PARENTS +
STUDENTS =
MATH SUCCESS

A practical guide for parents to help their children understand math

Compiled by:

Recognizing **A**ccelerated **M**ath **P**otential in **U**nderrepresented **P**eople

A partnership between North Carolina State University Colleges of Engineering and Education, Shaw University and the Wake County Public School System

Dear Parents,

The RAMP-UP program is one about potential and opportunity. We passionately believe that *anyone* can succeed in math IF they learn it in a way that makes sense to them. Even though I am an engineer, I learn math very slowly and have to do it physically (using stuff so I can SEE it) before I understand it. There are many, many folks just like me, who learn best by doing instead of listening. This guide will give some information about how to help your child DO math at home, to teach and reinforce basic facts so they are well prepared to take on more complex topics later. The activities are intended to be done together, and will give you some ideas how to help your child succeed in math, even if it wasn't YOUR favorite subject.

Math is everywhere, and success in math in high school gives us a good idea of overall success in college. We've given you some great ways to help your student on this path. Work together, develop new ideas and most importantly, HAVE FUN!

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Why me? Well, parents are their child's most important teacher
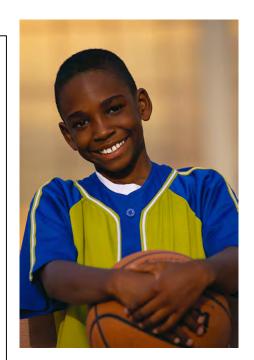
Parents can help their children succeed in math by:

- Talking with them about what they learned in math that day

- Showing them examples of math in daily life (the grocery store and gas station are just a couple of examples)

- Working with them at home on fun and interesting math activities

- Encouraging your child to ask questions, solve problems and to explain their answers. Don't be afraid to say "I don't know but let's figure it out" to your child

- Make them aware of when you are using math (such as figuring out how much money to give a clerk and how much change you get back). If it's difficult for you, admit it and then model determination by working it out.

- Challenge your child in their areas of math strength and get support for them in their areas of math weaknesses. Seek help from teachers and others if you are having trouble with it too.

- Be your child's BIGGEST math advocate. Stay aware of their progress in math and be sure they are on the right track.

Help Your Child See How Mathematics is a Part of Daily Life

Parents and other family members can greatly influence children's math skills and attitudes. Perhaps you do not realize it, but whenever you sort objects, read maps or schedules, compare prices, make change, or use a calculator or calendar, you are a model of mathematical behavior. When you measure, weigh, work with family finances, or figure out how much wallpaper will cover a wall, you are a living textbook!

The best help you can give your student in math is simply to make your child aware of when and how to use math.

Here are a few math activities that you can do with your child.

Estimation Activities

1. Young children can estimate by using items like pencils, crayons, or parts of their own bodies. Older children can use regular units of measurement like rulers or measuring cups and spoons.
2. Ask your child to guess the number of items in your home. Make a list. Then count them together. Examples may include pillows, windows. doors, chairs, and shoes. Then compare estimates with an actual count. Make comparisons between items to help young children understand the concepts of "more" or "less" and put them into categories.
3. Have your child complete his/her own height and weight charts. Begin by estimating, actually measure, and then graph the information. Keep a record over a period of time.
4. Help your child to measure the perimeter (border) and area (the amount of space something takes up) of things around the house. Some good things to start with are your body vs. theirs, the rooms in your house, your yard or driveway, windows…you get the idea.   An easy way to do this is to use string or rope to 'measure' and then figure out the length of that using a measuring tape or yardstick.

Traveling Activities

1. Discuss directions (north, south, east, and west) to give your child a sense of coordinates. Have child use street maps to find travel routes and addresses and estimate the time you'll get where you're going and compare that to the actual time it took to arrive there.
2. Have competitions when traveling. Have child count red cars or see who can find the largest number formed by the numerals on a license plate.
3. To help with learning place values, have your child practice, write down, and read the large number on license plates he/she sees while riding in the car. Find the largest number in a given time period of travel or per trip.

Cooking/Shopping Activities

1. Let your child help with the cooking by measuring the ingredients and checking cooking times and temperatures. Older children can increase or decrease recipes.
2. Have child figure out how to cut a pizza, cake, pie, or sandwich for different numbers of people.
3. Have child determine how much or how many of a grocery item is needed for the entire family, or how much is needed for a given recipe.

(Adapted from http://www.ictm.org/parents/important.html*)*

A Parent's Guide to Helping Your Child with Today's Math

Math looks different these days.

When you visit your child's mathematics classroom, it may look different from what you remember. 2 apples + 2 apples still equals 4 apples, and 7 x 8 is still 56, but now you're likely to see students counting real apples instead of just seeing them in a book. The math hasn't changed, but how we look at it has.

We want ALL students to realize that math is more than adding, subtracting, multiplying and dividing. We want children to be able to connect math to their everyday lives. We know that every child is capable of achieving in math topics such as geometry, data and statistics, algebra, and measurement — topics we've traditionally thought of as only accessible to some.

My child's teacher says that the mathematics curriculum is problem-based. What does that mean?

Teachers are now designing mathematical tasks that ask students to think deeply about math and how that math is part of their real lives. The problems students encounter won't be the two problems at the end of the lesson page that we all remember, but they'll be "real" problems that use math in a "real" way. It may be a problem that takes the children an hour, or perhaps several, to solve. There may be multiple ways to solve the problem.

My child talks about working in pairs and groups in math. Is this helpful?

Research shows that students working together enhances learning. Working together provides time for students to talk about the math they understand and the math they don't understand. This also provides more opportunities for more students to talk and allows the teachers to hear more students' thoughts and ideas.

Many different materials seem to be used in math class. I hear about pattern blocks and algebra tiles. How are they helping my child learn math?

Materials like pattern blocks and algebra tiles help students make sense of math. Psychologists believe that all students need to understand concepts at a concrete level before they move onto abstract ideas. Some materials inherently have math concepts connected to them and help students bridge their understanding of math concepts (sixth graders may fill a box with 1-inch cubes as they learn about volume, and fourth graders may make fraction kits to help them understand fractional parts).

My child's homework is so different from what I did in school. How do I help?

Today's homework is different, and the amount may be different too. Today's teachers know that practice is still important, and students will continue to do that. However, we also know from research that students need activities and tasks that ask them to delve deeper into the concepts and content of mathematics. Because of this, there may be fewer problems assigned, but these problems will require students to think more deeply about math and make connections to math in their own lives. You can help your child by participating in a [Family Math Night](#) or helping your child collect real data at home for a statistics project.

I see fewer graded papers coming home than I remember bringing home to my parents. How is my child being evaluated?

Teachers continue to use traditional paper and pencil tests as well as district and statewide tests to help them make decisions about instruction and assessment. However, teachers are also using tried and true methods of "kidwatching." Watching students while they work in pairs and alone provides teachers with valuable information about your child's progress. Students are asked to communicate their understanding in a variety of ways. They may be asked to keep a math journal and write about the math they are learning. For example, after learning a concept your child may be asked to write and describe how he would teach that concept to a younger child. Teachers can learn a great deal about a student's understanding this way.

What resources are available to help me support my child's interest in math?

Web Sites
NEA's mathematics topic area
The National Council of Teachers of Mathematics
FigureThis!
The Math Forum at Drexel University

Books
Beyond Facts & Flashcards; Exploring Math With Your Kids. Jan Mokros
50 Simple Things You Can Do To Raise a Child Who Loves Math. Kathy A. Zahler
Math Power: How to Help Your Child Love Math, Even If You Don't. Patricia Clark Kenschaft
Math: Facing an American Phobia. Marilyn Burns

Sample Problems:

1. Students in second grade may be asked to solve 13 + 39. Some students may answer it using a traditional algorithm (adding the ones and then the tens to get the answer, trading when they need to.) Other students may start by adding the 10's – 10 + 30 is 40 – and then going to the one's – + 3 is 43 + 9 is 52. Others might say 9 + 3 = 12, 10 + 30 = 40, and 40 +12 is 52.

2. Students at various grade levels can solve the following algebra problem in numerous ways:

A farmer sends his daughter and son out into the barnyard to count the number of chickens and pigs. When they return the son says that he counted 200 legs and the daughter says she counted 70 heads. How many pigs and chickens does the farmer have?

A student well versed in algebra might do the following to set up the problem: p = pigs, c = chickens. $p + c = 70$ (heads) $4p + 2c = 200$ (pigs have 4 legs and chickens have 2 legs). These two equations may be used to solve the problem. Students might solve this problem by "guessing and checking," or drawing pictures. Some methods of solving problems might be considered more "efficient." That may be true, but the correct answer can be found using multiple methods. Children think about mathematics in different ways depending on their prior experiences at home and school. By allowing students to think flexibly about numbers, we encourage them to "own" the math forever, instead of "borrowing" until class is over. *(Answer: 40 chickens and 30 pigs)*

This guide is a joint project of NEA and National PTA.

Problem Solving Strategies

When your child asks for (or needs) help with homework, you can best help them by reinforcing the tools they will need to know to be able to solve problems on their own. The following are some ways to approach problems to solve them (adapted from Mathstories.com).

1. Find a Pattern

Question: Carol has written a number pattern that begins with 1, 3, 6, 10, 15. If she continues this pattern, what are the next four numbers in her pattern?

Using the Strategy: Look for and find a pattern to the information that's been given.

1) UNDERSTAND: What do you need to find?

You need to find 4 numbers after 15.

2) PLAN: How can you solve the problem?

You can <u>find a pattern</u> by looking at the numbers. The new number depends upon the number before it.

3) SOLVE: Look at the numbers in the pattern.

$3 = 1 + 2$ (starting number is 1, add 2 to make 3)

$6 = 3 + 3$ (starting number is 3, add 3 to make 6)

$10 = 6 + 4$ (starting number is 6, add 4 to make 10)

$15 = 10 + 5$ (starting number is 10, add 5 to make 15)

New numbers will be

$15 + 6 = 21$

$21 + 7 = 28$

$28 + 8 = 36$

$36 + 9 = 45$

2. Make a Table

Question: You save $3 on Monday. Each day after that you save twice as much as you saved the day before. If this pattern continues, how much would you save on Friday?

Using the Strategy: Organize the information into a table.

1) UNDERSTAND: What do you need to find?

You need to find how much you will save on Friday if you save $3 on Monday and then save twice as much each

day as you saved the day before.

2) PLAN: How can you solve the problem?

You can make a table like the one below. List the amount of money you save each day. Remember to double the number each day.

Day	Amount of Money Saved
Monday	$3
Tuesday	$6
Wednesday	$12
Thursday	$24
Friday	$48

3) SOLVE: Look at the numbers in the table. You save $48 on Friday

3. Working Backwards

Question: Jack walked from Santa Clara to Palo Alto. It took 1 hour 25 minutes to walk from Santa Clara to Los Altos. Then it took 25 minutes to walk from Los Altos to Palo Alto. He arrived in Palo Alto at 2:45 P.M. At what time did he leave Santa Clara?

Using the Strategy: Start at the end: what time did you arrive at the destination (Palo Alto)?

1) UNDERSTAND: What do you need to find?

You need to find what time Jack left Santa Clara.

2) PLAN: How can you solve the problem?

You can work backwards from the time Jack reached Palo Alto. Subtract the time it took to walk from Los Altos to Palo Alto. Then subtract the time it took to walk from Santa Clara to Los Altos.

3) SOLVE:
Start at 2:45. This is the time Jack reached Palo Alto.
Subtract 25 minutes. This is the time it took to get from Los Altos to Palo Alto.
Time is: 2:20 P.M.

Subtract: 1 hour 25 minutes. This is the time it took to get from Santa Clara to Los Altos..

Jack left Santa Clara at 12:55 P.M.

4. Guess and Check

Question: Amy and Judy sold 12 show tickets altogether. Amy sold 2 more tickets than Judy. How many tickets did each girl sell?

Using the Strategy:

1) UNDERSTAND: What do you need to find?

You need to know that 12 tickets were sold in all. You also need to know that Amy sold 2 more tickets than Judy.

2) PLAN: How can you solve the problem?

You can guess and check to find two numbers with a sum of 12 and a difference of 2. If your first guess does not work, try two different numbers.

3) SOLVE:

First Guess:
Amy = 8 tickets
Judy = 4 tickets

Check
8 + 4 = 12
8 - 4 = 4 (Amy sold 4 more tickets)
These numbers do not work!

Second Guess:
Amy = 7 tickets
Judy = 5 tickets

Check
7 + 5 = 12
7- 5 = 2 (Amy sold 2 more tickets)
These numbers do work!

Amy sold 7 tickets and Judy sold 5 tickets.

5. Draw a Picture

Question: Laura has 3 green chips, 4 blue chips and 1 red chip in her bag. What fractional part of the bag of chips is green?

Using the Strategy:

1) UNDERSTAND: What do you need to find?

You need to find how many chips are in all. Then you need to find how many of the chips are green.

2) PLAN: How can you solve the problem?

You can draw a picture to show the information. Then you can use the picture to find the answer.

3) SOLVE: Draw 8 chips.

3/8 of the chips are green.

6. Make a List

Question: Judy is taking pictures of Jim, Karen and Mike. She asks them, "How many different ways could you three children stand in a line?"

Using the Strategy:

1) UNDERSTAND: What do you need to know?

You need to know that any of the students can be first, second or third.

2) PLAN: How can you solve the problem?

You can make a list to help you find all the different ways. Choose one student to be first, and another to be second. The last one will be third.

3) SOLVE: When you make your list, you will notice that there are 2 ways for Jim to be first, 2 ways for Karen to be first and 2 ways for Mike to be first.

First	Second	Third
Jim	Karen	Mike
Jim	Mike	Karen
Karen	Jim	Mike
Karen	Mike	Jim
Mike	Karen	Jim
Mike	Jim	Karen

So, there are 6 ways that the children could stand in line.

7. Write a Number Sentence

Question: Sam put 18 pencils in 3 equal groups. How many pencils are in each group?

Using the Strategy:

1) UNDERSTAND: What do you need to know?

You need to know that there are 18 pencils and they are divided into 3 equal groups

2) PLAN: How can you solve the problem?

You can write a number sentence to solve the problem. Write a division sentence to divide the pencils in 3 equal groups.

3) SOLVE:

$18 \div 3 = 6$ so there are 6 pencils in each group.

**Top Ten Ways to Help Your Kids Do Well in Math (**) *Peggy Gisler, Ed.S. and Marge Eberts, Ed.S.*

Mastering Math
Mastering mathematics is absolutely essential for future opportunities in school and careers. Your children will need to reach a certain level of competency in math to take many advanced high-school courses, to be admitted to college, and to have a wide variety of career choices. Here's how you can help them maximize their math-smarts.

1. Make sure your children understand mathematical concepts.
Otherwise, math becomes a meaningless mental exercise of just memorizing rules and doing rote drills. Have your children manipulate objects to figure out basic concepts. For addition, they could add one, two, or more blocks to a pile of blocks and then tell you how many blocks are in the pile.

2. Help them master the basic facts.
Mastery of a basic fact means that children can give an answer in less than three seconds. Considerable drill is required for children to give quick responses. Use flash cards to help your children learn the basic facts. When they don't know an answer, have them lay out objects to solve the problem.

3. Teach them to write their numbers neatly.
Twenty-five percent of all errors in solving math problems can be traced back to sloppy number writing. Improve your children's number-writing skills by having them trace over numbers that you have written. Suggest they use graph paper to keep the numbers in problems neatly aligned.

4. Provide help immediately when your children need it.
Math is one subject in which everything builds upon what has been previously learned. For example, a failure to understand the concept of percent leads to problems with decimals. If a teacher is unable to help your children, provide the help yourself or use a tutor or learning center.

5. Show them how to handle their math homework.
Doing math homework reinforces the skills your children are learning in class. Teach them to begin every assignment by studying the textbook or worksheet examples. Then have them redo the examples before beginning the assignment to make sure they understand the lesson.

6. Encourage your children to do more than the assigned problems.
Considerable practice is necessary for your children to hone their math skills. If the teacher only assigns the even problems, having them do some of the odd ones will strengthen their skills. The more time your children spend practicing their skills, the sooner they will develop confidence in their abilities.

7. Explain how to solve word problems.
Mathematicians have an expression: To learn to solve problems, you must solve problems. Teach your children to read a word problem several times. Also, have them draw a picture or diagram to describe it. Make it easier for them to understand the steps in a problem by teaching them to substitute smaller numbers for larger ones.

8. Help your children learn the vocabulary of mathematics.
They will never get a real feeling for math nor learn more advanced concepts without an understanding of its vocabulary. Check that your children can define new terms. If not, have them use models and simple problems to show you they understand how the term is used.

9.Teach them how to do math "in their head."
One of the major ways to solve problems is by using mental math. Kids should use this method frequently instead of using pencil and paper or a calculator. When helping your children with a problem, help them determine when it would be appropriate to use mental math.

10. Make mathematics part of your children's daily life.
Mathematics will become more meaningful when your kids see how important it is in so many real-life situations. Encourage them to use math in practical ways. For example, ask them to space new plants a certain distance apart, double a recipe, and pay bills in stores.