

## Focus on Helping Children Learn Math Facts

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The time you will invest in setting up a math facts program will be well worth it. Number lines, charts, counters, and calculators are great tools to introduce addition, subtraction, and multiplication, but the bottom line is that fluency and knowing the correct answers to math facts is essential! If children do not memorize the math facts, they will always struggle with math.

If you are working with a very young child, or one who has special needs, first determine if your child understands what numbers are, and if your child can:

1. Count to at least 18 for addition and subtraction facts. (Count to at least 81 for multiplication facts.)
2. Correctly count a given number of items. (Can your child see 3 buttons or 14 dots and count that number of items correctly?)
3. Identify numbers and show what those numbers mean. (5 means five ///// items.)

If your child demonstrates these readiness skills, and you are introducing addition and subtraction, then take the time to make sure your child can use counters or pictures to show what the concepts of addition and subtraction mean. This is very important.

For example, your child should be able to show with a drawing on paper or by using counters or other objects that  $5+3$  means five objects and three objects, and that the total is eight items. ( $3+5$  is the same answer.) Use meaningful story math problems. If you have 5 pennies, and mom gives you 3 more pennies, how many pennies will you have in all?

Your child should be able to show that  $11-4$  means there are eleven items and four were taken away. There were 11 cookies. Dad ate 4. There are 7 cookies left.

When ready to multiply, your child should be able to show that  $4 \times 6$  means there are four groups and each group has six items in it for a total of 24. There are 4 plates. Each plate has 6 pretzels. There are 24 pretzels in all. ( $6 \times 4$  is the same answer, but means 6 groups of 4.)

Once the above prerequisite skills are in place, it is time to teach strategies and tricks to help your children memorize math facts! Once you get started, you and your child will see that it does not take up a lot of time, and it is easy, and even fun, to learn math facts.

### Setting Up the Math Facts Program

(Skip to step 7 if you are teaching a beginning learner who has never been introduced to math facts.)

Two reproducible workbooks, *Two Plus Two Is Not Five: Easy Methods to Learn Addition and Subtraction* and *Five Times Five Is Not Ten: Make Multiplication Easy*, provide record-keeping pages, worksheets to introduce math fact strategies, and lots of practice and review pages.

1. Use sets of commercial math fact cards to determine which math facts are mastered or "known." "Known" means facts answered automatically and correctly without counting. You can make your own set of test cards, but in either case, only test up to 9+9 and 18-9. Check addition first, then subtraction. For students working on multiplication, test this last or on another day.
2. Explain that you want to find out which facts they already know, and that you will teach them the other facts. Tell them it is okay if they do not know some facts, and that they will not have time to count out answers.
3. How much time should you give for an answer? I do a check to see how long it takes for an answer that I am fairly sure the child will know. (1+1, 2+2, or 5+5) Say, "What is 5+5?" Most likely, you will get a very quick and correct response of 10. Then ask, "What is 14-6?" There might be some hesitation, and maybe a mental or finger count to get the answer of eight. (If your child knew this answer immediately, perhaps he knows many of the fact answers.)
4. Keep a record of known facts. Both books provide record-keeping pages for you to use, or you can manually list the known facts onto a sheet of paper.

As mentioned, the program initially takes time for set-up. Allot about 15-30 minutes per child to "test" which facts each child knows. Later, during planning time, make a fact card for each known fact for each of your children.

5. I use bright colored markers to write the facts on 3" by 5" blank index cards. Keep the cards in rubber-banded piles labeled with the child's name. Put addition and subtraction facts in one pile, and multiplication cards in another. Excluding zero facts, there are 81 addition, 81 subtraction, and 81 multiplication facts to learn in all.

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

$$\begin{array}{r} 3 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 6 \\ \hline \end{array}$$

6. Day 2. Review these fact cards. Remember, your child knows them, so they will be easy to answer, and your child will feel good about saying the answers quickly! (If there are a few facts that your child answers incorrectly, perhaps it was a lucky guess on test day. Pull out of the pile, and make sure you note that on the record-keeping page to teach on another day.)
7. Teach a few new math facts each day. Make new fact cards, and mark the record-keeping sheet. Add the new facts to the stack of known facts, and continue to practice daily. Give children a strategy or trick to remember and memorize the math fact. Some math facts have multiple strategies, and you may know some of your own.

Set the pace at the child's ability. Some children will be ready to learn new facts during each practice session; others may not. Keep your child successful, and remember to praise.

## Examples of Tricks and Strategies from Two Plus Two and Five Times Five

Certain facts and strategies have prerequisites.

*Number in the Middle* is an addition strategy based on knowing doubles facts in addition. The *number in the middle* facts are  $1+3$ ,  $3+1$ ,  $2+4$ ,  $4+2$ ,  $3+5$ ,  $5+3$ ,  $4+6$ ,  $6+4$ ,  $5+7$ ,  $7+5$ ,  $6+8$ ,  $8+6$ ,  $7+9$ , and  $9+7$ .

After your child knows  $5+5=10$ , teach  $4+6$  and  $6+4$ . Write on paper: 4 \_\_\_ 6. Ask what number comes between 4 and 6. Five is between 4 and 6. Then show with counters when you take one off six items and add it onto the 4 items, you have two groups of five. The addition facts  $6+4$  and  $4+6$  both equal 10 because five is the *number in the middle*, and  $5 + 5$  is 10.

*Right Next to Each Other* introduces  $10-9$ ,  $9-8$ ,  $8-7$ ,  $7-6$ ,  $6-5$ ,  $5-4$ ,  $4-3$ ,  $3-2$ , and  $2-1$ . Before teaching this subtraction strategy, children must realize that 10 is next to 9, 9 is next to 8, 8 is next to 7, and so on. When numbers are *right next to each other* in subtraction, the answer is always one.

*Straight Lines* is a visual trick. Of all the numerals 0,1,2,3,4,5,6,7,8,9, only 1, 4, and 7 are straight. Children will remember  $4+7=11$ ,  $7+4=11$ ,  $11-4=7$ , and  $11-7=4$  because of *straight lines*.

*Count by 3s* introduces  $3+6=9$ ,  $6+3=9$ ,  $9-3=6$ , and  $9-6=3$  with a little rhyme, “Three, six, nine, who do you think is mighty fine?” This also works when teaching  $3 \times 3$ , because you will show with counters that those three groups of 3 are the same as adding  $3+6$  or  $6+3$ .

*Count 5,6,7,8* is a very easy visual trick for  $7 \times 8$  and  $8 \times 7$ . Write on paper: \_\_\_, \_\_\_, 7, 8. Ask what numbers come before 7 and 8. They will fill in 5 and 6. Tell them to remember  $56=7 \times 8$  and  $8 \times 7$  because of the *count 5,6,7,8* trick.

### Fact Card Practice

After the first week, divide the growing pack of fact cards into quickly answered and less quickly answered sections. Separate the cards by putting a card labeled *Middle* on top of the quickly and correctly answered cards. Newest or incorrectly answered facts should stay on top of the *Middle* section and under your child’s name. Continue to practice daily leaving the quickly answered cards in the *Middle* section, and newer cards on *Top* under your child’s name.

This next part may sound confusing, but it really works! During the third week of the program, separate the pack again. Move quickly answered fact cards from the *Middle* section into a new section called *Quick*. Do not move newly assigned cards into the *Quick* section; do not move any cards from the *Top* part into the *Quick* section. Practice *Quick* cards only once a week.

Next, move fact cards answered quickly from the *Top* section into the *Middle* section. Newest or incorrectly answered cards should stay on *Top* of the *Middle* section and under your child's name. Continue to practice *Middle* and *Top* facts daily.

### Written Practice

Structure written practice with known and new math facts. Use worksheets from *Two Plus Two* and *Five Times Five*, or you can create your own worksheets by referring to the list of known and taught facts on the record-keeping sheet. Children will work with confidence, because we are asking them to answer only known facts.

### Routine:

1. First, mix the *Top* and *Middle* cards together. Quickly and correctly answered facts stay in the *Middle* section; the rest go back to the *Top*. Review strategies and math fact answers. These cards need extra practice.
2. Introduce a few new math facts per day. Make new fact cards, and update the record-keeping chart.
3. Assign worksheets using known and new facts. Children will get practice writing correct answers without counting.
4. Encourage use of trick or strategy names to recall answers.
5. Once a week, practice *Quick* cards. First, mix the *Middle* and *Quick* cards together. Keep all cards answered quickly and correctly in the *Quick* section. Move any others back to the *Top* under your child's name to give extra practice.
6. Give praise for progress!

### Mastery

Continue to practice and teach new facts so that over time, the child learns all of the facts. Time needed varies by ability, number of facts initially known, and frequency of practice sessions.

After all facts are taught and in the *Quick* section, pull out the *Middle* and *Quick* cards. Award a certificate of mastery, but it is important to continue review. Rotate through the pack by practicing about 15-20 facts each day from the top of the stack, and then place them on the bottom.

Some considerations when teaching new math skills:

Use known facts, and your child can focus on learning the skill. Help children see that the same  $4+5$  on a fact card is the same  $4+5$  on the practice paper and within a more complex problem such as  $24+5$ , and within a word math problem such as adding  $\$4 + \$5$ .

If your child knows  $5+9$ , but not  $4+8$ , then teach addition regrouping with  $25 + 9$ , but not  $24 + 8$ . Your child will not worry about counting out the answer to  $5+9$ , because the answer is already known!

Devise word math problems using known facts. If your child knows  $4 \times 6 = 24$ , teach area using  $6m$  and  $4m$  for length and width. Your child knows  $4 \times 6$ , and can focus on learning the formula and why it works.

Use calculators after math facts are learned and after students can do the calculation on paper. To complete the long division of 367 divided by 71, students need to divide, multiply, and subtract! Can a student multiply  $4.11 \times .9$  correctly on paper and understand why the answer is less than 4 and not about 36?

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### **Biographical Information**

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