Introduction

These strategies can be started as early as kindergarten, first, and second grade. They are appropriate for any person of any age who needs help with basic mathematics concepts and skills. The trick is to do these exercises both orally and visually, with little or no writing. Pictures can be used as visual aids. Real-world objects (coins, blocks...) should be used as appropriate.

Counting

The most basic skills in mathematics are counting and grouping (“seeing” numbers in groups). To develop counting skills, help children learn to count from any number, to any number, by any number. Do all counting forward and backward.

- Count by 1s, starting at 0 (0, 1, 2, 3…250…),
  - then starting at any number [e.g., 28, 29, 30…40…].
- Count by 2s, starting at 0 (0, 2, 4, 6…24…),
  - then starting at 1 (1, 3, 5…25…),
  - then starting at any number [e.g., 23, 25, 27…49…].
- Count by 10s, starting at 0 (0, 10, 20…500…),
  - then starting at 5 (5, 15, 25…205…),
  - then starting at any number [e.g., 37, 47, 57, 67…347…].
- Count by 1/2s, starting at 0 (0, 1/2, 1, 1 1/2…5…),
  - then by 1/4s, starting at 0 (0, 1/4, 2/4 = 1/2, 3/4, 4/4 = 1, 1 1/4…),
  - then by 3/4s, starting at 0 (0, 3/4, 1 1/4, 1 1/2, 1 3/4, 2…).
- Count by 15s, starting at 0 (0, 15, 30…120…).
- Count by 3s, 4s, 6s, 7s, 8s, 9s, 11s, 12s, 20s, 25s, 50s, 75s, 100s, and 150s, starting at 0.

The benefits of this type of counting practice are strong addition skills and the painless development of Times Tables.

Grouping

To expand children’s thinking processes and help them “see” groups, ask questions like:

- “7 and how much more make 10?” “70 and how much more make 100?”
  - “700 and how much more make 1,000?”
- “10 and how much more make 15?” “10 and how much more make 18?”
  - “10 and how much more make 25?”
“17 and how much more make 20?” “87 and how much more make 100?”
“667 and how much more make 1,000?”
“How far is it from 6 to 10?” “How far is it from 89 to 100?” “How far is it from 678 to 1,000?”
“How many 10s are there in 70? …100? …200? …340? …500? …1,000? …10,000? …1,000,000? …a quadrillion (there are 15 zeros)?”
“How many 4–person teams can you make out of 12 kids? …20 kids? …100 kids? …50 kids?”
“How much is 5, four times? …ten times? …a hundred times? …a thousand times?”

Notice how these questions focus on the number 10, multiples of 10, and powers of 10. These exercises can all be done by counting mentally, and do not require students to do pencil–and–paper computations.

**Fractions**

As counting skills begin to develop, fractions can be introduced. Long before introducing words like *numerator* and *denominator*, teach children that half means “2 parts the same,” and have them use this knowledge to figure out things like:


As the ability to split numbers in half develops, add questions like:

- “How do you know when you have half of something?”
- “Half of what number is 4? …25? …2½?”
- “How many half sandwiches can you make out of three whole sandwiches?”
- “How much is 2 plus 2½?” “How much is 3½ plus 4?”
- “How much is 7 take away 2½?” “How much is 7½ take away 2?”
- “How much is 2½, four times? …seven times? …two–and–a–half times?”
- “How much is a half plus a quarter?”
- “What part of 12 is 6? …is 4? …is 3? …is 1? …is 9? …is 8? …is 12? …is 24? …is 30?”
Don’t be afraid to ask these questions of kindergarteners and first graders. The ability to “see” a whole as being a collection of parts should be learned in the early grades.

**Problem Solving**

Children become good problem solvers when they are asked to solve a broad range of problems early on, at home and at school. Start with easy questions; let the level of difficulty increase as the child’s ability grows.

Ask children questions like:

- “I’m 38 years old, and you are 6. How old will I be when you are 10?”
- “If 3 pieces of candy cost 25 cents, how much do 6 pieces cost? …9 pieces?”
- “How many pieces can you buy for a dollar?”
- “Which would you rather have: 1 piece of a candy bar cut into 3 equal-size pieces, or 1 piece of the same candy bar cut into 6 equal-size pieces? Why?”
- “How can 3 kids share 2 candy bars equally?”
- “How can 3 kids share 6 candy bars equally?”
- “A boy and a girl went to the movies. They spent half of the money they had for their tickets, and they spent half of what they had left on snacks. Finally, they had $5.00 left. How much money did they start with?”

Questions like these help a child’s thought processes become animated. Try it. You’ll see!

**Money**

By the end of second grade, children should know the names and values of the U.S. coins:

- a penny = 1 cent
- a nickel = 5 cents
- a dime = 10 cents
- a quarter = 25 cents
- a half dollar = 50 cents
- a whole (“silver”) dollar = 100 cents

Preschool and kindergarten are appropriate times to begin this training. It is best that parents take care of these things at home, rather than have teachers spend valuable classroom time on them.
By the end of third grade, children should have learned the basic equivalents:

- 20 nickels = 10 dimes = 4 quarters = 2 half dollars = 1 dollar
- 1 dime = 2 nickels
- 1 quarter = 5 nickels
- 1 half dollar = 5 dimes = 10 nickels

Other combinations, like 3 quarters = 15 nickels and 15 dimes = 6 quarters, should also be explored. Next come questions like, “How many dimes have the same value as 6 quarters? …40 quarters?”

Counting piggy banks full of coins is an excellent way to develop these skills.

“Making Change” is a skill that can be introduced in late first grade or early second grade, and can be mastered by fourth grade. Children should learn to make change from:

- a dime
- a quarter
- a half dollar
- one dollar
- two (…five …ten …twenty …hundred…) dollars

Questions can take the form of:
- “You have a dime. If you spend 6 cents, how much will you have left?”
- “If you want to buy something that costs 50 cents, and all you have is 47 cents, how much more do you need?”
- “If you want to buy something that costs a dollar, and all you have is 78 cents, how much more do you need?”
- “If you buy something that costs 18 cents, how much change will you get from $2.00?”
- “If you buy something that costs $1.46, how much change will you get from $2.00?”
- “If you buy something that costs $12.89, how much change will you get from a twenty dollar bill?”

Other money-related questions:
- “A roll of dimes is worth $5.00. How many dimes are in a roll?”
- “A roll of quarters contains 40 quarters. How much is the roll worth?”

Money is the best model of our base 10 (decimal) number system.
Visual Elements

Pictures are useful in presenting and reinforcing many concepts.

- “How many circles are there in the picture?”
- “If each circle is a penny, how much money is shown in the picture?”
- “If each circle is a dime (...a nickel ...a quarter...), how much money is shown in the picture?”
- “Shade in half of the circles. How many circles are not shaded in?”
- “Shade in half of the circles that are not shaded in. Now how many circles are not shaded in?”
- “Again, shade in half of the circles that are not shaded in. Now how many circles are not shaded in?”

Learning Addition and Subtraction Facts

Here is the structure of the process of learning addition and subtraction facts.

Addition

“Doubles”

1) 5 + 5 = ________
2) 9 + 9 = ________

“Doubles plus 1” “Doubles minus 1”

3) 5 + 6 = 5 + 5 + 1 = ________
4) 8 + 7 = 8 + 8 – 1 = ________

“Counting on (start at x and count up by y)”

5) 7 + 2 = ________
6) 8 + 3 = ________

“Breaking down numbers”

7) 6 + _____ = 9
8) _____ + 7 = 11

“How far apart are two numbers?” “How far is it from x up to y?”

9) How far apart are 6 and 10? _____
10) How far is it from 9 up to 12? _____

“Combinations that make 10”

11) 8 + 2 = ________
12) 6 + 4 = ________

“10 plus a number”

13) 10 + 7 = 17
14) 10 + 9 = 19

“10 plus what number?”

15) 10 + _____ = 16
16) 10 + _____ = 19
“Putting it all together”
17) “8 + 6 = ___”: “8 plus how much makes 10” (2) ... [6 – 2 = 4] ... 10 plus the left–over (4) ... 10 + 4 = 14

18) “9 + 7 = ___”: “9 plus how much makes 10” (1) ... [7 – 1 = 6] ... 10 plus the left–over (6) ... 10 + 6 = 16

Subtraction
Subtraction has two aspects:
• the notion of “how much is left,” and
• the notion of “how far apart are the two numbers” (how far is it from the smaller number up to the bigger number).

Use the notion of “how much is left” when the numbers are fairly far apart, and count down.

For example, “12 – 3” is best thought of as “counting down from 12 by 3.”

On the other hand, use the notion of “how far apart are the two numbers” when the numbers are fairly close to each other, and count up.

For example, “12 – 9” is best thought of as “how far is it from 9 up to 12.”

After a good deal of practice with both methods, you will use the right one automatically as you are doing these types of problems.

Try these:

1) Which method would you use for “100 - 98”? (CIRCLE ONE)
   **How far apart**  **How much is left**

2) Which method would you use for “100 - 3”? (CIRCLE ONE)
   **How far apart**  **How much is left**

3) Which method would you use for “100 - 87”? (CIRCLE ONE)
   **How far apart**  **How much is left**

4) Which method would you use for “100 - 15”? (CIRCLE ONE)
   **How far apart**  **How much is left**
Learning to “Tell Time”

In our modern era it is tempting to let young children learn to tell time on a digital watch or a digital clock. Digital timepieces definitely have their place, after students have learned all of the benefits that can be derived from learning the ins and outs of reading an analog (a “round”) clock.

Here are a few of the benefits of learning to tell time on an analog clock.

- “Half past,” “quarter ‘til,” and “three quarters of an hour” are easy to visualize on a “round” clock.
- The notions of “clockwise” and “counterclockwise” are transparent on an analog clock. While most adults take this for granted—be forewarned—it is a learned skill.
- The imagery of the “big hand” sweeping through 90°, 180°, 270°, and 360° cannot be reproduced on a digital watch.
- The visualization of the angles between the hands of an analog clock is an excellent pre-Geometry skill (90° at 3:00 and 9:00, 120° at 4:00…).
- “Elapsed time” is much easier to “see” on a round clock.
- Counting by 5s, 10s, 15s, 30s, and 60s is greatly facilitated by being able to see the numbers on a round clock.

Eventually, students need to learn to deal with both systems. Make sure your child gets lots of practice outside the classroom, especially in dealing with analog (“round”) clocks.

A Different Way to Think about Percent

“PER cent” means “FOR EACH 100”
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Teaching Children Math in Ways That Make Sense to Them

The Math Tips for Parents of Children in Grades K–5 booklet was developed by Larry Martinek, the creator of the Mathnasium Method. The strategies outlined incorporate Mathnasium’s program philosophies and draw deeply on Larry’s more than 35 years of experience as a math teacher, educational consultant, and father. This booklet serves as a guide for parents who want to help their children to learn and love math.

Over thirty-five years ago, Larry was inspired to find a better way to teach children math. As a teacher-trainer and consultant in public schools as well as top private schools, and father to a mathematically gifted son, Larry possessed an incredibly comprehensive view of education. In his work with both stellar and struggling math programs, he clearly identified a common theme in mathematics instruction: a “serious disconnect between students’ basic skills training and the curriculum they are expected to master in the years to come.” Spurred by the challenges in math education, Larry decided to find an approach that would provide young children with the strong mathematical foundation they need to succeed.

Over the next three decades, Larry painstakingly developed and assembled a blend of methods and materials that proved highly effective for students of all ages. Instead of relying on traditional rote memorization and repetitive exercises, Larry’s work focused on helping children build deep mathematical understanding through the fundamental experience of working with numbers.
His book of tips focused on introducing children to math through oral, visual, mental, as well as written modalities. Classroom experience showed that teaching children to work with numbers beyond written exercises helps them to access *Number Sense*—an important step before they can apply their understanding on paper. His approach was groundbreaking—he taught kids math in ways that made sense to *them*.

As Larry’s innovative materials gained increasingly wide circulation over the years, he became recognized in Los Angeles as “Larry, The Math Guy.” Schools began teaching from his materials instead of their textbooks, and test scores skyrocketed at every grade he impacted within two years. He gradually expanded his work to develop a complete and integrated curriculum from pre-kindergarten math to Algebra. With his curriculum ready, Larry looked forward to a day when he could transform the way children of all ages understand math.

In the spring of 2002, Larry’s dream came true. Peter Markovitz and David Ullendorff, leaders in the field of the Education Business, made Larry and his curriculum the driving force of *Mathnasium*. Larry introduced his curriculum as the *Mathnasium Method* at their first math learning center in Westwood, California. Students of all ages found the curriculum to be incredibly powerful and engaging, and centers have sprung up across North America, South America, Europe, and Asia. The hallmark of the *Mathnasium* program has been the way it engages kids and gets them to know math at a level far beyond adult expectations. Today, over 35 years after its inception, the *Mathnasium Method* is providing children all over the world with confidence, critical thinking skills, and mathematical ability to last a lifetime.
Mathnasium is a learning center where kids go year-round to improve their math concepts and skills. We are highly specialized; we teach only math.

Members usually attend twice a week for 60 to 90 minutes per session. Like at a gym or health club, members pay a monthly membership fee, and attend at their convenience. Our goal is to enhance your child’s math skills, understanding of math concepts, and overall school performance. At the same time, we build confidence, which yields overwhelming results.

What distinguishes the Mathnasium Method?

✔ Comprehensive Written and Oral Evaluation
   A Mathnasium student takes a two-part diagnostic test—both written and oral. We use the results to create a learning plan customized to meet your child’s individual needs.

✔ Customized Program for your Child
   • Highly trained instructors
   • Personal attention
   • Periodic assessments to keep your child on track

✔ Results
   Your child’s progress is measured by improved grades in school, advancement in our program, and most importantly, a growing love of mathematics.

Mathnasium The Math Learning Center

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