

Elementary Parent Information

Tips for supporting your child at home:

1. Avoid endorsing math anxiety or being “bad at math”. Students who have these attitudes towards math have more difficulties learning math than those who approach it positively. This is the “growth mindset” versus “fixed mindset” and has been proven to really affect learning. Another way to encourage a Growth Mindset is to encourage perseverance through frustration and understanding that mistakes actually make the brain grow – so are not bad but rather are very useful for developing understanding.
2. Math is literally all around us....if we look for it. It doesn't have to be just computations but rather looking at relationships, patterns and sizes. Problem solving, deciding between choices are also mathematical processes, as are playing games and solving logic puzzles.
3. For younger students: grouping and organizing toys, practicing adding and subtracting using toys, blocks, etc. and looking for and making patterns. Comparing more than and less than and by how much. For example: a child has 4 dolls and 12 stuffed animals, you could ask, “how many more stuffed animals than dolls do you have and how do you know?”
4. Read books that involve math or find the math in nighttime stories. Encourage creativity and ask your child to find the math (shapes, counting, comparing, categorizing, estimating, etc) in stories, shows, movies etc. This helps develop mathematical habits of mind.
5. For older students, involve your child in “real-life” math.
 - a. Grocery shopping:
 - i. Practice rounding items to the nearest dollar or dime (example: if a jar of peanut butter is \$4.69 – is this closer to \$4 or \$5? How do you know?)
 - ii. Estimate the value of each item and create a total estimate. This can be a game to see how close you come to the real value.
 - iii. Compare prices to see which is the better deal. This can be done using estimation or using the unit prices listed on most prices.
 - iv. If you buy enough groceries to last 4 or 5 days, estimate the cost per day
 - v. Determine how much you save if you buy things on sale.
 - b. Cooking/Baking:
 - i. Just using measuring spoons and cups and reading recipes helps!
 - ii. When doubling or halving recipes, determine how much of each ingredient is needed.

- iii. Looking at the measurements on measuring spoons and cups, determine how many teaspoons in a tablespoon, how many tablespoons in a $\frac{1}{4}$ cup, etc.
 - iv. Ask them to do the measuring and show when you estimate (1/2 teaspoon in your palm etc).
- c. In the kitchen:
- i. What holds more – juice container or milk container? How do you know? How much more?
 - ii. Find containers that have similar volumes but different shapes (like a tall skinny container compared to a short fat container). Ask them to determine by looking which has more, then read the volumes
 - iii. Estimate weights of ingredients (a potato, carrots, etc) and then weigh them on a scale to see how close you came.
 - iv. Chop vegetables into fractions! If I chop a celery stalk into 4 pieces, what fraction of the stalk is each piece?
- d. In the car: (keep in mind that the working memory is not fully developed so don't surpass 2-digit numbers unless your child can work with larger numbers mentally)
- i. Make 20 – they can make 20 by adding, subtracting, multiplying, dividing, or a combination. This can be done with any number and the more ways a child can find the better! For K – make 5, for Gr. 1/2 – make 10, for Gr. 3/4 – Make 20, 25, 30, etc. for Gr. 5- up to make 100
 - ii. Estimate how far 1 km is (use your odometer). Estimate 2 km. Use Siri to get directions and then make a game out of when to turn (she'll say "turn left in 500m"). It helps students to know how far 500 m or 200 m is.
 - iii. Ask your child an addition (subtraction, multiplication, division) question and then ask them HOW they got it. For example: $15 + 7$ (they might say $10 + 5 + 7 = 10 + 12 = 22$).
 - iv. Ask your child to create a story problem or real-life problem to match a question. For example: $3 \times 4 \rightarrow$ A story problem that might work. I have 3 friends over and I give each friend 4 candies from my Halloween stash, how many candies did I give away?
 - v. Give a question and ask your child to estimate only and then see who is closest (you can play too). For example: 43×37 (estimate $40 \times 40 = 1600$).
6. Always ask WHY or HOW so that they are required to explain their thinking.
7. Play games such as:
- a. Cribbage

- b. Yahtzee
- c. Set
- d. Tangos
- e. Mastermind
- f. Dominoes
- g. Mancala
- h. Chess/Checkers
- i. For younger students: anything with Dice and cards (Snakes and Ladders, board games, card games – ‘ Make 10 Go Fish’)

Addition Strategies:

Power of 10 (partitioning): knowing the pairs of numbers that add to make 10 to partition numbers. Examples: $7+4 = 7+3+1 = 10+1 = 11$ or $8+5 = 8+2+3 = 10+3 = 13$

Near Doubles: once students know their doubles this can be used to find near doubles.

Examples: $7+8 = 7+7+1 = 14+1 = 15$ or $6+7 = 6+6+1 = 12+1 = 13$

Adding 9: we want students to see that adding 9 is the same as adding 10, subtract 1. Example: $9+6 = 10+6-1 = 16-1 = 15$ or $9+8 = 10+8-1 = 18-1 = 17$

Partitioning into place value: this also reinforces the universal “rule” to adding any numbers (whole numbers, decimals, fractions, variables) that you add “like terms”. Example: $324+68 \rightarrow 300 + (20+60) + (4+8) = 300+80+12 = 392$

Subtraction Strategies:

Subtract 9: is just like subtracting 10 +1. Connect this to adding 9. Example: $13-9 = 13-10+1 = 3+1 = 4$

Subtract 8: subtract 10 +2. Example: $12-8 = 12-10+2 = 2+2 = 4$

Power of 10 or partitioning: break up the numbers to make it a multiple of 10. Example: $13-5 = 13-3-2 = 10-2 = 8$.

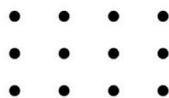
Think of it as addition and count up. Example: $14-6 = 6 + ? = 14 \rightarrow$ then they could do $6 + 4 = 10 + 4 = 14$ so $? = 8$. This strategy can be very useful for larger number subtractions.

Multiplication Strategies:

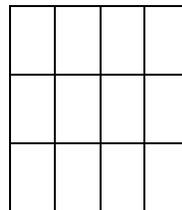
For meaning: use arrays, area models, manipulatives and “GROUPS OF” (if they can’t give you a story problem that would use multiplication it means they likely don’t have conceptual understanding)

Example: 3×4

Array =



Area Model:



3 Groups of 4:



Most students find the 0,1,2,5,10 multiplication facts easier to learn, and so use strategies based on what they know. Using strategies builds number sense and are good pre-algebra thinking activities for students.

3's: double a number and add another group (if they have become proficient at adding, this will be easier for them). Example: $3 \times 7 = 2 \times 7 + 7 = 14 + 7 = 21$

4's: double twice. Example: $4 \times 8 = 2 \times 8 \times 2 = 16 \times 2 = 32$

6's: double the 3's. Example: $6 \times 6 = 3 \times 6 \times 2 = 18 \times 2 = 36$

OR do the # x5 + another group of the #. Example: $6 \times 6 = 5 \times 6 + 6 = 30 + 6 = 36$

7's: do the #x5 + the #x2. Example: $7 \times 8 = 5 \times 8 + 2 \times 8 = 40 + 16 = 56$

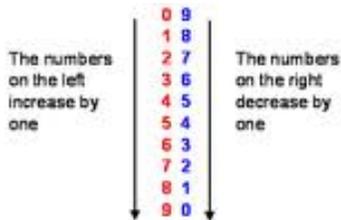
8's: double three times. Example: $8 \times 8 = 8 \times 2 \times 2 \times 2 = 16 \times 2 \times 2 = 32 \times 2 = 64$

OR double the 4's if they know them. Example: $8 \times 6 = 4 \times 6 \times 2 = 24 \times 2 = 48$

OR "jump off" what they know by adding or subtracting groups. Example: 8×7 (if the student knew $7 \times 7 = 49$, then they can add another group of $7 = 56$)

9's: multiply by 10 and then subtract one group of the number. Example: $9 \times 7 = 70 - 7 = 63$

OR use the knowledge that the digits will always add to 9, the pattern of tens and ones



11's: Pattern found up to 9×11 . Example: $11 \times 4 = 44$

OR Multiply by 10 and add another group. Example: $11 \times 7 = 10 \times 7 + 7 = 70 + 7 = 77$

12's: do $10 \times$ the # + $2 \times$ the number. Example: $12 \times 7 = 10 \times 7 + 2 \times 7 = 70 + 14 = 84$

OR add another group to 11's. Example: $12 \times 8 = 11 \times 8 + 8 = 88 + 8 = 96$

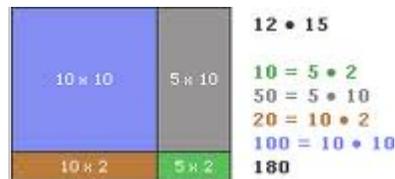
Multi-digit Multiplication:

Use box method or Area Model, distributive property, traditional with meaning (multiplying numbers not digits, so no "carrying over"). All of these methods will have future applications like multiplying binomials. Examples:

Box:

	10	2
10	100	20
5	50	10

Area Model:



Distributive Property:

$$(10 + 2) \times (10 + 5) = (10 \times 10) + (10 \times 5) + (2 \times 10) + (2 \times 5)$$

Traditional with Meaning:

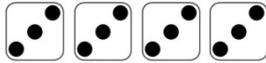
$$\begin{array}{r} 12 \\ \times 13 \\ \hline 100 \\ 30 \\ 20 \\ + 6 \\ \hline 156 \end{array}$$

Division strategies:

Most students find it easiest to think about as the opposite of multiplication.

For meaning: use arrays, area models, manipulatives and explore both equal sharing and equal grouping and how they are similar and different.

Equal Sharing: $12 \div 4 = 3$ means 12 divided into 4 equal groups = 3 in each group:



Note: this works well for whole number divisors

Equal Grouping: $12 \div 4 = 3$ means 12 divided so that there are 4 in each group = how many groups:



Note: this works well for decimal and fractional divisors

Multi-Digit Division:

Repeated subtraction or Partial Quotient method for multi-digit division can be a welcome strategy to use rather than the traditional long division algorithm:

$$\begin{array}{r} 5 \overline{) 672} \\ \underline{500} \\ 172 \\ \underline{100} \\ 72 \\ \underline{50} \\ 22 \\ \underline{20} \\ 2 \end{array} \begin{array}{l} 100 \\ 20 \\ 10 \\ 4 \\ \hline 134 \text{ R}2 \end{array}$$

$$\begin{array}{r} 5 \overline{) 672} \\ \underline{100} \\ 572 \\ \underline{100} \\ 472 \\ \underline{200} \\ 272 \\ \underline{200} \\ 72 \\ \underline{50} \\ 22 \\ \underline{20} \\ 2 \end{array} \begin{array}{l} 20 \\ 20 \\ 40 \\ 40 \\ 10 \\ 10 \\ 4 \\ \hline 134 \text{ R}2 \end{array}$$

Research shows that students who learn this method are more likely to be successful and are more likely to remember it year after year as it requires them to understand what they are doing.

Long division algorithm with meaning: 2 Options:

$$\begin{array}{r} 1,283 \\ 6 \overline{) 7,698} \\ \underline{-6,000} \\ 1,698 \\ \underline{-1,200} \\ 498 \\ \underline{-480} \\ 18 \\ \underline{-18} \\ 0 \end{array}$$

Option 1: use the actual numbers (for example 6000) rather than the digits.

Option 2: use place value so students understand that 43 tens = 430.

	hundreds	tens	ones	
13	4	3	3	R8
		3	3	
		43		
		<u>39</u>		
		4	47	
			<u>39</u>	
			8	

USEFUL WEBSITES

www.educatingnow.com – is my own company's site – the blog is free and has more detail about the information I shared with you this evening. It is also how you can contact me with questions.

<https://www.youcubed.org/students/> - great messages for students (and parents) and some good problems, articles, games, etc.

<http://www.mindsetonline.com/howmindsetaffects/parentsteacherscoaches/index.html>

- This is Carol Dweck's work around the Growth mindset – well worth the read!

https://www.ted.com/talks/carol_dweck_the_power_of_believing_that_you_can_improve?language=en

- This is Carol Dweck's TED talk – it's about 10 minutes long and is directly related to how the growth mindset affects mathematics achievement.

<http://www.mec-math.org/math-at-home/>

- A wonderful site filled with useful tips, games, and ways to support your child in math

<https://www.schoolbag.sg/story/preparing-students-for-the-21st-century#.Vp04yugrLIU>

- A quick read that sums up why and how the math curriculum is changing

<http://www.gregtangmath.com/breakapart>

- Great online game to teach basic fact mastery using STRATEGIES
- His other games are all beneficial as well – 10 minutes of this a night will make a big difference!

www.nrichmaths.org – has some great problems and activities that promote deeper mathematical thinking and it's free!

Find children's books that have a Math theme here:

<http://www.the-best-childrens-books.org/math-for-kids.html>

http://www.goodreads.com/list/show/14440.Top_Rated_Educational_Math_Books_for_Children

<http://teachmath.openschoolnetwork.ca/grade-1/number-sense/510-frames/>

-5 and 10 frames you can print and use with beans, buttons, etc.

