Ben Pitchford is in his 11th year of teaching mathematics at Colquitt County High School in Moultrie. Prior to entering the teaching profession he worked in the textile industry as a production manager, process engineer, and quality assurance manager. He holds a Bachelor’s of Industrial Engineering degree from Georgia Tech, a Master’s in Education degree from Valdosta State, and is a student in Valdosta State’s Doctor of Education program.

Linda Fountain is currently in her 10th year of teaching. She received her Bachelor’s degree from Augusta State University in Early Childhood Education. She has a Master’s degree from Grand Canyon University in Curriculum and Instruction. She received her Specialist in Educational Leadership from Liberty University. Linda is a recipient of the Presidential Award for Excellence in Mathematics and Science Teaching. She was recognized nationally and by President Obama in May 2011. She is also certified as a Georgia Master Teacher and recognized by Governor Nathan Deal.

Chuchu Wu, Ph.D. is an Associate Professor of Early Childhood Education at Georgia Southwestern State University, Americus, GA. She holds a Ph.D. in Child and Family Studies from Syracuse University. She has worked as a teacher in early childhood settings and a faculty member of the Teacher Education Program. She teaches Curriculum, Assessment, and Math Methods for Early Childhood Majors. Her research interest lies in preschooler’s emergent literacy and parental involvement in early learning.
Today is one of the “those” days! From the moment I walked in to the moment the 3 o’clock bell sounded, I seemed to being running helter-skelter putting out one fire after another. Snarled in traffic, teachers were late to their class, long planned schedule changes did not go smoothly, my students seemed inert, materials and books had not been retrieved from storage, etc. etc.

Yet, as I sit to write this, the frenzy has subsided along with the noisy hubbub of students pouring into the parking lots and I am become mindful of the many blessings that I enjoy. So many things that I neither worked for nor deserve enrich me each day. It seems fitting that we pause at the onset of the Holiday season for a time of Thanksgiving.

It will only be a short time and we’ll be back at it. The New Year will initiate a whole new round of school related busy-ness. So, I encourage you to take some time during this Holiday season to be quiet. Go aside for a spell. Recharge your batteries. Count your blessings.

On behalf of GCTM I wish you a blessed and peaceful Holiday.

New Mathematics Academies Coming to Georgia in 2014

The Georgia Department of Education and GCTM are teaming up again this summer for the 2014 Georgia Mathematics Academies. These professional development workshops will be offered at seven (7) different locations throughout the state of Georgia during June and July. Watch the GCTM website for details!
Big Ideas in the Big Easy!

Join us in New Orleans for the nation’s largest math education event. More than 700 presentations will offer ideas, tools, and strategies you can immediately apply to help your students grow and succeed. Whether you’re a classroom teacher, coach, administrator, teacher-in-training, or math specialist, NCTM’s Annual Meeting has something for you.

- Learn practices central to teaching the Common Core State Standards.
- Gain practical solutions to transform your classroom into an environment rich in problem solving.
- Discover new and effective methods to incorporate technology in the classroom.
- Get answers to pivotal questions and concerns of new and soon-to-be teachers.

Helping students to develop essential math skills begins with you. This is the math education event you can’t afford to miss!

Register at www.nctm.org/neworleans and follow us on Facebook, Twitter, LinkedIn, YouTube, and Pinterest.
Cutting to the "Common Core" for Grades PK–5
THE NCTM INTERACTIVE INSTITUTE SERIES

February 14–15, 2014 | Orlando, FL

The Interactive Institute for Grades PK–5 Teachers

Increase your knowledge of mathematics content related to the Common Core domains for the pre-k through elementary grades, and learn strategies that will help you align your instruction with the Common Core State Standards for Mathematics.

NCTM’s Interactive Institute offers the latest strategies to ensure that your students receive the best preparation for higher education, and beyond.

Topics addressed in the NCTM Interactive Institute Series include the following:
- Counting & Cardinality
- Operations & Algebraic Thinking
- Number & Operations in Base Ten
- Number & Operations—Fractions
- Measurement & Data
- Geometry

GROUP DISCOUNTS ARE AVAILABLE

This Institute is part of our comprehensive series available for PK–12 teachers and school leaders. Schools/Districts are encouraged to send groups to learn as a team. Visit the website for more information.

SPACE IS LIMITED. Register early at www.nctm.org/CCSSMes to secure your spot.
The Georgia Council of Teachers of Mathematics (GCTM) will host the first "Math Day at the Capitol" on February 11, 2014. The event is being organized to promote the importance of mathematics education in Georgia and to highlight the connection between mathematically literate citizens and economic development.

During the event, GCTM award winners and student mathletes from the Georgia American Region Mathematics League (ARML) team will be recognized, and a formal resolution will be made in the Senate.

We would like to make sure that every Georgia Congress member receives a visit from a GCTM member. If you are interested in attending this event and meeting with your congressional representative, please contact your GCTM region representative to receive additional information.
I thoroughly enjoyed this year’s Georgia Mathematics Conference! Through listening to great speakers, networking with wonderful teachers, and experiencing math first hand, I was reminded of all the reasons that I fell in love with mathematics education in the first place. From Dan Meyer’s inspiring keynote to the evening socials, I feel like I came away from the conference reenergized and excited to get back into the classroom.

- Michael Lomuscio
GCTM Award Winners

**Teacher of Promise Award**
Sarah DaSilva  
W.C. Britt Elementary School  
Lilburn

**Gladys M. Thomason Award**
Peggy Pool  
APS (Retired)  
Marietta

**John Neff Award**
Kenneth Jones  
Columbus State University  
Columbus

**Dwight Love Award**
Jeff McCammon  
Rockdale Magnet School  
Conyers

**Friend of Math**
Carolyn Cutts  
ETA Hand2Mind Consultant

**Secondary Teacher of Excellence Award - Carolyn Thigpen**
George Walton Academy  
Monroe
Tightly controlled budgets are the order of the day for school districts throughout Georgia. Fortunately, the Georgia Council of Teachers of Mathematics is a source of funding for class activities for mathematics teachers through the organization's mini-grants. These grants, up to $300, are given yearly to teachers at all grade levels to help fund mathematics activities. In this article, I will describe an activity used in my mathematics class which was funded through a GCTM mini-grant and I will describe the process for applying for the mini-grant.

With reading across the curriculum being emphasized in the education world in recent years, I wanted an activity for my Advanced Placement Statistics students that would enable them to read and write about a book that contained statistics concepts. It is important to me that my students realize that statistics concepts are all around them and not confined to their AP Statistics textbook. Furthermore, I want my students to become life-long learners so that their education will not end when their formal schooling ends. Reading is one of the ways to be a life-long learner.

With funding from the GCTM mini-grant I purchased enough books for each student to select one to read. I borrowed a term from English teachers at my school and referred to the assignment as a “choice book” since students were able to choose a book from fifteen titles that I purchased with the mini-grant funds rather than all students reading the same book. None of the books would be described as statistics books. Rather, they were books about sports, psychology, business, economics, and other topics that include references to statistics concepts. Some of the titles included Moneyball by Michael Lewis, Freakonomics by Steven Levitt and Stephen Dubner, and Outliers by Malcolm Gladwell. Since there was a wide range of books, the students were able to find a book that appealed to their interests.

The students were assigned to read their book and write a report about it. The report included a summary of the book, connections that the student made between the book and statistics concepts they learned in AP Statistics, an analysis of the author’s theme, a discussion of who the author’s intended audience is, and a list of words that the student did not know prior to reading the book and a definition of the word. The section of the report where the students made connections to statistics concepts was the one that I believed was the most valuable to students. The connections required students to think deeply about how the author was using the statistics term and the student was required to evaluate how well the author explained the concept. Students also were required to go beyond what the author said about the topic by discussing what they know about the topic.

The assignment was well-received by students, but at first as some students found the idea of reading a book outside of their English class to be daunting. Once they got started many students reported enjoying their books. Freakonomics was one in particular that many students chose to read and all who did found it to be quite interesting. Scorecasting was read by a student who claimed to hate reading. Yet, while reading it he came to class almost every day talking about an interesting concept he read about in the book. On the day before the region golf tournament he held an after-class strategy session with a classmate who is on the golf team to go over a statistics-based strategy he read about in Scorecasting. Another rewarding aspect of the assignment was hearing students talk about how they discussed their books with their parents. It was nice to hear that students were discussing mathematics at home with their parents.

The process for applying for a GCTM min-grant was extremely easy. In the application, which is located at the GCTM website, you explain the project in 500 words or less and provide a list of materials that you will spend the funds on. There is also a principal approval form that the school’s principal fills out that simply asks the principal to check off that he or she supports the grant application. Both the grant application and the principal’s approval form are completed and submitted online. With the budget restraints facing schools, the GCTM mini-grant is great way to get funding for worthwhile mathematics projects.
Mini-Grants

The Mini-Grant program has been implemented to provide funding for creative teaching projects. Proposals will be judged anonymously, and grants will be awarded in any amount up to $300.00. Each winner should be willing to either write an article for Reflections, the GCTM publication, or participate on a panel with other Mini-Grant winners at the following Georgia Math Conference. The criteria upon which applications will be evaluated are:

- Creativity, innovation
- Potential impact upon student achievement
- Potential for replication by and dissemination to other teachers
- Advancement of NCTM's Principles and Standards for School Mathematics
- Unavailability of funding from local sources

Winners of this grant for 2013 and their projects are:

<table>
<thead>
<tr>
<th>Name</th>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nancy Kelly</td>
<td>Building Computational Skills through Center Stage Math - Conyers</td>
</tr>
<tr>
<td>Katie Miller</td>
<td>VersaTile Differentiation - Oakwood</td>
</tr>
<tr>
<td>Estella Newkirt &amp; Melissa Bazemore</td>
<td>The Magic of Math - Statesboro</td>
</tr>
<tr>
<td>Ben Pitchford</td>
<td>Statistical Literacy Beyond the Textbook - Moultrie</td>
</tr>
<tr>
<td>Dedra Rollins</td>
<td>Constructing Solid Figures - Augusta</td>
</tr>
<tr>
<td>Kristin Siembieda</td>
<td>Math and Literacy - East Point</td>
</tr>
<tr>
<td>Dr. Linda Tuttle</td>
<td>OMG Foldables - Milledgeville</td>
</tr>
<tr>
<td>Tarla Williams &amp; Tamara Beasley</td>
<td>Growing and Learning&quot; - College Park</td>
</tr>
<tr>
<td>Kimberly Acosta</td>
<td>Maximizing Student-to-Student Communication Through Wireless Mirroring to Smartboard - Columbus</td>
</tr>
<tr>
<td>Lorey Baggett</td>
<td>Counting coins - Saint Simons Island</td>
</tr>
<tr>
<td>Erin Battershall</td>
<td>Interactive Math Journal - Augusta</td>
</tr>
<tr>
<td>Kelly Brown</td>
<td>Academic Quiz Bowl 10-Player Buzzer System - Brunswick</td>
</tr>
<tr>
<td>Shawna Cox</td>
<td>Using Technology to Increase Student Engagement - Calhoun</td>
</tr>
<tr>
<td>Nicki Gore</td>
<td>Math- A Balancing Act - Griffin</td>
</tr>
<tr>
<td>Tetse Hooten</td>
<td>OMG!!! Makes Learning Fun - Gray</td>
</tr>
<tr>
<td>Joanna Johnson</td>
<td>Making Numbers Make Sense. - Griffin</td>
</tr>
</tbody>
</table>

Special Projects

GCTM is now offering its members an opportunity to apply for funds to support large projects that promote the improvement of mathematics teaching in Georgia. These projects can be focused on staff development activities, conferences, curriculum development, task forces, research projects, or other initiatives with similar impact.
The Eight Standards for Mathematical Practice
Helping Students Evaluate, Refine, and Expand Their Thinking
By Linda Fountain

Each day in my 5th grade math class, I ask my students the following essential question: "What evidence shows that you are becoming a mathematically proficient student?" To help my students become proficient in their mathematical abilities, we use a rubric that focuses on the mathematical practices. Rubrics are a wonderful tool to help students think about their work. They provide feedback to students and teachers about a student's level of understanding.

Because the standards for mathematical practice are interconnected, it is possible and practical to group them. I worked with a curriculum team to develop Richmond County School District's Mathematics Problems Solving Rubric. As seen in the rubric, there are 5 focus strands that incorporate all eight mathematical practice standards. Standards MP.2, MP.3, and MP.8 were combined in the "Reasoning and Explaining" strand. Standards MP.4 and MP.5 were also combined in the "Models and Use of Tools" strand.

What do I do with this rubric? I model, model, model. Before giving the students the rubric, teachers must model how to use the rubric to guide their thinking. The best way to approach the rubric is by focusing on one strand at a time so that students can comprehend the expectation of that mathematical practice. Once students grasp the concept, you can then have them use the whole rubric. This is necessary because each strand is connected.

Here are some strategies to help students evaluate, refine, and expand their mathematical practices:

This is a student's work sample scored by a classmate using the "Reasoning and explaining" strand.

eREFLECTIONS is designed by The Digital Pen, Rome, GA
www.thedigitalpen.com 706-346-8731
The Eight Standards for Mathematical Practice cont.

<table>
<thead>
<tr>
<th>Standards for Mathematical Practice (SMP)</th>
<th>Not Evident</th>
<th>Progressing</th>
<th>Proficient</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attends to precision</td>
<td>The student was unable to use appropriate math language to communicate their strategies or results.</td>
<td>The student used limited grade level appropriate math language to communicate their strategies or results.</td>
<td>The student used precise grade level appropriate math language to clearly communicate their strategies and results.</td>
<td>The student used precise and extensive grade level appropriate math language to clearly communicate their strategies and results.</td>
</tr>
</tbody>
</table>

This is an example of the 'Attends to precision' strand of the rubric that students are allowed to write on.

**Performance Tasks**

I create a variety of performance tasks and use the Georgia Performance Framework tasks. My students' favorite tasks are those in which they have to do an error analysis and justify their thinking. When my students complete a task, they self-assess their understanding and score their work using the rubric. Work is also assessed by the teacher and a peer. Each person would use a different color writing tool so that the rating on the rubric is matched with the assessor. To facilitate peer assessment and meet mathematical practice MP.3 which expects students to critique the reasoning of others, we have a math station where samples of student work are posted. Students are able to analyze other's work and critique it. Students are very genuine in their efforts and when given the opportunity become increasingly proficient in scoring their work and classmates work with practice.

**Sharing Work**

When sharing student work using the rubric, focus on the mathematical practice standards that align to the task. As a whole group or small group, students are asked to assess the work using visual cues. Students hold up 1 finger (not evident), 2 fingers (progressing), 3 fingers (proficient), or 4 fingers (exemplary). Students explain their scoring using mathematical language in the standard. The teacher facilitates the process and refines student understanding.

**Conferencing**

Peer and teacher conferences should occur regularly in the classroom. Conferences are conducted with students in small group or individually. When conducting a teacher conference students create goals to meet the expectations of the mathematical practice standards. During peer conferencing, students have conversations about the work, the rubric, and suggestions for improvement. When students are conducting peer conferences, they use a colored pencil or a highlighter. This helps distinguish the owner’s work from the peer’s commentary. After the peer assesses the work, suggestions are then offered to help make improvements. When students are having peer conferences, it is important that the teacher model the expectations.

Incorporating performance tasks with instruction, sharing student work, and conducting both teacher and peer conferences are just a few strategies that can help students become mathematically proficient. The most important thing to remember is that the mathematical practices will always be a work in progress. Students need multiple opportunities to evaluate, refine, and expand their mathematical practices. They should be given multiple opportunities to showcase their increased knowledge. When given more engaging and personalized tasks, students will improve and excel. Through this process students will learn more about themselves as mathematicians. Just remember you have to model…model…and…model!
Each strand of the rubric is printed on separate color paper, laminated, and bound with a ring. Daily students flip to the rubric strand to guide their thinking and math work. Below, student work samples.

We continue to update memberships from conference registrations and thank you for your patience! Membership numbers stand at 2300. When your record is updated, please log on and be sure your information is correct with your home address and school information. If you were registered by your system, chances are a school board address was used.

Remember to invite one person to join GCTM. Each one of us can bring one person to experience the benefits of membership and our numbers will double. Remind a former member to renew!

Susan Craig
Membership Director
How Do You Use Math?
By Shelly Allen

Have your students ever asked the question, "When will I ever need to know this?"
A helpful website to share with your students is WeUseMath.org. Videos on this site explain career opportunities in math and interesting ways math is used daily to enrich our lives. GCTM would like your help in finding out ways that Georgians use math daily. Grab your video camera and head out asking those you meet, "How do you use math?"
Post your videos to your favorite social media site—Facebook or Twitter—with #GeorgiaUsesMath.
We'll be highlighting your videos on the GCTM website over the next year.

So get ready....
Lights, Camera, Math in Action!

Using the Standards for Mathematical Practice (SMP)
Connecting Literacy and Mathematical Learning
With Suggestions for English Language Learners (ELL)
By Chuchu Wu

When I visited our Collaborative Professional Development Network Schools this semester, I randomly asked 2 elementary teachers, "How do you incorporate the Standards for Mathematical Practice (SMP) into mathematics teaching and learning?" One said, "I am not sure what it is," and the other teacher said, "It is posted at the corner of our classroom." When I got closer to look at it, I saw a summary of the SMP's typed in 14 font size on an 8X11 paper. Boy, I was glad to see it is there! I asked, "Do you plan your mathematics teaching based on the SMP's?" She smiled embarrassedly and told me that "we don't really plan mathematics curriculum based on the SMP's."
Nevertheless, I was confident that many mathematics teachers DO practice a version of the Standards for Mathematical Practice, but they just don't know they are practicing them.

The Standards for Mathematical Practice are not new concepts to mathematics teachers. These standards rest on important "processes and proficiencies" with longstanding importance in mathematics education. Therefore, I believe if every math teacher would examine the current SMP's more deliberately, they would execute these goals in daily mathematical instruction through purposeful planning. Their students would actually benefit from making sense of mathematics through discussion, reasoning, modeling, and exploring different ways to solve problems.

Literacy plays an important role in the learning of mathematics. Many children in K-5 have limited literacy skills or understanding, especially those who are English Language Learners (ELL). This affects their ability to understand directions as well as elementary word or story problems.

After attending the 2013 Georgia Mathematics Conference at Rock Eagle, I was greatly inspired by Dr. Karen Morgan Ivy's presentation of "When Rhyme Meets Reason" and Dr. Maria Montalvo-Balbed & Ms. Denise Huddleston's presentation of "Equipping English Learners for Success with the Mathematics Common Core." I created the table that follows to summarize the key points of the Standards for Mathematical Practice by grade levels to show how literacy instruction can be integrated into these mathematical practices. This table makes it easy for teachers to identify the key mathematical practices and strategies of literacy integration in the mathematics classroom. 

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Page 14  Winter 2014
Using the Standards for Mathematical Practice (SMP) 

**cont.**

**Standard 1. Make sense of problems and persevere in solving them.**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Mathematical Practices</th>
<th>Literacy Integration</th>
<th>ELL Consideration</th>
</tr>
</thead>
</table>
| K-1    | • Look for different ways to solve | • Use concrete objects or pictures to help students understand the meaning of problem.  
• Instruct meaning of vocabularies (e.g., take away, total, less) in the problem as well as teach mathematical terminologies (e.g., add, plus, sum, subtract)  
• Have students explore and express different ways to solve the problem **verbally**. | • ELL students benefit from explicit examples using concrete objects or pictures to explain vocabularies.  
• Teachers use guided questions or sentence starters to lead students to expressive language. |
| 2      | • Same as K-1.  
• Conjecture about the solutions, plan out a problem solving approaches | | |
| 3-4    | • Same as k-2.  
• Use another method to check their answers. | | |
| 5      | • Same as K-4.  
• Seek the meaning of a problem and look for efficient ways to represent and solve it.  
• Solving problem by applying their understanding of whole numbers, decimals, and fractions including mixed numbers.  
• Explain whether the approach is efficient, making sense, or solving it in a different way. | | |

*Note: The ELL strategies were adopted and modified from the handout used in the presentation of Montalvo-Balbed & Huddlestun (2013).*

Reference:  
Using the Standards for Mathematical Practice (SMP) cont.

**Standard 2. Reason abstractly and quantitatively.**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Mathematical Practices</th>
<th>Literacy Integration</th>
<th>ELL Consideration</th>
</tr>
</thead>
</table>
| K-1    | • Understand a number represents a specific quantity  
         • Connect quantity to written symbols. | • Teach numeral (written) symbols as well as numbers in written language.  
         • Model and draw a representation of problem using words, pictures, and tables.  
         • Have students orally describe the problem using quantitative reasoning. | • ELL students need to practice translating and exchanging different forms of representations: Oral expression, written symbols, and picture representation of a numeral and its quantity.  
         • ELL benefits from hearing the teacher think aloud about the meaning of quantities, the operations, etc. |
| 2      | • Same as K-1.  
         • Use different properties of operations and objects. |                 |                   |
| 3      | • Same as K-2.  
         • Create a logical representation of the problems, considering the appropriate units and the meaning of quantities. |                 |                   |
| 4-5    | • Same as K-3.  
         • Extend their understanding from whole numbers to their work with fractions and decimals.  
         • Write simple expressions, record calculations with numbers, and represent or round numbers using place value concepts. |                 |                   |
Using the Standards for Mathematical Practice (SMP) 

**cont.**

**Standard 3. Construct viable arguments and critique the reasoning of others.**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Mathematical Practices</th>
<th>Literacy Integration</th>
<th>ELL Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>• Use concrete representation</td>
<td>• Have student orally present mathematical arguments using objects, pictures, drawings, or actions.</td>
<td>• Precise mathematical vocabularies and phrases must be taught to ELL students.</td>
</tr>
<tr>
<td></td>
<td>• Construct arguments using objects, pictures, drawings, or actions.</td>
<td>• Teach mathematical vocabularies by presenting multiple different examples (numbers, pictures, real world settings, concrete objects, and models.)</td>
<td>• ELL students must know and understand the different meanings for words with multiple meanings such as table, root, volume, power, rational, and etc.</td>
</tr>
<tr>
<td></td>
<td>• Begin to develop mathematical communication skills.</td>
<td>• Students practice mathematical discussions - use of explanations and questions.</td>
<td>• ELL students benefit from making both oral and written arguments.</td>
</tr>
<tr>
<td>1-2</td>
<td>• Same as K.</td>
<td>• Listen to others' explanation and evaluate the correctness.</td>
<td>• ELL students benefit from working in collaborative groups in which the exchanges of ideas help the development of language.</td>
</tr>
<tr>
<td></td>
<td>• Practice mathematical communication skills.</td>
<td>• Explain their thinking to others and respond to others' thinking.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>• Same as K-2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Refine mathematical communication skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>• Make connections between models and equations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Refine mathematical communication skills.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>• Explain calculations based upon models and properties of operations and rules that generate patterns.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Explain relationship between operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Refine explanations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Explain their thinking to others and respond to others' thinking.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Using the Standards for Mathematical Practice (SMP) cont.

**Standard 4. Model with mathematics.**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Mathematical Practices</th>
<th>Literacy Integration</th>
<th>ELL Consideration</th>
</tr>
</thead>
</table>
| K-2    | • Experiment with different forms of representations  
        • Make connection among different representations and explain the connections. | • Teacher explicitly model representations in multiple ways including numberals, mathematical terminology, drawing pictures, using objects, acting out, making a chart or list, creating equations, etc.  
        • Allow students to observe and explain connections of different representations  
        • Write word problems using real world contexts.  
        • Students orally present the evaluation of the results. | • ELL students benefit from explicit examples using concrete objects or pictures to explain vocabularies.  
        • Teachers use guided questions or sentence starters to lead students to expressive language. |
| 3-4    | • Evaluate the results in the context of the situation and reflect on whether the results make sense. | | |
| 5      | • Evaluate the utility of models to determine which models are most useful and efficient to solve problems. | | |

**Standard 5. Use appropriate tools strategically.**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Mathematical Practices</th>
<th>Literacy Integration</th>
<th>ELL Consideration</th>
</tr>
</thead>
</table>
| K-3    | • Use available tools to solve problems (including estimation) | • Explicit instruction on names, functions, and use of the tools.  
        • Students summarize the data-involve students using oral and written expressions. | • ELL students benefit from the use of technology and digital content from websites to help them gain understanding of concepts. |
| 4      | • Measurement tools | | |
| 5      | • Make prediction of real world data | | |
Using the Standards for Mathematical Practice (SMP) 

*cont.*

**Standard 6. Attend to precision.**

<table>
<thead>
<tr>
<th>Grades</th>
<th>Mathematical Practices</th>
<th>Literacy Integration</th>
<th>ELL Consideration</th>
</tr>
</thead>
</table>
| K-2    | • Use clear and precise language in discussion with others and in their own reasoning about mathematical concepts. | • Instruct clear and precise mathematical expression or phrases when communication with others (Read and write).  
  • Instruct mathematical terminologies so students can use appropriate terms when referring to expressions, fractions, geometric figures, and coordinates grids. | • Use models to help ELL students understand the meaning of mathematical terminologies.  
  • ELL students benefit from working in collaborative groups to practice communicating precisely. |
| 3      | • Specific mathematical concepts:  
  • Units of measure  
  • Meaning of the symbols  
  • Measure areas with unit squares. |                                                                                      |                                                                                  |
| 4      | • Specific mathematical concepts  
  • Units of measure  
  • Meaning of the symbols  
  • Use appropriate labels when creating a line plot. |                                                                                      |                                                                                  |
| 5      | • Specific mathematical concepts  
  • Units of measure  
  • Meaning of the symbols  
  • Use graph paper to create graphs and solve problems or make predictions from real world. |                                                                                      |                                                                                  |
Standard 7. Look for and make use of structure.

<table>
<thead>
<tr>
<th>Grades</th>
<th>Mathematical Practices</th>
<th>Literacy Integration</th>
<th>ELL Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>• Discern a pattern or structure&lt;br&gt;• Pattern in teen number&lt;br&gt;• Commutative property: 3+2=5; 2+3=5</td>
<td>• Explain mathematical vocabularies using pictures, concrete objects, or models.</td>
<td>• ELL students benefit from seeing the relationships and patterns modeled in many different ways prior to having the opportunity to look for structure e and patterns on their own.</td>
</tr>
<tr>
<td>1</td>
<td>• Commutative property of addition 12+3 =3+12=15&lt;br&gt;• Associative property 4+6+4=(4+6)+4=10+4</td>
<td>• Use multiple examples of number sentences to explain the meaning and function of mathematical properties (commutative property, associative property, distributive property).&lt;br&gt;• Students find patterns and relationships based on prior knowledge and have students orally express these observations.</td>
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<tr>
<td>2</td>
<td>• Adopt mental math strategies based on patterns (making ten, fact families, doubles)</td>
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<tr>
<td>3</td>
<td>• Use properties of operations as strategies to multiply and divide (commutative and distributive properties)</td>
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<tr>
<td>4</td>
<td>• Use properties of operations to explain calculations (partial products model).&lt;br&gt;• Relate representations of counting problems such as tree diagrams and arrays to the multiplication principal of counting.&lt;br&gt;• Generate number or shape patterns that follow a given rule.</td>
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<tr>
<td>5</td>
<td>• Use properties of operations as strategies to add, subtract, multiply and divide with whole numbers, fractions, and decimals.</td>
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</table>
Using the Standards for Mathematical Practice (SMP) cont.

Standard 8. Look for and express regularity in repeated reasoning.

<table>
<thead>
<tr>
<th>Grades</th>
<th>Mathematical Practices</th>
<th>Literacy Integration</th>
<th>ELL Consideration</th>
</tr>
</thead>
</table>
| K      | • Notice repetitive actions in counting and computations.                              | • Have students **verbally** express their observations about patterns and relationships in counting and computations. | • ELL students benefit from using sentence strips such as "When I ____, I notice_____."
 |        | • The pattern of "one more" and "ten more" when by ones and tens.                     | • Have student **write** down these patterns and structures observed in counting and computations. | These can assist student in finding patterns |
| 1      | • Understand place value.                                                               |                                                                                      |                   |
|        | • Notice the pattern by adding and subtracting "ten" and multiplying by "ten".         |                                                                                      |                   |
| 2      | • Look for patterns.                                                                   |                                                                                      |                   |
|        | • Adopt mental math strategies based on patterns (making ten, fact families, doubles). |                                                                                      |                   |
| 3      | • Notice repetitive actions in computation and look for shortcut methods.              |                                                                                      |                   |
|        | • Use distributive property as a strategy to solve products that they don't know.     |                                                                                      |                   |
| 4      | • Notice repetitive actions in computation to make generalizations.                   |                                                                                      |                   |
|        | • Use models to explain calculations and understand how algorithms work.               |                                                                                      |                   |
|        | • Use models to examine patterns and generate their own algorithms.                    |                                                                                      |                   |
| 5      | • Use repeated reasoning to understand algorithms and make generalizations about patterns. |                                                                                      |                   |
|        | • Connect place value and their prior work with operations to understand algorithms to fluently multiply multi-digit numbers and perform all operations with decimals to hundredths. |                                                                                      |                   |
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