

Math Welcome!



Max M. Learning

Which best describes your current feelings about math?



A. I love math. It's my favorite thing to do!



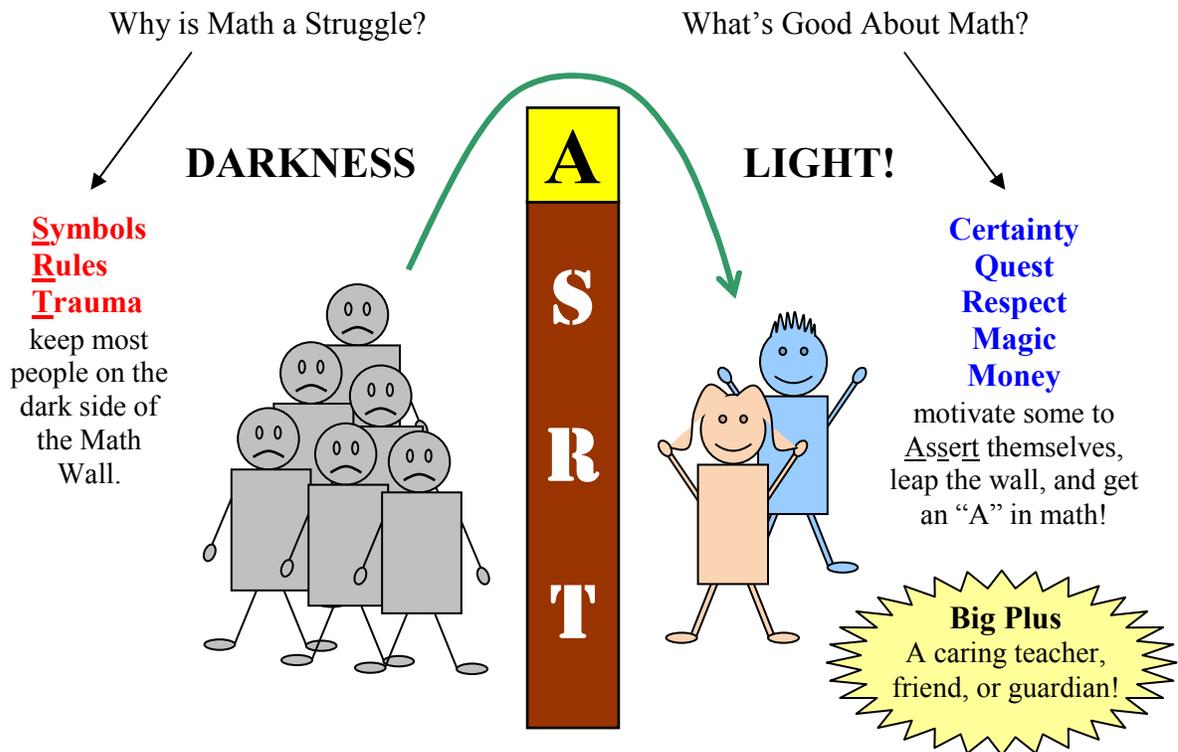
B. I'm so-so about math. I can take it or leave it.



C. I hate math. I would rather go to the dentist and get a tooth pulled!

If you chose option C, don't worry—you're normal! It's no secret that most people dislike math, including parents, professionals, and many who have to teach it. In this lesson, we'll explore why math is such a challenge for so many, and why it's so important for your life and career success.

THE MATH WALL!



Which side of the wall are you on?

Why is Math a Struggle? Symbols!

Symbols are marks that represent what's real.

Math uses symbols, *lots* of them, which makes math as difficult to learn as a foreign language. Our brains are naturally "wired" for *real* things, not symbols.

Yikes! All these symbols mean to multiply!

Observe the following marks magically grow into something you know!

IIII
 IFFL
 TFFE
 TPEE
 TREE

Even a drawing of a tree is a *symbol*, but it's much closer to the real thing, so it's easier for our brains to grasp.



Math can be complex because even something simple, like multiplication, can have many different *symbols*.



- 2×3
- $2 \cdot 3$
- $2 * 3$
- $2(3)$
- $(2)(3)$
- 2 times 3
- $\frac{1}{2}$ of 3
- 2a
- ab

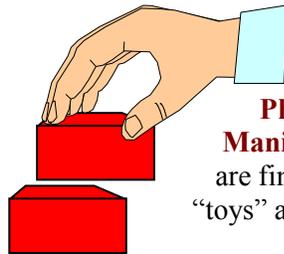
Adding an H to TREE makes us visualize another *symbol*: 3.

THREE → 3

All numbers are *symbols* for what's real. The symbol "3" represents three real things.

The Cure for Symbols: Mental Manipulatives!

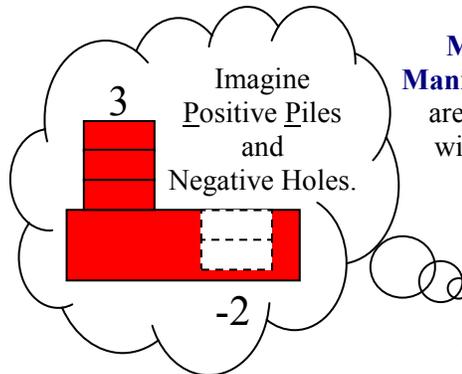
Physical manipulatives are useful for demonstrating math concepts. *Mani* is Latin for "hand." Manipulatives are things you touch or hold in your hands.



Physical Manipulatives are fine until the "toys" are put away.

Unfortunately, success with physical manipulatives does not always translate to success with math symbols.

Mental Manipulatives exist only in your imagination. When you see a number or operation, you'll visualize an object or pattern that you can mentally manipulate.



Mental Manipulatives are always with you!



Mental MathBots manipulate objects and represent numbers.



Why is Math a Struggle? Rules!

Math is based on rules and properties, *lots* of them. It's easy to confuse one for the other. To further complicate things, most rules work in some situations but not in others.



Rules, rules, rules!
No wonder I'm confused!!

Can you name the rule or property for each of the following?

$$1 + 2 = 2 + 1$$

$$2 + 0 = 2 ; 2 \times 1 = 2$$

$$(1 + 2) + 3 = 1 + (2 + 3)$$

$$2 + -2 = 0 ; 2 \times \frac{1}{2} = 1$$

$$2(3 + 4) = 2(3) + 2(4)$$

$$2 \times 0 = 0$$

Commutative Associative Distributive Identity Inverse Zero

The Cure for Rules: BrainAids!

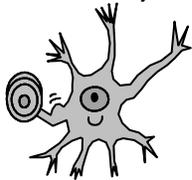


BrainAids are memory hints that aid learning.

Formal term: *mnemonics* [nee-MAWN-ix]

Analogy = Comparison

To learn something new, you must grow new brain fibers, which is hard work. In contrast, an analogy lets new learning hitchhike on top of old learning by comparing what you don't know to what you do.



Analogy: Just as it takes repeated exercise to build muscle fibers, it takes repeated study to build brain fibers.

Brain“A”ids

Four of the most common BrainAids start with the letter “A.”

Analogy

[uh-NOWL-uh-jee]

Acronym

[AK-roh-nim]

Acrostic

[uh-KRAW-stik]

Alliteration

[uh-LIT-ur-AA-shun]

C O M M U T A T I V E
H R Imagine CO stands for
A D Change Order.
N E $1 + 2 = 2 + 1$
G R
E

Alliteration

When all first letters match, phrases are easier to recall.

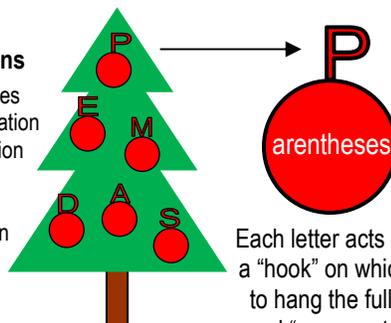
Addition Attaches
Subtractions Steals
Multiplication Magnifies
Division Dissolves

Acronym = Name

A nonsense name made from the first letters of a series of words that you want to remember.

Order of Operations

Parentheses
Exponentiation
Multiplication
Division
Addition
Subtraction

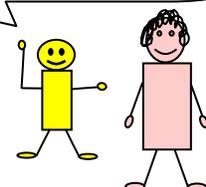


Each letter acts as a “hook” on which to hang the full-word “ornaments.”

Acrostic = Story

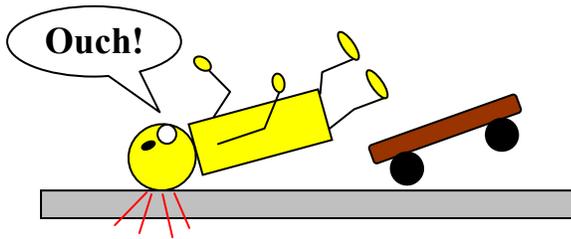
A story made from an acronym can make it easier to remember.

Please Excuse My Dear Aunt Sally for following the Order of Operations!



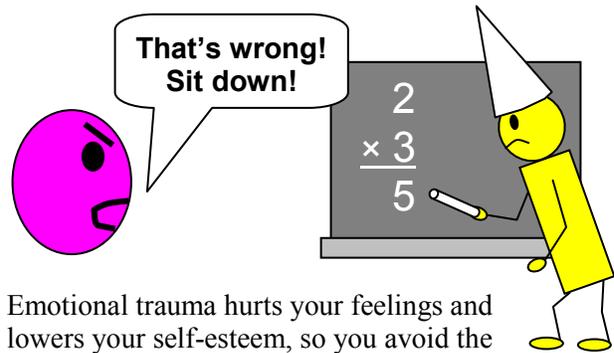
Why is Math a Struggle? Trauma!

Physical Trauma



Trauma [TRAW-muh] means "injury." Physical trauma hurts your body, but after you heal, you usually go right back to having fun!

Emotional Trauma



Emotional trauma hurts your feelings and lowers your self-esteem, so you avoid the source of hurt (math) and fall further behind.

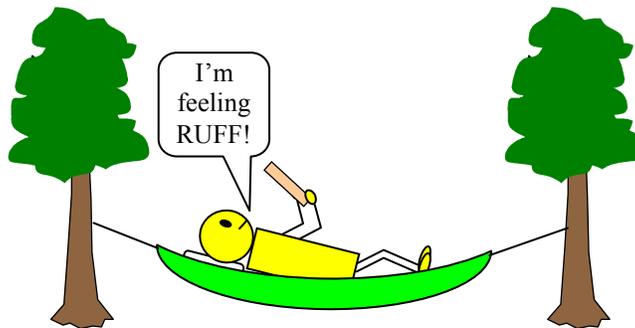
The Cure for Trauma: Be RUFF!

Physical trauma may require medical attention, but there's something *you* can do about emotional trauma.

BE . . .			
<p>Relaxed</p> <p>Close your eyes, breathe slowly and deeply as if you were falling asleep.</p> 	<p>Uncluttered</p> <p>Mentally unclutter your mind as you clear away any distracting thoughts.</p> 	<p>Focused</p> <p>Open your eyes & imagine peering through a magnifying glass to focus your attention.</p> 	<p>Flowing</p> <p>Once you're <u>Relaxed</u>, <u>Uncluttered</u>, and <u>Focused</u> then (like a river) you'll be <u>Flowing</u>.</p> 

RUFF is an acronym for Relaxed, Uncluttered, Focused, and Flowing.

Have you ever had a day where everything – school, work, sports – just seemed to go right? Where things came easily and you were totally absorbed in what you were doing? Athletes and others call this "flow" or being "in the zone."



When you're RUFF, it's like being in a hypnotic trance. You are so focused that you don't notice outside distractions or even time passing by. You're concentrating so effortlessly, that there is no room for self-doubt or mental blocks.

What's Good About Math?

Certainty

Math always has a right answer.
And it feels good to be right!

Writing
Task

F

Roses are green,

Violets are white,

If you look at my
teacher,

You'll get
a big
fright!!



MATH
TASK

A
Great job!

vs.

$$\begin{array}{r} 1 \\ + 1 \\ \hline 2 \end{array} \checkmark$$
$$\begin{array}{r} 1 \\ + 2 \\ \hline 3 \end{array} \checkmark$$
$$\begin{array}{r} 2 \\ + 2 \\ \hline 4 \end{array} \checkmark$$

$$\begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array} \checkmark$$
$$\begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array} \checkmark$$
$$\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array} \checkmark$$

Although this paper showed humor and creativity, the grade depended on the teacher's *opinion* (which for some reason was not favorable!).

Since all answers were correct, this paper received the highest grade. With math, answers are either right or wrong, so the teacher's opinion is not a factor.

What's Good About Math?

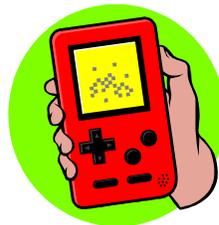
QUEST!

**Math is a game of
discovery!**

**Answers are the
treasure you seek!**



**Math can be more fun and challenging than
mindless games and puzzles.**



In contrast to spending hours on unproductive games, developing math skills will greatly enhance your chances for career and financial success.

What's Good About Math?

If you're good at math,
people will give you

RESPECT!

They'll think
you're a
genius...
really!



So many people dread math that if you're just a little bit better at it than they are, they'll think you're really smart!

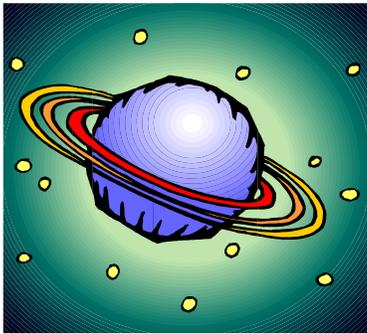
What's Good About Math?

There's

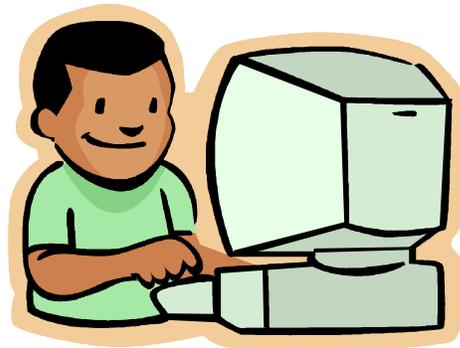
MAGIC!

In Math

Math is the language of the universe!

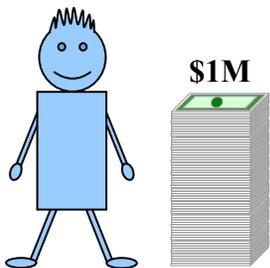


Everything you see, hear, feel, smell, and taste can be described with symbols and formulas.



Every word, number, symbol, graphic, video, and sound item on your computer can be represented by just two digits: 0 and 1.

Math Can Make You a *Millionaire!*

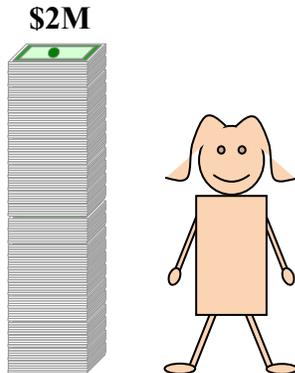


HS Diploma

Passes required math classes and high school exit exam to earn Diploma.

Works 2000 hr/yr
@ \$10/hr for 50 years.

Earnings
\$1 million



College Degree

Passes math entrance exam and required math classes to earn Bachelor's Degree.

Works 2000 hr/yr
@ \$20/hr for 50 years.

Earnings
\$2 million

Education & Earnings

U.S. Census Bureau Report
September 2011 (In 2008 dollars)

Education Level	40-Year Earnings
8 th Grade	\$920,000
High School	\$1.4 million
Bachelor's	\$2.3 million
Master's	\$2.8 million
Ph.D.	\$3.6 million
Professional	\$4.2 million

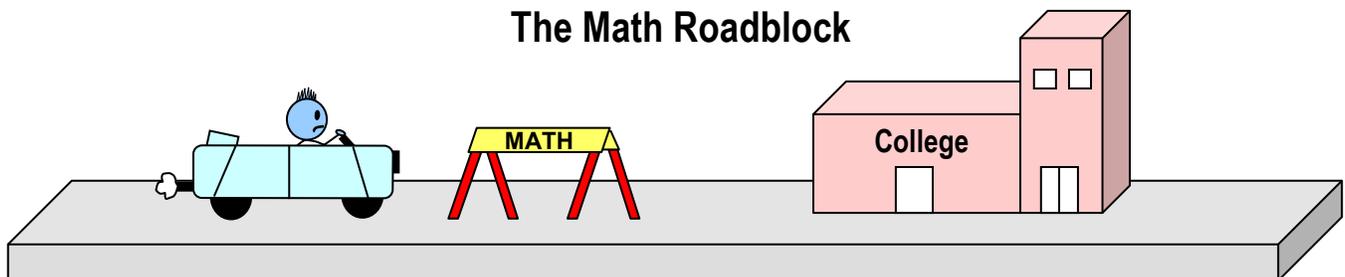
www.census.gov/prod/2011pubs/acs-14.pdf

You Have A Choice!

If you'll be working for 40-50 years, wouldn't you rather have a million dollars or more to show for it? Of course!

Make friends with math!

The Math Roadblock



Of all subjects, math is the one most likely to stand in the way of higher education. Some students never reach their goal and drop out of school because of difficulties with math. So if you're struggling, get the help you need to succeed from a tutor or friend, and work hard to master math. *It will* be worth the effort!

I'll get rich without college!

Surprise! If you decide to skip college and earn your fortune in a trade or your own business, you'll likely need and use *more* math than most college graduates!

Many construction workers, plumbers, and welders must pass math tests, including algebra, to be certified. And all business owners need math skills to successfully run their firms and manage their money.



A caring teacher, friend, or guardian who tutors, urges, and inspires you to succeed in math can make a huge difference!

