Helping Children Learn in the Primary and Elementary Years

MATH

A GUIDE TO THE MATH COMMON CORE STATE STANDARDS FOR PARENTS AND STUDENTS
This brochure is a product of the Tennessee State Personnel Development Grant, and was researched and compiled by Dr. Reggie Curran through a partnership between TN SPDG and UT/Knoxville/CLEE.

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IDEAs that Work
U.S. Office of Special Education Programs

For more information about the Common Core State Standards and Child Development, check out these websites:

Tennessee Common Core at www.TNCORE.org

Read Tennessee website at www.Readtennessee.org

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Purpose of This Booklet

This booklet has two goals:

■ to help parents understand more about what their children are learning in school, and

■ to help students know if they have mastered the skills their teachers expect them to know in each grade

Teachers work from a set of standards that tell them what to teach. Each state has created its own standards, and those standards have not been the same across our country. However, most states have recently agreed to use the same set of standards — the Common Core State Standards. More information is included about the Common Core State Standards in the following pages.

This booklet will explain what the Common Core State Standards are, and about the skills on which Tennessee teachers will focus math instruction while transitioning to the Common Core State Standards. You will find general information that will give you an overview of what the standards are and why states are using them.

At the end of each grade’s lists of standards and explanations, you will find a box with an “I can do it!” checklist. These are short statements about the skills your children will be expected to have mastered by the end of the year. Ask your children to look at them to see if they feel they have mastered those skills, or if they need some extra help in specific areas.

We hope you will find this booklet helpful in your effort to be a partner in your child’s education and development.

If you come across a math term and don’t remember what is or what it means, check out the Math is Fun dictionary at www.mathisfun.com/definitions
What are the Common Core State Standards?

Academic standards are statements that describe the goals of schooling — what children should know or be able to do at the end of the school year. For example, the second grade math standards state that by the end of the school year, a second grader should be able to count to 120 and understand what each digit in a three-digit number represents.

However, standards have not been the same across the United States. In the past, states have had their own sets of standards. This means that children in one state may be learning different things at different times (and in different years) than children in another state. Many states have recently agreed to use a common set of standards for learning that takes place in their classrooms; these are the Common Core State Standards (CCSS).

One major benefit of having common standards across states is that children are being required to learn the same information in the same years in each of those states, so that a child moving from one state to another will not be behind the children in the new location. A common set of standards ensures that all students, no matter where they live, are focused on graduating from high school prepared for postsecondary education and careers.

The Common Core State Standards for Math have two components: Standards for Mathematical Practice and Standards for Mathematical Content. The Practice Standards describe the kind of math teaching and learning that will produce the most successful learning and that will help students dig deeper and better understand math. The Content Standards outline the concepts and skills to be learned in each grade; teachers will balance procedural skills with understanding by finding find ways to engage students in good practices that will help them understand the math content as they grow in math maturity and expertise throughout the elementary, middle, and high school years.

The Common Core State Standards will provide students, teachers, and parents with a shared understanding of what students are learning. With students, parents, and teachers all on the same page and working together for shared goals, we can increase the likelihood that students will make progress each year and will graduate from school prepared to succeed and to build a strong future for themselves and the country.

Parents: In this booklet, you will find an overview of the standards for each grade, showing you what your children should be able to do by the end of the school year. At the end of the section, you will find a box with this “I can do it!” symbol. Discuss these items with your child to see if he/she is able to complete these tasks.

Students: Find the “I can do it!” box at the end of each section and check yourself to see if you can do all those things.
Overview of Goals for Standards for Mathematical Practice

The Standards for Mathematical Practice describe skills and behaviors that all students should be developing in their particular grades. These practices include important processes (ways of doing things) and proficiencies (how well we do things), including problem solving, reasoning and proof, communication, representation, and making connections. These practices will allow students to understand and use math with confidence. Following is what children will be working to be able to do with increasing ease:

**Make sense of problems and persevere in solving them**
- Find the meaning in problems
- Analyze, predict, and plan the path to solve a problem
- Verify answers
- Ask themselves the question: “Does this make sense?”

**Reason abstractly and quantitatively**
- Be able to translate the meaning of each math term in any equation
- Interpret results in the context (setting) of the situation

**Construct arguments and evaluate the reasoning of others**
- Understand and use information to build arguments
- Make and explore the truth of estimates and guesses
- Justify conclusions and respond to arguments of others

**Model with mathematics**
- Apply math to problems in everyday life
- Identify quantities (amounts, numbers) in a practical situation
- Present, show, or explain the problem and solution in an understandable way

**Use appropriate tools strategically**
- Consider the available tools when solving problems, and know which tool is most appropriate in the situation
- Be familiar with tools appropriate for their grade level or course (pencil and paper, concrete models, ruler, protractor, calculator, spreadsheet, computer programs, digital content on a website, and other technological tools)

**Be precise**
- Be able to communicate accurately with others
- Use clear definitions, state the meaning of symbols, and be careful when specifying units of measure and labeling axes (the “x” and “y” lines that cross at right angles to make a graph) in math figures
- Calculate accurately and efficiently

**Look for and make use of structure**
- Recognize patterns and structures
- Step back to find the big picture and be able to shift perspective
- See complicated things as single objects, or as being made up of several objects

**Look for and identify ways to create shortcuts when doing problems**
- When calculations are repeated, look for general methods, patterns, and shortcuts
- Be able to evaluate whether an answer makes sense

The major domains included in the math standards for Grades K-5 are listed below. In each grade, students build on what they learned previously to form a progression of increasing knowledge, skill, or sophistication.

<table>
<thead>
<tr>
<th>MAJOR DOMAINS FOR MATH STANDARDS</th>
<th>GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KINDERGARTEN</td>
</tr>
<tr>
<td>Counting and Cardinality</td>
<td>✓</td>
</tr>
<tr>
<td>Operations and Algebraic Thinking</td>
<td>✓</td>
</tr>
<tr>
<td>Numbers and Operations – Base Ten</td>
<td>✓</td>
</tr>
<tr>
<td>Numbers and Operations – Fractions</td>
<td>✓</td>
</tr>
<tr>
<td>Measurement and Data</td>
<td>✓</td>
</tr>
<tr>
<td>Geometry</td>
<td>✓</td>
</tr>
</tbody>
</table>
Focus Clusters for Third Grade – In third grade, teachers will focus instruction on these specific areas:

- Represent and solve problems involving multiplication and division.
- Understand properties of multiplication and the relationship between multiplication and division.
- Develop understanding of fractions as numbers.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

Skills that focus on these areas appear in the shaded box below. While these skills are priority areas, students will be learning all of the skills listed in the following sections.

For third graders, the math standards expect the following skills to be developing, so that a student can say, “I can ... (insert math goal),” for example, I can **fluently multiply and divide within 100**.” Help your child develop skills in these areas:

**Operations and Algebraic Thinking**

- Represent (show) products (the answer when two or more numbers are multiplied together) of whole numbers. **Example: interpret or show 5 x 7 as 5 groups of 7.**

- Interpret (show) whole number quotients (the answer after you divide one number by another) of whole numbers. **Example: 35 ÷ 7 = 5.**

- Use multiplication and division within 100 to solve word problems by using drawings and equations with symbols for the unknown number. **Examples: 100 ÷ 5 = __; 10 x __ = 60; 75 ÷ __ = 25**
Understand the properties of operations in multiplication and division.

- **commutative** – it doesn’t matter in which order numbers are for multiplication
  If $4 \times 6 = 24$, then $6 \times 4$ is also 24.

- **associative** – it doesn’t matter how you group the numbers when you multiply
  $3 \times 5 \times 2$ is found by $3 \times 5 = 15$ and $15 \times 2 = 30$, or by $5 \times 2 = 10$ and $3 \times 10 = 30$.

- **distributive** – you get the same answer when you multiply a number by a group of numbers added together as when you do each multiplication separately
  $8 \times 5 = 40$ and $8 \times 2 = 16$, so $8 \times 7$ is $8 \times (5+2) = (8 \times 5) + (8 \times 2) = 40 + 16$.

Understand division as an unknown factor problem.
Example: $32 \div 8$ is the same as $8 \times \_ = 32$

Fluently (quickly and easily) multiply and divide within 100. By end of grade 3, know from memory all the products of one-digit numbers (numbers from 1 to 9 times 1 to 9).

Solve two-step word problems using the four operations of addition, subtraction, multiplication, and division. Assess the reasonableness of answers using mental computation and estimation using rounding (taking the number to the nearest ten or hundred).
**Measurement and Using Data**

- Tell and write time to the nearest minute and solve word problems involving addition and subtraction of time intervals in minutes.

![Clock 10:00](image)

- Measure and estimate liquid volume and masses of objects using grams, kilograms, and liters. Use drawings to represent word problems involving mass or volume given in the same units.

- Draw a picture graph and a bar graph to represent several categories.

**Example: How many more or how many less?**

<table>
<thead>
<tr>
<th>Varities of Apples in a Food Store</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Delicious</td>
<td>![Apples]</td>
</tr>
<tr>
<td>Golden Delicious</td>
<td>![Apples, one less]</td>
</tr>
<tr>
<td>Red Rome</td>
<td>![Apples]</td>
</tr>
<tr>
<td>MacIntosh</td>
<td>![Apples]</td>
</tr>
<tr>
<td>Jonathan</td>
<td>![Apples, one less]</td>
</tr>
</tbody>
</table>

**KEY:**  ![Apple] = 10 apples  ![Apple, half] = 5 apples
Algebraic Thinking (Patterns and Relationships)

- Use place value understanding to round whole numbers to the nearest 10 or 100.
- Fluently add and subtract within 1,000.
- Multiply one-digit whole numbers by multiples of 10 (9 x 80, 5 x 60, etc.).
- Understand a fraction \( \frac{1}{b} \) as 1 whole partitioned into \( b \) equal parts.

*For example, \( \frac{1}{4} \) = 1 of 4 equal parts.*

- Understand a fraction as a number on a number line.

```
0  1  1  1  3  4  1
  8  4  2  4  1
```

- Understand and explain equivalent fractions. \( \frac{1}{2} = \frac{4}{8} \), \( \frac{4}{6} = \frac{2}{3} \)

- Compare two fractions with the same numerator (\( \frac{3}{4}, \frac{3}{5} \)) or denominator (\( \frac{2}{5}, \frac{4}{5} \)).

Use the symbols < (less than), > (more than), or = (equal) to compare them.

\[
\frac{3}{4} > \frac{3}{5}
\]
**Students:** You have been working on learning these skills this year. The green shaded boxes are the areas teachers gave extra focus to this year. Are you able to do these things? Check the box next to the skill if you can do it.

- I can solve multiplication and division problems and understand the relationship between them.
- I understand the properties of multiplication:
  - **Commutative** property of multiplication: If you know $6 \times 4 = 24$, then you know $4 \times 6 = 24$.
  - **Associative** property of multiplication: the product of $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$.
  - **Distributive** property of multiplication: If $8 \times 5 = 40$ and $8 \times 2 = 16$, then $8 \times 7$ is: $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$.
- I can fluently multiply and divide within 100.
- I know products of two one-digit numbers.
- I can solve word problems with addition, subtraction, multiplication, and division.
- I can use place value to round numbers and I know the value of each digit in a four-digit number.
- I can estimate reasonable answers using place value knowledge.
- I understand fractions as numbers.
  - I can compare two fractions with the same numerator or the same denominator.
  - I know that 25 cents is $\frac{1}{4}$ of a dollar, 50 cents is $\frac{1}{2}$ of a dollar and 75 cents is $\frac{3}{4}$ of a dollar.
- I can tell and write time to the nearest minute.
- I can estimate and measure time, volume, and weight.
- I understand area and perimeter.
- I understand that shapes in different categories can also be in a larger category.