**Why Memorize Math Facts?**

**by Aimee Yermish, Educational Consultant**

My private practice is full of kids whose parents thought that way, and now have to pay me lots of money to teach the kids what they could have been taught for free in second or third grade. They usually hit the wall some time in middle school or in algebra I, where you have to **use** these math facts rapidly on the fly.

Quick! Two numbers that multiply to -24 and sum to 5!

No, sorry, using a calculator to do guess-and-check to factor a quadratic equation is not an efficient strategy. And inefficient rather rapidly blends into ineffective, because when it takes you too long and uses too much working memory to do the basic skills, you can't keep track of the higher skills you're supposed to be learning in your current grade. It's like a dyslexic kid who can't keep track of the flow of ideas in a long article because he's spending too much brain power (and hence time) on reading individual words. It may seem like it only takes a few seconds to punch "6x4" into the calculator, but it really does add up and derail the kid's train of thought.

Calculators are useful tools, but they need to be used for the right kinds of tasks. They should **never** be used to substitute for learning the skill that is actually being taught. Kids need to be independent enough that they can choose their brain over the calculator as the most effective tool for the job, as it frequently is, and so that, as Marjorie points out, they will be estimating the answers on the fly so that they can realize when they may have made calculator mistakes.

"If you don't know the math, will you know that you pressed the wrong buttons? My chemistry professor used to have a saying, "Don't be a Calculator Cripple."" -- Marjorie

I usually express that as "Freitag's Law" (named after my friend Walt Freitag who was the first to say it in my hearing) "Never use a tool that's smarter than you are."

And while I would agree that some of the very highest areas of math (beyond my own expertise, as I am but a lowly molecular biologist-turned-educator, so I haven't studied much beyond multivariate calculus and simple differential equations, plus statistics, linear algebra, and discrete math) do not require automaticity of basic math facts, they do require automaticity of the skills that fall somewhere in between them and single-digit addition, and that **those** skills are very difficult to master and to automatize when the basic stuff isn't firmly in place. It's going to be very difficult to **get** to graduate-level mathematics if you can't hack calculus because you couldn't hack algebra because you couldn't hack middle-school math because you couldn't hack arithmetic.

Now, where you **do** have my agreement is that a gifted child who is ready to progress should be allowed to progress. If he is ready to understand algebra, then he should be allowed to study algebra, even if he is still struggling to memorize his math facts. The two areas should be worked on in parallel. Frequently, it's the algebra study that convinces the kids that it was a good idea to learn the math facts in the first place. Holding the "good stuff" hostage to the gifted kid's weakness with basic facts is really neither fair nor truly appropriate, and it's a recipe for underachievement.

I think there's a basic problem here that we as the parents of gifted children must come to terms with. Not all useful learning is intrinsically interesting. Our kids have a right not to be bored in that they should not be held down, but they do not have a right not to be bored such that they have a right to skip anything that isn't fun to learn. Math facts are boring. Absolutely. But that doesn't mean that our precious children who don't tolerate boredom well shouldn't have to learn them. We have to teach our kids the difference between being bored because you are being taught something you have already mastered and being bored because the work is intrinsically boring but still important. We can turn our fertile brains towards making the practice fun and interesting, if we don't tolerate boredom well, but we don't get to just declare ourselves to be so brilliant that no one should ever make us do anything we don't feel like doing.

Another issue that I think we as gifted parents have to come to terms with here is that our brilliant children may not always be brilliant across the board. They may in fact not be very good at rapid retrieval of decontextualized information like math facts. That skill may not come easily to them. Frequently, when someone asks this question on this board, it's because their kid is bombing the mad minutes and freaking out and calling themselves stupid, and the parent wants to tell the teacher not to make their kid do the timed practice. But that's completely backwards -- if the kid isn't doing well at the mad minutes, then that shows that he has something to learn! Wow! Since we're often complaining that they never teach our kids anything, when they actually **are** teaching our kids something, we should be **pleased**.

All gifted kids must, at some point in their lives, recognize that giftedness does not mean that everything comes easily and that one never needs to work hard at anything. As a parent, our goal in this kind of situation should be to help the kid emotionally adjust to the situation and to help him come up with effective strategies for learning those annoying math facts so that they don't have to be upsetting any more, **not** to browbeat the teacher into not teaching our precious kid something that he is having trouble learning to the level of automaticity necessary for future success in mathematics. We, of all people, should not lower our expectations of our children just because they meet with initial difficulty.

"Why stop there? Let's make them memorize Latin roots if holding large chunks of useful data in ones memory is good."

Actually, that's an **excellent** idea (I know you meant to be ironic, but sorry, it didn't work). If you want to improve your vocabulary, then by far the most efficient route is to memorize Latin and Greek roots.

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