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Count Me In

This newsletter goes out to all of the schools that participated in the Count Me In study in 2006. At eight elementary schools in Ottawa, Peterborough and Winnipeg, 400 children performed a wide variety of math-related activities.

This year, the youngest children in the study were in Kindergarten and the oldest children were in grade 4. All of them played a variety of number games with us, and we'll share some of what we learned in our study.

Our first article is about arithmetic in young children. The second article suggests ideas for older children.

Arithmetic without Words

In 2005, the youngest Count Me In participants played an arithmetic game. The children watched as toy animals were hidden in a barn, and then animals were moved in for addition or were moved out for subtraction. To show us their answer, the children collected the number of animals that they thought were left inside the barn. The game allows us to examine very early arithmetic because no written or spoken numbers were used, just the animals.

We wondered whether being able to play this game would relate to children's later ability to learn to do written arithmetic, such as, '2 + 4'. We assumed that children would keep track of the animals with their fingers or in their heads.

About a quarter of the Kindergarten children were not able to show us the correct number of animals. Despite high language skills, compared to other children, they also named fewer numbers and counted more slowly in other games.

This year, when the children were assessed at the end of their Kindergarten or Grade 1 year, we found that the children who had done poorly on this arithmetic game in 2005 had made great gains in learning about the number system. They now named numbers and counted as accurately as the other children. However, their arithmetic skills still lagged behind.

These findings suggest that some children may struggle with arithmetic, despite having good vocabularies and good reading skills. Children with excellent language skills were able to use those skills to compensate and do well on other aspects of primary grade mathematics. Verbal skills do contribute to children's ability to master many aspects of the number system. The other component of successful calculation seems to start with counting and thinking about sets of objects.

What can you do?

Most of these types of skills improve with practice. Dr. Sheri-Lynn Skwarchuk recommends that parents look for opportunities to draw out mathematics in everyday life. "We count grapes before eating them and we always keep track of how much money we have spent in the dollar store." You can also play hiding games with food or toys, asking them to guess how many are left. Practicing math in everyday settings enhances children's exposure to mathematics, increasing their familiarity with it and showing them that it is important.

Mathematics and the Older Child

For parents, math often means calculation, or even more simply, arithmetic. However, today we know that mathematical knowledge is multi-faceted. Our children's math curriculum includes a number of strands and each strand requires children to acquire a wide array of knowledge. Because of the volume of material to learn, arithmetic is not emphasized as much as in the past. Nevertheless, children and adults who have good math performance also typically have high arithmetic fluency. Just as in reading, fluency in arithmetic means being able to work quickly and accurately. And just like language, developing fluency at arithmetic takes practice and repeated exposure.

Fluency is an area that parents can help their children improve. Just as parents read to their young children, parents can provide extra exposure to arithmetic as part of daily life. "I've tried hard to incorporate more arithmetic into the activities of my daughter, who is in grade 5", says Dr. Jo-Anne LeFevre. "For example, when we do her math homework together, I encourage her to try to estimate 'about' what the answer will be, then calculate—without a calculator—using the estimate as a check. I also show her how to get to an answer in different ways." Research has shown that children with good math skills have what is termed 'adaptive expertise'—they are fast and efficient at calculating but they also know that there are multiple solutions to any problem.

Playing Scrabble is a fun way to build spelling and vocabulary skills—and also provides opportunities for arithmetic practice for the child who adds up the score on each round. Even flashcards can be turned into games like 'Multiplication War'. Researcher Lisa Fast keeps a set in her van for long car trips. As they've gotten older, her children have begun shouting out answers in funny accents and repairing wrong answers by repeating rhymes like"8 x 8 is 64. Shut your mouth and say no more!"

Computer games can also provide arithmetic practice. Jo-Anne's daughter enjoys the FunBrain.com™ Math Brain site and occasionally accesses the English version of the site to supplement her French Immersion math textbook. Lisa's 8-year-old son practices calculation on the MathBrain site to earn equivalent time on his favourite Pokemon site. MathBrain encourages fluency through games that emphasize both speed and accuracy. Links to these and other sites can be found in the KidZone of the CMI website.

Once you start looking, basic arithmetic is everywhere. How do you calculate tips at restaurants, balance your checkbook, decide if a sale is a 'good deal', or manage inventory? Of course, some children will find math harder or perhaps less interesting than others. Most children, however, can learn basic math skills, just as most children learn to read. If your child has particular difficulty with arithmetic, talk to his or her teacher. You may be able to supplement at home, or the teacher may recommend a tutor. Research in Australia and the US suggests that early intervention is just as important in math as it is in reading. If you're interested, more information is available from http://mathrecovery.org/.

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