Math Grade 4

Place Value of Whole Numbers

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 4

Summary and Rationale

Numeric reasoning involves fluency and facility with numbers.

Recommended Pacing

19 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.NBT.A Generalize place value understanding for multi-digit whole numbers.

Standard #	Standard
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.
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 >, =, < symbols to record the results of comparisons.
4.NBT.A.3	Use place value understanding to round multi-digit whole numbers to any place.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and

	explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Number sense can be based on place value patterns.

Unit Essential Questions

- How does the position of a digit in a number affect its value?
- What are strategies for comparing the value of numbers?

Objectives

Students will know:

- Place value in whole numbers up to and including the hundred thousand's place
- How to identify patterns in digits and periods
- Place value up to and including the hundred thousand's place in standard, expanded and word form
- Vocabulary: digit, rounding, about, expanded form, standard form, word form, place value, period

Students will be able to:

- Use number sense, place value, and estimation understandings to solve problems.
- Recognize that in multi-digit numbers, a digit in one place represents ten times what it represents in the place to its right
- Identify, express, and model place value up to and including the hundred thousand's place in standard, expanded and word form
- Round multi-digit whole numbers to any place
- Compare and order numbers up to and including the hundred thousand's place
- Estimate items up to 1000 using base 10 knowledge
- Recognize that the place and period of a digit determines its value

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

- Exemplars, *Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- *Math in Practice: Teaching Fourth Grade Math* by Kay B. Sammons, Susan O'Connell, & John SanGiovanni
- *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More* by Jennifer Lempp
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- *Mine the Gap for Mathematical Understanding, 3-5* by John J. SanGiovanni
- *Teaching Student Centered Mathematics: Developmentally Appropriate Instruction for Grades 3-5 (Volume*

II) by John A. Van de Walle, Karen S. Karp, LouAnn H. Lovin, & Jennifer M. Bay-Williams

Whole Number Operations: Addition and Subtraction

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 4

Summary and Rationale

Computational fluency includes understanding not only meaning, but also the appropriate use of numerical operations.

Recommended Pacing

17 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.OA.A Use the four operations with whole numbers to solve problems.

Standard #	Standard
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.

Standard 4.NBT.B Use place value understanding and properties of operations to perform multi-digit arithmetic.

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

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- The magnitude of numbers affects the outcome of operations on them.
- Fluency of computation allows us to solve real world problems.
- Algorithms are helpful when working with larger numbers.

Unit Essential Questions

- What makes a computational strategy both effective and efficient?
- What questions can be answered using addition and/or subtraction?

Objectives

Students will know:

- How to evaluate the reasonableness of a given answer
- How to use the properties of addition and subtraction to perform operations with whole numbers (Commutative Property and Associative Property)
- Strategies for determining the appropriate application of whole number operations to various problems
- That a decimal represents money

Students will be able to:

- Add and Subtract multi-digit whole numbers with regrouping
- Construct, use and explain procedures for performing whole number calculations with: paper-and -pencil, mental math, calculator
- Use efficient and accurate paper-and-pencil procedures for computation with whole numbers
- Select pencil-and -paper, mental math, or a calculator as the appropriate computational method in a given situation depending on the context and numbers
- Count and perform simple computations with money and record using standard dollars and cents notation
- Use patterns, models, and relationships as context for writing and solving simple equations
- Add and subtract decimals using money amounts
- Properly place decimals and dollar signs
- Apply problem solving skills and strategies

Resources

Primary Text:
enVision Math

Instructional & Professional Resources:

- Exemplars, *Problem Solving for the 21*^{*st*} *Century*
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Whole Number Operations: Multiplication

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 4

Summary and Rationale

Computational fluency includes not only the meaning, but also the appropriate use of numerical operations.

Recommended Pacing

19 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.OA.A Use the four operations with whole numbers to solve problems.

Standard #	Standard
4.OA.A.1	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 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.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.
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.

Standard 4.OA.B Gain familiarity with factors and multiples.

Standard #	Standard
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.

Standard 4.NBT.B Use place value understanding and properties of operations to perform multi-digit arithmetic.

Standard #	Standard
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.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.

CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Flexible methods of computation involve grouping numbers in strategic ways.
- Multiplication is a model for growing number patterns.
- Mathematical models simplify reality to enable useful solutions.
- Algorithms are helpful when working with larger numbers.

Unit Essential Questions

- What are different models of and models for multiplication?
- How can patterns help us to devise strategies for multiplying?
- How do mathematical representations reflect the needs of society?

Objectives

Students will know:

- There are different models for multiplication (i.e. equal sized groups, arrays, area models, equal intervals on the number line)
- Vocabulary: factor, product, prime, composite, array, multiples, zero property, associative property, commutative property, distributive property, and the identity element of 1
- The properties of multiplication (i.e. zero property, associative property, commutative property, distributive property, and the identity element of 1)

Students will be able to:

- Develop strategies to aid in the mastery of their multiplication facts up to 12 (i.e. skip counting, composing and decomposing numbers, repeated addition, etc.)
- Apply concept of repeated addition to solve multiplication problems

- Use arrays to explore factors and multiples
- Use arrays to express area as a multiplication number sentence.
- Use arrays to express numbers as prime or composite
- Recognize equivalent representations for the same number and generate them by decomposing and composing numbers using arrays (i.e. 6 × 2 is the same as 3 × 4)
- Develop fluency with basic number combinations for multiplication and use these combinations to mentally compute related problems (i.e. 30 × 50)
- Use factors and multiples as a means to multiply
- Multiply four-digit numbers by one-digit numbers; and two-digit numbers by two digit numbers
- Estimate products to determine the reasonableness of an answer
- Use patterns, models, and relationships as context for writing and solving simple equations
- Apply problem solving strategies
- Select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators and pencil and paper according to the context and nature of the computation and use the selected method or tool
- Recognize that the term "about" means to estimate

Resources

Primary Text:
enVision Math

Instructional & Professional Resources:
- Exemplars, *Problem Solving for the 21st Century*
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- *Math in Practice: Teaching Fourth Grade Math* by Kay B. Sammons, Susan O'Connell, & John SanGiovanni
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Whole Number Operations: Division

Content Area: Mathematics
Course & Grade Level: Mathematics, Grade 4

Summary and Rationale

Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations.

Recommended Pacing

23 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.OA.A Use the four operations with whole numbers to solve problems.

Standard #	Standard
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.
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.

Standard 4.NBT.B Use place value understanding and properties of operations to perform multi-digit arithmetic.

Standard #	Standard
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.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard

8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Flexible methods of computation involve grouping numbers in strategic ways.
- Division is a model for repeated subtraction, partitioning, and sharing, and represents the inverse of multiplication.
- Mathematical models simplify reality to enable useful solutions.
- Algorithms are helpful when working with larger numbers.

Unit Essential Questions

- What are different models of and models for division?
- How can patterns help us to devise strategies for dividing?
- How do mathematical representations reflect the needs of society?

Objectives

Students will know:

- There are different models of division (inverse of multiplication, partitioning, successive subtraction)
- The properties of multiplication (i.e. zero property, associative property, commutative property, distributive property, and the identity element of 1)
- A remainder represents a fractional part of a whole or a set
- Divisibility rules are patterns
- Vocabulary: dividend, divisor, quotient, remainder, partitioning, compatible numbers, divisibility

Students will be able to:

- Develop strategies to aid in the mastery of their division facts up to 12
- Use the inverse operation of multiplication to develop facility with basic facts
- Apply concept of repeated subtraction to solve division problems
- Identify and use divisibility rules to divide whole numbers (0, 1, 2, 5, 10)
- Use rounding skills to find compatible numbers based on fact families (e.g., 137 ÷ 6 can be estimated using the compatible numbers 120 ÷ 6)
- Use estimation to support the division algorithm using compatible numbers

- Find whole number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based on place value, properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation using equations, rectangular arrays, and/or area models.
- Use the division algorithm to solve for a quotient with and without remainders using the correct notation (up to and including 4-digit numbers by 1-digit numbers)
- 3-digit dividends with 3-digit quotients
- 3-digit dividends with 2-digit quotients
- zeros in the quotient
- zeros in the dividend
- Use patterns in numbers to check for reasonableness of an answer
- Interpret remainders in real world situations as they relate to a problem
- Apply problem solving skills
- Use patterns, models, and relationships as context for writing and solving simple equations
- Select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators and pencil and paper according to the context and nature of the computation and use the selected method or tool

Resources

Primary Text:
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Algebraic Thinking

Content Area: Mathematics	
Course & Grade Level: Mathematics, Grade 4	

Summary and Rationale

Algebra is a system used to communicate efficiently about patterns, rules, and relationships.

Recommended Pacing

9 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.OA.C Generate and analyze patterns.

Standard #	Standard
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. *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.*

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- The symbolic language of algebra is used to communicate and generalize the patterns in mathematics.
- Algebraic representation can be used to generalize patterns and relationships.

Unit Essential Questions

- How does finding patterns help in counting and/or computation?
- How can algebra help you solve real world problems?

Objectives

Students will know:

- Patterns can be numeric and nonnumeric
- Rules can be used to describe a sequence of numbers or objects
- Unknown quantities can be represented by a variable

Students will be able to:

- Describe, extend, and make generalizations about geometric and numeric patterns
- Use algebraic understandings to solve problems.
- Solve simple number sentences and functions (in-out box) with a variable
- Model problem situations with objects
- Use representations such as graphs, tables and equations to draw conclusions

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

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Fractions and Decimals

Content Area: Mathematics	
Course & Grade Level: Mathematics, Grade 4	

Summary and Rationale

Numbers are used for multiple purposes in our everyday lives.

Recommended Pacing

26 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.NF.A Extend understanding of fraction equivalence and ordering.

Standard #	Standard
4.NF.A.1	Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x 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.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 ½. Recognize that comparisons are valid only when 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.

Standard 4.NF.C Understand decimal notation for fractions, and compare decimal fractions.

Standard #	Standard
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.
4.NF.C.6	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 >, =, < and justify the conclusions, e.g., by using a visual model.

Standard 4.NF.B Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Standard #	Standard
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.
	b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation.
	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.
	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.

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.
	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.
	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.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
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W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- A quantity can be represented numerically in various ways, one representation may sometimes be more helpful than another.

Unit Essential Questions

- Why do we represent the same quantity in different ways?

• How do you decide the best representation of a certain quantity?
Objectives

Students will know:
- Decimal notation is an extension of the base-ten number system of writing whole numbers
- Decimals and fractions can be used to represent numbers between 0 and 1, between 1 and 2, and so on
- Fractions and decimals represent the same quantity in different ways
- Fractions and decimals represent a relationship between two numbers
- A unit fraction has a numerator of 1, and a non-unit fraction does not
- Vocabulary: equivalent, simplest form, least common multiple, greatest common factor, mixed number, improper fraction, numerator, denominator

Students will be able to:
- Use models, benchmarks, and equivalent forms to judge the size of fractions
- Decompose a fraction into a sum of fractions with the same denominators (3/8 = 1/8 + 1/8 + 1/8)
- Identify equivalent fractions using number patterns (least common multiple, greatest common factor), manipulatives, and models (e.g., number lines)
- Identify and convert improper fractions to mixed numbers and vice versa using various strategies
- Generate equivalent fractions using various strategies
- Simplify fractions using various strategies
- Compare and order fractions with different numerators and different denominators using various strategies
- Read and write decimals that are greater or less than 1 to the hundredths place
- Identify equivalent decimals
- Compare and order decimals to the hundredths place
- Generate equivalent forms of commonly used fractions and decimals
- Connect equivalent fractions and decimals by comparing models to symbols and locating equivalent symbols on a number line
- Round decimals to the nearest whole number
- Round decimals to the tenths place
- Estimate decimal and fractional amounts in problem solving
- Model addition and subtraction of fractions with like and unlike denominators using fraction strips, manipulatives, models, and pictures
- Select appropriate methods and tools for computing with decimals and fractions from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and the selected method or tool
- Add and subtract mixed numbers with like denominators
- Solve word problems involving addition and subtraction of fractions
- Multiply a fraction by a whole number. Solve word problems involving this.
- Express a fraction with denominator 10 as an equivalent fraction with denominator 100. Use this idea to add two fractions with respective denominators 10 and 100. (3/10 = 30/100, so 30/10 + 4/100 = 34/100)
- Make line plots with fractions and solve problems using addition and subtraction with this data

Resources

Primary Text:
enVision Math

Instructional & Professional Resources:
- Exemplars*, Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- *Math in Practice: Teaching Fourth Grade Math* by Kay B. Sammons, Susan O'Connell, & John SanGiovanni
- *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More* by

Jennifer Lempp

- *Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching* by Jo Boaler
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Geometry		
Content Area: Mathematics		
Course & Grade Level: Mathematics, Grade 4		
Summary and Rationale		
Children interpret the physical world with geometric ideas - shape, orientation, and spatial relations.		
Recommended Pacing		
18 Days		
New Jersey Student Learning Standards for Mathematics		
Standard 4.G.A Draw and identify lines and angles and classify shapes by properties of their lines and angles.		
Standard #	**Standard**	
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.	
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.	
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.	
Standard 4.MD.C Geometric measurement: understand concepts of angle and measure angles.		
Standard #	**Standard**	
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 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.C.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	
4.MD.C.7	Recognize angles 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.	
New Jersey Student Learning Standards for 21ˢᵗ Century Life and Careers		
Career Ready Practices		
Standard #	**Standard**	
CRP2.	Apply appropriate academic technical skills.	

CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Objects can be described and compared using their geometric attributes. By using transformations to design and analyze simple tilings and tessellations, students will deepen their understanding of two-dimensional space.
- The students will understand that they can use patterns in the real world for solving problems.
- Points, lines, and planes are the foundation of geometry.

Unit Essential Questions

- How are geometric properties used to solve problems in everyday life?
- What strategies can be used to verify symmetry and congruency?

Objectives

Students will know:

- Angles are measured with reference to a circle and based on 360 degrees
- 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.
- An angle that turns through n one-degree angles is said to have an angle measure of n degrees.

- Vocabulary: acute, obtuse, right angles, scalene, isosceles, equilateral triangles, center point, chord, radius, diameter, circumference, lines of symmetry, congruency and similarity of polygons, flips, turns, and slides of polygons, tessellations, line segments, rays, and lines, perpendicular, intersecting, and parallel, path

Students will be able to:

- Identify, classify, describe, and create 2D figures (square, triangle, any quadrilaterals, hexagon, octagon) according to the measure of their sides and angles
- Identify, classify, and draw acute, right, and obtuse angles and relate them to the real-world examples
- Measure and draw angles in whole number degrees using a protractor
- Recognize angle measures as additive
- Identify and classify triangles by their sides and angles (right, obtuse, acute, scalene, equilateral, isosceles).
- Identify congruency and similarity of polygons
- Investigate 2D and 3D geometric shapes from different perspectives and their attributes (e.g, bases, faces)
- Identify flips, turns, and slides. Note: 3rd graders are at the developing level for this skill
- Identify line segments, rays, and lines as perpendicular, intersecting, and parallel
- Recognize a line of symmetry for a 2D figure
- Explore an angle as a series of one-degree turns
- Recognize that when an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measure of the parts
- Measure angles in whole-number degrees using a protractor
- Sketch angles of specified measure

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

- Exemplars, *Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- *Math in Practice: Teaching Fourth Grade Math* by Kay B. Sammons, Susan O'Connell, & John SanGiovanni
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Measurement

Content Area: Mathematics
Course & Grade Level: Mathematics, Grade 4

Summary and Rationale

Standard units of measure help us to understand and describe our world, including units of weight, length, and capacity.

Recommended Pacing

15 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.MD.A Solve problems involving measurement and conversion of measurement from a larger unit to a smaller unit.

Standard #	Standard
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.
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.
4.MD.A.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.

Standard 4.MD.B Represent and interpret data.

Standard #	Standard
4.MD.B.4	Make a line plot to display a data set of measurements in fractions of a unit (½, ¼, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Objects have distinct attributes that can be measured using a common language.
- The choice of measurement tools depends on the measurable attribute and the degree of precision desired.

Unit Essential Questions

- Why do we need standard units of measurement?
- How do units within a system relate to each other?
- When is an estimate more appropriate than an actual measurement?

Objectives

Students will know:

- Appropriate measurement benchmarks
- Relationships between and among units
- The connection between units of measurement and the concepts of perimeter and area
- Formula for perimeter of rectangles
- Formula for area of a square, rectangle, and parallelogram
- That area is an attribute of two-dimensional regions and that they can quantify area by finding the total number of same-sized units of area that cover the shape without gaps or overlaps
- That a square that is 1 unit on a side is the standard unit for measuring area
- When to use linear measurement, capacity, and weight

Students will be able to:

- Estimate, measure, compare, and order standard (ounce, pound, ton) and metric (gram, kilogram) units of weight
- Use a chart to convert standard (oz/lbs.) and metric (g/kg) units of weight
- Estimate, measure, compare, and order standard (inch, foot, yard, mile) units of length
- Measure fractional parts of an inch to the nearest 1/2, 1/4, 1/8
- Use a chart to convert standard (yd/ft) and metric (m/cm) units of distance
- Estimate, measure, compare, and order metric (centimeter, decimeter, meter, kilometer) units of length

- Estimate, measure, compare and order standard (fluid ounce, cup, pint, quart, gallon) and metric (milliliter, liter) units of capacity
- Use a chart to convert standard (c/oz) and metric (l/ml) units of capacity
- Choose appropriate units of measure and justify choice
- Choose appropriate tools to measure length, weight and capacity
- Solve word problems involving simple fractions and decimals in the context of measurement
- Solve word problems that require expressing measurements given in larger units in terms of a smaller unit
- Apply the formulas for area and perimeter in real world and mathematical problems
- Record measurement equivalents in a two-column table

Resources

Primary Text:
enVision Math

Instructional & Professional Resources:
- Exemplars, *Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- *Math in Practice: Teaching Fourth Grade Math* by Kay B. Sammons, Susan O'Connell, & John SanGiovanni
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Time and Temperature

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 4

Summary and Rationale

Standard units of measure help us to understand and describe our world, including units of time and temperature.

Recommended Pacing

8 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.MD.A Solve problems involving measurement and conversion of measurement from a larger unit to a smaller unit.

Standard #	Standard
4.MD.A.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.
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.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Real world phenomena have distinct attributes that can be measured using a common language.
- The choice of measurement tools depends on the measurable attribute and the degree of precision desired.

Unit Essential Questions

- Why do we need standard units of measurement?
- When is an estimate more appropriate than an actual measurement?

Objectives

Students will know:

- What elapsed time is and how it is calculated
- Number of years in a decade, decades in a century
- Understand that a thermometer is an instrument used to measure temperature
- Understand that temperature is measured in degrees Fahrenheit and degrees Celsius

Students will be able to:

- Define a leap year
- Use and apply A.M., P.M., leap year, analog clock, digital clock, minutes: to/before/of/after/past
- Calculate elapsed time to the minute by skip counting hours and then minutes
- Calculate days and dates using a calendar
- Calculate and convert units of time: minute, hour, day, week, month, year, decade, century
- Describe, estimate, and order units of temperature with thermometers using Celsius and Fahrenheit
- Use time understandings to solve problems

Resources

Primary Text:
enVision Math

Instructional & Professional Resources:

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Data and Probability

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 4

Summary and Rationale

There are efficient mathematical ways to collect, organize, record, display, and communicate data. This helps us analyze, draw conclusions, and make predictions about real world events.

Recommended Pacing

14 Days

New Jersey Student Learning Standards for Mathematics

Standard 4.4.MD.B Represent and interpret data.

Standard #	Standard
4.MD.B.4	Make a line plot to display a data set of measurements in fractions of a unit (1/2, ¼, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Information can be represented in a variety of ways depending on the situation; the type of data and context will affect the choice of which representation to use.
- Probability can be used to understand and describe trends over a period of time; probability can rarely predict the outcome of an individual event with complete certainty.
- Mathematics can be used to provide models that help us interpret data and make predictions about the world around us.
- Real world phenomena has distinct attributes that can be measured using a common language.
- The choice of measurement tools depends on the measurable attribute and the degree of precision needed.

Unit Essential Questions

- How can the collection, organization, interpretation, and display of data be used to solve real world problems?
- How do we choose the best representation for a set of data? Why does it matter?
- How can you use probability to make predictions and inform decisions regarding real world phenomena?
- Why do we need standard units of measurement?
- When is an estimate more appropriate than an actual measurement?
- How do units within a system relate to each other?

Objectives

Students will know:

- The characteristics of different graphs: line graphs, line plots
- The characteristics of different organizers: tree diagram, maps
- The differences in representing categorical and numerical data
- Probability can be expressed in words and fractions
- Vocabulary: median, mode, mean, range, probability, impossible, unlikely, equally likely, likely, certain, x-axis, y-axis, trend, frequency, interpret, combinations, permutations

Students will be able to:

- Compare and contrast the purpose of different graphs: pictograph, bar graphs, line graphs, line plots
- Compare and contrast the purpose of different organizers: Venn diagrams, tree diagram, maps
- Determine the appropriate graph to use given a set of data
- Analyze and interpret data using pictographs, bar graphs, line graphs, line plots
- Be able to label the title and axis of a graph
- Collect, organize, analyze and interpret data using and/or constructing Venn diagrams, tree diagram, maps
- Find and/or calculate median, mode, range, mean (with calculator)
- Design an investigation to address a question and consider how data-collection methods affect the nature of the data set
- Collect data using observations, surveys and experiments
- Propose and justify conclusions and predictions that are based on data

- Determine the probability of a given event and predict outcomes from chance devices (spinners, dice, marbles, etc.)
- Determine combinations and permutations of a given set of data.
- Apply problem solving strategies
- Make a line plot to display a set of measurements in fractions of a unit (½, ¼, 1/8)
- Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale
- Collect and organize data used in measurement
- Analyze and interpret data using vocabulary: likely, equally likely, certain impossible, unlikely
- Use measurement and data analysis understanding to solve problems

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

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Problem Solving

Content Area: Mathematics
Course & Grade Level: Mathematics, Grade 4

Summary and Rationale

Context and Rationale: Problem solving involves examining mathematically formulating appropriate mathematical questions and using a variety of strategies.

Recommended Pacing

Embedded throughout the year

New Jersey Student Learning Standards for Mathematics

Standard 4.OA.A Use the four operations with whole numbers to solve problems.

Standard #	Standard
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 comparisons from additive comparison.
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.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic technical skills.
CRP4.	Communicate clearly and effectively with reason.
CRP6.	Demonstrate creativity and innovation.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard

RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- A variety of strategies are used to solve problems.
- Build new mathematics knowledge through problem.

Unit Essential Questions

- How can I use what I know to solve a problem?
- What strategy do I need to use to solve a problem?

Objectives

Students will know:
- Problems are solved using a variety of strategies
- The 4-step process to solve a problem

Students will be able to:
- Use the 4 step process to identify:
    - What are the facts needed to solve the problem?
    - What can we eliminate?
    - What is the question?
    - Choose a strategy and solve.
    - Does the answer make sense?
- Choose a strategy to solve a problem:
    - choose an operation
    - Draw a picture or diagram
    - Work backwards
    - Guess and check
    - Act it out
    - Make a table or an organized list
    - Use logical reasoning/decision making
    - Look for a pattern
    - Multi-step problems
- Communicate mathematical thinking through oral and written language

Resources

Primary Text:
enVision Math
Instructional & Professional Resources:

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- K-5 Math Teaching Resources
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Standards for Mathematical Practice

Content Area: Mathematics	
Course & Grade Level: Mathematics, Grade 4	

Summary and Rationale

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

Recommended Pacing

Embedded throughout the year

New Jersey Student Learning Standards for Mathematics

Standards for Mathematical Practice

Standard #	Standard
MP1	Make sense of problems and persevere in solving them.
MP2	Reason abstractly and quantitatively.
MP3	Construct viable arguments and critique the reasoning of others.
MP4	Model with mathematics.
MP5	Use appropriate tools strategically.
MP6	Attend to precision.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.

New Jersey Student Learning Standards for 21st Century Life and Careers

Career Ready Practices

Standard #	Standard
CRP2.	Apply appropriate academic and technical skills.
CRP4.	Communicate clearly and effectively and with reason.
CRP6.	Demonstrate creativity and innovation.
CRP8.	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11.	Use technology to enhance productivity.

9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.

New Jersey Student Learning Standards for Technology

Standard #	Standard
8.1	All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Interdisciplinary Connections

Standard #	Standard
RI.4.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Mathematicians problem solve by collaborating, analyzing, communicating and critiquing arguments, model, think strategically, and persevering when faced with a challenge.

Unit Essential Questions

- What are the essential practices and processes through which mathematicians learn to create and communicate knowledge?

Objectives

Students will be able to:

- Explain the meaning of problems, looking for multiple entry points to solve problems and use different methods to check their solutions.
- Make sense of quantities and their relationships in problem solving situations.
- Construct arguments using concrete referents such as objects, drawings, diagrams, and actions.
- Apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.
- Consider the available tools when solving a mathematical problem.
    - Identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems.
    - Use technological tools to explore and deepen their understanding of concepts.
- Communicate precisely to each other including the use of units of measure, and express numerical answers with a degree of precision appropriate for the context.
- Look closely to discern a pattern or structure.
- Notice if calculations are repeated, and look both for general methods and for more efficient methods of solving problems.

Resources

Primary Text:
enVision Math
Instructional & Professional Resources:

- Exemplars*, Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- *Math in Practice: Teaching Fourth Grade Math* by Kay B. Sammons, Susan O'Connell, & John SanGiovanni
- *Math Workshop: Five Steps to Implementing Guided Math, Learning Stations, Reflection, and More* by Jennifer Lempp
- *Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching* by Jo Boaler
- *Mindset Mathematics: Visualizing and Investigating Big Ideas, Grade 4* by Jo Boaler, Jen Munson, & Cathy Williams
- *Mine the Gap for Mathematical Understanding, 3-5* by John J. SanGiovanni
- *Teaching Student Centered Mathematics: Developmentally Appropriate Instruction for Grades 3-5 (Volume II)* by John A. Van de Walle, Karen S. Karp, LouAnn H. Lovin, & Jennifer M. Bay-Williams