

MATHEMATICS PARENT GUIDE



Every Student. Every Day.

Medinah School District # 11

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Mathematics Philosophy

The Medinah School District 11 Math Curriculum Committee affirms that students and teachers in grades K-8 have a well-developed and meaningful mathematics curriculum. The standards-based program is comprehensive and includes basic skills, problem solving, concept development, and critical thinking. This balanced, research-based curriculum encourages students to be thoughtful math practitioners.

"The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years."

—*Common Core State Standards for Mathematics*, page eight

The eight Standards for Mathematical Practice are:

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

The Math Committee recognizes that for effective implementation of this philosophy, ongoing support and cooperation from the home and school district are vital. To maximize the benefits of the allocated instructional time necessary for concept development, the majority of skill maintenance will take place outside the math classroom. Instructional support, depending upon grade level, includes technology resources, tutorials, homework, and home study. Ongoing staff development is fundamental as well.

The goal of the Medinah School District 11 math program is to ensure **all** students' **life-long** mathematical success.

Best Practices



Characteristics of Mathematically Proficient Students¹

Standards for Mathematical Practice

Student Characteristics

1. Make sense of problems and persevere in solving them.

Mathematically proficient students can

- Explain the meaning of a problem and restate it in their words.
 - Analyze given information to develop possible strategies for solving the problem.
 - Identify and execute appropriate strategies to solve the problem.
 - Evaluate progress toward the solution and make revisions if necessary.
 - Check for accuracy and reasonableness of work, strategy and solution.
 - Understand and connect strategies used by others to solve problems.
-

2. Reason abstractly and quantitatively.

Mathematically proficient students can

- Translate given information to create a mathematical representation for a concept.
 - Manipulate the mathematical representation by showing the process considering the meaning of the quantities involved.
 - Recognize the relationships between numbers/quantities within the process to evaluate a problem.
 - Review the process for reasonableness within the original context.
-

3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students can

- Use observations and prior knowledge (stated assumptions, definitions, and previous established results) to make conjectures and construct arguments.
 - Compare and contrast logical arguments and identify which one makes the most sense.
 - Justify (orally and in written form) the approach used, including how it fits in the context from which the data arose.
-

-
- Listen, understand, analyze, and respond to the arguments of others.
 - Identify and explain both correct and flawed logic.
 - Recognize and use counterexamples to refine assumptions or definitions and dispute or disprove an argument.
-

4. Model with mathematics.

Mathematically proficient students can

- Use a variety of methods to model, represent, and solve real-world problems.
 - Simplify a complicated problem by making assumptions and approximations.
 - Interpret results in the context of the problem and revise the model if necessary.
 - Choose a model that is both appropriate and efficient to arrive at one or more desired solutions.
-

5. Use appropriate tools strategically.

Mathematically proficient students can

- Identify mathematical tools and recognize their strengths and weaknesses.
 - Select and use appropriate tools to best model/solve problems.
 - Use estimation to predict reasonable solutions and/or detect errors.
 - Identify and successfully use external mathematical resources to pose or solve problems.
 - Use a variety of technologies, including digital content, to explore, confirm, and deepen conceptual understanding.
-

6. Attend to precision.

Mathematically proficient students can

- Understand symbols and use them consistently within the context of a problem.
 - Calculate answers efficiently and accurately and label them appropriately.
 - Formulate precise explanations (orally and in written form) using both mathematical representations and words.
 - Communicate using clear mathematical definitions, vocabulary, and symbols.
-

7. Look for and make use of structure.

Mathematically proficient students can

- Look for, identify, and accept patterns or structure within relationships.
- Use patterns or structure to make sense of mathematics and connect prior knowledge to similar situations and extend to novel situations.
- Analyze a complex problem by breaking it down into smaller parts.
- Reflect on the problem as a whole and shift perspective as needed.

8. Look for and express regularity in repeated reasoning.

Mathematically proficient students can

- Recognize similarities and patterns in repeated trials with a process.
- Generalize the process to create a shortcut which may lead to developing rules or creating a formula.
- Evaluate the reasonableness of results throughout the mathematical process while attending to the details.

¹http://www.ocde.us/CommonCoreCA/Documents/mathematicalpractices_characteristicsofproficientstudent_wisconson.pdf

Progression of Concepts



K-8 MATH

Progression of Concepts

KDG	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Counting and Cardinality								
Numbers and Operations in Base Ten				Ratios and Proportional Relationships				
		Numbers and Operations: Fractions			The Number Systems			
Operations and Algebraic Thinking				Expressions and Equations				
				Function				
Geometry								
Measurement and Data				Statistics and Probability				

Introductory Letters

by
Grade Level



Kindergarten

Kindergarten enVisionMATH Common Core

enVisionMATH Common Core is a focused and coherent mathematics curriculum that provides in-depth instruction on a limited number of important categories of mathematics content. The program revolves around Big Ideas in mathematics that children need to know, and shows how these ideas are related. To convey the power of Big Ideas to students, they are translated into student-friendly Essential Questions presented at the beginning of each topic. Throughout the topic, numerous smaller ideas (called Essential Understandings) are linked into a coherent whole. Application of the eight math practices are weaved into every topic.

enVisionMATH	
Topic 1	One to Five
Topic 2	Comparing and Ordering 0 to 5
Topic 3	Six to Ten
Topic 4	Comparing and Ordering Numbers 0 to 10
Topic 5	Numbers to 20
Topic 6	Numbers to 100
Topic 7	Understanding Addition
Topic 8	Understanding Subtraction
Topic 9	More Addition and Subtraction
Topic 10	Composing Numbers 11 to 19
Topic 11	Decomposing Numbers 11 to 19
Topic 12	Measurement
Topic 13	Sorting, Classifying, Counting, and Categorizing Data
Topic 14	Identifying and Describing Shapes
Topic 15	Position and Location of Shapes
Topic 16	Analyzing, Comparing, and Composing Shapes

Standards for Mathematical Practice

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- ✓ Model with mathematics.
- ✓ Use appropriate tools strategically.
- ✓ Attend to precision.
- ✓ Look for and make use of structure.
- ✓ Look for and express regularity in repeated reasoning.

Home School Connection:

Parent tutorial: <http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

Parents and students will also have online access to math videos, manipulatives, quizzes, and other resources. Look for upcoming information from your child's teacher that includes a username and password.

www.pearsonrealize.com

First Grade

enVisionMATH Common Core

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enVisionMATH	
Topic 1	Understanding Addition
Topic 2	Understanding Subtraction
Topic 3	Five and Ten Relationships
Topic 4	Addition and Subtraction Facts to 12
Topic 5	Addition Facts to 20
Topic 6	Subtraction Facts to 20
Topic 7	Counting and Number Patterns to 120
Topic 8	Tens and Ones
Topic 9	Comparing Numbers to 100
Topic 10	Adding with Tens and Ones
Topic 11	Subtracting with Tens and Ones
Topic 12	Length
Topic 13	Time
Topic 14	Using Data to Answer Questions
Topic 15	Geometry
Topic 16	Factions of Shapes

Standards for Mathematical Practice

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- ✓ Construct viable arguments and critique the reasoning of others.
- ✓ Model with mathematics.
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- ✓ Attend to precision.
- ✓ Look for and make use of structure.
- ✓ Look for and express regularity in repeated reasoning.

Home School Connection:

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Second Grade

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enVisionMATH	
Topic 1	Understanding Addition & Subtraction
Topic 2	Addition Strategies
Topic 3	Subtraction Strategies
Topic 4	Working with Equal Groups
Topic 5	Place Value to 100
Topic 6	Mental Addition
Topic 7	Mental Subtraction
Topic 8	Adding Two-Digit Numbers
Topic 9	Subtracting Two-Digit Numbers
Topic 10	Place Value to 1,000
Topic 11	Three-Digit Addition & Subtraction
Topic 12	Geometry
Topic 13	Counting Money
Topic 14	Money
Topic 15	Measuring Length
Topic 16	Time, Graphs & Data

Standards for Mathematical Practice

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

Home School Connection:

Parent tutorial: <http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

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Third Grade

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Topic 1	Numeration
Topic 2	Number Sense: Addition and Subtraction
Topic 3	Using Place Value to Add and Subtract
Topic 4	Meanings of Multiplication
Topic 5	Multiplication Facts: Use Patterns
Topic 6	Multiplication Facts: Use Known Facts
Topic 7	Meanings of Division
Topic 8	Division Facts
Topic 9	Understanding Fractions
Topic 10	Fraction Comparison and Equivalence
Topic 11	Two-Dimensional Shapes and Their Attributes
Topic 12	Time
Topic 13	Perimeter
Topic 14	Area
Topic 15	Liquid Volume and Mass
Topic 16	Data

Standards for Mathematical Practice

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

Home School Connection:

Parent tutorial:

<http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

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Fourth Grade

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enVisionMATH	
Topic 1	Multiplication and Division: Meanings and Facts
Topic 2	Generate and Analyze Patterns
Topic 3	Place Value
Topic 4	Addition and Subtraction of Whole Numbers
Topic 5	Number Sense: Multiplying 1-Digit Numbers
Topic 6	Developing Fluency: Multiplying by 1-Digit Numbers
Topic 7	Number Sense: Multiplying by 2-Digit Numbers
Topic 8	Developing Fluency: Multiplying by 2-Digit Numbers
Topic 9	Number Sense: Dividing by 1-Digit Divisors
Topic 10	Developing Fluency: Dividing by 1-Digit Divisors
Topic 11	Fraction Equivalence and Ordering
Topic 12	Adding and Subtracting Fractions and Mixed Numbers with Like Denominators
Topic 13	Extending Fraction Concepts
Topic 14	Measurement Units and Conversions
Topic 15	Solving Measurement and Data Problems
Topic 16	Lines, Angles, and Shapes

Standards for Mathematical Practice

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

Home School Connection:

Parent tutorial: <http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

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Fifth Grade

enVisionMATH Common Core

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enVisionMATH	
Topic 1	Place Value
Topic 2	Adding/Subtracting Decimals
Topic 3	Multiplying Whole Numbers
Topic 4	Dividing with 1-digit Divisors
Topic 5	Dividing with 2-digit Divisors
Topic 6	Multiplying Decimals
Topic 7	Dividing Decimals
Topic 8	Numerical Expressions/Patterns
Topic 9	Adding/Subtracting Fractions
Topic 10	Adding/Subtracting Mixed Numbers
Topic 11	Multiplying/Dividing Fractions and Mixed Numbers
Topic 12	Volume of Solids
Topic 13	Units of Measure
Topic 14	Data
Topic 15	Classifying Plane Figures
Topic 16	Coordinate Geometry

Standards for Mathematical Practice

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



Home School Connection:

Parent

tutorial: <http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

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Sixth Grade

CMP 3 MATH Common Core

CMP3 Math Common Core is a focused and coherent mathematics curriculum that provides in-depth instruction on a limited number of important categories of mathematics content. The program revolves around Big Ideas in mathematics that children need to know, and shows how these ideas are related. To convey the power of Big Ideas to students, they are translated into student-friendly Essential Questions presented at the beginning of each topic. Throughout the topic, numerous smaller ideas (called Essential Understandings) are linked into a coherent whole. Application of the eight math practices are weaved into every topic.

CMP3 MATH	
Topic 1	Prime Time: Factors and Multiples
Topic 2	Comparing Bits and Pieces: Ratios, Rational Numbers, and Equivalence
Topic 3	Let's Be Rational: Understanding Fraction Operations
Topic 4	Decimal Ops: Computing with Decimals and Percents
Topic 5	Variables and Patterns: Focus on Algebra

Standards for Mathematical Practice

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

Home School Connection:

Parent tutorial: <http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

Parents and students will also have online access to math videos, manipulatives, quizzes, and other resources. Look for upcoming information from your child's teacher that includes a username and password.

www.pearsonrealize.com

Seventh Grade

CMP 3 MATH Common Core

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CMP3 MATH	
Topic 1	Accentuate the Negative: Integers and Rational Numbers
Topic 2	Stretching and Shrinking: Understanding Similarity
Topic 3	Comparing and Scaling: Ratios, Rates, Percents & Proportions
Topic 4	Moving Straight Ahead: Linear Relationships
Topic 5	What Do you Expect?: Probability and Expected Value

Standards for Mathematical Practice

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

Home School Connection:

Parent tutorial: <http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

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Eighth Grade

CMP 3 MATH Common Core

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CMP3 MATH	
Topic 1	Moving Straight Ahead-Linear Relationships
Topic 2	Thinking with Mathematical Models: Linear and Inverse Variation
Topic 3	Butterflies, Pinwheels and Wall-paper: Symmetry and Transformations
Topic 4	Looking for Pythagoras: Pythagorean Theorem
Topic 5	Say it With Symbols: Making Sense of Symbols

Standards for Mathematical Practice

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

Home School Connection:

Parent tutorial: <http://mypearsontraining.com/products/pearsonrealize/tutorials.asp?page=students>

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Vocabulary



EnVision Math

Common Core Vocabulary

Kindergarten

Topic 1: One to Five

- one
- two
- three
- count
- number
- four
- five

Topic 2: Comparing and Ordering 0-5

- column
- row
- fewer (than)
- more (than)
- same number of
- same as
- 1 more (than)
- 2 more (than)
- 1 fewer (than)
- 2 fewer (than)
- zero
- none
- as many
- order
- fewest
- most
- greater
- less

Topic 3: Six to Ten

- six
- seven
- eight
- nine
- ten
- growing pattern

Topic 4: Comparing and Ordering Numbers 0 to 10

- forward
- backward
- order
- number line

Topic 5: Numbers to 20

- eleven
- twelve
- thirteen
- fourteen
- fifteen
- sixteen
- seventeen
- eighteen
- nineteen
- twenty

Topic 6: Numbers to 100

- hundred chart
- row
- column
- count by 10's

Topic 7: Understanding Addition

- in all
- join
- number story
- altogether
- plus sign
- add
- equal sign
- sum
- addition sentence

Topic 8: Understanding Subtraction

- separate
- left
- minus sign
- take away
- difference
- subtract
- subtraction sentence

Topic 9: More Addition and Subtraction

- graph
- whole
- part

Topic 10: Composing Numbers 11 to 19

- how many more

Topic 11: Decomposing Numbers 11 to 19

- double ten-frame
- set

Topic 12: Measurement

- longer than
- length
- as long as (same length as)
- shorter (than)
- shortest
- longest
- taller (than)
- height
- tallest
- as tall as
- balance scale
- weight
- weighs less
- weighs more
- heavier (than)
- about the same
- holds more
- empty
- most
- holds less
- least
- full

Topic 13: Sorting, Classifying, Counting, and Categorizing Data

- different
- same (alike)
- does not belong
- sort
- sorting rule
- picture graph
- real graph

Topic 14: Identifying and Describing Shapes

- rectangle
- corner
- side
- square
- circle
- triangle
- hexagon
- cone
- cylinder
- sphere
- cube
- flat surface

Topic 15: Position and Location of Shapes

- inside (in)
- outside (out)
- above (over)
- below (under)
- behind
- on (top of)
- beside
- next to
- right
- left
- in front of

Topic 16: Analyzing, Comparing, and Composing Shapes

- same size
- same shape
- roll
- stack
- slide

EnVision Math

Common Core Vocabulary

Grade 1

Topic 1: Understanding Addition

- join
- outside
- inside
- in all
- whole
- part
- double
- sum
- addition sentence
- plus (+)
- equals (=)
- add
- addend
- order

Topic 2: Understanding Subtraction

- missing part
- subtraction
- difference
- subtraction sentence
- equal sign
- minus sign
- compare
- take away
- same amount

Topic 3: Five and Ten Relationships

Topic 4: Addition and Subtraction Facts to 12

- 2 less than
- 1 less than
- 0 less than
- near double

Topic 5: Addition Facts to 20

- double plus 1
- double plus 2

Topic 6: Subtraction Facts to 20

- related fact
- fact family

Topic 7: Counting and Number Patterns to 120

- digit
- row
- column

Topic 8: Tens and Ones

- tens
- ones
- digit
- break apart a ten

Topic 9: Comparing Numbers to 100

- 1 more
- 1 less
- 10 more
- 10 less
- equal to =
- less than
- greater than

Topic 10: Adding with Tens and Ones

- Regroup

Topic 11: Subtracting with Tens and Ones

Topic 12: Length

- longest
- shortest
- taller
- shorter
- estimate
- measure

Topic 13: Time

- o'clock
- minute
- minute hand
- hour hand
- hour
- schedule
- half hour

Topic 14: Using Data to Answer Questions

- picture graph
- bar graph
- data
- tally mark

Topic 15: Geometry

- plane shape
- hexagon
- trapezoid
- sort
- side
- corner
- solid figure
- cube
- sphere
- rectangular prism
- cone
- cylinder
- vertex (vertices)
- vertex (vertices)
- flat surface
- pyramid

Topic 16: Fractions of Shapes

- Equal parts

EnVision Math

Common Core Vocabulary

Grade 2

Topic 1: Understanding Addition and Subtraction

- add
- addition sentence
- difference
- equals (=)
- fact family
- fewer
- join
- minus (-)
- more
- part
- plus (+)
- related
- separate
- subtract
- subtraction sentence
- sum
- whole

Topic 2: Addition Strategies

- addend
- doubles
- near doubles
- number sentence

Topic 3: Subtraction Strategies

Topic 4: Working with Equal Groups

- array

Topic 5: Place Value to 100

- after
- before
- digits
- equal to (=)
- even
- greater than (>)
- less than (<)
- number word
- odd

Topic 6: Mental Addition

- mental math
- next ten
- tens digit

Topic 7: Mental Subtraction

Topic 8: Adding Two-Digit Numbers

- number line
- regroup

Topic 10: Place Value to 1,000

- compare
- expanded form
- hundreds
- number word
- standard form
- thousands

Topic 11: Three-Digit Addition and Subtraction

Topic 12: Geometry

- angle
- circle
- column
- cone
- cube
- cylinder
- edges
- equal
- face
- flat surface
- fourths
- halves
- hexagon
- pentagon
- plane shapes
- polygon
- pyramid
- quadrilateral
- rectangle
- rectangular prism
- row
- side
- solid figure
- sphere
- square
- thirds
- triangle
- unequal
- vertex (vertices)

Topic 13: Counting Money

- cents
- coins
- decimal point
- dime
- dollar bill
- dollar coin
- dollar sign
- greatest value
- half-dollar
- least value
- nickel
- penny
- quarter
- tally mark

Topic 14: Money

Topic 15: Measuring Length

- centimeter (cm)
- foot (ft)
- height
- inch (in)
- length
- meter (m)
- nearest centimeter
- nearest inch
- unit
- width
- yard (yd)

Topic 16: Time, Graphs and Data

- a.m.
- bar graph
- data
- half hour
- half past
- hour
- hour hand
- line plot
- minute
- minute hand
- p.m.
- pictograph
- quarter past
- quarter to
- symbol

EnVision Math

Common Core Vocabulary

Grade 3

Topic 1: Numeration

- digits
- place value
- standard form
- expanded form
- word form
- round

Topic 2: Number Sense: Addition and Subtraction

- addends
- sum
- commutative (order) property of addition
- identity (zero) property of addition
- associative (grouping) property of addition
- estimate
- compatible numbers

Topic 3: Using Place Value to Add and Subtract

- equation
- inverse operations

Topic 4: Meaning of Multiplication

- multiplication
- factors
- product
- array
- commutative (order) property of multiplication
- commutative (order) property of multiplication

Topic 5: Multiplication Facts: Use Patterns

- identity (one) property of multiplication
- zero property of multiplication
- multiple

Topic 6: Multiplication Facts: Use Known Facts

- distributive property
- associative (grouping) property of multiplication

Topic 7: Meanings of Division

- Division

Topic 8: Division Facts

- dividend
- divisor
- quotient
- variable

Topic 9: Understanding Fractions

- halves
- thirds
- fourths
- fifths
- sixths
- eighths
- tenths
- twelfths
- fraction
- unit fraction
- numerator
- denominator
- mixed numbers

Topic 11: Two-Dimensional Shapes And Their Attributes

- polygon
- vertex
- diagonal
- triangle
- quadrilateral
- pentagon
- hexagon
- octagon
- decagon
- trapezoid
- parallel sides
- parallelogram
- rectangle
- right angles
- rhombus
- square

Topic 12: Time

- hour
- half hour
- quarter hour
- minute
- seconds
- A.M.
- P.M.
- elapsed time

Topic 13: Perimeter

- Perimeter

Topic 14: Area

- area
- square unit

Topic 15: Liquid Volume and Mass

- milliliters
- liters
- mass
- grams
- kilograms
- line plot

Topic 16: Data

- pictograph
- bar graph
- scale

EnVision Math

Common Core Vocabulary

Grade 4

Topic 1: Multiplication and Division: Meanings and Facts

- Breaking apart
- Factor
- Product
- Multiples
- Array
- Commutative Property of Multiplication
- Zero Property of Multiplication
- Identity Property of Multiplication
- Distributive Property of Multiplication

Topic 2: Generate and Analyze Patterns

- Compare
- Divide
- Multiply
- Regroup
- Repeating pattern

Topic 3: Place Value

- Odd
- Even
- Period
- Number line
- Digits
- Place value
- Standard form
- Expanded form
- Word form
- Compare

Topic 4: Addition and Subtraction of Whole Numbers

- Rounding
- Sum
- Difference
- Mental math
- Breaking Apart
- Compensation
- Tens
- Regroup
- Inverse operations

Topic 5: Number Sense: Multiplying by 1-Digit Numbers

- Multiples
- Arrays
- Factor
- Product
- Partial products
- Compensation

Topic 6: Developing Fluency: Multiplying by 1-Digit Numbers

- Product
- Array
- Factor
- Rounding

Topic 7: Number Sense: Multiplying by 2-Digit Numbers

- Equation
- Factors
- Product
- Rounding
- Compatible Numbers

Topic 8: Developing Fluency: Multiplying by 2- Digit Numbers

- Rounding
- Commutative Property
- Compatible
- Distributive Property

Topic 9: Number Sense: Dividing by 1 Digit Divisors

- Divisor
- Multiple
- Factor
- Quotient
- Product
- Division
- Remainder

Topic 10: Developing Fluency: Dividing by 1 Digit Divisors

- Array
- Compatible numbers
- Factors
- Partial product

Topic 11: Fraction Equivalence and Ordering

- Fraction
- Denominator
- Numerator
- Prime number
- Composite number
- Equivalent fractions
- Benchmark fraction

Topic 12: Adding and Subtracting Fractions and Mixed Numbers with Like Denominators

- Denominator
- Numerator
- Product
- Factor
- Mixed number
- Improper fraction

Topic 13: Extending Fraction Concepts

- Greater
- Digits
- Place value
- Number line
- Unit fraction
- Tenth
- Hundredth
- Decimal point

Topic 14: Measurement Units and Conversions

- Capacity
- Foot
- Length
- Mass
- inches
- Yard
- Mile
- Weight
- Ounce
- Pound
- Ton
- Centimeter
- Millimeter
- Decimeter
- Meter
- Kilometer
- Milliliter
- Liter
- Gram
- Kilogram

Topic 15: Solving Measurement and Data Problems

- Addition
- Multiplication
- Area
- Perimeter
- Line plot

Topic 16: Lines, Angles, and Shapes

- Line
- Point
- Plane figure
- Parallel lines
- Intersecting lines
- Perpendicular lines
- Right angle
- Acute angle
- Obtuse angle
- Straight angle
- Degrees
- Unit angle
- Angle measure
- Protractor
- Polygon
- Side
- Vertex
- Triangle
- Quadrilateral
- Pentagon
- Hexagon
- Octagon
- Equilateral triangle
- Isosceles triangle
- Scalene triangle
- Right triangle
- Acute triangle
- Obtuse triangle
- Rhombus
- Trapezoid
- Parallelogram
- Rectangle
- Square
- Symmetric
- Line of symmetry

EnVision Math

Common Core Vocabulary

Grade 5

Topic 1: Place Value

- digits
- value
- standard form
- expanded form
- word form
- equivalent decimals

Topic 2: Adding/Subtracting Decimals

- commutative property of addition
- associative property of addition
- compatible numbers
- compensation
- rounding

Topic 3: Multiplying Whole Numbers

- commutative property of multiplication
- associative property of multiplication
- identity property of multiplication
- zero property of multiplication
- product
- multiple
- underestimate
- overestimate
- exponential notation
- expanded form
- standard form
- partial products
- base
- exponent

Topic 4: Dividing with 1-digit Divisors

- dividend
- divisor
- quotient

Topic 5: Dividing with 2-digit Divisors

Topic 6: Multiplying Decimals

Topic 7: Dividing Decimals

Topic 8: Numerical Expressions/Patterns

- variable
- term
- sequence
- algebraic expression
- order of operations
- corresponding

Topic 9: Adding/Subtracting Fractions

- prime number
- composite number
- benchmark fraction
- prime factorization
- factor tree
- common denominator
- least common denominator (LCD)
- least common denominator (LCD)

Topic 10: Adding/Subtracting Mixed Numbers

- proper fraction
- mixed number
- improper fraction

Topic 11: Multiplying/Dividing Fractions and Mixed Numbers

- reciprocal
- resizing
- scaling

Topic 12: Volume of Solids

- volume
- cubic unit

Topic 13: Units of Measure

Topic 14: Data

- line plot
- outlier
- survey
- data
- frequency table
- sample

Topic 15: Classifying Plane Figures

- polygon
- regular polygon
- triangle
- quadrilateral
- pentagon
- hexagon
- octagon
- equilateral triangle
- isosceles triangle
- scalene triangle
- right triangle
- acute triangle
- obtuse triangle
- parallelogram
- trapezoid
- rectangle
- rhombus
- square
- generalization

Topic 16: Coordinate Geometry

- coordinate grid
- x-axis
- y-axis
- origin
- ordered pair
- x-coordinate
- y-coordinate

Connected Mathematics 3

Common Core Vocabulary

Grade 6

Prime Time: *Factors and Multiples*

- Common Factor
- Common Multiple
- Composite Number
- Conjecture
- Counter Example
- Distributive Property
- Divisor
- Equivalent Expression
- Even Number
- Expanded Form
- Exponent
- Factor
- Factor Pair
- Factored Form
- Factorization
- Greatest Common Factor
- Least Common Multiple
- Multiple
- Odd Number
- Order of Operation
- Prime Factorization
- Proper Factors
- Square Number

Comparing Bits and Pieces: *Ratios, Rational Numbers, and Equivalence*

- Absolute Value
- Benchmarks
- Equivalent Fractions
- Improper Fractions
- Mixed Number
- Opposites
- Percent
- Rate Table
- Ratio
- Rational Numbers
- Unit Rate

Let's Be Rational: *Understanding Fraction Operations*

- Algorithm
- Benchmark
- Fact Family
- Number Sentence
- Over and Under Estimate
- Reciprocal

Decimal Ops: *Computing with Decimals and Percents*

- Dividend
- Divisor
- Estimate
- Expanded Form
- Quotient
- Ratio
- Repeating Decimal
- Terminating Decimal
- Percent
- Unit Rate

Variables and Patterns: *Focus on Algebra*

- Average Speed
- Coefficient
- Dependent Variable
- Equation
- Equivalent Expressions
- Expression
- Income
- Independent Variable
- Profit
- Rate of Change
- Solution of an Equation
- Solving Equation
- Term
- Variable

Common Core Vocabulary

Grade 7

Accentuate the Negative: *Integers and Rational Numbers*

- Absolute Value
- Additive Inverses
- Commutative Property
- Distributive Property
- Expanded Form
- Factored Form
- Integers
- Multiplicative Identity
- Multiplicative Inverse
- Negative Number
- Number Sentence
- Opposites
- Order of Operation
- Positive Number
- Rational Number

Stretching and Shrinking: *Understanding Similarity*

- Adjacent Sides
- Corresponding Angles
- Corresponding Sides
- Equivalent Ratios
- Image
- Midpoint
- Nested Triangle
- Proportion
- Ratio
- Rep-Tile
- Scale Drawing
- Scale Factor
- Similar

Comparing and Scaling: *Ratios, Rates, Percents & Proportions*

- Commission
- Constant of Proportionality
- Equation
- Part-to-Part Ratio

Comparing and Scaling: *Ratios, Rates, Percents & Proportions cont.*

- Part-to-Whole Ratio
- Proportion
- Rate
- Rate Table
- Ratio
- Unit Rate

Moving Straight Ahead: *Linear Relationships*

- Coefficient
- Dependent Variable
- Equivalent Expressions
- Independent Variable
- Inequality
- Linear Relationship
- Point of Intersection
- Properties of Equality
- Slope
- Solution of an Equation
- X-Intercept
- Y-Intercept

What Do You Expect?: *Probability and Expected Value*

- Area Model
- Binomial Probability
- Compound Event
- Equally Likely
- Expected Value
- Experimental Probability
- Fair Game
- Favorable Outcome
- Outcome
- Probability
- Relative Frequency
- Sample Space
- Simulation
- Theoretical Probability
- Tree Diagram
- Trial

Common Core Vocabulary

Grade 8

Moving Straight Ahead: *Linear Relationships*

- Coefficient
- Dependent Variable
- Equivalent Expressions
- Independent Variable
- Inequality
- Linear Relationship
- Point of Intersection
- Properties of Equality
- Slope
- Solution of an Equation
- X-Intercept
- Y-Intercept

Thinking with Mathematical Models:

Linear and Inverse Variation

- - Additive Inverses
 - Categorical variables
 - Correlation Coefficient
 - Function
 - Inverse Variation
 - Mathematical Model
 - Multiplicative Inverses
 - Outlier
 - Residual
 - Scatter Plot
 - Slope
 - Standard Deviation
 - Variance

Butterflies, Pinwheels and Wallpaper:

Symmetry and Transformations

- Angle of Rotation
- Basic Design Element
- Center of Rotation
- Congruent Figures
- Dilation
- Line of Symmetry

- Line Reflection
- Reflectional Symmetry
- Rotation
- Rotational Symmetry
- Similarity Transformation
- Symmetry
- Transformation
- Translation
- Translational Symmetry

Looking for Pythagoras: *Pythagorean Theorem*

- Acute Triangle
- Cube Root
- Hypotenuse
- Irrational Number
- Legs
- Obtuse Triangles
- Perpendicular
- Pythagorean Theorem
- Radius
- Rational Number
- Real Number
- Repeating Decimal
- Right Triangle
- Square Root
- Terminating Decimal
- Theorem

Say it With Symbols: *Making Sense of Symbols*

- Commutative Property of Addition
- Commutative Property of Multiplication
- Distributive Property
- Equivalent Expressions
- Expanded Form
- Factored Form
- Properties of Equality
- Roots

Core Essentials



Kindergarten Core Essentials

I can use numbers to help me understand Math

- I can count to 100 by ones and tens. K.CC.1
- I can count forward starting at a given number. K.CC.2
- I can write numbers from 0 to 20. K.CC.3
- I can write a number for a group of 0 to 20 objects. K.CC.3
- I can put numbers in order. K.CC.4
- I can name a group of objects by using a number. K.CC.4
- I can understand that the last object counted tells the number of objects in a group. K.CC.4
- I can understand that the number of objects in a group can be rearranged and the total number will be the same. K.CC.4
- I can understand that adding an object to a group will make the total number one bigger. K.CC.4
- I can count to tell how many. K.CC.5
- I can count out a number of objects between 1 and 20. K.CC.5
- I can tell if a group of objects in one group is greater than, less than or equal to a group of objects in another group. K.CC.6
- I can compare two written numbers between 1 and 10. K.CC.7

I Can Use Addition and Subtraction to Help Me Understand Math

- I can use objects, fingers and pictures to help me show addition. K.OA.1
- I can use objects, fingers and pictures to help me show subtraction. K.OA.1
- I can solve addition and subtraction word problems within 10. K.OA.2
- I can take apart numbers less than or equal to 10. K.OA.3
- I can find the number that is added to 1 through 9 to make 10. I can use objects or drawings to show my answer. K.OA.4
- I can add and subtract within 5. K.OA.5

I Can Use Number Sense and Place Value to Help Me Understand Math

- I can put together and take apart numbers from 11 to 19 by naming the tens and ones. K.NBT.1
- I can use objects, drawings or equations to show tens and ones. K.NBT.1

I Can Use Measurement and Data to Help Me Understand Math

- I can tell how an object can be measured. K.MD.1 (length, weight)
- I can compare how two objects are similar or different. K.MD.2 (more of, less of, taller, shorter)
- I can place objects into categories. K.MD.3
- I can count the number of objects in categories. K.MD.3
- I can sort the categories by the number of objects. K.MD.3

I Can Use Geometry to Help Me Understand Math

- I can find shapes around me. K.G.1
- I can tell where shapes are. K.G.1 (above, below, beside, in front of, behind, next to)
- I can tell about shapes. K.G.1
- I can compare shapes. K.G.1
- I can name shapes. K.G.3
- I can tell about and compare two-dimensional and three-dimensional shapes. K.G.4
- I can make shapes using materials like sticks and clay. K.G.5
- I can use simple shapes to make larger shapes. K.G.6

1st Grade Core Essentials

Operations and Algebraic Thinking

- I can use strategies to solve addition word problems. 1.OA.1
- I can use strategies to solve subtraction word problems. 1.OA.1
- I can solve word problems by adding 3 whole numbers. 1.OA.2
- I can use the associative property of addition. 1.OA.3
- I can use an addition fact to help me answer a subtraction problem. 1.OA.4
- I can count to help me add and subtract. 1.OA.5
- I can add facts within 20. 1.OA.6
- I can subtract facts within 20. 1.OA.6
- I know what an equal sign means. 1.OA.7
- I can tell if addition or subtraction equations are true or false. 1.OA.8
- I can tell the missing number in an addition or subtraction problem. 1.OA.8

Numbers and Operations in Base Ten

- I can count to 120 1.NBT.1
- I can tell how many tens and how many ones are in a number. 1.NBT.2
- I can compare two-digit numbers using $<$, $=$, and $>$. 1.NBT.3
- I can use manipulatives and pictures to help me solve problems within 100. 1.NBT.4
- I can use math strategies to help me solve problems within 100. 1.NBT.4
- I can find 10 more or 10 less in my head. 1.NBT.5
- I can subtract multiples of 10 under 100 and explain what I did. 1.NBT.6

Measurement and Data

- I can put three objects in order from longest to shortest. 1.MD.1
- I can tell the length of an object using whole numbers. 1.MD.2
- I can tell and write time in hours and half-hours using a clock. 1.MD.3
- I can organize data. 1.MD.4
- I can understand data. 1.MD.4
- I can ask questions about data. 1.MD.4

Geometry

- I can tell about shapes. 1.G.1
- I can build and draw shapes. 1.G.1
- I can make two-dimensional shapes. 1.G.2
- I can make three-dimensional shapes. 1. G.2
- I can use shapes to make new shapes. 1.G.2
- I can divide shapes into parts. 1.G.3

2nd Grade Core Essentials

I Can Use Addition and Subtraction to Help Me Understand Math

- I can use strategies to solve addition word problems. 2.OA.1
- I can use strategies to solve subtraction word problems. 2.OA.1
- I know my addition facts. 2.OA.2
- I know my subtraction facts. 2.OA.2
- I can group objects to tell if a number is odd or even. 2.OA.3
- I can use repeated addition to help me understand multiplication. 2.OA.4

I Can Use Number Sense and Place Value to Help Me Understand

Math

- I can understand and use hundreds, tens and ones. 2.NBT.1
- I can count to 1,000 using 1s, 5s, 10s and 100s. 2.NBT.2
- I can read and write numbers to 1,000 in different ways. 2.NBT.3
- I can compare three-digit numbers using $<$, $=$, and $>$. 2.NBT.4
- I can add and subtract three-digit numbers. 2.NBT.5
- I can add more than two big numbers. 2.NBT.6
- I can add and subtract with regrouping. 2.NBT.7
- I can add and subtract tens and hundreds in my head. 2.NBT.8
- I can explain why I need to use addition or subtraction to help me solve problems. 2.NBT.9

I Can Use Measurement and Data to Help Me Understand Math

- I can use different tools to measure objects. 2.MD.1
- I can compare the length of an object using two different units of measurement. 2.MD.2
- I can estimate the lengths of objects. 2.MD.3
- I can compare the length of two different objects. 2.MD.4
- I can use addition and subtraction to solve measurement problems. 2.MD.5
- I can make and use a number line. 2.MD.6
- I can tell time to five minutes. 2.MD.7
- I can understand a.m. and p.m. 2.MD.7
- I can count money to help me solve word problems. 2.MD.8
- I can make a table to organize data. 2.MD.9
- I can use a table to make a line plot. 2.MD.9
- I can make a graph. 2.MD.10

I Can Use Geometry to Help Me Understand Math

- I can name and draw shapes. 2.G.1
(I know triangles, quadrilaterals, pentagons, hexagons and cubes.)
- I can find the area of a rectangle. 2.G.2
- I can divide shapes into equal parts. 2.G.3
- I can use fractions to describe the equal parts of a shape. 2.G.3

3rd Grade Core Essentials

Students in third grade will demonstrate proficiency in the following skills.

Operations and Algebraic Thinking

- I can understand multiplication by finding the total number of objects in equal groups. 3.OA.2
- I can use the Commutative Property of Multiplication. 3.OA.5
- I can write and solve multiplication word problems. 3.OA.8
- I can use the Distributive Property of Multiplication. 3.OA.5
- I can use the Associative Property of Multiplication. 3. OA. 5
- I can understand division by thinking about how a group objects can be divided into smaller groups. 3.OA.2
- I can find the answer to a division problem by thinking of the missing factor in a multiplication problem. 3.OA.7
- I can write and solve division word problems. 3.OA.8
- I can find the missing number in a multiplication or division equation because I know how multiplication and division are related. 3.OA.7
- I can use addition, subtraction, multiplication, and division to solve word problems and use mental math to determine if my answers are reasonable. 3.OA.8
- I can find patterns and explain them because I know how numbers work together. 3.OA.9

Number and Operations in Base Ten

- I can represent numbers with place-value blocks and number lines. 3.NBT
- I can round numbers to the nearest ten or hundred. 3.NBT.1
- I can add and subtract numbers within 1000 using different strategies and algorithms. 3.NBT.2
- I can easily multiply whole numbers by ten. 3.NBT.3

Number and Operations—Fractions

- I can understand and show that fractions are equal parts of a whole. 3.NF.1
- I can understand that fractions are parts of a group. 3.NF.1
- I can find and label fractions on a number line because I know a fraction is a number and the space between any two numbers can be thought of as a whole. 3.NF.2

- I can compare fractions by reasoning about their size. 3.NF.3
- I can explain in words and pictures how two fractions are equivalent. 3.NF.3
- I can show whole numbers as fractions. 3.NF.3
- I can recognize fractions that are equal to one whole. 3.NF.3

Measurement and Data

- I can tell and write time to the nearest minute. 3.MD.1
- I can measure elapsed time by adding and subtracting minutes. 3.MD.1
- I can solve real world problems using what I know about perimeter. 3.MD
- I can measure area by counting unit squares. 3.MD.6
- I can measure area by using what I know about multiplication and addition. 3.MD.7
- I can measure capacity with liters and grams. 3.MD.2
- I can solve word problems involving mass and volume. 3.MD.2
- I can create line plots to show collected data. 3.MD.4
- I can read and create picture and bar graphs to show data and solve problems using information from the graph. 3.MD.3

Geometry

- I can identify two-dimensional shapes and classify them by their defining attributes. 3.G.1
- I can recognize and draw quadrilaterals such as trapezoids, parallelograms, rectangles, rhombi, and squares. 3.G.1
- I can divide shapes into parts with equal areas and show those areas as fractions. 3.G.2

4th Grade Core Essentials

Number and Operations in Base Ten

I can use and explain place value concepts for multi-digit whole numbers.

- I can look at a multi-digit number and determine that the digit to the left is 10 times greater than a given digit.
- I can use place value to help multiply or divide numbers.
- I can read and write multi-digit whole numbers using base-ten numbers.
- I can read and write multi-digit whole numbers using number names.
- I can read and write multi-digit whole numbers using expanded form.
- I can compare the size of two multi-digit numbers using place value and record the results with $<$, $>$, $=$.
- I can use place value understanding to round multi-digit whole numbers to any place.

I can use and explain how to do arithmetic with multi-digit numbers.

- I can fluently add and subtract multi-digit whole numbers.
- I can multiply a whole number of up to four digits by a one-digit whole number.
- I can multiply a two-digit number by a two-digit number using strategies based on place value and/or operation properties.
- I can explain two-digit by two-digit multiplication by using equations, rectangular arrays, and/or area model.
- I can divide a single digit number into numbers up to 9,999 in a variety of ways.
- I can show and explain division problems by using equations, rectangular arrays, and/or area models.

Operations and Algebraic Thinking

I can solve real world problems that require me to add, subtract, multiply, and divide whole numbers.

- I can explain why multiplying numbers in an equation in any order will get the same product.
- I can write verbal statements about multiplicative comparisons as equations.
- I can solve word problems involving multiplication and division using drawings.
- I can solve word problems involving multiplication and division by using equations and a symbol for an unknown.
- I can explain the difference between a multiplicative comparison and an additive comparison.
- I can solve multi-step word problems using addition, subtraction, multiplication and division with remainders.
- I can solve multi-step word problems using addition, subtraction, multiplication, and division using equations where a symbol is used for the unknown.
- I can determine if the answer makes sense by using mental math, estimation, and rounding.

I can explain how multiples and factors are related and used.

- I can find all factor pairs for a whole number between 1 and 100.
- I can show how a whole number is a multiple of each of its factors.
- I can determine if a whole number between 1 and 100 is a multiple of a one digit number.
- I can determine the numbers between 1 – 100 that are composite.
- I can determine the numbers between 1 – 100 that are prime.

I can create and explain various number and shape patterns.

- I can generate a number pattern that follows a given rule.
- I can generate a shape pattern that follows a given rule.
- I can look at a number pattern and determine additional pattern found within the sequence.
- I can look at a shape pattern and determine additional patterns found within the sequence.

Numbers and Operations – Fractions

I can order fractions and explain when they are equivalent.

- I can create and explain equivalent fractions using visual models.
- I can create and explain equivalent fractions even though the number and size of the parts of the fraction may change.
- I can compare two fractions by creating common numerators or common denominators.
- I can compare two fractions using a benchmark fraction.
- I can explain why fraction comparisons are only valid when they refer to the same whole.
- I can correctly record the comparison of fractions using $<$, $>$, $=$, and I can defend my answers.
- I can explain the concepts of adding and subtracting fractions with like denominators.
- I can decompose (break down) a fraction into a sum of fractions with the same denominator in more than one way.
- I can decompose (break down) a fraction into a sum of fractions with the same denominator and justify my answer using a visual fraction model.
- I can add mixed numbers with like denominators using a variety of strategies.
- I can subtract mixed numbers with like denominators using a variety of strategies.

I can use and explain unit fractions and relate what I know about arithmetic of whole numbers to the arithmetic of unit fractions.

- I can solve real-world problems involving addition of fractions.
- I can solve real-world problems involving subtraction of fractions.
- I can explain how a fraction a/b is a multiple of $1/b$.
- I can explain how multiplying a whole number times a fraction can be changed to a whole number times a unit fraction.
- I can use a visual fraction model to justify multiplying a fraction by a whole number.
- I can solve word problems involving multiplication of a fraction by a whole number using visual fraction models and equations.

I can change fractions with denominators of 10 or 100 to decimals and can explain how these decimals differ in size.

- I can write fractions with denominators of 10 to equal fractions with denominators of 100.
- I can add two fractions with the denominators of 10 and 100.
- I can write a fraction with denominators of 10 or 100 as decimals.

- I can locate a decimal on a number line.
- I can compare two decimals, explain my reasoning, and record the results using $<$, $>$, $=$.
- I can explain that comparisons between two decimals are only valid when they refer to the same whole.

Measurement and Data

I can explain how unit size affects the measurement and can solve real world problems involving measurement, perimeter, and area.

- I can explain the relative sizes of units within the same system.
- I can translate the larger units into equivalent smaller units.
- I can record measurement equivalence in a two column table or as number parts.
- I can solve real-world problems that require arithmetic with distances, liquid volumes, masses, time, and money.
- I can use the four operations to solve word problems using simple fractions and decimals.
- I can use the four operations to solve word problems expressing measurements given in a larger unit in terms of a smaller unit.
- I can use number lines and diagrams to illustrate solutions.
- I can solve real-world problems involving the perimeter of rectangles.
- I can solve real-world problems involving the area of rectangles.
- I can make a line-plot to display a set of data in fractions measured to the nearest $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$ units.
- I can use information from a line plot to solve problems involving addition and subtraction of fractions.

I can draw, measure, and explain different concepts of angles.

- I can explain how an angle is made of two rays with common endpoints.
- I can explain how an angle is measured by its reference to a circle.
- I can define and explain a “one-degree angle” and how it is used to measure angles.
- I can explain how the measure of an angle is a multiple of the “one-degree” angle.
- I can use a protractor to measure whole degree angles.
- I can draw an angle of specified size, using a protractor.

- I can explain how when angles are joined in non-overlapping parts, the total measure is the sum of the parts.
- I can solve real-world problems involving addition and/or subtraction to find unknown angles on a diagram.

Geometry

I can draw and identify lines and angles and use these to classify shapes.

- I can draw and identify a point.
- I can draw and identify a line.
- I can draw and identify a line segment.
- I can draw and identify a ray.
- I can draw and identify a right angle.
- I can draw and identify an acute angle.
- I can draw and identify an obtuse angle.
- I can draw and identify perpendicular lines.
- I can draw and identify parallel lines.
- I can put 2-D figures in like groups based on whether certain sides are parallel or perpendicular.
- I can put 2-D figures in like groups based on whether certain angles are acute, obtuse, or right.
- I can identify right angles and can group right triangles from other triangles.
- I can identify line-symmetry.
- I can identify figures that have symmetry and can then draw the lines of symmetry.

5th Grade Core Essentials

Operations and Algebraic Thinking

- I can use parentheses and brackets in expressions. 5.OA.1
- I can write expression I hear using mathematic symbols and the order of operations. 5.OA.2
- I can use numerical rules and patterns to form ordered pairs. Graph the ordered pairs on a coordinate plane. 5.OA.3

Numbers and Operations in Base Ten

- I can understand and explain the value of digits. 5.NBT.1
- I can explain patterns when multiplying a number by powers of 10. 5.NBT.2
- I can explain patterns when a decimal is multiplied or divided by a power of 10. 5.NBT.2
- I can read, write, and compare decimals to thousandths. 5.NBT.3
- I can use place value understanding to round decimals to any place. 5.NBT.4
- I can multiply multi-digit whole numbers. 5.NBT.5
- I can divide four-digit dividends by two-digit divisors. 5.NBT.6
- I can illustrate and explain a division problem using equations, arrays, and/or models. 5.NBT.6
- I can add, subtract, multiply, and divide decimals to hundredths. I can use concrete models or drawings to explain the method used. 5.NBT.7

Number and Operations- Fractions

- I can add and subtract fractions with unlike denominators and mixed numbers. 5.NF.1
- I can solve word problems that involve fractions. 5.NF.2
- I can understand that fractions are really the division of the numerator by the denominator. 5.NF.3
- I can solve word problems where I divide whole numbers to create an answer that is a mixed number. 5.NF.3
- I can multiply a fraction or whole number by a fraction. 5.NF.4
- I can think of multiplication as the scaling of a number (similar to a scale on a map). 5.NF.5
- I can solve real world problems by multiplying fractions and mixed numbers. 5.NF.6
- I can divide fractions by whole numbers and whole numbers by fractions. 5.NF.7

Measurement and Data

- I can convert measurements within the same measuring system. 5.MD.1
- I can make a line plot to display data sets of measurements in fractions. 5.MD.2

- I can use fraction operations to solve problems involving information presented on a line plot. 5.MD.2
- I can understand volume. 5.MD.3
- I can measure volume by counting unit cubes. 5.MD.4
- I can solve real world problems involving volume. 5.MD.5
- I can find the volume of an object using the formulas $V = l * w * h$ and $V = b * h$. 5.MD.5

Geometry

- I can understand how to graph ordered pairs on a coordinate plane. 5.G.1
- I can graph and interpret points in the first quadrant of a coordinate plane. 5.G.2
- I can classify shapes into categories. 5.G.3
- I can classify shapes based on properties. 5.G.4

Sixth Grade Math: Core Essentials

CMP3 Prime Time

Factors and Multiples: Understand relationships among factors, multiples, divisors, and products

Goal	Standard
Classify numbers as prime, composite, even, odd, or square	
Recognize that factors of a number occur in pairs	
Recognize situations that call for common factors and situations that call for common multiples	
Recognize situations that call for the greatest common factor and situations that call for the least common multiple	
Develop strategies for finding factors and multiples	
Develop strategies for finding the least common multiple and the greatest common factor	
Recognize and use the fact that every whole number can be written in exactly one way as a product of prime numbers	
Use exponential notation to write repeated factors	
Relate the prime factorization of two numbers to the least common multiple and greatest common factor of two numbers	
Solve problems involving factors and multiples	

Equivalent Expressions: Understand why two expressions are equivalent

Goal	Standard
Relate the area of a rectangle to the Distributive Property	
Recognize that the Distributive Property relates the multiplicative and additive structures of whole numbers	
Use the properties of operations of numbers, including the Distributive Property, and the Order of Operations convention to write equivalent numerical expressions	
Solve problems involving the Order of Operations and Distributive Property	

List of Common Core Standards in Prime Time:

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *Investigations 2, 3, and 4*

Note: The development of the Distributive Property with variables is continued in *Variables and Patterns*.

6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents. *Investigations 3 and 4*

6.EE.A.2a Write expressions that record operations with numbers and with letters standing for numbers. *Investigations 1, 2, 3, and 4*

Note: The development in this Unit is primarily with numerical expressions and is further developed with expressions containing variables in *Variables and Patterns*.

6.EE.A.2b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *Investigations 1, 2, and 4*

Note: The words *term* and *coefficient* are developed in *Variables and Patterns*.

6.EE.A.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *Investigation 4*

Note: Expressions with variables are further developed in *Variables and Patterns* and *Covering and Surrounding*.

6.EE.A.3 Apply the properties of operations to generate equivalent expressions. *Investigations 1, 3, and 4*

Note: The development in this Unit is primarily with numerical expressions and is further developed with expressions containing variables in *Variables and Patterns*.

6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *Investigations 1, 3, and 4*

Note: The development in this Unit is primarily with numerical expressions and is generalized to expressions containing variables in *Variables and Patterns*.

CMP3 Comparing Bits and Pieces

Fractions as Numbers: Understand fractions and decimals as numbers that can be located on the number line, compared, counted, partitioned, and decomposed

Goal	Standard
Expand interpretations of a fraction to include expressing a fraction as a part-whole relationship, as a number, and as an indicated division	
Reason about the roles of the numerator and denominator in each of the interpretations of a fraction	
Use multiple interpretations of proper fractions, improper fractions, and mixed numbers	
Use decimals to represent fractional quantities with attention to place value	
Recognize that fractions are called <i>rational numbers</i> and that rational numbers are points on the number line	
Use the number line to reason about rational number relationships	
Use benchmarks to estimate the values of fractions and decimals and to compare and order fractions and decimals	
Recognize that fractions can represent both locations and distances on the number line	
Recognize that a number and its opposite are at equal distances from zero on the number line; the opposite of a is $-a$ and the opposite of $-a$ is a	
Recognize that the absolute value of a number is its distance from 0 on the number line and use it to describe real-world quantities	
Introduce percent as a part-whole relationship in which the whole is not necessarily out of 100, but is scaled or partitioned to be "out of 100" or "per 100"	
Apply a variety of partitioning strategies to solve problems	

Ratios as Comparisons: Understand ratios as comparisons of two numbers

Goal	Standard
Use ratios and associated rates to compare quantities	
Distinguish between a difference, which is an additive comparison, and a ratio, which is a multiplicative comparison	

Distinguish between fractions as numbers and ratios as comparisons	
Apply a variety of scaling strategies to solve problems involving ratios and unit rates	
Recognize that a unit rate is a ratio in which one of the quantities being compared has a value of 1; use rate language in the context of a ratio relationship	
Scale percents to predict new outcomes	

Equivalence: Understand equivalence of fractions and ratios, and use equivalence to solve problems

Goal	Standard
Recognize that equivalent fractions represent the same amount, distance, or location; develop strategies for finding and using equivalent fractions	
Recognize that comparing situations with different-sized wholes is difficult without some common basis of comparison	
Use partitioning and scaling strategies to generate equivalent fractions and ratios and to solve problems	
Develop meaningful strategies for representing fraction amounts greater than 1 or less than -1 as both mixed numbers and improper fractions	
Recognize that equivalent ratios represent the same relationship between two quantities; develop strategies for finding and using equivalent ratios	
Build and use rate tables of equivalent ratios to solve problems	

List of Common Core Standards in Comparing Bits and Pieces:

6.RP.A Understand ratio concepts and use ratio reasoning to solve problems. *Investigations 2 and 4*

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *Investigations 1, 2, and 4*

6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio $a : b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *Investigations 1, 2, and 4*

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. *Investigations 1, 2, and 4*

6.RP.A.3b Solve unit rate problems including those involving unit pricing and constant speed. *Investigation 2*

6.RP.A.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. *Investigations 2 and 4*

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. *Investigation 3*

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. *Investigation 3*

6.NS.C.6a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite. *Investigation 3*

6.NS.C.6c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. *Investigation 3*

6.NS.C.7 Understand ordering and absolute value of rational numbers. *Investigation 3*

CMP3 Let's Be Rational

Numeric Estimation: Understand that estimation is a tool used in a variety of situations including checking answers and making decisions, and develop strategies for estimating results of arithmetic operations

Goal	Standard
Use benchmarks and other strategies to estimate results of operations with fractions	
Use estimates to check the reasonableness of exact computations	
Give various reasons to estimate and identify when a situation calls for an overestimate or an underestimate	
Use estimates and exact solutions to make decisions	

Fraction Operations: Revisit and continue to develop meanings for the four arithmetic operations and skill at using algorithms for each

Goal	Standard
Determine when addition, subtraction, multiplication, or division is the appropriate operation to solve a problem	
Develop ways to model sums, differences, products, and quotients with areas, fraction strips, and number lines	
Use knowledge of fractions and equivalence of fractions to develop algorithms for adding, subtracting, multiplying, and dividing fractions	
Write fact families with fractions to show the inverse relationship between addition and subtraction, and between multiplication and division	
Compare and contrast dividing a whole number by a fraction to dividing a fraction by a whole number	
Recognize that when you multiply or divide a fraction, your answer might be less than or more than the numbers you started with	
Solve real-world problems using arithmetic operations on fractions	

Variables and Equations: Use variables to represent unknown values and equations to represent relationships

Goal	Standard
Represent unknown real-world and abstract values with variables	
Write equations (or number sentences) to represent relationships among real-world and abstract values	
Use fact families to solve for unknown values	

List of Common Core Standards in Let's Be Rational:

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

Investigations 2 and 3

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. *Investigation 1*

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *Investigation 1*

6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers. *Investigations 1 and 4*

6.EE.A.2a Write expressions that record operations with numbers and with letters standing for numbers. *Investigation 4*

6.EE.A.2b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *Investigations 1, 3, and 4*

6.EE.A.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *Investigation 4*

6.EE.A.3 Apply the properties of operations to generate equivalent expressions. *Investigation 2*

Essential for 6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *Investigation 1*

Essential for 6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. *Investigation 1*

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *Investigations 1 and 4*

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form $x+p=q$ and $px=q$ for cases in which p , q and x are all nonnegative rational numbers. *Investigations 1 and 4*

CMP3 Covering and Surrounding

Area and Perimeter: Understand that perimeter is a measure of linear units needed to surround a two-dimensional shape and that area is a measure of square units needed to cover a two-dimensional shape

Goal	Standard
Deepen the understanding of area and perimeter of rectangular and nonrectangular shapes	
Relate area to covering a figure	
Relate perimeter to surrounding a figure	
Analyze what it means to measure area and perimeter	
Develop and use formulas for calculating area and perimeter	
Develop techniques for estimating the area and perimeter of an irregular figure	
Explore relationships between perimeter and area, including that one can vary considerably while the other stays fixed	
Visually represent relationships between perimeter and area on a graph	
Solve problems involving area and perimeter of rectangles	

Area and Perimeter of Parallelograms and Triangles: Understand that the linear measurements of the base, height, and slanted height of parallelograms and triangles are essential to finding the area and perimeter of these shapes

Goal	Standard
Analyze how the area of a triangle and the area of a parallelogram are related to each other and to the area of a rectangle	
Recognize that a triangle can be thought of as half of a rectangle whose sides are equal to the base and height of the triangle	
Recognize that a parallelogram can be decomposed into two triangles. Thus the area of a parallelogram is twice the area of a triangle with the same base and height as the parallelogram	
Know that the choice of base of a triangle (or parallelogram) is arbitrary but that the choice of the base determines the height	
Recognize that there are many triangles (or parallelograms) that can be drawn	

with the same base and height	
Develop formulas and strategies, stated in words or symbols, for finding the area and perimeter of triangles and parallelograms	
Find the side lengths and area of polygons on a coordinate grid	
Solve problems involving area and perimeter of parallelograms and triangles	
Solve problems involving area and perimeter of polygons by composing into rectangles or decomposing into triangles	

Surface Area of Prisms and Pyramids and Volume of Rectangular Prisms: Understand that the surface area of a three-dimensional shape is the sum of the areas of each two-dimensional surface of the shape and that the volume of a rectangular prism is a measure in cubic units of the capacity of the prism

Goal	Standard
Extend the understanding of the volume of rectangular prisms	
Relate volume to filling a three-dimensional figure	
Extend understanding of the strategies for finding the volume of rectangular prisms to accommodate fractional side lengths	
Relate finding area of two-dimensional shapes to finding the surface area of three-dimensional objects	
Develop strategies for finding the surface area of three-dimensional objects made from rectangles and triangles	
Solve problems involving surface area of prisms and pyramids and volume of rectangular prisms	

List of Common Core Standards in Covering and Surrounding:

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. *Investigations 1 and 3*

6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers. *Investigations 1, 2, 3, and 4*

6.EE.A.2a Write expressions that record operations with numbers and with letters standing for numbers. *Investigations 1, 2, 3, and 4*

6.EE.A.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *Investigations 1, 2, 3, and 4*

6.EE.A.3 Apply the properties of operations to generate equivalent expressions. *Investigations 1, 2, and 4*

6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *Investigations 2 and 4*

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *Investigations 1, 2, 3, and 4*

6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d=65t$ to represent the relationship between distance and time. *Investigations 1, 2, 3, and 4*

6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. *Investigations 1, 2, 3, and 4*

6.G.A.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V=lwh$ and $V=bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. *Investigation 4*

6.G.A.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. *Investigation 3*

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

CMP3 Decimal Ops

Numeric Estimation: Understand that estimation can be used as a tool in a variety of situations, including as a way to check answers and make decisions

Goals	Standards
Use estimates to solve problems and check answers	

Decimal Operations Revisit and continue to develop meanings for the four arithmetic operations on rational numbers, and practice using algorithms to operate on decimals

Goals	Standards
Recognize when addition, subtraction, multiplication, or division is the appropriate operation to solve a problem	
Use place value to develop understanding of algorithms and to relate operations with decimals to the same operations with fractions	
Extend understanding of multiplication and division of multidigit whole numbers	
Develop standard algorithms for multiplying and dividing decimals with the aid of, at most, paper and pencil	
Find a repeating or terminating decimal equivalent to a given fraction	
Solve problems using arithmetic operations on decimals, including finding unit rates	

Variables and Number Sentences Use variables to represent unknown values and number sentences to represent relationships between values

Goals	Standards
Write number sentences to represent relationships between both real-world and abstract values	
Use fact families to write and solve equivalent number sentences	
Use multiplication sentences to check division sentences	

Percents Develop understanding of percents through various contexts, such as sales tax, tips, discounts, and percent increases

Goals	Standards
Develop models for percent problems	
Write and solve number sentences involving percents	

List of Common Core Standards in Decimal Ops:

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *Investigation 1*

6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio $a : b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *Investigation 1*

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. *Investigations 1 and 4*

6.RP.A.3b Solve unit rate problems including those involving unit pricing and constant speed. *Investigation 1*

6.RP.A.3c Find a percent of a quantity as a rate per 100 (e.g. 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. *Investigation 4*

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *Investigation 3*

6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm. *Investigation 3*

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. *Investigations 2, 3, and 4*

6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers. *Investigation 2*

6.EE.A.2a Write expressions that record operations with numbers and with letters standing for numbers. *Investigation 2*

6.EE.A.3 Apply the properties of operations to generate equivalent expressions. *Investigation 4*

6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. *Investigation 2*

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *Investigations 2 and 4*

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form $x+p=q$ and $px=q$ for cases in which p , q , and x are all nonnegative rational numbers. *Investigations 2, 3, and 4*

CMP3 Variables and Patterns

Variables and Patterns (Relationships): Develop understanding of variables and how they are related

Goal	Standard
Explore problem situations that involve variables and relationships	
Identify the dependent and independent variables and describe how they are related in a situation	
Interpret the “stories” told by patterns in tables and coordinate graphs of numeric (x, y) data	
Represent the pattern of change that relates two variables in words, data tables, graphs, and equations	
Investigate situations that change over time	
Examine increasing and decreasing patterns of change	
Compare linear and nonlinear patterns of change by using tables or graphs	
Use tables, graphs, and equations to find the value of a variable given the value of the associated variable	
Explore relationships that require graphing in all four quadrants	
Describe advantages and disadvantages of using words, tables, graphs, and equations to represent patterns of change relating two variables and make connections across those representations	
Write an equation to express the relationship between two variables in one and	

two operations: $y=mx$, $y=b+x$, and $y=b+mx$	
Calculate average speed and show how it is reflected in a table or graph and vice versa	
Recognize and express direct proportionality relationships with a unit rate ($y=mx$) and represent these relationships in rate tables and graphs	
Solve problems that involve variables	

Expressions and Equations: Develop understanding of expressions and equations

Goal	Standard
Use properties of operations, including the Distributive Property and the Order of Operations, to write equivalent expressions for the dependent variable in terms of the independent variable	
Use tables, graphs, or properties of numbers such as the Distributive Property to show that two expressions are equivalent	
Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity	
Interpret and evaluate expressions in which letters stand for numbers and apply the Order of Operations as needed	
Recognize that equations are statements of equivalence between two expressions	
Solve linear equations of the forms $y=ax$, $y=b+x$, and $y=b+ax$ using numeric guess and check, tables of (x,y) values, and graphs or fact families	
Write an inequality and associate it with an equation to find solutions and graph the solutions on a number line	

List of Common Core Standards in Variables and Patterns:

6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. *Investigation 3*

6.RP.A.3a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. *Investigations 1, 3, and 4*

6.RP.A.3b Solve unit rate problems including those involving unit pricing and constant speed. *Investigations 1 and 3*

6.RP.A.3d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. *Investigation 3*

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. *Investigation 2*

6.NS.C.6b Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. *Investigation 2*

6.NS.C.6c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. *Investigation 2*

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. *Investigations 1 and 2*

6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents. *Investigation 4*

6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers. *Investigation 3*

6.EE.A.2a Write expressions that record operations with numbers and with letters standing for numbers. *Investigation 3*

6.EE.A.2b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *Investigation 4*

6.EE.A.2c Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *Investigations 3 and 4*

6.EE.A.3 Apply the properties of operations to generate equivalent expressions. *Investigations 3 and 4*

6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *Investigations 3 and 4*

6.EE.B.5 Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. *Investigation 4*

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. *Investigations 2, 3, and 4*

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form $x+p=q$ and $px=q$ for cases in which p , q and x are all nonnegative rational numbers. *Investigations 3 and 4*

6.EE.B.8 Write an inequality of the form $x>c$ or $x<c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x>c$ or $x<c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. *Investigation 4*

6.EE.C.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *Investigations 1, 3, and 4*

CMP3 Data About Us

Statistical Process: Understand and use the process of statistical investigation

Goal	Standard
Ask questions, collect and analyze data, and interpret data to answer questions	
Describe data with respect to its shape, center, and variability or spread	
Construct and use simple surveys as a method of collecting data	

Attributes of Data: Distinguish data and data types

Goal	Standard
Recognize that data consist of counts or measurements of a variable, or an attribute; these observations comprise a distribution of data values	
Distinguish between categorical data and numerical data, and identify which graphs and statistics can be used to represent each kind of data	

Multiple Representations for Displaying Data: Display data with multiple representations

Goal	Standard
Organize and represent data using tables, dot plots, line plots, ordered-value bar graphs, frequency bar graphs, histograms, and box-and-whisker plots	
Make informed decisions about which graphs or tables can be used to display a particular set of data	
Recognize that a graph shows the overall shape of a distribution, whether the data values are symmetrical around a central value, and whether the graph contains any unusual characteristics such as gaps, clusters, or outliers	

Measures of Central Tendency and Variability: Recognize that a single number may be used to characterize the center of a distribution of data and the degree of variability (or spread)

Goal	Standard
Distinguish between and compute measures of central tendency (mean, median, and mode) and measures of spread (range, interquartile range (IQR), and mean absolute deviation (MAD))	
Identify how the median and mean respond to changes in the data values of a	

distribution	
Relate the choice of measures of central tendency and variability to the shape of the distribution and the context	
Describe the amount of variability in a distribution by noting whether the data values cluster in one or more areas or are fairly spread out	
Use measures of center and spread to compare data distributions	

List of Common Core Standards in Data About Us:

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. *Investigation 3*

6.RP.A.3A Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. *Investigation 3*

6.SP.A.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *Investigations 1, 2, 3, and 4*

6.SP.A.2 Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. *Investigations 1, 2, 3, and 4*

6.SP.A.3 Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Investigations 1, 2, 3, and 4

6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Investigations 1, 2, 3, and 4

6.SP.B.5A Summarize numerical data sets in relation to their context, such as by reporting the number of observations. *Investigations 1, 2, and 4*

6.SP.B.5B Summarize numerical data sets in relation to their context, such as by describing the nature of the attribute under investigation including how it was measured and its units of measurement. *Investigation*

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6.SP.B.5C Summarize numerical data sets in relation to their context, such as by giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. *Investigations 1, 2, 3, and 4*

6.SP.B.5D Summarize numerical data sets in relation to their context, such as by relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. *Investigations 2, 3, and 4*

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. *Investigations 2, 3, and 4*

6.NS.C.7 Understand ordering and absolute value of rational numbers. *Investigations 2, 3, and 4*

Seventh Grade Math: Core Essentials

CMP3 Shapes and Designs

Properties of Polygons: Understand the properties of polygons that affect their shape

Goal	Standard
Explore the ways that polygons are sorted into families according to the number and length of their sides and the size of their angles	
Explore the patterns among interior and exterior angles of a polygon	
Explore the patterns among side lengths in a polygon	
Investigate the symmetries of a shape—rotation or reflection	
Determine which polygons fit together to cover a flat surface and why	
Reason about and solve problems involving various polygons	

Relationships Among Angles: Understand special relationships among angles

Goal	Standard
Investigate techniques for estimating and measuring angles	
Use tools to sketch angles	
Reason about the properties of angles formed by parallel lines and transversals	
Use information about supplementary, complementary, vertical, and adjacent angles in a shape to solve for an unknown angle in a multi-step problem	

Constructing Polygons: Understand the properties needed to construct polygons

Goal	Standard
Draw or sketch polygons with given conditions by using various tools and techniques such as freehand, use of a ruler and protractor, and use of technology	
Determine what conditions will produce a unique polygon, more than one polygon, or no polygon, particularly triangles and quadrilaterals	
Recognize the special properties of polygons, such as angle sum, side-length relationships, and symmetry, that make them useful in building, design, and	

nature	
Solve problems that involve properties of shapes	

List of Common Core Standards in Shapes and Designs:

7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *Investigation 2*

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *Investigation 2*

7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. *Investigations 1, 2, and 3*

7.G.B.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. *Investigations 1, 2, and 3*

CMP3 Accentuate the Negative

Rational Numbers: Develop an understanding that rational numbers consist of positive numbers, negative numbers, and zero

Goal	Standard
Explore relationships between positive and negative numbers by modeling them on a number line	
Use appropriate notation to indicate positive and negative numbers	
Compare and order positive and negative rational numbers (integers, fractions, decimals, and zero) and locate them on a number line	
Recognize and use the relationship between a number and its opposite (additive inverse) to solve problems	
Relate direction and distance to the number line	
Use models and rational numbers to represent and solve problems	

Operations With Rational Numbers: Develop understanding of operations with rational numbers and their properties

Goal	Standard
Develop and use different models (number line, chip model) for representing addition, subtraction, multiplication, and division	
Develop algorithms for adding, subtracting, multiplying, and dividing integers	
Recognize situations in which one or more operations of rational numbers are needed	
Interpret and write mathematical sentences to show relationships and solve problems	
Write and use related fact families for addition/subtraction and multiplication/division to solve simple equations	
Use parentheses and the Order of Operations in computations	
Understand and use the Commutative Property for addition and multiplication	
Apply the Distributive Property to simplify expressions and solve problems	

List of Common Core Standards in Accentuate the Negative:

7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line. *Investigations 1, 2, and 4*

7.NS.A.1a Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged. *Investigations 1 and 2*

7.NS.A.1b Understand $p+q$ as a number located a distance $|q|$ from p , in a positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of zero. Interpret sums of rational numbers by describing real-world contexts. *Investigations 1 and 2*

7.NS.A.1c Understand subtraction of rational numbers as adding the inverse, $p-q=p+(-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. *Investigations 1 and 2*

7.NS.A.1d Apply properties of operations as strategies to add or subtract rational numbers. *Investigations 2 and 4*

7.NS.A.2 Apply and extend previous understandings of multiplication and division of fractions to divide rational numbers. *Investigations 3 and 4*

7.NS.A.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1)=1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. *Investigations 3 and 4*

7.NS.A.2b Understand that integers can be divided provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q)=(-p)/q=p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts. *Investigation 3*

7.NS.A.2c Apply properties of operations as strategies to multiply and divide rational numbers. *Investigations 3 and 4*

7.NS.A.2d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. *Investigation 3*

7.NS.A.3 Solve real-world problems involving the four operations with rational numbers. *Investigations 1, 2, 3, and 4*

7.EE.B.3 Solve multi-step and real-life mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of

operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *Investigations 2, 3, and 4*

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *Investigation 1*

7.EE.B.4b Solve word problems leading to inequalities of the form $px+q>r$ or $px+q<r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *Investigation 1*

CMP3 Stretching and Shrinking

Similar Figures: Understand what it means for figures to be similar

Goal	Standard
Identify similar figures by comparing corresponding sides and angles	
Use scale factors and ratios to describe relationships among the side lengths, perimeters, and areas of similar figures	
Generalize properties of similar figures	
Recognize the role multiplication plays in similarity relationships	
Recognize the relationship between scale factor and ratio in similar figures	
Use informal methods, scale factors, and geometric tools to construct similar figures (scale drawings)	
Compare similar figures with non similar figures	
Distinguish algebraic rules that produce similar figures from those that produce non similar figures	
Use algebraic rules to produce similar figures	
Recognize when a rule shrinks or enlarges a figure	
Explore the effect on the image of a figure if a number is added to the x - or y -coordinates of the figure's vertices	

Reasoning With Similar Figures Develop strategies for using similar figures to solve problems

Goal	Standard
Use the properties of similarity to find distances and heights that cannot be measured directly	
Predict the ways that stretching or shrinking a figure will affect side lengths, angle measures, perimeters, and areas	
Use scale factors or ratios to find missing side lengths in a pair of similar figures	
Use similarity to solve real-world problems	

List of Common Core Standards in Stretching and Shrinking:

7.RP.A.2 Recognize and represent proportional relationships between quantities. *Investigations 1, 2, 3, and 4*

7.RP.A.2a Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. *Investigations 2, 3, and 4*

7.RP.A.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. *Investigations 1, 2, 3, and 4*

7.RP.A.3 Use proportional relationships to solve multistep ratio and percent problems. *Investigation 4*

7.EE.B.3 Solve multi step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *Investigation 4*

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *Investigation 4*

Note: During this Investigation, students use variables to represent quantities and reason about unknown amounts. They are not directly asked to construct simple equations and inequalities in this Unit.

7.G.A.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. *Investigations 1, 2, 3, and 4*

7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. *Investigations 1 and 3*

7.G.B.6 Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. *Investigations 1, 2, 3, and 4*

Note: The development in this Unit is primarily with two-dimensional objects. Three-dimensional objects are further developed in *Filling and Wrapping*.

Essential for 7.EE.B.4a Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *Investigations 2, 3, and 4*

CMP3 Comparing and Scaling

Ratios, Rates, and Percents: Understand ratios, rates, and percents

Goal	Standard
Use ratios, rates, fractions, differences, and percents to write statements comparing two quantities in a given situation	
Distinguish between and use both part-to-part and part-to-whole ratios in comparisons	
Use percents to express ratios and proportions	
Recognize that a rate is a special ratio that compares two measurements with different units	
Analyze comparison statements made about quantitative data for correctness and quality	
Make judgments about which kind of comparison statements are most informative or best reflect a particular point of view in a specific situation	

Proportionality: Understand proportionality in tables, graphs, and equations

Goal	Standard
Recognize that constant growth in a table, graph, or equation is related to proportional situations	
Write an equation to represent the pattern in a table or graph of proportionally related variables	
Relate the unit rate and constant of proportionality to an equation, graph, or table describing a proportional situation	

Reasoning Proportionally: Develop and use strategies for solving problems that require proportional reasoning

Goal	Standard
Recognize situations in which proportional reasoning is appropriate to solve the problem	
Scale a ratio, rate, percent, or fraction to make a comparison or find an equivalent representation	

Use various strategies to solve for an unknown in a proportion, including scaling, rate tables, percent bars, unit rates, and equivalent ratios	
Set up and solve proportions that arise from real-world applications, such as finding discounts and markups and converting measurement units	

List of Common Core Standards in Comparing and Scaling:

7.RP.A.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *Investigations 2 and 3*

7.RP.A.2 Recognize and represent proportional relationships between quantities. *Investigations 1, 2, and 3*

7.RP.A.2a Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. *Investigations 1, 2, and 3*

7.RP.A.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. *Investigations 2 and 3*

7.RP.A.2c Represent proportional relationships by equations. *Investigations 1, 2, and 3*

7.RP.A.2d Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate. *Investigations 2 and 3*

7.RP.A.3 Use proportional relationships to solve multistep ratio and percent problems. *Investigations 1, 2, and 3*

7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers. *Investigation 3*

7.EE.B.3 Solve multi step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *Investigation 3*

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *Investigations 1, 2, and 3*

7.EE.B.4a Solve word problems leading to equations of the form $px+q=r$ and $p(x+q)=r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *Investigations 2 and 3*

CMP3 Moving Straight Ahead

Linear Relationships: Recognize problem situations in which two variables have a linear relationship

Goal	Standard
Identify and describe the patterns of change between the independent and dependent variables for linear relationships represented by tables, graphs, equations, or contextual settings	
Construct tables, graphs, and symbolic equations that represent linear relationships	
Identify the rate of change between two variables and the x - and y -intercepts from graphs, tables, and equations that represent linear relationships	
Translate information about linear relationships given in a contextual setting, a table, a graph, or an equation to one of the other forms	
Write equations that represent linear relationships given specific pieces of information, and describe what information the variables and numbers represent	
Make a connection between slope as a ratio of vertical distance to horizontal distance between two points on a line and the rate of change between two variables that have a linear relationship	
Recognize that $y=mx$ represents a proportional relationship	
Solve problems and make decisions about linear relationships using information given in tables, graphs, and equations	

Equivalence: Understand that the equality sign indicates that two expressions are equivalent

Goal	Standard
Recognize that the equation $y=mx+b$ represents a linear relationship and means that $mx+b$ is an expression equivalent to y	
Recognize that linear equations in one unknown, $k=mx+b$ or $y=m(t)+b$, where k , t , m , and b are constant numbers, are special cases of the equation $y=mx+b$	
Recognize that finding the missing value of one of the variables in a linear relationship, $y=mx+b$, is the same as finding a missing coordinate of a point (x,y) that lies on the graph of the relationship	
Solve linear equations in one variable using symbolic methods, tables, and graphs	

Recognize that a linear inequality in one unknown is associated with a linear equation	
Solve linear inequalities using graphs or symbolic reasoning	
Show that two expressions are equivalent	
Write and interpret equivalent expressions	

List of Common Core Standards in Moving Straight Ahead:

7.RP.A.2 Recognize and represent proportional relationships between quantities. *Investigation 1*

7.RP.A.2a Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. *Investigation 1*

7.RP.A.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. *Investigations 1 and 2*

7.RP.A.2c Represent proportional relationships by equations. *Investigations 1 and 2*

7.RP.A.2d Explain what a point (x,y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0,0)$ and $(1,y)$, where r is the unit rate. *Investigations 2 and 4*

7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. *Investigations 3 and 4*

7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *Investigations 3 and 4*

7.EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *Investigations 1, 2, 3, and 4*

7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. *Investigations 1, 2, 3, and 4*

7.EE.B.4a Solve word problems leading to equations of the form $px+q=r$ and $p(x+q)=r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *Investigations 1, 2, 3, and 4*

7.EE.B.4b Solve word problems leading to inequalities of the form $px+q>r$ or $px+q<r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

Investigation 3

CMP3 What Do You Expect?

Experimental and Theoretical Probabilities: Understand experimental and theoretical probabilities

Goal	Standard
Recognize that probabilities are useful for predicting what will happen over the long run	
For an event described in everyday language, identify the outcomes in a sample space that compose the event	
Interpret experimental and theoretical probabilities and the relationship between them and recognize that experimental probabilities are better estimates of theoretical probabilities when they are based on larger numbers	
Distinguish between outcomes that are equally likely or not equally likely by collecting data and analyzing experimental probabilities	
Realize that the probability of simple events is a ratio of favorable outcomes to all outcomes in the sample space	
Recognize that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring	
Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability	
Determine the fairness of a game	

Reasoning With Probability: Explore and develop probability models by identifying possible outcomes and analyze probabilities to solve problems

Goal	Standard
Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events	
Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process	
Represent sample spaces for simple and compound events and find probabilities using organized lists, tables, tree diagrams, area models, and simulation	
Realize that, just as with simple events, the probability of a compound event is a ratio of favorable outcomes to all outcomes in the sample space	

Design and use a simulation to generate frequencies for simple and compound events	
Analyze situations that involve two or more stages (or actions) called <i>compound events</i>	
Use area models to analyze the theoretical probabilities for two-stage outcomes	
Analyze situations that involve binomial outcomes	
Use probability to calculate the long-term average of a game of chance	
Determine the expected value of a probability situation	
Use probability and expected value to make a decision	

List of Common Core Standard in What Do You Expect?:

7.RP.A.2 Recognize and represent proportional relationships between quantities. *Investigations 1, 2, 3, 4, and 5*

7.RP.A.2a Decide whether two quantities are in a proportional relationship. *Investigations 1, 2, 3, 4, and 5*

7.RP.A.3 Use proportional relationships to solve multistep ratio and percent problems. *Investigations 1, 2, 3, 4, and 5*

7.SP.C.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. *Investigations 2, 3, 4, and 5*

7.SP.C.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *Investigations 1, 2, 3, and 4*

7.SP.C.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. *Investigations 2, 3, 4 and 5*

7.SP.C.7a Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *Investigations 1, 3, 4 and 5*

7.SP.C.7b Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *Investigations 1, 2, 3 and 4*

7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. *Investigations 2, 3, 4 and 5*

7.SP.C.8a Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. *Investigations 2, 3, 4, and 5*

7.SP.C.8b Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. *Investigations 2, 4, and 5*

7.SP.C.8c Design and use a simulation to generate frequencies for compound events. *Investigations 4 and 5*

CMP3 Filling and Wrapping

Surface Areas and Volumes of Polygonal Prisms and Cylinders: Understand surface areas and volumes of prisms and cylinders and how they are related

Goal	Standard
Describe prisms by using their vertices, faces, and edges	
Visualize three-dimensional shapes and the effects of slicing those shapes by planes	
Deepen understanding of volumes and surface areas of rectangular prisms	
Estimate and calculate surface areas and volumes of polygonal prisms by relating them to rectangular prisms	
Explore the relationships between the surface areas and volumes of prisms	
Relate surface areas and volumes for common figures, especially optimization of surface area for fixed volume	
Predict the effects of scaling dimensions on linear, surface area, and volume measures of prisms, cylinders, and other figures	
Investigate the relationship between volumes of prisms and volumes of cylinders as well as the relationship between surface areas of prisms and surface areas of cylinders	
Use volumes and surface areas of prisms to develop formulas for volumes and surface areas of cylinders	
Discover that volumes of prisms and cylinders can be calculated as the product of the area of the base and the height	
Solve problems involving surface areas and volumes of solid figures	

Areas and Circumferences of Circles: Understand the areas and circumferences of circles and how they are related

Goal	Standard
Relate area of a circle to covering a figure and circumference to surrounding a figure	
Estimate and calculate areas and circumferences of circles	
Explore the relationship between circle radius (or diameter) and circumference	

Explore the relationship between circle radius (or diameter) and area	
Investigate the connection of π to area calculation by estimating the number of radius squares needed to cover a circle	
Investigate the relationship between area and circumference of a circle	
Solve problems involving areas and circumferences of circles	

Volumes of Spheres and Cones: Understand the relationships between the volumes of cylinders and the volumes of cones and spheres

Goal	Standard
Relate volumes of cylinders to volumes of cones and spheres	
Estimate and calculate volumes of spheres and cones	
Solve problems involving surface areas and volumes of spheres and cones	

List of Common Core Standards in Filling and Wrapping:

7.RP.A.2 Recognize and represent proportional relationships between quantities. *Investigation 1*

7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers. *Investigations 2, 3, and 4*

7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. *Investigation 3*

7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *Investigations 1 and 3*

7.G.A.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and area from a scale drawing and reproducing a scale drawing at a different scale. *Investigation 1*

7.G.A.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. *Investigation 2*

7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. *Investigations 3 and 4*

7.G.B.6 Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Investigations 1, 2, 3, and 4

CMP3 Samples and Populations

The Process of Statistical Investigation: Deepen the understanding of the process of statistical investigation and apply this understanding to samples

Goal	Standard
Pose questions, collect data, analyze data, and interpret data to answer questions	

Analysis of Samples: Understand that data values in a sample vary and that summary statistics of samples, even same-sized samples, taken from the same population also vary

Goal	Standard
Choose appropriate measures of center (mean, median, or mode) and spread (range, IQR, or MAD) to summarize a sample	
Choose appropriate representations to display distributions of samples	
Compare summary statistics of multiple samples drawn from either the same population or from two different populations and explain how the samples vary	

Design and Use of Simulations: Understand that simulations can model real-world situations

Goal	Standard
Design a model that relies on probability concepts to obtain a desired result	
Use the randomly generated frequencies for events to draw conclusions	

Predictions and Conclusions About Populations: Understand that summary statistics of a representative sample can be used to gain information about a population

Goal	Standard
Describe the benefits and drawbacks to various sampling plans	
Use random-sampling techniques to select representative samples	
Apply concepts from probability to select random samples from populations	
Explain how sample size influences the reliability of sample statistics and resulting conclusions and predictions	

Explain how different sampling plans influence the reliability of sample statistics and resulting conclusions and predictions	
Use statistics from representative samples to draw conclusions about populations	
Use measures of center, measures of spread, and data displays from more than one random sample to compare and draw conclusions about more than one population	
Use mean and MAD, or median and IQR, from random samples to assess whether the differences in the samples are due to natural variability or due to meaningful differences in the underlying populations	

List of Common Core Standards in Samples and Populations:

7.RP.A.2 Recognize and represent proportional relationships between quantities. *Investigation 3*

7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

Investigations 1 and 3

7.NS.A.1b Understand $p+q$ as the number located a distance $|q|$ from p , in the positive or negative direction depending on whether q is positive or negative . . . Interpret sums of rational numbers by describing real-world contexts. *Investigations 1 and 3*

7.SP.A.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. *Investigations 2 and 3*

7.SP.A.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *Investigations 2 and 3*

7.SP.B.3 Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *Investigations 1 and 3*

7.SP.B.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *Investigations 1 and 3*

7.SP.C.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0

indicates an unlikely event, a probability around $1/2$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. *Investigation 3*

7.SP.C.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. *Investigations 2 and 3*

7.SP.C.7a Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *Investigations 2 and 3*

8th Grade Math Core Essentials

CMP3 Thinking with Mathematical Models

Linear and Nonlinear Relationships: Recognize and model patterns in bivariate data

Goal	Standard
Represent data patterns using graphs, tables, word descriptions, and algebraic expressions	
Investigate the nature of linear functions in contexts	
Use mathematical models to answer questions about linear relationships	
Write linear functions from verbal, numerical, or graphical information	
Analyze and solve linear equations	
Model situations with inequalities expressed as "at most" and "at least" situations	
Investigate the nature of inverse variation in contexts	
Use mathematical models to answer questions about inverse variation relationships	
Compare inverse variation relationships with linear relationships	

Data Analysis: Measure variation in data and strength of association in bivariate data

Goal	Standard
Use data to make predictions	
Fit a line to data that show a linear trend and measure closeness of fit	
Analyze scatter plots of bivariate data to determine the strength of the linear association between the two variables	
Use correlation coefficients informally to describe the strength of the linear association illustrated by scatter plots	
Use standard deviation to measure variability in univariate distributions	
Distinguish between categorical and numerical variables	
Use two-way tables and analysis of cell frequencies and relative frequencies to decide whether two variables are related	

List of Common Core Standards in Thinking with Mathematical Models:

8.EE.B.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Investigations 2, 3, 4, and 5

8.EE.C.7 Solve linear equations in one variable. *Investigations 2, and 5*

8.EE.C.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. *Investigation 2*

8.EE.C.8 Analyze and solve pairs of simultaneous linear equations. *Investigation 2*

8.EE.C.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

Investigation 2

8.EE.C.8c Solve real-world and mathematical problems leading to two linear equations in two variables.

Investigation 2

8.F.A.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. *Investigations 1, 2, 3, and 4*

8.F.A.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or with verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. *Investigation 2*

8.F.A.3 Interpret the equation $y=mx+b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear. *Investigations 1, 2, 3, and 4*

8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. *Investigations 1, 2, and 4*

8.F.B.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. *Investigations 1, 2, 3, and 4*

8.SP.A.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. *Investigations 1, 2, 3, and 4*

8.SP.A.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. *Investigations 1, 2, and 4*

8.SP.A.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *Investigations 1, 2, and 4*

8.SP.A.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *Investigation 5*

CMP3 Looking for Pythagoras

Pythagorean Theorem: Understand and apply the Pythagorean Theorem

Goal	Standard
Develop strategies for finding the distance between two points on a coordinate grid	
Explain a proof of the Pythagorean Theorem	
Use the Pythagorean Theorem and its converse to solve a variety of problems	
Use the Pythagorean Theorem to find the equation of a circle with its center located at the origin	

Real Numbers: Understand that the set of real numbers consists of rational and irrational numbers

Goal	Standard
Interpret square roots and cube roots of numbers by making use of their related geometric representations	
Relate the area of a square to the side length of the square	
Estimate the values of square roots	
Estimate the values of cube roots	
Relate the volume of a cube to the edge length of the cube	
Compare numbers that can be represented as fractions (rational numbers) to numbers that cannot be represented as fractions (irrational numbers) and recognize that the set of real numbers consists of rational and irrational numbers	
Represent rational numbers as fractions and as terminating decimals or repeating decimals	
Recognize that irrational numbers cannot be represented as fractions and are nonterminating, nonrepeating decimals	
Recognize that the square root of a whole number that is not a square is irrational	
Locate irrational numbers on a number line	
Use and understand properties of rational and irrational numbers	

List of Common Core Standards in Looking for Pythagoras:

8.NS.A.1 Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational. *Investigation 4*

8.NS.A.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *Investigations 2 and 4*

8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2=p$ and $x^3=p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $2\sqrt{}$ is irrational. *Investigations 2 and 4*

8.G.A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. *Investigation 3 and 5*

8.G.B.6 Explain a proof of the Pythagorean Theorem and its converse. *Investigations 1, 2, and 3*

8.G.B.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. *Investigations 2, 3, 4, and 5*

8.G.B.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. *Investigations 1, 2, 3, and 5*

CMP3 Growing, Growing, Growing

Exponential Functions: Explore problem situations in which two or more variables have an exponential relationship to each other

Goal	Standard
Identify situations that can be modeled with an exponential function	
Identify the pattern of change (growth/decay factor) between two variables that represent an exponential function in a situation, table, graph, or equation	
Represent an exponential function with a table, graph, or equation	
Make connections among the patterns of change in a table, graph, and equation of an exponential function	
Compare the growth/decay rate and growth/decay factor for an exponential function and recognize the role each plays in an exponential situation	
Identify the growth/decay factor and initial value in problem situations, tables, graphs, and equations that represent exponential functions	
Determine whether an exponential function represents a growth (increasing) or decay (decreasing) pattern, from an equation, table, or graph that represents an exponential function	
Determine the values of the independent and dependent variables from a table, graph, or equation of an exponential function	
Use an exponential equation to describe the graph and table of an exponential function	
Predict the y -intercept from an equation, graph, or table that represents an exponential function	
Interpret the information that the y -intercept of an exponential function represents	
Determine the effects of the growth (decay) factor and initial value for an exponential function on a graph of the function	
Solve problems about exponential growth and decay from a variety of different subject areas, including science and business, using an equation, table, or graph	
Observe that one exponential equation can model different contexts	
Compare exponential and linear functions	

Equivalence: Develop understanding of equivalent exponential expressions

Goal	Standard
Write and interpret exponential expressions that represent the dependent variable in an exponential function	
Develop the rules for operating with rational exponents and explain why they work	
Write, interpret, and operate with numerical expressions in scientific notation	
Write and interpret equivalent expressions using the rules for exponents and operations	
Solve problems that involve exponents, including scientific notation	

List of Common Core Standards in Growing, Growing, Growing:

8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. *Investigation 5*

8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2=p$ and $x^3=p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $2\sqrt{2}$ is irrational. *Investigation 5*

8.EE.A.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9 , and determine that the world population is more than 20 times larger. *Investigations 1 and 2*

8.EE.A.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. *Investigation 5*

8.F.A.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. *Investigations 1, 2, and 5*

8.F.A.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table

of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. *Investigation 1*

8.F.A.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1, 1), (2, 4) and (3, 9), which are not on a straight line. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

Investigations 1 and 5

8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. *Investigation 1*

8.F.B.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. *Investigations 1 and 2*

CMP3 Butterflies, Pinwheels, and Wallpaper

Transformations: Describe types of transformations that relate points by the motions of reflections, rotations, and translations, and describe methods for identifying and creating symmetric plane figures

Goal	Standard
Recognize properties of reflection, rotation, and translation transformations	
Explore techniques for using rigid motion transformations to create symmetric designs	
Use coordinate rules for basic rigid motion transformations	

Congruence and Similarity: Understand congruence and similarity and explore necessary and sufficient conditions for establishing congruent and similar shapes

Goal	Standard
Recognize that two figures are congruent if one is derived from the other by a sequence of reflection, rotation, and/or translation transformations	
Recognize that two figures are similar if one can be obtained from the other by a sequence of reflections, rotations, translations, and/or dilations	
Use transformations to describe a sequence that exhibits the congruence between figures	
Use transformations to explore minimum measurement conditions for establishing congruence of triangles	
Use transformations to explore minimum measurement conditions for establishing similarity of triangles	
Relate properties of angles formed by parallel lines and transversals, and the angle sum in any triangle, to properties of transformations	
Use properties of congruent and similar triangles to solve problems about shapes and measurements	

List of Common Core Standards in Butterflies, Pinwheels, and Wallpaper:

8.EE.B.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y=mx$ for a line through the origin and the equation $y=mx+b$ for a line intercepting the vertical axis at b . *Investigation 4*

8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations. *Investigations 1, 2, and 3*

8.G.A.1a Lines are taken to lines, and line segments to line segments of the same length. *Investigations 1 and 2*

8.G.A.1b Angles are taken to angles of the same measure. *Investigations 1, 2, and 3*

8.G.A.1c Parallel lines are taken to parallel lines. *Investigations 1, 2, and 3*

8.G.A.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. *Investigations 2 and 3*

8.G.A.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. *Investigations 3 and 4*

8.G.A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. *Investigation 4*

8.G.A.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *Investigations 3 and 4*

CMP3 Say it with Symbols

Equivalence: Develop understanding of equivalent expressions and equations

Goal	Standard
Model situations with symbolic statements	
Recognize when two or more symbolic statements represent the same context	
Use the properties of real numbers, such as the Distributive Property, to write equivalent expressions	
Determine if different symbolic expressions are mathematically equivalent	
Interpret the information that equivalent expressions represent in a given context	
Determine the equivalent expression or equation that is most helpful in answering a particular question about a relationship	
Use algebraic equations to describe the relationship among the volumes of cylinders, cones and spheres that have the same height and radius	
Solve linear equations involving parentheses	
Determine if a linear equation has a finite number of solutions, an infinite number of solutions, or no solution	
Develop understanding and some fluency with factoring quadratic expressions	
Solve quadratic equations by factoring	
Recognize how and when to use symbols, rather than tables or graphs, to display relationships, generalizations, and proofs	

Functions: Develop an understanding of specific functions such as linear, exponential and quadratic functions

Goal	Standard
Develop proficiency in identifying and representing relationships expressed in problem contexts with appropriate functions and use these relationships to solve the problem	
Analyze equations to determine the patterns of change in the tables and graphs that the equations represent	

Relate parts of a symbolic statement or expression to the underlying properties of the relationship they represent and to the context of the problem	
Determine characteristics of a graph (intercepts, maxima and minima, shape, etc.) of an equation by looking at its symbolic representation	

List of Common Core Standards in Say it with Symbols:

8.EE.A.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2=p$ and $x^3=p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $2\sqrt{}$ is irrational. *Investigation 3*

8.EE.C.7 Solve linear equations in one variable. *Investigations 1, 2, 3, and 4*

8.EE.C.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x=a$, $a=a$, or $a=b$ results (where a and b are different numbers). *Investigation 3*

8.EE.C.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. *Investigations 1, 2, 3, 4, and 5*

8.EE.C.8 Analyze and solve pairs of simultaneous linear equations. *Investigation 3*

8.EE.C.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. *Investigation 3*

8.EE.C.8b Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *Investigation 3*

8.EE.C.8c Solve real-world and mathematical problems leading to two linear equations in two variables. *Investigation 3*

8.F.A.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. *Investigations 2, 3, 4, and 5*

8.F.A.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *Investigations 2, 4, and 5*

8.F.A.3 Interpret the equation $y=mx+b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *Investigations 1, 2, and 4*

8.F.B.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. *Investigations 4 and 5*

8.F.B.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. *Investigation 4*

8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. *Investigation 2*

CMP3 It's in the System

Linear Equations: Develop understanding of linear equations and systems of linear equations

Goal	Standard
Recognize linear equations in two variables in standard form $Ax+By=C$	
Recognize that a linear equation in the form $Ax+By=C$ has infinitely many solutions (x,y) and the graph of those solutions is always a straight line	
Recognize that the form $Ax+By=C$ of linear equations is equivalent to the form $y=mx+b$ for linear equations	
Continue to develop skills in solving a linear equation in two variables by graphing and with algebraic methods	
Recognize that solving a system of linear equations is equivalent to finding values of the variables that will simultaneously satisfy all equations in the system	
Develop skills in solving systems of linear equations by graphing solutions of separate equations; writing the system of equations in equivalent $y=mx+b$ form; or using combinations of the system to eliminate one variable	
Recognize that systems of linear equations in the form $\begin{cases} Ax+By=C \\ Dx+Ey=F \end{cases}$ may have exactly one solution, which is the intersection point of the lines represented by the equations; infinitely many solutions, which is represented by a single line for both equations; or no solution, which is represented by two parallel lines	
Choose between graphing and symbolic methods to efficiently find the solution to a particular system of linear equations	
Gain fluency with symbol manipulation in solving systems of linear equations	
Solve problems that involve systems of linear equations	

Linear Inequalities: Develop understanding of graphing and symbolic methods for solving linear inequalities with one and two variables

Goal	Standard
Recognize differences between strict and inclusive inequalities	
Continue to develop skill in solving a linear inequality in two variables by graphing and symbolic methods	

Develop skill in solving systems of linear inequalities by graphing solutions of each inequality and finding the region of feasible points that satisfy both inequalities; and solving inequalities to find pairs of numbers that satisfy both inequalities	
Choose between graphing and symbolic methods to efficiently find the region of feasible points to a particular system of linear inequalities	
Solve a simple system consisting of a linear equation and a quadratic equation in two variables symbolically and graphically	
Solve problems that involve linear inequalities or systems of linear inequalities	

List of Common Core Standards in It's in the System:

8.EE.C.8 Analyze and solve pairs of simultaneous linear equations. *Investigations 1 and 2*

8.EE.C.8a Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. *Investigations 1, 2, and 3*

8.EE.C.8b Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *Investigations 1, 2, and 4*

8.EE.C.8c Solve real-world and mathematical problems leading to two linear equations in two variables. *Investigations 1, 2, 3, and 4*

8.F.A.3 Interpret the equation $y=mx+b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *Investigation 1*

Assessments



MEASURES of ACADEMIC PROGRESS (MAP)

Measures of Academic Progress (MAP) are state-aligned computerized adaptive tests that reflect the instructional level of each student and measure growth over time.

The assessment itself is unique in that it adapts to the student's ability, accurately measuring what a student knows and needs to learn. In addition, MAP tests measure academic growth over time, independent of grade level or age. Most importantly, the results educators receive have practical application to teaching and learning.

Students in Medinah take the mathematics and reading assessments in the fall, winter and spring from grades 1 thru 8. Each student is provided with a Rausch Unit Interval (RIT) score after testing. They are then given a RIT Target goal for the next assessment session.

Parents receive a summary of their student's progress in mathematics and reading. The report includes a growth chart, current test scores compared to a National perspective, and the projected RIT goal for students next session of testing.

Testing Seasons: FALL, WINTER, SPRING								
KDG	1st	2nd	3rd	4th	5th	6th	7th	8th
	Operations and Algebraic Thinking Number and Operations Measurement and Data Geometry					Operations and Algebraic Thinking The Real and Complex Number Systems Geometry Statistics and Probability		

AIMSWEB

At the foundation of Aimsweb is general outcome measurement, a form of curriculum-based measurement (CBM), used for universal screening and progress monitoring. This form of brief assessment measures overall performance of key foundational skills at each grade level and draws upon over thirty years of scientific research that demonstrates both its versatility to provide prediction or reading and math achievement as well as its sensitivity to growth.

The Power of CBM

Educators and researchers will tell you CBM is their assessment of choice for progress monitoring and Response to Intervention (RTI) because this method of general outcome measurement is:

- **Brief:** Can be administered frequently without disrupting instruction.
- **Predictive:** Provides accurate predictions of reading and math achievement.
- **Sensitive to Improvement:** An increase in ability will be reflected in rising scores on the measure.
- **Easy to administer and score:** Can be used accurately by a wide range of education personnel.
- A **valid** measure of skills that are central to the domain being measured (reading, math)
- **Standardized and reliable:** Producing consistent results across time or testing conditions.
- **Available in multiple equivalent forms** to reduce practice effects on retesting (up to 33 forms per measure, per grade)

Medinah School District #11 utilizes AIMSweb assessments for both benchmarking of student performance in Fall, Winter, and Spring, and progress monitoring of targeted students, weekly or bi-weekly, throughout the school year. The chart below indicates specific test administration information for students in grade K-8. Unless otherwise noted, the AIMSweb tests are administered for both benchmarking and progress monitoring.

Testing Seasons: FALL, WINTER, SPRING								
KDG	1st	2nd	3rd	4th	5th	6th	7th	8th
<ul style="list-style-type: none"> • Tests of Early Numeracy (1st Grade Only) 	<ul style="list-style-type: none"> • Math Computation • Concepts and Applications 							
*Administered for progress monitoring only								