

# Readington Township Public Schools

## Grade 3 Honors Math

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## I. OVERVIEW

Readington Township Public Schools' K-5 mathematics curriculum provides students with a strong foundation in mathematics content while promoting and instilling the skills of problem solving, communication in mathematics, making mathematical connections, and reasoning. Throughout the delivery of the K-5 mathematics program, various tools and technology are employed, including manipulatives, calculators, software, apps, videos, websites, and computing devices (computers, tablets, smart phones, interactive whiteboards, etc.). A strong focus of the program is on promoting high levels of mathematical thought through experiences which extend beyond traditional computation.

The Third Grade Honors course is a full-year course designed to provide advanced level mathematics instruction to select students who exhibit a demonstrated need to increase content knowledge in mathematics while accelerating the pace of instruction. The course was created with the goal of further developing strong, cogent mathematical thinking, and independent mathematical problem solving skills.

The program is directly correlated to the third and fourth grade New Jersey Student Learning Standards (NJSLS), and is designed to cover such topics as Operations and Algebraic Thinking, Number and Operations in Base Ten and with fractions, Measurement and Data, Geometry, and Mathematical Practices. Instruction fostering critical thinking and multiple strategies to solve complex problems is woven throughout the lessons. As per the NJSLS guidelines, instructional time is focused on developing fluency with multi-digit multiplication and division, developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers, as well as understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

## II. STUDENT OUTCOMES (Linked to New Jersey Student Learning Standards for Mathematics)

[NJSLS Grade 3 Mathematics](#)

[NJSLS Grade 4 Mathematics](#)

### Operations and Algebraic Thinking

- Represent and solve problems involving multiplication and division.
- Use the four operations with whole numbers to solve problems.
- Understand properties of multiplication and the relationship between multiplication and division.
- Gain familiarity with factors and multiples.
- Generate and analyze (mathematical) patterns.

### Number and Operations in Base Ten

- Generalize place value understanding for multi-digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

### Number and Operations—Fractions

- Develop understanding of fractions as numbers.
- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
- Understand decimal notation for fractions, and compare decimal fractions.

### Measurement and Data

- Solve problems involving estimation, measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.
- Geometric measurement: understand concepts of angle and measure angles.

- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

## **Geometry**

- Reason with shapes and their attributes.
- Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

## **Mathematical Practices**

- 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

## **III. ESSENTIAL QUESTIONS AND CONTENT OPERATIONS AND ALGEBRAIC THINKING**

### **Foundations in Multiplication**

- How are multiplication and addition related?
- How can patterns and models help me to understand and represent basic multiplication?
- How can I relate what I know about skip counting to help me learn the multiples of 2,5,10?

### **Multi-Digit Multiplication**

- What are some strategies for multiplying large numbers and how do they work?
- What makes one strategy or algorithm better than another?
- How does place value affect the accuracy of an estimate?
- What information do I need to know to solve a problem?

### **Division**

- How are multiplication and division related?
- How can I use what I know about repeated subtraction, equal sharing, and forming equal groups to solve division problems?
- How can I use the relationship between multiplication and division to learn my basic facts?
- How can patterns and modelling help me to understand and represent basic division facts?

### **Equations, Word Problems, Factors and Prime Numbers**

- What information and strategies would you use to solve a multi-step word problem?
- When should you use mental computation?
- How do you know if a number is divisible by 2, 3, 5, and 10?
- How can multiples be used to solve problems?
- How can a number be broken down into its smallest factors?
- How do you find the prime factors and multiples of a number?
- How does my knowledge about multiplication facts help me to solve problems?
- What are key words and how do they give me clues to solve a problem?
- What are the different strategies I can use to organize information in a complex, multi-step word problem?
- What is the most appropriate way of communicating a mathematical idea in a particular situation?
- How can I explain my thinking in a clear, concise response?

## **NUMBERS AND OPERATIONS IN BASE TEN**

### **Using Place Value to solve Multi-Digit Addition and Subtraction Problems**

- How can place value models help represent different numbers?
- How do place value models represent the procedures of a standard algorithm?
- How can I use what I know about number relationships to develop efficient strategies for adding/subtracting multi-digit numbers?

- What makes a good estimate?
- Why is rounding used and what are some strategies I can use to round accurately?
- How can I use models, words and expanded formats to order and compare numbers?
- What are variables and when should I use them?

## **NUMER AND OPERATIONS - FRACTIONS**

### **Basic Fractions**

- Where do I find fractions in my life?
- What does whole mean?
- What are the parts of a fraction and what do they represent?
- What does it mean to have equivalent fractions?
- How can I know if one fraction has more value than another?
- What is a good representation of adding and subtracting fractions with the same denominator?
- How do I identify and record the fraction of a whole or group?
- How do I use concrete materials and drawings to understand and show understanding of fractions?
- How do I explain the meaning of a fraction and its numerator and denominator, and use my understanding to represent values and solve problems?

### **Advanced Fractions and Decimals**

- How are fractions and decimals related?
- How does decimal notation and place value work?
- Why is place value so important in numbers with decimals?
- How can you use models such as a number line to order and compare decimals?
- How do I compare and order whole numbers, fractions and decimals through hundredths?
- How can decimals be rounded to the nearest whole number?
- How do you identify and write equivalent decimals and fractions?
- How can models be used to compute fractions with like and unlike denominators?
- How can models help us understand the addition and subtraction of decimals?
- How many ways can we use models to determine and compare equivalent fractions?
- How are common and decimal fractions alike and different?
- What strategies can be used to solve estimation problems with common and decimal fractions?
- What are some strategies I can use to compare decimals and fractions?
- How can I make and use a line plot to represent data involving fractions?
- What are some methods for carrying out operations with fractions and decimals?

## **MEASUREMENT AND DATA**

### **Measurement**

- What am I measuring when I measure an angle?
- Why doesn't the measure of the angle change as I move along the rays of the angle?
- Why is it helpful to classify things like angles or shapes?
- How do I use weight and measurement in my life?
- What tools and units are used to measure?
- How are the units of measure within a standard system related?
- How do I decide which unit of measurement to use?
- How could estimation help with measurement?
- How do I choose the appropriate tool and unit when measuring?

### **Perimeter, and Area and Polygons**

- How can patterns be used to determine standard formulas for area and perimeter?
- When would do people use perimeter and area in real life?
- How do you find perimeter, area, and volume of geometric figures?
- How are linear units different than square units?
- Why do shapes with the same perimeter have different areas?

### **Pictographs, bar graphs, and Line Plots**

- When solving multi-step word problems using charts, tables, and graphs, how can you tell if the information is sufficient?
- How can you collect, organize, and display data?
- How do you interpret the data you have collected?
- How do charts, tables, and graphs help you interpret data?
- How does the type of data influence the choice of graph?
- What kinds of questions can be answered using different data displays?
- In what ways can sets of data be represented by statistical measures?
- What data display is appropriate for a given set of data?
- Why are graphs helpful?
- What is the purpose of using line plots and how are they constructed?
- How can range, mean, median, and mode be computed and compared?

## **GEOMETRY**

### **Reason with shapes and their attributes**

- How can I identify and construct rays, angles, lines and points?
- What is the difference between a point, ray, line, line segment?
- How are angles measured?
- How are angles and sides used to classify triangles?
- What are some strategies I can use to find unknown angles in triangles?
- How can I demonstrate my understanding of parallel and perpendicular figures?
- How can I put shapes together and take them apart to form other shapes?

## **IV. STRATEGIES**

Students will be actively involved in daily lessons by means of guided and independent practice, cooperative learning activities, as well as group and individual projects. The Third Grade Honors Mathematics curriculum incorporates traditional approaches, real world problem situations, modeling, conceptual language and mathematical discourse in addition to problem-based learning, including hands-on activities, manipulatives, projects, and other approaches determined by the teacher. Students will also utilize the systems and tools of technology in order to solve problems appropriate to each unit of study. Activities that incorporate technology are peppered throughout the course. It is a rigorous program where students are challenged to stretch their thinking and optimize their achievement.

There is an emphasis on solving complex, multi-step problems. Students will understand the mathematical concepts in each problem and choose the appropriate path in order to calculate correct solutions. Students will be prompted either in group or individual problem-solving situations to use a variety of mathematical reasoning strategies to find multiple means to arrive at solutions. They will learn to apply prior knowledge to develop and in-depth understanding of the major mathematical ideas outlined in the curriculum. Additionally, the third graders will be trained to articulate their thought processes in words, drawings, and discussion.

## **V. EVALUATION**

- Teacher Observations
- Classroom assignments
- Homework Assignments
- Student Projects
- Independent Work
- Unit Tests and Quizzes
- End of the Year Test

## VI. REQUIRED RESOURCES

*Math Expressions Common Core Grade 3*, by Dr. Karen Fuson; Published by Houghton Mifflin Harcourt  
*Math Expressions Common Core Grade 4*, by Dr. Karen Fuson; Published by Houghton Mifflin Harcourt

### Supplemental Materials

IXL

Brain Pop

Reflex Math

[Think Central](#)

While our main resources include the *Math Expressions Common Core* Grades 3 and 4 books, class books and assessment guides, we also supplement with various activities, web sites and online learning sites. Some examples are Learn Zillion, Multiplication.com, David Larson's Math, and Singapore Math.

## VII. SCOPE AND SEQUENCE

### OPERATIONS AND ALGEBRAIC THINKING

#### Foundations in Multiplication (10 days)

- Making groups and arrays
- Strategies for multiplying by 4 and 9
- Building Fluency with 2-5's, 9's and 10's
- Problem solving and multiplication games
- Strategies for multiplying by 6 and 8
- Word problems and equations
- Strategies for multiplying by 7 and Understanding Square Numbers
- Strategies for multiplying by 7 and Understanding Square Numbers

#### Multi-Digit Multiplication (9 days)

- Introduce multi-digit multiplication using Area Model
- Estimating products
- Algebraic Notation Method
- Comparing Methods of One digit by two digit multiplication
- One digit by 3 and 4-digit multiplication using the area model and algebraic model
- Two-by-two digit multiplication
- Estimating products and Focus on mathematical practices

#### Division (10 days)

- The Meaning of Division
- Introduce Remainders, Divide with 0's
- Explain 3 digit quotients
- Just-Under Quotient Digits and Estimate to check quotients
- Making sense of Remainders
- Mixed problems solving
- Focus Mathematical Practices

#### Equations, Word Problems, Factors and Prime Numbers (17 Days)

- Using properties and algebraic notation to solve problems
- Solving problems with variables.
- Solving word problems involving multiplicative comparison
- Order of Operations
- Solving word problems using order of operations
- Interpret pictographs and bar graphs and represent thinking with equations
- Solving two step word problems
- Factors and Prime Numbers
- Analyzing Patterns

## **NUMBER AND OPERATIONS IN BASE TEN**

### **Using Place Value to solve Multi-Digit Addition and Subtraction Problems (10 days)**

- Place Value Patterns and numbers to the millions
- Comparing and Rounding Large Numbers
- New groups addition and estimation
- Independent Day- Quiz and reinforcement activities
- Subtraction, ungrouping and relationships with addition

## **NUMBER AND OPERATIONS- FRACTIONS**

### **Basic Fractions (10 days)**

- Understanding and modeling fractions
- Comparing fractions
- Equivalent fractions
- Problem solving with fraction by a whole number
- Mixed practice and problem solving

### **Advanced Fractions and Decimals (10 days)**

- Adding basic fractions to one and comparing fractions
- Adding and subtracting fractions with like denominators
- Mixed numbers and improper fractions
- Practice with fractions and mixed numbers
- Independent Day: Independent practice with fractions, improper fractions, and mixed numbers
- Multiplying a fraction by a whole number
- Mixed practice and problem solving

## **MEASUREMENT AND DATA**

### **Measurement (15 days)**

- Introduce Measurement
- The Metric system of measurement with length
- Metric Measures of Liquid Volume and Mass
- Time to the minute and Elapsed time
- Solving problems involving metric units of measure and elapsed time.
- Metric conversion activity/Movie theater elapsed time
- Intro Customary Measures of Weight
- Customary Measures of Volume
- Customary Measures of Length
- Perimeter and Area

### **Perimeter and Area (7 Days)**

- Perimeter and Area
- Comparing Areas and Perimeters
- Decomposing Rectangles
- Area and perimeter word problems

### **Pictographs, bar graphs, and Line Plots (6 days)**

- Analyzing and creating Data Displays, optional extension range, mean median and mode.

## **GEOMETRY**

### **Polygons (7 days)**

- Basic angles (supplement parallel and perpendicular lines) and triangles, building quadrilaterals from triangles
- Naming and building Polygons
- Attributes of Quadrilaterals

*N.B.: Additional days utilized for testing (NWEA, CogAT, SGOs, NJ ASK, Beginning of Year assessment, End of Year assessment)*