

COMMON CORE STATE STANDARDS

2 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:

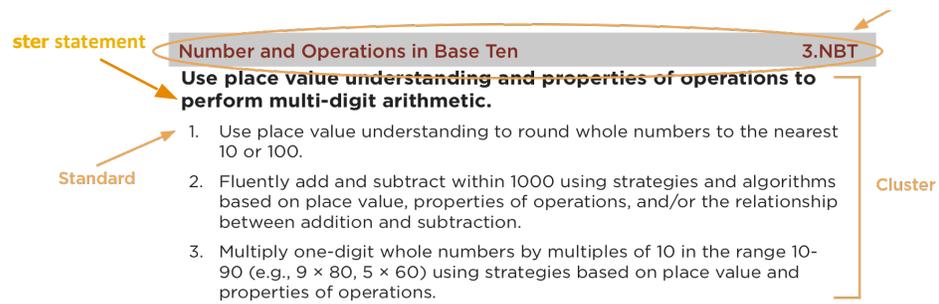
Mathematical Practices
<ol style="list-style-type: none"> 1. Make sense of problems, and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments, and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend 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 2nd Grade Focal Points	Common Core State Standards 2nd Grade Critical Areas
Developing an understanding of the base-ten numeration system and place-value concepts	Extending understanding of base-ten notation
Developing quick recall of addition facts and related subtraction facts and fluency with multi-digit addition and subtraction	Building fluency with addition and subtraction
Composing and decomposing geometric shapes	Describing and analyzing shapes
	Using standard units of measure

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.

1st Grade	2nd Grade	3rd Grade
OPERATIONS AND ALGEBRAIC THINKING (OA)		
<ul style="list-style-type: none"> • Represent and solve problems involving addition and subtraction. • Understand and apply properties of operations and the relationship between addition and subtraction. • Add and subtract within 20. • Work with addition and subtraction equations. 	<ul style="list-style-type: none"> • Represent and solve problems involving addition and subtraction. • Add and subtract within 20. • Work with equal groups of objects to gain foundations for multiplication. 	<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 and explain patterns in arithmetic.
NUMBER AND OPERATIONS IN BASE TEN (NBT)		
<ul style="list-style-type: none"> • Extend the counting sequence. • Understand place value. • Use place value understanding and properties of operations to add and subtract. 	<ul style="list-style-type: none"> • Understand place value. • Use place value understanding and properties of operations to add and subtract. 	<ul style="list-style-type: none"> • Use place value understanding and properties of operations to perform multi-digit arithmetic.
NUMBER AND OPERATIONS—FRACTIONS (NF)		
		<ul style="list-style-type: none"> • Develop understanding of fractions as numbers
MEASUREMENT AND DATA (MD)		
<ul style="list-style-type: none"> • Measure lengths indirectly and by iterating length units. • Tell and write time. • Represent and interpret data. 	<ul style="list-style-type: none"> • Measure and estimate lengths in standard units. • Relate addition and subtraction to length. • Work with time and money. • Represent and interpret data. 	<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.
GEOMETRY (G)		
<ul style="list-style-type: none"> • Reason with shapes and their attributes. 	<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.

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

Michigan Content Expectations	Common Core State Standards
Focal Point Developing an understanding of the base-ten numeration system and place-value concepts	Critical Area Extending understanding of base-ten notation

COMMON CONTENT

Count, write, and order numbers

N.ME.02.01 Count to 1000 by 1's, 10's and 100's starting from any number in the sequence. [Core-NC]

N.ME.02.02 Read and write numbers to 1000 in numerals and words, and relate them to the quantities they represent. [Core-NC]

N.ME.02.03 Compare and order numbers to 1000; use the symbols $>$ and $<$. [Core-NC]

N.ME.02.04 Count orally by 3's and 4's starting with 0, and by 2's, 5's, and 10's starting from any whole number. [NASL]

Understand place value

N.ME.02.05 Express numbers through 999 using place value, e.g., 137 is 1 hundred, 3 tens, and 7 ones; use concrete materials. [NASL]

Understand place value

2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

a. 100 can be thought of as a bundle of ten tens — called a “hundred.”

b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

2.NBT.2 Count within 1000; skip-count by 5s, 10s, and 100s.

2.NBT.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.

Mathematical Practices

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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
Focal Point Developing quick recall of addition facts and related subtraction facts and fluency with multi-digit addition and subtraction	Critical Area Building fluency with addition and subtraction

COMMON CONTENT

Add and subtract whole numbers

N.FL.02.06 Decompose 100 into addition pairs, e.g., $99 + 1$, $98 + 2$... [Core-NC]

N.MR.02.07 Find the distance between numbers on the number line, e.g., how far is 79 from 26? [Core-NC]

N.MR.02.08 Find missing values in open sentences, e.g., $42 + _ = 57$; use relationship between addition and subtraction. [Core-NC]

N.MR.02.09 Given a contextual situation that involves addition and subtraction using numbers through 99: model using objects or pictures; explain in words; record using numbers and symbols; solve. [Core-NC]

N.FL.02.10 Add fluently two numbers through 99, using strategies including formal algorithms; subtract fluently two numbers through 99. [Core-NC]

N.FL.02.11 Estimate the sum of two numbers with three digits. [Ext – NC]

N.FL.02.12 Calculate mentally sums and differences involving: three-digit numbers and ones; three-digit numbers and tens; three-digit numbers and hundreds. [NASL]

Relate addition and subtraction to length

2.MD.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

2.MD.6 Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ... , and represent whole-number sums and differences within 100 on a number line diagram.

Represent and solve problems involving addition and subtraction

2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Add and subtract within 20

2.OA.2 Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

Use place value understanding and properties of operations to add and subtract.

2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

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8. Look for, and express regularity in, repeated reasoning.

¹ Students need not use formal terms for these properties.

² This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations)

³ A range of algorithms may be used

COMMON CONTENT

Mathematical Practices

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2.NBT.7 Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

2. NBT.8 Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.

2. NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations. (Explanations may be supported by drawings or objects.)

Focal Point

Developing quick recall of addition facts and related subtraction facts and fluency with multi-digit addition and subtraction

Critical Area

Using standard units of measure

COMMON CONTENT

Measure, add, and subtract length

M.UN.02.01 Measure lengths in meters, centimeters, inches, feet, and yards approximating to the nearest whole unit and using abbreviations: cm, m, in, ft, yd. [Ext – NC]

M.PS.02.02 Compare lengths; add and subtract lengths (no conversion of units). [Core-NC]

Tell time and solve time problems

M.UN.02.05 Using both A.M. and P.M., tell and write time from the clock face in 5 minute intervals and from digital clocks to the minute; include reading time: 9:15 as nine-fifteen and 9:50 as nine-fifty. Interpret time both as minutes after the hour and minutes before the next hour; e.g., 8:50 as eight-fifty and ten to nine. Show times by drawing hands on clock face. [Ext-NC]

Solve measurement problems

M.PS.02.10 Solve simple word problems involving length and money. [Core-NC]

M.TE.02.11 Determine perimeters of rectangles and triangles by adding lengths of sides, recognizing the meaning of perimeter. [Core-NC]

Measure and estimate lengths in standard units

2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

2. MD.3 Estimate lengths using units of inches, feet, centimeters, and meters.

2. MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Relate addition and subtraction to length

2.MD.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

Work with time and money

2. MD.7 Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

COMMON CONTENT

2. MD.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ (dollars) and ¢ (cents) symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

Represent and interpret data

2. MD.9 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

CONTENT THAT IS DIFFERENT

Content moving out of 2nd grade

Tell time and solve time problems

M.UN.02.06 Use the concept of duration of time, e.g., determine what time it will be half an hour from 10:15. [Core-NC]

M.UN.02.07 Read and write amounts of money using decimal notations, e.g., \$1.15. [Ext – NC]

M.PS.02.08 Add and subtract money in mixed units, e.g., \$2.50 + 60 cents and \$5.75 - \$3, but not \$2.50 + \$3.10. [Ext – NC]

3rd Grade

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of

3. MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

4th Grade

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

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.

Content moving into 2nd grade

Measure and use units for length, weight, temperature and time

M.UN.03.03 Understand relationships between sizes of standard units, e.g., feet and inches, meters and centimeters.

Measure and estimate lengths in standard units

2. MD.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

Mathematical Practices

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Michigan Content Expectations	Common Core State Standards
Focal Point Composing and decomposing geometric shapes	Critical Area Describing and analyzing two-dimensional shapes

COMMON CONTENT

Work with unit fractions

N.ME.02.18 Recognize, name, and represent commonly used unit fractions with denominators 12 or less; model $1/2$, $1/3$, and $1/4$ by folding strips. [Ext – NC]

N.ME.02.22 Recognize that fractions such as $2/2$, $3/3$, and $4/4$ are equal to the whole (one). [Ext – NC]

Identify and describe shapes

G.GS.02.01 Identify, describe, and compare familiar two-dimensional and three-dimensional shapes, such as triangles, rectangles, squares, circles, semi-circles, spheres, and rectangular prisms. [Core-NC]

Reason with shapes and their attributes

2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

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.)

CONTENT THAT IS DIFFERENT

Content moving out of 2nd grade

Identify and describe shapes

G.GS.02.02 Explore and predict the results of putting together and taking apart two-dimensional and three-dimensional shapes. [Core-NC]

G.GS.02.04 Distinguish between curves and straight lines and between curved surfaces and flat surfaces. [Ext-NC]

G.SR.02.05 Classify familiar plane and solid objects, e.g., square, rectangle, rhombus, cube, pyramid, prism, cone, cylinder, and sphere, by common attributes such as shape, size, color, roundness, or number of corners and explain which attributes are being used for classification. [Ext-NC]

G.TR.02.06 Recognize that shapes that have been slid, turned, or flipped are the same shape, e.g., a square rotated 45° is still a square. [Core-NC]

Kindergarten

Identify and describe shapes

K.G.2 Correctly name shapes regardless of their orientations or overall size.

1st Grade

Reason with shapes and their attributes

I. G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); for a wide variety of shapes; build and draw shapes to possess defining attributes.

I. G.2 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.

4th Grade

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.

Mathematical Practices

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Work with unit fractions

N.ME.02.19 Recognize, name, and write commonly used fractions: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{3}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$. [Ext-NC]

N.ME.02.20 Place 0 and halves, e.g., $\frac{1}{2}$, $1\frac{1}{2}$, $2\frac{1}{2}$, on the number line; relate to a ruler. [Ext-NC]

N.ME.02.21 For unit fractions from $\frac{1}{12}$ to $\frac{1}{2}$ understand the inverse relationship between the size of a unit fraction and the size of the denominator; compare unit fractions from $\frac{1}{12}$ to $\frac{1}{2}$. [Ext-NC]

*3rd Grade**Reason with shapes and their attributes*

3. G.2 Reason with shapes and their attributes. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is $\frac{1}{4}$ of the area of the shape.

Develop understanding of fractions as numbers

3. NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

- b. Represent a fraction $\frac{a}{b}$ on a number line diagram by marking off a lengths $\frac{1}{b}$ from 0. Recognize that the resulting interval has size $\frac{a}{b}$ and that its endpoint locates the number $\frac{a}{b}$ on the number line.

Represent and interpret data

3. MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

Mathematical Practices

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COMMON CONTENT

Mathematical Practices

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Understand meaning of multiplication and division

N.MR.02.14 Represent multiplication using area and array models. [Ext – NC]

N.MR.02.16 Given a situation involving groups of equal size or of sharing equally, represent with objects, words, and symbols; solve. [Ext – NC]

Understand the concept of area

M.UN.02.03 Measure area using non-standard units to the nearest whole unit. [Ext – NC]

M.TE.02.04 Find the area of a rectangle with whole number side lengths by covering with unit squares and counting, or by using a grid of unit squares; write the area as a product. [Ext – NC]

Create, interpret, and solve problems involving pictographs

D.RE.02.01 Make pictographs using a scale representation, using scales where symbols equal more than one. [Ext – NC]

D.RE.02.02 Read and interpret pictographs with scales, using scale factors of 2 and 3. [Ext – NC]

D.RE.02.03 Solve problems using information in pictographs; include scales such as each \square represents 2 apples; avoid partial cases. [Ext – NC]

Work with equal groups of objects to gain foundations for multiplication

2.OA.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

Reason with shapes and their attributes

2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

Represent and interpret data

2.MD.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

CONTENT THAT IS DIFFERENT

Content moving out of 2nd grade

Understand meaning of multiplication and division

N.MR.02.13 Understand multiplication as the result of counting the total number of objects in a set of equal groups, e.g., 3×5 gives the number of objects in 3 groups of 5 objects, or $3 \times 5 = 5 + 5 + 5 = 15$.

[Ext – NC]

N.MR.02.15 Understand division (\div) as another way of expressing multiplication, using fact families within the 5×5 multiplication table; emphasize that division “undoes” multiplication, e.g., $2 \times 3 = 6$ can be rewritten as $6 \div 2 = 3$ or $6 \div 3 = 2$.

[Extended – NC]

N.MR.02.17 Develop strategies for fluently multiplying numbers up to 5×5 . [NASL]

Read thermometers

M.UN.02.09 Read temperature using the scale on a thermometer in degrees Fahrenheit. [Ext-NC]

Use coordinate systems.

G.LO.02.07 Find and name locations using simple coordinate systems such as maps and first quadrant grids. [Ext-NC]

*3rd Grade**Represent and solve problems involving multiplication and division*

3.OA.1 Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .

Understand properties of multiplication and the relationship between multiplication and division

3.OA.6 Understand division as an unknown-factor problem. For example, divide $32 \div 8$ by finding the number that makes 32 when multiplied by 8.

Multiply and divide within 100

3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of one-digit numbers.

*No match in the Common Core State Standards***Mathematical Practices**

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