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 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 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 in 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 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?

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. ACCOMMODATIONS

- **Accommodations and Modification Addendum**

VI. ASSESSMENTS

- **Formative**
  - Independent student work
  - Exit cards
  - Lesson Quizzes
  - Teacher Observation
  - Class Participation
  - Homework
  - Anecdotal Notes

- **Summative**
  - Mid-Unit Test
  - Unit Test

- **Alternative**
  - Google slide presentations on unit vocabulary/content
  - Math Journal/interactive student notebook
  - Student Designed Projects
  - Self Assessment

- **Benchmark**
  - I-Ready Diagnostic (given September, March, and June)
  - Reflex Math assessments (Fall, Winter, June)

- Performance Tasks

VII. MATERIALS

- **Core**
  - Ready Classroom Mathematics, Curriculum Associates, LLC
    - Teacher Manual Volumes 1 & 2
    - Student Books Volumes 1 & 2
  - Ready Classroom Teacher Toolbox

- **Supplemental Resources**
  - **Technology**
    - Brain Pop
    - IXL
    - Learning Farm
    - mathisfun.com
    - mathplayground.com
    - funbrain.com
    - superteacherworksheets.com
    - commoncoresheets.com

VIII. 21ST CENTURY SKILLS

- **Career Ready Practices**
  - **CRP3.** Attend to personal health and financial well-being.
    3.NBT A. Use place value understanding and properties of operations to perform multi-digit arithmetic.**1.** Use place value understanding to round whole numbers to the nearest 10 or 100. **2.** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
    Activity: Students will be given one million dollars to spend on items such as college education/trade school, vacation, home purchase, car purchase, pet, charitable donations, clothing, etc. They are to subtract the researched costs of the items to determine who has the lowest total remaining in the class.
  - **CRP8** Utilize critical thinking to make sense of problems and persevere in solving them.
    4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
    Activity: Students will be able to complete page 209-212 in Ready Math Grade 4 book. In this activity students will be solving multi-step word problems that have them using equations and deciding what to do with remainders. Students will also have to show how their answer is reasonable.

- **9.2 Career Awareness, Exploration, and Preparation**
  - **9.2.4.A.2**- Identify various life roles and civic and work-related activities in the school, home, and community.
    3.MD C.5- Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.b. A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.
    Activity: Have students design a dream home (architect, painter, carpenter, designer, engineer, homeowner, accountant) on graph paper, calculating the areas of each room in the house to find its total area. Calculate the areas of rooms to identify how much carpet, tile, wallpaper, paint is needed to decorate the rooms in the house.
  - **9.2.4.A.4** Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.
    4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.
    Activity: Students will complete Fourth Grade Ready Math Math In Action Unit 3 lesson on

page 350-353. In this activity students will pretend they work for a zoo and need to develop birdcages according to different criteria based on perimeter.

- **Technology**
  - **8.1.5.A.4** -Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
    3MD B.3 Represent and interpret data. 3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets
    Activity: Have students create various types of graphs (horizontal/vertical bar graphs, pictographs, pie charts, and line plots), using google sheets to represent collection of data (Favorite Dr. Seuss book.)
  - **8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems
    4.G.A.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
    Activity: Students will be able to use IXL and/ or i-Ready to practice classifying two-dimensional figures and triangles.

V. **PACING**

Number And Operations In Base Ten

Three-Digit Numbers (25 days)

- Understand Place Value and Rounding
- Addition and Subtraction with Whole Numbers

Interdisciplinary Connections:

- ***ELA/Math***
  RI.3.1. Ask and answer questions, and make relevant connections to demonstrate understanding of a text, referring explicitly to the text as the basis or the answers.
  3.NBT.A.1. Use place value understanding to round whole numbers to the nearest 10 or 100.
  Activity: Read, *Sir Cumference and All the King's Tens* by Cindy Neuschwander to introduce the concept of rounding using the understanding of place value. Have the students use dominoes to place on a place value chart. Add the dots on the dominoes to create a digit in each place value on the chart; hundreds, tens and ones. The students will then round the number they created to the nearest hundred and ten.
- ***Math/Science***
  4-ESS2-1 Analyze and interpret data from maps to describe patterns of Earth's features.
  4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.
  Activity: Students will be learning about topographical maps. Students will learn how to read and draw one. Students will understand what the interval measurements mean and be able to calculate the distance between two intervals by using subtraction.

Operations And Algebraic Thinking

Multiplication and Division (40 days)

- Meanings of Multiplication and Division
- Use Place Value to Multiply
- Understand Connection Between Multiplication and Division
- Multiply and Solve Multi-Digit Numbers
- Solve One and Two-Step Word Problems

Interdisciplinary Connections:

- ***ELA/Math***
  RI.3.1. Ask and answer questions, and make relevant connections to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
  3.OA A.1. Interpret products of whole numbers

Activity: Read, Amanda Bean's Amazing Dream by Cindy Neuschwander to introduce the concept of multiplication. Have the students begin a multiplication flip book to model the different ways to visually show multiplication.

- ***Math/ELA***

  RI.4.1. Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.

  4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
  Activity: Students will be able to learn how to interpret remainders in division problems. Students will complete division problems in lesson 15 session 2 of the Ready Classroom Grade 4 math program. As they are doing these problems they will have to interpret what the remainder means and how to use it in the final answer.

- ***ELA/Math***

  RI.3.1. Ask and answer questions, and make relevant connections to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

  3.OA A.1. Interpret products of whole numbers

  Activity: Read, Amanda Bean's Amazing Dream by Cindy Neuschwander to introduce the concept of multiplication. Have the students begin a multiplication flipbook to model the different ways to visually show multiplication.

Measurement And Data
Area and Scaled Graphs (20 days)

- Understand Area
- Multiply to Find Area
- Read and Create Scaled Graphs
- Measure Length and Plot Data

Interdisciplinary Connections:

- ***Science/Math***

  3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

  3.MD.B.4 Represent and interpret data. 4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.
  Activity: Students will measure force of motion using magnets. They will look for patterns in data to predict how far the magnetic field extends around two magnets. Students collect data for one and three magnets, measuring the distance at which paper clips are attracted. They use those data to predict how far the magnetic field extends around two magnets. Students use and discuss science practices in the context of investigating magnetic fields.

- ***Math/Social Studies***

  4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

  6.1.4.C.10 Explain the role of money, savings, debt, and investment in individuals' lives.
  Activity: Students will be able to learn about the role of money in their lives and discuss how budgeting and saving money can help them. Students will be able to solve problems using money that demonstrates their understanding of budgeting.

Measurement (20 days)

- Solve Problems with Time and Money
- Solve Problems about Length, Liquid Volume, Mass, and Weight
- Identify and Measure Angles
- Add and Subtract with Angles

Interdisciplinary Connections:

- ***Science/Math***

  3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

  3 MDB4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.

  Activity: Students will design and test carts to see which type of cart rolls farther down a ramp. Students will use tape measures to measure the distance of each roll. Students will make modifications to their carts to improve on the cart's ability to travel.

- ***Math/ELA***

  4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

  RI.4.4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

  Activity: Students will solve mathematical word problems. During this activity students will have to use the vocabulary in the problems to determine what operation and unit to use.

Number And Operations-Fractions
Explore Fractions (50 days)

- Fraction Concepts
- Equivalent Fractions
- Comparing Fraction
- Add and Subtract Fractions
- Add and Subtract Mixed Numbers
- Multiply Fractions
- Relate Decimals and Fractions
- Compare Decimals

Interdisciplinary Connections:

- ***Science/Math***

  3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

  3.NF.A.2. Develop understanding of fractions as numbers.

  Activity: Students examine germinated seeds to determine similarities and differences in the way the organisms grow. They set up a hydroponic garden to observe the life cycle of a bean plant. Students go outdoors to investigate the roots and shoots of various plants. They use tools to dig up plants and compare the structures above ground to those below ground. Growth should be measured and recorded in lengths to the nearest quarter inch.

- ***Math/ELA***

  W.4.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

  4.NF.A.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

  Activity: On P. 380 in the Ready Classroom Grade 4 book students will be able to reflect on the question that if 2 fractions of a granola bar are equivalent to each other will they also be equivalent if the 2 pieces come from different size granola bars.

Geometry
Shapes, Perimeter, and Area (28 days)

- Categories of Shapes

- Classify two-dimensional figures
- Fine Area and Perimeter
- Identify points, line segments, rays, and perpendicular and parallel lines
- Draw and identify lines of symmetry

Interdisciplinary Connections:

- ***ELA/Math***

  NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

  3.G.A.1 Reason with shapes and their attributes. 1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

  Activity: Read **The Greedy Triangle** by Marilyn Burns. Create a worksheet that uses the shapes encountered in the story and incorporates perimeter. You may add a bonus section for the area of a quadrilateral. On the back, students will draw their own Greedy Triangle, give it side lengths, and find its perimeter based on the side lengths they decided upon. They will then draw a picture of their triangle doing its favorite activity and write a short description of what they have drawn.

- ***Math/ELA***

  RL.4.7. Make connections between specific descriptions and directions in a text and a visual or oral representation of the text.

  4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

  Activity: In lesson 33 of the Ready Classroom Grade 4 math program students will be asked to classify shapes according to specific attributes they have. These attributes include types of lines and types of shapes. Students will have to make the connection between the written description and the visual representation.