Allamuchy Township School District
Allamuchy, NJ

Mathematics
Grade 3

CURRICULUM GUIDE

August 28, 2017

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This curriculum may be modified through varying techniques, strategies and materials, as per an individual student's Individualized Education Plan (IEP).

Approved by the Allamuchy Board of Education
At the regular meeting held on August 28, 2017
And
Aligned with the New Jersey Core Curriculum Content Standards
And Common Core Content Standards

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Philosophy and Rationale

Mathematics in third grade provides students with opportunities to strengthen their knowledge, skills, and understanding of place value, adding and subtracting multi-digit numbers, multiplication and division strategies, fractions, and measurement and data. Students learn to identify and manipulate

numbers as they build their problem-solving skills by applying their knowledge to real-world problems. Collaboration with peers and the use of technology allows students to interpret problems in various ways to challenge their thinking about mathematical concepts. Learning and practicing mathematical concepts gives students a range of skills and real-world applications they can use in various aspects of their lives.

Mission Statement

The mission of the Allamuchy Township District, in partnership with the larger community, is to provide a comprehensive, caring program for all of our students which:

*Nurtures the unique talents and interests of each individual
*Supports social responsibility and a love of learning
*Embraces the total development of each student intellectually, morally and physically
*Develops confidence, creativity and skills necessary to face the challenges of a technologically advanced and ever-changing society
*Promotes a culture of mutual respect with all other community members
*Supports the attainment of the New Jersey Core Curriculum Content Standards

The District seeks to exceed objective standards of achievement set by both the State and Federal government and to provide an educational experience beyond the boundaries established by the Core Curriculum Standards.

Scope and Sequence

Unit 1: Numbers and Operations in Base Ten
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Unit 2: 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 and arithmetic.

Unit 3: Numbers and Operations - Fractions
- Develop understanding of fractions as numbers.

Unit 4: Measurement and Data
- Solve problems involving measurement and estimation of intervals of time, liquid volume, and masses of objects.
- Represent and interpret data.
- Geometric measurement: understand concepts of area and relate area to multiplication and addition.
- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measurements.

Unit 5: Geometry
- Reason with shapes and their attributes.

Stage 1: Desired Results
Unit 1

Topic: Numbers and Operations in Base Ten

Content Standards

3.NBT.A.1 Use place value understanding to round whole numbers to the nearest 10 or 100.

3.NBT.A.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.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

3.OA.D.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.OA.D.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

Essential Questions

- How can I use place value to help me add and subtract multi-digit numbers?
- How are the operations of subtraction and addition related?

Enduring Understandings

- Multi-digit numbers can be compared and ordered by comparing the digits in each place.
- Rounding is a skill that can be used to estimate sums and differences.
- Versatile mathematical thinkers apply numerous strategies to solve problems using addition and subtraction, including using models, using mental math, and applying place value knowledge.

Knowledge and Skills (SWBAT embedded course proficiencies)

- Read, write, and identify place value of whole numbers through thousands.
- Use place value to compare numbers.
- Use a number line and place value to order numbers through thousands.
- Round numbers to the nearest ten.
- Round numbers to the nearest hundred.
- Use the "four-step plan" to solve problems.
- Use addition properties to add whole numbers.
- Identify patterns in the addition table.
- Use place value to identify addition patterns.
- Use mental addition strategies.
- Estimate sums using rounding.
- Use models to explore adding three-digit numbers.
- Add three-digit numbers and use estimation to check for reasonableness.
- Add four-digit numbers with regrouping.
- Check answers for reasonableness.
- Use strategies to subtract mentally.
- Estimate differences using rounding to the nearest ten or hundred.
- Determine whether an estimate or an exact answer is needed to solve a problem.
- Model subtraction with regrouping.
- Subtract three-digit numbers with regrouping.
- Subtract four-digit numbers with regrouping.
- Subtract across zeros.

Stage 2: Evidence of Understanding, Learning Objectives and Expectations

Benchmarks (embedded student proficiencies)

Assessment Methods (formative, summative, other evidence and/or student self- assessment)

- Teacher observation
- Small-group instruction
- Homework and Independent Practice Pages
- Common Core Quick Check Quizzes
- Am I Ready?
- Check My Progress
- Online Self-Check Quizzes
- Chapter Test
- Standardized Test Practice
- Vocabulary Test
- Oral Assessment
- eAssessment
- Teacher-made assessments and projects

Stage 3: Learning Plan (Same for all units)

During these units, students will be engaged through multiple means of instruction, in whole-group, small-group, and partner learning settings. Students will participate in a variety of instructional activities, and various assessment methods will be utilized to check for student understanding. Instruction will be differentiated to meet all students' needs through written, auditory, visual, and kinesthetic components incorporated into each lesson. Reteach and enrichment worksheets and resources provided through the My Math series will be utilized to ensure that instruction is provided on an appropriate level for each student.

Students will practice the 21st Century Skills of Communication and Collaboration, Critical Thinking and Problem Solving, and Creativity and Innovation, as they collaborate with peers, brainstorm, and come up with solutions to the problems presented in each lesson. Students will have opportunities to utilize technology and online resources by participating in online games and activities provided by the My Math series.

Time Allotment: September-October

Resources (Same for all units)

- McGraw Hill My Math
- Student workbooks
- Interactive SmartBoard lessons
- Reteach and Enrich worksheets
- Online math games and videos
- Teacher-made/acquired worksheets and activities

Stage 1: Desired Results

Unit 2

Topic: Operations and Algebraic Thinking

Content Standards

3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5 × 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 × 7.*

3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 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 ÷ 8.

3.OA.A.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.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \_ \div 3$, $6 \times 6 = ?$*

3.OA.B.5 Apply properties of operations as strategies to multiply and divide. *Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)*

3.OA.B.6 Understand division as an unknown-factor problem. *For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.*

3.OA.C.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.D.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.OA.D.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

3.NBT.A.3 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80, 5×60) using strategies based on place value and properties of operations.

Essential Questions

- What does multiplication mean? What does division mean?
- What strategies can be used to learn multiplication and division facts?

Enduring Understandings

- Multiplying means adding a number to itself a certain number of times.
- Dividing means making equal groups out of a whole.
- Multiplication facts and division facts are related. A known multiplication fact can help solve a division problem, and vice versa.
- A number of strategies can be used to multiply and divide numbers.

Knowledge and Skills (SWBAT embedded course proficiencies)

- Use models to explore the meaning of multiplication.
- Relate multiplication and addition.
- Use arrays to explore and model multiplication.
- Use arrays to multiply.

- Use the make a table strategy to solve problems.
- Use multiplication to find the total number of combinations that can be made when given two groups of objects.
- Explore two meanings of division.
- Model division as equal sharing.
- Use models to relate division and subtraction.
- Explore how division and multiplication are related.
- Divide using related multiplication facts.
- Use models to solve problems.
- Identify and explain patterns in the multiplication table.
- Use arrays and drawings, such as bar diagrams, to multiply by 2.
- Use models and related multiplication facts to divide by 2.
- Use different strategies, including patterns, to multiply by 5.
- Use different strategies, including related multiplication facts, to divide by 5.
- Solve problems by looking for a pattern.
- Use different strategies, including patterns, to multiply by 10.
- Use basic facts and patterns to multiply a number by a multiple of 10.
- Use different strategies, including related multiplication facts, to divide by 10.
- Use different strategies, such as arrays, equal groups, and properties, to multiply by 3.
- Use different strategies, including related multiplication facts, to divide by 3.
- Explore how to double a known fact in order to multiply.
- Double a known fact to multiply by 4.
- Use different strategies, including related multiplication facts, to divide by 4.
- Solve a problem by identifying extra or missing information.
- Use different strategies, such as equal groups, patterns, and properties, to multiply by 0 and 1.
- Use division rules to divide with 0 and 1.
- Use different strategies, including doubling a known fact, to multiply by 6.
- Use different strategies, such as properties, arrays, and decomposing factors, to multiply by 7.
- Use different strategies, including arrays and repeated subtraction, to divide by 6 and 7.
- Use different strategies, such as arrays, drawings, and known facts, to multiply by 8.
- Use different strategies, such as properties, known facts, or patterns, to multiply by 9.
- Use different strategies, such as equal groups, repeated subtraction, and related multiplication facts, to divide by 8 and 9.
- Make an organized list to solve problems.
- Use different strategies, such as patterns, models, and arrays, to multiply by 11 and 12.
- Use different strategies, such as equal groups, repeated subtraction, and related facts, to divide by 11 and 12.
- Explore how to take apart factors to multiply.
- Apply the Distributive Property to find products.
- Explore how to find the product of three factors.
- Apply the Associative Property of Multiplication to find products.
- Write expressions using the four operations.
- Write, then find the value of expressions.
- Represent one- and two-step word problems using equations with a variable.
- Represent and solve two-step word problems using equations with a variable.
- Use logical reasoning to solve problems.

Stage 2: Evidence of Understanding, Learning Objectives and Expectations
Benchmarks (embedded student proficiencies)

Assessment Methods (formative, summative, other evidence and/or student self- assessment)

- Teacher observation
- Small-group instruction
- Homework and Independent Practice Pages
- Common Core Quick Check Quizzes
- Am I Ready?
- Check My Progress
- Online Self-Check Quizzes
- Chapter Test
- Standardized Test Practice
- Vocabulary Test
- Oral Assessment
- eAssessment
- Teacher-made assessments and projects
- "Planning a Classroom Party" unit project, Chapter 4 and Chapter 6 (My Math website)
- "Make Friendship Bracelets" unit project, Chapter 4 (My Math website)
- "Make a Personal Scrapbook" unit project, Chapter 5 (My Math website)

Time Allotment: November-March

Stage 1: Desired Results
Unit 3

Topic: Numbers and Operations - Fractions

Content Standards

3.NF.A.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.

> **3.NF.A.2.A** Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/*b* and that the endpoint of the part based at 0 locates the number 1/*b* on the number line.

> **3.NF.A.2.B** Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

3.NF.A.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

> **3.NF.A.3.A** Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
>
> **3.NF.A.3.B** Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
>
> **3.NF.A.3.C** Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*
>
> **3.NF.A.3.D** Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols>, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Essential Questions

- How can fractions be used to represent numbers and their parts?

Enduring Understandings

- A unit fraction represents the quantity formed by one part when a whole is partitioned into equal parts.
- Fractions can name part of a whole or part of a set. The numerator refers to the number of parts being described, and the denominator represents the total number of parts.
- A whole number can be represented as a fraction.
- Models can be used to compare fractions.
- A number of strategies, including diagrams and number lines, can help determine the value of a fraction.

Knowledge and Skills (SWBAT embedded course proficiencies)

- Explore and model unit fractions.
- Read and write fractions that name part of a whole.
- Use models to represent fractions that name part of a set.
- Draw a diagram to solve problems.
- Represent fractions on a number line.
- Use models to find equivalent fractions.
- Express whole numbers as fractions and recognize fractions equivalent to whole numbers.
- Use models to compare two fractions and record the results.

Stage 2: Evidence of Understanding, Learning Objectives and Expectations
Benchmarks (embedded student proficiencies)

Assessment Methods (formative, summative, other evidence and/or student self- assessment)

- Teacher observation
- Small-group instruction

- Homework and Independent Practice Pages
- Common Core Quick Check Quizzes
- Am I Ready?
- Check My Progress
- Online Self-Check Quizzes
- Chapter Test
- Standardized Test Practice
- Vocabulary Test
- Oral Assessment
- eAssessment
- Teacher-made assessments and projects
- "Fraction Book" unit project, Chapter 10 (My Math website)
- "Fraction Web" unit project, Chapter 10 (My Math website)

Time Allotment: April

Stage 1: Desired Results
Unit 4

Topic: Measurement and Data

Content Standards

3.MD.A.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.

3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem

3.MD.B.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.*

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

> **3.MD.C.5.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.

> **3.MD.C.5.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.

3.MD.C.6 Measure areas by counting unit squares square cm, square m, square in, square ft, and non-standard units).

3.MD.C.7 Relate area to the operations of multiplication and addition.

> **3.MD.C.7.A** Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

> **3.MD.C.7.B** Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

> **3.MD.C.7.C** Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.
> **3.MD.C.7.D** Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

3.MD.D.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.OA.A.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.

Essential Questions

- Why do we measure?
- How do we obtain useful information from a set of data?

Enduring Understandings

- Different strategies can be used to measure capacity, mass, length, and time.
- Data can be organized in a number of ways, including bar graphs, picture graphs and line plots.

- Perimeter refers to the distance around the outside of a figure, and it is found by adding the lengths of all sides of a figure.
- Area refers to the space inside of a figure, and it can be found by counting tiles that make up a figure. The area of a rectangle can be found by multiplying its length times its width.
- Two figures can have the same area, but have different perimeters, and vice versa.

Knowledge and Skills (SWBAT embedded course proficiencies)

- Explore estimating and measuring liquid volume using metric units of capacity.
- Use the four operations to solve one-step word problems involving liquid volume.
- Explore estimating and measuring metric units of mass.
- Use the four operations to solve one-step word problems involving mass.
- Tell time to the nearest minute.
- Determine time intervals to solve problems.
- Work backward to solve problems.
- Collect and record data through observations and surveys.
- Draw a scaled picture graph.
- Draw scaled bar graphs.
- Relate bar graphs to scaled picture graphs.
- Draw, organize, and analyze data in line plots.
- Measure lengths to the nearest half inch and nearest quarter inch.
- Collect and display measurement data to fractions of an inch.
- Solve problems by solving a simpler problem.
- Explore finding the perimeter of a figure.
- Find the unknown when solving problems involving perimeter.
- Count unit squares to find the area of a figure.
- Use addition to measure the area of a figure.
- Use tiling to find the area of rectangles.
- Use the formula for area to find the area of rectangles.
- Use the Distributive Property to find area.
- Find the area of composite figures.
- Recognize the relationship between area and perimeter.
- Draw a diagram to solve problems.

Stage 2: Evidence of Understanding, Learning Objectives and Expectations
Benchmarks (embedded student proficiencies)

Assessment Methods (formative, summative, other evidence and/or student self- assessment)

- Teacher observation
- Small-group instruction
- Homework and Independent Practice Pages
- Common Core Quick Check Quizzes
- Am I Ready?
- Check My Progress
- Online Self-Check Quizzes
- Chapter Test
- Standardized Test Practice
- Vocabulary Test
- Oral Assessment
- eAssessment
- Teacher-made assessments and projects

- "Designing a Game" unit project, Chapter 11 (My Math website)
- "Design a Survey and Graph" unit project, Chapter 12 (My Math website)

Time Allotment: May

Stage 1: Desired Results
Unit 5

Topic: Geometry

Content Standards

3.G.A.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.

3.G.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*

Essential Questions

- How can geometric shapes help when solving real-world problems?

Enduring Understandings

- Angles and geometric shapes can be classified according to their attributes.
- Classifying geometric shapes can help when using select strategies to solve real-world problems.

Knowledge and Skills (SWBAT embedded course proficiencies)

- Explore angles of two-dimensional figures.
- Describe and classify polygons by their attributes.
- Describe and classify triangles by their attributes.
- Identify, describe, and classify quadrilaterals by their attributes.
- Describe the shared attributes of quadrilaterals.
- Use the guess, check, and revise strategy to solve problems.
- Partition shapes into equal sections and write unit fractions to represent each area.

Stage 2: Evidence of Understanding, Learning Objectives and Expectations
Benchmarks (embedded student proficiencies)

Assessment Methods (formative, summative, other evidence and/or student self- assessment)

- Teacher observation
- Small-group instruction
- Homework and Independent Practice Pages
- Common Core Quick Check Quizzes
- Am I Ready?
- Check My Progress
- Online Self-Check Quizzes
- Chapter Test
- Standardized Test Practice
- Vocabulary Test
- Oral Assessment
- eAssessment
- Teacher-made assessments and projects

Time Allotment: June

<u>New Jersey Core Curriculum and Common Core Content Standards</u>

http://www.state.nj.us/education/cccs/

<u>Integration of 21st Century Theme(s)</u>
The following websites are sources for the following 21st Century Themes and Skills:
http://www.nj.gov/education/code/current/title6a/chap8.pdf
http://www.p21.org/about-us/p21-framework .
http://www.state.nj.us/education/cccs/standards/9/index.html

21st Century Interdisciplinary Themes (into core subjects)
• **Global Awareness**
• **Financial, Economic, Business and Entrepreneurial Literacy**
• **Civic Literacy**
• **Health Literacy**
• **Environmental Literacy**

Learning and Innovation Skills
• **Creativity and Innovation**
• **Critical Thinking and Problem Solving**
• **Communication and Collaboration**

Information, Media and Technology Skills
• **Information Literacy**
• **Media Literacy**
• **ICT (Information, Communications and Technology) Literacy**

Life and Career Skills
• **Flexibility and Adaptability**

• **Initiative and Self-Direction**
• **Social and Cross-Cultural Skills**
• **Productivity and Accountability**
• **Leadership and Responsibility**

Integration of Digital Tools
- **Classroom computers/laptops/Chromebooks**
- **Technology Lab**
- **Voice amplification device**
- **Other software programs**