PBS TeacherLine New York
Math in Everyday Life
Grades K – 5

New York State Learning Standards: Mathematics, Science, and Technology - Standard 3

Students will:

- understand the concepts of and become proficient with the skills of mathematics;
- communicate and reason mathematically;
- become problem solvers by using appropriate tools and strategies;

through the integrated study of number sense and operations, algebra, geometry, measurement, and statistics and probability.

Number Sense and Operations Strand

Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.

Number Systems

K.N.7 Draw pictures or other informal symbols to represent a spoken number up to 10
K.N.8 Draw pictures or other informal symbols to represent how many in a collection up to 10
K.N.9 Write numbers 1-10 to represent a collection
K.N.10 Visually determine how many more or less, and then using the verbal counting sequence, match and count 1-10
K.N.11 Use and understand verbal ordinal terms, first to tenth

1.N.1 Count the items in a collection and know the last counting word tells how many items are in the collection (1 to 100)
1.N.2 Count out (produce) a collection of a specified size (10 to 100 items), using groups of ten
1.N.3 Quickly see and label with a number, collections of 1 to 10
1.N.8 Verbally count from a number other than one by 1's
1.N.10 Draw pictures or other informal symbols to represent a spoken number up to 20
1.N.11 Identify that spacing of the same number of objects does not affect the quantity (conservation)
1.N.12 Arrange objects in size order (increasing and decreasing)
1.N.15 Explore and use place value
1.N.16 Compare and order whole numbers up to 100
1.N.17 Develop an initial understanding of the base ten system: 10 ones = 1 ten, 10 tens = 1 hundred
1.N.18 Use a variety of strategies to compose and decompose one-digit numbers
1.N.19 Understand the commutative property of addition
1.N.20 Name the number before and the number after a given number, and name the number(s) between two given numbers up to 100 (with and without the use of a number line or a hundreds chart)
1.N.21 Use before, after, or between to order numbers to 100 (with or without the use of a number line)
1.N.22 Use the words higher, lower, greater, and less to compare two numbers
1.N.23 Use and understand verbal ordinal terms, first to twentieth

2.N.5 Compare and order numbers to 100

2.N.6 Develop an understanding of the base ten system: 10 ones = 1 ten, 10 tens = 1 hundred, 10 hundreds = 1 thousand
2.N.8 Understand and use the commutative property of addition
2N.10 Use and understand verbal ordinal terms
2.N.11 Read written ordinal terms (first through ninth) and use them to represent ordinal relations

3.N.1 Skip count by 25's, 50's, 100's to 1,000
3.N.2 Read and write whole numbers to 1,000
3.N.3 Compare and order numbers to 1,000
3.N.4 Understand the place value structure of the base ten number system: 10 ones = 1 ten, 10 tens = 1 hundred, 10 hundreds = 1 thousand
3.N.5 Use a variety of strategies to compose and decompose three-digit numbers
3.N.6 Use and explain the commutative property of addition and multiplication
3.N.7 Use 1 as the identity element for multiplication
3.N.8 Use the zero property of multiplication
3.N.9 Understand and use the associative property of addition
3.N.10 Develop an understanding of fractions as part of a whole unit and as parts of a collection
3.N.11 Use manipulatives, visual models, and illustrations to name and represent unit fractions (½, $^1/_3$, ¼, $^1/_5$, $^1/_6$, and $^1/_{10}$) as part of a whole or a set of objects
3.N.12 Understand and recognize the meaning of numerator and denominator in the symbolic form of a fraction
3.N.13 Recognize fractional numbers as equal parts of a whole
3.N.14 Explore equivalent fractions
3.N.15 Compare and order unit fractions (½, ., ¼) and find their approximate locations on a number line

Number Theory

2.N.14 Use concrete materials to justify a number as odd or even

3.N.16 Identify odd and even numbers
3.N.17 Develop an understanding of the properties of odd/even numbers as a result of addition or subtraction

5.N.16 Use a variety of strategies to multiply three-digit by three-digit numbers *Note: Multiplication by anything greater than a three-digit multiplier/ multiplicand should be done using technology.*
5.N.17 Use a variety of strategies to divide three-digit numbers by one- and two-digit numbers *Note: Division by anything greater than a two-digit divisor should be done using technology.*
5.N.18 Evaluate an arithmetic expression using order of operations including multiplication, division, addition, subtraction and parentheses
5.N.19 Simplify fractions to lowest terms
5.N.20 Convert improper fractions to mixed numbers, and mixed numbers to improper fractions

Students will understand meanings of operations and procedures, and how they relate to one another.

Operations

K.N.12 Solve and create addition and subtraction verbal word problems (use counting-based strategies, such as counting on and to ten)
K.N.13 Determine sums and differences by various means

1.N.24 Develop and use strategies to solve addition and subtraction word problems
1.N.25 Represent addition and subtraction word problems and their solutions as number sentences
1.N.26 Create problem situations that represent a given number sentence
1.N.27 Use a variety of strategies to solve addition and subtraction problems with one- and two-digit numbers without regrouping
1.N.28 Demonstrate fluency and apply addition and subtraction facts to and including 10
1.N.29 Understand that different parts can be added to get the same whole

2.N.15 Determine sums and differences of number sentences by various means (i.e., families, related facts, inverse operations, addition doubles, and doubles plus one)
2.N.16 Use a variety of strategies to solve addition and subtraction problems using one- and two-digit numbers with and without regrouping

3.N.18 Use a variety of strategies to add and subtract 3-digit numbers (with and without regrouping)
3.N.19 Develop fluency with single-digit multiplication facts
3.N.20 Use a variety of strategies to solve multiplication problems with factors up to 12 x 12
3.N.21 Use the area model, tables, patterns, arrays, and doubling to provide meaning for multiplication
3.N.22 Demonstrate fluency and apply single-digit division facts
3.N.23 Use tables, patterns, halving, and manipulatives to provide meaning for division
3.N.24 Develop strategies for selecting the appropriate computational and operational method in problem solving situations

4.N.15 Select appropriate computational and operational methods to solve problems

Students will compute accurately and make reasonable estimates.

Estimation

1.N.30 Estimate the number in a collection to 50 and then compare by counting the actual items in the collection

3.N.25 Estimate numbers up to 500
3.N.26 Recognize real world situations in which an estimate (rounding) is more appropriate
3.N.27 Check reasonableness of an answer by using estimation

4.N.27 Check reasonableness of an answer by using estimation

5.N.27 Justify the reasonableness of answers using estimation

Algebra Strand

Students will perform algebraic procedures accurately.

Equations and Inequalities

2.A.1 Use the symbols <, >, = (with and without the use of a number line) to compare whole numbers up to 100

3.A.1 Use the symbols <, >, = (with and without the use of a number line) to compare whole numbers and unit fractions (½, ½, ¼, $^1/_5$, $^1/_6$, and $^1/_{10}$)

Students will recognize, use, and represent algebraically patterns, relations, and functions.

Patterns, Functions, and Relations

K.A.1 Use a variety of manipulatives to create patterns using attributes of color, size, or shape
K.A.2 Recognize, describe, extend, and create patterns that repeat (i.e., ABABAB or ABAABAAAB)

1.A.1 Determine and discuss patterns in arithmetic (what comes next in a repeating pattern, using numbers or objects)

2.A.2 Describe and extend increasing or decreasing (+,-) sequences and patterns (numbers or objects up to 100)

3.A.2 Describe and extend numeric (+, -) and geometric patterns

4.A.4 Describe, extend, and make generalizations about numeric (÷ × - + , , ,) and geometric patterns
4.A.5 Analyze a pattern or a whole-number function and state the rule, given a table or an input/output box

5.A.7 Create and explain patterns and algebraic relationships (i.e.,2,4,6,8...) algebraically: 2n (doubling)
5.A.8 Create algebraic or geometric patterns using concrete objects or visual drawings (i.e., rotate and shade geometric shapes)

Geometry Strand

Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.

Shapes

K.G.1 Describe characteristics and relationships of geometric objects

1.G.1 Match shapes and parts of shapes to justify congruency
1.G.2 Recognize, name, describe, create, sort, and compare two-dimensional and three-dimensional shapes

2.G.1 Experiment with slides, flips, and turns to compare two- dimensional shapes
2.G.2 Identify and appropriately name two-dimensional shapes: circle, square, rectangle, and triangle (both regular and irregular)
2.G.3 Compose (put together) and decompose (break apart) two-dimensional shapes

3.G.1 Define and use correct terminology when referring to shapes (circle, triangle, square, rectangle, rhombus, trapezoid, and hexagon)
3.G.2 Identify congruent and similar figures
3.G.3 Name, describe, compare, and sort three-dimensional shapes: cube, cylinder, sphere, prism, and cone
3.G.4 Identify the faces on a three-dimensional shape as two-dimensional shapes

Students will identify and justify geometric relationships, formally and informally.

Geometric Relationships

K.G.2 Sort groups of objects by size and size order (increasing and decreasing)

2.G.4 Group objects by like properties

Students will apply transformations and symmetry to analyze problem solving situations.

Transformational Geometry

K.G.3 Explore vertical and horizontal orientation of objects
K.G.4 Manipulate two- and three-dimensional shapes to explore symmetry

1.G.3 Experiment with slides, flips, and turns of two-dimensional shapes
1.G.4 Identify symmetry in two-dimensional shapes

2.G.5 Explore and predict the outcome of slides, flips, and turns of two-dimensional shapes
2.G.6 Explore line symmetry

3.G.5 Identify and construct lines of symmetry

Students will apply coordinate geometry to analyze problem solving situations.

Coordinate Geometry

K.G.5 Understand and use ideas such as over, under, above, below, on, beside, next to, and between

1.G.5 Recognize geometric shapes and structures in the environment

Measurement Strand

Students will determine what can be measured and how, using appropriate methods and formulas.

Units of Measurement

K.M.1 Name, discuss, and compare attributes of length (longer than, shorter than)
K.M.2 Compare the length of two objects by representing each length with string or a paper strip
K.M.3 Relate specific times such as morning, noon, afternoon, and evening to activities and absence or presence of daylight

1.M.1 Recognize length as an attribute that can be measured
1.M.2 Use non-standard units (including finger lengths, paper clips, students' feet and paces) to measure both vertical and horizontal lengths
1.M.3 Informally explore the standard unit of measure, inch

2.M.1 Use non-standard and standard units to measure both vertical and horizontal lengths
2.M.2 Use a ruler to measure standard units (including whole inches and whole feet)
2.M.3 Compare and order objects according to the attribute of length
2.M.4 Recognize mass as a qualitative measure (i.e., Which is heavier? Which is lighter?)
2.M.5 Compare and order objects, using lighter than and heavier than

3.M.1 Select tools and units (customary) appropriate for the length measured
3.M.2 Use a ruler/yardstick to measure to the nearest standard unit (whole and ½ inches, whole feet, and whole yards)
3.M.3 Measure objects, using ounces and pounds
3.M.4 Recognize capacity as an attribute that can be measured
3.M.5 Compare capacities (i.e., Which contains more? Which contains less?)
3.M.6 Measure capacity, using cups, pints, quarts, and gallons

4.M.1 Select tools and units (customary and metric) appropriate for the length being measured
4.M.2 Use a ruler to measure to the nearest standard unit (whole, ½ and ¼ inches, whole feet, whole yards, whole centimeters, and whole meters)
4.M.3 Know and understand equivalent standard units of length: 12 inches = 1 foot, 3 feet = 1 yard
4.M.4 Select tools and units appropriate to the mass of the object being measured (grams and kilograms)
4.M.5 Measure mass, using grams
4.M.6 Select tools and units appropriate to the capacity being measured (milliliters and liters)
4.M.7 Measure capacity, using milliliters and liters

Students will use units to give meaning to measurements.

Units

1.M.4 Know vocabulary and recognize coins (penny, nickel, dime, quarter)
1.M.5 Recognize the cent notation as ¢
1.M.6 Use different combinations of coins to make money amounts up to 25 cents
1.M.7 Recognize specific times (morning, noon, afternoon, evening)
1.M.8 Tell time to the hour, using both digital and analog clocks
1.M.9 Know the days of the week and months of the year in sequence
1.M.10 Classify months and connect to seasons and other events

2.M.6 Know and recognize coins (penny, nickel, dime, quarter) and bills ($1, $5, $10, and $20)
2.M.7 Recognize the whole dollar notation as $1, etc.
2.M.8 Identify equivalent combinations to make one dollar
2.M.9 Tell time to the half hour and five minutes using both digital and analog clocks

3.M.7 Count and represent combined coins and dollars, using currency symbols ($0.00)

3.M.8 Relate unit fractions to the face of the clock: Whole = 60 minutes, ½ = 30 minutes, ¼ = 15 minutes

Students will develop strategies for estimating measurements.

Estimation

1.M.11 Select and use non-standard units to estimate measurements

2.M.10 Select and use standard (customary) and non-standard units to estimate measurements

3.M.9 Tell time to the minute, using digital and analog clocks
3.M.10 Select and use standard (customary) and non-standard units to estimate measurements

5.M.11 Justify the reasonableness of estimates

Statistics and Probability Strand

Students will collect, organize, display, and analyze data.

Collection of Data

K.S.1 Gather data in response to questions posed by the teacher and students

1.S.1 Pose questions about themselves and their surrounding
1.S.2 Collect and record data related to a question

3.S.1 Formulate questions about themselves and their surroundings
3.S.2 Collect data using observation and surveys, and record appropriately

Organization and Display of Data

K.S.2 Help to make simple pictographs for quantities up to 10, where one picture represents 1
K.S.3 Sort and organize objects by two attributes (i.e., color, size, or shape)
K.S.4 Represent data using manipulatives

1.S.3 Display data in simple pictographs for quantities up to 20 with units of one
1.S.4 Display data in bar graphs using concrete objects with intervals of one
1.S.5 Use Venn diagrams to sort and describe data

3.S.3 Construct a frequency table to represent a collection of data
3.S.4 Identify the parts of pictographs and bar graphs
3.S.5 Display data in pictographs and bar graphs
3.S.6 State the relationships between pictographs and bar graphs

Analysis of Data

K.S.5 Identify more, less, and same amounts from pictographs or concrete models

1.S.6 Interpret data in terms of the words: most, least, greater than, less than, or equal to

1.S.7 Answer simple questions related to data displayed in pictographs (i.e., category with most, how many more in a category compared to another, how many all together in two categories)

3.S.7 Read and interpret data in bar graphs and pictographs

Students will make predictions that are based upon data analysis.

Predictions from Data

1.S.8 Discuss conclusions and make predictions in terms of the words likely and unlikely
1.S.9 Construct a question that can be answered by using information from a graph

3.S.8 Formulate conclusions and make predictions from graphs

Problem Solving Strand

Students will build new mathematical knowledge through problem solving.

K.PS.1 Explore, examine, and make observations about a social problem or mathematical situation
K.PS.2 Interpret information correctly, identify the problem, and generate possible solutions

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2.PS.2 Interpret information correctly, identify the problem, and generate possible solutions

3.PS.1 Explore, examine, and make observations about a social problem or mathematical situation
3.PS.2 Understand that some ways of representing a problem are more helpful than others
3.PS.3 Interpret information correctly, identify the problem, and generate possible solutions

4.PS.1 Explore, examine, and make observations about a social problem or mathematical situation
4.PS.2 Understand that some ways of representing a problem are more helpful than others
4.PS.3 Interpret information correctly, identify the problem, and generate possible solutions

5.PS.1 Know the difference between relevant and irrelevant information when solving problems
5.PS.2 Understand that some ways of representing a problem are more efficient than others

5.PS.3 Interpret information correctly, identify the problem, and generate possible strategies and solutions

Students will solve problems that arise in mathematics and in other contexts.

K.PS.3 Act out or model with manipulatives activities involving mathematical content from literature and/or story telling
K.PS.4 Formulate problems and solutions from everyday situations (i.e., counting the number of children in the class, using the calendar to teach counting).

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1.PS.4 Formulate problems and solutions from everyday situations (i.e.,counting the number of children in the class or using the calendar to teach counting)

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3.PS.4 Act out or model with manipulatives activities involving mathematical content from literature
3.PS.5 Formulate problems and solutions from everyday situations
3.PS.6 Translate from a picture/diagram to a numeric expression
3.PS.7 Represent problem situations in oral, written, concrete, pictorial, and graphical forms
3.PS.8 Select an appropriate representation of a problem

4.PS.4 Act out or model with manipulatives activities involving mathematical content from literature
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5.PS.4 Act out or model with manipulatives activities involving mathematical content from literature
5.PS.5 Formulate problems and solutions from everyday situations
5.PS.6 Translate from a picture/diagram to a numeric expression
5.PS.7 Represent problem situations verbally, numerically, algebraically, and/or graphically
5.PS.8 Select an appropriate representation of a problem
5.PS.9 Understand the basic language of logic in mathematical situations (and, or, not)

Students will apply and adapt a variety of appropriate strategies to solve problems.

K.PS.5 Use informal counting strategies to find solutions
K.PS.6 Experience teacher-directed questioning process to understand problems
K.PS.7 Compare and discuss ideas for solving a problem with teacher and/or students to justify their thinking
K.PS.8 Use manipulatives (i.e., tiles, blocks) to model the action in problems
K.PS.9 Use drawings/pictures to model the action in problems

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2.PS.9 Use drawings/pictures to model the action in problems

3.PS.9 Use trial and error to solve problems
3.PS.10 Use process of elimination to solve problems
3.PS.11 Make pictures/diagrams of problems
3.PS.12 Use physical objects to model problems
3.PS.13 Work in collaboration with others to solve problems
3.PS.14 Make organized lists to solve numerical problems
3.PS.15 Make charts to solve numerical problems
3.PS.16 Analyze problems by identifying relationships
3.PS.17 Analyze problems by identifying relevant versus irrelevant information
3.PS.18 Analyze problems by observing patterns
3.PS.19 State a problem in their own words

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4.PS.12 Use physical objects to model problems
4.PS.13 Work in collaboration with others to solve problems
4.PS.14 Make organized lists to solve numerical problems
4.PS.15 Make charts to solve numerical problems
4.PS.16 Analyze problems by identifying relationships
4.PS.17 Analyze problems by identifying relevant versus irrelevant information
4.PS.18 Analyze problems by observing patterns
4.PS.19 State a problem in their own words

5.PS.10 Work in collaboration with others to solve problems
5.PS.11 Translate from a picture/diagram to a number or symbolic expression
5.PS.12 Use trial and error and the process of elimination to solve problems
5.PS.13 Model problems with pictures/diagrams or physical objects
5.PS.14 Analyze problems by observing patterns
5.PS.15 Make organized lists or charts to solve numerical problems

Students will monitor and reflect on the process of mathematical problem solving.

K.PS.10 Explain to others how a problem was solved, giving strategies

1.PS.10 Explain to others how a problem was solved, giving strategies and justifications

2.PS.10 Explain to others how a problem was solved, giving strategies and justifications

3.PS.20 Determine what information is needed to solve a problem

3.PS.21 Discuss with peers to understand a problem situation
3.PS.22 Discuss the efficiency of different representations of a problem
3.PS.23 Verify results of a problem
3.PS.24 Recognize invalid approaches
3.PS.25 Determine whether a solution is reasonable in the context of the original problem

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4.PS.25 Determine whether a solution is reasonable in the context of the original problem

5.PS.16 Discuss with peers to understand a problem situation
5.PS.17 Determine what information is needed to solve problem
5.PS.18 Determine the efficiency of different representations of a problem
5.PS.19 Differentiate between valid and invalid approaches
5.PS.20 Understand valid counterexamples
5.PS.21 Explain the methods and reasoning behind the problem solving strategies used
5.PS.22 Discuss whether a solution is reasonable in the context of the original problem
5.PS.23 Verify results of a problem

Reasoning and Proof Strand

Students will recognize reasoning and proof as fundamental aspects of mathematics.

K.RP.1 Understand that mathematical statements can be true or false

1.RP.1 Understand that mathematical statements can be true or false
1.RP.2 Recognize that mathematical ideas need to be supported by evidence

2.RP.1 Understand that mathematical statements can be true or false
2.RP.2 Recognize that mathematical ideas need to be supported by evidence

3.RP.1 Use representations to support mathematical ideas
3.RP.2 Determine whether a mathematical statement is true or false and explain why

4.RP.1 Use representations to support mathematical ideas
4.RP.2 Determine whether a mathematical statement is true or false and explain why

5.RP.1 Recognize that mathematical ideas can be supported using a variety of strategies
5.RP.2 Understand that mathematical statements can be justified, using models, facts and relationships to explain their thinking

Students will make and investigate mathematical conjectures.

K.RP.2 Investigate the use of knowledgeable guessing as a mathematical tool
K.RP.3 Explore guesses, using a variety of objects and manipulatives

1.RP.3 Investigate the use of knowledgeable guessing as a mathematical tool
1.RP.4 Explore guesses, using a variety of objects and manipulatives

2.RP.3 Investigate the use of knowledgeable guessing as a mathematical tool

2.RP.4 Explore guesses, using a variety of objects and manipulatives

3.RP.3 Investigate the use of knowledgeable guessing by generalizing mathematical ideas
3.RP.4 Make conjectures from a variety of representations

4.RP.3 Investigate the use of knowledgeable guessing by generalizing mathematical ideas
4.RP.4 Make conjectures from a variety of representations

5.RP.3 Investigate conjectures, using arguments and appropriate mathematical terms
5.RP.4 Make and evaluate conjectures, using a variety of strategies

Students will develop and evaluate mathematical arguments and proofs.

K.RP.4 Listen to claims other students make

1.RP.5 Justify general claims, using manipulatives
1.RP.6 Develop and explain an argument verbally or with objects
1.RP.7 Listen to and discuss claims other students make

2.RP.5 Justify general claims, using manipulatives
2.RP.6 Develop and explain an argument verbally or with objects
2.RP.7 Listen to and discuss claims other students make

3.RP.5 Justify general claims or conjectures, using manipulatives, models, and expressions
3.RP.6 Develop and explain an argument using oral, written, concrete, pictorial, and/or graphical forms
3.RP.7 Discuss, listen, and make comments that support or reject claims made by other students

4.RP.5 Justify general claims or conjectures, using manipulatives, models, and expressions
4.RP.6 Develop and explain an argument using oral, written, concrete, pictorial, and/or graphical forms
4.RP.7 Discuss, listen, and make comments that support or reject claims made by other students

5.RP.5 Justify general claims or conjectures, using manipulatives, models, expressions, and mathematical relationships
5.RP.6 Develop and explain an argument verbally, numerically, and/or graphically
5.RP.7 Verify claims other students make, using examples and counterexamples when appropriate

Students will select and use various types of reasoning and methods of proof.

2.RP.8 Use trial and error strategies to verify claims

3.RP.5 Justify general claims or conjectures, using manipulatives, models, and expressions
3.RP.6 Develop and explain an argument using oral, written, concrete, pictorial, and/or graphical forms

3.RP.7 Discuss, listen, and make comments that support or reject claims made by other students

4.RP.5 Justify general claims or conjectures, using manipulatives, models, and expressions
4.RP.6 Develop and explain an argument using oral, written, concrete, pictorial, and/or graphical forms
4.RP.7 Discuss, listen, and make comments that support or reject claims made by other students

5.RP.5 Justify general claims or conjectures, using manipulatives, models, expressions, and mathematical relationships
5.RP.6 Develop and explain an argument verbally, numerically, and/or graphically
5.RP.7 Verify claims other students make, using examples and counterexamples when appropriate

Students will select and use various types of reasoning and methods of proof.

4.RP.8 Justify an argument by trying many cases
4.RP.9 Disprove an argument by finding counterexamples

5.RP.8 Justify an argument through examples/counterexamples and special cases

Communication Strand

Students will organize and consolidate their mathematical thinking through communication.

K.CM.1 Understand how to organize their thought processes with teacher guidance

1.CM.1 Understand how to organize their thought processes with teacher guidance
1.CM.2 Verbally support their reasoning and answer

2.CM.1 Understand how to organize their thought processes
2.CM.2 Verbally support their reasoning and answer

3.CM.1 Understand and explain how to organize their thought process
3.CM.2 Verbally explain their rationale for strategy selection
3.CM.3 Provide reasoning both in written and verbal form

4.CM.1 Understand and explain how to organize their thought process
4.CM.2 Verbally explain their rationale for strategy selection
4.CM.3 Provide reasoning both in written and verbal form

5.CM.1 Provide an organized thought process that is correct, complete, coherent, and clear
5.CM.2 Explain a rationale for strategy selection
5.CM.3 Organize and accurately label work

Students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.

K.CM.2 Share mathematical ideas through the manipulation of objects, drawings, pictures, and verbal explanations

1.CM.3 Share mathematical ideas through the manipulation of objects, drawings, pictures, charts, and symbols in both written and verbal explanations

2.CM.3 Share mathematical ideas through the manipulation of objects, drawings, pictures, charts, and symbols in both written and verbal explanations
3.CM.4 Organize and accurately label work
3.CM.5 Share organized mathematical ideas through the manipulation of objects, drawings, pictures, charts, graphs, tables, diagrams, models, symbols, and expressions in written and verbal form
3.CM.6 Answer clarifying questions from others

4.CM.4 Organize and accurately label work
4.CM.5 Share organized mathematical ideas through the manipulation of objects, drawing, pictures, charts, graphs, tables, diagrams, models, symbols, and expressions in written and verbal form
4.CM.6 Answer clarifying questions from others

5.CM.4 Share organized mathematical ideas through the manipulation of objects, numerical tables, drawings, pictures, charts, graphs, tables, diagrams, models, and symbols in written and verbal form
5.CM.5 Answer clarifying questions from others

Students will analyze and evaluate the mathematical thinking and strategies of others.

K.CM.3 Listen to solutions shared by other students
K.CM.4 Formulate mathematically relevant questions with teacher guidance

1.CM.4 Listen to solutions shared by other students
1.CM.5 Formulate mathematically relevant questions

2.CM.4 Listen to solutions shared by other students
2.CM.5 Formulate mathematically relevant questions

3.CM.7 Listen for understanding of mathematical solutions shared by other students
3.CM.8 Consider strategies used and solutions found in relation to their own work

4.CM.7 Restate mathematical solutions shared by other students
4.CM.8 Consider strategies used and solutions found in relation to their own work

5.CM.6 Understand mathematical solutions shared by other students
5.CM.7 Raise questions that elicit, extend, or challenge others' thinking
5.CM.8 Consider strategies used and solutions found by others in relation to their own work

Students will use the language of mathematics to express mathematical ideas precisely.

K.CM.5 Use appropriate mathematical terms, vocabulary, and language

1.CM.6 Use appropriate mathematical terms, vocabulary, and language

2.CM.6 Use appropriate mathematical terms, vocabulary, and language

3.CM.9 Increase their use of mathematical vocabulary and language when communicating with others
3.CM.10 Describe objects, relationships, solutions and rationale using appropriate vocabulary
3.CM.11 Decode and comprehend mathematical visuals and symbols to construct meaning

4.CM.9 Increase their use of mathematical vocabulary and language when communicating with others
4.CM.10 Describe objects, relationships, solutions, and rationale using appropriate vocabulary
4.CM.11 Decode and comprehend mathematical visuals and symbols to construct meaning

5.CM.9 Increase their use of mathematical vocabulary and language when communicating with others
5.CM.10 Use appropriate vocabulary when describing objects, relationships, mathematical solutions, and rationale
5.CM.11 Decode and comprehend mathematical visuals and symbols to construct meaning

Connections Strand

Students will recognize and use connections among mathematical ideas.

1.CN.1 Recognize the connections of patterns in their everyday experiences to mathematical ideas
1.CN.2 Understand the connections between numbers and the quantities they represent
1.CN.3 Compare the similarities and differences of mathematical ideas

2.CN.1 Recognize the connections of patterns in their everyday experiences to mathematical ideas
2.CN.2 Understand and use the connections between numbers and the quantities they represent to solve problems
2.CN.3 Compare the similarities and differences of mathematical ideas

3.CN.1 Recognize, understand, and make connections in their everyday experiences to mathematical ideas
3.CN.2 Compare and contrast mathematical ideas
3.CN.3 Connect and apply mathematical information to solve problems

4.CN.1 Recognize, understand, and make connections in their everyday experiences to mathematical ideas
4.CN.2 Compare and contrast mathematical ideas
4.CN.3 Connect and apply mathematical information to solve problems

5.CN.1 Understand and make connections and conjectures in their everyday experiences to mathematical ideas
5.CN.2 Explore and explain the relationship between mathematical ideas
5.CN.3 Connect and apply mathematical information to solve problems

Students will understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

1.CN.4 Understand how models of situations involving objects, pictures, and symbols relate to mathematical ideas
1.CN.5 Understand meanings of operations and how they relate to one another
1.CN.6 Understand how mathematical models represent quantitative relationships

2.CN.4 Understand how models of situations involving objects, pictures, and symbols relate to mathematical ideas
2.CN.5 Understand meanings of operations and how they relate to one another
2.CN.6 Understand how mathematical models represent quantitative relationships

3.CN.4 Understand multiple representations and how they are related
3.CN.5 Model situations with objects and representations and be able to make observations

4.CN.4 Understand multiple representations and how they are related
4.CN.5 Model situations with objects and representations and be able to make observations

5.CN.4 Understand multiple representations and how they are related
5.CN.5 Model situations with objects and representations and be able to draw conclusions

Students will recognize and apply mathematics in contexts outside of mathematics.

K.CN.1 Recognize the presence of mathematics in their daily lives
K.CN.2 Use counting strategies to solve problems in their daily lives
K.CN.3 Recognize and apply mathematics to objects and pictures

1.CN.7 Recognize the presence of mathematics in their daily lives
1.CN.8 Recognize and apply mathematics to solve problems
1.CN.9 Recognize and apply mathematics to objects, pictures, and symbols

2.CN.7 Recognize the presence of mathematics in their daily lives
2.CN.8 Recognize and apply mathematics to solve problems
2.CN.9 Recognize and apply mathematics to objects, pictures and symbols

3.CN.6 Recognize the presence of mathematics in their daily lives
3.CN.7 Apply mathematics to solve problems that develop outside of mathematics
3.CN.8 Recognize and apply mathematics to other disciplines

4.CN.6 Recognize the presence of mathematics in their daily lives
4.CN.7 Apply mathematics to solve problems that develop outside of mathematics
4.CN.8 Recognize and apply mathematics to other disciplines

5.CN.6 Recognize and provide examples of the presence of mathematics in their daily lives
5.CN.7 Apply mathematics to problem situations that develop outside of mathematics
5.CN.8 Investigate the presence of mathematics in careers and areas of interest
5.CN.9 Recognize and apply mathematics to other disciplines and areas of interest

Representation Strand

PBS TeacherLine New York
Math in Everyday Life
Grades K – 5

Students will create and use representations to organize, record, and communicate mathematical ideas.

K.R.1 Use multiple representations, including verbal language, acting out or modeling a situation, and drawing pictures as representations
K.R.2 Use standard and nonstandard representations

1.R.1 Use multiple representations including verbal and written language, acting out or modeling a situation, drawings, and/or symbols as representations
1.R.2 Share mental images of mathematical ideas and understandings
1.R.3 Use standard and nonstandard representations

2.R.1 Use multiple representations, including verbal and written language, acting out or modeling a situation, drawings, and/or symbols as representations
2.R.2 Share mental images of mathematical ideas and understandings
2.R.3 Use standard and nonstandard representations

3.R.1 Use verbal and written language, physical models, drawing charts, graphs, tables, symbols, and equations as representations
3.R.2 Share mental images of mathematical ideas and understandings
3.R.3 Recognize and use external mathematical representations
3.R.4 Use standard and nonstandard representations with accuracy and detail

4.R.1 Use verbal and written language, physical models, drawing charts, graphs, tables, symbols, and equations as representations
4.R.2 Share mental images of mathematical ideas and understandings
4.R.3 Recognize and use external mathematical representations
4.R.4 Use standard and nonstandard representations with accuracy and detail

5.R.1 Use physical objects, drawings, charts, tables, graphs, symbols, equations, and technology as representations
5.R.2 Explain, describe, and defend mathematical ideas using representations
5.R.3 Read, interpret, and extend external models
5.R.4 Use standard and nonstandard representations with accuracy and detail

Students will select, apply, and translate among mathematical representations to solve problems.

1.R.4 Connect mathematical representations with problem solving

2.R.4 Connect mathematical representations with problem solving

3.R.5 Understand similarities and differences in representations.
3.R.6 Connect mathematical representations with problem solving
3.R.7 Construct effective representations to solve problems

4.R.5 Understand similarities and differences in representations
4.R.6 Connect mathematical representations with problem solving
4.R.7 Construct effective representations to solve problems

5.R.5 Use models to explore problem situations
5.R.6 Investigate relationships between different representations and their impact on a given problem

PBS TeacherLine New York
Math in Everyday Life
Grades K – 5

Students will use representations to model and interpret physical, social, and mathematical phenomena.

K.R.3 Use objects to show and understand physical phenomena (i.e., guess the number of cookies in a package)
K.R.4 Use objects to show and understand social phenomena (i.e., count and represent sharing cookies between friends)
K.R.5 Use objects to show and understand mathematical phenomena (i.e., draw pictures to show a story problem, show number value using fingers on your hand)

1.R.5 Use mathematics to show and understand physical phenomena (i.e., estimate and represent the number of apples in a tree)
1.R.6 Use mathematics to show and understand social phenomena (i.e., count and represent sharing cookies between friends)
1.R.7 Use mathematics to show and understand mathematical phenomena (i.e., draw pictures to show a story problem, show number value using fingers on your hand)

2.R.5 Use mathematics to show and understand physical phenomena (i.e., estimate and represent the number of apples in a tree)
2.R.6 Use mathematics to show and understand social phenomena (i.e., count and represent sharing cookies between friends)
2.R.7 Use mathematics to show and understand mathematical phenomena (i.e., draw pictures to show a story problem or show number value using fingers on your hand)

3.R.8 Use mathematics to show and understand physical phenomena (i.e., estimate and represent the number of apples in a tree)
3.R.9 Use mathematics to show and understand social phenomena (i.e., determine the number of buses required for a field trip)
3.R.10 Use mathematics to show and understand mathematical phenomena (i.e., use a multiplication grid to solve odd and even number problems)

4.R.8 Use mathematics to show and understand physical phenomena (i.e., estimate and represent the number of apples in a tree)
4.R.9 Use mathematics to show and understand social phenomena (i.e., determine the number of buses required for a field trip)
4.R.10 Use mathematics to show and understand mathematical phenomena (i.e., use a multiplication grid to solve odd and even number problems)

5.R.7 Use mathematics to show and understand physical phenomena (i.e., determine the perimeter of a bulletin board)
5.R.8 Use mathematics to show and understand social phenomena (i.e., construct tables to organize data showing book sales)
5.R.9 Use mathematics to show and understand mathematical phenomena (i.e., find the missing value that makes the equation true: (3 + 4) + 5 = 3 + (4 + ___)