MathElites

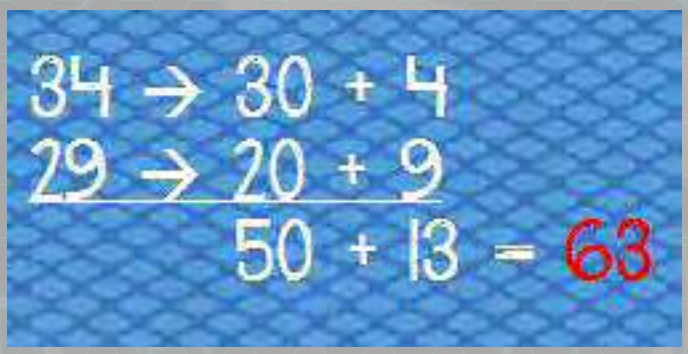
By: Alexa Cooper, Johnson City Schools

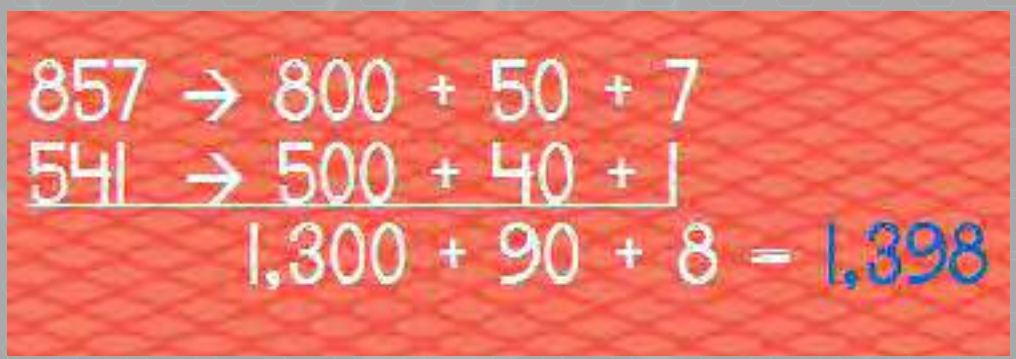
Kids think and learn differently and that's okay. Let them be different. Let them be in control. Let them work mathematics in ways that make sense to them, not ways that make sense to you. In MathElites we learned how this can really work in our classrooms. We learned several strategies for each of the four operations, so we are now able to return to our classrooms armed with enough ideas to reach each child. Below are some of my favorites. Keep in mind these strategies are targeted for my third graders, as that is my current teaching assignment.

We learned that addition is taking two or more groups of any size and putting them into one group, called the target set. Previously we, the teachers, were most familiar with a strategy commonly called carrying or regrouping. However, we learned that this strategy's dependence on a deep understanding of place value sometimes causes student to memorize rote procedures, rather than understand the mathematics that is actually taking place. This is not what we want as teachers. Therefore, we should want to use strategies that lend themselves to students' understanding.

One example is value expanded addition. Students will separate each addend into expanded form. They will then add each place value place individually. Finally, they take each partial sum and add them together for the final target set.

Examples:

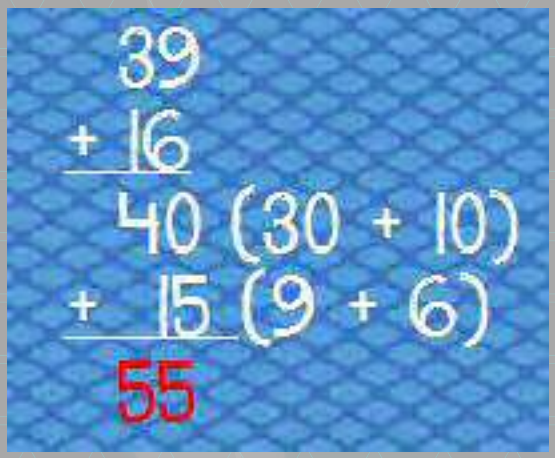


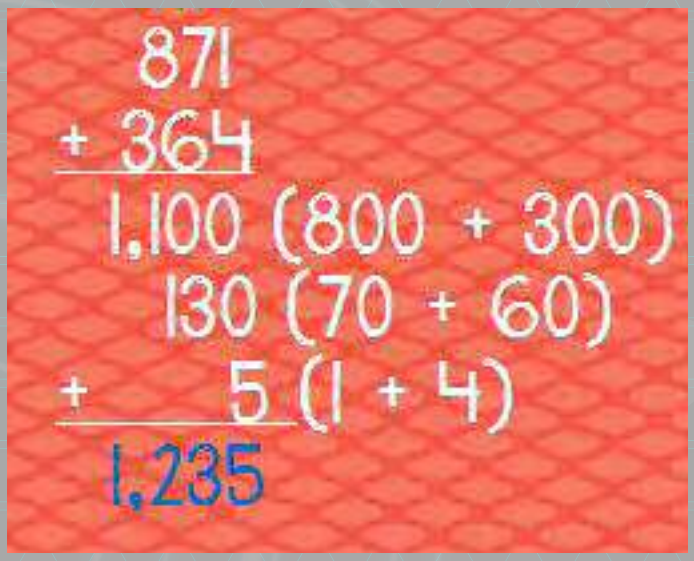


A second addition strategy is table array addition. This strategy also uses the expanded form of each addend; however, the appearance is different. We, as math teachers, know that a visual change can be the

difference between confusion and understanding. After looking at the expanded forms, students will add the largest place value place first and write the partial sum. Students will continue and work with each place value place, writing each partial sum as they go. Finally, they take each partial sum and add them together for the final target set.

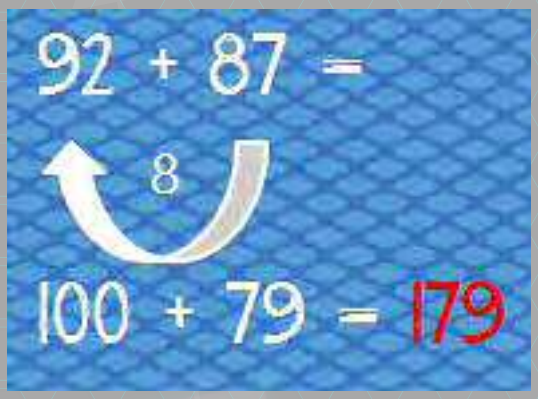
Examples:

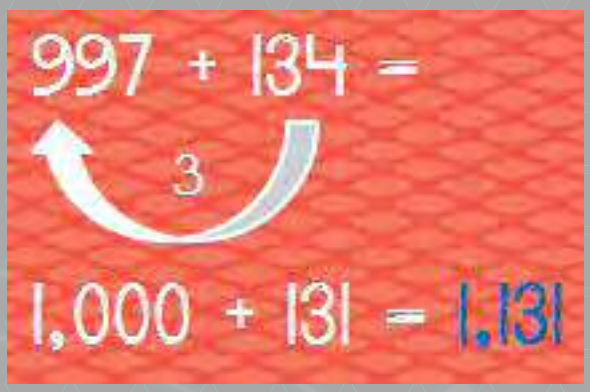




A third addition strategy is sharing. This strategy is based on compensation and friendly numbers. Students choose an addend on which to focus. They think of a nearby friendly number. To create that friendly number, they will 'share' a certain amount of one addend with the other addend. This should enable students to add the numbers mentally.

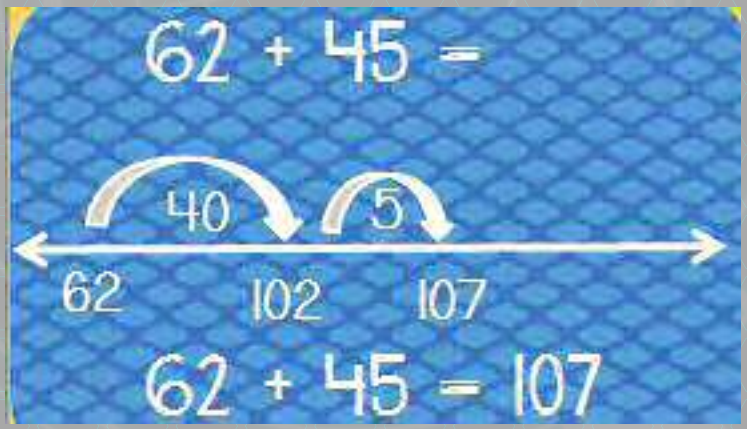
Examples:

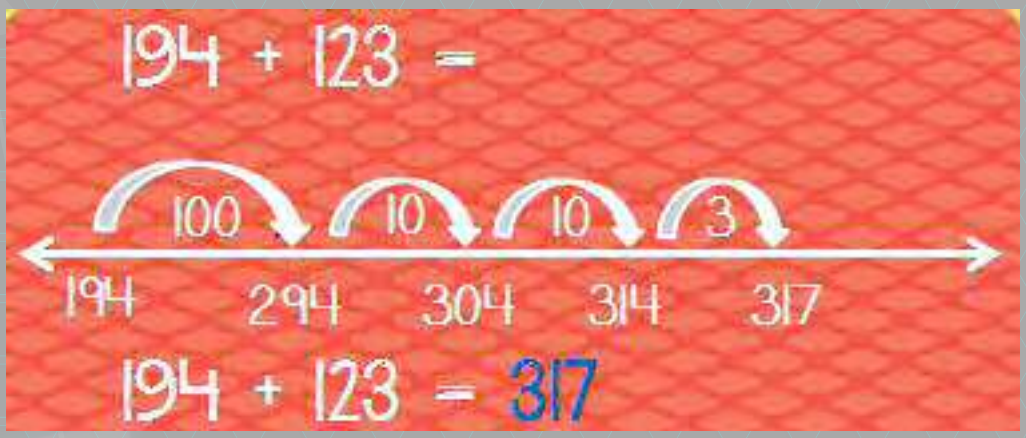




A fourth addition strategy I plan to use is hop, skip, jump, and leap. This strategy is also based on using an expanded form of an added. To apply this, students choose one addend and put it on a number line. They 'leap' up any thousands they may need, 'jump' up any hundreds, 'skip' up any tens, and 'hop' up any ones. Student can also use this strategy in application of friendly numbers. They may choose to hop, skip, jump, or leap to a friendly number first, and then continue with the rest of the second addend. I'll show an example of each.

Examples:

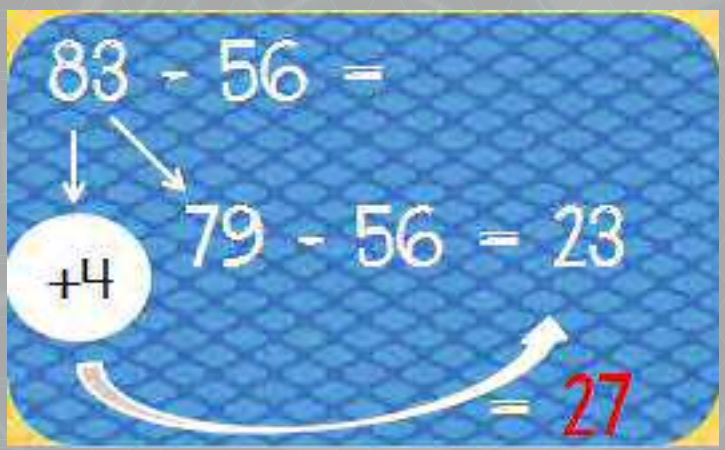


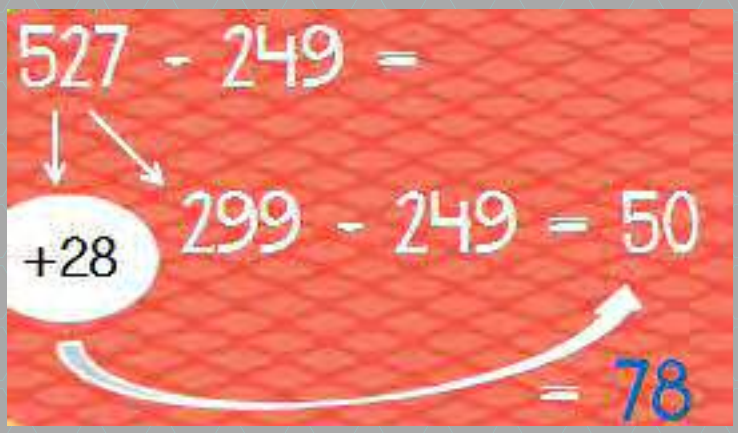


I feel that subtraction is an operation that needs alternative strategies even more than any other operation. The traditional strategy, borrowing or regrouping, is typically quite difficult for students to memorize. An extremely small number of students, or teachers, truly understand the mathematics actually occurring in the borrowing algorithm. Therefore we, as teachers, desperately need to teach subtraction differently.

Minuend splitting, or as my students call it: banana split to the nines, eliminates any need to borrow. Students learn to take enough away from the minuend to take it down to end in nines. When it ends in nines, you can always take the subtrahend away easily. Remember to return to the difference however much you took away from the minuend. Students will quickly see that you always need 'one more'. For example, if you want to work with a number to the hundreds place, you take away one more than is currently in the tens and ones place. If you want to work with a number to the tens place, you take away one more than is currently in the ones place.

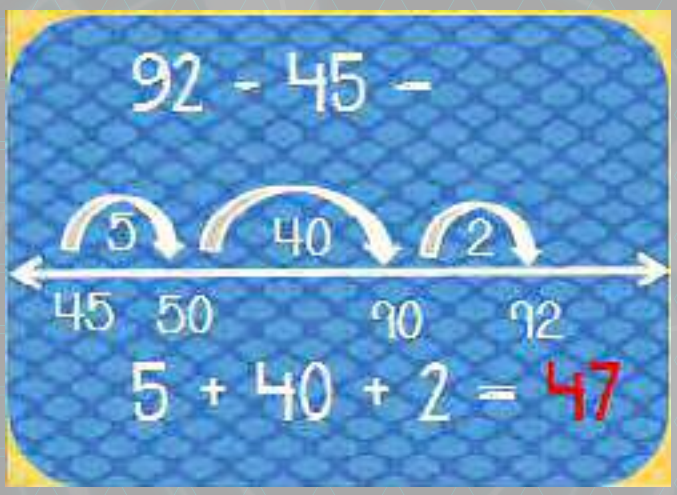
Examples:

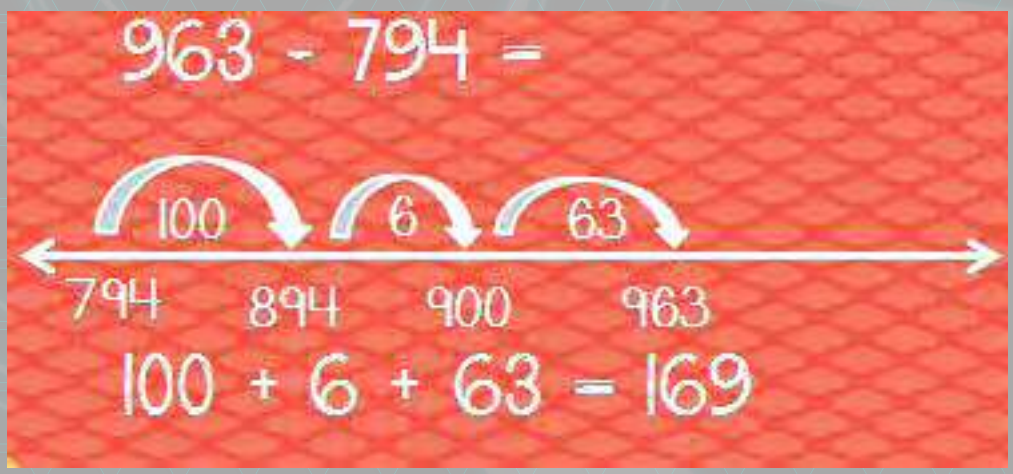




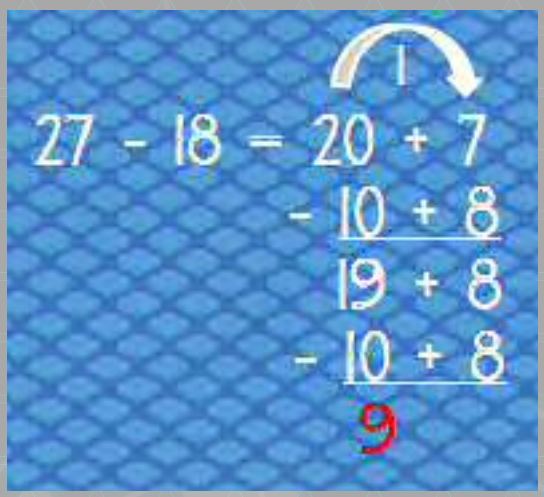
Another subtraction strategy is hop, skip, jump, and leap. As you'd expect, it is closely related to hop, skip, jump, and leap for addition. This strategy focuses on the difference between the minuend and the subtrahend on a number line. Students will place the subtrahend at the beginning of the number line and the minuend at the end. Using whatever size increments are friendly or comfortable for them, they will hop, skip, jump, and/or leap towards the minuend, marking the size of each movement. Students add together the movements, or partial differences, on the number line to find the total difference.

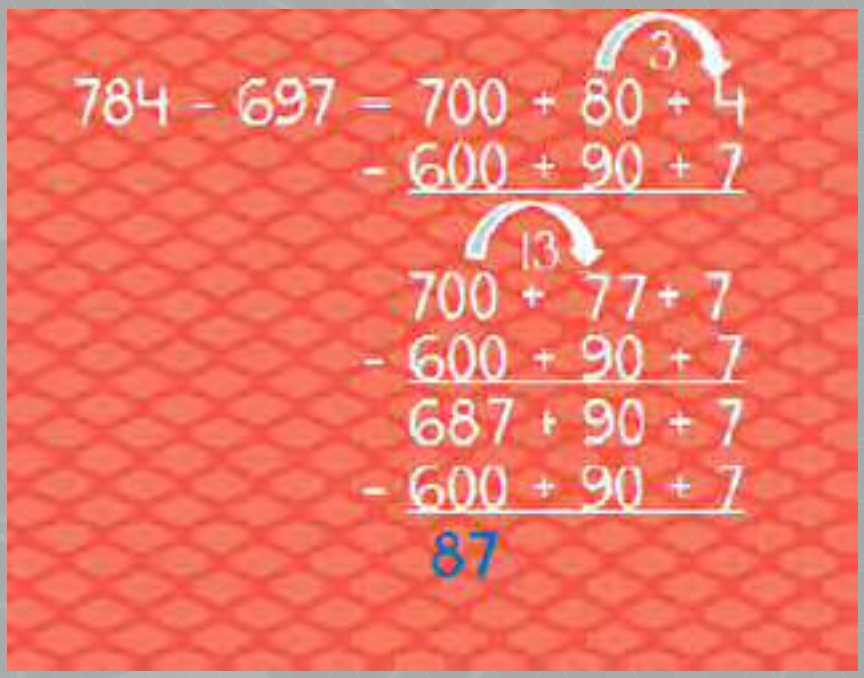
Example:





The last subtraction strategy I plan on introducing to my students is called borrow what you need. Once again students will separate the numbers into expanded form. If there's a size issue in the ones place, they don't take a whole ten. Rather they can choose to 'borrow what they need' to create a zero in the ones place. This leaves a friendly, or non-borrowing, subtraction problem.
Examples:

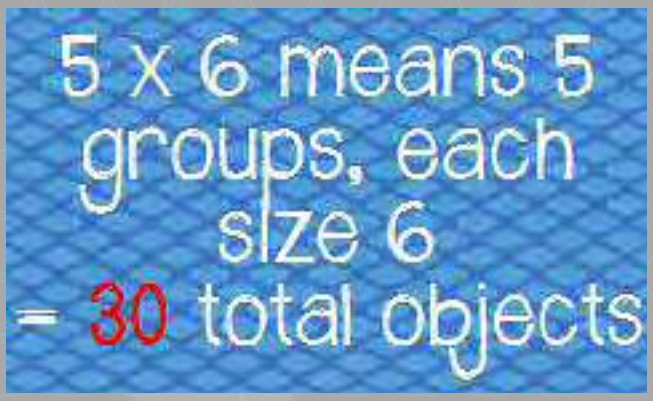


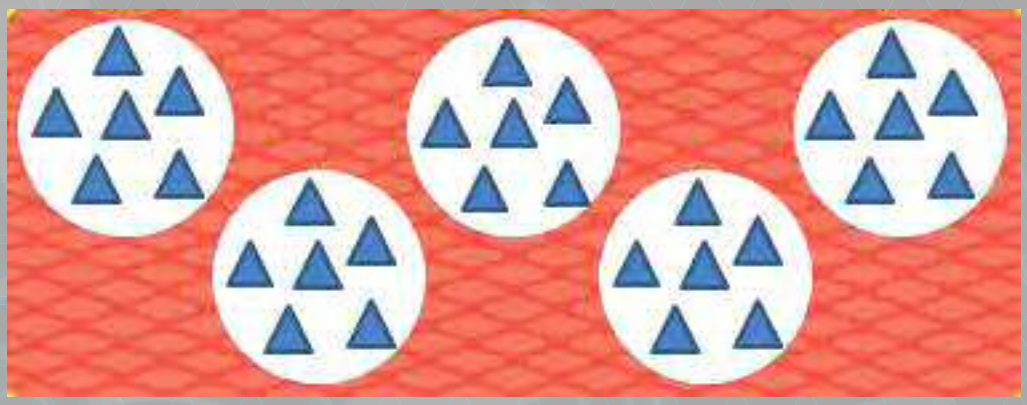


For my students, multiplication does not have to exceed products of 100. However, expecting my students to memorize their multiplication facts, and offering them no other option is unrealistic. Even if my students successfully memorized their basic multiplication facts, occasionally they, and we, forget a fact or two. They, and we, need a 'back up plan'. For these two reasons, I teach my students the following five strategies.

Equal groups is a strategy I use for students who need to see their process in a picture or diagram. To access this strategy, students must know that multiplication means a certain number of groups, each a certain size. They first create the number of groups as circles, bags, rectangles, etc. They then place the correct number of objects in each group and combine all of the objects for a product.

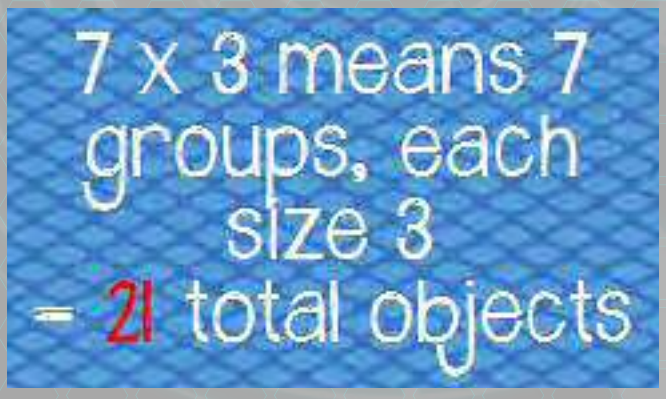
Example:





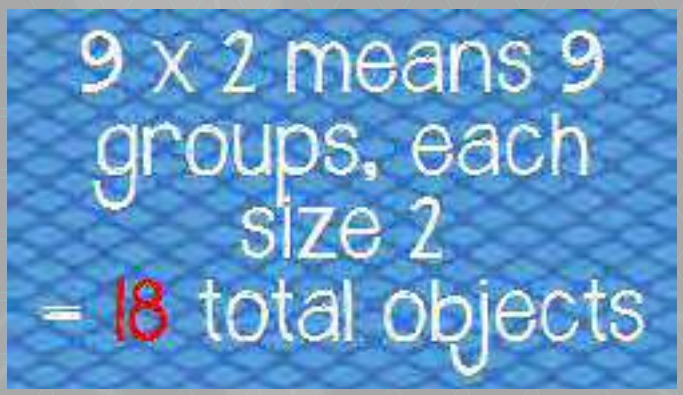
Repeated addition is a great introduction strategy. We must not forget that multiplication and addition are closely related operations. This strategy helps students see the meaning of multiplication as: this many groups, each this size. Repeated addition is great for basic facts, but quickly becomes tedious with larger numbers.

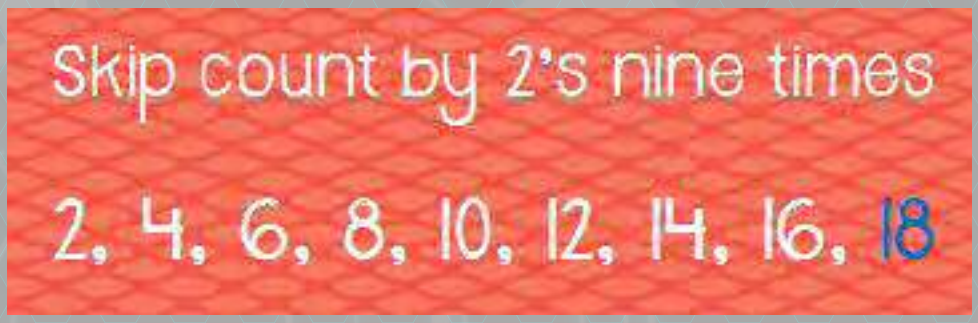
Example:



Skip counting is a strategy limited by the types of numbers you are able to skip count by. It is a fabulous strategy for 2, 3, 5, and 10. Students really love how quickly they can access this strategy for their friendly skip counting numbers.

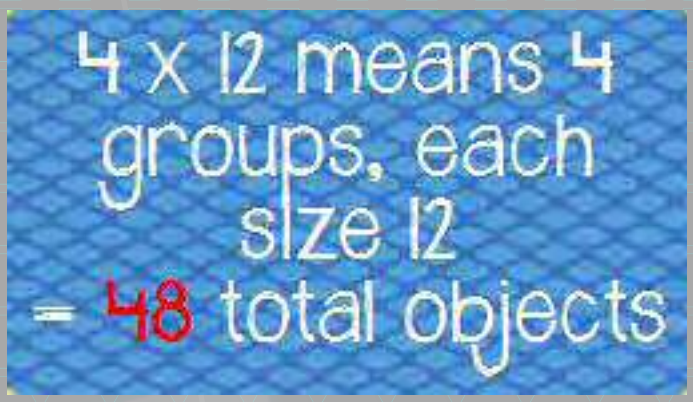
Example:

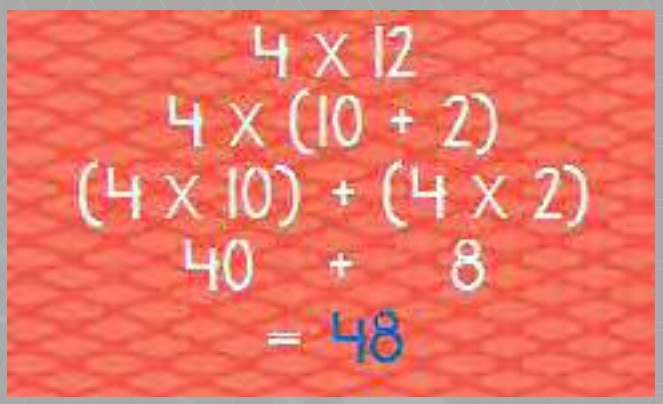




Value expanded is a great back up plan because it allows us to use either facts we know or friendlier facts. For basic multiplication facts, students can break either factor into addends. They can then multiply each addend by the other factor and add the partial products together. For multi-digit multiplication, students can break both factors into a friendly number and another addend. They can then multiply each of the numbers times the others.

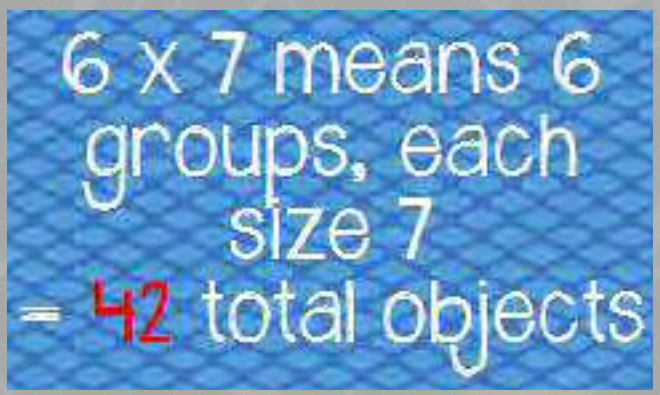
Example:

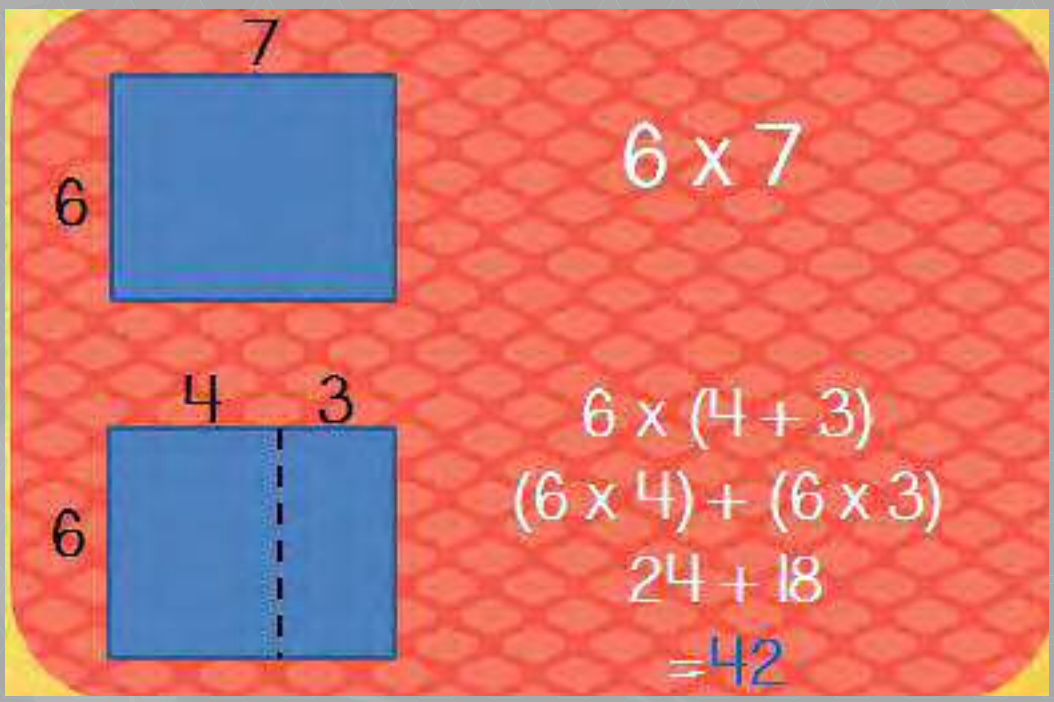




Array multiplication is a very similar strategy to value expanded, but with a visual component. First, students will draw an array representing the given multiplication problem. They then choose a way to partition the array in a way that makes the multiplication easier for them. There are many ways to partition an array, so this strategy allows them to control which numbers they would like to use.

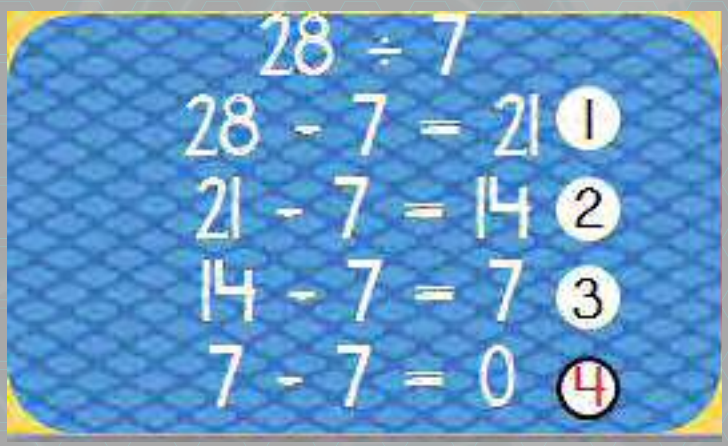
Example:

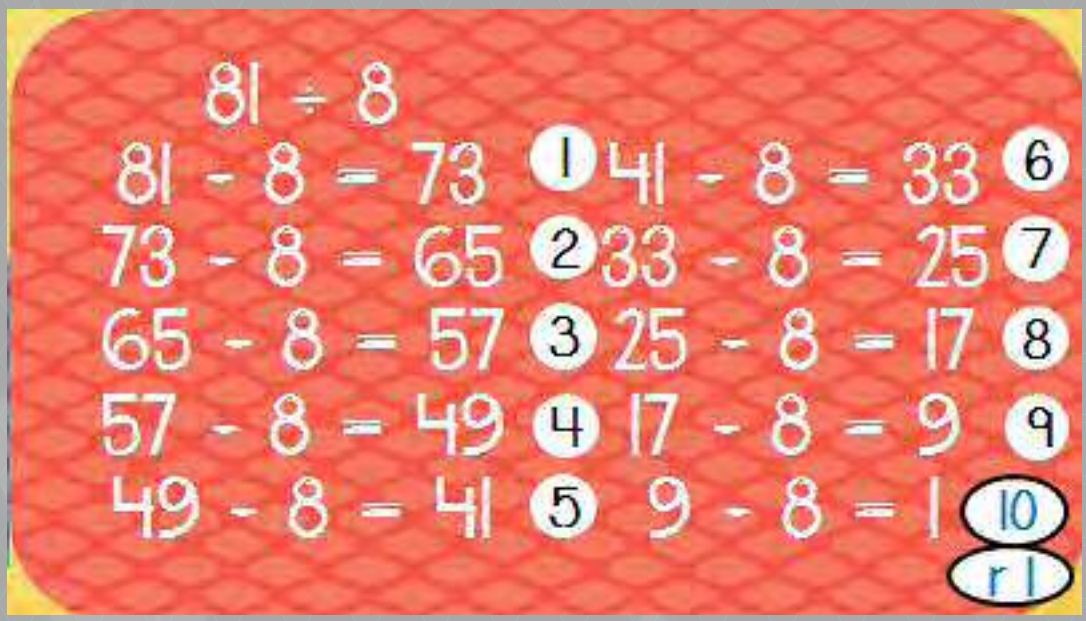




Division is more closely related to subtraction than multiplication, a fact that most teachers do not see. Multiplication is actually the opposite of division, while division is really just speedy subtraction. Therefore, the first strategy I introduce to students for division is repeated subtraction. Students begin with the dividend and subtract away the divisor. They will continue to do so this until they reach zero, or are unable to subtract again. The number of times you perform the subtraction is the quotient.

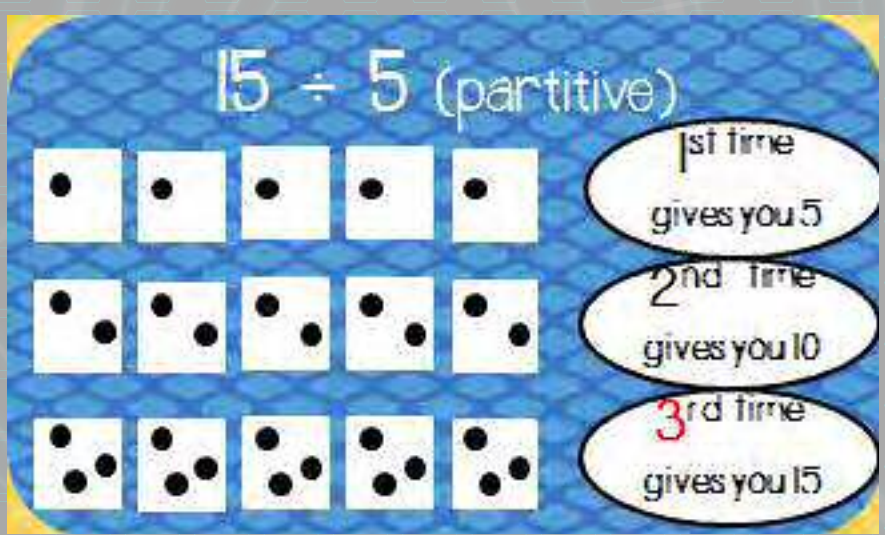
Example:

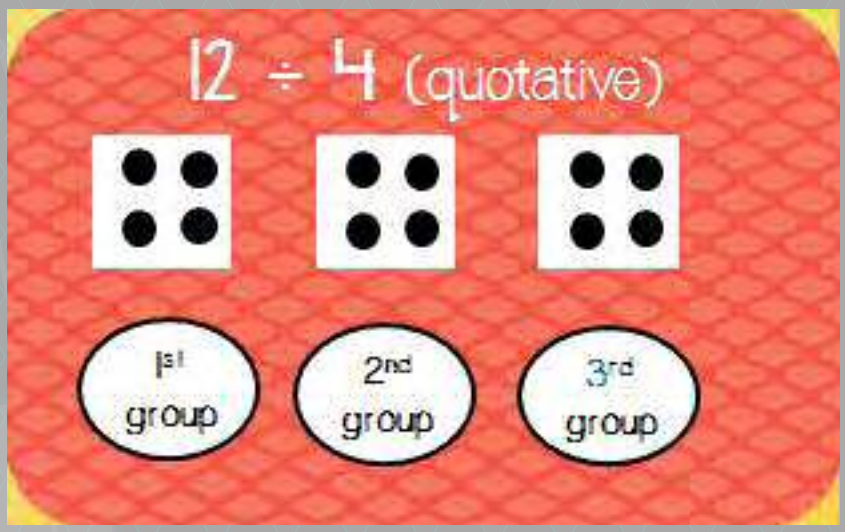




Equal groups is an even more visual representation of division. The can occur two ways, depending on what the division problem is asking. In partitive division problems, the number of groups is known, while the number in each group is unknown. Here students would draw the groups and place one object in each group until they reach the divisor. When they count the number they have in each group, they have the quotient. The other type of division problem, quotative, tells you the size of each group, but not the number of groups. Students can draw a group of that size repeatedly until they reach the divisor, similar to skip counting. The number of groups would be the quotient.

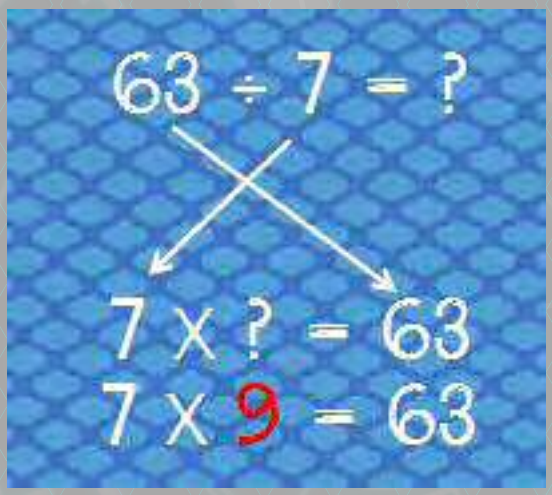
Example:

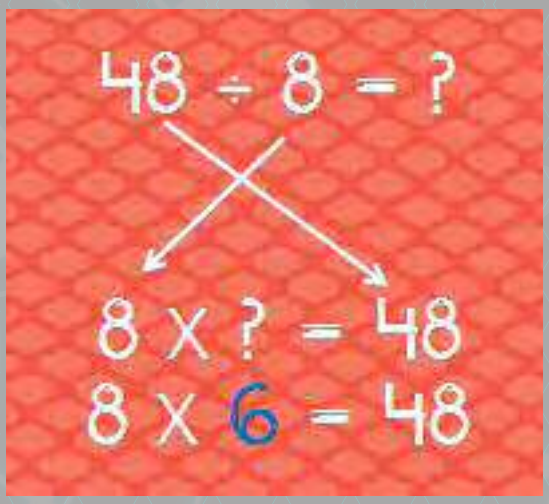




Finally students, who are very comfortable with multiplication, may use fact families to solve division problems. They see the relationship between the dividend as related to a product and the divisor as related to a multiplier or multiplicand. They can rewrite the symbols as a multiplication problem. If multiplication is a friendlier operation for them, they may like this strategy.

Example:





The importance of multiple strategies is that there is no right way to complete a math problem. The right way for you is the way that makes sense to you. The right way for your students is the way that makes sense to your students. Furthermore, one way, or strategy isn't enough. You use more than one strategy when computing the same type of operation, especially when computing mentally. Your students need to learn that that's okay, too. They need a 'back up plan' sometimes too. Maybe minuend splitting is their favorite, but it seems difficult for that subtraction problem. Let them hop, skip, jump, and leap. Let them choose. Let them do math their way. Let them know can control numbers… however it makes sense to them!

Scholarships & Grants

TMTA Teacher / Scholar Scholarship

Criteria: Applicants must be a TMTA member currently teaching in Tennessee and pursuing either a Masters, Ed.S., or doctoral degree to improve their mathematics teaching

A completed application must include the following: Scholarship Application Form (PDF File)

Application Deadline: Deadline for Application is normally JUNE 1 each year!

Past winners:

2011:Sarah Hacker (Huntsville Middle School, Scott County)

2014: Kathryn Taylor

2016: Now taking applications

For more information visit: https://tmta.wildapricot.org/page-18062

MET Grants to Individuals

Apply for NCTM's Mathematics Education Trust grants, scholarships, and awards. Funding ranges from $1,200 to $24,000 and is available to help math teachers, prospective teachers, and other math educators improve the teaching and learning of mathematics. For more information, go to www.nctm.org/MET/ and www.nctm.org/Grants/

MET Grants Build Membership and Revenue

Do you want to implement an innovative project in your Affiliate? Apply for an Affiliate Mathematics Education Trust (MET) grant! Grants are available for $2000, $2500, and $3500 to help your Affiliate build membership and revenues, promote creative projects that help make NCTM and its Affiliates more visible to the public and educational partners, and support the strategic priorities of NCTM. Based on the recommendation of the NCTM Affiliate Services Committee (ASC), the MET Board of Trustees may award the appropriate grant to a Partner Affiliate, Associate Affiliate, and Student Affiliate. The deadline for submitting a 2016-2017 grant application is June 1, 2016. All applications must be postmarked no later than June 1, 2016. Start planning your project now. www.nctm.org/Affiliates/Resources/MET-Grants-to-Affiliates/

2016 NCTM Affiliate Leaders Conference

July 18-20, 2016 • Las Vegas, Nevada

Leadership: Inspire Affiliates & Individuals to Take Action

Successful change comes down to three basic ideas: the WHY, the HOW, and the WHAT. Come and learn about how attending to these three basic ideas in a strategic way will help your Affiliate and Individuals toTake Action. How might your Affiliate transform to inspire individuals to actively participate to become thenext generation of leaders? Why and how might your Affiliate attract new leadership? Why does your Affiliate exist? What activities does your Affiliate plan and why does it do those activities? Those who start with the Why never manipulate—they inspire.

TMTA Annual Conference Information

Sponsored by: Middle Tennessee Mathematics Teachers

Location: Middle Tennessee State University

September 23-24, 2016

Speaker Proposals are currently being accepted. To apply to speak, complete your speaker proposal form at http://goo.gl/forms/ljnU6MtBnb. If you have questions about the form or submission process, please contact Lea Keith at lea.keith@rcstn.net. If you have general questions about the conference, please contact Dovie Kimmins at dkimmins@mtsu.edu.

Save the Date: 2016 Regional Conferences

Join us to connect face-to-face with your peers in education and to focus on the learning and resources that promote the mathematical habits of mind that will lead your students to college and career success. Whether you're a classroom teacher, math coach, administrator, math teacher educator, teacher-in-training, or math specialist, there's something for you at the NCTM Regional Conferences & Expositions.

2016 Locations and Dates:

Phoenix, Oct 26-28, 2016

Philadelphia, Oct 31-Nov 2, 2016

NCTM Unveils New Innov8 Conference.

St. Louis, November 16-18, 2016

2016 Innov8 Confer-ence: Engaging the Struggling Learner

Bring your team and engage in a hands-on, interactive, and new learning experience for mathematics education. While focusing on "Engaging the Struggling Learner," become part of a team environment and navigate through three different pathways:

- Response to Intervention (RtI)
- Supporting productive struggle
- Motivating the struggling learner

While collaborating with your team, create your own learning experience, using your choice of format:

- Keynote and expert presentations
- Activities in the Learning Lounge – ranging from one-on-one time withspeakers and mathematical innovators, to book discussions, to problem shar-ing with peers, and more
- Team time to map your strategies and share ideas
- New technologies and solutions from industry partners

www.nctm.org/innov8/

2017 Call for Speaker Proposals

Share your teaching ideas and practices by presenting at the upcoming 2017 NCTM Annual Meeting and Exposition that will be held in San Antonio, Texas, April 5-8, 2017. Call for speaker proposals for the 2017 annual meeting opens on March 1, 2016. Submit your proposal by the May 1, 2016, deadline.

Future NCTM Regional Conferences

Phoenix, AZ
Oct 26-28, 2016

Philadelphia, PA
Oct 31-Nov 2, 2016

Orlando, FL
Oct 18-20, 2017

Las Vegas, NV
Nov 15-17, 2017

Chicago, IL
Nov 29-Dec 1, 2017

Future NCTM Annual Meetings

San Antonio, TX
Apr 13-16, 2017

Washington, D.C.
Apr 25-28, 2018

San Diego, CA
Apr 3-6, 2019

Start a Student NCTM Affiliate

Starting Student Affiliates is one of the initiatives of NCTM and the Affiliate Services Committee. NCTM members who are faculty in higher education are encouraged to work with preservice teacher leaders to establish and sustain an NCTM Student Affiliate. In the spring, the Affiliates Services Committee plans to offer two webinars. One will examine how to create a Student Affiliate, and the other will focus on StudentAffiliate resources. Student-members of a NCTM Student Affiliate receive a complimentary NCTM student e-membership with access to member-only resources at NCTM.org.
www.nctm.org/Affiliates/Join/Starting-a-Student-Affiliate/

Write or Referee for NCTM Publications

The NCTM publishing program looks to the mathematics education community for expertise, insights, and accurate content. Our authors, who include some of the most respected professionals in the field from the classroom, academia, coaching, and administration, develop professional materials for our teachers, administrators, counselors, and parent members. Covering pre-K–14, NCTM publishes approximately 15 books and 5 journals over the course of a year.

Why referee manuscripts? The answer is simple—you always learn something. As a referee, you learn something about writing, pedagogy, and mathematics—every single time.

Why write a manuscript? The reasons are many. For example, teachers and other professionals with excellent lessons, assessments, or ideas about classroom research and practice can share them with everyone in the mathematics education community. Learn about writing or refereeing for NCTM publications here.

Nominations Sought for NCTM Board of Directors

Do you know someone who would bring valuable experience, perspective, and judgment to the NCTM Board of Directors? The Board needs a broad representation of NCTM membership to enrich its discussions, inquiries, and decisions. Help the Nominations and Elections Committee identify talented, energetic individuals who are qualified to assume leadership roles in the Council, and nominate them today. Get complete details on the process, procedures, qualifications and responsi-responsibilities, and school incentives.
http://www.nctm.org/nominations/

Opportunities to Join NCTM Affiliates-at-Large

Most NCTM Affiliates are organized by geographic area, and each Affiliate is assigned an NCTM Affiliate Services Committee representative. However, some NCTM Affiliates are organized around a specific topic in mathematics education. These groups are called Affiliates-at-Large. Some listings include a link to the Affiliate's Web site. Consider reviewing these important Affiliates-at-Large topics in mathematics education and joining their cause and mission to improve mathematics education for all.
Search for the Affiliates-at-Large here: www.nctm.org/Affiliates/Directory/

Upper East Tennessee Council of Teachers of Mathematics

Upper East Tennessee Council of Teachers of Mathematics
Membership Application for 2016-2017

Complete and return to Amy Glass with a check for $10.00 made payable to UETCTM. Completed application and check may be mailed to:

Amy Glass, UETCTM Treasurer
712 Whippoorwill Court
Mt. Carmel, TN 37645

Name: _____

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Email Address: _____

Please check the following statements if applicable:

☐ I am a current member of NCTM

☐ UETCTM may be asked to share your information with other math organizations (NCTM, TMTA, etc.) that promote mathematics education. Please check if you do not want your information to be shared.