MATHEMATICS
GRADE 3

EWING PUBLIC SCHOOLS
2099 Pennington Road
Ewing, NJ 08618

Board Approval Date: November 25, 2019
Revised by: District Math Staff

Michael Nitti
Superintendent

In accordance with The Ewing Public Schools' Policy 2230, Course Guides, this curriculum has been reviewed and found to be in compliance with all policies and all affirmative action criteria.

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Course Description and Rationale

In this third grade course in mathematics, students will build fluency with addition and subtraction up through 1,000. Lay foundations for multiplication and division, with fluency to 100, build upon and develop fluency in working with equivalent fractions, use standard units of measure and describing and analyzing shapes.

Students will use the following eight Mathematics Practices to demonstrate understanding of the mathematics process:

- 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.

This course is a year-long course that meets for 60 minutes per day. The course uses a constructivist approach to investigate relationships in math. This approach will be balanced with a level of practice needed to attain skill mastery. Throughout the course, students will be actively engaged in problem solving through reasoning. Students will be expected to communicate their reasoning and problem solving on a daily basis though written and verbal formats.

In the end, the goal of this course is to develop young mathematicians with the habits of mind enabling them to meet the vision shared below; enabling their future success in mathematics.

The course content is arranged into four units of study:

- Unit 1: Addition & Subtraction
- Unit 2: Multiplication
- Unit 3: Fractions
- Unit 4: Geometry, Measurement, and Data

Math Vision

The Ewing Public Schools will deliver an instructional program in mathematics where students are actively engaged in the discovery of math concepts and are applying these concepts in ways that they find meaningful and relevant.

Ewing students will be mathematical thinkers who can reason, communicate and solve problems.

Ultimately, Ewing students will master and will be able to utilize these math concepts and skills throughout their lives.

21st Century Skills - During this course, students will work on developing, to an age appropriate level, the following 21st century skills:

Career Readiness Pathways:

- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP12. Work productively in teams while using cultural global competence.

Learning and Innovation Skills

Creativity and Innovation

Think Creatively
- Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts

Work Creatively with Others
- View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes

CRITICAL THINKING AND PROBLEM SOLVING

Reason Effectively
- Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

Use Systems Thinking
- Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems

Make Judgments and Decisions
- Effectively analyze and evaluate evidence, arguments, claims and beliefs

- Synthesize and make connections between information and arguments
- Interpret information and draw conclusions based on the best analysis

Solve Problems
- Identify and ask significant questions that clarify various points of view and lead to better solutions

COMMUNICATION AND COLLABORATION

Communicate Clearly
- Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
- Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions
- Use communication for a range of purposes (e.g. to inform, instruct, motivate and persuade)
- Utilize multiple media and technologies, and know how to judge their effectiveness a priori as well as assess their impact
- Communicate effectively in diverse environments (including multi-lingual)

Collaborate with Others
- Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

<u>Information, Media, and Technology Skills</u>

Informational Literacy

Access and Evaluate Information
- Evaluate information critically and competently

Use and Manage Information
- Use information accurately and creatively for the issue or problem at hand

<u>Life and Career Skills</u>

Social and Cross-Cultural Skills

Interact Effectively with Others
- Know when it is appropriate to listen and when to speak

Work Effectively in Diverse Teams
- Respond open-mindedly to different ideas and values

Be Responsible to Others
- Act responsibly with the interests of the larger community in mind

Technology Integration

8.1 Educational Technology
All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

ELA Integration:

NJSLS. 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.
NJSLS.RI.3.2. Determine the main idea of a text; recount the key details and explain how they support the main idea.
NJSLS. RI.3.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.
NJSLS. RI.3.7. Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
NJSLS.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
NJSLS.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
NJSLS.SL3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.
NJSLS.SL4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

Unit 1: Addition and Subtraction

Why Is This Unit Important?

This is the first unit in this grade level where students continue to develop ideas about place value to 1000, the structure of the base-ten number system and the operations of addition and subtraction. In this unit, the students will focus on understanding the equivalence of one group and the units that comprise it. Students will also add and subtract accurately and efficiently. This unit further explores the operations of addition and subtraction as well as being able to use multiple operations to solve mathematical operations as exhibited in tables.

The big ideas embedded in this unit are:

- Addition and subtraction of facts
- Addition and subtraction by place value
- Addition and subtraction of two-digit numbers using multiple strategies
- Identify place value of 100s, 10s and 1s
- Extend knowledge of the number system to 1,000
- Add and subtract accurately and efficiently
- Understand different types of subtraction problems
- Add and subtract accurately and efficiently to 1,000
- Decide on efficient strategies for addition and subtraction
- Use tables to represent change with mathematical operations

Enduring Understandings:

- How to identify digits in the 1000, 100s, 10s and 1s place
- How to use manipulatives, drawings, tools and notations to show strategies and solutions
- How to read, write and sequence numbers to 1,000
- How to estimate numbers to the nearest 10 or 100
- How to construct 1,000 from groups of 100
- How to find the number of 10s in 3-digit numbers using place value strategies
- How to solve addition and subtraction with 3-digit numbers using multiple strategies
- How to interpret addition and subtraction story problems
- How to round using place value understanding
- How to add numbers to 1,000
- What strategy to choose to efficiently add numbers to 1,000
- How to subtract numbers from others to 1,000
- What strategy to choose to efficiently subtract numbers from 1,000

Essential Questions:

- How does place value connect to numbers on the 100 chart?
- How are addition and subtraction related?
- How is place value determined?

- What landmark numbers can be used on a 1,000 chart to help identify 3-digit numbers?
- How does adding and subtracting multiples of 10 and 100 relate to place value?
- How do you find the difference between two numbers by either adding or subtracting?
- What clues can you use from the 1,000 chart to add numbers by place?
- How can you use the number line to estimate to the hundreds?
- What strategy is most efficient for you to add 3-digit numbers?
- How can you use estimation to help determine the solution to a multiple-addend problem?
- How can visualization aid in solving story problems?
- What strategy is most efficient for you to solve subtraction with 3-digits?
- What steps need to be taken to solve multi-operation story problems?

Acquired Knowledge:

- Know the structure of the 1000s chart
- Identify place value through the 1000s place
- Demonstrate fluency with the addition combinations up to 10 + 10
- Add multiples of 10 (up to 100) to and subtract from 2-digit and 3-digit numbers
- Solve addition problems with 2-digit numbers using multiple strategies
- Identify the expanded form of 3-digit numbers
- Find combinations of 2-digit numbers that add up to 100 or $1.00
- Read, write and sequence numbers to 1,000
- Use place value to determine the size of any number to 1,000
- Use place value understanding to round whole numbers to the nearest 10 or 100
- Recognize and represent the groups of 10s in 3-digit numbers
- Represent the structure of 3-digit numbers as being composed of 100s, 10s and 1s
- Use the value of each place to make 2-digit and 3-digit numbers closest to 100
- Estimate the sums of 2-digit and 3-digit numbers using knowledge of place value and known combinations
- Find the difference between 3-digit numbers
- Represent addition strategies
- Represent subtraction strategies
- Understand the comparison as the difference between two numbers
- Solve story problems that involve comparison
- Develop an efficient and fluent strategy to add larger numbers to 1,000
- Understand estimation is an efficient method to find a close solution to a problem
- Understand the sum of an addition story problem is the total of the parts
- Develop an efficient and fluent strategy to subtract larger numbers from 1,000
- Understand that changing some number in a subtraction problem affects the difference

Acquired Skills:

- Solve problems that involve adding and subtracting groups of 10
- Show representations for adding and subtracting multiples of 10 using Base 10 materials
- Solve a set of problems that involve adding and subtracting 2-digit numbers using Base 10 materials
- Solve missing addend problems to find the difference between 2-digit numbers and 100 using

100s chart
- Use 100 grids and number lines as tools to solve problems
- Identify equivalent combinations that represent 3-digit numbers using Base 10 materials
- Show fluency with addition combinations to 10 + 10
- Make pairs of 2-digit numbers that add to 100
- Estimate the sums of 2-digit numbers
- Show equivalencies of different combinations of hundreds, tens and ones for the same number
- Solve story problems that involve finding equivalencies of 100s, 10s and 1s
- Locate numbers on a 1,000 chart
- Estimate the sums of 2-digit and 3-digit numbers
- Determine the number of 10s in 3-digit numbers
- Solve addition problems to 1,000 using multiple strategies
- Add and subtract 1s, 10s and 100s by place value
- Solve subtraction problems that are related to addition combinations
- Identify the difference between a pair of numbers using the number line
- Solve travel problems by using subtraction strategies
- Use subtraction to compare numbers Subtract from multiples of 100
- Add multiples of 10 and 100 to, and subtracting them from 3-digit numbers
- Estimate answers to subtraction problems with 3-digit numbers
- Use the relationship of numbers in a subtraction expression to multiples of 100 to solve subtraction problems
- Solve addition problems with 3-digit numbers
- Solve addition problems with more than 2 addends
- Estimate which of two sums is greater
- Know and use addition and subtraction fact families to 10 + 10 fluently
- Determine combinations of addends for a given sum
- Solve addition and subtraction problems with more than one step
- Use story contexts and representations to support explanations about how changing a number in a subtraction problem can affect the difference
- Solve addition problems by changing the numbers to create an equivalent problem that is easier to solve
- Use story contexts and representations to support explanations about equivalent addition expressions (e.g., 88 + 105 = 90 + 103)
- Identify addition strategies by focusing on how each strategy starts
- Solve subtraction problems that involve comparison, removal or finding a missing part
- Subtract 3-digit numbers by using strategies that involve either subtracting one number in parts, adding up or subtracting back
- Represent solutions to subtraction problems with number lines, 1,000 charts and/or story contexts
- Read and write numbers in the thousands

Instructional Materials:

- Investigations in Number, Data and Space, Pearson Education, Inc., 2012
- Investigations in Number, Data and Space, Manipulatives Kit for Grade 3
- Investigations in Number, Data and Space, Card Package for Grade 3
- Chart Paper
- Color Tiles
- Communicators
- Counters – 2 color
- Dice
- 6 sided
- 10 sided
- Hundreds Chart
- Snap Cubes
- Thousand Chart

Differentiation:

Enrichments:

- More Sticker Combinations Extension
- Sequencing Numbers in Four Categories Extension
- Creating Starter Problems Extension
- How Far From 100? Extension
- Comparing Heights of Trees Extension
- Extending a Set of Problems Extension
- Making Equivalent Problems Extension
- Subtracting with Larger Numbers Extension
- Finding a Rule Extension

Supplements:

- Adding 2-Digit Numbers Intervention
- Practice Adding and Subtracting 10s
- Practice Finding Sums That Equal 100 Intervention
- Making Sums Close to 100 Practice Measuring With A Ruler Practice
- Finding Groups of 10 Intervention
- Addition and the 900 Chart Practice
- Modeling Solutions to Addition Problems Intervention
- Using Addition Strategies Practice
- Number Lines and the 200 Chart Intervention
- "Less Than" Questions Practice
- Using the Number Line Intervention
- More Subtraction Problems Practice
- Subtracting Multiples of 10 Intervention
- Addition and Subtraction Practice

- Adding Smaller 3-Digit Numbers Intervention
- Adding 3-Digit Numbers Practice
- Oregon Trail Problems Intervention
- Lunch Orders Practice

Assessments:

Formative Assessments:

- Assessment Checklist for Rounding
- Assessment Checklist for Place Value Addition
- Assessment Checklist for Place Value Subtraction
- Teacher's observation of students at work; anecdotal records
- Individual conferences and group discussions
- Students' recording sheets

Summative Assessments:

- Teacher's observation of students at work
- Individual conferences
- Q1 Assessments

Benchmarks:

- Quarterly Mathematics Assessment

Alternative Assessments:

- Modified tasks and assessment rubrics
- Performance-based assessment tasks

List of Applicable New Jersey Student Learning Standards Covered in This Unit:

- NJSLS.3.0A.A.3
- NJSLS.3.0A.B.5
- NJSLS.3.0A.C.8
- NJSLS.3.0A.C.9
- NJSLS.3.NBT.A.1
- NJSLS.3.NBT.A.2
- NJSLS.3.MD.A.1
- NJSLS.MP.1-8

Suggested Learning Experiences and Instructional Activities:

- Exploring Sticker Station
- Story Problem Strategies
- Make a 1,000 Chart
- Close to 1000
- Today's Number
- Distance Riddles
- Capture 300 to 600 Game
- Related Subtraction Problems
- Making Addition Representations
- Addition Starter Problems
- Crossing over 1,000 with Addition
- Categorizing Addition Strategies
- Multiple-Addend Problems
- Estimation with Addition
- Game: Collections Compare
- Travel Problems
- Solving a Comparison, Removal or Missing Part Subtraction Problem
- Making Story Problems

Websites:

Sheppardsoftware.com – Games - http://www.sheppardsoftware.com/math.htm

- Basic operations
- Place Value
- Early math

Mathfact.cafe - Online Practice http://www.mathfactcafe.com /

- Addition, Subtraction

www.mrnussbaum.com

www.ixl.com/math/ - Online Practice

- Equations and Variables
- Addition
- Subtraction
- Logical Reasoning

Unit 2: Multiplication and Division

Why Is This Unit Important?

In second grade, students were introduced to skip counting, tables and arrays. In this unit, third graders will develop these skills and become familiar with how they are related to the concepts of multiplication, and division.

The big ideas embedded in this unit are:

- Understand the meaning of multiplication
- Reason about numbers and their factors and multiples
- Understand and use the array model of multiplication
- Relate the array model to the area of a rectangle
- Learn multiplication combinations for 1-digit by 1-digit numbers
- Multiply 1-digit numbers by multiples of 10
- Understand division notation
- Understand division as an unknown factor problem
- Utilize strategies to fluently divide within 100
- Develop an understanding of the distributive property to solve 1-digit by 2-digit multiplication problems

Enduring Understandings:

- How to interpret products and quotients of whole numbers
- How to use the commutative, associative and distributive properties to solve multiplication problems
- When to choose strategies to solve multiplication problems in context
- Fluently multiply and know the product of 1-digit numbers within 100
- How to identify patterns in the multiplication tables
- When to use multiplication and division within 100 to solve word problems in situations involving equal groups
- How to determine the unknown whole number in a division equation
- Learn to fluently divide within 100
- How to solve division problems in context
- Apply the distributive property to solve higher order multiplication problems

Essential Questions:

- What things come in equal groups?
- How can you find the product in a multiplication situation?
- How can you determine or predict the final number in a skip counting event?
- How are multiplication and division related?
- How are multiples related to skip counting?
- What patterns do you see with multiples on the 100s chart?
- How do arrays connect to multiplication and division?

- What strategies can you use to solve multiplication and division problems with arrays?
- What strategies can you use to learn multiplication combinations by memory?
- How are equal groups associated with division?
- Can you write a division or multiplication story problem to represent an equation?
- How is skip counting and repeated addition related to division?
- How are multiples used to solve division problems?
- What strategies can you use to solve a 1-digit by 2-digit multiplication problem using an array?
- How is the distributive property associated with the break apart strategy?

Acquired Knowledge:

- Understand multiplication as combining equal parts
- Understand the relationship among skip counting and multiplication
- Comprehend the concepts of multiples
- Understand that doubling (or halving) one factor in a multiplication expression doubles (or halves) the product
- Develop an understanding that can be found by multiplying the dimensions of a rectangle
- Retain the products of 1-digit by 1-digit numbers within 100
- Understand the effect of multiplying multiples of 10

Acquired Skills:

- Write and solve multiplication problems in context
- Identify the number of groups, the number in each group, and the product in a multiplication situation
- Use multiplication notation
- Find the multiples of the numbers 1 through 10 by skip counting and multiplication
- Describe and compare characteristics and patterns of the multiples of a number
- Use arrays to model multiplication situations
- Use arrays to find factors of 2-digit numbers within 100
- Use arrays to identify characteristics of numbers
- Use arrays to find a product by skip counting by one of its dimensions
- Break an array into parts and use the distributive property to solve multiplication problems within 100
- Use known multiplication combinations to determine products not yet known
- Learn 1-digit by 1-digit multiplication combinations fluently
- Use arrays to illustrate the distributive property in multiplication
- Multiply by multiples of 10
- Use fact families to relate multiplication and division concepts
- Use multiplication combinations to solve division problems
- Use and understanding division notations
- Identify the dividend as the total number and the divisor as the number of groups or number in each group
- Describe the quotient as either the number of groups or number in each group as the solution for a division problem
- Utilize the multiples strategy to find the quotient
- Find the missing number in a division equation
- Write and solve division problems in context

Instructional Materials:

- Investigations in Number, Data and Space, Pearson Education, Inc., 2012
- Investigations in Number, Data and Space, Manipulatives Kit for Grade 3
- Investigations in Number, Data and Space, Card Package for Grade 3
- Chart Paper
- Color Tiles
- Communicators
- Counters – 2 color
- Dice
- 6 sided
- 10 sided
- Hundreds Chart
- Number Line
- Snap Cubes
- Thousand Chart

Differentiation:

Enrichments:

- How Many in Larger Groups? Extension
- Relating Multiples of 3 and 6 Extension
- Arranging More Chairs Extension
- Problems with Larger Numbers Extension
- 1-Digit by 2-Digit Multiplication Extension

Supplements:

- Another Picture Problem Intervention
- Ears and Toes Practice
- Skip Counting Intervention
- Using Known Multiplication Combinations Practice
- Arrays and Skip Counting Intervention
- How Many Petals? Practice
- Spots and Stripes Practice
- Problems About Counting Around the Class Practice
- Modeling Story Problems Intervention
- Finding Factors Practice
- More Problems About Counting Around the Class Practice
- Equations for Division Problems Practice
- Equations for Missing Factors Practice

Assessments:

Formative Assessments:

- Assessment Checklist for Place Value Multiplication
- Assessment Checklist for Place Value Division
- Teacher's observation of students at work; anecdotal records
- Individual conferences and group discussions
- Students' recording sheets

Summative Assessments:

- Teacher's observation of students at work
- Individual conferences
- Q2 Assessments

Benchmarks:

- Quarterly Mathematics Assessment

Alternative Assessments:

- Modified tasks and assessment rubrics
- Performance-based assessment tasks

List of Applicable New Jersey Student Learning Standards Covered in This Unit:

- NJSLS.3.0A.A.1
- NJSLS.3.0A.A.2
- NJSLS.3.0A.A.3
- NJSLS.3.0A.A.4
- NJSLS.3.0A.B.5
- NJSLS.3.0A.B.6
- NJSLS.3.0A.C.7
- NJSLS.3.0A.D.8
- NJSLS.3.0A.D.9
- NJSLS.3.NBT.A.3
- NJSLS.3.MD.A.1
- NJSLS.3.MD.C.7 a-d
- NJSLS.MP.1-8

Suggested Learning Experiences and Instructional Activities:

- Things That Come in Groups List
- Things That Come in Groups Book
- Representations of Equal Groups and Multiplications Combinations
- Counting Around the Class with Skip Counting

- Solving Picture Problems
- Highlighting Multiples on the 100 Chart
- Making Multiples towers for Multiplication Tables
- Solving Multiplication Story Problems
- Finding Multiple Patterns for Multiplication Tables
- Arranging Chairs, Representing Multiplication with Arrays
- Making Fact Triangle Cards
- Finding the Number of Squares in an Array
- Combinations I Know
- Combinations I'm Working On
- Array Game: Factor Pairs
- Array Game: Count and Compare
- Solving Division Story Problems
- Making Representations of Division Problems
- Solving Related Multiplication and Division Story Problems
- Write Multiplication and Division Story Problems for a Given Combination
- Create a Class Multiplication/Division Book
- Play the Game: Missing Factors/Arrays
- List Possible Division Notations for a Problem
- Multiplication/Division Combination Chart
- Use the Distributive Property and Arrays to Solve 1-Digity by 2-Digit Multiplication Problems

Websites:

Funbrain.com – Games:

- http://www.funbrain.com/tictactoe/index.html - Tic Tac Toe Squares - Addition, Subtraction, Multiplication, Division
- http://www.funbrain.com/math/index.html - Math Baseball - Addition, Subtraction, Multiplication, Division
- http://www.funbrain.com/measure/index. html

Sheppardsoftware.com – Games - http://www. sheppardsoftware.com/math.htm

- Basic operations

Mathplayground.com – Games - http://www.mathplayground.com/balloon invaders.html

- Number Invaders - Multiplication and Division
-

http://www.mathplayground.com/multiples.html

- Pumpkin Multiples

www.ixl.com/math/ - Online Practice

- Multiplication
- Division

www.mrnussbaum.com

Unit 3: Number and Operations - Fractions

Why Is This Unit Important?

Students have been introduced to the basics of equal shares and how they relate to fractions. In this unit, students will begin to become familiar with methods for comparing and combining fractions.

The big ideas embedded in this unit are:

- Understand the meaning of fractions
- Understand a fraction as a number on the number line
- Explain equivalence of fractions and compare fractions by reasoning about their size
- Understand and represent unit fractions and whole number fractions

Enduring Understandings:

- How to identify a fraction through the meanings of its parts
- How to find the fraction of a whole, an area, or a set of objects
- How to order fractions on a number line between 0 and 1
- How to recognize simple equivalent fractions
- Learn to express whole numbers as fractions
- How to compare fractions by reasoning about their size

Essential Questions:

- What do you use to identify a fraction by name?
- How do you create a set of equal fractions of a whole?
- What parts of a fraction can be used to order them on a number line?
- How do you compare fractions by their size?
- How can you write an equation using more than 1 fraction to create a whole?
- How many ways can you make fraction equivalencies of another fraction?

Acquired Knowledge:

- Understand the meaning of fractions as equal parts of a whole (an object, an area, a set of numbers)
- Understand a fraction as a number on the number line
- Explain equivalencies of fractions
- Understand that fractions can be compared by reasoning about their size
- Understand that two fractions are equivalent if they are the same size or at the same point on the number line
- Comprehend that whole numbers can be expressed as fractions

Acquired Skills:

- Find equal parts of a whole and name them with fractions
- Divide an area into equal parts
- Name fractional parts with unit fractions
- Order unit fractions
- Represent fractions on a number line
- Demonstrate that different shaped pieces that are the same fraction of the same area have equal areas
- Name fractional parts with fractions that have numerators greater than 1
- Divide a group into equal parts and name the parts with fractions
- Identify equivalent fractional parts
- Use notation to record equivalencies
- Identify equivalent fractions
- Compare fractions
- Use the number line to compare fractions
- Use representations to combine fractions that sum to 1
- Use representations to combine fractions to equal other fractions

Instructional Materials:

- Investigations in Number, Data and Space, Pearson Education, Inc., 2012
- Investigations in Number, Data and Space, Manipulatives Kit for Grade 3
- Investigations in Number, Data and Space, Card Package for Grade 3
- Chart Paper
- Color Tiles
- Communicators
- Counters – 2 color
- Dice
- 6 sided
- 10 sided
- Hundreds Chart
- Number Line
- Snap Cubes
- Thousand Chart

Differentiation:

Enrichments:

- A Sharing Challenge Extension
- Adding and Subtracting Fraction Cookies Extension
- My Own Sharing Puzzles Extension

Supplements:

- Sharing five Brownies Intervention
- More Sharing Problems Practice
- Halves, Fourths, and Eights on Number Lines Practice
- Representing and Comparing Thirds and Sixths Practice
- Representing and Comparing Fourths and Eighths Practice
- Comparing Fractions on a Number Line Practice
- Is It Half Yellow? Intervention
- Identifying Equivalent Fractions Practice

Assessments:

Formative Assessments:

- Assessment Checklist for Equal Partitioning
- Assessment Checklist for Equivalent Fractions
- Teacher's observation of students at work; anecdotal records
- Individual conferences and group discussions
- Students' recording sheets

Summative Assessments:

- Teacher's observation of students at work
- Individual conferences
- Q3 Assessments

Benchmarks:

- Quarterly Mathematics Assessment

Alternative Assessments:

- Modified tasks and assessment rubrics
- Performance-based assessment tasks

List of Applicable New Jersey Student Learning Standards Covered in This Unit:

- NJSLS.3.0A.A.3
- NJSLS.3.NBT.A.1
- NJSLS.3.NBT.A.2
- NJSLS.3.NF.A.3a-d
- NJSLS.3.MD.A.1
- NJSLS.3.G.A.2
- NJSLS.MP.1-8

Suggested Learning Experiences and Instructional Activities:

- One Brownie to Share: Sharing One Brownie
- Directions for Making a Fraction Set
- Make Fraction Sets
- Order Fraction Pieces by Size
- Ways to Make 1 Whole
- Fraction Facts-Equations
- Fractions of 12
- Sharing Several Brownies
- Cutting Up Cookies: Hexagon Cookies Game
- Writing Fraction Equations
- Ways to Make 1/2 Equivalents
- The Fraction Cookie Game
- Half-Yellow Designs

Websites:

Sheppardsoftware.com – Games - http://www. sheppardsoftware.com/math.htm

- Fractions

Mathplayground.com – Games - http://www.mathplayground.com/Triplets/Triplets.html

- Triplets - Equivalent Fractions

www.ixl.com/math/ - Online Practice

- Fractions

Unit 4: Geometry, Measurement, & Data

Why Is This Unit Important?

Geometry is an area of mathematics that is an observable part of every child's world. . Students' knowledge of shapes from Grade 2 will help begin the process of classifying geometric figures by newly observed attributes. Students will learn how to take, display, and look at measurement data.

The big ideas embedded in this unit are:

- Measure with standard and metric units
- Understand and find perimeter
- Understand and find area
- Describe and classify two-dimensional figures
- Describe and measure angles
- Collect and classify data into categories
- Represent categorical data by using a graph (pictograph or bar graph)
- Measure with different units for length, capacity and mass

Enduring Understandings:

- How to generate measurement by measuring lengths with rulers marked with halves and fourths of an inch
- How to solve real world and mathematical problems involving perimeter of polygons
- How to find the perimeter given the side lengths of a polygon
- How to find the area of a plane figure in square units
- How arrays and areas of rectangles are related
- How areas are additive via decomposition of figures
- How geometric shapes in different categories may share attributes
- How to partition shapes into parts with equal areas
- How to sort and classify data
- How to represent data
- How to read and interpret data representations
- How to measure and estimate length, volume and mass
- How to use manipulatives to measure and solve measurement problems

Essential Questions:

- Which tools do you use to measure certain objects?
- What are the names of the units of measure?
- When do you use a specific unit of measure?
- How do you use a measurement tool accurately?
- What are "Measurement Benchmarks"?
- How do you find the perimeter of a 2-dimensional shape?
- How do you find the area of a polygon?

- How do you determine congruence between shapes?
- What are the important attributes of 2-dimensional figures?
- How do you classify a polygon by its attributes?
- What is the meaning of an angle?
- What categories can be used to sort the data?
- What is the best way to represent the data?
- How do you read and interpret data from the graph?
- What is the best interval to be used for the representation?
- What tools do you use to measure length, volume and mass?
- What representations can be used to show a specific measure and solve a measurement problem?

Acquired Knowledge:

- Review and understand length of units of measure
- Understand the relationship between feet and inches
- Understand 1/2 and 1/4 of an inch on a foot ruler
- Understand perimeter as the measure around the outside of a 2-D figure
- Understand that rectangles can have the same perimeter and different areas or the same area and different perimeters
- Understand that area is measured in square units
- Understand that when measuring area, the space being measured must be completely covered with no gaps or overlaps
- Compute the area of rectangles by tiling it, and recognize that area may also be found by multiplying the side lengths
- Understand that shapes with the same area can look different
- Comprehend congruence through geometric moves
- Determine geometric nomenclature through their attributes
- Develop methods for collecting data
- Explain attributes of data
- Explain representation systems of data
- Develop and use systems of measurement
- Use of measurement tools

Acquired Skills:

- Measure in 1/2, 1/4 and full inches
- Measure lengths longer than the measuring tool
- Establish measurement benchmarks
- Use the U.S. standard and the metric units to accurately measure length
- Recognize and explaining possible sources of measurement error
- Find perimeter using standard units
- Create different shapes with the same perimeter
- Find the perimeter of an irregular shape
- Use tiles to find the area and perimeter of a rectangle
- Find the dimensions of a rectangle to determine the area

- Use squares and triangles to make shapes with an area in square units
- Make shapes with the same area but different perimeters
- Find the area of partially covered rectangles
- Find the area of an irregular shape
- Design a shape for a given area
- Find area by counting or calculating whole and partial square units
- Identify the attributes of triangles: Three sides, three vertices and three angles
- Identify the attributes of quadrilaterals: four sides, four vertices and four angles
- Collect data and sort into categories based on similar attributes
- Represent a set of data
- Represent data on a bar graph
- Represent data on a pictograph
- Read and interpret representations of data
- Solve problems related to representations of data
- Compare the difference in categories through mathematical operations
- Share results from a data investigation
- Use manipulatives to measure length, volume and mass
- Measure objects using a foot, yard, centimeter and a meter ruler
- Estimate the distance before using a measuring tool
- Measure distances greater than one yard or meter
- Solve operational problems related to measurement
- Measure and estimate liquid measures, weight and mass of objects using the metric system
- Create a line plot related to measurement of length
- Solve story problems related to the measurement of capacity, weight and mass

Instructional Materials:

- Investigations in Number, Data and Space, Pearson Education, Inc., 2012
- Investigations in Number, Data and Space, Manipulatives Kit for Grade 3
- Investigations in Number, Data and Space, Card Package for Grade 3
- Investigations in Number, Data and Space, Pearson Education, Inc., 2012
- Investigations in Number, Data and Space, Manipulatives Kit for Grade 3
- Investigations in Number, Data and Space, Card Package for Grade 3
- Chart Paper
- Color Tiles
- Communicators
- Counters – 2 color
- Dice
- 6 sided
- 10 sided
- Geoblocks
- Hundreds Chart
- Meter Stick
- Number Line
- Pattern Blocks
- Pitchers
- Rulers
- Scales

Differentiation:

Enrichment:

- Same Perimeter, Different Shape Extension
- Another Perfect Cover-Up Extension
- Quadrilaterals with 4 Different Side Lengths Extension
- Data Details Extension
- Compare Two Sets of Data Extension
- Yards, Feet and Inches Extension

Supplements:

- Another Ant's Path Intervention
- Ordering More Shapes by Perimeter Practice
- Finding the Area 1 Unit 5 3.1 A
- Finding the Area 2 Unit 5 3.1 A
- Finding the Area 3, 4 Unit 5 3.1A
- What's the Area Practice Unit 5 3.1 A
- Two Area Problems Intervention
- More Perimeter and Area Practice
- Identifying Triangles Intervention
- Building Shapes Practice
- Breakfast Data Intervention
- More Bar Graphs Practice
- How Many Crayons? Intervention
- Representing and Describe Data Practice
- Measure With a Ruler Intervention
- More Feet and Inches Practice
- Units for Measure Liquid Volume Practice
- Story Problems About Liquid Volume Practice
- Units for Measure Weight and Mass Practice
- Story Problems About Weight and Mass Practice
- Measurement Story Problems

Assessments:

Formative Assessments:

- Assessment Checklist for Shape Attribute Reasoning
- Assessment Checklist for Measuring
- Assessment Checklist for Data Representation
- Teacher’s observation of students at work; anecdotal records
- Individual conferences and group discussions
- Students’ recording sheets

Summative Assessments:

- Teacher's observation of students at work
- Individual conferences
- Q4 Assessments

Benchmarks:

- Quarterly Mathematics Assessment

Alternative Assessments:

- Modified tasks and assessment rubrics
- Performance-based assessment tasks

List of Applicable New Jersey Student Learning Standards Covered in This Unit:

- NJSLS.3.NBT.A.1
- NJSLS.3.NBT.A.2
- NJSLS.3.MD.A.1
- NJSLS.3.MD.A.2
- NJSLS.3.MD.B.3
- NJSLS.3.MD.B.4
- NJSLS.3.MD.C.5a-d
- NJSLS.3.MD.C.6
- NJSLS.3.MD.C.7a-d
- NJSLS.3.MD.D.8
- NJSLS.3.G.A.1
- NJSLS.MP.1-8

Suggested Learning Experiences and Instructional Activities:

- Measurement Tools Chart
- Estimate and Measure Standard and Metric Lengths
- Measurement Benchmarks
- An Ant's Path Perimeter
- Find and Measure Classroom Perimeters
- Measurement Guidelines
- Solving Perimeter Problems
- Order Shapes by Perimeters
- Quick Images 2-D
- Tetrominoes and Area
- Covering a Rectangle: The Perfect Cover-Up
- Tetromino Puzzle
- Shape Poster with Tetrominoes

- How Big Is Your Foot? Irregular Areas
- Make a Shape of a Given Area
- Building Straw Triangles
- Triangles Have... Attributes
- Tricky Triangles: Identify Triangles
- Building Quadrilaterals
- Attributes of Squares and Rectangles
- Right Angles vs. Not Right Angles
- Finding Angles
- Places Where We Like to Eat
- Classify Grade 3 Data, Places Where We Like to Eat
- Organizing the Data
- Creating a Pictograph Representation
- Creating a Bar Graph
- Guess My Rule
- Develop a Survey Question "What Is Your Favorite..."
- Compare Bar Graphs
- Find Length with Measurement Tools
- Collect Data Using Measurement
- Is Your Foot a Foot Long?
- Blowing a Pattern Block
- Measuring the Classroom
- How Far Can a Grade 3 Student Jump?
- Measure Liquid Volume With Containers
- Measure Mass and Weight With a Scale

Websites:

Funbrain.com – Games:

- http://www.funbrain.com/measure/index.html - Measurement Game - Measuring inches and centimeters

Sheppardsoftware.com – Games - http://www. sheppardsoftware.com/math.htm

- Measurement

www.ixl.com/math/ - Online Practice

- Measurement
- Geometry
- Graphing

Sample Standards Integration

21st Century Skills & Career Readiness Practices

CRP4. Communicate clearly and effectively and with reason.

For example, in Unit 1 students will justify their reasoning in their choice of addition and subtraction strategies used.

CRP6. Demonstrate creativity and innovation.

For example, in Unit 4 students will create shapes and solids by combining other shapes and solids and describe their creations.

CRP7. Employ valid and reliable research strategies.

For example, in Unit 4 students will select a question and gather data from the class; they will organize and represent the data and describe what they've learned from the data set.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

For example, in Unit 3 students will work to solve and understand the partitioning and representing them with equivalence in real world applications.

CRP12. Work productively in teams while using cultural global competence.

For example, in Unit 4 students will work in small teams to design a survey question, gather data, and present the findings.

8.1 Educational Technology
All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

For example, in Unit 4 students will access, manage, evaluate, and synthesize information to develop models for geometric shapes and their manipulation.

Interdisciplinary Connections

NJSLS. 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.

NJSLS.RI.3.2. Determine the main idea of a text; recount the key details and explain how they support the main idea.

NJSLS. RI.3.4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

NJSLS. RI.3.7. Use information gained from text features (e.g., illustrations, maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

These standards are met throughout the course. For example, in Unit 2 students will read stories to explore concepts relating multiplication and division.

NJSLS.SL1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

NJSLS.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

NJSLS.SL3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

NJSLS.SL4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

These standards are met throughout the course. For example, in Units 1 and 2 students will discuss their solutions to a variety of story problems, listen to classmates' explanations, establish norms about math discussions, and work to develop conversation skills in responding to and building upon others' math ideas. In Units 3 and 4, students will ask and answer questions about information presented in various media, including videos about adding fractions and measurement.