



Frameworks for Mathematics

Grade 4



West Virginia DEPARTMENT OF
EDUCATION



**West Virginia Board of Education
2018-2019**

David G. Perry, President
Miller L. Hall, Vice President
Thomas W. Campbell, CPA, Financial Officer

F. Scott Rotruck, Member
Debra K. Sullivan, Member
Frank S. Vitale, Member
Joseph A. Wallace, J.D., Member
Nancy J. White, Member
James S. Wilson, D.D.S., Member

Carolyn Long, Ex Officio
Interim Chancellor
West Virginia Higher Education Policy Commission

Sarah Armstrong Tucker, Ed.D., Ex Officio
Chancellor
West Virginia Council for Community and Technical College Education

Steven L. Paine, Ed.D., Ex Officio
State Superintendent of Schools
West Virginia Department of Education

Grade 4

Instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; and (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and Students also work toward fluency in addition and subtraction within 1,000,000 using the standard algorithm.

Operations and Algebraic Thinking

Standards	Teacher Understandings	Resources	Student Understandings
<p>Use the four operations with whole numbers to solve problems.</p> <p>M.4.1 Interpret a multiplication equation as a comparison (e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5). Represent verbal statements of multiplicative comparisons as multiplication equations.</p> <p>M.4.2 Multiply or divide to solve word problems involving multiplicative comparison (e.g., by using drawings and equations with a symbol for</p>	<p>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.</p> <p>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.</p> <p>Students need to understand if the value in an equation or an expression can change (or vary), we replace it with a symbol called a variable. Remember, an equation contains an equal sign and an expression does not contain an equal sign.</p>	<p>The following provides resources for teachers and students:</p> <p>Math TREE Online Education Resources A curated set of aligned internet resources for WV elementary teachers</p> <p>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</p>	<ul style="list-style-type: none"> • Develop an understanding of the order and meaning of numbers in multiplicative comparison problems. • Know multiplication terminology: The numbers multiplied are called factors. The answer is called a product. • Know division terminology: The number divided is called the dividend; what it is divided by is the divisor; the



<p>the unknown number to represent the problem) and distinguish multiplicative comparison from additive comparison.</p> <p>M.4.3 Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</p> <p>Gain familiarity with factors and multiples.</p> <p>M.4.4 Find all factor pairs for a whole number in the range 1–100, recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number.</p>	<p>Work from inner to outer grouping symbols.</p> <p>When working with expressions do not insert equal signs changing the expression into an equation.</p> <p>The word “of” implies multiplication.</p> <p>Be aware students have difficulty understanding the order and meaning in multiplicative comparison problems: which quantity (factor) is being multiplied, which number (factor) tells how many times, and which number is the product.</p> <p>Additive comparison problems are different from multiplicative comparison problems.</p> <p>Multiplicative comparison problems come in 3 types:</p> <ul style="list-style-type: none"> • Unknown Product • Unknown Group Size • Number of Groups Unknown <p>When a problem asks the question “How many in each group?” it is an example of partitive or fair-share division. If a problem asks “How many groups?” it is classified as quotitive or measurement division.</p>	<p>most relevant to standards.</p> <p>Illustrative Mathematics http://www.illustrativemathematics.org This website provides teachers with learning tasks that develop the WV College- and Career- Readiness Standards for Mathematics and that support to extend the teacher’s content knowledge of mathematics.</p> <p>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.</p> <p>Inside Mathematics</p>	<p>result or answer is called the quotient.</p> <ul style="list-style-type: none"> • Understand multiplication is commutative: $a \times b = b \times a$ and associative: $(a \times b) \times c = a \times (b \times c)$; however, division is not. • There are several types of Multiplication and Division problems (Equal groups; Arrays or Area; Compare). • Understand not all division problems result in a whole number answer and be able to interpret the remainder. • Multiplying two numbers does not always result in a product larger than the factors. When students begin multiplying by numbers less than 1 (fractions)) the “multiplication always results in a
---	---	---	---



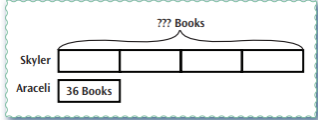
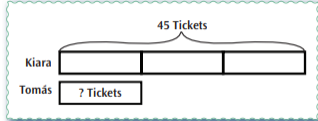
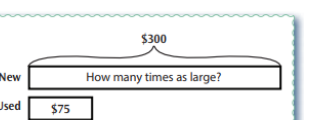
Determine whether a given whole number in the range 1–100 is prime or composite.

Generate and analyze patterns.

M.4.5

Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. (e.g., Given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.)

Using *tape diagrams* or *bar models* can help students visualize and solve multiplication and division word problems.

Unknown Product	
Group Size Unknown	
Number of Groups Unknown	

Encourage representation of the remainder in a division problem in a manner consistent with the content of the problem. For example, in a simple division problem, $100 \div 33 = 3R1$ is not as accurate as $100 \div 33 = 3 \frac{1}{33}$ or by saying “When we divide 100 by 33, the quotient is 3 with 1 left over.” Writing the equation as $100 = 33 \times 3 + 1$ is also accurate. Students need to be able to interpret the remainder: If 250 students travel on buses that hold 45 students

<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.mathcoachcorner.com>

This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts, as well as, mathematical tasks.

larger number” concept is no longer true.

- “More than” can be both additive (5 more than a number) and multiplicative (3 times a number)
- Find all factor pairs for whole numbers from 1 to 100.
- Understand the difference between *Prime* (exactly 2 unique whole number factors) and *Composite* (more than 2 factors).
- Know that “1” is *neither* Prime nor composite.
- Be able to search systematically to find all factor pairs by checking if 2 is a factor, then 3, then 4, and so on until they find a “reversal” in the pairs.
- Know that not all prime numbers are



6	$6 \times 700 =$	$6 \times 20 =$	$6 \times 9 = 54$
	6 groups of 7 hundreds =	6 groups of 2 tens =	
	42 hundreds = 4200	12 tens = 120	

each: $250 \div 45 = 5 \frac{25}{45}$. The solution needs to be interpreted as 6 buses are needed. Otherwise, you will have 25 unhappy students with no bus to ride!

The chart above depicts an area model for 6×729 with 729 written as $700 + 20 + 9$.

Students can use area models to represent various multiplication situations. The rows can represent the equal groups of objects in the situation, and students then imagine that the objects lie in the squares forming an array. With larger numbers, such array models become too difficult to draw, so students can make sketches of rectangles and then label the resulting product as the number of things or square units.

Math drawings and base-ten blocks support the development of *extended multiplication facts*. The ability to find products such as these is important when variations of the standard algorithm are used for multi-digit

odd (2 is the only even prime number.)

- Larger numbers do not necessarily have more factors.



multiplication, as described in the following examples.

Left to right, showing the partial products.

729

$\times 6$ Thinking:

4200	6×7 hundreds
120	6×2 tens
54	6×9

4374

Right to left, showing the partial products.

729

$\times 6$

54	6×9
120	6×2 tens
4200	6×7 hundreds

4374



Right to left, recording
the newly composed tens
and hundreds below the
line.

$$\begin{array}{r} 729 \\ \times 6 \\ \hline 15 \\ 4224 \\ \hline 4374 \end{array}$$

Or

Note: The
15 is where
the
regrouping
was
recorded.

Rectangular arrays

	60	+ 5
2	20 × 60 =	20 × 5 =
0	2 tens times 6	2 tens × 5 =
	tens =	10 tens = 100
+	12 hundreds =	
	1200	



	<p>7</p> <table border="1" data-bbox="688 191 1186 310"> <tr> <td data-bbox="688 191 955 310"> $7 \times 60 =$ $7 \times 6 \text{ tens} =$ $42 \text{ tens} = 420$ </td> <td data-bbox="955 191 1186 310"> $7 \times 5 = 35$ </td> </tr> </table> <p>Partial products</p> $\begin{array}{r} 65 \text{ Thinking:} \\ \times 27 \\ \hline 35 \quad 7 \times 5 \\ 420 \quad 7 \times 6 \text{ tens} \\ 100 \quad 2 \text{ tens} \times 5 \\ 1200 \quad 2 \text{ tens} \times 6 \\ \hline 1755 \end{array}$ <p>General methods for multi-digit division computation include decomposing the dividend into like base-ten units and finding the quotient unit by unit, starting with the largest unit and continuing on to smaller units.</p>	$7 \times 60 =$ $7 \times 6 \text{ tens} =$ $42 \text{ tens} = 420$	$7 \times 5 = 35$		
$7 \times 60 =$ $7 \times 6 \text{ tens} =$ $42 \text{ tens} = 420$	$7 \times 5 = 35$				

Number and Operations in Base Ten

Standards	Teacher Understandings	Resources	Student Understandings
<p>Generalize place value understanding for multi-digit whole numbers.</p> <p>M.4.6 Recognize that in a multi-digit whole number, a digit in one place represents</p>	<p>It is important for teachers to understand that neglecting any grade-level standards will leave gaps in students' skills and understandings. Therefore,</p>	<p>The following resources provide teachers with resources for teachers and students:</p>	<ul style="list-style-type: none"> • Know place value positions • Be able to expand numerals



<p>ten times what it represents in the place to its right (e.g., recognize that $700 \div 70 = 10$ by applying concepts of place value and division).</p> <p>M.4.7 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$ and $<$ symbols to record the results of comparisons.</p> <p>M.4.8 Use place value understanding to round multi-digit whole numbers to any place.</p> <p>Use place value understanding and properties of operations to perform multi-digit arithmetic.</p> <p>M.4.9 Fluently add and subtract multi-digit whole numbers using the standard algorithm.</p> <p>M.4.10 Multiply a whole number of up to four digits by a one-digit whole number, multiply two two-digit numbers, using strategies based on place value and the properties of operations and illustrate and explain the calculation by using</p>	<p>students will be unprepared for the challenges they face in later grades.</p> <p>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.</p> <p>To represent multiplication instruct students to use equations, rectangular arrays and/or area models.</p> <p>Instruct students to use commas to assist in reading and writing numerals.</p>	<p><u>Math TREE Online Education Resources</u> A curated set of aligned internet resources for WV elementary teachers</p> <p><u>Quantile Teacher Assistant</u> 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.</p> <p>Illustrative Mathematics <u>http://www.illustrativemathematics.org</u> This website provides teachers with learning tasks that develop the WV College- and Career-Readiness Standards for Mathematics and that support the extension of the teacher’s content knowledge of mathematics.</p> <p>Graham Fletcher Site G Fletchy <u>http://www.gfletchy.com</u></p>	<ul style="list-style-type: none"> • Round multi-digit whole numbers • Stack numbers vertically to see relationships when rounding • Work from inner to outer grouping symbols. • When working with expressions do not insert equal signs changing the expression into an equation. • The word “of” implies multiplication.
---	---	--	--



<p>equations, rectangular arrays and/or area models.</p> <p>M.4.11 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays and/or area models.</p>		<p>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.</p> <p>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.</p> <p>NCTM Illuminations https://illuminations.nctm.org/ Illuminations is a project designed by NCTM. The site includes lessons, activities and computer applets.</p> <p>Math Coach's Corner Donna Boucher http://www.mathcoachescorner.com</p>	
---	--	--	--



		This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts, as well as, mathematical tasks.	
--	--	--	--

Number and Operations Fractions

Standards	Teacher Understandings	Resources	Student Understandings
<p>Extend understanding of fraction equivalence and ordering.</p> <p>M.4.12 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.</p>	<p>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.</p> <p>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.</p> <p>Help student make sense of writing mixed numbers as unit fractions. Visual models such as the one below support student understanding.</p>	<p>The following resources provide teachers with resources for teachers and students:</p> <p>Math TREE Online Education Resources A curated set of aligned internet resources for WV elementary teachers</p> <p>Quantile Teacher Assistant This tool is aligned to WV standards and is designed to help educators locate resources that can support instruction and</p>	<ul style="list-style-type: none"> Understand a fraction, $\frac{a}{b}$ as a sum of the unit fractions, $\frac{1}{b}$. Write and use unit fractions. Understand that every fraction is composed of unit fractions. A mixed number is the sum of a whole number and a fraction. Know how to convert mixed numbers to fractions.



M.4.13

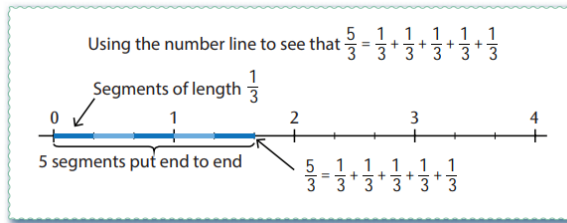
Compare two fractions with different numerators and different denominators (e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$). Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$ or $<$, and justify the conclusions by using a visual fraction model.

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

M.4.14

Understand the fraction $\frac{a}{b}$, with $a > 1$, as the sum of a of the fractions $\frac{1}{b}$.

- a. Understand addition and



Use money or base 10 blocks to help students understand decimal notation for denominators of 10 or 100.

A Common Misconception: Students sometimes treat decimals as whole numbers when making comparisons of two decimals, ignoring place value. For example, they may think that $0.2 < 0.07$ simply because $2 < 7$.

Students sometimes think, “*The longer the decimal number, the greater the value.*” For example, they may think that 0.03 is greater than 0.3.

Students will need ample opportunities to become familiar with new units of measure. In prior years, work with units was limited to units such as pounds, ounces, grams, kilograms, and liters, and students did not convert measurements.

identify skills most relevant to standards.

Illustrative Mathematics
<http://www.illustrativemathematics.org>

This website provides teachers with learning tasks that develop the WV College- and Career-Readiness Standards for Mathematics and that support the extension of 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>



<p>subtraction of fractions as joining and separating parts referring to the same whole.</p> <p>b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation and justify decompositions by using a visual fraction model (e.g., $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2\frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$).</p> <p>c. Add and subtract mixed numbers with like denominators by replacing each mixed number with an equivalent fraction and/or by using properties of operations and the relationship between addition and subtraction.</p> <p>d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like</p>		<p>Inside Mathematics is a nationally recognized multimedia website for educators around the world. This site includes videos, learning tasks, and performance assessment tasks.</p> <p>NCTM Illuminations https://illuminations.nctm.org/ Illuminations is a project designed by NCTM. The site includes lessons, activities and computer applets.</p> <p>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.</p>	
---	--	---	--



denominators by using visual fraction models and equations to represent the problem.

M.4.15

Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

a. Understand a fraction a/b as a multiple of $1/b$, (e.g., use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$).

b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number (e.g., use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. In general, $n \times (a/b) = (n \times a)/b$).

c. Solve word problems involving



multiplication of a fraction by a whole number by using visual fraction models and equations to represent the problem (e.g., If each person at a party will eat $\frac{3}{8}$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?).

Understand decimal notation for fractions, and compare decimal fractions.

M.4.16

Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100 (e.g., express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$).

Instructional Note:
Students who can



generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.

M.4.17

Use decimal notation for fractions with denominators 10 or 100 (e.g., rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line diagram).

M.4.18

Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$ or $<$, and justify the conclusions by using a



visual model.			
---------------	--	--	--

Measurement and Data

Standards	Teacher Understandings	Resources	Student Understandings
<p>Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</p> <p>M.4.19 Know relative sizes of measurement units within a system of units, including the metric system (km, m, cm; kg, g; l, ml), the standard system (lb, oz), and time (hr, min, sec.). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (e.g., Know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...)</p> <p>M.4.20 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals and problems that require expressing measurements given in a larger unit in</p>	<p>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.</p> <p>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.</p> <p>Work with angle measures connects to and supports addition of fractions.</p> <p>Students need to gain experience measuring angles prior to working with</p>	<p>The following is a list of resources for teachers and students:</p> <p>Math TREE Online Education Resources A curated set of aligned internet resources for WV elementary teachers</p> <p>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.</p> <p>Illustrative Mathematics http://www.illustrativemathematics.org This website provides teachers with learning tasks that develop the WV College- and Career-Readiness Standards for</p>	<ul style="list-style-type: none"> Understand how to record information on a line plot. Have experience with benchmark angles. Transfer understanding that a 360° rotation about a point makes a complete circle to recognize and sketch angles that measure approximately 90° and 180°. This understanding is extended to recognize and sketch angles that measure approximately 45° and 30°. Use appropriate terminology (<i>acute</i>, <i>right</i>, and <i>obtuse</i>) to describe angles and rays (<i>perpendicular</i>).



<p>terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.</p> <p>M.4.21 A pply the area and perimeter formulas for rectangles in real world and mathematical problems by viewing the area formula as a multiplication equation with an unknown factor. (e.g., find the width of a rectangular room given the area of the flooring and the length.)</p> <p>Represent and interpret data.</p> <p>M.4.22 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots (e.g., from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection).</p> <p>Geometric measurement: understand concepts of angle and measure angles.</p> <p>M.4.23 Recognize angles as geometric shapes that are formed wherever two rays</p>	<p>word problems involving angle measurement.</p> <p>Students need to understand geometric terms prior to solving word problems.</p> <p>When a new concept is introduced, concrete objects help students visualize the meaning.</p> <p>Base-ten blocks are a useful tool when developing an understanding of equivalent representations.</p> <p>Previously, students built a conceptual understanding of multiplication with whole numbers as they applied multiple strategies to compute and solve problems. Students can continue to use different strategies and methods learned previously—as long as the methods are <i>efficient</i>.</p>	<p>Mathematics and support that extends the teacher’s content knowledge of mathematics.</p> <p>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.</p> <p>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.</p> <p>NCTM Illuminations https://illuminations.nctm.org/</p>	<ul style="list-style-type: none"> Recognize angle measure as additive and use this to solve addition and subtraction problems to find unknown angles on a diagram.
---	---	--	--



<p>share a common endpoint, and understand concepts of angle measurement:</p> <p>a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a “one-degree angle,” and can be used to measure angles.</p> <p>b. An angle that turns through b one-degree angles is said to have an angle measure of b degrees.</p> <p>M.4.24 Measure angles in whole-number degrees using a protractor and sketch angles of specified measure.</p> <p>M.4.25 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems (e.g., by using an equation with a symbol for the unknown angle measure).</p>		<p>Illuminations is a project designed by NCTM. The site includes lessons, activities and computer applets.</p> <p>Math Coach’s Corner Donna Boucher http://www.mathcoachscorner.com</p> <p>This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts; as well as, mathematical tasks.</p>	
---	--	--	--



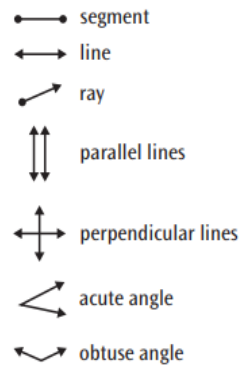
Geometry

Standards	Teacher Understandings	Resources	Student Understandings
<p>Draw and identify lines and angles and classify shapes by properties of their lines and angles.</p> <p>M.4.26 Draw points, lines, line segments, rays, angles (right, acute, obtuse) and perpendicular and parallel lines. Identify these in two-dimensional figures.</p> <p>M.4.27 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.</p> <p>M.4.28 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.</p>	<p>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.</p> <p>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.</p> <p>Geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.</p> <p>For the first time, students in grade four are exposed to</p>	<p>The following is a list of resources for teachers and students:</p> <p>Math TREE Online Education Resources A curated set of aligned internet resources for WV elementary teachers</p> <p>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.</p> <p>Illustrative Mathematics http://www.illustrativemathematics.org This website provides teachers with learning tasks that develop the WV College- and Career-Readiness Standards for Mathematics and that support the extension</p>	<ul style="list-style-type: none"> • Draw and identify right, acute, and obtuse angles. • Classify two-dimensional figures based on specific angle measurements. • Use the benchmark angles of 90°, 180°, and 360° to approximate the measurement of angles. • Know that right triangles (triangles with one right angle) can be a category for classification, with subcategories—for example, an isosceles right triangle has two or more congruent sides and a scalene right triangle has no congruent sides.



the concepts of rays, angles, and perpendicular and parallel lines.

It is helpful to provide



students with a visual reminder of examples of points, line segments, lines, angles, parallelism, and perpendicularity. Students should be exposed to all of these representations in different orientations. They could draw the representations in different orientations and decide if all of the drawings are correct. They also need to see and draw the range of angles that are acute and obtuse.

Two-dimensional figures may be classified according

of 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.

NCTM Illuminations

<https://illuminations.nctm.org/>

Illuminations is a project designed by



	<p>to characteristics, such as the presence of parallel or perpendicular lines or by angle measurements. Students may use transparencies with lines drawn on them to arrange two lines in different ways to determine that the two lines might intersect at one point or might never intersect, thereby understanding the notion of parallel lines. Further investigations may be initiated with geometry software. These types of explorations may lead to a discussion on angles.</p>	<p>NCTM. The site includes lessons, activities and computer applets.</p> <p>Math Coach's Corner Donna Boucher http://www.mathcoachs-corner.com</p> <p>This site is a blog by an elementary mathematics coach. Her blog includes mathematical background on concepts; as well as, mathematical tasks.</p>	
--	---	---	--





Steven L. Paine, Ed.D.
West Virginia Superintendent of Schools