

# **Fair Lawn Public Schools**

**Fair Lawn, NJ**

**Grade 3  
Math**

**Adopted August**

**2017**

**Revised August 2017  
Developed August 2011**

Grade 3 Mathematics is aligned to the Student Learning Standards and will expand upon topics learned in Grade 2 as well as prepare students for Grade 4 Mathematics.

**Grade 3 Math**

# **Fair Lawn School District**

## **Committee Credits Grade 3 Math Team**

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## Grade 3 Math

### I. Course Synopsis

In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

1. Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.
2. Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example,  $\frac{1}{2}$  of the paint in a small bucket could be less paint than  $\frac{1}{3}$  of the paint in a larger bucket, but  $\frac{1}{3}$  of a ribbon is longer than  $\frac{1}{5}$  of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.
3. Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.
4. Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

### II. Philosophy & Rationale

The mathematics curriculum is completely aligned to the Student Learning Standards for third grade. Third grade content required by the Student Learning Standards focuses on the

procedures, concepts, and applications in four critical areas. In Grade 3, instructional time should focus on the following areas:

#### Operations and Algebraic Thinking

- Represent and solve problems involving multiplication and division.
- Understand properties of multiplication and the relationship between multiplication and division.
- Multiply and divide within 100.
- Solve problems involving the four operations, and identify and explain patterns in arithmetic.

#### Number and Operations in Base Ten

- Use place value understanding and properties of operations to perform multi-digit arithmetic.

#### Number and Operations—Fractions

- Develop understanding of fractions as numbers.

#### Measurement and Data

- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- Represent and interpret data.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

#### Geometry

- Reason with shapes and their attributes.

As the content is taught, the Student Learning Standards mathematical practices are also woven in, helping to develop the attitudes and habits of mind of those who know and enjoy mathematics and use it effectively. The practices include:

- Problem solving
- Multiple representations
- Reasoning
- Mathematical modeling
- Tool use
- Communication

*The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly,*

*accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).*

**MATH.PRACTICE.MP1 - Make sense of problems and persevere in solving them.**

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

**MATH.PRACTICE.MP2 - Reason abstractly and quantitatively.**

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

**MATH.PRACTICE.MP3 - Construct viable arguments and critique the reasoning of others.**

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning

from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

**MATH.PRACTICE.MP4 - Model with mathematics.**

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

**MATH.PRACTICE.MP5 - Use appropriate tools strategically.**

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

**MATH.PRACTICE.MP6 - Attend to precision.**

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They

are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

**MATH.PRACTICE.MP7 - Look for and make use of structure.**

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see  $7 \times 8$  equals the well-remembered  $7 \times 5 + 7 \times 3$ , in preparation for learning about the distributive property. In the expression  $x^2 + 9x + 14$ , older students can see the 14 as  $2 \times 7$  and the 9 as  $2 + 7$ . They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see  $5 - 3(x - y)^2$  as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers  $x$  and  $y$ .

**MATH.PRACTICE.MP8 - Look for and express regularity in repeated reasoning.**

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation  $(y - 2)/(x - 1) = 3$ . Noticing the regularity in the way terms cancel when expanding  $(x - 1)(x + 1)$ ,  $(x - 1)(x^2 + x + 1)$ , and  $(x - 1)(x^3 + x^2 + x + 1)$  might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

### III. Scope & Sequence

Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
1.1 - 1.11	1.12 – 2.12	2.11 – 3.7	3.8 - 4.4	4.5 - 5.5	5.6 - 6.3	6.4 - 7.5	7.6 - 8.2	8.3 - 9.4	9.5 - 9.8

Grade 3 has 9 instructional units.  
Each unit is completed in approximately 3-5 weeks.

Unit	Name	Weeks	Topics
1	Math Tools, Time and Multiplication	Weeks 1-5	<ul style="list-style-type: none"> <li>• Number Grids</li> <li>• Introducing the <i>Student Reference Book</i></li> <li>• Tools for Mathematics</li> <li>• Number Lines and Rounding</li> <li>• Time</li> <li>• How Long is a Morning?</li> <li>• Scaled Bar Graphs</li> <li>• Multiplication Strategies</li> <li>• Introducing Division</li> <li>• Foundational Multiplication Facts</li> <li>• The Length-of-Day Project</li> <li>• Exploring Mass, Equal Shares, and Equal Groups</li> <li>• Measuring Mass</li> </ul>
2	Number Stories and Arrays	Weeks 6-9	<ul style="list-style-type: none"> <li>• Extended Facts: Addition and Subtraction</li> <li>• Number Stories</li> <li>• More Number Stories</li> <li>• Multistep Number Stories, Part 1</li> <li>• Multistep Number Stories, Part 2</li> <li>• Equal Groups</li> <li>• Multiplication Arrays</li> <li>• Picturing Division</li> <li>• Modeling Division</li> <li>• Playing <i>Division Arrays</i></li> <li>• Frames and Arrows</li> <li>• Exploring Fraction Circles, Liquid Volume, and Area</li> </ul>
3	Operations	Weeks 10-14	<ul style="list-style-type: none"> <li>• “What’s My Rule?”</li> <li>• Estimating Costs</li> </ul>

			<ul style="list-style-type: none"> <li>• Partial-Sums Addition</li> <li>• Column Addition</li> <li>• Counting-Up Subtraction</li> <li>• Expand-and-Trade Subtraction</li> <li>• Exploring Bar Graphs, Area, and Partitioning Rectangles</li> <li>• Scaled Picture Graphs</li> <li>• Exploring Multiplication Squares</li> <li>• The Commutative Property of Multiplication</li> <li>• Adding a Group</li> <li>• Subtracting a Group</li> <li>• Equivalent Names</li> </ul>
4	Measurement and Geometry	Weeks 15-18	<ul style="list-style-type: none"> <li>• Measuring with a Ruler</li> <li>• Application: Line Plots</li> <li>• Exploring Measures of Distance and Comparisons of Mass</li> <li>• Polygon Review</li> <li>• Special Quadrilaterals</li> <li>• Perimeter</li> <li>• Area and Perimeter</li> <li>• Area and Composite Units</li> <li>• Number Sentences for Area of Rectangles</li> <li>• Playing <i>The Area and Perimeter Game</i></li> <li>• Building a Rabbit Pen</li> <li>• Rectilinear Figures</li> </ul>
5	Fractions and Multiplication	Weeks 19-23	<ul style="list-style-type: none"> <li>• Exploring Equal Parts, Fractions of Different Wholes, and Area</li> <li>• Representing Fractions</li> <li>• Equivalent Fractions</li> <li>• Recognizing Helper Facts</li> <li>• Multiplication Facts Strategies</li> <li>• Patterns in Products</li> <li>• Finding Missing Factors</li> </ul>
6	More Operations	Weeks 24-28	<ul style="list-style-type: none"> <li>• Trade-First Subtraction</li> <li>• Playing <i>Baseball Multiplication</i></li> <li>• Taking Inventory of Known Facts Strategies</li> <li>• Fact Power and <i>Beat the Calculator</i></li> </ul>

			<ul style="list-style-type: none"> <li>• Exploring Geometry Problems, Measurement Date, and Polygons</li> <li>• Multiplication and Division Diagrams</li> <li>• Multiplication with Larger Factors</li> <li>• Number Sentences with Parentheses</li> <li>• Writing Number Stories</li> <li>• Order of Operations</li> <li>• Number Models for Two-Step Number Stories</li> </ul>
<b>7</b>	Fractions	Weeks 29-33	<ul style="list-style-type: none"> <li>• Liquid Volume</li> <li>• Exploring Arrays, Volume, and Equal Shares</li> <li>• Number Stories with Measure</li> <li>• Fraction Strips</li> <li>• Fractions on a Number Line</li> <li>• Comparing Fractions</li> <li>• Locating Fractions on a Number Lines</li> <li>• Justifying Fraction Comparisons</li> <li>• Fractions in Number Stories</li> <li>• Fractions of Collections</li> </ul>
<b>8</b>	Multiplication and Division	Weeks 34-38	<ul style="list-style-type: none"> <li>• Measuring to the Nearest <math>\frac{1}{4}</math> inch</li> <li>• Extended Facts: Multiplication and Division</li> <li>• Factors of Counting Numbers</li> <li>• Playing <i>Factor Bingo</i></li> <li>• Sharing Money</li> <li>• Exploring Number Lines, Fractions, and Area</li> <li>• Solid Shapes</li> </ul>
<b>9</b>	Multidigit Operations	Weeks 39-43	<ul style="list-style-type: none"> <li>• Playing <i>Product Pile-Up</i></li> <li>• Multiply and Divide with Multiples of 10</li> <li>• Using Mental Math to Multiply</li> <li>• Exploring Elapsed Time, Squares, and Bridges</li> <li>• Multidigit Multiplication</li> <li>• Packing Apples</li> <li>• The Length-of-Day Project, Revisited</li> </ul>

## IV. Unit Descriptions

### Unit 1: Math Tools, Time, and Multiplication

(Weeks 1 - 5)

#### Enduring Understanding

Children will recall how to use an variety of math tools to solve problems, tell time to the nearest minute, and use mathematical models to calculate elapsed time.

#### Essential Question(s)

1. How can I use math tools to solve problems and tell time to the nearest minute?
2. How can I use math models to calculate elapsed time?
3. How do mathematical models help me to solve problems and ask questions?

#### Learning Objectives

Students will be able to:

1. Use Number Grids patterns for computation
2. Explore the *Student Reference Book* and play *Number-Grid Difference*
3. Review and use a variety of math tools
4. Use open number lines to round numbers
5. Tell time to the nearest minute and calculate elapsed time
6. Interpret data on scaled bar graphs
7. Use drawings and number models to represent and solve multiplication
8. Learn and develop strategies for 2s, 5s, 10s facts
9. Calculate elapsed time
10. Compare masses and divide wholes and sets into equal shares
11. Estimate and measure masses of objects.

#### New Jersey Student Learning Standards

- **3.OA.1** Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as  $5 \times 7$ .
- **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities
- **3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division, or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
- **3.NBT.1** Use place value understanding to round whole numbers to the nearest 10 or 100.
- **3.NBT.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.

- **3.MD.1** Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to:*

1. Activities
  - a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts
  - e. Explorations: Exploring Mass, Equal Shares, and Equal Groups
  - f. Open Response and Reengagement Lesson: How Long is a Morning?
  - g. Unit 1 Progress Check and Open Response Assessment
  - h. Ongoing Assessment through Check Ins
  - i. Games: *Number-Grid Difference Game, Hit the Target, Spin and Round, and Multiplication Draw*
2. English Language Learners
  - a. Teach the slate routine with one-word signals and gestures. For example, LISTEN-Pull on one ear.
3. Special Education/504 Students
  - a. Have children use the Number-Grid Poster and partially cover with a stick-on note in a T or L shape pattern. Point and ask children to figure out which number is covered.
4. Gifted and Talented Students
  - a. Have children use a number grid to find the differences between pairs of 3-digit numbers. Then have children record their work.

### New Jersey Student Learning Standards— Standards 8, 9 and Career Readiness Practices

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

## **Unit 2: Number Stories and Arrays**

**(Weeks 6 - 9)**

### Enduring Understanding

Children will make sense of one- and two-step number stories involving all four arithmetic operations.

### Essential Question(s)

1. What is the number story asking?
2. How can I organize and represent my thinking?

### Learning Objectives

Students will be able to:

1. Use basic addition and subtraction facts to solve problems with larger numbers
2. Use diagrams or pictures to help solve number stories
3. Use situation diagrams to help solve number stories
4. Make sense of and solve two-step number stories.
5. Solve number stories using two operations
6. Solve problems involving multiples of equal groups and make sense of multiplying by 0 and 1
7. Solve array problems and play *Array Bingo*
8. Solve division number stories and learn about remainders
9. Explore even and odd number patterns and play *Division Arrays*
10. Review Frames-and-Arrows diagrams and solve problems using the four operations

#### New Jersey Student Learning Standards

- **3.OA.1** Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as  $5 \times 7$ .
- **3.OA.2** Interpret whole-number quotients of whole numbers, e.g., interpret  $56 \div 8$  as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe and/or represent a context in which a number of shares or a number of groups can be expressed as  $56 \div 8$ .
- **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities
- **3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division
- **3.OA.8** Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity.
- **3.NBT.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.

#### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to:*

1. Activities
  - a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts
  - e. Explorations: Fraction Circles, Liquid Volume, and Area
  - f. Open Response and Reengagement Lesson: Picturing Division

- g. Unit 2 Progress Check and Cumulative Review
  - h. Ongoing Assessment through Check Ins
  - i. Games: *Array Bingo, Salute!, Addition and Subtraction Top-it, and Division Arrays*
2. English Language Learners
    - a. Use a physical model to relate the terms to an everyday item, such as an extension cord.
  3. Special Education/504 Students
    - a. Have students play games that have been previously taught that practice addition and subtraction facts (*Addition Top-It, Subtraction Top-It, Salute!*)
  4. Gifted and Talented Students
    - a. Have children solve high-decade fact extensions mentally. Ask partners to take turns posing a basic addition or subtraction fact, followed by extensions with larger numbers.

#### New Jersey Student Learning Standards– Standards 8, 9 and Career Readiness Practices

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

### **Unit 3: Operations**

**(Weeks 10-14)**

#### Enduring Understanding

Children use place value to develop and practice strategies for addition and subtraction of 2- and 3-digit numbers. They represent multiplication using arrays, and use these representations to develop strategies for solving multiplication facts.

#### Essential Question(s)

1. What do the numbers used in the problem represent?
2. What ideas that have we learned before were useful in solving this problem?

#### Learning Objectives

Students will be able to

1. Find missing numbers and rules in “What’s My Rule?” tables.
2. Make estimates for problems they solve using mental math and examine other’s explanations using a rubric as a guide, and then revise their work.
3. Use partial-sums addition to add 2- and 3-digit numbers
4. Be introduced to column addition
5. Review counting-up subtraction.
6. Use expand and trade to solve subtraction problems.
7. Explore different ways to measure area, partition rectangles, and represent data on a scaled bar graph.
8. Create scaled picture graphs.
9. Discover the multiplication squares and begin a fact strategy journal.
10. Learn about the turn-around rule for multiplication

11. Develop the adding-a-group strategy for solving unknown multiplication facts.
12. Develop the subtracting-a-group strategy.
13. Use all four operations to generate equivalent names for numbers.

#### New Jersey Student Learning Standards

- **3.OA.1** Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as  $5 \times 7$ .
- **3.OA.5** Apply properties of operations as strategies to multiply and divide.
- **3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division
- **3.OA.8** Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity.
- **3.NBT.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.
- **3.MD.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.

#### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,:*

1. Activities
  - a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts
  - e. Explorations: Exploring Bar Graphs, Area, and Partitioning Rectangles
  - f. Open Response and Reengagement Lesson: Estimating Costs
  - g. Unit 3 Progress Check and Open Response Assessment
  - h. Ongoing Assessment through Check Ins
  - i. Games: *Roll to 1,000*, *Shuffle to 100/1,000*, and *Name that Number*
2. English Language Learners
  - a. Scaffold the terms *input* and *output*, build on children's understanding of the words *in* and *out*.
3. Special Education/504 Students
  - a. Have children identify a mystery rule after it is applied to a series of numbers. Ask a child to say a number between 1 and 10, mentally add an amount to the given number and 'give back' the result. Repeat several times and then identify the rule.
4. Gifted and Talented Students

- a. Have children make up and solve “What’s My Rule?” problems. Have partners solve each other’s problems and discuss strategies for completing tables.

New Jersey Student Learning Standards– Standards 8, 9 and Career Readiness Practices

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

**Unit 4: Measurement and Geometry**

**(Weeks 15-18)**

Enduring Understanding

Children measure to the nearest half inch and generate measurement data and represent it on a scaled line plot. Children will also identify and measure the perimeters of polygons and distinguish between perimeter and area.

Essential Question(s)

1. How can I clearly explain my thinking while using the correct mathematical language?
2. What patterns do you notice and how does this pattern connect to other mathematical concepts?

Learning Objectives

Students will be able to:

1. Measure to the nearest half inch and centimeter
2. Generate measurement data and represent the data on a line plot
3. Measure distances around objects to the nearest 1.2 inch, compare masses, and determine distances in half-inch increments
4. Review characteristics of polygons
5. Classify quadrilaterals
6. Identify and measure perimeters of rectangles and other polygons
7. Distinguish between perimeter and area
8. Find the area of a rectangle by using composite units
9. Find areas of rectangles and write matching number sentences
10. Develop strategies for finding area and perimeter while playing *The Area and Perimeter Game*
11. Create and use models of a rabbit pen to solve a problem
12. Find areas of rectilinear figures

New Jersey Student Learning Standards

- **3.MD.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.
- **3.MD.5** Recognize area as an attribute of plane figures and understand concepts of area measurement.

- **3.MD.6** Measure areas by counting unit squares (square cm, square m, square in, square ft, and non-standard units)
- **3.MD.7** Relate area to the operations of multiplication and addition.
- **3.MD.8** Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
- **3.G.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.

### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,:*

1. Activities
  - a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts
  - e. Explorations: Measures of Distance and Comparisons
  - f. Open Response and Reengagement Lesson: Building a Rabbit Pen
  - g. Unit 4 Progress Check and Open Response Assessment
  - h. Ongoing Assessment through Check Ins
  - i. Games: *What's My Polygon Rule?*, *Shading Shapes*, and *The Area and Perimeter Game*
2. English Language Learners
  - a. Use role play to introduced the term *nearest*, connecting it to near/nearer and contrasting with *far* and *away*.
3. Special Education/504 Students
  - a. Have children use square pattern blocks to measure small objects. Have children carefully line up the blocks end to end along each object's edge, count to find the total length, and recorded the measure on paper as "about \_\_\_\_\_ square pattern blocks long."
4. Gifted and Talented Students
  - a. Have children determine which rulers on *Math Masters* page 118 can be used to measure accurately. Have children provide arguments for why they think the rulers do or do not work.

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

## Unit 5: Fractions and Multiplication Strategies

(Weeks 19-23)

### Enduring Understanding

Children relate their part-whole understanding of fractions to visual and symbolic representations, including standard notation, and begin to explore fraction equivalence. They develop multiplication fact strategies by working from either understanding of multiplication and known facts to find unfamiliar products by using arrays, area models, and properties of multiplication.

### Essential Question(s)

1. How can I clearly explain my thinking while using the correct mathematical language?
2. How to helper facts help with other mathematical concepts?

### Learning Objectives

Students will be able to:

1. Represent fractions as equal parts of different wholes, and they find all shapes with a given area.
2. Represent fractions using standard notation, words, and drawings.
3. Recognize equivalent fractions using a visual fraction model.
4. Use known multiplication facts, called helper facts, to solve harder multiplication facts.
5. Explore the use of doubling to solve number stories involving area.
6. Use the doubling strategy to solve multiplication facts.
7. Identify and explain arithmetic patterns using properties of operations.
8. Play *Salute!* to find missing factors.
9. Use square products to find products of near squares.
10. Make sense of and solve a number story and compare solutions and explanations and review their work.
11. Decompose factors to solve multiplication facts.

### New Jersey Student Learning Standards

- **3.OA.1** Interpret products of whole numbers, e.g., interpret  $5 \times 7$  as the total number of objects in 5 groups of 7 objects each. For example, describe and/or represent a context in which a total number of objects can be expressed as  $5 \times 7$ .
- **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities
- **3.OA.5** Apply properties of operations as strategies to multiply and divide.
- **3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division

- **3.OA.9** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.
- **3.NF.1** Understand a fraction  $1/b$  as the quantity formed by 1 part when a whole is partitioned into  $b$  equal parts; understand a fraction  $a/b$  as the quantity formed by  $a$  parts of size  $1/b$ .
- **3.MD.7** Relate area to the operations of multiplication and addition.

### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to,:*

1. Activities
  - a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts
  - e. Explorations: Exploring Equal Parts, Fractions of Different Wholes, and Area
  - f. Open Response and Reengagement Lesson: Button Dolls: Solving a Number Story
  - g. Unit 5 Progress Check and Open Response Assessment
  - h. Ongoing Assessment through Check Ins
  - i. Games: *Fraction Memory, Multiplication Draw, Salute!*
2. English Language Learners
  - a. Provide a variety of examples and non-examples to visually support the understanding of *whole* by pointing to classroom objects. (differentiate between *whole* and *hole*)
3. Special Education/504 Students
  - a. Have children study the examples and non-examples of 1-fourth on *Math Masters*, page 153
4. Gifted and Talented Students.
  - a. Have students work in partnerships to complete *Math Masters 154*.
  - b. Use centimeter cubes and a ruler to complete the whole based on a given fractional part.

### New Jersey Student Learning Standards— Standards 8, 9 and Career Readiness Practices

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

## **Unit 6: More Operations**

**(Weeks 24-28)**

### Enduring Understanding

Children compare different approaches to solving the same problem and reflect on which strategies are more efficient and appropriate. Children continue to take inventory of known

multiplication facts and model multi-step number stories with one or more equations and represent the unknown qualities with letters.

### Essential Question(s)

1. How would you describe what you are trying to find?
2. What information is given in the problem?
3. What mathematical evidence would support your solution?

### Learning Objectives

Students will be able to:

1. Use the trade-first method to solve subtraction problems
2. Play Baseball Multiplication to build fact fluency
3. Use square products as helper facts to find products of near squares
4. Self-assess their automaticity with multiplication facts
5. Construct quadrilaterals, measure and plot distances to the nearest  $\frac{1}{2}$  inch, and compare perimeter measurements of polygons
6. Use multiplication/division diagrams to make sense of and solve number stories
7. Play Multiplication top-it and apply strategies to multiply larger factors
8. Use parentheses in number sentences
9. Use the order of operations to solve multi-step problems
10. Solve two-step number stories and represent them with equations

### New Jersey Student Learning Standards

- **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities
- **3.OA.4** Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
- **3.OA.5** Apply properties of operations as strategies to multiply and divide
- **3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division
- **3.OA.8** Solve two-step word problems using the four operations. 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.
- **3.NBT.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.

### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to:*

1. Activities

- a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts
  - e. Explorations: Geometry Problems, Measurement Date, and Polygons
  - f. Open Response and Reengagement Lesson: Writing Number Stories
  - g. Unit 6 Progress Check and Open Response Assessment
  - h. Ongoing Assessment through Check Ins
  - i. Games: *Salute!*, *Baseball Multiplication*, *Beat the Calculator*
2. English Language Learners.
    - a. Scaffold the term *trade* as an exchange for something of equal value.
  3. Special Education/504 Students
    - a. Have children represent the number 375 using a concrete model. Have them display 3 flats, 7 longs, and 5 cubes on a place-value mat. Then write it in expanded form.
  4. Gifted and Talented Students
    - a. Have children write 2- or 3- digit subtraction problems and find the differences using as many tools and strategies as they can.

#### New Jersey Student Learning Standards— Standards 8, 9 and Career Readiness Practices

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

### **Unit 7: Fractions**

**(Weeks 29-33)**

#### Enduring Understanding

Children revisit volume measurement and focus on comparing, estimating, and then measuring liquid volumes. They continue to develop an understanding of fractions as numbers by exploring a new area fraction model and fractions as representations of distances on number lines.

#### Essential Question(s)

1. What are some ways to represent the quantities?
2. What tools would be helpful to use when solving a problem?

#### Learning Objectives

Students will be able to:

1. Estimate and measure liquid volumes.
2. Estimate the number of dots in an array, measure liquid volume, and identify equal shares.
3. Solve number stories involving time, mass, volume and length.
4. Partition fraction strips and use them to name and compare fractions.
5. Represent fractions on number lines.

6. Identify fractions greater than, less than, and equal to one on a number line.
7. Compare fractions using visual models.
8. Order fractions with the same numerator and write a rule for ordering similar sets of fractions and analyze and discuss others' rules and revise their work.
9. Partition distances to locate fractions on number lines.
10. Make and justify fraction comparisons.
11. Solve fraction number stories.
12. Name fractions of sets of objects.

#### New Jersey Student Learning Standards

- **3.NF.1** Understand a fraction  $1/b$  as the quantity formed by 1 part when a whole is partitioned into  $b$  equal parts; understand a fraction  $a/b$  as the quantity formed by  $a$  parts of size  $1/b$ .
- **3.NF.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram.
- **3.NF.3** Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
- **3.MD.2** Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).1 Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units
- **3.G.2** Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.

#### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to:*

1. Activities
  - a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts
  - e. Explorations: Exploring Arrays, Volume and Equal Shares
  - f. Open Response and Reengagement Lesson: Finding Rules for Comparing Fractions
  - g. Unit 7 Progress Check and Open Response Assessment
  - h. Ongoing Assessment through Check Ins
  - i. Games: *Fraction Memory, Salute!, The Area and Perimeter Game*
2. English Language Learners.
  - a. Scaffold the term *hold* as it relates to volume. Demonstrate the different meanings of the term using familiar contexts.
3. Special Education/504 Students.

- a. Have children estimate about 1-half and 1-fourth of a 1-liter beaker. Have children identify the 1-liter beaker and point at the halfway and quarter marks.
4. Gifted and Talented Students
  - a. Have children explore the liquid volume of irregularly shaped containers.
  - b. Have children choose a container and estimate how much water they think it can hold.

New Jersey Student Learning Standards– Standards 8, 9 and Career Readiness Practices

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

**Unit 8: Multiplication and Division**

**(Weeks 34-38)**

Enduring Understanding

Children deepen and apply their understanding of multiplication, division, measurement, and attributes of shapes.

Essential Question(s)

1. How can you prove your mathematical reasoning is accurate?
2. How can I explain how this strategy works in other situations?

Learning Objectives

Students will be able to:

1. Use rulers to measure to the nearest  $\frac{1}{4}$  inch.
2. Develop strategies for solving extended multiplication and division facts.
3. Find factors of counting numbers.
4. Use clues to make conjectures and arguments about the total number of chairs in a room and discuss some conjectures and arguments, and revise their work.
5. Learn to play *Factor Bingo* and discuss how to find products for a given factor.
6. Model equal-sharing situations with \$10 and \$1 bills.
7. Compare fractions, generate equivalent fractions, and explore the areas of rectangles.
8. Explore the shared attributes of prisms

New Jersey Student Learning Standards

- **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.
- **3.OA.6** Understand division as an unknown-factor problem.
- **3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division, or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

- **3.MD.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.
- **3.G.1** Understand that shapes in different categories may share attributes, and that the shared attributes can define a larger category. Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to:*

1. Activities
  - a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts
  - e. Explorations: Exploring Number Lines, Fractions, and Area
  - f. Open Response and Reengagement Lesson: Setting Up Chairs
  - g. Unit 8 Progress Check and Open Response Assessment
  - h. Ongoing Assessment through Check Ins
  - i. Games: *Array Bingo, Finding Factors, Speed Factor Bingo*
2. English Language Learners
  - a. Scaffold the phrases *distance from* and *distance between* using gestures, number lines, and think-alouds.
3. Special Education/504 Students
  - a. Have children compare a number line and a ruler.
  - b. Have children complete *Math Masters p. 270-271*.
  - c. Encourage children to use vocabulary such as *denominator, numerator, whole,* and *distance from 0 to 1* in their descriptions.
4. Gifted and Talented Students.
  - a. Have children draw, measure, and label paths to a buried treasure on *Math Masters, page 272*.

### New Jersey Student Learning Standards– Standards 8, 9 and Career Readiness Practices

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

## **Unit 9: Multi-Digit Operations**

**(Weeks 39-43)**

### Enduring Understanding

Children develop their understanding of multiplication and division as they apply basic fact knowledge to mentally solve number stories and multiply larger factors. They also interpret length of day data and work to calculate elapsed time more efficiently.

### Essential Question(s)

1. How would you describe what you are trying to find?
2. What are some other strategies you might try?
3. What are some ways to represent the quantities?

### Learning Objectives

Students will be able to:

1. Play a game to practice multiplication facts
2. Solve number stories by multiplying and dividing with multiples of 10
3. Use mental steps to multiply problems involving larger factors
4. Work with elapsed time, explore polygon relationships, and find the masses of objects.
5. Partition rectangles to solve multi-digit multiplication problems
6. Develop strategies for using a calculator with a broken division key
7. Analyze the Length-of-Day Graph

### New Jersey Student Learning Standards

- **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- **3.OA.4** Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
- **3.OA.5** Apply properties of operations as strategies to multiply and divide.
- **3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division.
- **3.NBT.3** Multiply one-digit whole numbers by multiples of 10 in the range 10-90
- **3.MD.1** Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes.

### Suggested Activities/Modifications

*Below is a list of suggested activities, modifications, accommodations, and enrichment opportunities. This includes, but is not limited to:*

1. Activities
  - a. Mental Math
  - b. Math Message
  - c. Journal pages
  - d. Writing/Reasoning Prompts

- e. Explorations: Elapsed Time, Squares, and Bridges
  - f. Open Response and Reengagement Lesson: Packing Apples
  - g. Unit 9 Progress Check and Open Response Assessment
  - h. Ongoing Assessment through Check Ins
  - i. Games: *Product Pile-Up*, *Multiplication Top-It with Extended Facts*, *Fraction Memory*
2. English Language Learners
    - a. Scaffold the term *pass* within the context of *Product Pile-Up*.
  3. Special Education/504 Students
    - a. Have children record multiplication number sentences on slates.
    - b. Encourage children to mentally visualize groups.
  4. Gifted and Talented Students
    - a. Have children write *A Guide to Playing Math Games*, a booklet filled with hints and strategies for winning Everyday Mathematics games.

New Jersey Student Learning Standards– Standards 8, 9 and Career Readiness Practices

- See Technology & Career Readiness & 21st Century Skills Standards Curriculum Appendix

**V. Course Materials** (included, but not limited to)

- Textbook: Everyday Mathematics, McGraw Hill Education Copyright 2015
- Materials: Math Masters, Classroom Posters, Assessment Handbook, *Home Connection Handbook*, Student Math Journal: Volumes 1 and 2, Homelinks, *My Reference Book*, Activity Cards
- Manipulatives: attribute blocks, base-10 blocks, beakers, clock faces, clock face stamp, connectrors, counters, dice, dominos, Everything Math Deck, fraction circle pieces, geoboards, marker boards, medicine dropper, metersticks, number line, pattern blocks, money set, Quick Look Cards, rocker (pan) balance, rubber bands, ruler, metric masses, straws, tape measure, thermometer
- Computer Programs: Exam View
- Internet Resources: ConnectED, eToolkit, ePresentations, Smart Notebook, Virtual Learning Community, iXL

**VI. Assessments** (included, but not limited to)

- Sept: Baseline Fact Mastery +, -, x, /
- Jan: Mid Year Fact Mastery +, -, x, /
- May: End of Year Fact Mastery +, -, x, /
- Unit 1-9 Progress Checks
- Odd Units- Open Response Assessment
- Even Units- Cumulative Assessments
- Ongoing Assessment Check Ins
- Writing/Reasoning Prompts
- District online trimester benchmarks

**VII. Cross Curricular Aspects**

- Literature Links are available for each unit. For example, Unit 1: *The Doorbell Rang* and *A Remainder of One*
- Students also have opportunities to connect to science by participating in the Length-of-Day project. They track the length of the day once a week and record the changes throughout the year.