

## Math Curriculum for Grades K-8

### KINDERGARTEN

#### Number Sense

- Counts by ones to 100.
- Counts on by 2s, 5s, 10s, and back by 1s with the use of a number line or number grid.
- Counts objects in a collection.
- Read, write and model with manipulatives whole numbers up to 100.
- Compare and order whole numbers up to 20.
- Use manipulatives and drawings to model half of a region or collection
- Use manipulatives, drawings and numerical expressions involving addition and subtraction of 1-digit numbers to give equivalent names for whole numbers up to 20.

#### Operations and Computation

- Use manipulatives, number lines, and mental arithmetic to solve problems. involving the addition and subtraction of single-digit whole numbers.
- Identify join and take-away situations.

#### Measurement

- Use non-standard measuring tools to estimate and compare length and weight
- Identify pennies, nickels, dimes, quarters, and dollar bills.
- Identify standard tools used to measure length, weight, temperature, and time.

#### Algebra

- Extend, describe, and create visual, rhythmic, and movement patterns.
- Use rules to sort, make patterns, and play "What's My Rule" games.
- Read and write expressions and number sentences containing numbers and math symbols.

#### Geometry

- Identify and describe plane and solid figures including circles, triangles, rectangles, squares, spheres, and cubes.
- Identify shapes having line symmetry.

#### Data and Probability

- Collect and organize data to create class-constructed tally charts, tables and bar graphs.
- Use graphs to answer simple questions.
- Describe events using basic probability terms such as certain, possible and impossible.

#### Problem Solving

- Apply knowledge of grade level mathematics and problem solving strategies to solve novel multi-step problems.
- Represent problem solving process using drawings and words.

### GRADE 1

#### Number Sense

- Counts on by 1s, 2s, 5s, 10s past 100 and back by 1s from any number less than 100.
- Read, write, model with manipulatives whole numbers up to 1,000.
- Compare numbers up to 1,000.
- Identify place value of digits in numbers up to 1,000 and determine value of each digit.
- Use manipulatives and drawings to model halves, thirds, and fourths as equal parts of a whole or collection.
- Use numerical expressions, tally marks, drawings and manipulatives to find equivalent names for numbers.

#### Operations and Computation

- Solve problems involving the addition and subtraction of 2-digit whole numbers.
- Describe strategies used to add and subtract multi-digit numbers.
- Make reasonable estimates for multi-digit addition and subtraction problems.
- Use manipulatives, number grids, tally marks and mental arithmetic to solve addition and subtraction of 1- and 2-digit numbers.
- Calculate and compare combinations of coins.

#### Basic Facts

- Demonstrates proficiency using the following fact strategies: plus or minus zero, plus or minus one, doubles, and sum of ten strategies and can recall these facts with accuracy.
- Develop and use addition strategies to recall addition facts.

#### Measurement

- Use standard and non-standard tools to measure length and weight.
- Compare, and make exchanges between pennies, nickels, dimes, quarters, and dollar bills.
- Read a Fahrenheit/Celsius thermometer to the nearest  $10^{\circ}$ .
- Use calendar to identify days, weeks, months, and dates.
- Tell and show time to the nearest half and quarter hour.

#### Algebra

- Solve problems involving function machines, "What's my Rule" tables, and Frames-and-Arrows diagrams.
- Extend, describe, and create numeric, visual, and concrete patterns.
- Solve equations involving addition and subtraction.
- Use math symbols to write number sentences.
- Describe rules for patterns and use rule to solve problem.
- Apply the Commutative and Associative Property of Addition to basic addition fact problems.

#### Geometry

- Identify, describe, and model plane and solid figures.
- Identify shapes having line symmetry.
- Complete line-symmetric designs.

#### Data and Probability

- Collect and organize data to create tally charts, tables, bar graphs and line plots
- Use graphs to answer simple questions and draw conclusions.
- Find the maximum and minimum of a data set.

- Describe events using basic probability terms such as certain, likely, unlikely, and impossible.

### Problem Solving

- Apply knowledge of grade level mathematics and problem solving strategies to solve novel multi-step problems.
- Communicate problem solving process orally and in writing

## GRADE 2

### Number Sense

- Counts on by 1s, 2s, 5s, 10s and 25s and 100s past 1,000 from any number less than 1000.
- Read, write, model with manipulatives, and compare numbers up to 10,000.
- Identify place value of digits in numbers up to 10,000 and determine value of each digit.
- Represent fractions as equal parts of a whole or collection.
- Use manipulatives and drawings to model equivalent names for  $\frac{1}{2}$ .
- Use area models to compare fractions.

### Operations and Computation

- Solve problems involving the addition and subtraction of 2-digit whole numbers
- Describe strategies used to add and subtract multi-digit numbers.
- Make reasonable estimates for multi-digit addition and subtraction problems.

### Basic Facts

- Proficient recall of addition and subtraction facts to  $10 + 10$ .

### Measurement

- Measure length to the nearest inch or centimeter and use benchmarks to make reasonable estimates.
- Use standard and non-standard tools to measure weight and use benchmarks to make reasonable estimates.
- Make exchanges between coins and bills.
- Read temperature on both Fahrenheit and Celsius scales.
- Tell time to the nearest five minutes and record using digital notation.

### Algebra

- Extend, describe, and create numeric, visual, and concrete patterns.
- Describe rules for patterns and use rule to solve problems.
- Use numbers and symbols to write rules for functions involving addition and subtraction.
- Write expressions and number sentences to model number stories.
- Apply the Commutative and Associative Property of Addition to mental math problems.

### Geometry

- Draw line segments and identify parallel line segments.
- Identify, describe, and model plane and solid figures.
- Create and complete two-dimensional symmetrical designs.

### Data and Probability

- Collect and organize data in tally charts, tables, bar graphs and line plots.
- Use graphs to answer questions and draw conclusions.
- Find the maximum, minimum, mode, and median of a data set.
- Use probability terms to describe the likelihood of an event.

### Problem Solving

- Apply knowledge of grade level mathematics and problem solving strategies to solve novel multi-step problems.
- Communicate problem solving process orally and in writing.

## GRADE 3

### Number Sense

- Read, write, and model whole numbers to one million and decimals to the hundredths place.
- Read, write, and model fractions.
- Solve problems involving fractional parts of a region or set.

### Operations

- Use mental math, paper-and-pencil, and calculators to solve problems involving addition and subtraction of whole numbers and decimals (money).
- Use mental math, paper-and-pencil, and calculators to solve problems involving multiplication of 2- and 3-digit by 1-digit numbers.
- Identify place value and value of digits in whole numbers to one million and decimals to hundredths.
- Make reasonable estimates and describe strategy used.

### Basic Facts

- Accurate and fluent recall of addition and subtraction facts 10.
- Use of strategies to accurately recall multiplication facts to 10 x 10.

### Measurement

- Tell time and record to nearest minute.
- Determine length and perimeter of polygons to the nearest  $\frac{1}{2}$  inch or  $\frac{1}{2}$  centimeter.
- Use unit squares to determine area of a rectangle.
- Describe relationship between inches, feet, and yards and hours, days and weeks.

### Algebra

- Describe and apply these algebraic properties: Associative, Commutative, and Identity for Addition and Multiplication.
- Extend, describe, and create numeric patterns.
- Use words and symbols to describe and write rules for functions.
- Use order of operations and grouping symbols to solve multi-step problems.

### Geometry

- Identify, describe, model, and compare plane and solid figures.
- Use geometric terms to identify and describe plane and solid figures.
- Create and complete two-dimensional symmetrical designs.

### Data and Probability

- Determine maximum, minimum, range, mode and median from data displayed on a graph.
- Create charts, tables, bar graphs and line plots to collect and organize data.
- Predict outcome of simple probability experiments and test prediction using manipulatives.
- Use probability terms to describe the likelihood of an event.

#### Problem Solving

- Apply knowledge of grade level mathematics and problem solving strategies to solve novel multi-step problems.
- Communicate problem solving process orally and in writing.

### GRADE 4

#### Number Sense

- Compare and order integers from -100 to one billion.
- Given a fractional part, identify the whole.
- Solve problems involving fractional parts of a region or collection and explain strategies used.
- Find multiples of numbers less than ten.
- Identify and find equivalent fractions.
- Use benchmark fractions to compare and order fractions.
- Rename common fractions as decimals and percents.

#### Operations

- Use mental math, paper-and-pencil, and calculators to solve problems involving addition and subtraction of whole numbers and decimals through hundredths.

- Use mental math, paper-and-pencil, and calculators to solve problems involving multiplication of multidigit number by a two-digit whole number.
- Use mental math, paper-and-pencil, and calculators to solve problems involving division of multi-digit whole numbers by a 1-digit divisor.
- Explain strategies used to solve multiplication and division problems and explain why they work.
- Make reasonable estimates for problems containing whole numbers, fractions, or decimals and describe strategy used.

#### Basic Facts

- Demonstrate automaticity with multiplication facts to 10 x 10 and proficiency with related division facts.

#### Measurement and Reference Frames

- Determine the length and perimeter of polygons to the nearest  $\frac{1}{4}$  inch or  $\frac{1}{2}$  centimeter.
- Estimate length and size of angles.
- Determine area and perimeter of regular and irregular shape.
- Use ordered pairs to name, locate, and plot points in the first quadrant of a coordinate grid.

#### Algebra

- Write expressions and number sentences to model number stories.
- Evaluate numeric expressions containing grouping symbols.
- Insert grouping symbols to make number sentences true.
- Use words and symbols to write rules for functions.

- Apply the Distributive Property to the partial-products algorithm for multiplication.

### Geometry

- Identify, draw, and describe points, intersecting lines, parallel line lines, rays, and right, acute, and obtuse angles.
- Describe, compare, and classify plane and solid figures, including polygons, circles, spheres, cylinders, rectangular prisms, cones, cubes, and pyramids, using appropriate geometric vocabulary.
- Identify and describe reflections, translations and rotations.

### Data and Probability

- Use maximum, minimum, range, mode, median and graphs to answer questions, draw conclusions, and make predictions.
- Collect and organize data in charts, tables, bar graphs, line plots and line graphs.
- Predict the outcome of probability experiments and test the predictions using manipulatives.
- Express probability of an event as a fraction.

### Problem Solving

- Apply knowledge of grade level mathematics and problem solving strategies to solve novel multi-step problems.
- Communicate problem solving process orally and in writing.

## GRADE 5

### Number Sense

- Read, write whole numbers and decimals and identify place value of each digit.
- Use expanded notation to represent whole numbers and decimals.
- Solve problems involving percents and discounts.
- Represent numbers in prime factor form.
- Convert between fractions, mixed numbers, decimals and percents.
- Compare and order fractions and mixed numbers.

### Operations

- Use mental math, paper-and-pencil algorithms, and calculators to solve problems involving addition, subtraction, multiplication, and division of whole numbers, and decimals.
- Use mental math, paper-and-pencil, and calculators to solve problems involving addition and subtraction of signed numbers.
- Describe strategies used to compute with whole numbers, fractions, and decimals.
- Make reasonable estimates for problems containing whole numbers, fractions, or decimals and describe strategy used.
- Solve problems involving ratios of parts of a set to the whole set.

### Basic Facts

- Demonstrate automaticity with multiplication facts to 10 x 10 and proficiency with division facts and fact extensions.

### Measurement and Reference Frames

- Measure length to the nearest  $\frac{1}{8}$  inch and millimeter.
- Measure, estimate and draw angles.
- Find the area and perimeter of polygons and circles and the volume of a prism.
- Describe relationship among U.S. customary units of length and among metric units of length as well as U.S. customary units of capacity.
- Use ordered pairs of numbers to name, locate, and plot points in all four quadrant of a coordinate grid.

#### Algebra

- Represent functions using words, symbols, tables, and graphs and use the representations to solve problems.
- Use variables to write and solve open sentences.
- Use order of operations including grouping symbols to make number sentences true.
- Describe and apply properties of arithmetic such as Distributive, Associative, Commutative, Identity, etc.

#### Geometry

- Identify, draw, name, describe and compare angles.
- Use properties of vertical and supplementary angles and sums of the angles in triangles and quadrangles to determine missing measures.
- Identify congruent figures and describe their properties.
- Identify, describe, and sketch examples of reflections, translations, and rotations.

#### Data and Probability

- Use maximum, minimum, range, mode, median, mean, and graphs to answer questions, draw conclusions, and make predictions.
- Collect and represent data in bar, line, and circle graphs.
- Predict the outcome of experiments, test predictions, and summarize results.
- Determine theoretical probability and compare with experimental results.
- Use probability to predict future events.
- Express probability of an event as a fraction, decimal, or percent.

#### Problem Solving

- Apply knowledge of grade level mathematics and problem solving strategies to solve novel multi-step problems.
- Communicate problem solving process orally and in writing.

#### GRADE 6

Hadley's Math program is designed to meet students where they are and prepare them to succeed in high school Math. Hadley students are placed appropriately using a combination of tests, classroom performance and teacher recommendations. All sixth grade students will apply mathematical knowledge to problem solve, communicate thinking, apply various strategies and use technology tools appropriately. The units of study are identified below for each of the courses taught in sixth grade:

**Course 1:** Number Theory, Fractions, Decimals and Percents, Introduction to Algebra, Integers, Geometry, Area, Perimeter and Measurement, Ratios and Proportions, Data, Probability and Statistics.

**Course 2:** Large and Small Numbers, Ratios, Proportions and Percents, Algebra, Geometry, Data Analysis and Probability.  
Pre-Algebra: Number Sense, Ratio, Proportions and Percents, Algebra, Measurement, Geometry, Data Analysis and Probability.

### GRADE 7

Hadley's Math program is designed to meet students where they are and prepare them to succeed in high school Math. Hadley students are placed appropriately using a combination of tests, classroom performance and teacher recommendations. All seventh grade students will apply mathematical knowledge to problem solve, communicate thinking, apply various strategies and use technology tools appropriately. The units of study are identified below for each of the courses taught in seventh grade.

**Course 2:** Large and Small Numbers, Ratios, Proportions and Percents, Algebra, Geometry, Data Analysis, Probability.  
Pre-Algebra: Number Sense, Ratio, Proportions and Percents, Algebra, Measurement, Geometry, Data Analysis, Probability.

**Algebra:** Pre-Algebra Review, Variables and Equations, Linear Equations and Inequalities, Systems of Equations, Exponential Equations, Polynomials,

Quadratic Equations, Rational and Radical Expressions, Equations.

### GRADE 8

Hadley's Math program is designed to meet students where they are and prepare them to succeed in high school. Hadley students are placed appropriately using a combination of tests, classroom performance and teacher recommendations. All eighth grade students will apply mathematical knowledge to problem solve, communicate thinking, apply various strategies and use technology tools appropriately. Following are the courses taught in eighth grade.

**Pre-Algebra:** Number Sense, Ratio, Proportions and Percents, Algebra, Measurement, Geometry, Data Analysis and Probability.

**Algebra:** Pre-Algebra Review, Variables and Equations, Linear Equations and Inequalities, Systems of Equations, Exponential Equations, Polynomials, Quadratic Equations, Rational and Radical Expressions, and Equations.

**Geometry:** Geometric Systems, Proof Strategies, Similarity, Circles, Lines, Line Segments and Planes, Three-Dimensional Figures, Angles and Polygons, and Geometry Application.