

COMMON CORE STATE STANDARDS

4 MATH

A Crosswalk to the Michigan Grade Level Content Expectations

Introduction

In June 2010, the Michigan State Board of Education adopted the Common Core State Standards (CCSS) as the state K-12 content standards for Mathematics and English Language Arts.

The complete CCSS standards document can be found at www.michigan.gov/k-12.

Districts are encouraged to begin this transition to instruction of the new standards as soon as possible to prepare all students for career and college. New assessments based on the Common Core State Standards will be implemented in 2014-2015. More information about Michigan's involvement in the CCSS initiative and development of common assessments can be found at www.michigan.gov/k-12 by clicking the Common Core State Standards Initiative link

The CCSS for Mathematics are divided into two sets of standards: the Standards for Mathematical Practices and the Standards for Mathematical Content. This document is intended to show the alignment of Michigan's current mathematics Grade Level Content Expectations (GLCE) to the Standards for Mathematical Content to assist with the transition to instruction and assessment based on the CCSS.

It is anticipated that this initial work will be supported by clarification documents developed at the local and state level, including documents from national organizations and other groups. This document is intended as a conversation starter for educators within and across grades. While curriculum revisions will be guided by local curriculum experts, ultimately the alignment is implemented at the classroom level. Educators will need to unfold these standards in order to compare them to current classroom practice and identify adjustments to instruction and materials that support the depth of understanding implicit in these new standards.

The crosswalk between the Grade Level Content Expectations and the Standards for Mathematical Content is organized by Michigan Focal Points/CCSS Critical Areas. There is not an attempt to show one-to-one correspondence between expectations and standards because for the most part there is none at this level. The alignment occurs when looking across focal points/critical areas and/or across GLCE topics/CCSS domains.

Mathematical Practices

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These standards appear in every grade level and are listed below:

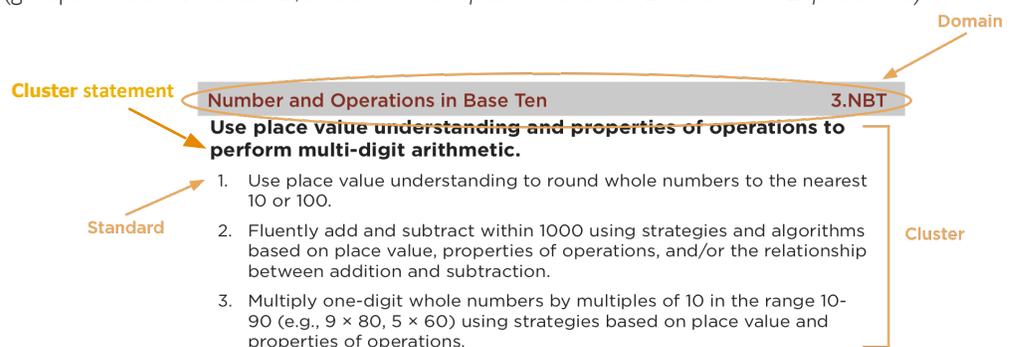
Mathematical Practices
<ol style="list-style-type: none"> 1. Make sense of problems, and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments, and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for, and make use of, structure 8. Look for, and express regularity in, repeated reasoning.

Organization of the Common Core State Standards

Each CCSS grade level document begins with a description of the “critical areas.” These Critical Areas are parallel to the Michigan Focal Points. Below is a comparison of the Michigan Focal Points to the Critical Areas for this grade.

Michigan 4th Grade Focal Points	Common Core State Standards 4th Grade Critical Areas
Developing fluency with multiplication of whole numbers	Developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends
Developing an understanding of fractions and decimals, including the connections between them	Developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, multiplication of fractions by whole numbers
	Understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry

The standards themselves are organized by *Domains* (large groups that progress across grades) and then by *Clusters* (groups of related standards, similar to the *Topics in the Grade Level Content Expectations*).



The table below shows the progression of the CCSS domains and clusters across the grade before, the target grade, and the following grade.

3rd Grade	4th Grade	5th Grade
OPERATIONS AND ALGEBRAIC THINKING (OA)		
<ul style="list-style-type: none"> • Represent and solve problems involving multiplication and division. • Understand properties of multiplication and the relationship between multiplication and division. • Multiply and divide within 100. • Solve problems involving the four operations, and identify 	<ul style="list-style-type: none"> • Use the four operations with whole numbers to solve problems. • Gain familiarity with factors and multiples. • Generate and analyze patterns. 	<ul style="list-style-type: none"> • Write and interpret numerical expressions. • Analyze patterns and relationships.
NUMBER AND OPERATIONS IN BASE TEN (NBT)		
<ul style="list-style-type: none"> • Use place value understanding and properties of operations to perform multi-digit arithmetic. 	<ul style="list-style-type: none"> • Generalize place value understanding for multi-digit whole numbers. • Use place value understanding and properties of operations to perform multi-digit arithmetic. 	<ul style="list-style-type: none"> • Understand the place value system. • Perform operations with multi-digit whole numbers and with decimals to hundredths.
NUMBER AND OPERATIONS—FRACTIONS (NF)		
<ul style="list-style-type: none"> • Develop understanding of fractions as numbers. 	<ul style="list-style-type: none"> • Extend understanding of fraction equivalence and ordering. • Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. • Understand decimal notation for fractions, and compare decimal fractions. 	<ul style="list-style-type: none"> • Use equivalent fractions as a strategy to add and subtract fractions. • Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
MEASUREMENT AND DATA (MD)		
<ul style="list-style-type: none"> • Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. • Represent and interpret data. • Geometric measurement: understand concepts of area and relate area to multiplication and to addition. • Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. 	<ul style="list-style-type: none"> • Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. • Represent and interpret data. • Geometric measurement: understand concepts of angle and measure angles. 	<ul style="list-style-type: none"> • Convert like measurement units within a given measurement system. • Represent and interpret data. • Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
GEOMETRY (G)		
<ul style="list-style-type: none"> • Reason with shapes and their attributes. 	<ul style="list-style-type: none"> • Draw and identify lines and angles, and classify shapes by properties of their lines and angles. 	<ul style="list-style-type: none"> • Graph points on the coordinate plane to solve real-world and mathematical problems. • Classify two-dimensional figures into categories based on their properties.

Alignment of Michigan Content Expectations to Common Core Standards by Michigan Focal Point

Michigan Content Expectations	Common Core State Standards
Focal Point Developing fluency with multiplication of whole numbers	Critical Area Developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends
COMMON CONTENT	

Mathematical Practices

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.

Use factors and multiples

N.ME.04.04 Find all factors of any whole number through 50, list factor pairs, and determine if a one-digit number is a factor of a given whole number. [Core]

N.ME.04.05 List the first ten multiples of a given one-digit whole number; determine if a whole number is a multiple of a given one-digit whole number. [Core]

N.MR.04.06 Know that some numbers including 2, 3, 5, 7, and 11 have exactly two factors (1 and the number itself) and are called prime numbers. [Extended]

Gain familiarity with factors and multiples

4.OA.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; Determine whether a given whole number in the range 1-100 is prime or composite.

Multiply and divide whole numbers

N.ME.04.09 Multiply two-digit numbers by 2, 3, 4, and 5 using the distributive property, e.g., $21 \times 3 = (10 + 10) \times 3 = (10 \times 3) + (10 \times 3) = 30 + 30 = 60$. [Core]

N.FL.04.10 Multiply fluently any whole number by a one-digit number and a three-digit number by a two-digit number; for a two-digit by one-digit multiplication use distributive property to develop meaning for the algorithm. [Core]

N.FL.04.11 Divide numbers up to four-digits by one-digit numbers and by 10. [Core]

N.FL.04.12 Find the value of the unknowns in equations such as $a \div 10 = 25$; $125 \div b = 25$. [Core]

N.MR.04.13 Use the relationship between multiplication and division to simplify computations and check results. [Extended]

N.MR.04.14 Solve contextual problems involving whole number multiplication and division. [Core]

Use the four operations with whole numbers to solve problems

4.OA.3 Solve multistep 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.

Use place value understanding and properties of operations to perform multi-digit arithmetic

4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

COMMON CONTENT

4.NBT.6 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.

CONTENT THAT IS DIFFERENT

Content moving out of 4th grade

Use factors and multiples

N.MR.04.07 Use factors and multiples to compose and decompose whole numbers. [Core]

6th Grade

Compute fluently with multi-digit numbers and find common factors and multiples

6.NS.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express $36 + 8$ as $4(9 + 2)$.

Mathematical Practices

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.

[Not explicit in the GLCE]

Use the four operations with whole numbers to solve problems

4.OA.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.

4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

Generate and analyze patterns

4.OA.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. For example, 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.

Mathematical Practices

1. Make sense of problems, and persevere in solving them.
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Focal Point

Developing an understanding of fractions and decimals, including the connections between them

Critical Area

Developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, multiplication of fractions by whole numbers

COMMON CONTENT

Read, interpret and compare decimal fractions

N.ME.04.15 Read and interpret decimals up to two decimal places; relate to money and place value decomposition. [Core]

N.ME.04.16 Know that terminating decimals represent fractions whose denominators are 10, 10×10 , $10 \times 10 \times 10$, etc., e.g., powers of 10. [Extended]

N.ME.04.17 Locate tenths and hundredths on a number line. [Extended]

N.ME.04.18 Read, write, interpret, and compare decimals up to two decimal places. [Core]

N.MR.04.19 Write tenths and hundredths in decimal and fraction forms, and know the decimal equivalents for halves and fourths. [Core]

Understand decimal notation for fractions, and compare decimal fractions

4.NF.6 Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $62/100$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

COMMON CONTENT

Understand fractions

N.ME.04.20 Understand fractions as parts of a set of objects. [Extended]

N.MR.04.21 Explain why equivalent fractions are equal, using models such as fraction strips or the number line for fractions with denominators of 12 or less, or equal to 100. [Core]

N.MR.04.22 Locate fractions with denominators of 12 or less on the number line; include mixed numbers. [Core]

N.MR.04.23 Understand the relationships among halves, fourths, and eighths and among thirds, sixths, and twelfths. [Core]

N.ME.04.24 Know that fractions of the form m/n where m is greater than n , are greater than 1 and are called improper fractions; locate improper fractions on the number line. [Extended]

N.MR.04.25 Write improper fractions as mixed numbers, and understand that a mixed number represents the number of “wholes” and the part of a whole remaining, e.g., $5/4 = 1 + 1/4 = 1 \frac{1}{4}$. [Core]

N.MR.04.26 Compare and order up to three fractions with denominators 2, 4, and 8, and 3, 6, and 12, including improper fractions and mixed numbers. [Core]

Extend understanding of fraction equivalence and ordering

4.NF.1 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.

4.NF.2 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 $1/2$. 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, e.g., by using a visual fraction model.

Mathematical Practices

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.
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6. Attend to precision.
7. Look for, and make use of, structure.
8. Look for, and express regularity in, repeated reasoning.

Critical Area

Understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry

COMMON CONTENT

Understand right angles

M.TE.04.10 Identify right angles and compare angles to right angles. [Extended]

Understand perpendicular, parallel, and intersecting lines

G.GS.04.01 Identify and draw perpendicular, parallel, and intersecting lines using a ruler and a tool or object with a square (90°) corner. [Extended]

G.GS.04.02 Identify basic geometric shapes including isosceles, equilateral, and right triangles, and use their properties to solve problems. [Extended]

Geometric measurement: understand concepts of angle and measure angles

4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

- 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.

COMMON CONTENT

Recognize symmetry and transformations

G.TR.04.04 Recognize plane figures that have line symmetry. [Extended]

b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

Draw and identify lines and angles, and classify shapes by properties of their lines and angles

4. G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

4. G.2 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.

Draw and identify lines and angles, and classify shapes by properties of their lines and angles

4. G.3 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.

CONTENT THAT IS DIFFERENT

Content moving out of 4th grade

Identify basic geometric shapes and their components, and solve problems

G.SR.04.03 Identify and count the faces, edges, and vertices of basic three-dimensional geometric solids including cubes, rectangular prisms, and pyramids; describe the shape of their faces. [Extended]

2nd Grade

Reason with shapes and their attributes

2. G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)

Recognize symmetry and transformations

G.TR.04.05 Recognize rigid motion transformations (flips, slides, turns) of a two-dimensional object. [Extended]

High School

Understand congruence in terms of rigid motions

9-12.G.CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

Mathematical Practices

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.

Michigan Content Expectations**Common Core State Standards****Content moving into 4th grade***5th Grade**Know the meaning of angles, and solve problems*

G.TR.05.01 Associate an angle with a certain amount of turning; know that angles are measured in degrees; understand that 90° , 180° , 270° , and 360° are associated respectively, with $1/4$, $1/2$, and $3/4$, and full turns. [Extended]

G.GS.05.02 Measure angles with a protractor and classify them as acute, right, obtuse, or straight. [Core]

G.GS.05.03 Identify and name angles on a straight line and vertical angles. [Extended]

G.GS.05.04 Find unknown angles in problems involving angles on a straight line, angles surrounding a point, and vertical angles. [Core]

G.GS.05.05 Know that angles on a straight line add up to 180° and angles surrounding a point add up to 360° ; justify informally by “surrounding” a point with angles. [Core]

Geometric measurement: understand concepts of angle and measure angles

4. MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

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.

b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

4. MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

4. MD.7 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.

Mathematical Practices

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.

Connections**COMMON CONTENT***Understand and use number notation and place value*

N.ME.04.01 Read and write numbers to 1,000,000; relate them to the quantities they represent; compare and order. [Extended]

N.ME.04.02 Compose and decompose numbers using place value to 1,000,000's, e.g., 25,068 is 2 ten thousands, 5 thousands, 0 hundreds, 6 tens, and 8 ones. [Extended]

N.ME.04.03 Understand the magnitude of numbers up to 1,000,000; recognize the place values of numbers and the relationship of each place value to the place to its right, e.g., 1,000 is 10 hundreds. [Extended]

Generalize place value understanding for multi-digit whole numbers

4. NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.

4. NBT.2 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.

COMMON CONTENT

Mathematical Practices

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.

Add and subtract whole numbers

N.FL.04.08 Add and subtract whole numbers fluently. [Extended]

Estimate

N.FL.04.34 Estimate the answers to calculations involving addition, subtraction, or multiplication. [Extended]

N.FL.04.35 Know when approximation is appropriate and use it to check the reasonableness of answers; be familiar with common place-value errors in calculations. [Extended]

N.FL.04.36 Make appropriate estimations and calculations fluently with whole numbers using mental math strategies. [NASL]

Use the four operations with whole numbers to solve problems

4. OA.3 Solve multistep 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.

Use place value understanding and properties of operations to perform multi-digit arithmetic

4. NBT.3 Use place value understanding to round multi-digit whole numbers to any place.

4. NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Add and subtract fractions

N.MR.04.27 Add and subtract fractions less than 1 with denominators through 12 and/or 100, in cases where the denominators are equal or when one denominator is a multiple of the other; e.g., $1/12 + 5/12 = 6/12$; $1/6 + 5/12 = 7/12$; $3/10 - 23/100 = 7/100$. [Extended]

N.MR.04.28 Solve contextual problems involving sums and differences for fractions where one denominator is a multiple of the other (denominators 2 through 12, and 100). [Extended]

N.MR.04.29 Find the value of an unknown in equations such as $1/8 + x = 5/8$ or $3/4 - y = 1/2$. [Extended]

[Note that in the CCSS addition and subtraction with unlike denominators is not a requirement at this grade]

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

4. NF.3 Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

Connections

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

Understand decimal notation for fractions, and compare decimal fractions

4. NF.5 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. For example, express $\frac{3}{10}$ as $\frac{30}{100}$ and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$. (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.)

Multiply fractions by whole numbers

N.MR.04.30 Multiply fractions by whole numbers, using repeated addition and area or array models. [Extended]

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

4. NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

a. Understand a fraction $\frac{a}{b}$ as a multiple of $\frac{1}{b}$. For example, use a visual fraction model to represent $\frac{5}{4}$ as the product $5 \times (\frac{1}{4})$, recording the conclusion by the equation $\frac{5}{4} = 5 \times (\frac{1}{4})$.

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

c. Solve word problems involving multiplication of a fraction by a whole number; e.g., by using visual fraction models and equations to represent the problem. For example, 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?

Mathematical Practices

1. Make sense of problems, and persevere in solving them.
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4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for, and make use of, structure.
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Connections

Mathematical Practices

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.
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Measure using common tools and appropriate units

M.UN.04.01 Measure using common tools and select appropriate units of measure. [Extended]

M.PS.04.02 Give answers to a reasonable degree of precision in the context of a given problem. [Extended]

Convert measurement units

M.TE.04.05 Carry out the following conversions from one unit of measure to a larger or smaller unit of measure: meters to centimeters, kilograms to grams, liters to milliliters, hours to minutes, minutes to seconds, years to months, weeks to days, feet to inches, ounces to pounds (using numbers that involve only simple calculations). [Extended]

Represent and solve problems for given data

D.RE.04.01 Construct tables and bar graphs from given data. [Extended]

Use perimeter and area formulas

M.TE.04.06 Know and understand the formulas for perimeter and area of a square and a rectangle; calculate the perimeters and areas of these shapes and combinations of these shapes using the formulas. [Extended]

M.TE.04.07 Find one dimension of a rectangle given the other dimension and its perimeter or area. [Extended]

M.TE.04.08 Find the side of a square given its perimeter or area. [Extended]

M.PS.04.09 Solve contextual problems about perimeter and area of squares and rectangles in compound shapes. [Extended]

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit

4. MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; 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. For example: 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)...

4. MD.2 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 terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit

4. MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.

Connections

CONTENT THAT IS DIFFERENT

Content moving out of 4th grade

Add and subtract decimal fractions

N.MR.04.31 For problems that use addition and subtraction of decimals through hundredths, represent with mathematical statements and solve. [Extended]

N.FL.04.32 Add and subtract decimals through hundredths. [Extended]

Multiply and divide decimal fractions

N.FL.04.33 Multiply and divide decimals up to two decimal places by a one-digit whole number where the result is a terminating decimal, e.g., $0.42 \div 3 = 0.14$, but not $5 \div 3 = 1.6$. [Extended]

Measure using common tools and appropriate units

M.UN.04.03 Measure and compare integer temperatures in degrees. [Extended]

Measure using common tools and appropriate units

M.TE.04.04 Measure surface area of cubes and rectangular prisms by covering and counting area of the faces. [NASL]

Problem-solving

M.PS.04.11 Solve contextual problems about surface area. [Extended]

*5th Grade**Perform operations with multi-digit whole numbers and with decimals to hundredths*

5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, 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.

[No match in Common Core State Standards]

*6th Grade**Solve real-world and mathematical problems involving area, surface area, and volume*

6.G.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Mathematical Practices

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.

Connections

Represent and solve problems for given data

D.RE.04.02 Order a given set of data, find the median, and specify the range of values. [Extended]

D.RE.04.03 Solve problems using data presented in tables and bar graphs, e.g., compare data represented in two bar graphs and read bar graphs showing two data sets. [Extended]

*3rd Grade**Represent and interpret data*

3. MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 sets.

*6th Grade**Summarize and describe distributions*

6. SP.5 Summarize numerical data sets in relation to their context, such as by:

- Reporting the number of observations.
- Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
- Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data was gathered.
- Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

Mathematical Practices

- Make sense of problems, and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments, and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for, and make use of, structure.
- Look for, and express regularity in, repeated reasoning.

Content moving into 4th grade

[Not explicit in the GLCE at any grade]

Represent and interpret data

4. MD.4 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. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.



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