

New Jersey Student Learning Standards for Mathematics and Student Learning Objectives

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Grade 4 – Place Value and Operations with Whole Numbers - Unit 1, Module A

Rationale

Unit 1 focuses on place value and builds on learners' prior work reading and writing numbers using base-ten numerals, number names, and expanded form. Learners go beyond representing numbers to 1000 to representing any whole number in any of these forms. They use these understandings to round numbers to any place.

Having been introduced to multiplication and division in grade 3, grade 4 learners use these understandings to find factor pairs and to determine whether one whole number is a multiple of another one-digit number. They deepen their understanding of multiplication and relationships to represent verbal statements of multiplicative comparisons as multiplication equations. They continue to solve multistep word problems and extend that skill to interpreting problems for which the remainder must be interpreted. Learners represent these problems using equations with a variable. They use both mental computation and estimation strategies to assess the reasonableness of their answers.

In grade 3, learners' experiences developed fluency for addition and subtraction within 1000. They demonstrated fluency using various strategies and algorithms based on place value or properties of operations. In grade 4, students become fluent with the standard algorithm for addition and subtraction for any multi-digit whole numbers.

Note: Double asterisks (**) indicate that the example(s) included within the New Jersey Student Learning Standard may be especially informative when considering the Student Learning Objective.

Grade 4 – Unit 1, Module A

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
4.NBT.A.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. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>	recognize that a digit represents 10 times the value of what it represents in the place value to its right
4.NBT.A.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.	- read and write multi digit whole numbers in base-ten numerals, word, and expanded form - compare two multi digit numbers based on place value using $<$, $>$, $=$, to record the results of the comparison

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Standard	Student Learning Objectives We are learning to ... / We are learning that ...
■ 4.NBT.A.3 Use place value understanding to round multi-digit whole numbers to any place.	▪ round multi-digit numbers to any place using place value understanding
■ 4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	▪ add multi-digit whole numbers using the standard algorithm working towards accuracy and efficiency ▪ subtract multi-digit whole numbers using the standard algorithm working towards accuracy and efficiency

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Grade 4 – Unit 1, Module B

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
4.OA.C.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. <i>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.</i>	- generate a number or shape pattern that follows a given rule - identify the features of a pattern that are not explicit in the rule
4.OA.B.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.	- find all factors pairs for a whole number in the range 1 through 100 - recognize that a whole number is a multiple of each of its factors - determine whether a given whole number is a multiple of a given one-digit number in the range 1 through 100 - determine whether a given whole number is prime or composite in the range 1 through 100
4.OA.A.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.	- interpret multiplication equations as a comparison statement - represent verbal comparison statements as multiplication equations
4.OA.A.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.	- distinguish multiplicative comparison from additive comparison - multiply and divide to solve word problems involving multiplicative comparisons, using drawings and equations containing a variable to represent the problem

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Standard	Student Learning Objectives We are learning to ... / We are learning that ...
■ 4.OA.A.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.	▪ solve multi-step whole number word problems that have whole number answers, 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, estimation strategies, and rounding

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Grade 4 – Multi-digit Multiplication and Division & Fraction Equivalence – Unit 2

Rationale

In Unit 2, learners extend their work with multiplication and division to focus on multi-digit numbers. They multiply whole numbers up to four digits by a one-digit number and multiply two two-digit numbers. They work with four-digit dividends and one-digit divisors to find whole number quotients. Learners continue to use strategies based on place value and the properties of operations from grade 3 to multiply and divide, while illustrating and explaining their calculations using equations, rectangular arrays, and area models. Learners build on the work of the prior unit – solving word problems that involve multiplicative comparison – to solve multi-step word problems involving the four operations. They represent these problems using equations with variables and they use mental computation and appropriate estimation strategies to determine whether their answers are reasonable.

In second module of this unit, learners build upon their grade 3 understandings of fraction equivalence. In grade 3, learners determined fraction equivalence by comparing size or by locating fractions at the same point on the number line. They also recognized and generated simple equivalent fractions and used visual fraction models to illustrate their equivalence. Now in grade 4, learners compare the number of parts and the size of the parts when comparing two fractions that are the same size. They use this principle to recognize and generate equivalent fractions.

Unit 2 concludes as students develop understanding of adding and subtracting fractions as joining and separating parts that refer to the same whole. With this understanding in place, they then decompose fractions whose numerator is larger than into a sum of fractions and justify these decompositions with visual fraction models.

Grade 4 – Unit 2, Module A

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
 4.NBT.B.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.	▪ multiply up to four-digit by one digit numbers using strategies based on place value and properties of operations ▪ multiply two two-digit numbers using strategies based on place value and properties of operations ▪ illustrate and explain the multiplication calculation by using equations, rectangular arrays, and area models

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Standard	Student Learning Objectives We are learning to ... / We are learning that ...
■ 4.NBT.B.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.	▪ find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based on place value ▪ illustrate and explain the division calculation by using equations, rectangular arrays, and/or area models ▪ find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based properties of operations and/or the relationship between multiplication and division
■ 4.OA.A.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.	▪ solve multi-step whole number word problems that have whole number answers, 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, estimation strategies, and rounding
□ 4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>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.</i>	▪ apply the area formula for rectangles in real world and mathematical problems ▪ apply perimeter formulas for rectangles in real world and mathematical problems
■ 4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	▪ add multi-digit whole numbers using the standard algorithm working towards accuracy and efficiency ▪ subtract multi-digit whole numbers using the standard algorithm working towards accuracy and efficiency

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Grade 4 – Unit 2, Module B

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
■ 4.NF.A.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.	■ explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models ■ understand that the number and size of the parts of equivalent fractions differ even though the two fractions are the same size ■ recognize and generate equivalent fractions
■ 4.NF.A.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 $<$.	■ recognize that, when comparing two fractions, they must refer to the same whole ■ record the results of comparison with symbols $>$, $=$, or $<$, ■ compare two fractions with different numerators and different denominators by comparing to benchmark fraction such as $1/2$ ■ compare two fractions with different numerators and different denominators by creating common denominators and numerators
■ 4.NF.B.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.	■ addition of fractions can be thought of as joining parts that refer to the same whole ■ subtraction of fractions can be thought of as separating parts that refer to the same whole
■ 4.NF.B.3 Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. 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. <i>Examples:</i> $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.	■ decompose a fraction, in multiple ways, into a sum of fractions that have the same denominator ■ record each decomposition by an equation ■ justify decompositions using visual fraction models

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Grade 4 – Building Fractions & Decimal Notation – Unit 3

Rationale

The focus of Unit 3 is early operations with fractions. Learners add and subtract fractions with like denominators. They solve word problems involving both addition and subtraction of fractions, including fractions data gathered from line plots. Learners multiply fractions by whole numbers and understand that fractions that are not unit fractions are multiples of some basic unit fraction. As with earlier grades, learners continue to model their fractions understanding with visual fraction models .

Previous understandings of fraction equivalence are extended to express a fraction with denominator 10 as an equivalent fraction with denominator 100. Learners use this technique to add two fractions with respective denominators 10 and 100, use decimal notation for fractions with these two denominators, and compare two decimals. The unit concludes as learners revisit solving multistep word problems posed with whole numbers and use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money. These problems include those involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit.

Grade 4 – Unit 3, Module A

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
4.NF.B.3 Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. 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.	add and subtract mixed numbers with like denominators
4.NF.B.3 Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. 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.	- solve word problems involving addition and subtraction of fractions that refer to the same whole and have like denominators using visual fraction models - solve word problems involving addition and subtraction of fractions that refer to the same whole and have like denominators using equations to represent the problem

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Standard	Student Learning Objectives We are learning to ... / We are learning that ...
4.MD.B.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. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>	- make a line plot to display a data set of measurements using unit fractions ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$) - use data presented in line plots to solve problems involving addition and subtraction of fractions.
4.NF.B.4 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 $1/b$. <i>For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</i>	a fraction a/b is a multiple of $1/b$
4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. 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. <i>For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)</i>	- a multiple of a/b is also a multiple of $1/b$ using a visual fraction model - multiply a fraction by a whole number by using the idea that a/b is a multiple of $1/b$ **
4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. 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. <i>For example, if each person at a party will eat $3/8$ 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?</i>	solve word problems involving multiplication of a fraction by a whole number, using fraction models and equations to represent the problem

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Grade 4 – Unit 3, Module B

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
■ 4.NF.C.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. <i>For example, express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$.</i>	- express a fraction with denominator of 10 as an equivalent fraction that has a denominator of 100 - add two fractions, one with a denominator of 10 and one with a denominator of 100, by writing each fraction as a fraction with denominator 100**
■ 4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100. <i>For example, rewrite $\frac{62}{100}$ as 0.62; describe a length as 0.62 meters; locate 0.62 on a number line diagram.</i>	use decimal notation for fractions with denominators 10 or 100 **
■ 4.NF.C.7 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 $<$.	- 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 and to record the results of comparisons with the symbols $>$, $=$, or $<$
■ 4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm. mm; 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. <i>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), ...</i>	- know relative sizes of measurement units within one system of units including km, m, cm. mm; kg, g; lb, oz.; l, ml; hr, min, sec. - express measurements in larger units in terms of a smaller unit within a single system of measurement - record measurement equivalents in a two-column table**

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Standard	Student Learning Objectives We are learning to ... / We are learning that ...
■ 4.MD.A.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 word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, using the four operations ▪ solve word problems involving measurement that includes simple fractions or decimals, using the four operations ▪ solve word problems that require expressing measurements given in a larger unit in terms of a smaller unit, using the four operations ▪ represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale
■ 4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	▪ add multi-digit whole numbers using the standard algorithm, working towards accuracy and efficiency ▪ subtract multi-digit whole numbers using the standard algorithm, working towards accuracy and efficiency
■ 4.OA.A.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.	▪ solve multi-step whole number word problems that have whole number answers, 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, estimation strategies, and rounding

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Grade 4 – Geometry and Measurement – Unit 4

Rationale

In this final unit, learners build, draw, and analyze two-dimensional shapes to deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry. They identify key parts of figures such as parallel lines, perpendicular lines, points, line segments, and right angles. Learners recognize angles as geometric shapes formed by two rays, understand concepts of angle measurement, and measure angles using protractors. They sketch angles and use the understanding that angle measure is additive to create and solve equations to find unknown angle measures.

Grade 4 – Unit 4, Module A

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	- draw points, lines, line segments, rays, right angles, acute angles, obtuse angles, perpendicular lines and parallel lines - identify points, lines, line segments, rays, right angles, acute angles, obtuse angles, perpendicular lines and parallel lines in two-dimensional figures
4.G.A.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.	- classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines - classify two-dimensional figures based on the presence or absence of angles of a specified size - identify right triangles and recognize right triangles as a category
4.G.A.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.	- a line of symmetry is a line across the figure that divides the figure into matching parts - recognize a line of symmetry - identify line-symmetric figures and draw lines of symmetry

New Jersey Student Learning Standards for Mathematics and Student Learning Objectives

Grade 4 – Unit 4, Module B

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
 4.MD.C.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 $\frac{1}{360}$ 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.	- recognize angles as geometric shapes that are formed wherever two rays share a common endpoint - angles are measured in degrees - an angle is measured by considering the fraction of the circular arc that is between the two points where the two rays intersect the circle - a “one degree angle” is defined as $\frac{1}{360}$ of the entire circle - one degree angles can be used to measure angles
 4.MD.C.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	- measure angles in whole-number degrees using a protractor - sketch angles that have a specified measure
 4.MD.C.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.	- angle measure as additive - when an angle is decomposed into non-overlapping parts, the angle measurement of the whole equals the sum of the angle measures of its parts - solve addition and subtraction problems to find unknown angle measures on a diagram in real world and mathematical problems
 4.OA.A.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.	- solve multi-step whole number word problems that have whole number answers, 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, estimation strategies, and rounding

New Jersey Student Learning Standards for Mathematics and Student Learning Objectives

Standard	Student Learning Objectives We are learning to ... / We are learning that ...
■ 4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	▪ add multi-digit whole numbers using the standard algorithm with accuracy and efficiency ▪ subtract multi-digit whole numbers using the standard algorithm with accuracy and efficiency