West Virginia
math*4*life

Frameworks for Mathematics
Grade 2

West Virginia DEPARTMENT OF
EDUCATION

Grade 2

In grade two, students further build a mathematical foundation that is critical to learning higher mathematics. Instructional time focuses on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes (National Governors Association Center for Best Practices, Council of Chief State School Officers [NGA/CCSSO] 2010i). Students also work toward fluency with addition and subtraction within 20 using mental strategies and within 100 using strategies based on place value, properties of operations, and the relationship between addition and subtraction. They know from memory all sums of two one-digit numbers.

Operations and Algebraic Thinking

Standards	Teacher Understandings	Resources	Student Understandings
Represent and solve problems involving addition and subtraction. M.2.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions (e.g. by using drawings and equations with a symbol for the unknown number to represent the problem). **Add and subtract within 20.** M.2.2 Fluently add and subtract within 20 using mental strategies and by end of Grade 2, know from memory all sums of two one-digit numbers. **Work with equal groups of objects to**	It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. This will leave students unprepared for the challenges they face in later grades. Students use the **Mathematical Habits of Mind** to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards. By the end of grade two students are to be	The following is a list of resources for teachers and students: **Math TREE Online Education Resources** A curated set of aligned, internet resources for WV elementary math teachers Quantile Teacher Assistant This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills most relevant to standards.	• Students solve addition and subtraction problems related to all additive structures with unknowns in all positions. • Students fluently add and subtract within 20. • Students determine a number up to 20 is odd or even by pairing objects or counting them by twos. • Students use repeated addition to find the sum of equal groups of objects up to 5.

gain foundations for multiplication. M.2.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g. by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends. M.2.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	proficient in solving addition and subtraction problems related to the all of additive structures with unknowns in all positions. These problems should include numbers that are appropriate for grade two students (related to sums less than 1000). See standards in Operations and Algebraic Thinking and Numbers and Operations in Base Ten to identify strategies and appropriate numbers. The standard algorithm is not a grade two expectation. It is a grade four expectation. Students in grade two develop fluency with addition and subtraction within 20. Students develop fluency by using number relationships and mental strategies. Students need ample opportunity to practice these strategies. Games are effective in providing opportunities for students to practice strategies. This is an end-of-year expectation.	**Illustrative Mathematics** http://www.illustrativemathmatics.org This website provides teachers with learning tasks that develop the WV College- and Career-Readiness Standards for Mathematics, supporting the teacher's content knowledge of mathematics. **Graham Fletcher Site G Fletchy** http://www.gfletchy.com This website includes learning progression videos related to counting, and 3-Act tasks that may be connected to the WV College- and Career-Readiness Standards for Mathematics. **Inside Mathematics** http://insidemathematics.org Inside Mathematics is a nationally recognized	**Common Misconceptions** • Students frequently think that the equal sign (=) is an operation and that they must do something to find an answer. • Students may believe that they can apply properties related to addition to subtraction. For example, students may apply the commutative property to subtraction. The commutative property does not apply to subtraction because order makes a difference in subtraction. • Student may think that you are not able to subtract a larger number from a smaller number because problems in second grade always have a smaller number taken from a larger number. Focus on the structure

		multimedia website for educators around the world. This site includes videos, learning tasks, and performance assessment tasks. **NCTM Illuminations** https://illuminations.nctm.org/ Illuminations is a project designed by NCTM. The site includes lessons, activities, and computer applets. **Math Coach's Corner** **Donna Boucher** http://www.mathcoachscorner.com This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts as well as mathematical tasks.	of subtraction problems. - Students will overgeneralize situations. For example, *in all* does not always indicate addition. There are 4 cookies on the plate. There were 8 cookies in all. How many did I eat? When students see the words *in all* they believe they should add.

Number and Operations in Base Ten

Standards	Teacher Understandings	Resources	Student Understandings

Understand place value.
 	
M.2.5
Understand that the three digits of a three-digit number represent amounts of hundreds, tens and ones (e.g., 706 equals 7 hundreds, 0 tens and 6 ones). Understand the following as special cases:
   a.   100 can be thought of as a bundle of ten tens – called a "hundred."
   b.   Numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight or nine hundreds, and 0 tens and 0 ones.
 	
M.2.6
Count within 1000 and skip-count by 5s, 10s and 100s.
 	
M.2.7
Read and write numbers to 1000 using base-ten numerals, number names and expanded form.
 	
M.2.8
Compare two three-digit numbers based on meanings of the hundreds, tens and ones digits, using >, = and < symbols to record the results of comparisons.
	It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. This will leave students unprepared for the challenges they face in later grades.
	
	Students use the **Mathematical Habits of Mind** to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards.
	
	Understanding place value is more than identifying the number in the tens place. Students use place value in strategies to add and subtract larger numbers. An example of this is partial sums.
	
	The standards in Number and Operations in Base Ten
		The following is a list of resources for teachers and students:
		
		Math TREE Online Education Resources
		A curated set of aligned, internet resources for WV elementary math teachers
		
		Quantile Teacher Assistant
		This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills most relevant to standards.
		
		Illustrative Mathematics
		http://www.illustrative mathmatics.org
		This website provides teachers with learning tasks that develop the
			• Students understand the digits in a three-digit number represents amounts of hundreds, tens and ones.
			• Students read and write numbers to 1000.
			• Students compare two three-digit numbers based on meanings of the hundreds, tens, and ones digit and use the symbols >, =, <.
			• Students use place value strategies (expanded number form) and properties of operations within 1000.
			• Students understand that subtraction is the inverse of addition.
			• Students mentally add 10 or100 to a given number.
			
			Common Misconceptions

Use place value understanding and properties of operations to add and subtract. M.2.9 Fluently add and subtract within 100 using strategies based on place value, properties of operations and/or the relationship between addition and subtraction. M.2.10 Add up to four two-digit numbers using strategies based on place value and properties of operations. M.2.11 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones and sometimes it is necessary to compose or decompose tens or hundreds. M.2.12 Mentally add 10 or 100 to a given number 100-900 and mentally subtract	provide the parameters in selecting numbers for addition and subtraction problems. An example of this is *add up to 4 two digit numbers.* The equal sign (=) is related to the greater than symbol (>) and less than symbol (<) and shows a relationship between to quantities. The equal sign means that the two sides of the equation have the same value.	WV College- and Career-Readiness Standards for Mathematics, supporting the teacher's content knowledge of mathematics. **Graham Fletcher Site G Fletchy** http://www.gfletchy.com This website includes learning progression videos related to counting, and 3-Act tasks that may be connected to the WV College- and Career-Readiness Standards for Mathematics. **Inside Mathematics** http://insidemathematics.org Inside Mathematics is a nationally recognized multimedia website for educators around the world. This site includes videos, learning tasks, and performance assessment tasks.	• Students may misread larger numbers. For example, 572 is read as five hundred and seventy-two instead of five hundred seventy-two.

10 or 100 from a given number 100-900. M.2.13 Explain why addition and subtraction strategies work, using place value and the properties of operations. Instructional Note: Explanations may be supported by drawing or objects.		**NCTM Illuminations** https://illuminations. nctm.org/ Illuminations is a project designed by NCTM. The site includes lessons, activities, and computer applets. **Math Coach's Corner** **Donna Boucher** http://www.mathcoac hscorner.com This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts as well as mathematical tasks.	

Measurement and Data

Standards	Teacher Understandings	Resources	Student Understandings
Measure and estimate lengths in standard units. M.2.14 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. M.2.15 Measure the length of an object twice, using length units of different lengths for the two measurements, describe how the two measurements relate to the size of the unit chosen. M.2.16 Estimate lengths using units of inches, feet, centimeters, and meters. M.2.17 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. **Relate addition and subtraction to length.** M.2.18 Use addition and subtraction within 100 to solve word problems involving	It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. This will leave students unprepared for the challenges they face in later grades. Students use the **Mathematical Habits of Mind** to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards. Grade two students begin using standard tools for measuring such as rulers, yardsticks and meter sticks. They need multiple experiences with tools using various standards of measures. A connection should be made between the ruler and	The following is a list of resources for teachers and students: **Math TREE Online Education Resources** A curated set of aligned, internet resources for WV elementary math teachers [Quantile Teacher Assistant](#) This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills most relevant to standards. **Illustrative Mathematics** http://www.illustrative mathmatics.org This website provides teachers with learning tasks that develop the	• Students are able to measure length using standard tools to the whole unit. • Students estimate lengths. • Students measure length to compare the length of units. • Students begin using the number line to solve addition and subtraction problems. • Students tell time to the nearest 5 minutes. • Students solve problems related to money using dollars **or** cents. • Students use a line plot, bar graph, picture graph to represent data and answer questions based on the line plot. **Common Misconceptions** • Students may not make the connection

lengths that are given in the same units (e.g., by using drawings, such as drawings of rulers), and equations with a symbol for the unknown number to represent the problem.

M.2.19
Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2… and represent whole-number sums and differences within 100 on a number line diagram.

Work with time and money.
M.2.20
Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

M.2.21
Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately (e.g., If you have 2 dimes and 3 pennies, how many cents do you have?).

Represent and interpret data.

M.2.22
Generate measurement data by measuring lengths of several objects to the nearest whole unit or by making repeated measurements of the same

the number line. As students become familiar with a number line do not allow it to become a tool for counting.

Problems related to money include numbers that are consistent with the Number in Operations base Ten standards. Grade two students will NOT work with amounts represented as decimals. Students in grade two work with either dollars or cents using the follow symbols: $ or ¢. Students work with either dollars or cents but not both at the same time.

A connection should be made between the data standards and the standards in Number and Operations in Base Ten. Ask questions like, "How many more? How many less? or How many in all?"

WV College- and Career-Readiness Standards for Mathematics, supporting the teacher's content knowledge of mathematics.

Graham Fletcher Site G Fletchy
http://www.gfletchy.com
This website includes learning progression videos related to counting, and 3-Act tasks that may be connected to the WV College- and Career-Readiness Standards for Mathematics.

Inside Mathematics
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between the ruler and the number line.
- Students may use the number line as a counting tool and not use their thinking skills to solve problems.
- Money is counter-intuitive. A nickel is larger than a dime but a dime is worth more.

object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units. M.2.23 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.		**NCTM Illuminations** https://illuminations.nctm.org/ Illuminations is a project designed by NCTM. The site includes lessons, activities, and computer applets. **Math Coach's Corner Donna Boucher** http://www.mathcoachscorner.com This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts as well as mathematical tasks.	

Geometry

Standards	Teacher Understandings	Resources	Student Understandings
Reason with shapes and their attributes. M.2.24 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces (sizes are compared directly or visually, not compared by measuring). Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. M.2.25 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them. M.2.26 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.	It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. This will leave students unprepared for the challenges they face in later grades. Students use the **Mathematical Habits of Mind** to interact with the grade level content standards. The teacher needs to craft instructional tasks that connect the Mathematical Habits of Mind to the content standards. Partitioning a rectangle into rows and columns is providing the foundation for grade three standards related to multiplication. Partitioning circles and rectangles and using terms such as halves and thirds and describing the whole as	The following is a list of resources for teachers and students: **Math TREE Online Education Resources** A curated set of aligned, internet resources for WV elementary math teachers Quantile Teacher Assistant This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and identify skills most relevant to standards. **Illustrative Mathematics** http://www.illustrativemathmatics.org This website provides teachers with learning	• Students will recognize and draw shapes based on identified attributes. • Students will partition a rectangle into rows and columns of the same size. • Students will partition rectangles into two, three, or four equal shares. • Students will use the vocabulary halves, thirds and fourths to describe the equal shares. **Common Misconceptions** • Students may believe that a rectangle divided into four unequal pieces is divided into fourths.

| | two halves is providing the foundation for formal work with fractions in grade three. | tasks that develop the WV College- and Career-Readiness Standards for Mathematics, supporting the teacher's content knowledge of mathematics.

Graham Fletcher Site G Fletchy
http://www.gfletchy.com
This website includes learning progression videos related to counting, and 3-Act tasks that may be connected to the WV College- and Career-Readiness Standards for Mathematics.

Inside Mathematics
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		and performance assessment tasks. **NCTM Illuminations** https://illuminations.nctm.org/ Illuminations is a project designed by NCTM. The site includes lessons, activities, and computer applets. **Math Coach's Corner Donna Boucher** http://www.mathcoachscorner.com This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts as well as mathematical tasks.	