The Math Maniac

Saturday, February 21, 2015

Fly on the Math Teacher's Wall Squashing Fraction Misconceptions

I love fractions! Today I am linking up with some of the best math bloggers out there to bring you the Fly on the Math Teacher's Wall Blog hop. Last time, we talked about place value and this time we are talking about squashing fraction misconceptions. One of the biggest misconceptions I had when I first started teaching is that finding a common denominator is the only way to compare fractions. Boy was I wrong. After reading a great teaching book and listening to my students share their invented strategies, my misconception has been cleared up. Today I am going to share with you 5 different strategies for comparing fractions.

Common Denominators

Yes, you can compare fractions with common denominators. However, this isn't always the most efficient way of doing things and it involves a lot of steps and a lot of calculation which means there is a lot of places where you can make mistakes. The good news is, it works every single time and sometimes you just can't figure out which fraction is larger without it.

Common Numerators

The long lost twin of common denominators, finding a common numerator is just like finding a common denominator. However, sometimes the numerators already are the same and sometimes it can be more efficient to calculate a common numerator than a common denominator depending on the numbers in the problem.

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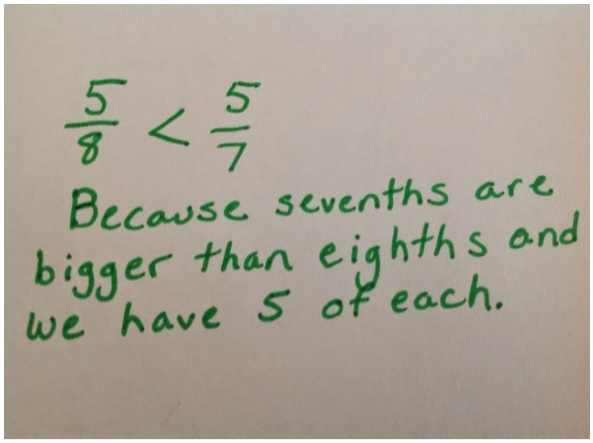
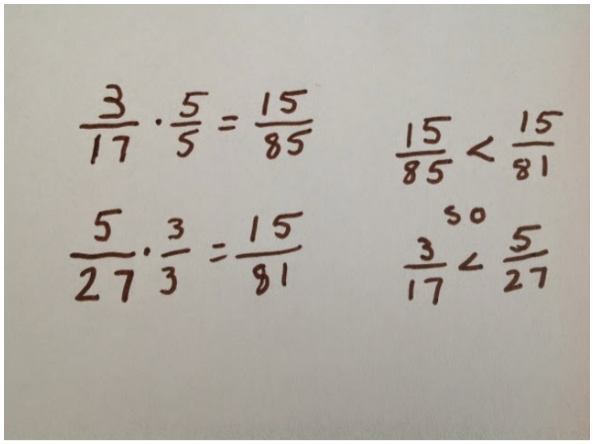


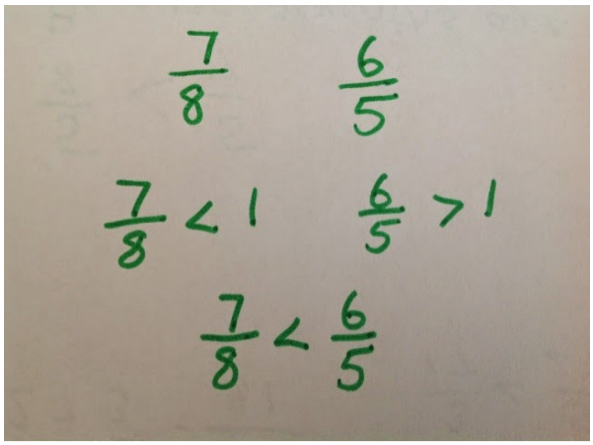
The numerators already match! Use this to help you compare the fractions instead of finding a common denominator.



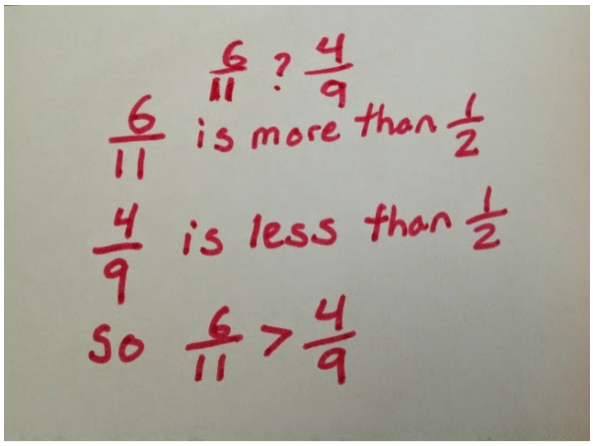
Comparing these two fractions is tricky because they are very close together! Finding a common denominator would work but look how much easier it is to find a common numerator for this problem because the numerators are much friendlier numbers to work with then the denominators. Most kids will instantly know the LCM of 3 and 5 but I bet they won't know the LCM of 17 and 27!

Comparing to a Benchmark

This is a great strategy that can be very efficient on the right numbers. If your fractions are close to a benchmark number like 0. 1/2 or 1, this can be so quick and easy!



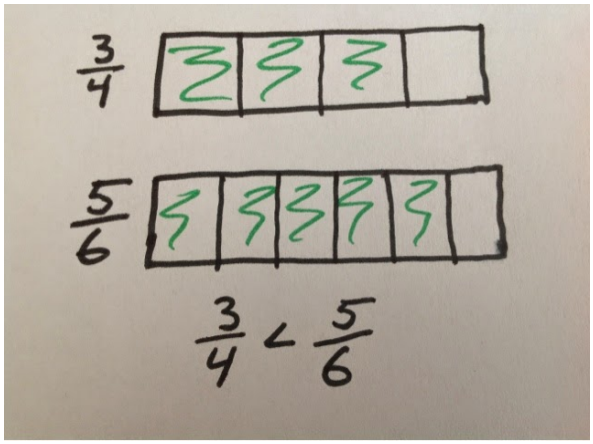
These two fractions are great to compare using a benchmark because one of them is a bit less than 1 and the other is a bit more.



One of these fractions is a little more than one half and the other is a little less than one half. This makes them easy to compare using a benchmark!

Draw a Model

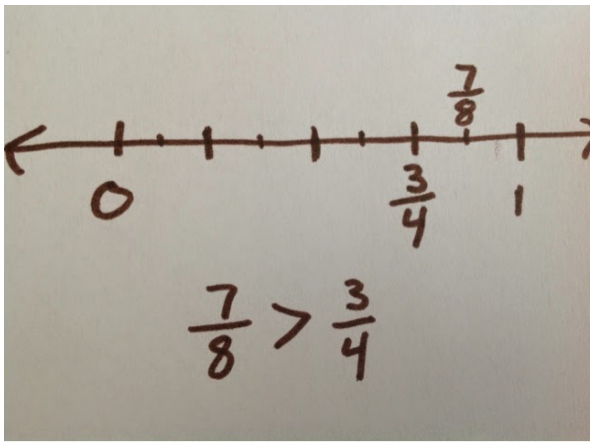
Model drawing is so important in the development of fraction understanding. I certainly don't want to leave my fifth graders in a place where they need to draw a model every single time they need to compare fractions but it is an excellent stepping stone and one that should not be skipped. When students draw models, they develop some big ideas about fractions and help make a visual model in their head that they can refer to later if needed. I spend a lot of time teaching good model drawing in second and third grade. There are many ways to draw models, but I like to focus on using rectangles because they are easy to partition and if you partition them all in one direction, it is a quick jump from a rectangle model to using a number line.



The farther apart two fractions are, the more reliable model drawing can be. When the fractions get very close together, small model drawing inefficiencies can lead to students getting the wrong answer or concluding that the fractions are equal when they are now. The student who can use a rectangular model like this one is just one step away from really understanding number lines.

Blog Archive

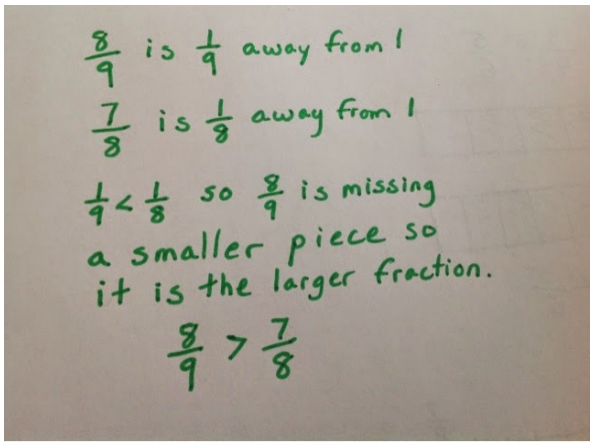
About Me



This student used a number line to compare these fractions. Notice that if the fractions were really close together, this model drawing might not work. It also takes some time to set up and draw accurately. Partitioning into equal pieces is definitely a conversation to have with students as you work on model drawing. I introduce the number line model in grade 3.

Unit Fraction Reasoning

Unit fraction reasoning is often one of the first strategies to develop. It starts in first grade when you are partitioning rectangles into halves and quarters and a student notices that one half is bigger than one quarter. It develops from there and as kids get more comfortable with using unit fractions it can lead to some great ideas when comparing fractions.



This student used the fact that each of these fractions is missing a pieces that is a unit fraction to help him figure out which fraction was bigger. Don't let the writing fool you about the amount of time the student took to figure this out. He just looked at them and knew each was missing one piece and the one missing the smaller pieces would be the bigger fraction. The writing was done during the sharing of strategies and is an attempt to capture his thinking for the other kids to see.

If you want to see what strategies your students have for comparing fractions, here is a quick little worksheet that will give you an idea of some of the strategies your students have. The numbers were chosen strategically to illicit a range of strategies.

Ready to learn more about squashing misconceptions? Head on over to Beyond Traditional Math to read more about the importance of the whole!

Beyond Traditional Math

The Math Maniac

TheElementary MathManiac

438

I have spent the last 9 years working as an elementary math specialist. I spend my days helping kids in grades K-6 construct their mathematical knowledge and make connections between things they have learned

View my complete profile

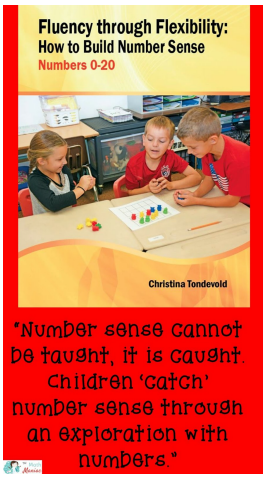
BL DESIGNS

Blog Design Images by 123RF
Clip art by Graphics From the Pond

Posted by TheElementary MathManiac at 9:00 PM 14 comments:

Monday, February 16, 2015

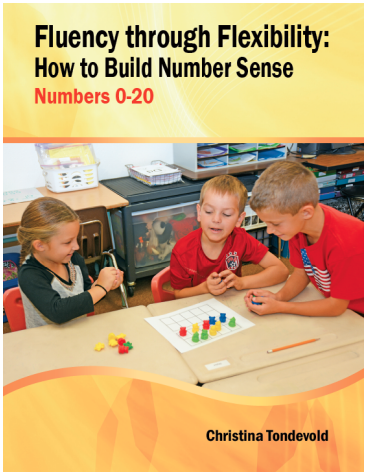
Great Teaching Books: Fluency Through Flexibility



I like to read. Yes, I have spent the last 9 years teaching just math but I still love reading. I may not like teaching reading as much as I like teaching math but to the shock of my students, I do know how to read. They seriously look at me like I have 2 heads when I make a comment about helping them with a reading assignment. I read whatever I can get my hands on. To the shock of many of my colleagues, I read a lot of teaching books. I read at least 1 teaching book per month and often will be in the middle of 2 or 3 at a time. I love hearing what other teachers are doing in their classrooms and how they are applying educational research to improve their teaching practices. I have so enjoyed doing book studies on my blog (like Children's Math and Number Talks) and love how they get me to slow down and interact with other teachers about what I am reading. However, there is just no way I can keep up with my own reading doing book studies, so I will also be sharing with you some of my favorite teaching books as I read them and a few of my past favorites. (Like A Focus on Fractions)

Today, I want to share with you a book I read a few weeks ago. I have been working on a blog post about fluency with addition and subtraction facts since October. Now, usually I just write a blog post and hit publish, but this one has been bothering me. I feel like talking about fluency can be a loaded conversation. In my post, I am trying to convey the importance of fluency and kids thinking flexibility while not making it all about speed. Yes, figuring out facts quickly is important but focusing on developing thinking strategies is so much more important than pushing speed so much that your students just become fast counters. We need to move them beyond counting strategies. I have been struggling with these words for months but this book has essentially said what I was trying to say in my blog post and really conveyed that being fluent requires number sense. If you are a primary teacher or a teacher who has always wondered why some kids seem to develop addition and subtraction fact fluency while others can't seem to get there than this book is for you.

Fluency Through Flexibility: How to Build Number Sense



This book really follows the idea of Cognitively Guided Instruction. The activities in each section are based on children sharing and comparing ideas and strategies about how they got they answers. Many of these activities are also easy to adapt to a Number Talk. All of the activities are designed with best practices in mind and all blacklines are included. Busy teachers will love having a set of blacklines that can be made once and used over and over again in a variety of games and activities.
I think the most powerful part of this book is that it is such a good mix of theory and practice. The beginning pages outline the why of teaching this way and the rest of the pages tell you how. Unlike other books that are all theory with a few examples thrown in, this is a book that you can but in a busy teacher's hands and have them going with new and engaging activities in a matter of days. I also think this would be an excellent book for special educators and para professionals that work with kids in math.

As a math leader in my district, I am often asked to provide professional development in math teaching to other teachers and para educators. This book would make an excellent resource to use in conjunction with this kind of professional development around early numeracy and additive reasoning. It would be a great resource for everyone who works with K-2 teachers to have access to both for its theory and easy to implement classroom ideas.

Want to grab a copy of this book? You can head here to pick up your own. You can also read more written by this author over on her blog, The Recovering Traditionalist.

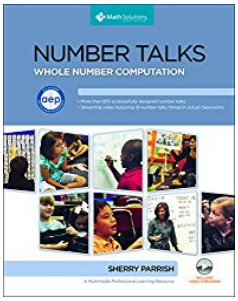
The Math Maniac

Posted by TheElementary MathManiac at 1:46 PM 4 comments:

Sunday, February 15, 2015

Number Talks Book Study: Part 6

Welcome to the conclusion of our Number Talks book study! After learning about number talks several years ago and implementing them in my classroom, it is great to finally read the book and have some time to reflect on how number talks have changed the way I teach math. If you missed some of the previous posts, you can catch up on them below.



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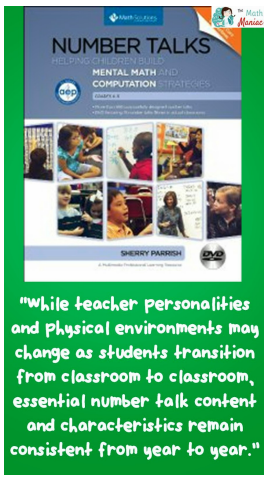
Part 3: January 25th Chapter 4
Part 4: February 1st: Chapters 5 & 6
Part 5: February 8th: Chapters 7 & 8
Part 6: February 15th: Chapter 9

Today we will be looking at chapter 9 which wraps up some of the big ideas of number talks.

Getting Parents Involved
When I started making the transition from a teaching by telling model to a inquiry based constructivist approach, I had many parents balk and struggle to understand this "new math" their kids were learning. I did a few things to help alleviate their fears but their is certainly more I could have done to help ease this transition for them. If I were to do it all over again, I would do many of the things suggested in chapter 9.

- Host a school wide Family Math Night. We have done this at my school since the very beginning and families love it. We host it in the middle of winter when there is less going on and families are looking for something to do. We have excellent attendance and it is such a fun night for families. You can read more about our Family Math Night here.

- Host grade level math nights. At our school this started with the Kindergarten teacher wanting to reach out to parents and grew up from there. The way do it is to offer child care in the gym and bring the parents down to the classroom. There we can take them through a number talk or let them experience some other aspect of what they might see in their students' math class. We finish the night by bringing kids and parents back together to play some of the math games or center activities they have been working on in class. These grade level math nights are certainly a huge commitment of time but they don't need to be done every year and offer huge rewards for the time invested.



- Get parents into the classroom! The best way to get parents to see what their children are doing in math is to have them in the classroom for math time. We have had parents make a weekly commitment in the past but are currently very short on classroom volunteers for math time. This is definitely an area where my school could use some work. If you have a good system for getting classroom volunteers in your school, I would love to hear more about it!

School Wide Number Talks

Watching the DVD let me see how powerful it is to have students in fourth or fifth grade who have had years of number talks under their belts. The idea of number talks began in my school as a K-2 initiative and has since spread to grades 3 and 4. Since we have had quite a bit of staff turn over in the 4-6 grade classrooms over the past 2 years, we still have more work to do incorporating number talks into upper elementary classrooms. I really want my older students to have the same deep understanding of multiplication, division and fraction operations that they do of addition and subtraction. I am planning on making number talk professional development a big part of the coaching part of my role in grades 4-6 next year once I know which teachers will be teaching math at those grade levels for the foreseeable future. I am excited to have this DVD and the excellent number talks happening at the lower grade levels in my building to serve as models for good number talks.

Your Practice: A Closer Look

If you haven't had a chance to look at the reflection questions on page 333, make sure you make the time. These 8 questions really helped me think about how number talks are going and what I need to do next. I am going to wrap up this book study by asking you to think about reflection question #8: "Remember to start small in making shifts in your classroom practice related to number talks. Write down one change you will make."

The Math Maniac

Posted by TheElementary MathManiac at 10:49 AM 2 comments:

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Monday, February 9, 2015

I {Heart} My Followers Giveaway

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This week I am thinking about all of the things I love! Next week it will be two years since I started this blog and I have to say I love blogging! I love talking about what is happening in the classroom and the research I am reading. I love connecting with wonderful teachers all over the country and I

love all the things I have learned on this journey. Today I am taking a few minutes to say thanks to all my followers and everyone who has been with me on this wild ride. I am linking up with some of my newest blogger friends to bring you the I {Heart} My Followers Mega Giveaway! I will be giving away 2 different prize packs containing some of my favorite things and then you can click on the links at the bottom of this post to check out more great giveaways.

Teaching With Music

I absolutely love teaching with music and some of the most read posts on my blog are from my Teaching Math with You Tube videos series. I have been using music in my teaching for years but You Tube has really stepped it up to the next level. Recently, I found Jack Hartmann's You Tube channel and added a few more to my repertoire. Here are a few of my new favorites

Numbercise

I have had the Every 1 Counts CD that this song came from for a few years but seeing it as a video really helped my students get the song!

Numbercise | Writing Numbers | Educational S…

Lets Get Fit Count to 100

A really fun way to get a movement break and counting practice together. Makes a great transition!

Let's Get Fit | Count to 100 | Count to 100 Son…

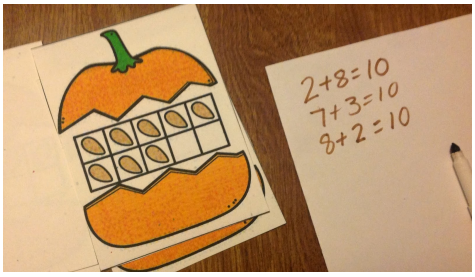
The Coin Song

My students' new favorite song for coin value and recognition!

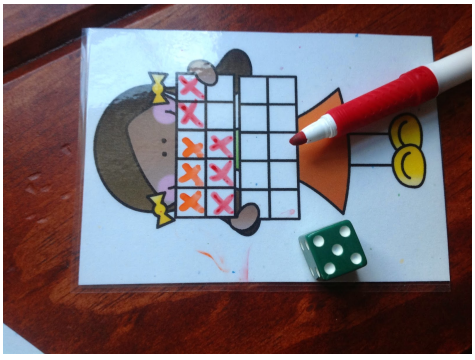
These are my favorite math videos but there are also some great videos for teaching literacy concepts over on Jack Hartmann's You Tube channel.

Using Card Games for Classroom Instruction and Intervention

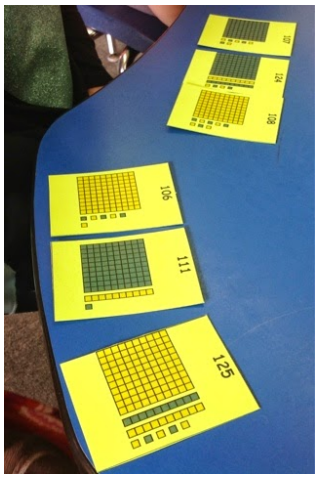
I love card games! I have created several decks of cards over the past 3 years and now I use these cards over and over again to play all kinds of games with kids. About 80% of my intervention time with students is spent using one of these decks of cards to play a huge variety of games. The best part is how much time, money and paper I save by using the same materials over and over again.



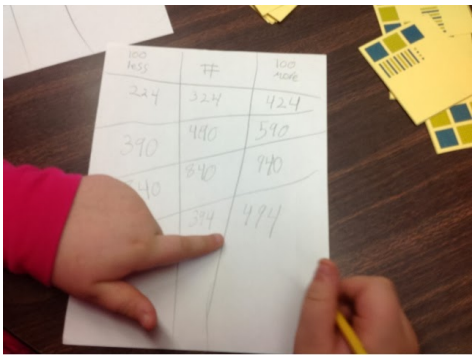
Playing a game with 10 frame cards



A roll and add game with 20 frame cards



Working on non-sequential ordering and reading 3 digit numbers with the Numbers to 120 place value deck



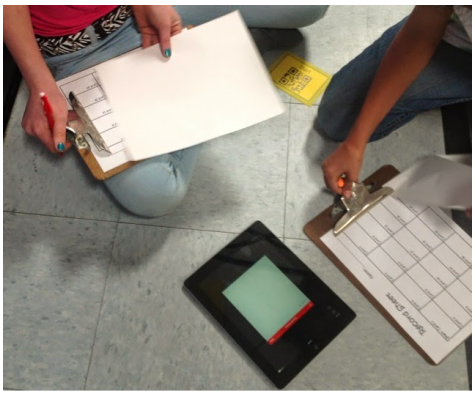
Playing 100 less/100 more with the numbers to 1000 deck.

These 4 decks of cards help me take games and make them fun and engaging interventions that include visual models to support students who are still developing a conceptual understanding.

QR Code Scavenger Hunts

If I had not started blogging, I am not sure I ever would have thought about using QR codes with students. My QR code scavenger hunts have taken routine (and rather boring) practice and made it engaging, active and fun. If you haven't tried QR code scavenger hunts, read more about them here.

A free multiplication fact QR code scavenger hunt.



Students work together to solve one step equations using QR codes

Giveaway Time!

Now it is time to show how much I {heart} my followers! I will be giving away some of these things I love the most! I have put together 2 prize packs. One is best from primary teachers and the other for upper elementary. If you teach many grades or work with younger and older students feel free to register for both giveaways!

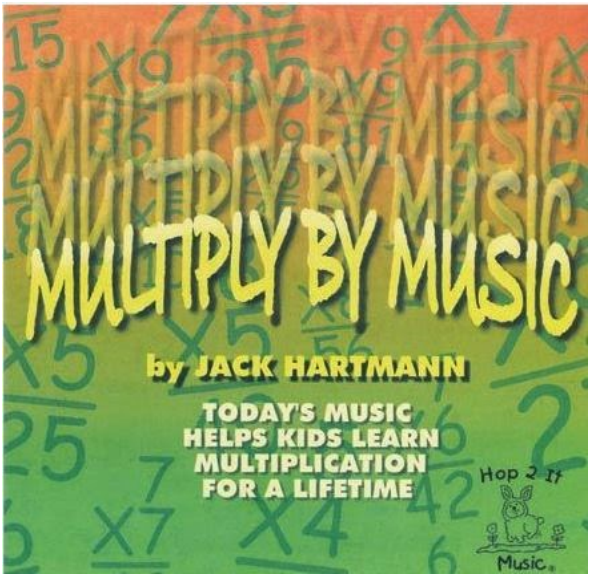
Primary Prize Pack

Digital files including 4 of my most popular decks of cards with activity sets. You get the 10 frame cards, 20 frame cards, numbers to 120 place value deck and the numbers to 1000 place value deck. Each deck includes a variety of activities to meet the needs of your students.

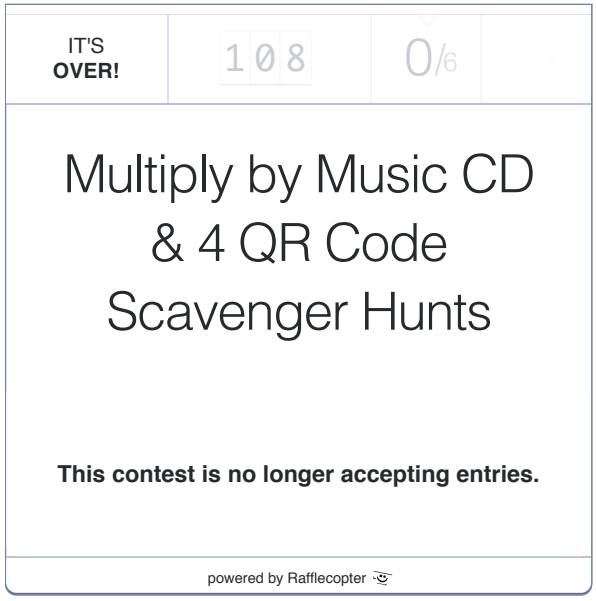
Four different Jack Hartmann math cds including Every 1 Counts, Math All Around Me, Math in Motion and Movin' 2 Math. These CDs are full of fun math songs that will get your students moving and learning and having fun with math.

Upper Elementary Giveaway

You choice of 4 QR code scavenger hunts from my store. I have many to chose from including addition, subtraction, multiplication, division, fractions, decimals and solving equations.



Multiply by Music CD by Jack Hartmann. My students love singing along and dancing to these songs while practicing their multiplication facts.



Thanks for being a part of my journey! Head over to these lovely blogs for more giveaways and freebies!

This InLinkz account has expired. You can still view the linkup here

The Math Maniac

Posted by TheElementary MathManiac at 10:00 AM 19 comments:

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Sunday, February 8, 2015

Number Talks Book Study: Part 5

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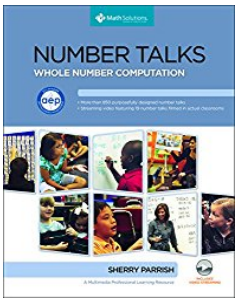
Welcome to week 5 of our book study on Number Talks. This is a great book for K-5 classroom teachers, special educators and math specialists. It is also a great book for administrators and other educational professionals to read to learn more about what good math teaching looks like.

Join me each Sunday as we discuss the week's reading and make connections to our own teaching practice. Leave a comment on this blog post or head over to Facebook and leave your thoughts there. If you have your own blog and want to write a post about it on your own blog, just leave the link in the comments section.



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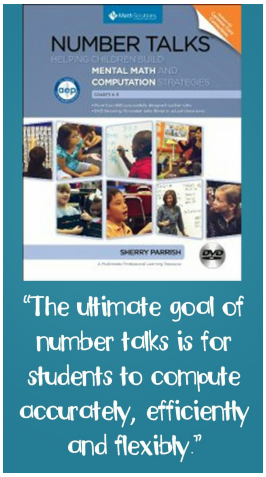
This week we transition from thinking about addition and subtraction to thinking about multiplication and division. If you thought addition and subtraction were a huge change in thinking for teachers, wait until you approach the idea of multiplication and division being done mentally with teachers and parents. Many adults do not even think doing multi-digit multiplication and division mentally is a possibility. There are so many people who learned the traditional algorithm as the one and only method for multiplying and dividing. Many people lack the conceptual understanding of these operations that is necessary for mental computation. But don't let that scare you off! Approaching multiplication and division in this way and having kids invent strategies to solve these type of problems really does work.

The Array Model

If you have never used the array model for multiplication and division, you are missing out on a huge opportunity. There has been a ton of research done about how much the area model helps students and using it in number talks is a powerful tool. Just like recording addition and subtraction ideas on a number line, using the area or array model to record students' thinking about multiplication and division will provide a visual and help all your students connect the big ideas for these operations. We started using the area model 8 years ago in my school and what a huge difference it made! If you want to read more about this model and other amazing ideas for teaching multiplication and division I highly recommend Constructing Multiplication and Division. This book changed the way I think about teaching multiplication and has made such a difference in my school.

The Number Talks DVD

When watching the number talks on the DVD this week, I was struck by how powerful this DVD would be during professional development. The number talks on the DVD do such a great job of showing best practices, showing how to do a number talk and showing some of the big ideas of operations and properties. Even if you only have professional development time in small chunks like for an hour after-school, this DVD could be a great tool for getting the discussion about number talks going. Handing busy teachers a big book and telling them to read it means that many folks are not going to ever open it or learn more about it. Having the DVD really could show teachers the power of the number talk and increase their engagement and excitement about reading the book.



Efficiency

I love the focus on efficiency in these chapters about multiplication and division. It is so important for kids to develop efficient strategies for solving problems. It is great when kids develop new to them ideas about multiplication and division but it is our job as teachers to move them from less efficient strategies towards more efficient ones that will work for a variety of problems. I think number talks are such a powerful way to help kids make this transition. The suggestions about asking kids which strategy is most efficient are excellent and definitely something you will want to make sure you leave time for at the end of your number talk time.

What did you get out of this week's chapters? What have your experiences been using number talks for multiplication and division? Please respond in the comments below!

The Math Maniac

Posted by TheElementary MathManiac at 9:23 AM 1 comment:

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