

Plans for Basic Math Facts

Learning basic addition, subtraction, multiplication, and division facts typically demands that students memorize a large amount of information. Students who memorize math facts learn the information in order. For example, students are often encouraged to say or write the basic facts in sequence ($7 + 8 = 15$). Writing or saying this sequence of numbers puts the task into a linear order with at least five steps. A strategy that teaches children to obtain the correct answer without relying on memorization of a string of digits can be helpful. Because many students may not use strategies to learn their basic facts, they should be specifically taught to do so.

Plans to Learn Basic Math Facts

Using plans to learn math facts is an effective strategy because the answer is obtained by thinking (using the plan or method) rather than by relying on remembering the string of numbers. The method requires that the student use some rule or method of arriving at the answer. For example, the “doubles plus one” rule can be used to help students find the answer to $7 + 8$ without relying on memory of the answer because the answer can be obtained by thinking as follows: “ $7 + 8 . . .$ well, $7 + 7$ is 14, so $7 + 8$ has to be one more than 14, so the answer is 15.” Here are some strategies for addition:

- $2 + 2$ is a car with four wheels.
- $3 + 3$ is the legs of an ant.
- $4 + 4$ is an octopus with four legs on each side.
- $5 + 5$ is fingers on both hands.
- $6 + 6$ is an egg carton (or the legs of two ants).
- $7 + 7$ is two weeks.
- $8 + 8$ is two spiders.
- $9 + 9$ is two baseball teams.

Here are some rules for multiplication:

- 0 multiplied by any number is always 0 ($0 \times 9 = 0$).
- 1 multiplied by any number is always that number ($1 \times 7 = 7$).
- 2 multiplied by a number will end in a zero or an even number ($2 \times 2 = 4$, $2 \times 10 = 20$).
- 5 multiplied by any number gives an answer that must end in 0 or 5. 5 multiplied by any number involves counting by fives, as when telling time from a standard clock. 5 multiplied by an even number is half that number with a 0 added ($5 \times 4 = 20$, $5 \times 8 = 40$).
- 9 multiplied by any number can be solved by a plan: take one away from the multiplier. That number goes into the tens place. Subtract that number from 9. That number goes into the ones place, which gives the answer ($9 \times 8 = 72$, $8 - 1 = 7$, which goes in the tens place. $9 - 7 = 2$, which goes in the ones place for a final answer of 72). 9 multiplied by any number is that number multiplied by 10 minus the number ($9 \times 7 = 63$,

$10 \times 7 = 70$, and $70 - 7 = 63$). Of course, the tens rule should be mastered before this one.

- The answer to 10 multiplied by any number always ends in 0. Simply put a 0 on the end of the multiplier ($4 \times 10 = 40$).

After learning all of the multiplication rules, only the following facts must be specifically memorized: 3×3 ; 3×4 ; 3×6 ; 3×7 ; 3×8 ; 4×4 ; 4×7 ; 4×8 ; 6×7 ; 7×7 ; 7×8 ; 8×8 . Teachers should teach a few rules at a time, allowing students to learn each one thoroughly before moving to the next. After the rules have been taught and monitored, they can be posted in the room for independent use. Throughout instruction the teacher should

- Use direct explanation. Teach why, when, and where to use these rules.
- Model skills. Talk through examples and show how the skill is applied.
- Provide practice with feedback.
- Phase out teacher direction and phase in student use throughout instruction.

Who Should Learn Plans for Math Facts?

This instruction is likely to benefit students who have had problems learning math facts. Because this intervention encourages children to solve the problems by applying a strategy, it involves a lot of Planning. If a child scores low in Successive processing, he or she is likely to have problems memorizing math facts because they are presented in a specific order. Students with Successive processing problems should be taught to use these math strategies or plans. This technique may be used to help students approach multiplication and division in a strategic way that does not rely on their problem area (Successive processing).

Resources

Two excellent starting points for both students and teachers are available at forum.swarthmore.edu/dr.math/dr-math.html and <http://www.mathgoodies.com>.

Goldstein, S., & Mather, N. (1998). *Overcoming underachieving: An action guide to helping your child succeed in school*. New York: John Wiley & Sons.

Muschla, J.A., & Muschla, R.G. (1995). *The math teacher's book of lists*. Upper Saddle River, NJ: Prentice Hall.

Naglieri, J.A. (1999). *Essentials of CAS assessment*. New York: John Wiley & Sons.