professional developments. The MCTM Math Coaches Retreat will take place at MLC on August 9 and 10, the K-6 PDA on Implementing the Algebra Standard K-6 is in Billings on the MSUB campus July 19-22 and our first Middle School PDA on Implementing the Algebra Standard 5-9 is at MLC at Canyon Ferry July 12-15. There has been a change in presenters for the Middle School PDA. Mary Buck was looking forward to providing the PDA but had to bow out. Darlene Rector from Billings is taking her place. Darlene has been providing professional development in Montana for many years. She had taken a hiatus while raising her daughter and has agreed to present the Middle School PDA. We are pleased to have her. Thank you, Darlene. We have stream lined our registration process for the PDA's this year. Just get on the MCTM website at montanamath.org, click on the desired PDA, and register.

Congratulations to Melissa Romano from Helena and Mandy Bighorn from Billings who were elected as our new MCTM Board members! They will start their terms on June 12th. I am sure they will serve MCTM well. They will be replacing Kathy Hill and Verne Schlepp. The board will miss both Kathy and Verne and thank them for all the hard work they have done for MCTM. They will continue to be an important part of MCTM and we look forward to their continued contributions. Our own Lisa Scott has been selected to be the NCTM Western Regional Representative for the Affiliate Organizations. Congratulations Lisa! I know she will do a wonderful job and help keep Montana as an important presence in NCTM. If you are not a member of NCTM seriously consider joining. They

have so much relevant material on their website and their journals are wonderful as well.

Nominations for the Dean Preble award are due on June 15th. All the important information is on the MCTM website. Please honor Dean by seriously considering your colleagues and nominating a worthy teacher. They will receive a monetary award, a plaque and a lifetime membership to MCTM. A good friend and colleague of Dean's, Gary Bauer, has written the feature article about the award in this issue. Check it out!!

The Montana Learning Center is providing many workshops this summer. Take a look at their website at montanalearning.org. I understand there has been some remodeling at MLC this winter, stop in check out the site. Keep MLC in mind when you are planning an educational workshop and need a place to present. Your participants will love the atmosphere, the opportunity to network, as well as the people.

As you may or may not know, my father James Wood was one of the founding members for MCTM. He is proud to have been a part of MCTM history and I am proud to have served as MCTM President these past two years. Thank you for your support of MCTM, an organization near and dear to my heart. Consider running for the board so you can help shape MCTM's future and continue to do all the wonderful things you do for Montana's children. Enjoy the summer, learn something new, and get refreshed because that new school year, a new beginning, is right around the corner!

Submitted by Lisa Wood, MCTM President



MONTANA MATHEMATICS

Lesson Plans

Complete lesson plans are available at www.montanamath.org

Middle School Arianna Writes Books

Submitted by David Erickson, The University of Montana, david.erickson@umontana.edu

The *Arianna Writes Books* lesson plan is an adaptation of a problem from Billstein, Libeskind, and Lott (2007) *A problem solving approach to mathematics*, 9th edition, p. 1. Students should be challenged by the complexity of the simple problem and the need to keep track of a variety of components. Be sure to have a large supply of scratch paper for student experimentation. Ask your students what information they need to include in their table. Of course, you are seeking the number of 8.5" by 11" pieces of paper in the book (n), the number of pages in the book (p), the sum of the pairs of numbers on each side of each piece of paper (s), and the sum of all the page numbers in the book (T). Many will be able to generalize from a well-developed table and a good class discussion about this problem, but plan for more time than you have 😊

High School Solving Absolute Value Inequalities

Submitted by Beth Burroughs

Students will collect their own data and create a distance versus time graph. With partners they will walk a set pre-measured distance and record the time it takes on of their partners to walk there and back. The will then graph their findings and answer questions based on their graphs.

Correction from March Newsletter. The High School Lesson Plan was submitted by Marcia **Anderson**, not Marcia Welliever.

MCTM Membership Form

<input type="checkbox"/> New Member	<input type="checkbox"/> Renewal	Annual Dues (January - December)
Grade Level: Check all that apply		<input type="checkbox"/> Regular (1 year) \$20
<input type="checkbox"/> Elem	<input type="checkbox"/> MS	<input type="checkbox"/> Regular (2 years) \$30
<input type="checkbox"/> HS	<input type="checkbox"/> College	<input type="checkbox"/> Regular (10 years) \$150
Name: _____		<input type="checkbox"/> Life Time \$200
Address: _____		<input type="checkbox"/> Student \$10
_____		<input type="checkbox"/> Retired Educator Free
Phone #: _____		<input type="checkbox"/> MCTM & MSTA \$40
E-mail: _____		

Send form to:

Pam Koterba, MCTM Membership Chair

101 Turquoise Drive

Lewistown, MT 59457

pamkoterba@gmail.com

MONTANA MATHEMATICS

MCTM Sponsored Math Coach Retreat

Are you a math coach? Do you ever wonder what your role should be or look like? Do you need support from others and want to start networking with other coaches around the state of Montana? If so, this retreat is for you. The retreat is from 8:00 AM Monday, August 9th through 4:00 PM Tuesday, August 10th, 2010.

Topics Covered

- What does coaching look like?
- How can I develop the process of reflection in my coaching and among those I coach?
- How can coaching be focused on mathematics content?
- How can I use appropriate data to inform my coaching?
- How can I get involved in a network of Montana mathematics coaches?

Please go to www.montanamath.org to register for the workshop.

Want more information?

Contact Beth Burroughs at burrough@math.montana.edu

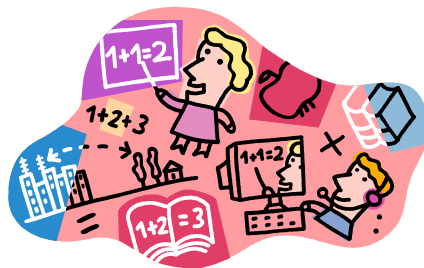
Presenters include Beth Burroughs, Angel Zickefoose, Lisa Scott, and David Yopp.

Registration Information

Location: Montana Learning Center at Canyon Ferry Lake, Helena, MT

Time: 8:00 am August 9th - 4:00 pm August 10th, 2010

Cost: \$300 per person. This includes 2-year membership for MCTM, lodging Sunday and Monday nights, meals and registration



Welcome and Thank You!

The MCTM Board of Directors and membership would like to welcome the following wonderful people to serve for the board:

Mandy Bighorn, K- 4 Director Region IV

Melissa Romano, K-8 Director Region III

We would like to say thank you for all your hard work and time serving for the board to the following people:

Verne Schlepp, Director Region V

Kathy Hill, Director Region I

MONTANA MATHEMATICS

2010 State and Regional MCTM Contest

Winners

Sidney	Amy Johnson Brian Redman	Plentywood Sidney
Ashland	Lana Hoglan Cory Lovec	Terry Ekalaka
Havre	Ashley Vahdolah David Jeffrey	Choteau Havre
Glasgow	McKenna Brown Patrick Billingsley	Circle Glasgow
Grass Range	Cassie Mosdal Jerome Rangitsch	Roundup Roundup
Whitehall	Kayla Bishop Colton Hash	Three Forks Helena High
Billings	Markie Reichert Grant Emery	Billings Senior Billings Central
Great Falls	Kaitlyn Carlson Mauro Whiteman	CMR CMR
Livingston	Hailey Maier Cole Mauch	Shields Valley Park
Missoula	Katie Michels Alec Patterson	Big Sky HS Hellgate
Overall winners:	Markie Reichert Alec Patterson	Billings Senior Missoula Hellgate

What I Learned at NCTM in San Diego...

One of my favorite sectionals, titled, "Making it Happen: Re-engaging Students Who Have Been Turned Off to Mathematics" was full of useful information for all teachers. I wanted to take a moment to share some of the high points – that led to some personal "ah ha!" moments.

For too many students, the cost of learning mathematics is too high for them. Unlike failed learners, who at least try, intentional non-learners believe that if they don't try, then they can't fail. In this interactive session, participants will learn strategies for re-engaging students who have decided that mathematics is not for them.

Motivation = Value x Expectancy

Two common reasons people give for not bothering to learn something are "It's not important" and "I know I won't be able to do it."

- Value: *Is this important?*
- Expectancy: *Can I do this?*

Zero Value x High Expectancy = Zero Motivation *High Value x Zero Expectancy = Zero Motivation*

1. **About Valuing.** What makes something worth doing? *Curiosity, innate striving for competence, self-determination*
2. **About Expectations.** We may value something a great deal; but if we believe we can't do it or can't obtain it without paying too great a personal price, we are likely to look for other valued activities and outcomes to pursue.

Taken from *Addressing Barriers to Learning*, Volume 7, Issue 1, UCLA Mental Health Project (2002). <http://smhp.psych.ucla.edu/pdfdocs/Newsletter/winter02.pdf>

Is This Important?

Students consider learning goals/tasks important when:

- Success is connected to achievement of *personal long-term goals*, such as college or career endeavors
- Success is connected to achievement of *personal short-term goals*, such as good grades, peer & parental approval, personal pride, recognition
- They are placed in *authentic and real* contexts that are personally meaningful to them in the present or near future

Can I Do This?

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SMART Boards in the Classroom

A group of eight Montana teachers traveled to San Diego to attend the NCTM convention. For some of us it was our first national math convention, and we were eager to get to the business of gaining some new insights to take back and share with our students. Since many of us from Townsend are fortunate enough to have SMART boards in our classrooms, I decided to attend one of these workshops. The presenters for this workshop were two energetic teachers from Virginia who were also giving Smart Board demonstrations at the exhibit hall. Because we are educating the 21st century child, we need 21st century technology. SMART boards help students become actively involved in learning especially those visual learners.

One of the things I learned was by adding a dark background, it reduces glare. I also learned how to create an input/output machine, and how to hide math values behind a box so students can pick items out randomly to use in various problems. I decided to add animation to some of my slides to add visual interest. Another idea to include more of my Smart board into my math lessons is to put my mental math from our Everyday Math Series on slides. This way I don't have to write it on the Board each day.

A great resource for SMART board lessons is Smart Tech (which is the link is listed below). I found two lessons that I have already used from this site. Both were coordinate pair lessons, one multiple-choice quiz and one battle ship game. It is nice to know that you do not have to reinvent the wheel when creating lessons for your Smart board.

It is hard to show the unique and exciting lessons found, in a newsletter article, therefore I have provided several links below that presenters shared at NCTM.

Emints.org is a site from the University of Missouri and offers great resources for grades 6-12 <http://www.emints.org/ethemes/resources/S00001794.shtml>

Great video tutorials on a blog that are great suggestions for grades 6-12 <http://teachingwithsmartboard.com/>

We are excited to use these great resources with our curriculum Everyday Math. This site is for grades K-5. <http://www1.center.k12.mo.us/Edtech/everydaymath.htm>

This site is for younger students K-5 and includes other subjects. They are great lessons that you could incorporate into any kind of interactive whiteboard. <http://pbskids.org/whiteboard/>

SMART exchange is a web site that SMART provides for its users to connect and share ideas and lessons. I have found several lessons and wish I would have learned about this site when I first starting using my SMART board. There are resources for every subject, grade level, and there are even ideas for classroom management. As a suggestion, you might want to search under the keywords "NCTM" or "Math" for great lesson ideas. <http://exchange.smarttech.com/index.html>

Submitted by Aubra Lewis
MCTM Scholarship Awardee



MONTANA MATHEMATICS

Professional Development Academy

Sponsored by
Montana Council of Teachers of Mathematics

Implementing the Algebra Standard 5 - 9

Presenter: Mary Buck
National Mathematics Consultant
Co-presenter: Mary Wren
Middle School Teacher, Great Falls

Designed to enhance 5th -9th grade Math Education
July 12-15, 2010 at Montana Learning Center, Canyon Ferry, MT
Monday – Wednesday 8a.m. to 4 p.m.; Thursday 8a.m. until noon

Join colleagues at the Montana Learning Center to participate in an in-depth workshop designed to enhance the teaching and learning of Algebra in your classroom. Participants will be engaged in an interactive workshop designed to teach algebra fundamentals via a problem solving approach. Making the Montana Algebra Standards come alive in your classroom will be the focus throughout the week. Participants will discover how to make Algebraic concepts explicit and how to make algebraic connections within mathematics. Participants will also have the opportunity to examine student struggle and effective questioning.

The \$585 registration fee includes:

- A 1-year MCTM membership or a 1-year MCTM membership renewal
- Meals and lodging at Montana Learning Center (Individuals who do **not** plan to stay at MLC can deduct \$150 for lodging.)
- 30 OPI Renewal Units **or** 2 semester credits (P/F) through MSU-Bozeman (Estimated tuition cost is an additional \$220)

Registration is due by **June 1, 2010** with your **non-refundable** \$100 deposit made payable to **MCTM**. The balance must be paid by check or PO before the workshop.

Return or email your registration:

Cliff Bara
Box 610
Troy, MT 59935
cliffbara@hotmail.com

For more information contact:

Kathy Hill
406-862-2828 or 406-752-2640
kathymarie56@hotmail.com

Name _____ Grade Level _____

School District _____ School _____

School Address _____ Phone _____

Home Address _____ Phone _____

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Please share this information with ALL members of your math department!
Thank you!

MCTM Math Contest Writing Course
Billings Central Catholic High School
Billings, MT
June 27-28, 2010
Registration Deadline: June 11, 2010

___ YES, I want to help write the 2010 Math Contest Tests (OPI renewal units available or 1 graduate credit available)

___ NO, I cannot help write this year, but would like to help by proof-reading completed tests. Tests will be mailed out by July 10th and will need to be returned by August 10, 2010.

Name _____

Address (after June 1) _____

City/State/Zip _____

Phone number(s) _____ - _____

E-mail (after June 1) _____

Current Teaching Assignment (2009-2010)

_____ Class(es) _____ Grade levels

Hotel stay will be paid directly by MCTM. Sunday night meal will be provided. The course runs from noon-9 pm on Sunday, and 8 am – 5 pm on Monday. Sign-up for college (MSU) or OPI credit will be Sunday afternoon. A \$250 stipend will be mailed to each writer upon completion of the course. Mileage and per diem will also be reimbursed. Carpooling will be required when possible.

___ Yes, I would like to stay at a hotel on Sunday night at no charge to me.

___ No, I will make other accommodations with the understanding that any charges will be my responsibility.

THANK YOU FOR YOUR INTEREST IN HELPING!

Return forms by June 11, 2010 to:

Kathje Dalton
3534 Pebble Brook Drive
Billings, MT 59101
406.231.5657

kdalton@billingscatholicschools.org

MONTANA MATHEMATICS

Notes from the Montana Learning Center at Canyon Ferry Lake “Learning at the Lake”

Changing of the “Guard”

At the May 1 MLC Board of Directors meeting, long serving member who completed two teams of serve “retired”: David Erickson (UM-Missoula Education Dept.), Eric Feaver (MEA-MFT), Sue Harding (Kalispell MS), Rick Jones (Billings Senior HS), Liz Gundersen (Explorations Works), Jennie Luebeck (MSU-Bozeman Mathematical Sciences Dept.), Dick Seitz (Helena HS). Their contributions and accomplishments were very much appreciated, capped by the \$50,000 renovation of the kitchen/dining hall.

At the same time, new Board members were welcomed: Craig Beals (Billings Senior HS), Marco Ferro (MEA-MFT), Irene Grimberg (MSU-Bozeman SMRC), Ke Norman (UM Mathematical Sciences Dept.), Melissa Romano (Helena K-8), Marvin Weber (Courtview Justice Solutions).

New MLC officers are: Glenn Allinger (Executive Director), Marie Vanisko (Board Chair), Melissa Romano/Mary Larsen (Secretary), Ke Norman (Treasurer).

Student Summer Camps

- - CAMP DISCOVERY

What: A four-day science day camp for primary students

Who: Students entering grades K-3

When: July 19th – 22nd, 2010

Cost: \$190 per camper

Instructor: Chris Ralph, Helena Public Schools

- - YOUNG NATURALIST'S

What: A four-day, three overnight math and science camp

Who: Students entering grades 4-7

When: July 19th -22nd, 2010 (entering grades 4-5)

July 26th-29th, 2010 (entering grades 6-7)

Cost: \$290 per camper per week

Instructor: Beth Thomas, Great Falls Public Schools

- - INNOVATIONS 1 & 2

What: A week long camp in which math and science will be explored in the outdoors.

Who: Students entering grades 8-10

When: July 18th -24th; July 25th – 31st (different topics each week)

Cost \$490 per camper per week

Instructor: Jody Brown, Augusta Public Schools

Refer your math/science interested students or their parents to www.montanalearning.org for descriptions of each camp's activities and registration details. Contact Carol Bock at cbock@montanalearning.org, (406) 475-3638, and fax: (406) 475-3871.

MCTM and MSTA PD Academies

July 12 - 15 at MLC

MCTM grade 5-9 teachers "Implementing the Algebra Standard 5 - 9"

MSTA grade 5 - 8 teachers "Science Inquiry"

Teachers are encouraged to participate as individuals but math and science teachers attending from the same school/district will find much to discuss and share. [Go to www.montanalearning.org for further information including registration details.]

MCTM Math Coaches Retreat 2010 August 9-10

Submitted by Glenn Allinger

MONTANA MATHEMATICS

NCTM Representative's Report

Lisa Wood, MCTM President, and I attended the NCTM Annual Conference and Delegate Assembly in San Diego. The site seeing was amazing and so was the assembly and conference!

If you haven't read the **Common Core Math Standards**, I strongly suggest you do! You can find the document at <http://www.corestandards.org/>. Read NCTM's public comments related to the Common Core at <http://www.nctm.org/about/content.aspx?id=25186>.

FREE E-WORKSHOPS!

Problem Solving in Grades Pre-K-2 (Free)

E-Workshop Leader: [Emily Hendricks](#)

September 27 and November 8

2-3:30pm MT

Register at <http://www.nctm.org/profdev/content.aspx?id=25450#Sep28>

NCTM is committed to equity in mathematics – high expectations and strong support for all students. This does not mean every student should receive identical instruction, but every student should be provided with the tools they need to meet high mathematics expectations. This workshop identifies possible student barriers to learning and useful strategies in addressing these barriers. Classroom activities will be provided with suggested modifications to address the varied needs of all students within the mathematics classroom.

Math Games for the Classroom - Grades 6-8

E-Workshop Leader: [Jennifer Seay](#) September 28 and November 9 5-6:30pm MT

Register at <http://www.nctm.org/profdev/content.aspx?id=25450#Sep28>

Learn how to keep your students more engaged through the use of classroom games. In this pair of 90-minute E-Workshops, we will explore sample games and extensions while engaging in rich discussions that will allow you to make the most of each game with your students. Our focus will be primarily on the topic of Number and Operations as defined in NCTM's *Principles and Standards for School Mathematics*. We will discuss feedback from participants and explore additional classroom games on Problem Solving during our follow-up session.

NEW BOOKS!

Go to <http://www.nctm.org/catalog/allproducts.aspx?id=new> to order!

- **Developing Essential Understanding of Number and Numeration for Teaching Mathematics in Pre-K-2**
- **Developing Essential Understanding of Ratios, Proportions, and Proportional Reasoning for Teaching Mathematics: Grades 6-8**
- **A Guide to Mathematics Coaching: Processes for Increasing Student Achievement**
- **Focus in Grade 1: Teaching with Curriculum Focal Points**
- **Focus in Grade 8: Teaching with Curriculum Focal Points**
- **Focus in High School Mathematics: Reasoning and Sense Making in Algebra**

And many more!

Submitted by Lisa Scott, NCTM Representative

MONTANA MATHEMATICS



Implementing the Algebra Standard K-6



Who dares to teach must never cease to learn. John Cotton Dana

Presenter: Angel Greenley Zickefoose
Billings Public Schools Math Coach

**Designed to enhance K-6 Math Education
July 19-22 in Billings, Montana**

Sponsored by

**Montana Council of Teachers of Mathematics Monday Monday – Wednesday 8a.m. to
4 p.m.; Thursday 8a.m. until noon**

Gain an interactive overview of the algebra expectations as defined in NCTM's Principles and Standards for School Mathematics. This workshop will offer approaches and techniques for integrating algebraic concepts in the classroom and provide activities for classroom implementation. In this workshop patterns, representations, modeling, and analysis of change will be explored using a variety of formats including utilization of virtual manipulatives.

Updates regarding the workshop and **scholarship applications** will be available in upcoming MCTM newsletters or at the MCTM website: <http://www.montanamath.org>.

The \$325 registration fee includes:

- A 1-year MCTM membership or a 1-year MCTM membership renewal
- Three and one-half days of quality in-service
- 30 OPI Renewal Units **or** 2 semester credits (P/F) through MSU-Bozeman (Estimated tuition cost is an additional \$220)

Registration is due by **June 1, 2010** with your **non-refundable** \$100 deposit made payable to **MCTM**. The balance must be paid by check or PO before the workshop.

Return or email your registration:

Cliff Bara
Box 610
Troy, MT 59935
cliffbara@hotmail.com

For more information contact:

Kathy Hill
406-862-2828 or 406-752-2640
kathymarie56@hotmail.com

Name _____ Grade Level _____

School District _____ School _____

School Address _____ Phone _____

Home Address _____ Phone _____

Email _____ (Updates thru the year and summer.)

MONTANA MATHEMATICS

What I Learned Continued:

Carol Dweck's research indicates that people tend to develop two different concepts of ability/ intelligence — an *entity* view or an *incremental* view (<http://www.schoolnet.com/Viewpoints08/Need%20to%20Know/Favorites/Dweck.ppt>.)

- Students with an **entity** view sees intelligence/ ability as a fixed or stable trait. Either you have it or you don't. When these students fail, they often internalize their failure with statements such as "Why bother? I'm just not smart enough to do any better." "Only a few students can get top marks." "I just can't get this." Others externalize the blame with statements such as "My teacher can't teach." "My teacher doesn't like me." "That grade isn't fair."
- Students with an **incremental** view believe that intelligence/ability is an ever expanding body of knowledge and skills. It can be increased through effort and figuring out successful strategies. Failure usually encourages *more* practice and study, increasing chances of future success. "Making mistakes is part of learning"

Teaching Implications

- Attribute "failures" to low effort and/or an ineffective strategy ("Well, that strategy didn't work. What should we try next?") Avoid "Don't worry. You did the best you could."
- Attribute "successes" to effort *and* competence in terms of effective strategies ("Your hard work paid off by figuring out the best strategy/ approach to the problem") Avoid "Wow, you're smart."
- Explicitly discuss the different self theories about intelligence with students — work to get them to develop an incremental view about high performance in academic contexts.
- Structure instruction to be explicit about what sorts of effort leads to success: notetaking, showing work, problem solving, organizing a notebook, accountable talk, getting help, giving others help, etc.
- Until students develop an incremental view of intelligence, repackage the content so that it doesn't look difficult or boring.
- Implement low risk activities that require higher order thinking.
- See learning through the eyes of your students.
- Avoid deficit views of students and processes that make students feel controlled or coerced.

Standards Based Continued:

benchmarks into essential learning necessary for students to achieve the goals. Teachers must develop classroom assessments, both formative and summative, that measure what they want their students to learn. These tasks take time and collaboration to be done well. Teachers need the opportunity to work together to create the necessary alignment of standards, curriculum, instruction and assessment to teach all students.

The Montana Office of Public Instruction (OPI) is working toward Standards-Based Education. The definition OPI gives is "A dynamic framework to improve student learning through planning, implementing and monitoring of academic programs, learning environments, and organizational structures." (http://opi.mt.gov/Curriculum/Index.html#gpm1_8, Montana Standard Based Education Presentation – September 15, 2009) This means providing all children with challenging academic expectations, identifying what students should know, understand and be able to do, and guiding local curriculum and instruction. OPI is providing Standards Professional Development in three levels. Level I provides the basic introduction and orientation to new standards and Indian Education For All. Level II provides high-quality, job-embedded training in strategies for developing, implementing and evaluating learning experiences. Level III creates and sustains a network of experienced Montana educators who advocate and disseminate the ideas and methods that exemplify best instructional practices. Each content area will also develop performance rubrics that will assist teachers in assessing student mastery of essential learning expectations.

The book by Lisa Carter and the education vision for OPI are very similar. Both talk about the necessity of aligning standards, instruction and assessment. This is a simple idea however it will be a lot of work to accomplish. The work will be less daunting if we take it on together. The bottom line is giving students the education they need and deserve to be competitive in a world that is now flat. Technology has created careers that can be done all over the world from anywhere. There are careers now that older generations have never heard of and there will be new careers we can't even imagine. We need to prepare students for a different world than our current educational system is designed to do. It is time to demand collaborative time for schools to create a Standards-Based Education system.

Submitted by Lisa Scott

MONTANA MATHEMATICS

Professional Learning Communities

This year at the National Math Conference in San Diego, 8 teachers, 5 from the Townsend area, and 3 from Bozeman all went to San Diego. Out of the many different sectionals that we attended, PLC's was a topic that came up a lot.

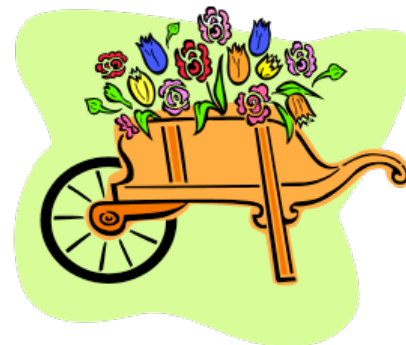
Lesson Study discussion was given by a group of nine teachers from Robert Lunt Elementary School in Clark County Nevada. They formed a PLC that was working for them. They created a committee of elementary teachers and a university professor that got together with a classroom teacher and formed a Lesson Study. They used their Lesson Study to help form a Professional Learning Community within their own school that had the aim of developing a better understanding of the developmental nature of students' learning. They met before, during, and after school to discuss curriculum, teaching strategies, and best practices to create one single lesson to be taught by one of the teachers. The lesson sparked constant discussion from the personnel involved to improve communication about teaching in the school system.

This was one way of creating a PLC that was very successful in Robert Lunt Elementary. The 8 teachers from Townsend and Bozeman were also involved in a professional learning community of their own that was much similar to those in Nevada. We have been doing lesson study in our own school system for three years.

It is different in many aspects from the group in Robert Lunt Elementary in its design. They didn't search for a lesson and make it up on their own, they used a lesson from their textbook and adapted it for the lesson study. In Townsend, we spend 20 total hours at different scheduled times identifying a problem area, creating a lesson, teaching it to students, and reflecting the findings before we adjust it to be re-taught it to another group of students. This process of Lesson Study is our way of creating a professional learning community. We used a math coach, Karma Nelson, and aid from Montana State University professors to guide us in the direction that we need to go.

In all of that time that is spent together in Bozeman, Townsend and Clark County, we build trust and communication that can be described as a PLC. That PLC extends past the school systems that it is part of and networks to other schools that are working to create a PLC too.

Submitted by Gary Bauman
MCTM Scholarship Recipient



MONTANA MATHEMATICS

Secrets of Effective Instruction

I attended Dr. Frank Wang’s “Secrets of “Effective Instruction” sectional at the NCTM meeting in San Diego on Friday, April 23, 2010. His sectional was highlighted in the catalog and had an interesting write up so I thought I would go check it out. There were many math teachers in this room when I arrived and so I took that as a good sign.

Dr. Wang had a self-effacing sense of humor; he explained to us that he was very nearly kicked out of elementary school because he wasn’t doing well in school. As he matured, math became easier for him, and he graduated from MIT as a self confirmed nerd with a PhD in math.

His “Keys to Successful Teaching” are:

#1 Provide the students a rewarding learning experience—find ways to help your student succeed. Implement instructional strategies and management techniques that improve your teaching. He quoted from a book by Harry Wong “The First Days of School” that gives great advice for how to manage a classroom.

#2 Get the students actively involved. He suggests a model of “I do, you watch; I do, you do; you do, I watch.” He feels that all three parts of this process must be performed. When teachers take a shortcut and just demonstrate how to do something without asking the students to participate, then the teaching is not effective. He reminds us that “talking is not teaching and listening is not learning”. He also thinks that giving the students an assignment or a quiz when they enter the room is a good idea.

#3 Constantly review, especially the fundamental concepts. Review should be mixed instead of the same type of problem. Introduce a concept and apply and practice the

concept along with previously learned concepts and skills. Math is not difficult, just different. He believes that “practice not only makes perfect, practice makes permanent.” Games and activities can help students practice their math skills in a fun way.

#4 Build concepts incrementally over a period of time. This is easier said than done. Before teaching a large concept or complex skill to students, try to break down that concept into sub-concepts that can be introduced over time. Learning takes time, and to offer students a rewarding experience, breaking down the larger concepts is very important. An example of this is the division of fractions. Now, we say “invert the divisor and multiply” and that is very difficult to understand. Dr. Wang and a colleague came up with a manipulative that easily illustrates fraction division.

#5 Test frequently and cumulatively. Dr. Wang suggests giving a brief quiz every class period, then try to grade and return the graded quiz the next period because learning is the greatest when the feedback is immediate. Cumulative tests are best because they send the message that students need to retain prior learning. Dr. Wang is not a fan of the chapter method used in books. He believes that learning is best when there is a gradual building process and each piece of learning becomes incorporated and integrated into what has already been learned.

Dr. Wang had some controversial views. He believes in direct instruction approach, the algorithmic approach rather than the constructivist approach (where the students “discover” how to solve a problem) and that problem solving is best achieved by having students solve a lot of different types of

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MONTANA MATHEMATICS

Secrets Continued:

problems. He does not advocate block scheduling because he believes that math is best learned through frequent and repeated exposures to the subject matter rather than through concentrated and less frequent doses of the subject matter.

Visit Dr. Wang's website at www.wangeducation.com. There are several resources available for teachers.

Dr. Wang sent his presentation notes to me and this report is a summary of his presentation.

I thoroughly enjoyed my time in San Diego. I would recommend a National Math Conference to every teacher.

Submitted by Ginny Poole
MCTM Scholarship Recipient

The Flood is over and the ark has landed. Noah lets all the animals out and says, "Go forth and multiply."

A few months later, Noah decides to take a stroll and see how the animals are doing. Everywhere he looks he finds baby animals. Everyone is doing fine except for one pair of little snakes.

"*What's the problem?*" says Noah.

"*Cut down some trees and let us live there*", say the snakes.

Noah follows their advice. Several more weeks pass. Noah checks on the snakes again. Lots of little snakes, everybody is happy.

Noah asks, "*Want to tell me how the trees helped?*"

"*Certainly*", say the snakes. "*We're adders, so we need logs to multiply.*"

MCTM Early Career Scholarship

MCTM is offering an "Early Career" scholarship worth \$500. This scholarship will be given to one K-12 Montana teacher each year to attend either the K-6 or the 7-12 MCTM Professional Development Academy (PDA) during the summer. This scholarship may not be used for any other convention or conference.

To be eligible for this scholarship you must

- 1) have taught math in Montana for at least one (1) year and not more than five (5).
- 2) be contracted to teach math this coming year in Montana.
- 3) be a current member of MCTM

You must also fill at least one of the following criteria:

- 1) an elementary teacher who teaches at least one section of math during the day or
- 2) a secondary teacher who teaches at least 3 sections of math each day or
- 4) special education teacher who has at least one period of math each day or
- 5) a Title 1 math teacher who teaches at least 2 periods of math each day

The deadline for a completed and submitted application is April 30th of the year of the PDA.

In the event that the original winner is unable to attend, an alternate will be chosen.

Please visit www.montanamath.org for more information.

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