Math Grade 5

Place Value

Content Area: Mathematics	
Course & Grade Level: Mathematics, Grade 5	

Summary and Rationale

Our number system helps us communicate in a mathematical language.

Recommended Pacing

18 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.NBT.A Understand the place value system.

Standard #	Standard
5.NBT.A.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.NTB.A.3	Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base ten numerals, number names, and expanded form.
5.NBT.A.4	Use place value understanding to round decimals to any place.

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.
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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in 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.
- Place value is used to organize number systems.
- One representation may sometimes be more helpful than another; and, used together, multiple representations give a fuller understanding of a problem.

Unit Essential Questions

- How does the position of a digit in a number affect its value?
- To what extent can mathematics model the real world? What do numbers mean?

Objectives

Students will know:

- In a multi-digit number, a digit in the ones place represents ten times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left
- Place value of whole numbers through the millions period
- Place value of decimals through the thousandths place
- Number lines can be used to order and compare the magnitude of whole numbers and decimals
- Symbols =, <, > may be used to compare any number
- Vocabulary: digit, rounding, notation, expanded form, standard form, word form, place value
- Develop and apply problem-solving strategies with number theory
- The use of whole number exponents to denote powers of 10

Students will be able to:

- Read and write whole numbers to the millions in standard, expanded, and word form
- Read and write decimals to the thousandths in standard, expanded, and word form
- Recognize that the place and period of a digit determines its value
- Determine why multiplying by the power of ten shifts the digits of whole numbers or decimals that many places to the left
- Express $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/110) + 2 \times (1/1000)$ as represented in expanded form
- Understand how place value can be used to compare and order whole numbers and decimals
- Round whole numbers and decimals

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

- Exemplars, *Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- *Math in Practice: Teaching Fifth Grade Math* by Joan Petti Tellis, 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 5* 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

Adding/Subtracting Whole Numbers and Decimals

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

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

Recommended Pacing

8 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Standard #	Standard
5.NBT.B.7	Add, subtract, multiply and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

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.
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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Adding and subtracting multi-digit decimals is similar to adding and subtracting multi-digit whole numbers.
- There is more than one algorithm for each of the operations with rational numbers.

Unit Essential Questions

- To what extent can mathematics model the real world?
- What is estimation and how is it useful?
- How are adding and subtracting whole numbers different from adding and subtracting decimals?

Objectives

Students will know:

- How to evaluate the reasonableness of a given answer
- That estimation is a way to get an approximate answer
- When to estimate or solve for the actual answer
- Addition and subtraction of whole numbers and decimals require an understanding of regrouping within place value
- Vocabulary: estimating, about, rounding, addend, sum, difference, front end estimation, compatible numbers, equation, expression, variable, property, associative property, commutative property, computation, mental math, algorithm
- Develop and apply problem-solving strategies using addition and subtraction of whole numbers and decimals
- How to use patterns, models and relationships as context for writing and solving simple equations (algebraic thinking)

Students will be able to:

- Explain the difference between estimating and rounding and use them appropriately
- Add and subtract any whole numbers
- Recognize that the term about means to estimate
- Use place value knowledge to add and subtract whole numbers and decimals
- Align decimals properly when adding and subtracting
- Use the commutative and associative properties

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

- Exemplars, *Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
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Multiplication of Whole Numbers and Decimals

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

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

Recommended Pacing

20 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Standard #	Standard
5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

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.
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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Patterns can be used to mentally multiply decimals: 10, 100, 1,000.
- There is more than one way to estimate products of whole numbers and decimals.
- Steps for multiplying decimals are similar to steps for multiplying whole numbers.
- Place value is important in understanding when multiplying a decimal by a decimal.

Unit Essential Questions

- What makes a computational strategy both effective and efficient?
- How do operations affect numbers?
- To what extent can mathematics model the real world?

Objectives

Students will know:

- How to evaluate the reasonableness of a given answer
- Estimation is a way to get an approximate answer
- When to estimate or solve for the actual answer
- How to use place value to determine the placement of decimals when multiplying whole numbers and decimals
- Vocabulary: commutative, associative, identity, about, zero property, factor, product, multiple, estimation, rounding, equation, expression, variable, exponent, base, exponential notation, distributive, LCM
- Develop and apply problem-solving strategies when multiplying whole numbers and decimals
- How to use patterns, models, and relationships as context for writing and solving simple equations (algebraic thinking)
- Spiral Review:
  - Relate multiplication to the understanding of repeated addition
  - Use basic facts, patterns, and properties as a useful tool when multiplying mentally
  - Select pencil-and-paper, mental math, or a calculator as the appropriate computational method

Students will be able to:

- Apply the commutative, associative, identity, distributive, and zero property
- Multiply by multi-digit whole numbers fluently
- Multiply decimals through the hundredths place
- Create factor trees to determine prime factorization
- Identify multiples, common multiples, and least common multiples
- Use exponents to show the number of times a factor is repeated (e.g., $5^2 = 5 \times 5$)
- Use patterns when mentally multiplying decimals by multiples of 10, 100...
- Use rounding and compatible numbers to estimate the product of a decimal and a whole number
- Add, subtract, multiply, and divide money amounts

Resources

Primary Text:
enVision Math

Instructional & Professional Resources:

- Exemplars, *Problem Solving for the 21st Century*
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Division of Whole Numbers and Decimals

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

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

Recommended Pacing

20 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

Standard #	Standard
5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-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.
5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

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.
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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Proficiency with basic facts aids estimation and computation of smaller and larger numbers.
- Computation involves taking apart and combining numbers using a variety of approaches.
- Flexible methods of computation involve grouping numbers in strategic ways.

Unit Essential Questions

- What makes a computational strategy both effective and efficient?
- How do operations affect numbers?
- To what extent can mathematics model the real world?

Objectives

Students will know:

- How to evaluate the reasonableness of a given answer
- Estimation is a way to get an approximate answer
- When to estimate or solve for the actual answer
- That the standard division algorithm which involves using place value to break the calculation into smaller calculations can be extended to dividing decimals by whole numbers and whole numbers by whole numbers
- Vocabulary: division, divisor, dividend, quotient, estimate, remainder, interpret, remainders, divisibility, prime, composite, compatible number, equation, expression, variable
- How to apply problem solving strategies
- How to use patterns, area models (including arrays) and relationships, as context for writing and solving simple equations. (Algebraic thinking)

Students will be able to:

- Identify and apply properties of division
- Apply rules of divisibility
- Divide by single numbers
- Divide by two-digit divisors with a four-digit dividend
- Express remainders as fractions or decimals in the quotient
- Identify prime and composite numbers
- Divide whole numbers and decimals by the multiples of 10 and 100
- Estimate quotients
- Recognize that the term about means to estimate
- Interpret remainders
- Divide decimals by whole numbers
- Divide decimals to the hundredths place
- Create factor trees to determine prime factorization

Resources

Primary Text:
enVision Math

Instructional & Professional Resources:

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Algebraic Thinking

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

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

Recommended Pacing

20 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.OA.A Write and interpret numerical expressions.

Standard #	Standard
5.OA.A.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.OA.A.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

Standard 5.OA.B Analyze patterns and relationships.

Standard #	Standard
5.OA.B.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms form the two patterns, and graph the ordered pairs on a coordinate plane.

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.
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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Patterns, models, and relationships as contexts for writing and solving simple equations.

Unit Essential Questions

- How can change be best represented mathematically?
- How can patterns, relations, and functions be used as tools to best describe and help explain real life situations?

Objectives

Students will know:

- Variables and symbols can be used to write algebraic equations
- There is a difference between an expression (phrase) and an equation (sentence)
- How to solve using order of operations
- Numerical patterns when they are given two rules
- That corresponding terms are used to create an ordered pair on a coordinate plane
- Vocabulary: algebra, patterns, equation, algebraic expression, variable, evaluate, rule, input, output, properties

Students will be able to:

- Form ordered pairs based on two patterns and graph on a coordinate plane
- Solve number sentences and functions with a single variable
- Model problem situations with objects and use representations to draw conclusions
- Identify and investigate sequence patterns
- Analyze and create tables (in/out boxes)
- Identify properties such as commutative, associative, and distributive and use them to compute whole numbers, fractions, and decimals
- Solve equations using order of operations

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

- Exemplars*, Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- *Math in Practice: Teaching Fifth Grade Math* by Joan Petti Tellis, Susan O'Connell, & John SanGiovanni
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Fractions, Decimals, and Percent

Content Area: Mathematics
Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

Numbers are used for multiple purposes in our everyday lives.

Recommended Pacing

28 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.NF.A Use equivalent fractions as a strategy to add and subtract fractions.

Standard #	Standard
5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
5.NF.A.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g. by using visual fractions models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.

Standard 5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Standard #	Standard
5.NF.B.3	Interpret a fraction as division of the numerator by the denominator. Solve word problems involving division of whole numbers leading to answers in the form of fraction or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
	
	    a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q / b$. For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)
	    b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5.NF.B.5	Interpret multiplication as scaling (resizing), by: a. comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number; explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principal of fraction equivalence to the effect of multiplying a/b by 1.

5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
5.NF.B.7	Apply and extend previous understanding of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
	a. interpret division of a unit fraction by a non-zero whole number, and compute such quotients.
	b. Interpret division of a whole number by a unit fraction, and compute such quotients.
	c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, 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 and technical skills.
CRP4.	Communicate clearly and effectively and 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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Fractions, decimals, and percent's can be read, written, and represented interchangeably by using words, and models.
- Fractions, decimals, and percent's express a relationship between two numbers.

Unit Essential Questions

- How can we compare and contrast numbers?
- What is the relationship among fractions, decimals, and percent's?

Objectives

Students will know:

- There is a relationship among fractions, decimals, and percent
- Place value is important when adding and subtracting fractions and decimals
- The standard procedures for adding and subtracting fractions with like and unlike denominators
- When multiplying decimals and fractions less than one, the product will be less than one of the factors. (e.g. 2. 3 × 0.5 = 1.15, 2 3/10 × 5/10 = 1 15/100
- Vocabulary: fraction, mixed number, improper fraction, decimal, percent, simplify, numerator, denominator, factors, multiples, equivalent, greatest common factor, like fractions, unlike fractions, least common multiple, lease common denominator, greatest common factor, unit fraction
- Writing answers in simplest form is a standard convention
  -a fraction represents the division of the numerator by the denominator
  -writing answers in simplest form is a standard convention

Students will be able to:

- Relate fractions to decimals and percents
- Use models (pictures) to develop an understanding of fractions, decimals and percents
- Identify and determine equivalency among fractions, decimals, and percents
- Understand greatest common factors
- Compare like and unlike fractions by determining the least common denominator using multiples
- Determine the least common multiple in order to determine the least common denominator
- Determine the greatest common factor in order to simplify fractions
- Compare and order fractions, decimals, and percents
- Develop fluency with addition and subtraction of fractions using models, pictures, and numbers (like, unlike, and mixed)
- Develop an understanding of multiplication and division of fractions and decimals using models, pictures, and equations (with the exception of dividing decimals by decimals)

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

- Exemplars, *Problem Solving for the 21st Century*
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Geometry

Content Area: Mathematics	
Course & Grade Level: Mathematics, Grade 5	

Summary and Rationale

Children interpret the physical world with geometric ideas – shape, orientations, and spatial relations.

Recommended Pacing

20 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.G.A Graph points on the coordinate plane to solve real-world and mathematical problems.

Standard #	Standard
5.G.A.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate.)
5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Standard 5.G.B Classify two-dimensional figures into categories based on their properties.

Standard #	Standard
5.G.B.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.
5.G.B.4	Classify two-dimensional figures in a hierarchy based on properties.

Standard 5.MD.C Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

Standard #	Standard

5.MD.C.3	Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
	    a. A cube with side length 1 unit, called a "unit cube" is said to have "one cubic unit" of volume, and can be used to measure volume.
	    b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.

5.MD.C.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and non-standard units.
5.MD.C.5	Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the

	base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
	b. Apply the formulas V = l x w x h and V=B x h for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
	c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

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.
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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Geometric ideas and relationships apply to other disciplines and to problems that arise in the classroom and/or everyday life.
- Objects can be described and compared using their geometric attributes for two and three-dimensional figures.
- Points, lines, and planes are the foundation of geometry.

Unit Essential Questions

- How are geometric properties used to solve problems in everyday life?

• How are geometric figures constructed?
• How are properties used to classify geometric figures?

Objectives

Students will know:

- That attributes belonging to a category of 2-D figures belong to all subcategories of that group (i.e.; all squares are rectangles)
- Strategies and formulas for finding volume of cubes and rectangular prisms
- Volume can be quantified by finding the total number of same-sized units of volume.
- To use appropriate units of volume and label accordingly. Volume must be expressed in cubic units
- Strategies to determine volume of rectangular solids
- How a coordinate plane is constructed
- How to distinguish the placement of a point on a coordinate grid using the *x* and *y* axis
- Two and three-dimensional figures have line symmetry and rotational symmetry
- Planes are endless flat surfaces
- Vocabulary: volume, three dimensional, translation (slide), reflection (flip) and rotation (turn)
- Triangles are classified by angles and length of sides
- Strategies and formulas for finding perimeter and area for triangles, squares, rectangles, and parallelograms
- 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
- Area must be expressed in square units
- To use appropriate units for perimeter and area and label accordingly
- A protractor is used to measure and draw angles
- The appropriate symbols for angles, lines, line segments, rays, parallel line, perpendicular and intersecting lines

Students will be able to:

- Identify, classify, describe and create three-dimensional figures (cubes, cylinders, cones, prisms, pyramids, and spheres)
- Calculate the volume of three-dimensional figures counting the numbers of cubes that fill the figure and using a formula (cubes and rectangular prisms)
- Recognize volume as additive and be able to find the volume of two rectangular prisms by adding the volumes
- Identify faces, bases, edges, and vertices of three-dimensional figures (cubes and rectangular prisms)
- Identify a plane by three points in space
- Use the terms rotation, reflection, and translation in place of flip, slide, and turn
- Find the distance between points along horizontal and vertical lines of a coordinate system and graph points in all quadrants

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

- Exemplars, *Problem Solving for the 21st Century*
- K-5 Math Teaching Resources
- *Math in Practice: Teaching Fifth Grade Math* by Joan Petti Tellis, Susan O'Connell, & John SanGiovanni
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Data Analysis and Probability

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 5

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

16 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.MD.B Represent and interpret data.

Standard #	Standard
5.MD.B.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, ¼, 1/8). Use operations on fractions for this grade to solve problems involving 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 and technical skills.
CRP4.	Communicate clearly and effectively and 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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Reading, understanding, interpreting, and communicating data are critical in modeling a variety of real-world situations, drawing appropriate inferences, making informed decisions, and justifying those decisions.
- The message conveyed depends on how the data is collected, how it is represented, and how it is summarized.
- Probability is the mathematics of chance. Sampling affects the relationship between experimental and theoretical probability.
- Experimental results tend to approach theoretical probabilities after a large number of trials.
- There are differences and similarities between theoretical and experimental probability.

Unit Essential Questions

- How can the collection, organization, interpretation, and display of data be used to answer questions and solve real world problems?
- Why is it important to choose the best representation for a set of data?
- How can experimental and theoretical probabilities be used to make predictions or draw conclusions?

Objectives

Students will know:

- The characteristics of different graphs
- The differences in representing categorical and numerical data
- How to read, interpret and create line plots to display a set of measurements in fractions of a unit (1/2, ¼, 1/8)
- Vocabulary: line plots, range, median, mode, mean, survey, trend, interpret, average, probability, equally likely, unlikely, outcome, impossible, certain, sample, predictions, event
- A frequency table is a chart/table used to show the number of times something occurs
- How to use patterns, models and relationships as context for writing and solving simple equations based on data (algebraic thinking)
- How to model situations involving probability using simulations (with spinners and dice)
- How to select appropriate graphs to properly represent the data
- Use of other graphs such as bar graphs, line plot, line graph, double bar graphs, stem and leaf plots

Students will be able to:

- Collect, generate, organize and display data generated from surveys
- Read, interpret, and create line plots
- Make a line plot with data including fractions, then be able to add/subtract fractions based on the data within the line plot
- Identify the collection of data from a survey as a frequency table
- Read and interpret graphs
- Construct a graph that reflects the data:
  - Double bar graph
  - Line graph
  - Line plots
  - Stem and leaf plot
- Interpret the use of a circle graph and compare it to other graphs
- Calculate range, median, mode, and mean with whole numbers and decimals in order to organize data
- Determine the intervals using whole numbers, fractions, and decimals when constructing graphs
- Propose and justify conclusions and predictions that are based on data
- Interpret and present data as ratios, percents, fractions, and decimals

- Determine the probability of an event
- Use models of probability to predict events based on actual data (e.g. line plots)

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

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Measurement (Length, Weight, Capacity, and Time)

Content Area: Mathematics

Course & Grade Level: Mathematics, Grade 5

Summary and Rationale

There are some attributes of objects that are measureable and can be quantified using nonstandard and standard units.

Recommended Pacing

16 Days

New Jersey Student Learning Standards for Mathematics

Standard 5.MD.A Convert like measurements within a given measurement system.

Standard #	Standard
5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

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.
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
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Instructional Focus

Unit Enduring Understandings

- Everyday objects have a variety of attributes each of which can be measured in many ways.
- Measurements can be used to describe, compare, and make sense of phenomena.
- What we measure affects how we measure it.

Unit Essential Questions

- How can measurement be used to solve problems?
- What are tools of measurement and why are they used?
- What is the purpose of standard units of measurement?

Objectives

Students will know:

- How to select and use appropriate customary and metric units to measure length
- How to convert linear measurement units in a metric system and customary system using a chart
- The relationship of units within a given system (smallest to largest)
- The importance of appropriate labels in measurement
- Weight is the measure of how light or heavy an object is
- Mass is the measure of the quantity of matter in an object
- Elapsed time within problem solving situations
- Vocabulary: inches, feet, yard, mile, millimeters, centimeters, decimeters, meters, kilometer, equation, expression, variable, ounces, pounds, tons, milligrams, grams, kilograms, cups, fluid ounces, quarts, pints, gallons, milliliter, liter

Students will be able to:

- Use a ruler to measure to the nearest 1/8 of an inch
- Convert units of length (i.e. inches to feet, centimeters to meters) using a conversion chart and label appropriately
- Select and apply appropriate standard units and tools to measure length, capacity, mass, time
- Estimate, measure, compare, and order lengths, weights, mass, capacity, using customary and metric units
- Convert units of weight (i.e.; ounces to pounds and grams to kilograms)
- Convert units of capacity (i.e.; ounces to cups and milliliters to liters)
- Solve problems with estimation and exact measure using customary and metric measurements

Resources

Primary Text:

enVision Math

Instructional & Professional Resources:

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Problem Solving

Problem Solving	
Content Area: Mathematics	
Course & Grade Level: Mathematics, Grade 5	
Summary 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 5.NF.A Use equivalent fractions as a strategy to add and subtract fractions.	
Standard #	**Standard**
5.NF.A.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g. by using visual fractions models or equations to represent the problem.
Standard 5.NF.B Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	
Standard #	**Standard**
5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fractions models or 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 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**
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

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.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

W.5.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in 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 solving.

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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Standards for Mathematical Practice

Content Area: Mathematics	
Course & Grade Level: Mathematics, Grade 5	

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.
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9.2 Career Awareness, Exploration, and Preparation

Standard #	Standard
9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

New Jersey Student Learning Standards for Technology

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Interdisciplinary Connections

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W.5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
SL.5.5	Include multimedia components (e.g., graphics, sound) and visual displays in 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

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