



Grade 4

Math Curriculum

Oradell Public School District
Oradell, NJ

2023

The Grade 4 Math Curriculum was developed by the Oradell Math Curriculum Team and aligned with the New Jersey Student Learning Standards (NJSLS).

Oradell Public School District

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Board Policy

This revision is aligned with the New Jersey Student Learning Standards for Mathematics, the New Jersey Student Learning Standards for Computer Science and Design Thinking, the New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills, and the inclusion of connections to Social-Emotional Learning Competencies.

Affirmative Action

During the development of this course of study, particular attention was paid to the elimination or exclusion of any materials which might discriminate on the basis of race, color, national origin, ancestry, age, sex, affectional or sexual orientation, gender identity or expression, marital status, familial status, genetic information, mental or physical disabilities, or in educational opportunities. Every effort has been made to uphold both the letter and spirit of Affirmative Action mandates as applied to the content, the texts and the instruction inherent in this course.

Introduction to Teaching Mathematics

For more than a decade, research studies of mathematics education in high-performing countries have concluded that mathematics education in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on this promise, the New Jersey Student Learning Standards (NJSLS) in Mathematics were designed to address the problem of a curriculum that is “a mile wide and an inch deep (Common Core State Standards Initiative, 2019).”

The new standards build on the best of high-quality math standards from states across the country. They also draw on the most important international models for mathematical practice, as well as research and input from numerous sources, including state departments of education, scholars, assessment developers, professional organizations, educators, parents and students, and members of the public.

The math standards provide clarity and specificity rather than broad general statements. They follow a design that not only stresses conceptual understanding of key ideas but also the organizing principles such as place value and the laws of arithmetic to structure those ideas.

In addition, the sequence of topics and performances outlined in the body of math standards respects what is known about how students learn, namely, that developing sequenced obstacles and challenges for students, absent from the insights about meaning that derive from careful study, is unwise. Therefore, the development of the standards began with research-based learning progressions detailing what is known today about how students’ mathematical knowledge, skill, and understanding develop over time. The knowledge and skills students need to be prepared for mathematics in college, career, and life are woven throughout the mathematics standards.

These standards define what students should understand and be able to do in their study of mathematics. Additionally, this curriculum is written around the Standards for Mathematical Practice. These standards describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem-solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

Teachers are required to assess understanding by asking the student to justify, in a way that is appropriate to the student’s mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from. Mathematical understanding and procedural skill are equally important, and both are assessed by using mathematical tasks of sufficient richness. The assessments contained in this curriculum document reflect the level of rigor represented in the state-level assessments and the NJ state

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Model Curriculum for Math. They serve as guideposts for teachers in determining the level of preparedness students need to reach. This curriculum document will continue to evolve as teachers plan their lessons and gather more resources to teach the units.

All About the Mathematics Curriculum

How was the curriculum developed?

The Oradell Public School District's curriculum consists of units that have been inspired by the New Jersey Student Learning Standards — Mathematics. The main professional resource teachers use is *Go Math!* by Houghton Mifflin Harcourt Publishing Company. Teachers are encouraged to collaborate to create additional lessons and formative assessments for the whole group, small-group, and individual conferences.

Each unit contains enduring understandings and essential questions with corresponding teaching points. Enduring understandings are statements summarizing important ideas and core processes that are central to math and have lasting value beyond the classroom. They synthesize what students should understand—not just know or do—as a result of studying a particular unit. Moreover, they articulate what students should “revisit” over the course of their lifetimes in relationship to the content area. Essential questions are broad questions with many answers. They encourage transfer beyond the specific skill or topic students are studying and should recur over many years to promote curriculum coherence and real-world connections. In math, a teaching point addresses both the skill and strategy that will be practiced in a given math class. The teaching points in the math curriculum are meant to build student skills over the unit and are chosen based on the assessment of combined skills.

Modifications

The modifications section at the end of each bend is meant to help guide the differentiation of the units for students with IEPs, English Language Learners, Tier 2 At-Risk students (students in Basic Skills) and Gifted and Talented students. Carol Ann Tomlinson defines differentiation as tailoring instruction to meet individual needs. Whether teachers differentiate content, process, products, or the learning environment, the use of ongoing assessment and flexible grouping makes this a successful approach to instruction. At its most basic level, differentiation consists of the efforts of teachers to respond to variance among learners in the classroom. Whenever a teacher reaches out to an individual or small group to vary his or her teaching in order to create the best learning experience possible, that teacher is differentiating instruction (Tomlinson, 2000).

Teachers can differentiate at least four classroom elements based on student readiness, interest, or learning profile:

1. Content: what the student needs to learn or how the student will get access to the information
2. Process: activities in which the student engages in order to make sense of, or master the content
3. Products: culminating projects that ask the student to rehearse, apply, and extend what he or she has learned in a unit
4. Learning environment: the way the classroom works and feels

Our Math Philosophy

We believe in a Guided Math approach to the teaching of math. We develop mathematicians to become thinkers and to develop strategies to become global citizens. We believe that students need access to

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real-world problems and experiences. We believe that students need time, choice, and feedback to be successful. Partnered with explicit instruction in mathematics content, a strategy-based curriculum promotes math behaviors and skills that contribute to strategic thinking, accurate problem solving and extending mathematical learning to new situations.

What is the Guided Math Framework?

To help teachers build capacity by expanding their repertoire of instructional strategies, many educational leaders may consider the implementation of Guided Math (Sammons, 2010 and 2013).

This framework offers a wide selection of instructional strategies from which teachers can choose - all of which engage students in challenging mathematical instruction. The flexibility of the framework permits teachers to adapt it to align with their own teaching styles and to meet the needs of their students. When implemented, Guided Math instruction may vary from week to week and from classroom to classroom (Sammons, 2013).

The components of a Guided Math approach are as follows:

- Math Warm-Ups
- Whole-Class Instruction
- Small-Group Instruction
- Math Workshop
- Math Conferences
- Assessment

Components Guided Math Workshop

Math Warm-Ups

While setting a mathematical tone for the day, Math Warm-Ups at the beginning of a day or a class period also provide valuable ongoing mathematical practice for students. Calendar board activities and Math Stretches may serve as brief Warm-Ups for students. Warm-Ups also provide opportunities for students to learn about current event connections to mathematics and to assume classroom responsibilities that reinforce mathematical skills.

Whole-Class Instruction

This more traditional instructional mode is an option for teachers to deliver mini lessons, conduct math-related read-alouds, and model mathematical thinking. Whole-Class Instruction is also valuable for Math Huddle discussions as follow-ups to Math Stretch tasks. Additionally, this format can be used for review, class mathematical games, and activating strategies. Working together in these ways is important in establishing a sense of mathematical community.

Small-Group Instruction

At the heart of the framework is Small-Group Instruction with groups in which the composition is fluid and based upon previously identified, specific instructional needs. These Small-Group lessons allow teachers to more easily differentiate instruction and to help students develop proficiency in the mathematical practices as described by the New Jersey State Learning Standards for Mathematics.

In addition, the intimate nature of Small-Group lessons enables teachers to maximize student engagement (both hands-on and minds-on), to conduct ongoing informal formative assessment, and to closely monitor understanding while students are working. Because teachers are able to respond immediately when misconceptions are observed or move forward with greater challenges when understanding is evident, instruction is more efficient than traditional whole-class lessons. In spite of the fact that these lessons are usually much shorter in duration, greater student understanding of concepts and skills is achieved.

Math Workshop

During Math Workshop, students work independently on math workstation tasks that provide practice of previously mastered concepts and skills, promote computational fluency, or challenge students to engage in mathematical investigations. Playing math games is a common component of Math Workshop, but not the only option. Paper and pencil tasks may be included, as well as tasks that require documenting mathematical thinking in math journals. Students learn to assume responsibility for working independently during Math Workshop. This allows teachers to teach small-group lessons and conduct conferences with individual students.

Math Conferences

These one-on-one conversations between a teacher and a student are important assessment and teaching tools. Students explain their mathematical thinking related to the work at hand while teachers ask clarifying questions, assess student understanding, and determine the students' next steps in learning. Specific, targeted, and brief teaching points are delivered during these conversations. Students practice mathematical communication skills as they are encouraged to self-assess their progress toward their own mathematical learning goals.

Assessment

Essential to the Guided Math framework is balanced and timely assessment, especially formative assessment. Knowing students' learning needs allows teachers to plan lessons so that students receive "just right" instruction. That may require instruction that fills gaps in knowledge and skills for some students or provides additional challenges for others. Only by knowing specific needs when learning is occurring can teachers maximize their effectiveness.

Suggested Pacing Guide for Math Grade 4

Unit	Approximate Months	Unit	Skills
1	4 Sept - Dec	<u>Operations and Algebraic Thinking, Number and Operations in Base Ten</u>	Place Value, Addition and Subtraction to One Million, Multiply by 1-Digit and 2-Digit Numbers, Divide by 1-Digit Numbers, Factors, Multiples and Patterns
2	2 Jan - Mid-Feb	<u>Number Operations - Fractions</u>	Fraction Equivalence and Comparison, Add and Subtract Fractions
3	2 Mid-Feb - March	<u>Number Operations - Fractions</u>	Multiply Fractions by Whole Numbers, Relate Fractions and Decimals
4	2 April- May	<u>Measurement and Data, Geometry</u>	Two-Dimensional Figures, Angles, Relative Sizes of Measurement Units, Area and Perimeter
5	1 June	<u>Real-World Application of Math</u>	Use Fourth Grade Skills to Solve Real-World Problems

4th Grade Math Curriculum

Unit 1: Operations and Algebraic Thinking, Number and Operations in Base Ten

Refer to Go Math! Chapters 1-5

Unit Overview

In this unit, students will extend their knowledge from prior years' experiences. They will deepen their understanding that our number system is known as a base-ten positional number system. The value of each digit is determined by its position and for whole numbers, the digit farthest to the right is in the ones place. Moving to the left, each digit has a place value ten times the value of the place to the right. By focusing on this pattern in place value during instruction allows students to build understanding.

Students will also be encouraged to use their own strategies for multiplication, as long as they understand the strategy and it makes sense mathematically. Compensation is a particularly useful strategy that makes use of mental math. For example, 9×17 , can be thought of as 10×17 , with a group of 17 subtracted. Students who use this strategy demonstrate a deep understanding and make connections to basic multiplication facts, multiples, and properties of numbers, such as the distributive property of multiplication over addition. Students will make connections to basic multiplication facts, multiples, and properties of numbers, such as the Distributive Property of multiplication over addition. They will become familiar with a rectangular model that utilizes the Distributive Property, which will later support algebraic polynomial multiplication.

Another focus of this unit will allow students to build fluency with the standard division algorithm, emphasizing the meaning and logic that lies behind the heart of the algorithm, not just the steps of the algorithm. Arrays are a powerful representation that can be used to visualize multi-digit division.

Students will also understand that the concepts of prime and composite numbers are directly related to the concepts of factors and multiples.

Enduring Understandings

- Solve addition and subtraction to one million by applying knowledge of base-ten place value system.
- Solve multiplication problems of one and two-digit numbers.
- Solve division problems by one-digit numbers.
- Identify factors and multiples by recognizing patterns and models.

Essential Questions

- How does understanding place value allow you to compare, add, subtract, and estimate with whole numbers?
- When does understanding the relationship between multiplication and division help you to problem solve in your everyday life?
- What do patterns teach us about factors and multiples?

Assessments

Possible Formative Assessments
<ul style="list-style-type: none">● Teacher Observation● Student Participation● One-to-One Conferring● Small Strategy Groups● LinkIt! Progress Reports● DreamBox Progress Reports
Summative Assessments
<ul style="list-style-type: none">● Chapter Quizzes & Tests<ul style="list-style-type: none">○ Chapter 1, 2, 3, 4, and 5● Student Self-Reflection by Chapter● Chapter Performance Tasks (as appropriate)● Online Math Activity Scores
Benchmark Assessments
<ul style="list-style-type: none">● LinkIt! Math Form A
Alternative Assessments
<ul style="list-style-type: none">● Modified Unit Assessment● Modified Chapter Assessment

Standards (NJSLs) Addressed in this Unit

Operations and Algebraic Thinking 4.OA
<p>A. Use the four operations with whole numbers to solve problems.</p> <p>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>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>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>B. Gain familiarity with factors and multiples.</p> <p>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>

C. Generate and analyze patterns.

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. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.

Number and Operations in Base Ten 4.NBT

A. Generalize place value understanding for multi-digit whole numbers.

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.

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.

3. Use place value understanding to round multi-digit whole numbers to any place.

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

4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

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.

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.

Computer Science and Design Thinking

8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.

8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

Career Readiness, Life Literacies, and Key Skills

LIFE LITERACIES AND KEY SKILLS

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

PRACTICES

- **CLKSP4** Demonstrate creativity and innovation.
- **CLKSP5** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CLKSP8** Use technology to enhance productivity, increase collaboration, and communicate effectively.

Interdisciplinary Connections:

English Language Arts

Writing

- **W.4.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- **W.4.5** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.
- **W.4.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

Reading

- **RI.4.4.** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
- **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

Language

- **L.4.3** Use knowledge of language and its conventions when writing, speaking, reading, listening.
a. Choose words and phrases to convey ideas precisely. b. Choose punctuation for effect.

Standards for Mathematical Practice

MP.1 Make sense of problems and persevere in solving them.

MP.2 Reason abstractly and quantitatively.

MP.3 Construct viable arguments & 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.

Unit 1: Operations and Algebraic Thinking, Number and Operations in Base Ten

Suggested Teaching Points

Place Value, Addition, and Subtraction to One Million

Students will...

- Model the 10-1 relationship among place value positions in the base-ten number system.
- Read and write whole numbers in standard form, word form, and expanded form.
- Compare and order whole numbers based on the values of the digits in each number.
- Round a whole number to any place.
- Rename whole numbers by regrouping.
- Add whole numbers and determine whether solutions to addition problems are reasonable.
- Subtract whole numbers and determine whether solutions to subtraction problems are reasonable.
- Use the strategy “*draw a diagram*” to solve comparison problems with addition and subtraction.

Multiply 1-Digit and 2-Digit Numbers

Students will...

- Relate multiplication equations and comparison statements involving multiplicative comparison and additive comparison.
- Multiply tens, hundreds, and thousands by whole numbers through ten.
- Estimate products by rounding and determine if exact answers to multiplication problems are reasonable.
- Use the Distributive Property to multiply a 2-digit number by a 1-digit number.
- Use expanded form to multiply a multidigit number by a 1-digit number.
- Use place value and partial products to multiply a multidigit number by a 1-digit number.
- Use mental math and properties to multiply a multidigit number by a 1-digit number.
- Use the “*draw a diagram*” strategy to solve multistep problems.
- Use regrouping to multiply a 2-digit number by a 1-digit number.
- Use regrouping to multiply a multidigit number by a 1-digit number.
- Represent and solve multistep problems using equations.
- Use place value and multiplication properties to multiply by tens.
- Estimate products by rounding or by using compatible numbers.
- Use area models and partial products to multiply 2-digit numbers.
- Use place value and partial products to multiply 2-digit numbers.
- Use regrouping to multiply 2-digit numbers.
- Choose a method to multiply 2-digit numbers.

Divide by 1-Digit Numbers**Students will...**

- Use multiples to estimate quotients.
- Use models to divide whole numbers that do not divide evenly.
- Use remainders to solve division problems.
- Divide tens, hundreds, and thousands by whole numbers to ten.
- Use compatible numbers to estimate quotients.
- Use the Distributive Property to estimate quotients.
- Use repeated subtraction and multiples to find quotients.
- Use partial quotients to divide.
- Use base-ten blocks to model division with regrouping.
- Use place value to determine where to place the first digit of the quotient.
- Divide multi-digit numbers by 1-digit divisors.
- Solve multistep division problems by using the “*draw a diagram*” strategy.

Factors, Multiples, and Patterns.**Students will...**

- Find all the factors of a number using models.
- Determine whether the number is a factor of a given number.
- Solve problems with common factors by using the strategy *make a list*.
- Understand the relationship between factors and multiples, and determine whether a number is a multiple of a given number.
- Determine whether a number is prime or composite.
- Generate a number pattern and describe the features of the pattern.

Unit Specific Vocabulary

Estimate	Product
Expanded Form	Regroup
Period	Multiple
Round	Partial Quotient
Standard Form	Remainder
Word Form	Dividend
Compare	Divisor
Order	Common Factor
Place Value	Common Multiple
Distributive Property	Composite Number
Partial Product	Divisible
Compatible Numbers	Factor
Associative Property of Addition	Pattern
Commutative Property of Multiplication	Prime Number
Commutative Property of Addition	Term
Distributive Property	Partial Product

Suggested Modifications and Accommodations

These strategies can be adapted to scaffold for students needing more support or extend the learning for higher level students. Differentiation is accomplished through content, process, product, and learning environment.

Instructional Materials and Learning Activities

Core Instructional Materials:

- *Go Math 4* © 2015 - Houghton Mifflin Harcourt
 - Teacher Edition, Student Workbooks, Unit Assessments, Student Reference Book, Activity Cards, Blackline Masters

Supplemental Materials:

- Bridges in Mathematics for intervention
- Digital Resources:
 - *Think Central*® Digital (<https://www-k6.thinkcentral.com>)
 - ebooks, eToolkit, eTeacher's Manual, eStudent Books, online resources
 - Online Practice Assignments (Includes but not limited to: IXL, Xtra Math)
 - [Grade 4 - eGlossary](#)
 - Bridges in Mathematics (<https://bridges.mathlearningcenter.org/>) for intervention
 - DreamBox

Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall what they have already learned in ways that activate prior knowledge and build on that knowledge.
- Model problem-solving processes.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.

- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers and graph paper.
- Use step-by-step how-to sheets to guide student problem-solving.
- Refer to student IEP goals and modifications.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Provide frequent breaks.
- Use a problem [solving plan](#) to organize mathematical thinking.
- Incorporate [place value charts](#) into small group lessons.

Students at Risk

- Use the reteach component of Go Math! lesson in small group settings.
- Shorten assignments.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Allow student to orally construct their response.
- Provide frequent breaks.
- [Introduction to Place Value - Khan Academy](#)
- [Distributive Property - Brainpop](#)
- [Associative Property - Brainpop](#)
- [Commutative Property - Brainpop](#)
- [Expanded Form - Khan Academy](#)
- [Rounding - Brainpop](#)
- [Factors and Multiples - Khan Academy](#)
- [Prime and Composite - Khan Academy](#)
- [Rounding to the Nearest Thousand - Khan Academy](#)
- [Place Value - Khan Academy](#)
- [Comparing Place Value - Khan Academy](#)
- [Place Value Table - Khan Academy](#)
- [Subtracting 3 Digit Numbers Regrouping 0- Khan Academy](#)

English Language Learners

- [Grade 4 - eGlossary](#)
- Allow use of a bilingual dictionary.
- Allow use of handheld translator.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.

- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Use projects, such as the following:
 - [How Many Donuts is That](#)
 - [Legos](#)
 - [Jorge is 14 Years Old Now](#)
 - [The Cost of Going Back to School](#)
 - [World Cup-How Many Ways?](#)
 - [How Many Cars Are There?](#)

Students with 504 Plans

- *Reteach* activities
- Use of manipulatives, counters, number grid, and vocabulary picture cards
- Preferential Seating
- Monitor On-Task Performance
- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

- **Self-Awareness:** ability to recognize one's emotions and know one's strengths and limitations
 - Connections:
 - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
- **Self-Management:** ability to regulate and control one's emotions and behaviors, particularly in stressful situations
 - Connections:
 - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
- **Social Awareness:** ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
 - Connections:

- Students collaborate and help each other during math centers
- **Relationship Skills:** refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
 - Connections:
 - Class discussions
 - Incentives for individual students and small groups
- **Responsible Decision-Making:** refers to the ability to use multiple pieces of information to make ethical and responsible decisions
 - Connections:
 - Class rules and routines
 - Class discussions
 - Following directions for math centers

4th Grade Math Curriculum

Unit 2: Numbers Operations—Fractions

Refer to Go Math! Chapters 6-7

Unit Overview

In this unit, students will gain an understanding that area and linear models are especially helpful in making sense of equivalent fractions. They will learn to reason, find equivalencies, compare, and order fractions. This improves their number sense as it relates to fractions or their fraction sense. Students will then understand that fraction addition and subtraction is often interpreted as finding common denominators and then adding or subtracting the numerators. When learning to add and subtract fractions and mixed numbers, students need many opportunities to make sense of problems and build meaning for the algorithms. This is facilitated by solving problems situated in real-world contexts by representing them with models and symbols.

Enduring Understandings

- Identify equivalent fractions using models and multiplication.
- Order fractions using common denominators and benchmarks.
- Compare fractions by first writing fractions with a common numerator or a common denominator.
- Solve addition and subtraction of mixed numbers by renaming.

Essential Questions

- How can models and multiplication to help us to understand equivalent fractions?
- Can common denominators or common numerators be helpful when comparing fractions?
- What are the different ways to add and subtract fractions and mixed numbers?

Assessments

Possible Formative Assessments
<ul style="list-style-type: none">● Teacher Observation● Student Participation● One-to-One Conferring● Small Strategy Groups● LinkIt! Progress Reports● DreamBox Progress Reports
Summative Assessments
<ul style="list-style-type: none">● Chapter Quizzes & Tests<ul style="list-style-type: none">○ Chapter 6 and 7● Student Self-Reflection by Chapter● Chapter Performance Tasks (as appropriate)● Online Math Activity Scores
Benchmark Assessments
<ul style="list-style-type: none">● LinkIt! Math Form B
Alternative Assessments
<ul style="list-style-type: none">● Modified Unit Assessment

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Standards (NJSLs) Addressed in this Unit

Number and Operations—Fractions 3 4.NF

A. Extend understanding of fraction equivalence and ordering.

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.

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.

B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

3. Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

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. Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

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.

Computer Science and Design Thinking

8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.

8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

Career Readiness, Life Literacies, and Key Skills

LIFE LITERACIES AND KEY SKILLS

9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

PRACTICES

- **CLKSP4** Demonstrate creativity and innovation.
- **CLKSP5** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CLKSP8** Use technology to enhance productivity, increase collaboration, and communicate effectively.

Interdisciplinary Connections:

English Language Arts

Writing

- **W.4.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- **W.4.5** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.
- **W.4.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

Reading

- **RI.4.4.** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
- **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

Language

- **L.4.3** Use knowledge of language and its conventions when writing, speaking, reading, listening.
 - a. Choose words and phrases to convey ideas precisely.
 - b. Choose punctuation for effect.

Standards for Mathematical Practice

- MP.1 Make sense of problems and persevere in solving them.
 MP.2 Reason abstractly and quantitatively.
 MP.3 Construct viable arguments & 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.

Unit 2: Numbers Operations—Fractions

Suggested Teaching Points

Fraction Equivalence and Comparison

Students will...

- Use models to show equivalent fractions.
- Use multiplication to generate equivalent fractions.
- Write and identify equivalent fractions in simplest form.
- Use equivalent fractions to represent a pair of fractions as fractions with a common denominator.
- Use the strategy “*make a table*” to solve problems using equivalent fractions.
- Compare fractions using benchmarks.

- Compare fractions by first writing them as fractions with a common numerator or a common denominator.
- Compare and order fractions.

Add and Subtract Fractions

Students will...

- Understand that to add or subtract fractions they must refer to parts of the same whole.
- Decompose a fraction by writing it as a sum of fractions with the same denominators.
- Use models to represent and find sums involving fractions.
- Use models to represent and find differences involving fractions.
- Solve word problems involving addition and subtraction with fractions.
- Write fractions greater than 1 as mixed numbers and write mixed numbers as fractions greater than 1.
- Add and subtract mixed numbers.
- Rename mixed numbers to subtract.
- Use the properties of addition to add fractions.
- Use the strategy *act it out* to solve multi-step fraction problems

Unit Specific Vocabulary

Fraction	Multiple
Denominator	Common Multiple
Numerator	Benchmark
Equivalent Fractions	Unit Fraction
Simplest Form	Mixed Number
Common Factor	Associative Property of Addition
Common Denominator	Commutative Property of Addition

Suggested Modifications and Accommodations

These strategies can be adapted to scaffold for students needing more support or extend the learning for higher level students. Differentiation is accomplished through content, process, product, and learning environment.

Instructional Materials and Learning Activities

Core Instructional Materials:

- *Go Math 4* © 2015 - Houghton Mifflin Harcourt
 - Teacher Edition, Student Workbooks, Unit Assessments, Student Reference Book, Activity Cards, Blackline Masters

Supplemental Materials:

- Bridges in Mathematics for intervention
- Digital Resources:
 - *Think Central*® Digital (<https://www-k6.thinkcentral.com>)
 - ebooks, eToolkit, eTeacher's Manual, eStudent Books, online resources
 - Online Practice Assignments (Includes but not limited to: IXL, Xtra Math)
 - [Grade 4 - eGlossary](#)
 - Bridges in Mathematics (<https://bridges.mathlearningcenter.org/>) for intervention
 - DreamBox

Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall what they have already learned in ways that activate prior knowledge and build on that knowledge.
- Model problem-solving processes.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.
- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers and graph paper.
- Use step-by-step how-to sheets to guide student problem-solving.
- Refer to student IEP goals and modifications.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Provide frequent breaks.
- [Use a problem solving plan](#) to organize mathematical thinking.
- Incorporate [place value charts](#) into small group lessons.

Students at Risk

- Use the reteach component of Go Math! lesson in small group settings.
- Shorten assignments.
- Ask students to recall what they already learned in ways that activate their prior knowledge.

- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Allow student to orally construct their response.
- Provide frequent breaks.
- [Equivalent Fractions - Khan Academy](#)
- [Common Denominator - Khan Academy](#)
- [Reducing Fractions - Brainpop](#)
- [Adding and Subtracting Fractions - Brainpop](#)
- [Renaming Mixed Numbers as Fractions Greater Than One - Khan Academy](#)
- [Comparing Fractions with Uncommon Denominators Visually - Khan Academy](#)
- [Comparing Fractions Using a Number Line - Khan Academy](#)
- [Comparing Fractions Visually with Pie Diagrams- Khan Academy](#)
- [Comparing Fractions Using Common Denominators - Khan Academy](#)
- [Decomposing a Fraction - Khan Academy](#)
- [Add and Subtract Fractions with Like Denominators - Khan Academy](#)
- [Changing a Mixed Number to an Improper Fraction - Khan Academy](#)
- [Adding Mixed Numbers - Khan Academy](#)
- [Subtracting Mixed Numbers - Khan Academy](#)

English Language Learners

- [Grade 4 - eGlossary](#)
- Allow use of a bilingual dictionary.
- Allow use of handheld translator.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set a writing goal for the assignment and then focus only on that goal.

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Use projects, such as the following:
 - [Drill Bit Fractions](#)
 - [Triple Crown Possibilities, 2015](#)

Students with 504 Plans

- *Reteach* activities
- Use of manipulatives, counters, number grid, and vocabulary picture cards
- Preferential Seating
- Monitor On-Task Performance

- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
 - Connections:
 - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
 - Connections:
 - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
 - Connections:
 - Students collaborate and help each other during math centers
- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
 - Connections:
 - Class discussions
 - Incentives for individual students and small groups
- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
 - Connections:
 - Class rules and routines
 - Class discussions
 - Following directions for math centers

4th Grade Math Curriculum

Unit 3: Number Operations—Fractions

Refer to Go Math! Chapters 8-9

Unit Overview

In this unit, students will develop a sense of the meaning of multiplication with fractions by a whole number. This will be achieved through a variety of representations such as area models, number lines, and set models using counters. As students explore these different strategies to multiply a fraction by a whole number, they develop ways to explain their work and reasoning. Working with area representations, counters, and number line strategies gives students many opportunities to construct viable arguments and critique the reasoning of others.

Students will also learn that a fraction with a denominator that is a multiple of ten can be represented in decimal form. Students will model with mathematics as they explore, interpret, represent, and describe decimal fractions. Students use tools such as decimal squares and number lines to build relationships between decimal numbers and their corresponding fractions.

Enduring Understandings

- Solve multiplication of a fraction by a whole number using a model.
- Record tenths and hundredths as fractions and decimals.
- Translate among representations of fractions, decimals, and money.
- Add fractions when the denominators are 10 or 100.

Essential Questions

- How can you use models to show how to multiply a fraction by a whole number?
- How can you multiply a fraction by a whole number to solve a problem?
- In what ways are fractions, decimals, and money related?

Assessments

Possible Formative Assessments
<ul style="list-style-type: none">● Teacher Observation● Student Participation● One-to-One Conferring● Small Strategy Groups● LinkIt! Progress Reports● DreamBox Progress Reports
Summative Assessments
<ul style="list-style-type: none">● Chapter Quizzes & Tests<ul style="list-style-type: none">○ Chapter 8 and 9● Student Self-Reflection by Chapter● Chapter Performance Tasks (as appropriate)● Online Math Activity Scores
Alternative Assessments
<ul style="list-style-type: none">● Modified Unit Assessment

- Modified Chapter Assessment

Standards (NJSLs) Addressed in this Unit

Number and Operations—Fractions 4.NF

B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

a. Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.

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. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)

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. For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?

C. Understand decimal notation for fractions, and compare decimal fractions.

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. For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.

6. Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $62/100$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

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.

Computer Science and Design Thinking

8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.

8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

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9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

PRACTICES

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Interdisciplinary Connections:

English Language Arts

Writing

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- MP.2 Reason abstractly and quantitatively.
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- 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.

Unit 3: Number Operations—Fractions

Suggested Teaching Points

Multiply Fractions by Whole Numbers

Students will...

- Write a fraction as a product of a whole number and a unit fraction.
- Write a product of a whole number and a fraction as a product of a whole number and a unit fraction.
- Use a model to multiply a fraction by a whole number.
- Multiply a fraction by a whole number to solve a problem.

- Use the strategy “*draw a diagram*” to solve comparison problems with fractions.

Relate Fractions and Decimals

Students will...

- Record tenths as fractions and as decimals.
- Record hundredths as fractions and as decimals.
- Record tenths and hundredths as fractions and decimals.
- Translate among representations of fractions, decimals and money.
- Solve problems by using the “*act it out*” strategy.
- Add fractions when the denominators are 10 or 100.
- Compare decimals to hundredths by reasoning about their size.

Unit Specific Vocabulary

Factor
 Fraction
 Identity Property of Multiplication
 Multiple
 Product
 Unit Fraction
 Equivalent Fractions

Decimal
 Decimal Point
 Tenth
 Hundredth
 Equivalent Decimals
 Compare

Suggested Modifications and Accommodations

These strategies can be adapted to scaffold for students needing more support or extend the learning for higher level students. Differentiation is accomplished through content, process, product, and learning environment.

Instructional Materials and Learning Activities

Core Instructional Materials:

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Supplemental Materials:

- Bridges in Mathematics for intervention
- Digital Resources:
 - *Think Central*® Digital (<https://www-k6.thinkcentral.com>)
 - ebooks, eToolkit, eTeacher’s Manual, eStudent Books, online resources
 - Online Practice Assignments (Includes but not limited to: IXL, Xtra Math)
 - [Grade 4 - eGlossary](#)
 - Bridges in Mathematics (<https://bridges.mathlearningcenter.org/>) for intervention
 - DreamBox

Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall what they have already learned in ways that activate prior knowledge and build on that knowledge.
- Model problem-solving processes.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.
- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers and graph paper.
- Use step-by-step how-to sheets to guide student problem-solving.
- Refer to student IEP goals and modifications.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Provide frequent breaks.
- Use a problem [solving plan](#) to organize mathematical thinking.
- Incorporate [place value charts](#) into small group lessons.

Students at Risk

- Use the reteach component of Go Math! lesson in small group settings.
- Shorten assignments.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Allow student to orally construct their response.
- Provide frequent breaks.
- [Multiply Unit Fractions by Whole Numbers - Khan Academy](#)
- [Multiply Fractions by Whole Numbers - Khan Academy](#)
- [Multiply Mixed Number by a Whole Number - Khan Academy](#)
- [Multiply and Divide Fractions - Brainpop](#)
- [Convert Tenths and Hundredths Visually - Khan Academy](#)
- [Writing a Number as a Fraction and Decimal- Khan Academy](#)
- [Decimal Place Value- Khan Academy](#)
- [Relating Decimals and Fractions in Words - Kahn Academy](#)
- [Decimals as Words - Kahn Academy](#)
- [Writing Decimals and Fractions Greater Than 1 Shown on Grids_ Kahn Academy](#)
- [Adding Fractions with Denominators of 10 and 100 - Khan Academy](#)
- [Comparing Decimals Visually - Khan Academy](#)
- [Comparing Decimals - Khan Academy](#)
- [Compare Decimals on a Number line- Khan Academy](#)
- [Comparing Numbers Represented Different Ways - Kahn Academy](#)

English Language Learners

- [Grade 4 - eGlossary](#)
- Allow use of a bilingual dictionary.
- Allow use of handheld translator.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set a writing goal for the assignment and then focus only on that goal.

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Use projects, such as the following:
 - [Someone Ate My Cake](#)
 - [Delicious Pumpkin Pie](#)

Students with 504 Plans

- *Reteach* activities
- Use of manipulatives, counters, number grid, and vocabulary picture cards
- Preferential Seating
- Monitor On-Task Performance
- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

- **Self-Awareness:** ability to recognize one's emotions and know one's strengths and limitations
 - Connections:
 - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
- **Self-Management:** ability to regulate and control one's emotions and behaviors, particularly in stressful situations
 - Connections:
 - Visit the mindfulness/cool down corner in the classroom for

self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)

- **Social Awareness:** ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
 - Connections:
 - Students collaborate and help each other during math centers
- **Relationship Skills:** refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
 - Connections:
 - Class discussions
 - Incentives for individual students and small groups
- **Responsible Decision-Making:** refers to the ability to use multiple pieces of information to make ethical and responsible decisions
 - Connections:
 - Class rules and routines
 - Class discussions
 - Following directions for math centers

4th Grade Math Curriculum

Unit 4: Measurement and Data, Geometry

Refer to Go Math! Chapters 10-13

Unit Overview

In this unit, students explore geometry and polygons and classify them based on their attributes. This involves hands-on application of concepts. When classifying polygons, it is helpful to begin the process with concrete representations of the polygons and to provide opportunities for students to discuss their observations concerning the polygons. The geometry unit will include the study of angles. Students will measure angles using a protractor. Then, students will begin to explore measurement attributes such as perimeter and area of common polygons.

Another focus of this unit allows students to explore both metric and customary units of measure. Working with measurement concepts gives students multiple opportunities to attend to precision. They may use the relative sizes of units to evaluate the reasonableness of their results. Or, they may use benchmark measures to estimate length, weight, and volume.

Enduring Understandings

- Understand that geometric figures can be analyzed and classified based on their properties.
- Use formulas to find the area and perimeter of objects.
- Draw, identify, and measure lines and angles.
- Identify relative sizes of measurements to solve problems and to generate measurement tables that show a relationship.

Essential Questions

- How can you classify lines, shapes, and angles based on their attributes?
- How can you measure the perimeter and area of the classroom?
- What everyday tools can you use to measure different objects?
- How can you relate fractions and angles to the hands of a clock?
- How do you decide which tools to use when measuring length, mass, or liquid volume of an object?

Assessments

Possible Formative Assessments
<ul style="list-style-type: none">● Teacher Observation● Student Participation● One-to-One Conferencing● Small Strategy Groups● LinkIt! Progress Reports● DreamBox Progress Reports
Summative Assessments
<ul style="list-style-type: none">● Chapter Quizzes & Tests<ul style="list-style-type: none">○ Chapter 10, 11, 12, and 13● Student Self-Reflection by Chapter● Chapter Performance Tasks (as appropriate)● Online Math Activity Scores

Alternative Assessments

- Modified Unit Assessment
- Modified Chapter Assessment

Standards (NJSL) Addressed in this Unit

Measurement and Data 4.MD

A. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

1. Know the 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. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...

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.

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.

B. Represent and interpret data.

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. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.

C. Geometric measurement: understand concepts of angle and measure angles.

5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

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.

6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

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 problems, e.g., by using an equation with a symbol for the unknown angle measures.

Geometry 4.G

A. Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
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.
3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Computer Science and Design Thinking

8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.

8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

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PRACTICES

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- MP.7 Look for and make use of structure.
- MP.8 Look for and express regularity in repeated reasoning.

Unit 4: Measurement and Data, Geometry

Suggested Teaching Points

Two-Dimensional Figures

Students will...

- Identify and draw points, lines, line segments, rays and angles.
- Classify triangles by the size of their angles.
- Identify and draw parallel lines and perpendicular lines.
- Sort and classify quadrilaterals.
- Determine whether a figure has a line of symmetry.
- Identify and draw lines of symmetry in two-dimensional figures.
- Use the strategy “*act it out*” to solve pattern problems.

Angles

Students will...

- Relate angles and fractional parts of a circle.
- Relate degrees to fractional parts of a circle by understanding that an angle that measures n° turns through $n/360$ of a circle.
- Use a protractor to measure an angle and draw an angle with a given measure.
- Determine the measure of an angle separated into parts.
- Use the strategy “*draw a diagram*” to solve angle measurement problems.

Relative Sizes of Measurement Units

Students will...

- Use benchmarks to understand the relative sizes of measurement units.
- Use models to compare customary units of length.
- Use models to compare customary units of weight.

- Use models to compare customary units of liquid volume.
- Make and interpret line plots with fractional data.
- Use models to compare metric units of length.
- Compare metric units of mass and liquid volume.
- Use models to compare units of time.
- Use the strategy “*draw a diagram*” to solve elapsed time problems.
- Solve problems involving mixed measures.
- Use patterns to write number pairs for measurement units.

Algebra: Perimeter and Area

Students will...

- Use a formula to find the perimeter of a rectangle.
- Use a formula to find the area of a rectangle.
- Find the area of combined rectangles.
- Given perimeter or area, find the unknown measure of a side of a rectangle.
- Use the strategy “*solve a simpler*” problem to solve area problems.

Unit Specific Vocabulary

Angle	Rhombus	Metric Units	Line Plot
Acute Angle	Square	Benchmark	Gram
Obtuse Angle	Trapezoid	Kilometer	Kilogram
Straight Angle	Quadrilateral	Mile	Liter
Right Angle	Line of Symmetry	Foot	Milliliter
Line	Line Symmetry	Inch	Second
Line Segment	Diagonal	Weight	Day
Point	Horizontal	Yard	Hour
Ray	Vertical	Ounce	Minute
Polygon	Hexagon	Pound	Month
Triangle	Regular Polygon	Ton	Week
Venn Diagram	Pentagon	Cup	Year
Octagon	Obtuse Triangle	Fluid Ounce	A.M.
Right Triangle	Acute Triangle	Gallon	P.M.
Perpendicular Lines	Clockwise	Half Gallon	Elapsed Time
Parallel Lines	Counterclockwise	Liquid Volume	Area
Intersecting Lines	Formula	Pint	Base
Degree (°)	Perimeter	Quart	Height
Protractor	Length	Decimeter	Square Unit
Vertex	Width	Millimeter	
Parallelogram	Perimeter	Centimeter	
Rectangle	Customary Units	Meter	

Suggested Modifications and Accommodations

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- Digital Resources:
 - *Think Central*® Digital (<https://www-k6.thinkcentral.com>)
 - ebooks, eToolkit, eTeacher's Manual, eStudent Books, online resources
 - Online Practice Assignments (Includes but not limited to: IXL, Xtra Math)
 - [Grade 4 - eGlossary](#)
 - Bridges in Mathematics (<https://bridges.mathlearningcenter.org/>) for intervention
 - DreamBox

Special Education Students

- Use various methods to understand a student's learning style, i.e.- observation, surveys, conferring.
- Ask students to recall what they have already learned in ways that activate prior knowledge and build on that knowledge.
- Model problem-solving processes.
- Model productive and engaging partner talk.
- Provide direct instruction and/or think aloud for clarity.
- Build and/or use anchor charts with students and continually refer to them while teaching.
- Provide opportunities for students to turn and talk.
- Use modeling and manipulatives.
- Provide graphic organizers and graph paper.
- Use step-by-step how-to sheets to guide student problem-solving.
- Refer to student IEP goals and modifications.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Provide frequent breaks.
- Use a problem [solving plan](#) to organize mathematical thinking.
- Incorporate [place value charts](#) into small group lessons.

Students at Risk

- Use the reteach component of Go Math! lesson in a small group setting.
- Shorten assignments.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.

- Allow for extended time.
- Provide guided notes as necessary.
- Allow student to orally construct their response.
- Provide frequent breaks.
- [Grade 4 - eGlossary](#)
- [Area Blocks- Arrays, Area and Perimeter Game](#)
- [Squirt the Dog - Practice Using Angles](#)
- [Basic Quadrilaterals - Guess the Polygon - Desmos](#)
- [Metric Conversions - Khan Academy](#)
- [Measurement - Bill Nye](#)
- [Metric vs. Customary - Brainpop](#)
- [Introduction to Quadrilaterals - Khan Academy](#)
- [Fruit Picker- Angle Game](#) (Flash must be turned on to access this link)
- [Protractor Introduction](#)
- [Plane Geometry](#)
- [Area and Perimeter - Both Simple and Complex](#)
- [Cube Nets - NCTM](#)
- [Interactive Geometry - Math is Fun](#)
- [Angles - BrainPop](#)
- [Geometry - BrainPop](#)
- [Parallel and Perpendicular Lines - BrainPop](#)
- [Similar Figures - BrainPop](#)

English Language Learners

- [Grade 4 - eGlossary](#)
- Allow use of a bilingual dictionary.
- Allow use of handheld translator.
- Ask students to recall what they already learned in ways that activate their prior knowledge.
- Use pre-assessment data to drive instruction.
- Use preferential seating.
- Use flexible grouping.
- Model productive and engaging partner talk.
- Allow for extended time.
- Provide guided notes as necessary.
- Set a writing goal for the assignment and then focus only on that goal.

Gifted and Talented

- Provide opportunities to lead discussion.
- Use flexible grouping.
- Use projects, such as the following:
 - [Wanna Rent a Chaise Lounge?](#)
 - [Earth Day-12 Possible Activities](#)
 - [NHL Playoff Games Can Sure Last a Long Time!](#)
 - [Winter Olympics, PyeongChang](#)
 - [Lighting the Olympic Torch](#)

Students with 504 Plans

- *Reteach* activities
- Use of manipulatives, counters, number grid, and vocabulary picture cards
- Preferential Seating
- Monitor On-Task Performance
- Establish and maintain eye contact when giving oral directions
- Directions repeated and/or clarified
- Provide copy of class notes
- Homework does not impact grade in class
- Reduce homework amount
- Modify assessments

Social-Emotional Learning Competencies

- **Self-Awareness**: ability to recognize one's emotions and know one's strengths and limitations
 - Connections:
 - Reflecting on one's learning (Oral, Thumbs Up, Thumbs Down, Pictures, etc.)
- **Self-Management**: ability to regulate and control one's emotions and behaviors, particularly in stressful situations
 - Connections:
 - Visit the mindfulness/cool down corner in the classroom for self-soothing activities (Squishy ball, sand timer, fidget popper, etc.)
- **Social Awareness**: ability to take the perspective of others, demonstrate empathy, acknowledge and appreciate similarities and differences, and understand how one's actions influence and are influenced by others
 - Connections:
 - Students collaborate and help each other during math centers
- **Relationship Skills**: refers to one's ability to demonstrate prosocial skills and behaviors in order to develop meaningful relationships and resolve interpersonal conflicts
 - Connections:
 - Class discussions
 - Incentives for individual students and small groups
- **Responsible Decision-Making**: refers to the ability to use multiple pieces of information to make ethical and responsible decisions
 - Connections:
 - Class rules and routines

- Class discussions
- Following directions for math centers

4th Grade Math Curriculum

Unit 5: Real-World Application of Math

Unit Overview

The objective of this unit is for students to use the mathematical skills they learned this year to create something new. They will apply fourth grade math skills to real-world situations. Since there are choice activities and various projects in this unit, it allows for easy differentiation and successful student pacing. There are steps and procedures to assist students in these real-world projects, but the work and results will be determined by each student. Throughout the unit, the students will create a project plan, design their project, assess that the project solves the proposed problem, and present their findings. Three sample projects that can be used are the following:

- **Project Party** - [Project Party Project](#)
- **Breaking Up the Bakery** - [Breaking Up the Bakery Project](#)
- **Design a Zoo** - [Design a Zoo Project](#)

Enduring Understandings

- Understand that mathematical formulas help solve multi-step problems.
- Apply knowledge of fractions to solve real-life situations.
- Plan and design preparations for various situations using number knowledge and algorithms.
- Use formulas of area and perimeter to create desired results in real-world circumstances.

Essential Questions

- In what real-life situations would you need to compute with integers?
- When do you use formulas to solve real life problems?
- How can you use math knowledge to plan for different situations?

Assessments

Possible Formative Assessments
<ul style="list-style-type: none">● Teacher Observation● Student Participation● One-to-One Conferencing● Small Strategy Groups● LinkIt! Progress Reports● DreamBox Progress Reports
Summative Assessments
<ul style="list-style-type: none">● Student records of project progress● Student Self-Reflection● Performance Tasks (as appropriate)
Benchmark Assessments
<ul style="list-style-type: none">● LinkIt! Math Form C
Alternative Assessments
<ul style="list-style-type: none">● Modified Unit Assessment

Standards (NJSLs) Addressed in this Unit

Operations and Algebraic Thinking 4.OA

A. Use the four operations with whole numbers to solve problems.

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.

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.

C. Generate and analyze patterns.

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. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.

Number and Operations in Base Ten 4.NBT

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

4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

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.

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.

Number and Operations—Fractions 4.NF

A. Extend understanding of fraction equivalence and ordering.

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.

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.

B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

- 3. Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
 - a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
 - 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. Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.
 - 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.

C. Understand decimal notation for fractions, and compare decimal fractions.

- 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 100.4 For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.
- 6. Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $62/100$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.
- 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.

Computer Science and Design Thinking

- 8.1.5.AP.1: Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
- 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
- 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

Career Readiness, Life Literacies, and Key Skills

LIFE LITERACIES AND KEY SKILLS

- 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
- 9.4.5.CI.4: Research the development process of a product and identify the role of failure as a part of the creative process (e.g., W.4.7, 8.2.5.ED.6).

PRACTICES

- **CLKSP4** Demonstrate creativity and innovation.
- **CLKSP5** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CLKSP8** Use technology to enhance productivity, increase collaboration, and communicate effectively.

Interdisciplinary Connections:

English Language Arts

Writing

- **W.4.2** Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
- **W.4.5** With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.
- **W.4.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

Reading

- **RI.4.4.** Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
- **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

Language

- **L.4.3** Use knowledge of language and its conventions when writing, speaking, reading, listening.
 - a. Choose words and phrases to convey ideas precisely.
 - b. Choose punctuation for effect.

Standards for Mathematical Practice

- MP.1 Make sense of problems and persevere in solving them.
- MP.2 Reason abstractly and quantitatively.
- MP.3 Construct viable arguments & 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.

Unit 5: Real World Application of Math

Suggested Teaching Points

Project Planning

Students will

- Create a plan and assess the necessary steps.
- Display mathematical equations and data to support that the design plan is feasible.
- Work with peers and teachers to share design plans.
- The projects may include the following skills:
 - Explain why there is a need for a standard order of operations.
 - Problem solving using all the appropriate mathematical operations.

- Display data using graphs, charts, and pictures.
- Evaluate numerical expressions involving several operations and grouping symbols.
- Rewrite a group of fractions and decimals using the equivalent representation.
- Explain how to compare fractions and decimals.
- Work with algebraic expressions and properties.
- Create equations.
- Evaluate and reflect on whether an answer is reasonable.

Design

Students will

- Create a design plan to solve the proposed problem.
- Amend the plan as necessary.
- Confer with peers and teachers to think through the problem solving process.
- Provide mathematical evidence to support the process.
- Utilize an appropriate graphic organizer to manage data and results.

Self-assessment

Students will

- Review design plan and amend them if necessary.
- Reevaluate and modify data if desired outcome is not achieved.
- Summarize the process and reflect on the results at the conclusion of the project.

Presentation

Students will

- Share results with peers through visual data and oral presentations.

Unit Specific Vocabulary

See Math Terms in Units 1-4

Suggested Modifications and Accommodations

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- Use flexible grouping.
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- Allow for extended time.
- Provide guided notes as necessary.
- Allow student to orally construct their response.
- Provide frequent breaks.
- See links in Units 1- 4 to review previously learned skills.

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- [Grade 4 - eGlossary](#)
- Allow use of a bilingual dictionary.
- Allow use of handheld translator.
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- Use flexible grouping.
- Use projects in Units 1-4

Students with 504 Plans

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