Readington Township Public Schools

Grade 3 Honors Math

Authored by: Joyce McGibbon and Lisa Schmidt

Reviewed by: Erik Yates
Supervisor of Math, Science, and Technology

Readington Township Public Schools
Whitehouse Station, NJ 08889
www.readington.k12.nj.us

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 in 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 Common Core Curriculum State Standards (CCCSS), 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 CCCS 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 (Grade 3 Common Core Math and Grade 4 Common Core Math)

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
Unit 1 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 is 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?

Unit 2: 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?

Unit 3: Multi-Digit Multiplication (Use 4th grade curriculum)
- 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 in do I need to know to solve a problem?

Unit 4: 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?

Unit 5: 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?

Unit 6: 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?

Unit 7: 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?

Unit 8: 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?

Unit 9: 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?

Unit 10: Advanced Fractions and Decimals (Use 4th grade curriculum)
- 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?

Unit 11: Geometry
- 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
Grade 3 Unpacked Standards Document: [Click here to access the document](#).
Grade 4 Unpacked Standards Document: [Click here to access the document](#).
IXL
Brain Pop
Reflex Math

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
Unit 1 Using Place Value to solve Multi-Digit Addition and Subtraction Problems (10 days)
Day 1: Place Value Patterns and numbers to the millions
Day 2: Comparing and Rounding Large Numbers
Day 3 & 4: New groups addition and estimation
Day 5 - Independent Day- Quiz and reinforcement activities
Day 6 &7- Subtraction, ungrouping and relationships with addition
Day 8 &9- Problem Solving and Review
Day 10 - Independent Day - Unit Test and Reinforcement activities

Unit 2: Foundations in Multiplication (10 days)
Day 1: Making groups and arrays
Day 2: Strategies for multiplying by 4 and 9
Day 3: Building Fluency with 2-5's, 9's and 10's
Day 4: Introduce multiplication.com online self-assessment procedures. Problem solving and multiplication games Unit 1
Day 5: Independent Practice Day Multiplication quiz and writing assessment. Write and explain word problem. Online multiplication.com activity
Day 6: Strategies for multiplying by 6 and 8
Day 7: Word problems and equations

Day 8: Strategies for multiplying by 7 and Understanding Square Numbers
Day 9: Strategies for multiplying by 7 and Understanding Square Numbers (Unit 2, Lessons 5 &6)
Day 10: Independent Day- Unit Test for 3ʳᵈ grade Units 1 & 2. Follow-up online multiplication.com activity

Unit 3: Multi-Digit Multiplication (9 days)
Day 1: Introduce multi-digit multiplication using Area Model
Day 2: Estimating products
Day 3: Algebraic Notation Method
Day 4: Comparing Methods of One digit by two digit multiplication
Day 5: Independent Day- Assessment (quiz) and practice
Day 6: One digit by 3 and 4-digit multiplication using the area model and algebraic model
Day 7: Two-by -two digit multiplication
Day 8: Estimating products and Focus on mathematical practices
Day 9: Independent Day- 4ᵗʰ Grade Unit 2 Test

Unit 4: Division (10 days)
Day 1: The Meaning of Division
Day 2 &3: Introduce Remainders, Divide with 0's
Day 4: Explain 3 digit quotients
Day 5: Independent Day- Assessment and practice
Day 6: Just-Under Quotient Digits and Estimate to check quotients
Day 7: Making sense of Remainders
Day 8: Mixed problems solving
Day 9: Focus Mathematical Practices
Day 10: Independent Day- Modified 4ᵗʰ Grade Unit 3 test

Unit 5: Equations, Word Problems, Factors and Prime Numbers (17 Days)
Day 1: Using properties and algebraic notation to solve problems
Day 2 & 3: Solving problems with variables.
Day 4: Solving word problems involving multiplicative comparison
Day 5: Independent Day – solving real world problems
Day 6 & 7: Order of Operations
Day 8: Solving word problems using order of operations
Day 9: Interpret pictographs and bar graphs and represent thinking with equations
Day 10: Independent Day – pictographs, bar graphs, order of operations
Day 11 & 12: Solving two step word problems
Days 13 & 14: Factors and Pr1me Numbers
Day 15: Analyzing Patterns
Day 16: Review
Day 17: End of Unit Test

Unit 6: Measurement (15 days)
Day 1: Introduce Measurement
Days 2: The Metric system of measurement with length
Day 3 & 4: Metric Measures of Liquid Volume and Mass
Day 5: Independent Day- Independent Practice with the metric system
Day 6 & 7: Time to the minute and Elapsed time
Day 8 & 9: Solving problems involving metric units of measure and elapsed time.

Day 10: Independent Day- Metric conversion activity/Movie theater elapsed time
Day 11: Intro Customary Measures of Weight
Day 12: Customary Measures of Volume
Day 13: Customary Measures of Length
Day 14: Perimeter and Area
Day 15: Independent Day- Independent project: Using Tangrams to find Area

Unit 7: Perimeter, and Area and Polygons (14 Days)
Day 1: Basic angles (supplement parallel and perpendicular lines) and triangles, building quadrilaterals from triangles
Day 2: Naming and building Polygons
Day 3 and 4: Attributes of Quadrilaterals
Day 5: Independent Day: Project Based Learning- Quadrilaterals
Day 6: Perimeter and Area:
Day 7: Comparing Areas and Perimeters
Day 8: Decomposing Rectangles
Day 9: Area and perimeter word problems
Day 10:   Independent Day: Real World Problems – Area and Perimeter
Day 11: Review for Unit 7 test
Day 12:   Unit 7 test (3rd grade End of Unit 6 test)

Unit 8: Pictographs, bar graphs, and Line Plots (6 days)
Days 1-4: Analyzing and creating Data Displays, optional extension range, mean median and mode.
Day 5: Review 3rd Grade Unit 3
Day 6: Unit 8 test: 3rd Grade End of Unit 3 test

Unit 9: Basic Fractions (10 days)
Day 1: Understanding and modeling fractions
Day 2: Fractions on a number line
Day 3 and 4: Comparing fractions
Day 5:   Independent Day: Independent practice fractions modeling and comparing fractions
Day 6: Equivalent fractions
Day 7: Problem solving with fraction by a whole number (3rd Grade Unit 6 Lessons 8)
Day 8: Mixed practice and problem solving (3rd Grade Unit 6 Lesson 9 and 10)
Day 9: Review Unit 9
Day 10: Unit 9 test (3rd Grade Unit 7 End of Unit Test)

Unit 10: Advanced Fractions and Decimals (10 days)
Day 1: Adding basic fractions to one and comparing fractions
Day 2: Adding and subtracting fractions with like denominators
Day 3: Mixed numbers and improper fractions
Day 4: Practice with fractions and mixed numbers
Day 5: Independent Day: Independent practice with fractions, improper fractions, and mixed numbers
Day 6: Multiplying a fraction by a whole number
Day 7: Mixed practice and problem solving
Day 8: Real world application of problem solving with fractions and mixed numbers
Day 9: Review Unit 10
Day 10: Unit 10 test

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