West Virginia math4life

Frameworks for Mathematics
Grade 1

West Virginia DEPARTMENT OF EDUCATION

Grade 1

Grade-one students begin to develop the concept of place value by viewing 10 ones as a unit called a *ten*. This basic but essential idea is the underpinning of the base-ten number system. In grade one, instructional time focuses 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. Students work toward fluency in addition and subtraction with whole numbers within 10.

Operations and Algebraic Thinking

Standards	Teacher Understandings	Resources	Student Understandings
Represent and solve problems involving addition and subtraction M.1.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions (e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem). M.1.2 Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20 (e.g., by using objects, drawings, and equations with a symbol for the unknown number	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. The standards in the domain of Operations and Algebraic Thinking build on the understandings of number 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	• Students are able to solve addition and subtraction word problems related to each of the additive structures. • Students understand that subtraction is the inverse of addition. • Students use properties such as commutative, associative, or identity property of addition to solve problems. (Formal terms are not required in grade one.) • Students understand that equal sign (=) is showing a relationship between the two sides.

to represent the problem).

Understand and apply properties of operations and relationship between addition and subtraction.

M.1.3
Apply properties of operations as strategies to add and subtract (e.g., If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known: Commutative Property of Addition. To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12: Associative Property of Addition).
Instructional Note: Students need not use formal terms for these properties.

M.1.4
Understand subtraction as an unknown-addend problem (e.g., subtract 10 – 8 by finding the number that makes 10 when added to 8).

Add and subtract within 20.

M.1.5
Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

addition and subtraction developed in kindergarten.

Grade one students solve addition and subtraction word problems related to all of the additive structures with the unknown in all positions. The comparison structure is the most difficult and students in grade one may not obtain mastery of this structure. This understanding will be a focus of grade two.

Grade one students will begin to use the properties of operations; however, the use of formal vocabulary is not required.

Grade one students add and subtract numbers within 20 using visual representations and mental strategies. Students will develop fluency of addition and subtraction facts with 10. Fluency is developed over time. This is an end of year expectation. Students will need multiple experiences using visual representations (ten frames, rekenreks) and mental strategies. Games provide opportunities for

most relevant to standards.

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

The equal sign indicates that both sides of an equation have the same value.
- Students are able to fluently add and subtract within 10.

Common Misconceptions

- Students frequently think that the equal sign (=) is an operation and that they must do something to find and 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.

M.1.6
Add and subtract within 20, demonstrating fluency for addition and subtraction within 10 and use strategies such as
   • counting on;
   • making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14);
   • decomposing a number leading to a ten (e.g., 13 − 4 = 13 − 3 − 1 = 10 − 1 = 9);
   • using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 − 8= 4); and
   • creating equivalent but easier or known sums (e.g., adding 6 +7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).
 	
Work with addition and subtraction equations.
 	
M.1.7   Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false (e.g., Which of the following equations are true and which are false? 6 = 6, 7 = 8 − 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2).
 	
M.1.8
Determine the unknown whole number in an addition or
	students to practice these strategies.
	
	If students in grade one continue to use Level 1 counting strategies (counting all) to solve addition and subtraction problems, they will need additional support to develop additional strategies.
	
	Words convey meaning. Be careful not to over generalize the meaning of words in word problems. Focus on the structure and not on the key words.
		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.
		
		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.
			• Student may think that you are not able to subtract a larger number from a smaller number because problems in grade one always have a smaller number taken from a larger number. Focus on the structure 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.

subtraction equation relating three whole numbers (e.g., Determine the unknown number that makes the equation true in each of the equations. 8 + ? = 11, 5 = ? − 3, 6 + 6 = ?).			

Number and Operations in Base Ten

Standards	Teacher Understandings	Resources	Student Understandings

Extend the counting sequence.
 	
M.1.9
Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.
 	
Understand place value.
 	
M.1.10
Understand the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
    a.   10 can be thought of as a bundle of ten ones — called a "ten." (e.g., A group of ten pennies is equivalent to a dime.)
    b.   The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven,
	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.
	
	The understanding of our place value system is essential for future work in mathematics. Students need to use this understanding as they interact with grade level mathematics.
		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 will understand that 10 can be thought of a bundle of 10 ones and that 100 can be thought of as a bundle of 10 tens.
			• Students compare two two-digit numbers using the symbols >,=,<.
			• Students use concrete objects (base ten blocks), or pictorial representations to solve the addition of two two-digit numbers.
			• Students mentally add/subtract 10 from a number.

eight or nine ones.
   c.   The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight or nine tens (and 0 ones).
 	
M.1.11
Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
 	
Use place value understanding and properties of operations to add and subtract.
 	
M.1.12 Add within 100, including
   •   adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of 10,
   •   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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones, and sometimes it is necessary to compose a ten.
	As students begin solving addition and subtraction problems of two-digit numbers, they begin by working with concrete models to build understanding, moving to pictorial representations, and finally to strategies based on place value. The standard algorithm is not a grade one expectation. It is an expectation of grade four.
	
	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.
		Illustrative Mathematics
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		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
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		Inside Mathematics
		http://insidemathema tics.org
		Inside Mathematics is a nationally
			Common Misconceptions
			
			• Students may misread number, for instance, "a hundred" instead of "one hundred".
			• Students may write a numeral incorrectly, for instance, forty-seven as 407 instead of 47.

M.1.13 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count and explain the reasoning used. M.1.14 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences) 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 and explain the reasoning used.		recognized 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.	

Measurement and Data

Standards	Teacher Understandings	Resources	Student Understandings
Measure lengths indirectly and by iterating length units. M.1.15 Order three objects by length and compare the lengths of two objects indirectly by using a third object. M.1.16 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Instructional Note: Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. **Tell and write time.** M.1.17 Tell and write time in hours and half-hours using analog and digital clocks. **Represent and interpret data.**	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. The iteration of length units is the foundation for understanding a ruler and the number line in grade two. Students need repeated experience measuring objects by laying the units end to end with no overlaps. The concept of time should be embedded throughout the school year. This helps students develop an understanding of	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 the length of an object having that attribute by iterating length units. • Students tell time to the hour and half-hour. • Students represent and organize data into as many as 3 categories. Students are able to make statements and answer questions about their data. *There are three more people who like apples than the number of people who like oranges.* **Common Misconceptions** • Students do not understand that they must begin aligning the units to the end of the object being measured.

M.1.18 Organize, represent, interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category and how many more or less are in one category than in another.	time and not just how to read a clock. Students organize data into categories, posing questions like, "how many more or less?" connecting the work back to the Operations and Algebraic and Number and Operations in Base Ten standards.	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.	

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Geometry

Standards	Teacher Understandings	Resources	Student Understandings
Reason with shapes and their attributes. M.1.19 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, and/or overall size); build and draw shapes to possess defining attributes. M.1.20 Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape and compose new shapes from the composite shape. Instructional Note: Students do not need to learn formal names such as, "right rectangular prism." M.1.21 Partition circles and rectangles into two and four equal shares, describe the shares using the	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. The standards in the Geometry Domain extend past the identification of shapes and figures. The standards have students focus on attributes. Instruction focuses on defining and non-defining attributes. For example, color is a non-defining attribute while the number of sides is a defining attribute. As students partition circles and rectangles into two and four equal shares, they are building	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](http://www.illustrativemathmatics.org) This website provides teachers with learning tasks that develop the	• Students are able to distinguish between defining attributes of a figure, such as number of sides, and non-defining attributes, such as color and position. • Students draw or build shapes based on defining attributes. • Students compose composite shapes from simple shapes. • Students partition circles and rectangles into two and four equal shares and use the words halves (half), fourths, and quarters. **Common Misconceptions** • Young children may attach meaning to the way a shape looks and is positioned or the color of the shape. For example, all triangles

words halves, fourths and quarters and use the phrases half of, fourth of and quarter of. Describe the whole as two of, or four of the shares and understand for these examples that decomposing into more equal shares creates smaller shares.	the foundation for future work with fractions. The concept of partitioning is a big idea in mathematics.	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.	are green equilateral triangles. Students need to see shapes that are not regular and focus on the defining attributes of the shapes. • Squares and rectangles are frequently referred to as two distinct shapes; however, squares are a subset of rectangles. A square is a rectangle where all sides have the same length. The definition of a rectangle is " a parallelogram with (four) right angles". • Students may describe one of two parts as halves or one of four parts as fourths, without the parts being equal parts.

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