

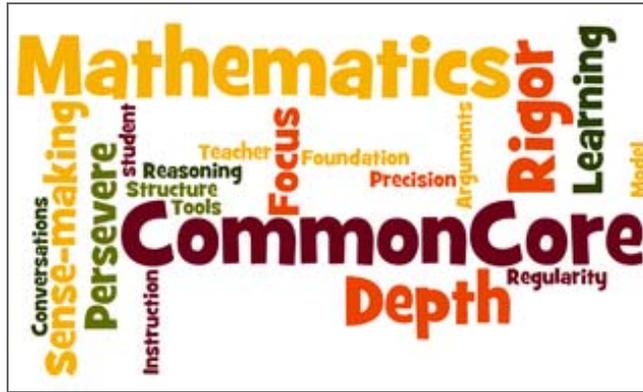


West Genesee Mathematics

A Parent's Guide to 1st Grade Mathematics



Compiled by Teachers at East Hill Elementary School



Dear Parents,

This guide is intended to better acquaint you with the NYS Common Core Learning Standards for 1st Grade Mathematics. It has been compiled from several different sources.

Included in this guide is an overview of the Common Core Learning Standards for 1st grade, a glossary created by Michele Gipe, West Genesee math coach, that contains many of the newer terms to which students are being exposed, information from “A Parent’s Backpack Guide to the Common Core” from EngageNY.org, a sampling of strategies that students use in first grade for various concepts from a variety of sources, information from “Parent Roadmap: Supporting Your Child in First Grade Mathematics,” a list of math apps, and a list of websites for both parents and students.

We will continue to update and revise these guides as we continue along our journey in the implementation of the Common Core. If you have any suggestions for things to include in this guide, please send an email to lcraig@westgenesee.org. I hope you find this guide helpful. Thank you!

Lisa Craig
East Hill Elementary Principal
Elementary Math Coordinator

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The way we taught students in the past simply does not prepare them for the higher demands of college and careers today and in the future. Your school and schools throughout the country are working to improve teaching and learning to ensure that all children will graduate high school with the skills they need to be successful.

In mathematics, this means three major changes. Teachers will concentrate on teaching a more focused set of major math concepts and skills. This will allow students time to master important ideas and skills in a more organized way throughout the year and from one grade to the next. It will also call for teachers to use rich and challenging math content and to engage students in solving real-world problems in order to inspire greater interest in mathematics.

Taken from Parent Roadmap: Supporting Your Child in Grade One Mathematics

An Overview of 1st Grade Math

In Grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

1. Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., “making tens”) to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.
2. Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.
3. Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement.¹
4. Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

Big Ideas in Grade 1

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.

Number and Operations in Base Ten

- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data

- Measure lengths indirectly and by iterating length units.
- Tell and write time and money.
- Represent and interpret data.

Geometry

- Reason with shapes and their attributes.

What is Changing in Mathematics Education

The information below was taken from the “Parent’s Backpack Guide to Common Core State Standards” found on engageny.org.

To improve student learning, the new Common Core State Standards are different from the old ones. These changes are called shifts. The chart below shows what is shifting, what you might see in your child’s backpack and what you can do to help your child. Again, if your child’s assignments do not reflect the shifts, then talk to your child’s teacher.

What’s Shifting?	What to Look for in the Backpack?	What Can You Do?
<ul style="list-style-type: none"> • Your child will <u>work more deeply in fewer topics</u>, which will ensure full understanding. (less is more!) 	<ul style="list-style-type: none"> • Look for assignments that require students to show their work and explain how they arrived at an answer. 	<ul style="list-style-type: none"> • Know what concepts are important for your child based on their grade level and spend time working on those concepts.
<ul style="list-style-type: none"> • Your child will <u>keep building on learning year after year</u>, starting with a strong foundation. 	<ul style="list-style-type: none"> • Look for assignments that build on one another. For example, students will focus on adding, subtracting, multiplying and dividing. Once these areas are mastered, they will focus on fractions. Building on that, they will then focus on Algebra. You should be able to see the progression in the topics they learn. 	<ul style="list-style-type: none"> • Be aware of what concepts your child struggled with last year and support your child in those challenge areas moving forward.
<ul style="list-style-type: none"> • Your child will <u>spend time practicing and memorizing math facts</u>. 	<ul style="list-style-type: none"> • Look for assignments that ask your child to master math facts such as addition groupings up to 20 or multiplication tables. 	<ul style="list-style-type: none"> • Help your child know and memorize basic math facts. Ask your child to “do the math” that pops up in daily life.
<ul style="list-style-type: none"> • Your child will <u>understand why the math works and be asked to talk about and prove their understanding</u>. 	<ul style="list-style-type: none"> • Your child might have assignments that ask her or him to show or explain their mathematical thinking - to SAY why they think their answer is the right one. 	<ul style="list-style-type: none"> • Talk to your child about their math homework and ask them to teach you new concepts. Help them figure out ways to explain their thinking.
<ul style="list-style-type: none"> • Your child will now be asked to <u>use math in real-world situations</u>. 	<ul style="list-style-type: none"> • Look for math assignments that are based on the real world. For instance, homework for 5th graders might include adding fractions as part of a dessert recipe or determining how much pizza friends ate based on fractions. 	<ul style="list-style-type: none"> • Provide time every day for your child to work on math at home.

How 1st Grade “Fits” in the Progression

(taken from Parent Roadmap: Supporting Your Child in Grade One Mathematics)

In grade one, students will work with whole numbers and place value—including grouping numbers into tens and ones as they learn to add and subtract up through 20. Students will also use charts, tables, and diagrams to solve problems. Activities in these areas will include: quickly and accurately adding numbers together that total up to 10 or less and subtracting from numbers up through 10; understanding the rules of addition and subtraction (for example, $5+2=2+5$); solving word problems that involve adding or subtracting numbers up through 20; understanding what the different digits mean in two-digit numbers (place value); comparing two-digit numbers using the symbols $>$ (more than), $=$ (equal to), and $<$ (less than); understanding the meaning of the equal sign ($=$) and determining if statements involving addition and subtraction are true or false (for example, which of the following statements are true? $3+3=6$, $4+1=5+2$); adding one- and two-digit numbers together; measuring the lengths of objects using a shorter object as a unit of length; putting objects in order from longest to shortest or shortest to longest; organizing objects into categories and comparing the number of objects in different categories, and dividing circles and rectangles into halves and quarters.

Here are just a few examples of the skills and strategies students will develop as they solve word problems in grade one.

Kindergarten Mathematics	Grade One Mathematics	Grade Two Mathematics
<ul style="list-style-type: none"> Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (such as claps), acting out situations, verbal explanations, expressions, or equations Solve word problems by adding or subtracting numbers up through 10 using objects and drawings 	<ul style="list-style-type: none"> Solve word problems by adding or subtracting numbers up through 20 Solve addition and subtraction problems for different unknown numbers ($20-?=15$, $9+4=?$) 	<ul style="list-style-type: none"> Solve one- and two-step word problems by adding or subtracting numbers up through 100

Examples of Grade One Word Problems

 Addition	6 bunnies sat on the grass. Some more bunnies hopped over. Then there were 14 bunnies. How many bunnies hopped over?
 Subtraction	14 bunnies were sitting on the grass. Some bunnies hopped away. Then there were 5 bunnies. How many bunnies hopped away?
Comparison	Lucy has 12 apples. Julie has 9 apples. How many more apples does Lucy have than Julie?

Your child will use pictures and diagrams to show addition and subtraction and to compare amounts.



*Lucy has three more apples than Julie.
Julie has three fewer apples than Lucy.*

Partnering with your Child's Teacher

(taken from Parent Roadmap)

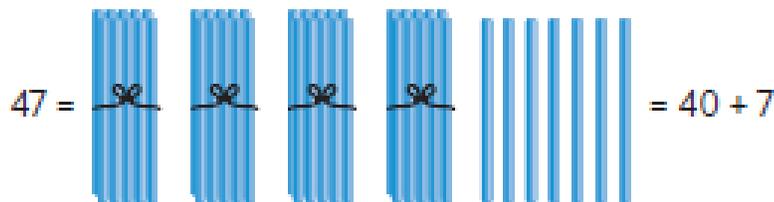
Don't be afraid to reach out to your child's teacher—you are an important part of your child's education. Ask to see a sample of your child's work or bring a sample with you. Ask the teacher questions like:

- Is my child at the level where he/she should be at this point of the school year?
- Where is my child excelling? How can I support this success?
- What do you think is giving my child the most trouble? How can I help my child improve in this area?
- What can I do to help my child with upcoming work?

Here are just a few examples of how students will develop and use their understanding of place value in grade one.

Kindergarten Mathematics	Grade One Mathematics	Grade Two Mathematics
<ul style="list-style-type: none"> • Count to 100 by ones and tens • Understand that numbers from 11 to 19 contain a ten and some leftover ones (for example, $14=10+4$) 	<ul style="list-style-type: none"> • Understand that 10 can be thought of as a bundle of ten ones—called a “ten” • Understand that the two digits of a two-digit number represent amounts of tens and ones (place value) • Add and subtract numbers through 100 using what students have learned about place value 	<ul style="list-style-type: none"> • Understand that 100 can be thought of as a bundle of ten tens—called a “hundred” • Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones (place value) • Add and subtract numbers through 1000 using what students have learned about place value

Students use models and pictures to show that 47 is the same as 47 ones, or 4 tens + 7 ones, and to better understand the relative size of the units.



Your child will use this understanding of place value to add one- and two-digit numbers together.

$$47 + 2 = 49$$



$$47 + 20 = 67$$



WHAT THEY NEED TO KNOW

In math, students will work with whole numbers and place value. They will group numbers into tens and ones, and learn to add and subtract up through 20. They will use charts, tables, and diagrams to solve problems.

In ELA, children will continue to learn the letters and sounds that make up words. They will think, talk, and write about what they read in stories, articles, and other sources of information. In writing, students will work on putting together clear sentences on a range of topics, using a growing vocabulary.

MATH

■ Solve word problems by adding or subtracting numbers up through 20

■ Solve addition and subtraction problems for different unknown numbers ($20 - ? = 15$, $9 + 4 = ?$)

Addition

■ 6 bunnies sat on the grass. Some more bunnies hopped over. Then there were 14 bunnies. How many bunnies hopped over?

Subtraction

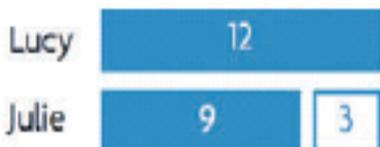
■ 14 bunnies were sitting on the grass. Some bunnies hopped away. Then there were 5 bunnies. How many bunnies hopped away?

Comparison

Lucy has 12 apples. Julie has 9 apples. How many more apples does Lucy have than Julie?

Use pictures and diagrams to show addition and subtraction and to compare amounts.

See chart in printout:



Lucy has three more apples than Julie.
Julie has three fewer apples than Lucy.

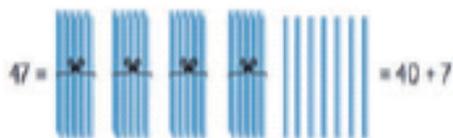
Place Value

■ Understand that 10 can be thought of as a bundle of ten ones—called a “ten”

■ Understand that the two digits of a two-digit number represent amounts of tens and ones (place value)

■ Add and subtract numbers through 100 using what students have learned about place value

■ Students use models and pictures to show that 47 is the same as 47 ones, or 4 tens + 7 ones, and to better understand the relative size of the units.



GRADE



■ Your child will use this understanding of place value to add one- and two-digit numbers together.

$$47 + 2 = 49$$

$$47 + 20 = 67$$



Classroom task: Nina's Numbers

This problem gives you the chance to: show your understanding of whole numbers (answers below)

■ Nina loves to play Fill in the Blank games.

1. Write the numbers that belong in each blank.

a) 25, __, 35, 40, __, 50

b) 4, 7, __, 13, __, 19, __, 25

2. Fill in the missing number to make this number sentence correct.

$$58 + \underline{\quad} = 65$$

Show your work using pictures, words, and numbers

■ Nina has three number cards.

3. What is the largest two-digit number Nina can make using these cards?

Write that number in the boxes.

4. Using these same cards, what two-digit number can Nina make that is closest to 45?

Write that number in the boxes.

5. Show how you figured it out using pictures, words, and numbers.

Help children learn outside school

1. Look for everyday opportunities to have your child do math. For example: If you open a carton of eggs and take out seven, ask, “How many are left in the carton?”

2. Play math games with your child. For example: “I’m thinking of a number. When I add five to it, I get 11. What is the number?”

3. Encourage your child to read and write numbers in different ways. For example: What are ways that you can make the number 15? 15 can be 10+5, 7+8, 20-5, or 5+5+5.

4. Have your child create story problems to represent addition, subtraction, and comparisons. For example: “I have seven pennies. My brother has five pennies. How many pennies does he need to have the same number as I have? He needs two more pennies.”

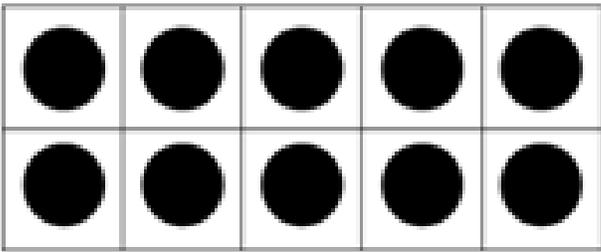
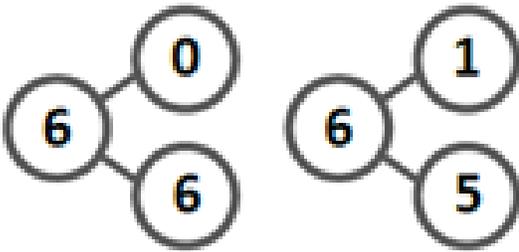
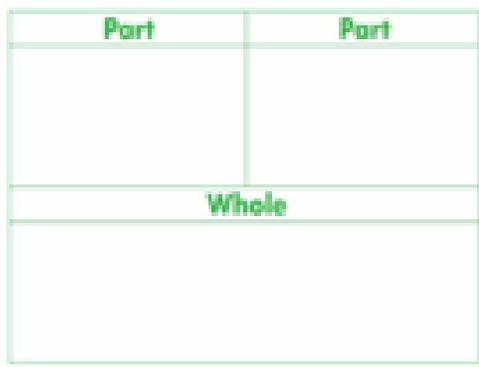
Mathematical Practices

These eight practices are the goals of all math education, K-12

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.



Glossary for 1st Grade Math

Term	Description	Visual Representation
Tens Frame	A 2x5 grid used for combinations to 10 and adding and subtracting within 20	
Number Bond	A representation of two smaller parts that make up a whole. For example, 6 is made up of 0 and 6 or 6 is made up of 1 and 5	
Number Path	Foundation for understanding a number line – 1 number, 1 space Counting and matching numbers and objects	
Part-Part Total Part- Part Whole	A way to show the two smaller parts that make up a whole (similar to a number bond, different visual representation)	
Decompose	How numbers can be broken apart to make them easier to use	<p><u>Grade 1 Example</u></p> <p>Decompose 13 into 10 and 3. Subtract 9 from the 10. $10 - 9 = 1$ Then add 1 + 3. $1 + 3 = 4$, so $13 - 9 = 4$</p> 

Glossary for 1st Grade Math, cont.

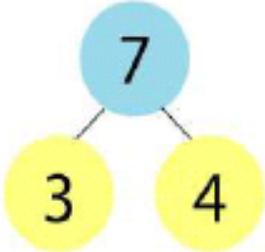
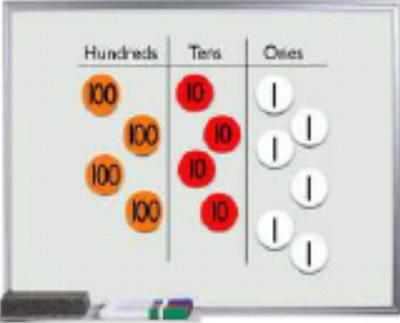
<p>Tape Diagram</p>		 <p><i>Rachel collected 58 seashells. Sam gave her 175 more. How many seashells did she have then?</i></p>
<p><u>Subitizing</u></p>	<p>Knowing the amount in a visual without actually counting each one (i.e. knowing if all fingers are up on my hand, that is five)</p>	

Stages of Addition

Stages of Addition

(taken and adapted from Why Before How: Singapore Math Computation Strategies by Jana Hazekamp)

It is important to encourage your students to use a variety of computation strategies. Guide your students to notice what is the same and different about these methods. Begin with the concrete, move on to pictorial representations, and with the abstract. You can do this by teaching the concept of addition in the following sequence: 1) Number bonds, 2) Decomposing numbers, 3) Left-to-right addition, 4) Place value disks and charts, 5) Vertical addition, and 6) Traditional addition.

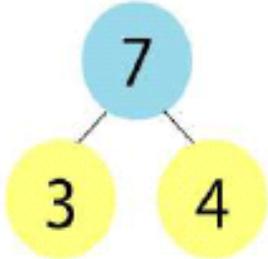
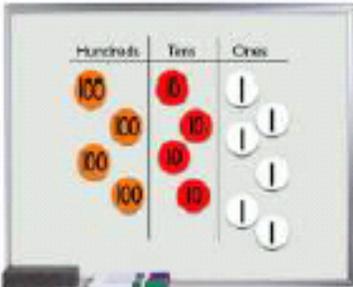
<p>Number Bonds help students see that numbers can be “broken” into pieces to make computation easier.</p> 	<p>Decomposing Numbers encourages students to think about place value, and students’ awareness of place value will be key to later success with mental math and other computation methods.</p> <table border="1" data-bbox="857 682 1333 821"> <thead> <tr> <th>hundreds</th> <th>tens</th> <th>ones</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>6</td> <td>4</td> </tr> </tbody> </table> <p>Composing $200+60+4=264$</p> <p>Decomposing $264=200+60+4$</p>	hundreds	tens	ones	2	6	4
hundreds	tens	ones					
2	6	4					
<p>Left-to-Right Addition emphasizes place value. Decomposing is an important prerequisite.</p> $34 + 45$ $(30 + 40) + (4 + 5)$ $70 + 9$	<p>Place Value Disks and Charts help move students toward understanding the traditional algorithm, and help students</p> 						
<p>Vertical Addition is similar to left-to-right, except that it is vertical instead of horizontal. This is also known as partial sums.</p> $\begin{array}{r} 59 \\ +37 \\ \hline 80 \\ 16 \\ \hline 96 \end{array}$	<p>Traditional Addition is the final addition strategy that students learn. It is important that it is connected to other methods when it is taught.</p> $\begin{array}{r} 1 \\ 59 \\ +37 \\ \hline 96 \end{array}$						

Subtraction Stages

Stages of Subtraction

(taken and adapted from *Why Before How: Singapore Math Computation Strategies* by Jana Hazekamp and *Foundations of Number Sense* by SDE—Staff Development for Educators)

It is important to help our students understand the concept of subtraction first, before bombarding them with abstract rules. Students can build an understanding of subtraction by sharing stories in which they have subtracted. They need to begin with the concrete, move on to pictorial representations, and then move to the abstract. You can do this by teaching the concept of subtraction in the following sequence: 1) Number bonds, 2) Place value disks and charts, 3) partial

<p>Number Bonds help students see that numbers can be “broken” into pieces to make computation easier.</p> 	<p>Decomposing Numbers encourages students to think about place value, and students’ awareness of place value will be key to later success with mental math and other computation methods.</p> <table border="1" data-bbox="1003 667 1338 806"> <thead> <tr> <th>hundreds</th> <th>tens</th> <th>ones</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>6</td> <td>4</td> </tr> </tbody> </table> <p>Composing $200+60+4=264$</p> <p>Decomposing $264=200+60+4$</p>	hundreds	tens	ones	2	6	4
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Websites for 1st Graders

www.xtramath.org

www.ictgames.com/

<http://www.aplusmath.com/>

<http://www.aaamath.com/>

<http://www.coolmath4kids.com/>

<http://www.funbrain.com/>

<http://www.teachrkids.com/>

<http://www.mathplayground.com/wordproblems.html>

<http://www.amathsdictionaryforkids.com/>

Video Clips

Dr. Nicki's math videos: <http://www.youtube.com/watch?v=SIkJIUOYcB4>

Teacher Recommended Free Apps for Kids

First Grade Math Magic

10 Frame Fill

Concentration

Number Lines

Teacher Recommended Apps for Kids (less than \$2.00)

iMath 10 Maker (\$0.99)

Math Workout and Exercise (\$0.99)

Skip Counting, HAVOC (\$0.99)

Missing Numbers (\$1.99)

Monkey Math (\$1.99)

ArithmeticRek (\$0.99)

Resources Used in this Publication

EngageNY, www.engageny.org

Math with Meaning: Foundations of Number Sense, Staff Development for Educators, 2011

Kansas Association of Teachers of Mathematics (KATM) Flip Books, www.katm.org

New York Post Schools Special, *Crack the Core*, March 30, 2014, CUNY

New York State Education Department, Common Core Learning Standards for Mathematics, K-12

Parent Roadmap: Supporting Your Child in Grade One Mathematics, Council of the Great City Schools, Washington, D.C.; <http://www.cgcs.org>

Why Before How: Singapore Math Computation Strategies, Jana Hazenkamp, 2011