

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding.

~William Paul Thurston~

Elementary Education

Katherine Thorn, Elementary Supervisor

Curriculum Committee

Simone Siegel

Jessica Velez

Curriculum Developed:

August 2019

Date of Board Approval:

September 3, 2019

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Table of Contents

Section	
Affirmative Action Statement.....	3
EDUCATIONAL GOALS.....	4
Introduction.....	5
Curriculum Pacing Chart	6
Unit I: Place Value, Addition, and Subtraction.....	7
Unit II: Multidigit Multiplication.....	13
Unit III: Division and Multiplication Relationship.....	19
Unit IV: Fraction and Decimal Introduction.....	23
Unit V: Customary Conversions and Geometry	28
Unit VI: Fraction and Decimal Application.....	35
Unit VII: Geometric Applications.....	41
APPENDIX A: Technology Resources	45

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Mission Statement

We commit to inspiring and empowering all students in Randolph schools to reach their full potential as unique, responsible and educated members of a global society.

**Affirmative Action Statement
Equality and Equity in Curriculum**

The Randolph Township School district ensures that the district's curriculum and instruction are aligned to the state's standards. The curriculum provides equity in instruction, educational programs and provides all students the opportunity to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

N.J.A.C. 6A:7-1.7(b): Section 504, Rehabilitation Act of 1973; N.J.S.A. 10:5; Title IX, Education Amendments of 1972

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

**EDUCATIONAL GOALS
VALUES IN EDUCATION**

The statements represent the beliefs and values regarding our educational system. Education is the key to self-actualization, which is realized through achievement and self-respect. We believe our entire system must not only represent these values, but also demonstrate them in all that we do as a school system.

We believe:

- The needs of the child come first
- Mutual respect and trust are the cornerstones of a learning community
- The learning community consists of students, educators, parents, administrators, educational support personnel, the community and Board of Education members
- A successful learning community communicates honestly and openly in a non-threatening environment
- Members of our learning community have different needs at different times. There is openness to the challenge of meeting those needs in professional and supportive ways
- Assessment of professionals (i.e., educators, administrators and educational support personnel) is a dynamic process that requires review and revision based on evolving research, practices and experiences
- Development of desired capabilities comes in stages and is achieved through hard work, reflection and ongoing growth

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Introduction

The fourth-grade mathematics curriculum has been closely aligned to the New Jersey Student Learning Standards to provide teachers with a clear and consistent framework to help ensure student readiness for college and the workforce. To this end, instructional time in Grade 4 will focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

All students in Randolph Township Schools will be empowered to acquire knowledge and develop communication and problem-solving skills that will serve as tools to promote lifelong learning as confident, flexible, and resourceful thinkers. This curriculum has been designed, using the mathematical practice standards, to foster students' natural curiosity by encouraging all students, regardless of gender, economic status, or cultural heritage, to develop the ability, confidence, and motivation to succeed academically. Students will communicate and reason thereby increasing their mathematical literacy. This mathematical understanding will allow students to be successful at simple and complex real world tasks. Through this curriculum learning is centered around engaging students' interest and intellect through rich mathematical exploration, fostering a diverse and equitable environment that is challenging, caring, and technologically equip for the 21st century.

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Curriculum Pacing Chart

SUGGESTED TIME ALLOTMENT	UNIT NUMBER	CONTENT - UNIT OF STUDY
5 weeks	I	Place Value, Addition, and Subtraction
5 weeks	II	Multidigit Multiplication
4 weeks	III	Division and Multiplication Relationships
6 weeks	IV	Fractions and Decimal Introduction
6 weeks	V	Customary Conversions and Geometry
6 weeks	VI	Fraction and Decimal Applications
4 weeks	VII	Geometric Applications

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit I: Place Value, Addition, and Subtraction

TRANSFER: Analyze mathematical patterns and relationships to make sense of problems and persevere in solving them.		
STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p><u>NJSLS</u></p> <p><u>MATH</u></p> <p>4.NBT.A.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</p> <p>4.NBT.A.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.</p> <p>4.NBT.A.3 Use place value understanding to round multi-digit whole numbers to any place.</p>	Analyzing patterns increases mathematical understanding of whole numbers.	<ul style="list-style-type: none"> How does the value of a digit change within a number? What strategies can be used to find rules for patterns?
	The use of mathematical strategies can aid in solving real world problems.	<ul style="list-style-type: none"> How does understanding place value help in solving more complex mathematical problems? How can using addition and subtraction help solve real world problems?
	Estimation functions as a strategy for achieving reasonable approximations in given situations.	<ul style="list-style-type: none"> How can a mathematician check reasonableness of an answer?
	<u>KNOWLEDGE</u> Students will know:	<u>SKILLS</u> Students will be able to:
	In a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.	Recognize place value in whole numbers through the hundred-thousand place.

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit I: Place Value, Addition, and Subtraction

<p>4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.</p> <p>4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</p> <p>4.OA.C.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.</p> <p><u>Standards of Mathematical Practice</u></p> <p>MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.</p>	<p>A number can be read and written using base-ten numerals, number names, and expanded form.</p> <p>Multi-digit numbers can be compared and ordered based on the value of the digits in each place.</p> <p>Place value understanding can be used to round multi-digit numbers to any place.</p>	<p>Look for and make use of structure to analyze how the place value of a digit can change its value.</p> <p>Identify and construct numbers in base-ten numerals, number names, and expanded form orally and in writing.</p> <p>Attend to precision while organizing multi-digit numbers in order based on their value.</p> <p>Compare multi-digit numbers based on meanings of the digits in each place, using $<$, $>$, $=$ symbols to record the results of the comparison.</p> <p>Utilize place value to understand strategies for rounding.</p> <p>Apply algorithms to round whole numbers up to 1,000,000 to the nearest ten, hundred, thousand, ten thousand, hundred thousand, or millions place.</p>
---	--	--

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit I: Place Value, Addition, and Subtraction

<p>MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.</p> <p><u>NJSLS</u></p> <p><u>TECHNOLOGY</u></p> <p>8.1.5.A.1 8.1.5.A.3 8.2.5.C.4 8.1.P .C.1</p>	<p>Adding and subtracting multi-digit numbers in base-ten units relies on an understanding of place value.</p> <p>Sum and difference number stories can be interpreted and solved using a variety of strategies and models.</p> <p>Estimation can help assess the reasonableness of answers.</p> <p>Patterns are generated by following a specific rule.</p>	<p>Attend to precision when fluently adding and subtracting single digit numbers.</p> <p>Apply understanding of place value to fluently add and subtract multi-digit whole numbers.</p> <p>Reason abstractly and quantitatively in making sense of multi-digit addition and subtraction problems and explain the process used in solving problems.</p> <p>Solve addition and subtraction number stories by constructing appropriate mathematics models.</p> <p>Make sense of sum and difference problems and persevere in solving them.</p> <p>Compare precise answers to estimates to evaluate the reasonableness of the answer.</p> <p>Generate a number pattern that follows a given rule.</p>
--	--	---

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit I: Place Value, Addition, and Subtraction

		Use mathematical language to describe the features of a number or shape pattern, including those that were not explicit in the rule itself.
	KEY TERMS: compare, digit, estimate, expanded form, place value, round, standard form, word form, addend, difference, estimate, regrouping, algorithm, sum, base-ten, pattern, rule, multistep, strategy, perseverance, term, repeating, number model, value	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Demonstrating computational fluency and flexibility within place value concepts • Applying prior knowledge of place value, addition and subtraction to complex real-world problems (Performance Task) <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> • Compare place value in whole numbers up to the million's place • Apply place value concepts to understand values of a number • Explore the relationship between each digit in a multi-digit whole number, specifically that a number represents a value ten times greater than the digit to its right • Explore how to represent numbers in standard form, word form, and expanded form • Investigate how to compare and order multi-digit whole numbers using place value concepts • Explore the rounding process by using number lines and benchmarks 		

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit I: Place Value, Addition, and Subtraction

<ul style="list-style-type: none"> • Practice formal procedures in rounding for numbers up to the million's place • Apply understandings of place value and operations to add and subtract • Explore and practice using the U.S. traditional addition to add multi-digit numbers up to one million • Explore and practice using the U.S. traditional subtraction to subtract multi-digit numbers up to one million • Analyze addition and subtraction patterns to determine the rule • Generate and identify patterns that use addition and subtraction • Investigate strategies to solve addition and subtraction number stories and persevere in solving problems • Apply estimation strategies to assess the reasonableness of a sum or difference 	
SUGGESTED TIME ALLOTMENT	5 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Everyday Math Manual</p> <ul style="list-style-type: none"> • 1.1 Place Value in Whole Numbers • 1.2 Place Value Concepts • 1.3 Formal Procedures in Rounding • 1.5 Estimation Strategies • 1.6 Guide to Solving Number Stories • 1.7 U.S. Traditional Addition • 1.9 U.S. Traditional Subtraction • 2.13 Finding the Pattern • 7.9 Generating and Identifying Patterns • 8.12 Applying Understandings of Place Value and Operations <p>Math in Practice-4th Grade</p> <ul style="list-style-type: none"> • Module 3: Understanding the Place Value System

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit I: Place Value, Addition, and Subtraction

	<ul style="list-style-type: none">• Module 4: Fluently Adding and Subtracting Multidigit Numbers• Module 15: Solving Complex Problems <p>Internet Links (SEE APPENDIX A)</p>
--	--

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit II: Multidigit Multiplication

TRANSFER: Attend to precision when making sense of and solving problems.		
STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p><u>NJSLS</u></p> <p><u>MATH</u></p> <p>4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.</p> <p>4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.</p> <p>4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the</p>	There are different structures and strategies for solving multiplication problems.	<ul style="list-style-type: none"> • Why is precision important when solving multiplication problems? • How are the various multiplication strategies interrelated?
	Mathematicians are flexible when utilizing mathematical concepts to solve real-world problems.	<ul style="list-style-type: none"> • How does breaking apart a number aid in solving complex problems? • What strategies can be utilized in making sense of a complex math problems?
	Analyzing patterns increases mathematical understanding of whole numbers.	<ul style="list-style-type: none"> • How does understanding patterns help in solving multiplication problems?
	<p style="text-align: center;"><u>KNOWLEDGE</u> Students will know:</p>	<p style="text-align: center;">SKILLS Students will be able to:</p>
	<p>Multiplication can be interpreted and represented as a comparison statement.</p> <p>Multidigit multiplication can be solved by using a variety of acceptable algorithms.</p>	<p>Interpret and represent multiplication equations as a comparison statement with variables.</p> <p>Attend to precision when fluently multiplying single digit numbers.</p>

Randolph Township Schools Randolph Elementary Schools Mathematics Grade 4 Curriculum

Unit II: Multidigit Multiplication

<p>reasonableness of answers using mental computation and estimation strategies including rounding.</p> <p>4.OA.B.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.</p> <p>4.NBT.B.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.</p> <p>4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p> <p><u>Standards of Mathematical Practice</u></p> <p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments and critique the reasoning of others.</p>	<p>Different multiplication strategies can be used to solve multiplicative comparison number stories.</p> <p>Multistep multiplication number stories require additional time to make sense of the problem, create a plan to complete each step, and carry out the plan.</p> <p>Letters can stand for unknown quantities.</p> <p>Estimation strategies can help assess the reasonableness of products.</p>	<p>Apply knowledge of different multiplication strategies to precisely answer multiplication problems</p> <p>Create drawings, models, and equations with symbols to represent multiplicative comparison number stories.</p> <p>Recognize the different steps necessary to solve a multiplication number story.</p> <p>Design and implement a plan to solve multistep number stories involving multiplication and division.</p> <p>Represent an unknown quantity with a letter in a multiplication number model.</p> <p>Use estimation strategies to find a reasonable answer to a product.</p> <p>Compare precise answers to estimates to evaluate the reasonableness of the answer.</p>
--	---	--

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit II: Multidigit Multiplication

<p>MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.</p> <p><u>Technology</u></p> <p>8.2.5.C.4</p>	<p>Factors are the numbers that are multiplied in an equation; the number they equal is the product.</p> <p>A multiple of a number is the product of that number and another whole number.</p> <p>A prime number is a counting number greater than one that only has two factors- one and itself and a composite number is a counting number greater than one that has more than two different factors.</p> <p>A mathematician demonstrates fluency of addition and subtraction through understanding, flexibility, and efficiency in use of strategies.</p>	<p>Find all factor pairs for a whole number in the range 1-100.</p> <p>Identify math facts that are difficult and develop a plan to increase fluency.</p> <p>Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number.</p> <p>Recognize a whole number is a multiple of each of its factors.</p> <p>Define the characteristics of a prime number and a composite number.</p> <p>Determine whether a given whole number in the range 1-100 is prime or composite.</p> <p>Fluently add and subtract within 1,000,000.</p> <p>Make sense of multiplication problems and explain solution utilizing addition. Critique and understand the reasoning of others in use of addition strategies to solve varied multiplication problems.</p>
--	--	---

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit II: Multidigit Multiplication

	KEY TERMS: factor, factor pair, multiple, prime, composite, product, repeated addition, lattice, array, rectangular model, area model, standard algorithm, strategy, estimate, rounding, perseverance, partial product, formula, unknown, equal groups, comparison statement, multiplicative comparison, times as many	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Demonstrating computational fluency within multidigit multiplication concepts • Applying knowledge of multi-digit multiplication to complex real-world scenarios (Performance Task) <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> • Build an understanding of factors and multiples through investigation and discussions • Identify factors and factor pairs for numbers 1-100 • Express the next 10 multiples of a number 1-100 • Investigating the concepts of prime and composite numbers • Classify prime and composite numbers from 1-100 • Interpret and express multiplication equations as comparisons statements • Practice solving multiplicative comparison number stories • Explore what happens when multiplying a number by 10, 100, and 1,000 • Construct extended multiplication facts using two-digit and three-digit numbers 		

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit II: Multidigit Multiplication

- Apply estimation strategies to assess the reasonableness of a products
- Practice with models to understand the process of multi-digit multiplication
- Multiply a whole number of up to four digits by a 1-digit whole number using strategies based on place value and properties (partitioning rectangles, partial products, lattice)
- Multiply two 2-digit numbers using strategies based on place value and properties (partitioning rectangles, partial products, lattice)
- Investigate strategies to solve multistep multiplication number stories and persevere in solving problems
- Practice solving multistep multiplication number stories

SUGGESTED TIME ALLOTMENT

5 weeks

SUPPLEMENTAL UNIT RESOURCES

Everyday Math Manual

- 2.3 Factors and Factor Pairs
- 2.4 Multiples
- 2.5 Prime and Composite Numbers
- 2.8 Multiplicative Comparisons
- 2.9 Multiplicative Comparison Number Stories
- 4.1 Extended Multiplication Facts
- 4.2 Making Reasonable Estimates for Products
- 4.3 Partitioning Rectangles
- 4.6 Introducing Partial-Products Multiplication
- 4.8 Money Number Stories
- 4.9 Partial-Products Multiplication
- 4.10 Multiplication Wrestling
- 4.12 Multistep Multiplication Number Stories
- 4.13 Lattice Multiplication

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit II: Multidigit Multiplication

- 5.13 More Multistep Multiplication Number Stories

Math in Practice-4th Grade

- Module 1: Understanding and Solving Problems with Multiplicative Comparison
- Module 2: Exploring Factors, Multiples, and Prime Numbers
- Module 3: Understanding the Place Value System
- Module 5: Using Place Value to Perform Multidigit Multiplication
- Module 15: Solving Complex Problems

Internet Links

(SEE APPENDIX A)

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit III: Division and Multiplication Relationship

TRANSFER: Apply knowledge of mathematical relationships to new scenarios.		
STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p><u>NJSLS</u></p> <p><u>MATH</u></p> <p>4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.</p> <p>4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.</p> <p>4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations</p>	The four basic arithmetic operations are interrelated, and the properties of each may be used to understand the others.	<ul style="list-style-type: none"> How do the four operations' relationships help to solve problems?
	Mathematicians are flexible when solving problems.	<ul style="list-style-type: none"> How can using different models for solving division and multiplication problems help in attending to precise?
	Numbers have meaning in the real-world and can be interpreted in different ways.	<ul style="list-style-type: none"> What are some ways that you can interpret remainders differently? How does the context of a number story help decipher the meaning of a number?
	<p><u>KNOWLEDGE</u></p> <p>Students will know:</p>	<p>SKILLS</p> <p>Students will be able to:</p>
	Multidigit division can be solved by using a variety of acceptable algorithms.	<p>Attend to precision when fluently dividing single digit numbers.</p> <p>Apply knowledge of different division strategies to precisely answer division problems.</p>

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit III: Division and Multiplication Relationship

<p>with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</p> <p>4.OA.B.4 Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.</p> <p>4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p> <p>4.NBT.B.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.</p> <p><u>Standards of Mathematical Practice</u></p> <p>MP.1 Make sense of problems and persevere in solving them.</p>	<p>Remainders can affect the quotient depending on how it is interpreted.</p> <p>Letters can stand for unknown quantities.</p> <p>Estimation strategies can help assess the reasonableness of quotients.</p> <p>Multiplication and division are inverse operations.</p> <p>Multistep multiplication and division number stories require additional time to make sense of the problem, create a plan to complete each step, and carry out the plan.</p>	<p>Identify when a quotient has a remainder.</p> <p>Interpret and analyze remainders in division problems.</p> <p>Represent an unknown quantity with a letter in multiplication and division number models.</p> <p>Use estimation strategies to find a reasonable answer to a quotient.</p> <p>Compare precise answers to estimates to evaluate the reasonableness of the answer.</p> <p>Demonstrate the relationship between multiplication and division.</p> <p>Apply knowledge of multiplication strategies to solve division problems.</p> <p>Recognize the different steps necessary to solve multiplication and division number stories.</p> <p>Design and implement a plan to solve multistep number stories involving multiplication and division.</p>
---	--	--

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit III: Division and Multiplication Relationship

<p>MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.</p> <p><u>Technology</u></p> <p>8.2.5.C.4</p>	<p>KEY TERMS: quotient, divisor, dividend, remainder, estimate, unknown, equal groups, divisibility, formula, repeated subtraction, standard algorithm, partial quotients, perseverance, strategy, mathematical relationship</p>	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Interpreting and solving complex mathematical problems using strategic thinking as it relates to multiplication and division • Applying of prior knowledge of multiplication and division to real world scenarios (Performance Task) <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> • Apply place value to extended division facts • Practice with strategies for division (visual models, rectangle model, partial-quotients) • Apply place value strategies to find whole-number quotients with up to four-digit dividends and one-digit divisors • Explore division problems and discuss how the remainders affect the answer • Express and interpret remainders that change the quotient • Extend understanding of whole-number multiplication • Discover the relationship between division and multiplication using rectangle models and area models • Investigate strategies to solve multistep division number stories and persevere in solving problems 		

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit III: Division and Multiplication Relationship

<ul style="list-style-type: none"> Practice solving multistep division number stories 	
SUGGESTED TIME ALLOTMENT	4 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Everyday Math Manual</p> <ul style="list-style-type: none"> 6.1 Extended Division Facts 6.3 Strategies for Division 6.4 Partial-Quotients Division, Part 1 6.7 Partial-Quotients Division, Part 2 6.8 Expressing and Interpreting Remainders 6.13 Extending Understanding of Whole-Number Multiplication <p>Math in Practice-4th Grade</p> <ul style="list-style-type: none"> Module 5: Using Place Value to Perform Multidigit Multiplication Module 6: Using Place Value to Perform Multidigit Division Module 15: Solving Complex Problems <p>Internet Links (SEE APPENDIX A)</p>

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit IV: Fraction and Decimal Introduction

TRANSFER: Analyze how mathematical concepts relate to one another in the context of a problem or an abstract relationship.		
STANDARDS / GOALS: <u>NJSLS</u> <u>MATH</u> 4.NF.A.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a) / (n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. 4.NF.A.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. 4.NF.B.3 Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
	Fractions are an integral part of our daily life and an important tool in solving problems.	<ul style="list-style-type: none"> How are fractions used in real life situations?
	Numbers can be represented in different ways to express the same value.	<ul style="list-style-type: none"> What is the relationship between fractions and decimals?
	Mathematical problem solvers make sense of problems and justify their reasoning.	<ul style="list-style-type: none"> What strategies can a mathematician use to determine the reasonableness of an answer?
	<u>KNOWLEDGE</u> Students will know:	SKILLS Students will be able to:
	Fractions with different numerators and denominators can represent the same value. The value of fractions is dependent on the relationship between the numerator and denominator.	Draw visual representations of fractions by showing the number of parts and the whole. Read, write and say decimal and fractional numbers to the hundredths place.

Randolph Township Schools **Randolph Elementary Schools** **Mathematics Grade 4 Curriculum**

<p>4.NF.C.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and use this technique to add two fractions with respective denominators 10 and 100.</p> <p>4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100.</p> <p>4.NF.C.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.</p> <p><u>Standards of Mathematical Practice</u></p> <p>MP.1 Make sense of problems and persevere in solving them.</p> <p>MP.2 Reason abstractly and quantitatively.</p> <p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <p>MP.4 Model with mathematics.</p> <p>MP.5 Use appropriate tools strategically.</p> <p>MP.6 Attend to precision.</p> <p>MP.7 Look for and make use of structure.</p> <p>MP.8 Look for and express regularity in repeated reasoning.</p> <p><u>Technology</u></p>	<p>Fractions with different numerators and denominators can be compared and ordered.</p> <p>Unit fractions always have a numerator of 1 and are used to compose the sum of other fractions.</p> <p>Place value can be used to find equivalent fractions with a denominator of 10 or 100.</p> <p>Fractions with denominators of 10 or 100 can be represented as decimals.</p>	<p>Explain what the numerator and denominator represent in a fraction.</p> <p>Use benchmark fractions of 0, $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ and 1 when comparing and ordering fractions.</p> <p>Compare fractions by creating visual fraction models or by finding common denominators or numerators.</p> <p>Use area models, number lines, verbal justification and benchmark numbers to compare fractions with unlike denominators.</p> <p>Distinguish between a unit fraction and a fraction with a numerator greater than 1.</p> <p>Convert fractions with a 10 in the denominator into equivalent fractions that have a 100 in the denominator.</p> <p>Convert fractions with a 10 or 100 in the denominator into equivalent decimals.</p> <p>Write decimals in fractional form and word form.</p>
--	--	--

Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum

8.2.5.C.4	Using place value concepts, fractions and decimals can be compared using symbols.	<p>Recognize that fractions can only be compared when they are referring to the same whole.</p> <p>Utilize the symbols $>$, $<$, and $=$ to compare fractions and decimals.</p>
	Use a visual model to justify comparisons between decimals.	<p>Compare decimals by examining the values of the digits in order.</p> <p>Demonstrate the value of a decimal by using base ten blocks, decimal grids and other manipulatives.</p>
	<p>KEY TERMS:</p> <p>benchmark, compare, denominator, equivalent fractions, fraction, numerator, order, decompose, factors, product, unit fraction, decimal, equivalent, hundredths, tenths, decimal point, represent, justify, word form, represent, estimate, common denominator, visual model</p>	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Demonstrating and explaining the relationship between fractions and decimals • Applying prior knowledge of fractions and decimals to solve complex real-world problems (Performance Task) <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> • Investigate ways to equally share objects • Use fraction circles to find equivalent fractions up to twelfths • Practice with number lines to find equivalent fractions up to twelfths 		

Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum

<ul style="list-style-type: none"> • Prove two fractions are equivalent using models, reasoning, or computations • Develop a rule for finding equivalent fractions for fractions • Generate equivalent fractions with a denominator up to hundredths • Explore comparing and ordering fractions by using concrete materials, diagrams, and discussions • Practice with comparing fractions with unlike denominators by finding a common denominator • Apply strategies and create models to order and compare fractions with unlike denominators • Use line plots to practice solving fraction addition and subtraction problems • Use fraction circles to model tenths • Use base-10 blocks to model decimals up to hundredths • Explore the relationship between tenths and hundredths • Practice with decimal notation up to hundredths • Apply place value to compare decimals up to hundredths 	
SUGGESTED TIME ALLOTMENT	6 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Everyday Math Manual</p> <ul style="list-style-type: none"> • 3.1 Equal Sharing and Equivalence • 3.2 Fraction Circles and Equivalence • 3.3 Number Lines and Equivalence • 3.4 An Equivalent Fractions Rule • 3.6 Comparing Fractions • 3.7 Comparing and Ordering Fractions • 3.8 Modeling Tenths with Fraction Circles • 3.9 Modeling Decimals with Base-10 Blocks • 3.10 Tenths and Hundredths • 3.13 Comparing Decimals • 5.9 Line Plots <p>Math in Practice-4th Grade</p> <ul style="list-style-type: none"> • Module 7: Exploring Equivalence and Ordering Fractions

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

- | | |
|--|---|
| | <ul style="list-style-type: none">• Module 10: Understanding Decimal Notation for Fractions• Module 13: Representing and Interpreting Data |
|--|---|

Internet Links

(SEE APPENDIX A)

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit V: Customary Conversions and Geometry

TRANSFER: Look for and make use of structure as a strategy for solving complex mathematical problems.		
STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<p><u>NJSLS</u></p> <p><u>MATH</u></p> <p>4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm. mm; kg, g; lb., oz.; l, ml; hr., min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.</p> <p>4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.</p>	There is a specific, mathematical relationship between different units of measurement.	<ul style="list-style-type: none"> How can the four mathematical operations be applied when converting between units?
	Units of measurement are represented in the physical world.	<ul style="list-style-type: none"> How does one determine the appropriate unit of measure for a given circumstance? How can knowledge of measurement help solve real-world problems?
	Patterns in geometric shapes help to solve real-world problems.	<ul style="list-style-type: none"> How can lines and angles be described and classified? How can angles be composed or decomposed to form larger or smaller angles?
	<u>KNOWLEDGE</u> Students will know:	<u>SKILLS</u> Students will be able to:
	There is a relative size for the customary units of measurement for the different systems: length, capacity, and weight.	Predict the appropriate unit of measurements to use when measuring.

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit V: Customary Conversions and Geometry

<p>4.MD.A.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</p> <p>4.MD.C.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:</p> <p>a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles. b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.</p> <p>4.MD.C.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.</p> <p>4.MD.C.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical</p>	<p>Measurement units can be converted within a single system of measurements.</p> <p>The four mathematical operations aid when solving word problems involving measurement.</p> <p>Data sets can be organized in a variety of ways.</p> <p>Perimeter is a real-life application of addition and subtraction.</p>	<p>Express measurements in a larger unit in terms of a smaller unit of measure. For example, show that 1 ft is 12 times as long as 1 in.</p> <p>Recognize when converting measurements within one system, the length, weight, volume, time or value remains the same.</p> <p>Select the appropriate operation when converting between units in one system.</p> <p>Design and implement a plan to solve multistep number stories involving unit conversion.</p> <p>Collect information to organize using an appropriate tool.</p> <p>Organize conversions using different tools such as a two-column table or a number line diagram with a measurement scale.</p> <p>Utilize knowledge of addition strategies to solve perimeter problems.</p>
--	--	---

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit V: Customary Conversions and Geometry

<p>problems, e.g., by using an equation with a symbol for the unknown angle measure.</p> <p>4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.</p> <p><u>Standards of Mathematical Practice</u></p> <p>MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.</p> <p><u>Technology</u></p> <p>8.2.5.C.4</p>	<p>Area is a real-life application of multiplication and division.</p> <p>Angles are composed of two rays that share a common endpoint.</p> <p>Angles are measured within the context of a circle, which contains 360 1-degree angles.</p> <p>Protractors are tools that can be used to measure and create angles.</p>	<p>Make use of the perimeter formula to solve problems with different unknown variables.</p> <p>Utilize knowledge of multiplication and division strategies to solve area problems.</p> <p>Apply the area formula to solve problems with different unknown variables.</p> <p>Identify the characteristics of lines, line segments, and rays.</p> <p>Explain and demonstrate how to draw and label an angle.</p> <p>Predict the measure of an angle based on its portion of a circle.</p> <p>Measure angles in whole-number degrees using a protractor and sketch angles of a specific measure.</p>
--	--	--

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit V: Customary Conversions and Geometry

	<p>Angles can be classified as right, acute or obtuse based on their measures.</p> <p>Angles are composed of smaller angles.</p>	<p>Apply knowledge of lines, line segments and rays to identify the characteristics of a right, acute or obtuse angle.</p> <p>Classify an angle as right, acute or obtuse based on observations of angle measures.</p> <p>Identify important benchmark angles through observations. For example, a right-angle measures 90°, a straight-angle measures 180°, and a reflex-angle measures 270°.</p> <p>Identify angles in two-dimensional figures</p> <p>Recognize that angles that are decomposed into non-overlapping parts have a measure that is the sum of the parts.</p> <p>Apply addition and subtraction strategies to solve for unknown angle measurements.</p>
	<p>KEY TERMS:</p> <p>Capacity, volume, weight, length, elapsed time, foot (ft.), inch (in.), yard (yd.), gallon (gal.), fluid ounce (oz.), quart (qt.), pint (pt.), minute (min.), second (sec.), hour (hr.), month, week, year (yr.), ounce</p>	

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit V: Customary Conversions and Geometry

	(oz.), pound (lb.), ton, area, perimeter, formula, unknown, square units (units ²), table, number line, scale, column, acute angle, obtuse angle, right angle, degree, point, protractor, ray, line	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> Solving and explaining solutions to complex mathematical problems using strategic thinking as it relates to conversions and geometry Applying prior knowledge of division and multiplication as it relates to conversions to real-world scenarios (Performance Task) <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> Investigate U.S. customary units of length: inches, feet, yards and miles Investigate U.S. customary units of weight: ounces, pounds, and tons Investigate U.S. customary units of liquid: fluid ounces, pints, quarts, and gallons Investigate units of time: seconds, minutes, hours, days, weeks, months and years Investigate the different money units: pennies, nickels, dimes, quarters and dollar bills Convert between U.S. customary units, time and money using division and multiplication strategies Practice with multiplication and division measurement number stories Apply knowledge of addition strategies to find the perimeter of rectangles Apply knowledge of multiplication strategies to find the area of rectangles Explore the relationship between area and perimeter Explore how measurement strategies can help find the area and perimeter of non-rectangular objects 		

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit V: Customary Conversions and Geometry

<ul style="list-style-type: none"> • Find the missing side lengths of rectangular figures when the area or perimeter is given • Apply the area model to solve for irregular rectilinear figures • Explore the relationship between squares and square numbers • Explore basic concepts and relationships of lines: points, line segments, lines and rays • Explore basic concepts of angles: acute, obtuse right, and straight angles • Use manipulatives to explore and apply strategies for estimating and measuring angles • Use a half-circle protractor to measure angles and sketch angles of a specified measurement • Explore and describe how angle measurements are additive • Apply addition and subtraction skills to find unknown angles • Investigate real world applications for angles 	
SUGGESTED TIME ALLOTMENT	6 weeks
SUPPLEMENTAL UNIT RESOURCES	Everyday Math Manual <ul style="list-style-type: none"> • 1.10 U.S. Customary Units of Length • 1.11 Points, Line Segments, Lines and Rays • 1.12 Angles, Triangles, and Quadrilaterals • 1.13 Finding Perimeters of Squares and Rectangles • 2.1 Square Number Patterns • 2.2 The Area Formula for Rectangles • 2.7 Units of Time • 4.8 Money Number Stories • 4.11 Area Models for Rectangles and Rectilinear Figures • 6.2 Area: Finding Missing Side Lengths • 6.6 Customary Units of Weight

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit V: Customary Conversions and Geometry

	<ul style="list-style-type: none">• 6.9 Measuring Angles• 6.10 Using a Half-Circle Protractor• 6.11 Angle Measures as Additive• 7.1 Converting Liquid Measures: U.S. Customary Units• 7.8 Division Measurement Number Stories• 8.2 Real-Life Angle Measures as Additive <p>Math in Practice-4th Grade</p> <ul style="list-style-type: none">• Module 11: Exploring Measurement and Measurement Conversions• Module 12: Understanding Area and Perimeter• Module 13: Representing and Interpreting Data• Module 14: Exploring Geometry and Geometric Measurements <p>Internet Links (SEE APPENDIX A)</p>
--	--

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit VI: Fraction and Decimal Application

TRANSFER: Look for and make use of structure when solving real world problems.		
STANDARDS / GOALS:	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
<u>NJSLS</u>		
<u>MATH</u>		
4.NF.B.3		
Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.	There are many ways to represent and compare numbers.	<ul style="list-style-type: none"> When do we need to consider amounts that do not represent whole numbers?
a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	Mathematical tools and strategies aid when solving real-world problems.	<ul style="list-style-type: none"> How are fractions and decimals used in problem solving?
b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.	Mathematical problem solvers justify their reasoning and conclusions by constructing viable arguments and critiquing the reasoning of others.	<ul style="list-style-type: none"> How does explaining the mathematical process help to understand a problem's solution better?
c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.		
d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.		
	<u>KNOWLEDGE</u> Students will know:	<u>SKILLS</u> Students will be able to:
	Adding and subtracting fractions joins and separates parts that refer to the same whole.	Fluently add and subtract fractions with like denominators.
	Fractions can be broken down by decomposing them.	Decompose fractions into a sum of fractions with the same denominator in multiple ways using equations.

Randolph Township Schools Randolph Elementary Schools Mathematics Grade 4 Curriculum

<p>4.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <ul style="list-style-type: none"> a. Understand a fraction a/b as a multiple of $1/b$. b. Understand a multiple of a/b as a multiple of $1/b$ and use this understanding to multiply a fraction by a whole number. c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. <p>4.NF.C.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and use this technique to add two fractions with respective denominators 10 and 100.</p> <p>4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm, mm; kg, g; lb., oz.; l, ml; hr., min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.</p> <p>4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.</p>	<p>Mixed numbers with like denominators can be added and subtracted.</p> <p>Multi-step fraction and decimal number stories require additional time to make sense of the problem, create a plan to complete each step, and carry out the plan.</p> <p>Fractions have multiples.</p> <p>Multiplying fractions by a whole number is connected to fraction multiples.</p> <p>Fractions with denominators of 10 or 100 can be converted and added.</p>	<p>Justify fraction decompositions by using visuals and written explanations.</p> <p>Convert mixed numbers into improper fractions.</p> <p>Fluently add and subtract mixed numbers with like denominators by using a variety of strategies.</p> <p>Solve multi-step fraction and decimal number stories by constructing appropriate mathematics models.</p> <p>Make sense of problems and persevere in solving them.</p> <p>Identify the sequence of multiples that come after a unit fraction.</p> <p>Create a multiplication number sentence with a unit fraction and a whole number for a given fraction.</p> <p>Express a fraction with a denominator of 10 as an equivalent fraction with a denominator of 100.</p> <p>Add two fractions with denominators of 10 and 100.</p>
--	---	--

Randolph Township Schools Randolph Elementary Schools Mathematics Grade 4 Curriculum

<p>4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.</p> <p><u>Standards of Mathematical Practice</u></p> <p>MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.</p> <p><u>Technology</u></p> <p>8.2.5.C.4</p>	<p>There is a relative size for the metric units of measurement for the different systems: length, volume, and mass.</p> <p>Measurement units can be converted within a single system of measurements.</p> <p>The four operations aid when solving word problems involving measurement.</p> <p>Data sets can be organized in a variety of ways.</p>	<p>Predict the appropriate unit of measurements to use when measuring.</p> <p>Express measurements in a larger unit in terms of a smaller unit of measure. For example, show that 1 meter is 100 times as long as 1 centimeter.</p> <p>Apply place value ideas to convert units in the metric system.</p> <p>Recognize when converting measurements within one system, the length, mass or volume of the object remains the same.</p> <p>Select the appropriate operation when converting between units in one system.</p> <p>Design and implement a plan to solve multistep number stories involving unit conversions.</p> <p>Collect information to organize using an appropriate tool.</p> <p>Express conversions using different tools such as a two-column table or a number line diagram with a measurement scale.</p>
---	---	--

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

	KEY TERMS: capacity, centigram, centimeter, convert, decigram, deciliter, decimeter, elapsed time, gram, kilogram, liter, mass, meter, metric, milligram, milliliter, millimeter,	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Interpreting and solving complex mathematical problems using strategic thinking as it relates to fractions, decimals and the conversion of metric units. • Applying prior knowledge of fractions, decimals, and conversions to real-world scenarios (Performance Task) <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> • Decompose a fraction into a sum of unit fractions • Compare fractions in relation to a whole • Practice adding fractions with like denominators by drawing models and using an understanding of fractions as numbers • Practice adding mixed numbers with like denominators • Investigate adding fractions with denominators 10 and 100 • Practice subtracting fractions with like denominators by drawing models and using an understanding of fractions as numbers • Practice subtracting mixed numbers with like denominators • Apply fraction, addition and subtraction skills to solve number stories with fractions and mixed numbers • Investigate situations with fraction multiplication • Investigate strategies for converting a mixed number to an improper fraction • Apply fraction decomposition to multiply a whole and a fraction • Practice multiplying a whole number and a fraction • Practice multiplying a whole number and a mixed number • Practice solving multi-step fraction number stories • Create and interpret line plots that display data in fractional units: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ • Solve problems using addition and subtraction of fractions using data on a line plot 		

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

- Apply fractional and decimal skills to solve decimal number stories
- Investigate metric units of length: millimeter, centimeter, meter, kilometer
- Investigate metric units of volume: milliliter, liter
- Investigate metric units of mass: milligram, gram, kilogram
- Apply place value and decimal concepts to convert between metric units

SUGGESTED TIME ALLOTMENT	6 weeks
SUPPLEMENTAL UNIT RESOURCES	Everyday Math Manual <ul style="list-style-type: none"> • 3.11 Tenths and Hundredths of a Meter • 3.12 Tenths of a Centimeter • 4.4 Converting Liquid Measures • 4.7 Metric Units of Mass • 5.1 Fraction Decomposition • 5.2 The Whole for Fractions • 5.3 Adding Fractions • 5.4 Adding Mixed Numbers • 5.5 Adding Tenths and Hundredths • 5.7 Subtracting Fractions • 5.8 Subtracting Mixed Numbers • 6.12 Number Stories with Fractions and Mixed Numbers • 7.2 Exploring Fraction Multiplication Situations • 7.3 Fractions as a Multiple of a Unit Fraction • 7.4 Multiplying Fractions by Whole Numbers • 7.5 Multiplying Mixed Numbers by Whole Numbers • 7.10 Solving Multistep Fraction Number Stories • 7.12 Decimal Number Stories • 7.13 Displaying Insect Data • 8.1 Extending Multistep Number Stories

Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum

- 8.5 Line Plots: $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ Inches
- 8.6 Fractions and Perimeter
- 8.8 Areas of Rectangles with Fractional Side Lengths
- 8.7 More Decimal Number Stories
- 8.9 More Fraction Multiplication Number Stories

Math in Practice-4th Grade

- Module 7: Exploring Equivalence and Ordering Fractions
- Module 8: Adding and Subtracting Fractions with Like Denominators
- Module 9: Multiplying Fractions by Whole Numbers
- Module 10: Understanding Decimal Notation for Fractions
- Module 11: Exploring Measurement and Measurement Conversions
- Module 13: Representing and Interpreting Data
- Module 15: Solving Complex Problems

Internet Links

(SEE APPENDIX A)

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit VII: Geometric Applications

TRANSFER: Analyze patterns to solve problems to construct viable arguments and critique the reasoning of others.		
STANDARDS / GOALS: <u>NJSLS</u> <u>MATH</u> 4.OA.C.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. 4.G.A.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. 4.G.A.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category and identify right triangles. 4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded	ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
	Relationships can be described, and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.	<ul style="list-style-type: none"> How can analyzing patterns aid in understanding and describing geometric shapes?
	Geometry and spatial sense offer ways to interpret and reflect on our physical environment.	<ul style="list-style-type: none"> What are examples of two-dimensional figures in everyday life? How are measurement of angles and symmetry of shapes related?
	Analyzing geometric relationships develops reasoning and justification skills.	<ul style="list-style-type: none"> How can having mathematical knowledge of geometry help in solving real-world problems?
	<u>KNOWLEDGE</u> Students will know:	<u>SKILLS</u> Students will be able to:
	Patterns are generated by following a specific rule.	Generate a shape pattern that follows a given rule. Describe sequences of geometric objects using mathematical rules.

Unit VII: Geometric Applications

42

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit VII: Geometric Applications

	Shapes can have more than one line of symmetry.	Investigate strategies for identifying all lines of symmetry in a shape.
	KEY TERMS: Acute angle, acute triangle, adjacent angles, degree, endpoint, equilateral triangle, intersecting lines, isosceles triangle, line, line of symmetry, line segment, obtuse angle, obtuse triangle, parallel lines parallelogram, pattern, perpendicular lines, point, protractor, quadrilateral, ray, rectangle, rhombus, right angle, right triangle, scalene triangle, square, symmetry, trapezoid, vertex	
<p>ASSESSMENT EVIDENCE: Students will show their learning by:</p> <ul style="list-style-type: none"> • Interpreting and solving complex mathematical problems using strategic thinking as it relates to geometry • Applying of prior knowledge of angles and geometric figures through solving complex real-world problems (Performance Task) <p>KEY LEARNING EVENTS AND INSTRUCTION:</p> <ul style="list-style-type: none"> • Explore basic concepts of lines: parallel, perpendicular, point, line segment • Explore basic concepts of angles: acute, obtuse, right, and straight angles • Explore the relationship between lines, angles and shapes • Draw and identify various types of lines and angles • Explore basic concepts of triangles and quadrilaterals • Classify different types of triangles: acute, obtuse, right, equilateral, isosceles, scalene • Classify different types of quadrilaterals: parallelograms, rectangles, squares, rhombuses, and trapezoids • Practice with solving real-world angle measurement problems 		

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

Unit VII: Geometric Applications

<ul style="list-style-type: none"> • Explore symmetry in shapes • Explore how color, shape, and size affects symmetry • Create symmetric figures • Create, practice, and continue patterns with shapes • Analyze shape patterns to determine the rule • Represent numbers and shapes in different ways 	
SUGGESTED TIME ALLOTMENT	4 weeks
SUPPLEMENTAL UNIT RESOURCES	<p>Everyday Math Manual</p> <ul style="list-style-type: none"> • 1.12 Angles, Triangles, and Quadrilaterals • 2.10 Classifying Triangles • 2.11 Classifying Quadrilaterals • 2.12 Finding Line Symmetry • 2.13 Finding the Pattern • 5.12 Creating Symmetric Figures • 7.9 Generating and Identifying Patterns • 8.4 Extending Line Symmetry • 8.13 Many Names for Numbers <p>Math in Practice-4th Grade</p> <ul style="list-style-type: none"> • Module 14: Exploring Geometry and Geometric Measurements • Module 15: Solving Complex Problems <p>Internet Links (SEE APPENDIX A)</p>

**Randolph Township Schools
Randolph Elementary Schools
Mathematics Grade 4 Curriculum**

APPENDIX A: Technology Resources

Technology Resources:

Virtual Math Manipulatives: <https://www.mathlearningcenter.org/resources/apps>

Three Act Math Tasks: <https://gfletchy.com/3-act-lessons/>

Youcubed Suggested Math Sites: <https://www.youcubed.org/resource/apps-games/>

Estimation 180: [Estimation 180](#)

Number Strings: <https://numberstrings.com/>

Math Forum: <https://www.nctm.org/mathforum/>

Visual Patterns: <http://www.visualpatterns.org/>

University of Cambridge Math: <https://nrich.maths.org/>

Scholastic/Study Jams for Math and Science: <http://studyjams.scholastic.com/studyjams/jams/math/index.htm>

Everyday Math Online: <https://www.rtnj.org/Page/3378>

Heinemann: <http://heinemann.com>

Number Talk: <https://elemath.hallco.org/web/wp-content/uploads/2014/05/Number-Talks-Quick-Start-Guide.pdf>