

## Importance of Math Fact Fluency

One of the primary goals of every math teacher is to help students learn the basic facts efficiently, gain fluency with their use, and retain that fluency over time. Fluency is the stage of learning where the learner acquires the information at an automatic level. In reading, when a child sees a word, he/she doesn't have to stop and sound it out; when a child has to write a spelling word he/she doesn't have to think about each letter as it is written. Similarly in math, a student must have this fluency of math facts in order to perform multi-digit algorithms.

Research shows that using strategies to learn the facts results in a better understanding of math facts and a better attitude towards mathematics than learning math facts through memorization. In the book: The Glass Wall: Why Mathematics Seem Difficult, Frank Smith says, "How well we remember anything depends on how richly connected it is to other things we know. Not only is it easier to put mathematical facts into memory if they make sense to us, but it is also easier to get them out. Meaningfulness, or the richness of connections, determines how quickly and efficiently anything goes into (and out of) memory." This is why memorization is both difficult for some children, as well as inefficient. "If we strive to memorize something we don't understand, if we're on the wrong side of the glass wall, we'll have difficulty trying to remember it." To really understand addition and subtraction (or multiplication and division), we must understand how they are connected.

In grades K-3, we encourage the use of strategies for fact recall. This not only leads to more effective learning and better retention, but also to the development of mental math skills and number sense. We have found that the following four addition/subtraction strategies to be very effective:

1. Doubles plus 1 – Ex.  $6+7 = 6+6+1$
2. Doubles plus 2 – Ex.  $6+8 = 6+6+2$
3. Making tens – Ex.  $9+7 = 10+6$
4. Using relationships – Ex.  $5+7=12$ , so  $7+5=12$ ,  $12-5=7$  and  $12-7=5$

The tools students use to develop these strategies include the arithmetic rack, dominoes, and the open number line. At Trinity, teachers will work to give students tools for computing facts fluently; however, **like reading, it is necessary that students continue practice at home**. Below are ways to help your child become fluent with facts.

- ✓ Games – Games provide real, relevant, connected, and fun ways to use math facts repeatedly
  - **War:** This game is played with a deck of cards (minus the face cards). Each person turns one card over, and the first person to announce the sum takes both cards.
  - **Sum Swamp:** This is a popular board game where a player rolls all 3 dice and creates a number sentence by placing the highest

number die first, the operation die second, and the smallest number die last. The player then adds or subtracts the numbers and moves ahead the sum or difference on the game board.

- **Go Fish with Facts:** Instead of looking for the same number as in the original “Go Fish” card game, players try to pair cards with equal sums.
- **Domino Top It:** Have players place dominoes facedown between them. Each player turns over a domino and calls out the sum of the dots on the two halves.

✓ Websites

- <http://www.aplusmath.com/games/picture/AddPicture.html>
- <http://www.funbrain.com/math/>
- <http://www.quia.com/jg/387225.html>
- <http://www.funbrain.com/math>
- <http://www.mathmastery.com/cyberchallenge>
- <http://www.mathfactcafe.com>

✓ Triangle Flash Cards

- These flash cards stress the relationship between facts. For example, the numbers on a card might be 7, 9, and 16. You cover one of the numbers and the child says all four related facts.  $7 + 9 = 16$ ,  $9 + 7 = 16$ ,  $16 - 9 = 7$ , and  $16 - 7 = 9$ .

✓ Written and oral practice

- Once the child is confident with the facts through games, have him/her practice both orally and in writing. One good time to practice is in the car on the way to school. Also, if the child is fluent with the facts, practice saying the fact and have the child give another fact with an equal sum.

## GOALS:

- Our goal is for students to accurately solve math facts at a rate of one fact per every 3 seconds.
- By the end of kindergarten, students should be fluent with sums to 5.
- By the end of the first grade, students should be fluent with all addition and subtraction facts to 10.
- By the end of second grade, students should be fluent with all addition and subtraction facts and should be developing strategies for multiplication.
- Students should be fluent with facts in all four operations by the end of third grade.

**The goal of fact fluency has not changed, it's our belief of how the students should become fluent that has.** We believe in teaching students to think, not memorize. We can't always rely on our memory. If a child memorizes  $9 + 6 = 15$ ,

he or she may forget. However, if he understands that  $9 + 6$  is the same as  $10 + 5$ , he can recall the answer quickly.

In teaching facts through memorization, we lose a crucial opportunity to develop a child's number sense. Number sense includes the ability to compute accurately and efficiently, to detect errors, and to recognize results as reasonable. People with number sense are able to understand numbers and use them effectively in everyday living. Number sense must be developed early on. **Rote teaching of early arithmetic deprives students of powerful ways of thinking about mathematics.**