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IN THIS ISSUE:

MATH FUN

Why are some letters above the red line, and some letters are below the red line?

A E F H I K L M N T V W X Y Z

B C D G J O P Q R S U

SOLUTION ON PAGE 4

UETCTM MEETING
Monday, May 2

Vance Middle School
815 Edgemont Avenue
Bristol, TN 37620
423-653-9449

Meeting Agenda

- **4 p.m. Refreshments**
- **4:30 p.m. Business Meeting**
- **5 p.m. Programs**

1/4

2/4

3/4

4/4

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A message from your President

Another school year is drawing to a close. Soon the summer will be in full swing and before we know it, a new school year will start. I hope those who went to the NCTM Annual meeting in Indianapolis have had a chance to share all the activities and enthusiasm they gained while they were there. I shared a lesson on Fraction Strips there, and Dr. Poole from the ETSU Mathematics department also shared a session as well. Next year's meeting will be in Philadelphia, PA. I attended the annual meeting held there in 2004, and let me assure you, the location is one of my favorites! I hope you can attend.

As you know, this fall we are hosting the Tennessee Mathematics Teacher Association annual meeting. Rather than having our typical three fall meetings, we will be using this meeting as our only fall gathering. I highly encourage you to attend, and to bring your friends and colleagues in the teaching profession. We are integrating a STEM theme, so please encourage your science education co-workers to attend. The dates are set for Friday and Saturday, September 23-24 at ETSU. Friday night we will hold a banquet dinner for all attendees at the Millennium Center for a wonderful 3 course meal, guest speaker, and student awardees from the TMTA statewide math contests.

Please be sure to keep your membership current and to log in to our wiki space at: http://uetctm.wikispaces.com/

Here you will find access to meeting agendas, a place to share lessons and hold online discussions. Please take advantage of this online resource.

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I hope you have a great summer and I am looking forward to all the fine essays that our members will submit for next year's newsletters. This year we had a record number of essays and I am proud of our membership for their enthusiastic participation. Please spend a few hours this summer putting your thoughts and experiences in writing to share with the larger community. If you have already published an essay in the UETCTM Newsletter, consider writing something for the *Bulletin*, the TMTA newsletter. Let's get involved at the state level this year. See you in the fall at the TMTA Annual Conference here in the Tri-Cities!

Sincerely,

Ryan Nivens

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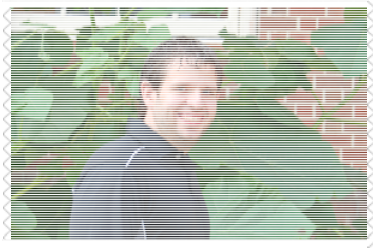
MULTIPLICATION MAYHEM

By Jason Cross
Anderson Elementary School
Bristol Tennessee City Schools, 3rd Grade



Although this will be my first year teaching upper grade math, my issue teaching math in 3rd grade was always with the mastery of multiplication facts.

The mastery of multiplication facts is the foundation for skills that I will teach this year as well as throughout the rest of their lives in math courses.

How can one understand and master the concepts of division without the mastery of multiplication facts? We have to develop and devise strategies and plans to ensure that these students have the foundation for the rest of their mathematical careers.

MATH FUN SOLUTION

All the "straight" letters are above the line, and all the "curvy" letters are below the line.

http://www.coolmath4kids.com/math_puzzles/a1-alphabetsoup_sol.html

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MATHEMATICAL LITERACY

By Kayla Perkins
Tennessee High School
Bristol Tennessee City Schools, 9th Grade

Mathematical Literacy: Introduction

Rachel McAnallen, professor at the University of Connecticut, responded to the teaching of mathematics with the following quote: "We encourage children to read for enjoyment, yet we never encourage them to "math" for enjoyment. We teach kids that math is done fast, done only one way and if you don't get the answer right, there's something wrong with you. You would never teach reading this way" (McAnallen, R, NA). Professor McAnallen's comment represents an underlying concern with the way mathematics is taught in today's educational system. Educators need a clear understanding and definition of literacy.

> In the narrowest sense, literacy refers to the ability to read, write, speak, and use language. Literacy is not isolated bits of knowledge but in students' growing ability to use language and literacy in more and broader activities (Martin, 2007, pp. 28).

The definition of literacy is often bound to reading and comprehending literary texts. However, it is crucial to understand that literacy is also represented in other disciplines, such as mathematics. Mathematical literacy plays a vital role in being able to analyze and understand the world in which we live.

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It is essential that educators teach students how to become mathematically literate. Understanding the definition of mathematical literacy, identifying the need for teaching mathematical literacy, and developing methods in which teachers can successfully promote mathematical literacy are essential components of teaching students how to become mathematically literate.

Mathematical Literacy: Definition

The definition of mathematical literacy extends far beyond knowing rules and algorithms to solve simple algebraic problems. Mathematical literacy can be defined as the "ability to reason, analyze, formulate, and solve problems in a real-world setting" (Martin, 2007, pp. 29). Mathematically literate individuals are educated citizens and clever entrepreneurs. They have the ability to analyze and interpret a wide variety of information in which they encounter on a daily basis. This vast array of information comes in the form of newspapers, textbooks, television, radio, internet, bank statements, stock market, etc (Martin, 2007, pp. 29). Mathematically literate individuals are capable of identifying and analyzing the role that mathematics play in the real-world, making sensible judgments, and engaging with mathematics in ways that promote themselves as productive, concerned, and reflective citizens (Yore & Pimm, et. al., 2007, pp. 561).

The National Council of Teachers of Mathematics refers to mathematical literacy as an "individual's abilities to explore, conjecture, and reason logically, as well as to use a variety of mathematical methods effectively to solve nonroutine problems" (Yore & Pimm, et. al., 2007, pp. 578). The key component of this definition is that mathematically literate individuals can effectively solve nonroutine problems. They possess the cognitive abilities needed to devise solutions to problems and situations that they have not encountered in the past. Upon establishing a concrete definition for mathematical literacy, we must determine the importance of becoming mathematically literate.

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Mathematical Literacy: Importance

It is not uncommon for students in a mathematics classroom to ask their teacher to explain to them when they will ever use mathematics in their real lives. The teacher's response to this question is vitally important in those children being able to form connections between their curriculum and real life. In order for a teacher to properly explain the importance of mathematical literacy, they must first realize the importance that mathematical literacy plays in our economy/jobs, life skills, work and leisure, and community and civic decisions.

The United States is considered to have an information-based economy fueled by human capital. A vast majority of occupations require that their employees possess a degree of post-secondary knowledge of mathematics (McCrone & Dossey, 2007, pp. 32). This post-secondary knowledge of mathematics enables employees to use quantitative reasoning skills to solve real-world problems. The flux of numbers and statistics in our every day lives calls for a "fundamental broadening of the concept of literacy: mathematical literacy assuming a coequal role in the curriculum alongside language-based literacy" (McCrone & Dossey, 2007, pp. 32).

Reports show that the number of U.S. students who are capable of applying mathematical literacy in a workplace environment is steadily declining (McCrone & Dossey, pp. 32). Employers are looking for employees that have the ability to analyze, reason, and solve problems in a real-world setting. This situation has been summarized by Thomas Friedman, an international economics columnist for the *New York Times*, when he wrote:

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> When I was growing up, my parents used to say to me, "Tom, finish your dinner-
> people in China and India are starving." My advice to my daughters now is: Girls finish your homework- people in China and India are starving for your jobs
> (McCrone & Dossey, 2007, pp. 33).

Thomas Friedman's comment exemplifies the need for employees to be mathematically literate in order to successfully compete for jobs in a global economy.

Mathematical literacy also plays an important role in common life skills. Individuals need to be mathematically literate to successfully buy a new car, buy a new home, sign up for a new mobile phone plan, make a household budget, etc. Without being mathematically literate, they could easily be taken advantage of by paying higher interest rates or by making payments for an overextended period.

Many work, leisure, and civic and community decisions require excellent mathematical literacy skills. These are instances where simply knowing rules to solve equations are not sufficient. Analyzing decisions and proposing solutions to community problems require high levels of mathematical literacy. Individuals must be capable of viewing all data, analyzing situations, and proposing sound solutions. Many individuals possess these necessary mathematical literacy skills. However, they view them as unconnected to mathematics curriculum taught in the education system.

Mathematical Literacy: In the classroom

Once the need for mathematical literacy has been established, we must investigate how individuals can be taught how to be mathematically literate. Mathematical literacy can and should be taught to children. The cognitive processes associated with mathematical literacy should begin at an early age. "Reports of

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what mathematics students know and are capable of applying, along with rapidly changing workplace environments, are raising questions about the level of mathematical literacy in the United States (McCrone & Dossey, 2007, pp. 33).

There have been major reforms in mathematics education in the past decade in hopes of successfully promoting mathematical literacy. The present focus on mathematical literacy is unlike reforms in the past. The present focus places emphasis on bringing relevance and deeper understanding to mathematics students rather than pushing students to study higher and more formal mathematics. The implication of this shift in focus places more responsibility on the student to relate mathematics to their present needs (McCrone & Dossey, 2007, pp.35).

The present focus on mathematical literacy applies to all individuals. Reforms in the past only promoted mathematical literacy for individuals pursuing careers in engineering, banking, or scientists. Research has shown that mathematical literacy is of vital importance in all career paths; thus the change in current educational reform (McCrone & Dossey, 2007, pp. 35).

The reform also broadens the scope of what concepts math classes should include. Reformations in the past placed less emphasis on probability, data analysis, and statistics. However, these skills have become a major part of everyday life, and should be included in courses that promote mathematical literacy (McCrone & Dossey, 2007, pp. 35).

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Once the framework of the reform has been established, teachers need to learn how to promote mathematical literacy in their own classrooms. One important aspect of promoting mathematical literacy is teaching the mathematical language. This may include mathematical terminology, mathematical discussions, mathematical journaling, etc. "Research has demonstrated that purposeful conversation, discussion, debate, and argument have enhanced students' conceptions of the problem space, inquiry, solution process, alternative solutions, and results (Yore & Pimm, et. al., 2007, pp. 566).

All teachers, nonmathematics teachers as well, have an obligation to promote mathematical literacy in the lives of our students. Mathematical literacy should span across the curriculum (Yore & Pimm, et. al., 2007, pp. 561). It is the duty of every teacher to prepare students in the skills necessary to be successful, productive citizens. If mathematical literacy was promoted across the curriculum, students would be more likely to develop the cognitive processes needed to become mathematically literate. They would encounter a greater variety of situations and instances in which mathematical literacy is necessary to solve real world problems. In 2000 the National Council of Teachers of Mathematics joined the reform to give teachers an outline to promote mathematical literacy. The National

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Council of Teachers of Mathematics current teacher outline fits into the categories of quantity, space and shape, change and relationship, and uncertainty (Martin, 2007, pp. 30-31). The categories that require the strongest sense of mathematical literacy are change and relationship and uncertainty.

All natural phenomena including the growing of organisms, changes in the stock market, or changes in weather patterns or bank accounts, represents changes that can be modeled mathematically. Individuals that can mathematically identify and analyze these types of changes are engaging in mathematical literacy of a higher form. The highest form of mathematical literacy, in my opinion, is uncertainty. Knowing how to deal with uncertainty involves knowing how to analyze, interpret, and predict uncertain phenomena. The world is filled with uncertain phenomena that are continuously changing. The level of mathematical literacy needed to reason, analyze, formulate, and solve uncertain problems in a real-world setting, places individuals at the top of being mathematically literate. The goal of every teacher should be to help each student attain this level of mathematical literacy. "Teachers should consistently expect students to explain their ideas, to justify their solutions, and to persevere when they are stuck and to learn to expect and ask for justifications and explanations from one another" (Yore & Pimm, et. al., 2007, pp. 579).

Mathematical Literacy: Conclusion

Mathematical literacy can be defined as the ability to analyze, interpret, draw conclusions, and propose solutions to real-world problems. Research shows that the number of U.S. students capable of promoting mathematical literacy in industrial settings is rapidly declining. Based on the need for mathematical literacy in

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the workplace, in the economy, and in everyday life, teachers must step up to the plate and promote mathematical literacy in the lives of their students.

The groundwork has been set and outlines have been made by organizations such as the National Council of Teachers of Mathematics to help teachers reform their teaching in a way that promotes mathematical literacy. Once teachers understand the definition of mathematical literacy, the need for mathematical literacy, and how to promote mathematical literacy in their classrooms, our society can move toward greater mathematical literacy. This reformation in the teaching of mathematics should ensure that math will no longer be taught by the chaotic principles outlined by Professor McAnallen. On the other hand, mathematical literacy will be promoted to its fullest extent!

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CALCULATORS: HARMFUL OR HELPFUL?

By Kelly Crandell
Vance Middle School
Bristol Tennessee City Schools, 7th grade

As technology becomes more invasive in everyday life, the effects on the mathematics classroom become more apparent. Computers and calculators are accessible at almost every corner through cell phones, laptops, and other gadgets that are becoming more common at every age group. Since the hand-held calculator was invented in 1967, it has become an ever increasing part of the mathematics curriculum. The reduction in the cost of calculators as well as the changing difficulty and number of skills covered per grade level has led to calculators becoming more popular in the education of our youth.

So the question is whether or not it is helpful or harmful to allow calculators in the classroom. Some research reviews have concluded that experience with calculators in lessons did not harm calculating skills (Hembree & Dessart, 1986). Others feel that the widespread use of calculators is taking the place of students learning and memorizing basic facts.

We know that technology is changing things in our society. Some firmly believe that we will soon become a paperless society. If that happens, is it necessary for students to learn how to give change, or will computers and calculators take care of it all? People do not memorize nearly as many phone numbers in today's society because of cell phones doing it for them. Are basic facts still an important part of our society or should educators focus more on skills that promote thinking

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and problem solving and let calculators and computers do the basic work? These are questions that many feel are vitally important to our educational system.

The use of calculators in the classroom is a sensitive topic in the mathematics field. There seems to be a major controversy over the use of calculators and whether or not they are helpful or harmful to students. Some feel that calculators cause students to lose their confidence and their ability to think and process mental math. Others feel that calculators give students better conceptual knowledge and students display a more positive attitude when they are given calculators. There are many research studies that take a stand on either side of this issue. The following are some of the studies and articles that support or disagree with calculators in the classroom.

In the article *Let's Abolish Pencil-and-Paper Arithmetic,* Anthony Ralston, who is a professor emeritus of computer science and mathematics at the State University of New York, proposes that calculators should be used exclusively for basic calculations as well as creative explorations and problem solving. He states that there is no significant research that shows calculator usage is harmful and that there is a rapidly declining need to the purpose of paper and pencil mathematics. Ralston (1999) feels that only parental and political barriers keep classrooms from using the technology that is available. He feels that number sense and symbol sense are what is lacking in students today and that ultimately calculators are helpful in developing these skills. Ralston proposes a kindergarten curriculum that has full usage of calculators with an emphasis on learning the mental arithmetic for one- and two-digit calculations.

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In direct disagreement with Anthony Ralston is an article written by Kim Mackey, a mathematics and science teacher in Alaska. He has been awarded the Distinguished Teacher Award from the White House Commission on Presidential Scholars. He wrote an article entitled “Do we Need Calculators?” He believes that calculators in the classroom are detrimental in teaching mathematics due to their limited ability to only produce answers. He states that some of the worst effects of calculator usage are the collapse of arithmetical fluency and the loss of symbolic calculations. He also feels that students are unable to solve two-step problems because they have not been trained to show their work and therefore cannot explain their answers. He strongly feels that calculators lead to mindless “button-pushing” without any understanding of the mathematical process.

Randall Charles, a Professor of Mathematics and Computer Sciences at the San Jose State University feels that calculators help elementary school students reach essential key goals. Calculators are a tool that can help develop conceptual understandings and abilities that underlie strong number sense (Charles, 1999). He feels that it is a teacher’s responsibility to help students become responsible users of calculators. He states that even very young children can use real data to understand concepts, whereas without calculators they would not be able to meet the demands of the computations. Charles feels that calculators can help with patterns, flexibility of numbers, and developing understanding of number relations.

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Some feel that the problem with calculators is not the age that they are introduced or even whether or not they should be in the classroom at all, but the competency and willingness of the educators who are teaching students to use the calculator. A study by the National Assessment of Educational Progress (NAEP) stated that even though technological and scientific changes are having a profound effect in the workforce, this has caused very few changes in the American schoolroom. Even though the National Council of Teachers of Mathematics (NCTM, 1989) has recommended calculators available to all students at all times, NAEP found very few schools have implemented these recommendations. Only two percent of fourth graders and thirty-four percent of eighth graders were permitted to use calculators when taking tests. It also found that forty-seven percent of fourth graders and twenty-two percent of eighth graders were never asked to use a calculator in the mathematics classroom. (NAEP, 1990). This finding was also seconded by Hembree and Dessart (1986) who stated that they found that calculators have been unsuccessful in redirecting the curriculum and in most classrooms calculators are not even introduced. Even though they feel that researchers have shown that calculators can produce higher achievement scores in basic operations and in problem solving, most teachers are unwilling to utilize them in the classroom. The long term studies on the topic of calculators are very limited. Very few researchers have studied the effects of calculators on adults who were trained without paper and pencil methodology. Most researchers use statistics from short term studies or ones that include students who have been exposed to paper and pencil and then made the switch to calculators.

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Many of the negative aspects of the calculator come from peoples' perceptions and unwillingness to change current educational practices. Whereas you can find one educator who supports calculators, you can find another who does not. One educator will state that they are okay to use with older students; another will state that they are fine even being introduced at the kindergarten level. Reys and Reys (1987) stated that all schools should have a clear calculator policy so that teachers will be using them consistently at each grade level.

Many feel that this is the major flaw within the usage of calculators now. Most schools have no set policy or guidelines to help teachers utilize calculators effectively in the classroom. Even though most teachers do not feel that we are ready for a mandatory calculator policy, effective teacher training would help teachers become more aware of the positive effects of calculators in the classroom. By allowing teachers to see the advantages of calculators and showing teachers the best ways to implement them into their teaching setting, we can dispel common misconceptions about calculators. Setting up guidelines to help teachers use calculators effectively could be used in conjunction with our new Tennessee Math Standards which emphasize the use of technology. If there is going to be an answer to the calculator question of helpful or harmful, a long term study and a set guideline with appropriate training will have to be implemented.

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WHEN WILL TCAP/TVASS SCORES IMPROVE?

By Kristin Wilson
Anderson Elementary School
Bristol Tennessee City Schools, 6th grade

Teachers, principals, administrators, school districts and states all have consequences related to TCAP/TVASS scores. Legislation has been passed that will include test scores as a part of teacher evaluations. Principals and administrators can be hired or fired based on test scores. Schools and school districts can be "Target" or assigned a "High Priority" status if they do not make adequate yearly progress and improvement. States can be denied Federal funding if test scores are not up to federal requirements.

Many people have a stake in students performing well on TCAP/TVASS scores. However, two main groups of people seem to be unscathed by the scores, parents and students. Students sit through hours of lessons, complete or don't complete homework assignments, take assessments and finally complete the TCAP.

The scores received by the students are not included in final grades, they don't determine if the student will be promoted or have a bearing on the student's progress. Parents sometimes get involved by making sure students complete homework and read and study for tests, but in many schools, parental involvement is greatly lacking.

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When test scores are received in late summer or early fall, test scores are sent to parents via their student. Parents are not directly impacted by their child's scores therefore they do not see the importance of performing well on the test.

When students and parents have a concrete consequence from the TCAP/TVASS scores, students will become more involved in their success on the test and TCAP/TVASS scores will improve.

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BUILDING EFFECTIVE RELATIONSHIPS BETWEEN SPECIAL EDUCATION TEACHERS AND GENERAL EDUCATION TEACHERS OF SECONDARY MATHEMATICS

By Scott Lamie
Tennessee High School
Bristol Tennessee City Schools, 9th grade

Recent changes in state-wide educational standards that require students to take four years of mathematics in high school will, most likely, significantly increase the number of students with disabilities who take upper level courses, such as Algebra II or Trigonometry. These changes may lead to increased levels of anxiety for both general education teachers and special education teachers. From the general education teacher perspective, they will be asked to educate an increasingly large population of students who have already experienced difficulties of some kind in the classroom, and they will be asked to do so in courses that many of these students may have opted out of under the old graduation standards due to the abstract and intricate nature of the subject-matter. From the special education teacher perspective, difficulties may arise as they are asked to assist regular education teachers in presenting information to or collecting from students with disabilities, despite the fact that many of these teachers will have limited or no real experience with the information being taught.

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Students with disabilities who attend schools where strong relationships between special education and general education teachers exist will be able to benefit from the combination of the support that they will receive. Sadly, it is not always the case that these relationships are particularly strong or even functional because clearly defined goals for interaction between general education teachers and special education teachers rarely exist. In fact, while there are variety of professional teacher development programs that focus on building strong working relationships with parents and a number of other options that help build strong relationships between teachers and administrators, there is often very little discussion about building strong relationships between general education teachers and special educations teachers, particularly in settings where areas of professional expertise are often scarcely overlapping. In practice, it is often the case that these relationships are built solely on interaction among the types of personalities involved. This practice generally leads to teacher relationships that range from supportive to reluctant and, in some cases, to relationships that are outright adversarial. Fortunately, many of these problems are not so overwhelming that they cannot be resolved. In fact, the majority of this friction can be alleviated if teachers stay open to discussion and focus communication on the two critical dimensions of a disability: input and output.

The first major area of concern for teachers when working with students with disabilities is input, which is defined as the ways in which students receive information. Although not as obvious as difficulties with output, deficiencies in the ability to obtain information under certain conditions can often lead to significant frustration for both the student and the teacher. This frustration is exacerbat

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ed when a lack of communication permeates the special education – regular education teacher dynamic. As an example, consider the mathematics teacher who spends weeks working through a variety of mathematical methods to help a struggling student with a learning disability not knowing that the real issue is that the student's specific learning disability is in the area of listening comprehension and not math problem solving, which is quite possible due to the fact that the state of Tennessee recognizes eight different areas for learning disabilities. Incidentally, the difficulties faced by this student can be addressed using a variety of simple techniques, such as written directions and lecture notes, that are well known by the special education teacher, but a lack of communication between the teachers and the intimidation that the special education feels regarding the concepts covered in Algebra II prevents this communication from occurring in a timely fashion. The solution to this issue is a simply shift in types and depth of information that is provided to and requested by the classroom teacher. Difficulties with input are often well documented by the time students reach the secondary level, so it is important that special education teachers readily provide classroom teachers with information on disability conditions, required accommodations, and any assessment information that is not easily accessible. With that said, it is equally important that the regular education teacher reads over this information, particularly the accommodation information because teachers are legally bound to provide these accommodations whether they think the student needs them or not, and ask for more information if he or she feels uninformed on issues relating to specific students or on issues regarding methods for reaching students with similar learning difficulties. Under these conditions, both teachers feel involved in the

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student's success and are less intimidated when engaging in a process that requires them to work outside of their comfort zones.

Output, the way in which students explain what they know, is the other major area of concern for students with disabilities in regards to academics. Generally, output difficulties are easy to spot because students with difficulties in output will either provide too little information, too much information, unorganized information, or irrelevant information. The problem with output issues is that they are not always as easy to solve as input issues due to the potential for a variety of factors to be involved. This is especially true considering the increasing variety of output formats with which students are asked to show proficiency. Due to this, solutions to these difficulties often require some trial-and-error that can involve anything from coaching in organizational strategies to the use of assistive technology. Based on the time-intensive nature of determining appropriate modifications, a classroom teacher who is concerned needs to provide prompt and specific information to the special education teacher so that a solution can be determined. In order for a special education teacher to provide any meaningful assistance; however, he or she must be informed of both the exact nature of the student's responses and the teacher's expectations regarding output. This will allow for complete analysis of output difficulties without a significant discrepancy between the suggested solution and the actual problem, which can alleviate reluctance for teachers to interact in the future. It may also be necessary for the teachers to work together to determine an output method that is reasonable for the student to provide and also mathematically relevant and acceptable. This process will help both in the short-term, as students currently in the classroom benefit, but

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also over the long-term, as teachers are more readily able to link modifications to specific areas of difficulties for students. In short, if a student's work is not meeting the criteria defined by the classroom teacher, it is important that the special education teacher be informed of any concerns in a timely fashion and that the two teachers work together to provide solutions that meet the expectations of the classroom within reasonable parameters.

As a growing number of students with disabilities enroll in upper level math courses, it is increasingly important for the teachers of these courses and special education teachers to communicate more effectively. Students struggling with issues regarding input can benefit greatly from a free exchange of information between special education teachers and regular education teachers at the early onset of their academic year. Similarly, students struggling with issues related to information output will be best served when teachers work together to analyze the student's output methodology and determine acceptable ways in which the student can meet classroom expectations in a way that may be modified but no less mathematically viable. In closing, a strong working relationship of trust and respect developed between a classroom teacher and a special education teacher will provide the most substantial base for success for students with disabilities as they participate in upper level mathematics courses throughout their high school experience.

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DESIGNING A PERFORMANCE TASK

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According to Dr. Carol Tomlinson (2001), an effective performance assessment requires "students to think about, apply, and even expand on all the key understandings and skills of the learning span it represents" (p. 85). Students are motivated to complete a product because they feel a sense of ownership and the product will bear the creator's thumbprint just as a piece of pottery bears the mark of the artist. Like many of my students, I enjoy learning when I believe that what I am learning will be useful or is interesting to me personally. Thus, developing a performance task that is highly interesting to students is essential. Let's face it, many of our students can tell us how to beat the latest video game, how to program an IPOD, or how to navigate around a proxy server which requires many more skills and thought processes than solving a basic math problem. The difference is that students are interested in those things. They spend large amounts of time experimenting, failing, and adjusting their strategies until their perseverance pays off – they beat the video game, download their favorite songs, and open the website. An effectively designed performance task will stretch students previously learned skills beyond basic understanding and require them to apply what they have learned to create a product or to express themselves creatively in their preferred learning styles and multiple intelligences.

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We want students to learn the skills and concepts we are teaching for much more than a test or the next math class; we want that knowledge to endure the test of time. Dr. Richard Stiggins suggests that performance tasks should be built around meaningful context, call for thinking and thoughtful application of knowledge, and yield relevant products and performances (Laureate Education, Inc., 2003b). Now, how do you create a performance assessment dealing with the topic of percent?

> You are preparing to take a very special trip and want to look your best. A new outfit is a must down to a new pair of shoes and the latest accessories. Your parents told you that they would "think about it," so you must convince them that your purchases are responsible and not frivolous. Therefore, your task is to purchase a whole new outfit for under $200. You must comparison shop to find the best deals on shirts, pants, shoes, etc. You may use the Internet, catalogs, or sale papers from the newspaper to find your items. Calculate any discounts and taxes. Make a foldable displaying your purchases with the total cost of each item. To show your parents that you are a responsible teenager, write them a persuasive letter demonstrating how hard you have worked to find the best deals, how much money you can save, and the total price including tax. Do not beg and no pulling out the "pouty" face. State your case and await the verdict.

This performance assessment requires students to use their thinking skills to compare prices, evaluate what they are willing to pay for items, and determine the better deal. After they make their decisions, they may evaluate a classmate's work and look for errors in their calculations. They may help each other by role-playing the presentation of the rationale to their parents and make suggestions for improvement. When students are convinced their calculations are accurate and their rationale sound, they must present their work to their parents and record their responses to report to the class.

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To differentiate instruction, teachers could allow students to choose the amount of money they will be spending and the items they may purchase. Taxes for Tennessee may be rounded to 10% and 5% for Virginia. In addition, students may use a calculator to calculate their answers. It may be necessary to limit their options to two stores. Other students may purchase items from stores on the Internet and calculate shipping and handling cost.

The focus of this assignment is on solving problems with percent, but this performance assessment integrates language arts skills with the rationale to parents and technology skills through the Internet. Comparison shopping and calculating discounts and taxes are life skills that students need now and in the future. Students love to buy new clothes, so shopping is a high interest activity that even the most reluctant learner will want to participate. This task is in agreement with Dr. Stiggins's (2005) attributes of truly effective tasks because it addresses a specific content, has clear instructions to students, is feasible for use in the classroom, and can be fairly and accurately assessed.

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UPCOMING CALENDAR DATES

UPPER EAST TENNESSEE COUNCIL OF TEACHERS OF MATHEMATICS

- Monday, May 2, 2011
  Bristol City Schools, TBA

NATIONAL COUNCIL OF TEACHERS OFMATHEMATICS 2010 REGIONAL CONFERENCES AND EXPOSITIONS

- Infusing the Classroom with Reasoning and Sense Making, July 28—30, Orlando, FL
- Algebra Readiness for Every Student, Baltimore, MD, August 9—11
- Atlantic City, New Jersey—October 19–21
- St. Louis, Missouri—October 26–28
- Albuquerque, New Mexico—November 2–4

TENNESSEE MATHEMATICS TEACHERS ASSOCIATION

- TMTA Fall Conference
  September 23—24, 2011
  East Tennessee State University, Johnson City, TN

SOUTHWEST VIRGINIA COUNCIL OF TEACHERS OF MATHEMATICS

- Annual Meeting
  September 12, 2011
  The University of Virginia's College at Wise
  Any K-16 teacher of mathematics is welcome to attend. For registration information please go to www.mcs.uvawise.edu/svctm.

Request for Article Submissions

We are always looking for people to contribute articles to our ongoing "Math Perspectives" series. Every month, we would like four submissions for the series: a preservice undergraduate student, a preservice graduate student, a current classroom teacher, and one of our local math coordinators. Each person will voice their opinions, concerns, or observations upon a particular aspect of teaching mathematics. There are no set topics for this series.

Another section will be included in the next issue dedicated to mathematics problems. We are looking for submissions on favorite problems focused on various grade bands.

*If you or someone you know would like to contribute to this column, please contact **Ryan Nivens, Newsletter Editor**.*

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UETCTM

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The Upper East Tennessee Council of Teachers of Mathematics is an organization for anyone involved in mathematics education from preschool through college in the greater -Cities region. We meet six afternoons per year in various locations across the region. The purpose of UETCTM is to promote excellence in teaching mathematics and to share best practices among mathematics educators.