Learning Math the Write Way

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This curriculum unit is recommended for:
Math/Grades 2-5

Keywords: Writing in math, open-ending questioning, math vocabulary, journaling

Teaching Standards: See Appendix 1 for teaching standards addressed in this unit.

Synopsis: "Learning Math the Write Way" is a unit intended to get my fourth graders writing about math. Many students are focused only on achieving the "right" answer because they have not been expected to "write" in math. The new Common Core standards expect students to clearly express their thinking. Throughout this unit, students will be taught explicitly how to articulate the steps they took to solve problems. My goal is for students to enjoy writing in math and feel that it is natural to explain their thinking. During this unit students will participate in seminars and partner talk to get them discussing concepts about math. Students will also have interactive journals where classmates and I can respond to them about their work and ideas about topics in math. Students will be taught how to analyze and respond to open-ended questions. Finally, students will complete a writing activity that compares and contrast two topics in math. They will use what they know about making comparisons in reading and writing, and merge what they have learned throughout this unit to complete the assignment. Students will continue to use what they learned from this unit throughout this year and hopefully their understandings will follow them throughout the rest of their education.

I plan to teach this unit during the coming year to 26 students in Math/Grade 4.

Learning Math the Write Way

Ullanda A. Tyler

Content Objectives

Introduction

So many times we hear parents say “That’s not how I learned math!” or “That’s not the way I do it!” Expectations for math have changed and I plan to incorporate those changes with my unit, “Learning Math the Write Way.” This unit is intended for my fourth grade math blocks. Writing in Math is an important critical-thinking skill that needs to be modeled and taught explicitly.

My current school is a district-wide science, technology, engineering, and mathematics (STEM). It is a kindergarten through eighth grade school. Due to the fact that it is a magnet school, we receive students from all over Charlotte. Currently there are over nine hundred students enrolled and they come from many different backgrounds and socioeconomic statuses. Approximately sixty-eighty percent of my school is made up of African-American children and sixty-three percent are economically disadvantaged students. Many parents place their children in magnet schools for the high expectations and rigor that the curriculum provides. Some parents also choose magnet schools as an alternative to their home schools not meeting their academic needs.

Currently I teach three blocks of math a day and I have twenty-six students per class and that is the magnet capacity for students per classroom. My first block of students is a pretty much heterogeneous group with high, medium and low students depending on the day and the concept. My second block of students consists of English as a Second Language students, and Exceptional Children as well as regular education students. Lastly, my third block has Talented and Development students along with regular education students. My students have some background in mathematical and writing concepts. However, I have received much resistance from parents and students about having to write and explain the steps that were taken to achieve the correct answer. With this unit, I plan to strengthen and connect their mathematical knowledge with writing processes. I also hope that students will see that there is a true connection to writing in math and that they will begin to become better writers and mathematicians by merging the two in a meaningful way on a daily basis.

My unit has been developed for my fourth grade math students. It is my belief that all grade levels and subject areas can find benefits from this unit. As teachers start

incorporating writing throughout the curriculum, students will become more familiar with writing during other subjects areas rather than just writing papers during their writing blocks. Students gain knowledge from consistency and continuity through grade levels. The more grade levels start incorporating writing across the curriculum, the chances can increase that students will become better writers and more knowledgeable about the subject area that they are writing about.

This unit has been designed to be taught after whole group instruction, during the math workshop part of each day. I have planned this unit for one week because it is the foundation week for the writing in math strategies and activities that we will use all year. It is my hope that many of the expected outcomes will be continued throughout the year. For example, students will continue to write in their math journals and receive open-ended math questions as we continue to learn concepts. Students will also do other writing activities that are not in this unit, such as writing poems, creating recipes, writing short stories, and creating puzzles about math concepts. This unit will lay the groundwork for my fourth grade students to learn how to write in math and across the curriculum. Students will learn how to write about what they are learning in math and about concepts that they are struggling with. Students will also be given open-ended math questions that they will have to write to explain their thinking and how they found their answers. This lesson can be taught during math workshop and then incorporated during the regular math block.

Rationale

Currently students are being expected to explain their thinking as opposed to just finding the correct answer. Gone are the days when all that is required is just the right answer. Teachers are no longer saying, "I don't care how you solve it, just get the correct answer!" In fact, we want the exact opposite. Less emphasis is being placed on the answer and more importance is now directed to the strategy and process. The new Common Core Standards have "8 Standards for Mathematical Practices" that must be incorporated into our lessons on a daily basis. The 3rd standard is for students to be able to construct viable arguments and critique the reasoning of others:

> In fourth grade mathematically proficient students may construct arguments using concrete referents, such as objects, pictures, and drawings. They explain their thinking and make connections between models and equations. They refine their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" They explain their thinking to others and respond to others' thinking.[i]

Students have to explain step by step what they were thinking, how they got their answer and why they believe that their answer is rational. Over and over on math and other content-related assessments, students are being mandated to justify their answers. I believe that this is a great concept in theory; however; students are destined to fall short

of our expectations if they are not explicitly taught to view math and writing as one and the same. Often times on homework I would find that some students would answer every question on the page; however, the "Writing in Math" question would either be blank or only contain numbers. If we expect our students to be proficient at something they've never been taught before, then we as teachers must be intentional in our deliver of the methodology.

Objectives

My goal for this unit is to have students accurately use their knowledge of math vocabulary and concepts along with writing processes to problem solve in math. Throughout the year students will be taught content-specific vocabulary that they are expected to use when they discuss mathematics. We will make the transition from speaking to writing using correct grammar and formats. My aim is for writing to become a natural part of students' mathematical understanding where they are not afraid of or confused by writing about math.

Students have already been introduced to Cornell-style[ii] note taking and the importance of vocabulary in discussing mathematics. In our classroom we use something called "Mathlish" where students combine their knowledge of the mathematical concepts with English practices. Since students have some understanding of listening and speaking about math, now is a great time to transition them into writing about math. Students will be introduced to math journals. In these journals, students will be expected to write about what they are learning and the concepts that are a struggle for them. They will also use their journals to create and solve problems as well as complete other writing tasks. Students will share these journals for peer and teacher feedback.

The next goal of this unit is to teach students strategies for writing in math. One of the wonderful things about math is that it allows for students to be creative and explore different ways to understand and solve problems. I love when multiple students are excited to share the different ways in which they thought about the problem and solved it. Students are becoming better at verbally explaining themselves; now the task is to transfer the spoken language to written language. Often times, students are very literal with their understanding of directions from teachers. If a student delivers a great spoken answer, a teacher is likely to respond by saying, "Great. Now write that down." Students will either write down too much unneeded information, or they won't even write down half of what they said. I believe that this problem can be corrected with teacher modeling and practice. Students have the misconception that writing should only be done when they are in writing class and writing a paper. This fallacy can be fixed as more and more content teachers are explicit in their expectations of writing across the curriculum.

My final goal of "Math the Write Way" is for students to realize the importance of taking responsibility for their own learning and explaining their thinking. Usually, there

are many components to solving a problem. If a student is able to articulate what he or she understands, as well as explain the parts that they are struggling with, it is easier to help clarify the part that is unclear. This allows for students to take ownership of their learning. Also, as teachers, if we are reading their explanations, it is easier for us to notice the misunderstandings of concepts rather than only marking an answer right or wrong and not knowing their mistakes.

Background Information

In order for students to be successful in this unit they will need to know some of the fundamental mathematical vocabulary that is used to explain problems. Students will also need to know essential rules of grammar and writing. As teachers, if we start in kindergarten referring to things in math by their technical names, we will give our students the foundation they need to speak about math correctly. For example, when students in the younger grades are exploring pattern blocks, they should refer to shapes using their names, like hexagon and rhombus. This continuity among grade levels will help to ensure that students are able to use math vocabulary correctly and it will decrease the amount of time that is spent reteaching correct wording in mathematics.

Another thing that students need to know is how to merge grammatically correct sentences with mathematically correct terminology. Students need to know that common words in English have different meanings in mathematics, such as key and table. Students will need to receive formal instruction in how to set up their open-ended responses. They will need to know basic grammatical rules like writing in complete sentences and using proper punctuation. By allowing students the opportunities to speak about their problem solving, they can become better writers. Often times, when speaking students will use incomplete thoughts. As teachers, we can help them to develop their thoughts by simple prompts, such as “Say more.” We can also help students by having them restate the answer in their responses. All these techniques will help students as they make the transition from speaking about math to writing about math.

Recently standardized test are moving away from all multiple choice questions and more towards short answer and open-ended responses. Students have been trained to work a problem out and to choose the correct answer. Even if a student did not know how to solve the problem, he or she could still eliminate some answer choices and choose the best if they were a good test taker. Today it is not enough to simply find the right answer. The expectations are higher, and students need to reason and justify their answer while explaining their thinking. This is a new and foreign concept to many of our students. Students struggle with written responses in other concept areas, and math is no exception. Providing students with open-ended questions will allow them the opportunity to practice writing responses to mathematical problems. I will model how to break down the parts to the word problems and decipher what we are being asked to solve. With the students, we will also pay attention to key vocabulary that appears in the questions and to the

vocabulary that should also be in our responses. Modeling the writing expectations for the students is a crucial part of their success. It is not enough to tell them to explain their thinking, or give them a problem and ask them to solve it. We must scaffold and guide them towards what we would like to see.

Teaching Strategies

Complex concepts need to be presented in a variety of ways. They also need to build and expand on one another. For this unit we will use a few research-based strategies to get students writing in math.

Communication is a life-long skill that needs to be developed early on in education. We will hone in on this skill by participating in class Socratic seminars and in partner think-pair-share. Socratic seminars will allow us to share thinking and to respond to each other where everyone can hear at once. This will enable us to begin the correct format for explaining and arguing our thinking. As the teacher, I will facilitate and address misconceptions as needed. It is my hope that students will be able to start correcting each other during the seminars. The think-pair-share strategy will allow everyone the opportunity to share their thinking. Some students are shy and afraid to address the entire class; however, they are not as uncomfortable to speak to a partner. This strategy is welcomed because everyone gets a turn to share and feel at ease.

As we make the transition from listening and speaking to writing, students will begin to write in a journal. Students will start by writing down what they are learning in class as well as concepts that are confusing for them. The journals will be a place where students can start getting their thoughts down on paper, and it will help them become comfortable with writing in math. The journals enable students to take responsibility for their learning. It allows them to say exactly what it is that they don't understand. Some students are reluctant to "be wrong" in front of their peers. Journals are a safe place for this to occur. Students will also be responsible for peer reviews of their journals. Once a week they will exchange journals and write comments to each other. Again, this allows for students to be in control and partners in their education rather than just spectators. Students will also create their own story problems in their journals. We will pull activities that students complete during writing class and use those same activities during math. For example, in reading students may compare and contrast two characters in a story and writer a summary. I will show students how we can complete this assignment in math by comparing two mathematical terms or concepts.

Classroom Activities

Socratic Seminars

Students need to know the reason why they are learning something and the relevance of it to their lives. We will start by discussing the design and purpose of Socratic seminars. Students will be told that this is a forum to discuss their ideas and opinions and to learn strategies from other peers. Students will be allowed to respectfully agree or disagree with one another. In instances where students disagree, they should start with statements such as “I disagree because…” or “I solved it another way, because…” Students should feel free to share their thinking even if it is not fully developed. One purpose of the seminar is to help those students that need additional guidance in articulating their thoughts.

Students started this year by learning about multiplication and division concepts. We will continue to enrich their knowledge of multiplication and division while adding on place value and number sense concepts. We will start our seminars by discussing what they have learned about multiplication and division and how it connects to our everyday life. The next seminar will be about place value and the ways in which we use it every day. Students will explain the meanings of “place” and “value.” They will argue whether or not they think it is one concept or two separate ideas.

Response Journals

Formal assessment in the classroom is very essential; however, informal assessments can be equally as important for the student and the teacher. Response journals allow the teacher to gain an understanding of what the students are comprehending and what subject matter is challenging for them. In the beginning, it will be necessary for students to spend a few minutes writing in their journals daily. This will help them to see that writing is a part of math. Students will see that writing is to be done often throughout the day and that it is not reserved just for writing class. Together we will practice writing in our journals and responding to each other in our journals.

Vocabulary Word Wall

When analyzing content area assessments, one area where students have the most difficulty is with vocabulary. If they are unable to decipher the vocabulary in the question or answer, then the likelihood of them solving the problem correctly drops dramatically. Vocabulary is a vital part of comprehending and being able to explain and write about your thinking. When folding paper, students are sometimes directed to fold the paper “hotdog” or “hamburger” style. As a believer in “Mathlish,” I always questioned why teachers would not simply introduce students to the words “horizontal” and “vertical” when folder paper. This would give students a hands-on visual application to the words and help them to create meaning. When teaching content material, it is crucial to teach the correct vocabulary and to allow students opportunities to connect meanings. Students must also be held accountable for using proper vocabulary while explaining their

thinking, whether verbally or written. Students have been taking notes on math vocabulary, and we have a math word wall with illustrations in the room. Students will use their notebooks and the word wall as a reference daily to speak and write about math.

Components of Open-Ended Questions

The idea open-ended questions is relatively new for students. However, the task of decomposing a question should be familiar for students. When modeling the components of open-ended questions for students, there are a few questions that students need to ask themselves. The most essential question is: "What am I being asked to figure out?" I have found that students answer only parts of the multistep problems because they don't begin with the end in mind. The next question students need to ask themselves is: "What important information am I being given in this story problem?" Being able to pull out important information is a skill that students must master. It also helps students not to be overwhelmed by all the information being presented in the story problem. The final question is simply: "What do I need to do in order to solve this problem?" This is where strategies learned in class come into play. Some students prefer to draw pictures, while others like to use non-standard algorithms to solve. Students are taught at least two different strategies to solve basic arithmetic problems; however, this is a great opportunity for students to discover different ways to solve and to communicate their thinking to their peers.

Components of Open-Ended Responses

Now that students know how to interpret and solve open-ended questions, the next thing they need to do is to write about the thinking that went into discovering their answer. This is the ultimate goal. If students are able to clearly explain and justify their thinking by writing, then they are well on their way to become the 21st Century scholars that we are educating them to be. Students' explanations of how they found their answers and why they chose a particular strategy are two components of open-ended responses. Their justifications allows for the teacher to see if they really know what they are talking about, and it allows the teacher to see exactly where the misconception is within a particular problem. It is necessary that teachers hold students accountable for math vocabulary and grammar rules at this point. Many times teachers will not take off for grammar mistakes since this is math; once again, I feel as though this sends the wrong message to our students. Such an approach reinforces the notion that grammar only matters during writing class. Today students have texting, blogs, Twitter, Facebook, Instagram, and other areas of social media where the rules for grammar and writing are relaxed. Writing about their thinking and justifying their answers should not be an area where we as teachers are not looking for accuracy in grammar.

Open-Ended Response Questions/Writing Prompts

Students are now ready, with the guidance of the teacher, to begin writing responses to math problems. Students will be given a variety of tasks where they have to explain the rationale and they will be given problems where there is not one particular answer for them to choose. For example, students will be given a problem where they have to explain how the 9 is related in the numbers 9 and 900. There is not one particular answer that I am looking for, though there are certain responses that will let me know whether or not the student understands place value and multiplication. Student A may respond by saying, "The 9 in 900 just added two more zeros at the end." Student B may respond by saying, "The value of the 9 in 900 is 100 times greater. I know this to be true because if I multiply the first 9 by 100, I will get 900 as my product." The response given by Student A allows me to see that he or she has an incorrect understanding of the procedure by using the words "add two zeros to the end." Student B has a more detailed response and used correct content vocabulary.

Day 1

Today students will begin learning the connection to writing in math as they respond to writing prompts in their math journals. I will explain to students that writing is not just something that they do in language arts class. We will revisit our "I ❤ Mathlish" poster. Students will share what this poster means to them. I will also tell students that being able to explain their thinking helps to show a deeper understanding of mathematical concepts, and it allows them the opportunity to also become better writers.

Next, I will ask students how they think their math journals will be similar to their Writer's notebooks. I will tell students that their journal will be a place where they can reflect on what they are learning in Math class and problem solve to find multiple strategies and solutions. Journals will also be a way for the teacher and other classmates to respond and communicate with each other. I will project "Math Journal Prompts about Attitudes and Dispositions[iii]" to start the class discussion. I will get students started by responding to the prompt, "I use math in my life... It helps me to..." Students will then raise their hands and share out loud their responses. Next, students will choose their own prompt from the list and turn and talk with their neighbor. Before students record their responses in their journal we will chart a list of writing nonnegotiables. We will discuss some things that we learned that need to be included in our writing. Writing nonnegotiables should include, but are not limited to: starting a sentence with a capital letter; ending sentences with correct punctuation; making sure that each sentence is a complete thought, especially when beginning with the word "because;" using "Mathlish" that consists of numbers and mathematical vocabulary. At this point, students are ready to record their responses in their journals. After writing, students will volunteer to share their responses with the whole group and within their table groups. Tonight for

homework students will also choose one problem and explain step by step how they found their answer.

Day 2

Today we will begin with a Socratic seminar. I will explain to students that we will continue to talk and write about math. As a class we will brainstorm a list of shared agreements for how we should participate during seminar. I will guide students by asking questions such as “How will we know who has permission to speak, and what should I do while my classmate is speaking?” Also, students must come up with a solution to the question, “What should I do if I agree or disagree with my classmate?” The person speaking will use the finger pointer stick. Only the person holding the stick will be able to speak; once finished, he/she will pass the stick to the next person. Students will use phrases like “I disagree because…” or “I solved it another way, because…” when responding to statements from other classmates. After we have our shared agreements in place, I will pose the prompt, “Describe your feelings about when you are asked to show your work to others or to explain a problem.” Students will take turn sharing responses. The next prompt I will pose is, “Do you think it is important to write in math? Why or why not?” The final prompt I will pose is, “When I see a problem I don’t know, the first thing I do is...Then I...” Students will then go to their desks and reflect in their journals about today’s seminar.

Day 3

Today we will begin to learn about open-end questions and responses. We will begin by learning the components of open-ended questions. I will have students record Cornell-style notes about the three essential questions to ask yourself when reading any type of math question, especially open-ended questions. The first question is “What am I being asked to figure out?” Students first need to determine what they are being asked to do. Once they know what the question is asking, they can then determine the relevant information from extra information in the problem. Students will look for key words and numbers in the story problem that will help them with solving the problem. Students will choose the appropriate operation/operations and strategies to use to solve the problem.

Students will then be introduced to the components of open ended responses. After students have worked out the problem, they will need to write a response explaining the thinking, strategies, and work that went into finding the correct answer. Students will need to give a step-by-step explanation. I will explain to students the importance of using correct math vocabulary and also the importance of all our grammar nonnegotiables.

After we have taken notes together, we will practice solving and writing about a math story problem. The story problem I will use is: “Ms. Tyler and Mrs. Talton were playing

a game of guess the number. Mrs. Talton said, ‘I am thinking of a number between 31 and 41. It is a multiple of 3. It is also an even number.’ What number is Mrs. Talton’s number?” We will analyze the question and determine what we have to answer. Then we will pick out the important information and choose a strategy to solve the problem. Finally, we will explain and write about our work together.

After modeling an example together, students will be given the following story problem to solve with a partner: “Evan is putting all of his trophies onto 7 shelves. If he places 7 trophies on each shelf but still has 2 trophies left over, how many trophies does he have?” Students will share their responses with the class.

Day 4

Today we will create our own story problems for classmates to solve. We will begin by reviewing components of story problems. We will brainstorm a list of concepts that we have covered so far this year. This list includes: factors, multiples, properties of multiplication, multiplication, division, addition, and subtraction. We will write two story problems together as a class and respond in our math journals. Students will then create two of their own problems. Teacher once again reminds students that math vocabulary and grammar rules must be used when writing their problems. I will work with small groups to help students create problems. Students will also show me their journals so that I can help them edit their problems. Once story problems are complete, students will switch with a partner and solve the problem and explain their answer in their partner’s writing journal. Students will peer edit responses using a rubric.

Day 5

Today during math workshop students will complete a writing activity that demonstrates an understanding of concepts in math that we have been learning. Students will use the teacher- made “Comparing Two Concepts in Math” graphic organizer to compare and contrast two concepts in math and write a gist summary. Teacher will first model how to complete the graphic organizer by comparing and contrasting writing in Language Arts to Writing in Math with the students. Students will then choose their own two topics to compare. Teacher will approve the topics that students have chosen to compare. Teacher will work with a small group to complete this activity. Students may also work with a partner.

At the end of class, students will write in their journal about their new feelings regarding writing in math now that they have completed a week’s worth of activities. I will take the journals home to read and respond to all students.

Format for note-taking

Topic: Date:

Questions/Main Ideas/Vocabulary	Notes/Answers/Definitions/Examples/Sentences
Summary:	

http://www.readwritethink.org/files/resources/lesson_images/lesson820/MathPrompts.pdf

Math Journal Prompts about Attitudes and Dispositions

•Explain how you feel about mathematics now as compared to when you were in a different grade. The difference between... and ... is...

•The most important part of solving a problem is...

•My best kept secret about math is... It makes me feel like...

•If math could be a color (shape, sound), it would be...because...

•Find something that you learned today that is similar to something you already knew. Write about these similarities.

•I want to become better at math so that I...

•People who are good at math...

•I use math in my life... It helps me to...

• My best experience with math was when...

•When I think of math, I think...

•My worst experience with math was when...

•When it comes to math, I find it difficult to...

•Write a letter to your teacher explaining what you do understand about the topic, and what needs to be clarified.

•When I hear someone say math is fun, I...

•Draw a picture of a mathematician and describe what a mathematician does.

http://www.readwritethink.org/files/resources/lesson_images/lesson820/MathPrompts.pdf

Math Journal Prompts about Attitudes and Dispositions

• If I were better at math, I would...

•When I see a problem I don't know, the first thing I do is...Then I...

• What are the benefits of journal writing for math classes?

• Describe your feelings about when you are asked to show your work to others or to explain a problem.

• How could journal writing be changed to be more effective?

• Does mathematics or math class scare you in any way?

• When you make mistakes, what do you do first? Do you make corrections or ask questions? Why or why not?

• My three personal goals for math are...

• Describe how today's math class will affect your day.

• What did you like most about your previous math class? What did you like the least?

• My math grade now is ...because...

• This is how I feel about math...

• What is the most significant thing you learned this week?

• One mathematics activity I really enjoy is...because...

• What questions are still unanswered at the end of this week?

• Describe any discoveries you make about mathematics (patterns, relationships, procedures, etc.).

• My family feels that math is...

Open-Ended Response Rubric

4	3	2	1	0
• Very detailed explanation. All steps and thinking was included. • Answer was correct.	• Good explanation. Some thinking or steps may have been left out. • Answer was correct.	• Some explanation was given; however it was not clear. • Answer was correct	• Some explanation was given; however it was not clear. • Answer was incorrect.	• No work or explanation was given. • Work was not related to the problem.

Comparing Two Concepts in Math Graphic Organizer

Concept 1:
Three facts about Concept 1
1.
2.
3.

How can I use Concept 1 in my everyday life?

What jobs use Concept 1?

Concept 2:
Three facts about Concept 2
1.
2.
3.

How can I use Concept 2 in my everyday life?

What jobs use Concept 2?

What are three ways Concept 1 and 2 are similar?
1.
2.
3.

What are three ways Concept 2 and 3 are different?
1.
2.
3.

Write a 20-word GIST.

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

Resources

Bibliography for Teachers

Whitin, Phyllis, and David Whitin. 2000. *Math Is Language Too: Talking and Writing in the Mathematics Classroom.* Urbana, IL: NCTE.

Math Is Language Too: Talking and Writing in the Mathematics Classroom is a great resource for teachers to introduce students to connecting writing to math in a meaningful way. It also has illustrations of actual student work.

Whitin, Phyllis & Whitin, David J. "Promoting Communication in the Mathematics Classroom." Teaching Children Mathematics 9.4 (December 2002): 205-211.

Promoting Communication in the Mathematics in the Classroom helps teachers to create opportunities for students to deepen their understandings of mathematical concepts and transfer their knowledge throughout the curriculum.

Altieri, Jennifer. *Literacy + Math- Creative Conenctions in the Elementary Classroom.* International Reading Assoc., 2010

Literacy + Math- Creative Conenctions in the Elementary Classroom. It is a resource that helps to explain the connections between reading and math. It also gives teachers strategies and activities that are ready to be used in the classroom.

Reading List for Students

Scieszka, Jon, and Lane Smith. *Math Curse*. New York, N.Y: Viking, 1995. Print.

Math Curse is an awesome book that allows students to read about math and solve word problems in the process. It is also is a great model that will help students with creating word problems.

Materials for Classroom Use

Math Journal Prompts about Attitudes and Dispositions is used to start kids writing in math. These prompts can be used for seminars, classwork and homework.

Open-Ended Response Rubric is used to help students write effective responses. It is also used to help teachers and students evaluate responses.

Comparing Two Concepts in Math Graphic Organizer is used to help students compare and contrast math vocabulary and concepts. It allows students to organize their thoughts and then summarize.

LCD Projector is used to present information to students.

Implementing Common Core Standards

CCSS.Math.Content.4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Multistep word problems, place value and the four operations is the foundation and basis for many math problems that students will encounter. Students should be able to communicate about the reasonableness of their answer and how they found their answer.

CCSS.ELA-Literacy.W.4.1b Provide reasons that are supported by facts and details

Students should be able to work out multistep problems and explain step-by-step what they did to solve each part of the problem

CCSS.ELA-Literacy.W.4.2b Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic

This writing standard connects to math because it has students developing their mathematical knowledge using explicit examples and details. By mastering this standard, students are able to demonstrate a true understanding of the mathematical topic.

CCSS.ELA-Literacy.W.4.2d Use precise language and domain-specific vocabulary to inform about or explain the topic.

This standard calls for students to use mathematically rich vocabulary when explaining their work. It holds students accountable for using accurate words mathematics when talking about how they solved problems.

[i] National Governors Association Center for Best Practices, Council of Chief State School Officers 4th Grade Mathematics Unpacked Content 3

[ii] The Cornell Note-taking System
http://lsc.cornell.edu/LSC_Resources/cornellsystem.pdf

[iii] "Math Journal Prompts about Attitudes and Dispositions." Read Write Think.
http://www.readwritethink.org/files/resources/lesson_images/lesson820/MathPrompts.pdf