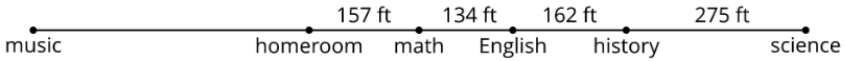
4th GRADE MATH CURRICULUM

Mai's cousin is in middle school. She travels from her homeroom to math, then English, history, and science. When she finishes her science class, she takes the same path back to her homeroom.

Mai's cousin makes the same trip 5 times each week. The distances between the classes are shown.



- What mathematical questions can you ask about this situation?

Grade Level(s): 4th Grade

Curriculum Author(s): Taryn Fernandez, Jennifer Schnitzer, Alicia Schiavo
(Curriculum content aligns with the CT State Model Math Curriculum and is based on the Illustrative Math program used in grades K-9)

Course Description: The big ideas in grade 4 include: developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; 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.

Year At A Glance			
Unit Title	**Overarching Essential Question**	**Overarching Enduring Understanding**	**Vision of A Learner "I Can" Statements**
Factors and Multiples	What patterns do I notice when I am multiplying whole numbers that can help me multiply more efficiently?	A number can be multiplicatively decomposed into factor pairs and expressed as a product of these factor pairs.	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Fraction Equivalence and Comparison	How are fractions compared and represented?	Fractions with different denominators can be compared by using visual fraction models, benchmark fractions, finding common denominators, and finding common numerators.	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Extending Operations to Fractions	How can I represent decomposing a fraction?	Fractions and Mixed Numbers are composed of unit fractions and non-unit fractions and can be decomposed as a sum of unit and/or non-unit fractions.	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
From Hundredths to Hundred-Thousands	How are fractions and decimals related?	Fractions can be expressed as decimals and compared as decimal fractions.	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Multiplicative Comparison and Measurement	How does understanding the multiplicative relationships between measurements help us in our daily lives?	Whether measuring liquids, weights, distance, or time, understanding multiplicative relationships helps us to better visualize, estimate, comprehend, and respond to the questions how much, how many, how long, or how far.	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Multiplying and Dividing Multi-digit Numbers	How can I strategically determine which strategy to use while solving	Flexible methods of computation involve grouping numbers in strategic ways, and the context of a problem	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5);

	various multiplication and division problems?	can help determine the strategy to use when solving.	TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Angles and Angle Measurement	How are angles applied in the context of a circle?	Angles are measured in the context of a central angle of a circle, and a 360º rotation about a point makes a complete circle.	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Properties of Two-Dimensional Shapes	What characteristics or attributes help identify two-dimensional shapes?	Shapes can be classified by properties of their lines and angles.	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)
Putting it All Together	How can we utilize our learning to develop strategies that get us ready to practice and apply our math skills?	We can create our own strategies for math warm-ups that will help us prepare for lessons by using our prior knowledge.	TCC4(3-5); CCE1(3-5); CCE2(3-5); CCE3(3-5); CCE4(3-5); DE1(3-5); TI2(3-5); TI3(3-5); P2(3-5); AA1(3-5); AA2(3-5); AA4(3-5)

Unit 1 - Factors and Multiples

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.
- 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. 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.
- 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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Patterns are generated by following a specific operational rule; • Multiplication and division are inverse operations. • A number can be multiplicatively decomposed into factor pairs and expressed as a product of these factor pairs.	• What strategies can be used to find rules for patterns and what predictions can the pattern support? • How can the relationship between multiplication and division help us solve problems? • What patterns do I notice when I am multiplying whole numbers that can help me multiply more efficiently? • How can my knowledge of prime and composite numbers help me solve multiplication and division problems?
Students will know...	**Students will be able to...**
• Multiplication equations can show comparisons • The distributive property can be represented on the area model and/or partial products method of multiplication. • Verbal statements of multiplicative comparisons can be written as equations with and without variables. • A prime number has only two factors: one and itself (only one factor pair). • A composite number has more than two factors (more than one factor pair). • Any whole number is a multiple of each of its factors. • In multiplicative comparisons, the relationship between quantities is described in terms of how many times larger one is than the other.	• Generate a pattern that follows a rule. • Given a pattern, identify the rule and extend the pattern; identify apparent features of a pattern that follows a given rule, which are not explicit in the rule itself. • Identify all factor pairs for any given number 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. • Use visuals, symbols and/or language to explain their reasoning.
Key Vocabulary: As much, Difference, Equation, Pattern, Rule, Times, Times as many, Composite, Factor Pairs, Factor, Multiple, Multiplicative Comparisons, Multiplicative Equations, Prime, Product, Quotient, Remainder, Sum, Whole Number	
Assessment Evidence	
Performance Tasks: Students determine whether a number is prime or composite. Students select the statements about multiples and factors that are true. Students find all factor pairs of a number within 100. Students examine multiples of different numbers.	**Other Evidence:** Various checkpoints throughout the unit for the following: • Determine if a number is prime or composite.

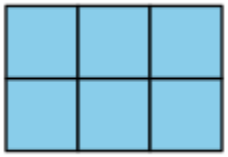
	• Explain what it means to be a factor or a multiple of a whole number. • Relate the side lengths and area of a rectangle to factors and multiples • Apply multiplication fluency within 100 and the relationship between multiplication and division to find factor pairs and multiples.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

    - ***Students apply understanding of multiplication and area to work with factors and multiples.***

In this unit, students extend their knowledge of multiplication, division, and the area of a rectangle to deepen their understanding of factors and to learn about multiples.
In grade 3, students learned that they can multiply the two side lengths of a rectangle to find its area, and divide the area by one side length to find the other side length.
To represent these ideas, they used area diagrams, wrote expressions and equations, and learned the terms "factors" and "products."



In this unit, students return to the concept of area to make sense of factors and multiples of numbers. Given a rectangle with a particular area, students find as many pairs of whole-number side lengths as they can. They make sense of those side lengths as factor pairs of the whole-number area, and the area as a multiple of each side length.
Students also learn that a number can be classified as prime or composite based on the number of factor pairs it has.
Throughout the unit, students encounter various contexts related to school, gatherings, and celebrations. They are intended to invite conversations about students' lives and experiences. Consider them as opportunities to learn about students as individuals, to foster a positive learning community, and to shape each lesson based on insights about students.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 2 - Fraction Equivalence and Comparison

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 4.NF.A.1: Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × 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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Fractions with different denominators can be compared by using visual fraction models, benchmark fractions, finding common denominators, and finding common numerators. • Comparisons are valid only when the two fractions refer to the same whole.	• How are fractions compared and represented? • Why is it important to identify, label, and compare fractions as representations of equal parts of a whole or of a set? • How are benchmark fractions such as ½ helpful when comparing fractions?
Students will know...	**Students will be able to...**
• Equivalent fractions use different sized fractional parts to describe the same amount, e.g., 1/2 = 2/4 • A product of a fraction times a whole number can be written as a multiple of a unit fraction. • Visual models, such as rectangular area models, arrays (e.g., egg cartons) and length models (including fraction strips and number lines), can be used to represent and compare fractions. • To compare fractions using models, each fraction should be represented with the same visual model and the same sized whole. • Using equivalent fractions, any fraction with a denominator of ten can be renamed as a fraction with a denominator of 100 • A fraction a/b is equivalent to a fraction (n x a)/(n x b) • A fraction with a denominator of 10 can also be expressed as an equivalent fraction with a denominator of 100.	• Given pairs of length models divided into different numbers of equal parts, explore how both of the models can illustrate equivalent quantities • Explore and generate an equivalent fraction in tenths as a fraction in hundredths • Explore and express a decimal up to hundredths as a fraction. • Add and subtract fractions with denominators of 10 and 100 • Recognize and generate equivalent fractions • Compare 2 fractions with different denominators and different numerators by representing the fractions with symbols, visual models and words and by comparing to a benchmark fraction using symbols, visual models and words • Identify if comparisons are valid or invalid and explain why
Key Vocabulary: Area, Digits, Equal, Equal to, Equation, Equivalent, Expression, Greater than, Halves, Increment, Length, Less than, Quarters, Range, Symbols, Whole number, Benchmark fractions, Common denominators, Compose, Decompose, Denominator, Divide, Fraction, Fraction greater than a whole (Improper Fraction), Mixed numbers, Number line, Numerator, Square units, Tenths, Unit fractions, Visual fraction model	
Assessment Evidence	
Performance Tasks: Students identify which fractions are equivalent to a given fraction. Students compare fractions to the benchmarks 1/2 and 1. Students identify a fraction that is less than a given fraction. Students find	**Other Evidence:** Various checkpoints throughout the unit for the following: • Make sense of fractions with denominators 2, 3, 4, 5, 6, 8, 10, and 12 through physical representations and diagrams.

fractions equivalent to a given fraction with no scaffold. They may draw a picture or use a number line or reason abstractly in terms of the number and size of parts. Students address a common misconception about fractions, namely, reasoning that focuses on the numerator without taking into account the meaning of the denominator. Students list fractions in terms of increasing size. Students compare fractions in context.	• Reason about the location of fractions on the number line. • Generate equivalent fractions with the following denominators: 2, 3, 4, 5, 6, 8, 10, 12, and 100. • Use visual representations to reason about fraction equivalence, including using benchmarks such as 1/2 and 1.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
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- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

- ***Students generate and reason about equivalent fractions and compare and order fractions with the following denominators: 2, 3, 4, 5, 6, 8, 10, 12, and 100.***

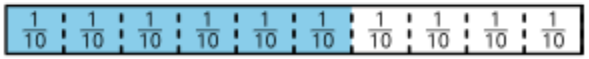
In this unit, students extend their prior understanding of equivalent fractions and comparison of fractions.

In grade 3, students partitioned shapes into parts with equal area and expressed the area of each part as a unit fraction. They learned that any unit fraction $1/b$ results from a whole partitioned into b equal parts. They used unit fractions to build non-unit fractions, including fractions greater than 1, and represent them on fraction strips and tape diagrams. The denominators of these fractions were limited to 2, 3, 4, 6, and 8. Students also worked with fractions on a number line, establishing the idea of fractions as numbers and equivalent fractions as the same point on the number line.

Here, students follow a similar progression of representations. They use fraction strips, tape diagrams, and number lines to make sense of the size of fractions, generate equivalent fractions, and compare and order fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

Students generalize that a fraction $\frac{a}{b}$ is equivalent to fraction $\frac{(n \times a)}{(n \times b)}$ because each unit fraction is being broken into n times as many equal parts, making the size of the part n times as small $\frac{1}{(n \times b)}$ and the number of parts in the whole n times as many $(n \times a)$. For example, we can see $\frac{3}{5}$ is equivalent to $\frac{6}{10}$ because when each fifth is partitioned into 2 parts, there are 2×3 or 6 shaded parts, twice as many as before, and the size of each part is half as small, $\frac{1}{(2 \times 5)}$ or $\frac{1}{10}$.





As the unit progresses, students use equivalent fractions and benchmarks such as 1/2 and 1 to reason about the relative location of fractions on a number line, and to compare and order fractions.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 3 - Extending Operations to Fractions

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 4.NF.B.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- 4.NF.B.4.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 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).
- 4.NF.B.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 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)
- 4.NF.B.4.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?
- 4.MD.B.4: Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 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.
- 4.NF.B.3: Understand a fraction a/b with a > 1 as a sum of fractions 1/b.
- 4.NF.B.3.a: Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- 4.NF.B.3.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 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.
- 4.NF.B.3.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.
- 4.NF.B.3.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.
- 4.NF.A.1: Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × 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.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 100.2 For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.

Vision of A Learner Attributes: Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
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- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...

- Fractions and Mixed Numbers are composed of unit fractions and non-unit fractions and can be decomposed as a sum of unit and/or non-unit fractions.
- Addition and subtraction of fractions involves joining and separating parts referring to the same whole.
- A product of a fraction times a whole number can be written as a multiple of a unit fraction

Essential Questions:

- How can I represent decomposing a fraction?
- How can decomposing fractions help me to add and subtract fractions with like denominators, whether in a story problem or line plot?
- What strategies can be used for finding products when multiplying a whole number by a fraction?

Students will know...

- A unit fraction is the building block of fractions which is any fraction where the numerator is 1, and the denominator is a whole number not equal to zero
- Fractions can be added and subtracted when the wholes are the same size
- Unit fractions can be combined from multiple wholes if all the wholes are the same size

Students will be able to...

- Represent unit fractions as a fraction with a numerator of 1 with manipulatives, pictures, symbols, language, and real-life examples
- 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

• Fractions can be decomposed in multiple ways into a sum of fractions with the same denominator. • Fractions with the same denominators can be added and subtracted using visual models, properties of operations, and relationships of addition and subtraction of whole numbers. • Mixed numbers can be written as fractions, e.g., 14/3 = 4 2/3 , and can be added or subtracted in this form. • Equivalent fractions can be used to add and subtract fractions. • Multiplication of a whole number by a fraction can be represented as repeated addition using equations. • Multiplication of a whole number by a fraction can be solved by using visual models. • Data involving measurements in fractions of a unit can be represented on a line plot. • Addition and subtraction of fractions can be used to interpret data on a line plot.	• Add and Subtract mixed numbers with like denominators and model the decomposition of the mixed numbers into unit fractions using manipulatives, pictures, symbols, language, and real-life examples • Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators using visual models and/or equations • Represent multiplication of a fraction by a whole number as repeated addition using area or linear models • Multiply a fraction by a whole number by decomposing the fraction into a multiple of a unit fraction such as ¾ x 2 = 3 x 2 x ¼ which equals 6/4, using manipulatives, pictures, symbols, language, and real-life examples • Solve word problems involving multiplication of any fraction by a whole number by using visual models and/or equations • Make a line plot to display a set of measurements to the nearest ½, ¼ or 1/8 of a unit • Solve problems involving addition and subtraction of fractions by using information presented in line plots • Solve real-world problems that will result in various equivalent answers, having students explain why the solutions are equivalent
Key Vocabulary: Add, Difference, Equal, Equivalent, Interval, Model, Product, Subtract, Sum, Common/like denominators, Compose, Data set, Decompose, Denominator, Distance, Equation, Expression, Fraction, Fractional model, Improper fraction, Line Plots, Mixed numbers, multiple, Numerator, Parts of a whole, Unit fractions, Unlike denominator, Whole, Whole number	
Assessment Evidence	
Performance Tasks: Students identify expressions that are equivalent to an improper fraction. Students compare the value of expressions with 1. The expressions involve sums of fractions with the same denominator or products of a whole number and a fraction. Students identify products of whole numbers and fractions that are equivalent to a given fraction. Students solve a contextual problem which requires multiplying a whole number and a fraction. Students interpret the measurement data on the	**Other Evidence:** Various checkpoints throughout the unit for the following: • Recognize that $n \times \frac{a}{b} = \frac{(n \times a)}{b}$ • Represent and explain that a fraction a/b is a multiple of $1/b$, namely a x $1/b$ • Represent and solve problems involving multiplication of a fraction by a whole number.

line plot to answer questions and use the data to subtract fractions. Students find sums, differences, and products of fractions without context. Students add fractions with denominators 10 and 100.Students find sums and differences of fractions with denominator 6 in context.	• Create and analyze line plots that display measurement data in fractions of a unit $(1/8,\ 1/4,\ 1/2)$ • Represent and solve problems that involve the addition and subtraction of fractions and mixed numbers, including measurements presented in line plots. • Use various strategies to add and subtract fractions and mixed numbers with like denominators. • Reason about equivalence to add tenths and hundredths. • Reason about equivalence to solve problems involving addition and subtraction of fractions and mixed numbers.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

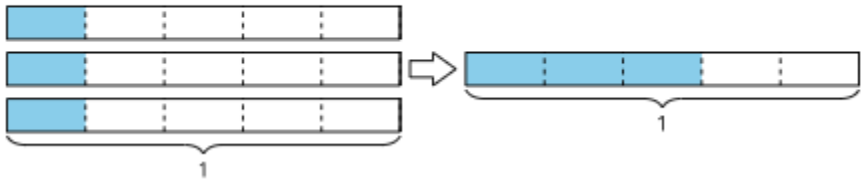
- Students learn that a fraction $\frac{a}{b}$ is a product of a whole number a and a unit fraction $\frac{1}{b}$, or $\frac{a}{b} = a \times \frac{1}{b}$, and that $n \times \frac{a}{b} = \frac{(n \times a)}{b}$. Students learn to add and subtract fractions with like denominators, and to add and subtract tenths and hundredths.

In this unit, students deepen their understanding of how fractions can be composed and decomposed, and learn about operations on fractions.

In grade 3, students partitioned a whole into equal parts and identified one of the parts as a unit fraction. They learned that non-unit fractions and whole numbers are composed of unit fractions. They used visual fraction models, including tape diagrams and number lines, to represent and compare fractions. In a previous unit, students extended that work and reasoned about fraction equivalence.

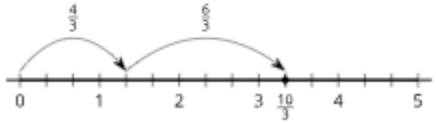
Here, students multiply fractions by whole numbers, add and subtract fractions with the same denominator, and add tenths and hundredths. They rely on familiar concepts and representations to do so. For instance, students had represented multiplication on a tape diagram, with equal-size groups and a whole number in each group. Here, they use a tape diagram that shows a fraction in each group.

$$3 \times \frac{1}{5} = \frac{3}{5}$$

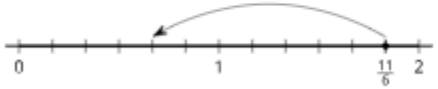


In earlier grades, students used number lines to represent addition and subtraction of whole numbers. Here, they use number lines to represent the decomposition of fractions into sums, and to reason about addition and subtraction of fractions with the same denominator, including mixed numbers.

$$\frac{4}{3} + \frac{6}{3} = \frac{10}{3}$$



$$\frac{11}{6} - \frac{7}{6} = \frac{4}{6}$$



Students then apply these skills in the context of measurement and data. They analyze line plots showing fractional lengths and find sums and differences to answer questions about the data.

Lastly, students use fraction equivalence to find sums of tenths and hundredths. For instance, to find $\frac{3}{10} + \frac{15}{100}$, they reason that $\frac{3}{10}$ is equivalent to $\frac{30}{100}$, so the sum is $\frac{30}{100} + \frac{15}{100}$, which is $\frac{45}{100}$.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 4 - From Hundredths to Hundred-Thousands

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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. For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.
- 4.NF.C.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.
- 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.
- 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 ÷ 70 = 10 by applying concepts of place value and division.
- 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.
- 4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- 4.NBT.A.3: Use place value understanding to round multi-digit whole numbers to any place.
- 4.NF.B.3.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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.

- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• A fraction with a denominator of 10 or 100 can be written using decimal notation • Fractions can be expressed as decimals and compared as decimal fractions. • Place value can be used to compare and order decimals. • The place value system of whole numbers can be expanded to represent numbers less than 1. • Decimals can be represented visually and in written form.	• How are fractions and decimals related? • How can I apply what I know about place value to decimals?
Students will know...	**Students will be able to...**
• A number can be written as a fraction, e.g., 17/100, or as a decimal, e.g., 0.17 • A decimal point or horizontal bar can be used to show where the unit is located, e.g., 35/100 = 0.35 • Decimals written as tenths or hundredths can be compared using equivalent fractions	• Explore and generate an equivalent fraction in tenths as a fraction in hundredths • Explore and express a decimal up to hundredths as a fraction. • Write fractions with 10 and 100 in the denominator as decimals • Compare two decimals to the hundredths using >, <, =., and justify the conclusions • Explain that comparisons are valid only when two decimals and/or fractions refer to the same whole

Key Vocabulary: fraction, denominator, numerator, decimals, place value, compare, whole numbers, whole, tenths, hundredths, equivalent, explore, generate, express, justify, conclusions, expanded form

Assessment Evidence

Performance Tasks:	**Other Evidence:**
Students identify how to represent a number using words or expanded form. Students compare numbers within 1,000,000. Students multiply a whole number by 10 in context and explain why the digits are the same but they are shifted to the left by one place and there is a 0 at the end. Students find expressions equivalent to a given fraction with a	Various checkpoints throughout the unit for the following: • Represent, compare, and order decimals to the hundredths by reasoning about their size. • Write tenths and hundredths in decimal notation.

denominator of 100. Students find a sum and a difference without a context. The problems are arranged in a way that encourages the use of the standard algorithm. Students find a decimal between two decimal numbers using time as a context. Students round a number to different place values without the support of a number line. Students compare and subtract whole numbers within one million.	• Read, represent, and describe the relative magnitude of multi-digit whole numbers up to 1 million. • Recognize that in a multi-digit whole number, the value of a digit in one place represents ten times what it represents in the place to its right. • Compare, order, and round multi-digit whole numbers within 1,000,000. • Add and subtract multi-digit whole numbers using the standard algorithm.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
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- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

    - ***Students read, write and compare numbers in decimal notation. They also extend place value understanding for multi-digit whole numbers and add and subtract within 1,000,000.***

In this unit, students learn to express both small and large numbers in base ten, extending their understanding to include numbers from hundredths to hundred-thousands.

In previous units, students compared, added, subtracted, and wrote equivalent fractions for tenths and hundredths. Here, they take a closer look at the relationship between tenths and hundredths and learn to express them in decimal notation. Students analyze and represent fractions on square grids of 100 where the entire grid represents 1. They reason about the size of tenths and hundredths written as decimals, locate decimals on a number line, and compare and order them.

Students then explore large numbers. They begin by using base-ten blocks and diagrams to build, read, write, and represent whole numbers beyond 1,000. Students see that ten-thousands are related to thousands in the same way that thousands are related to hundreds, and hundreds are to tens, and tens are to ones.

As they make sense of this structure (MP7), students see that the value of the digit in a place represents ten times the value of the same digit in the place to its right.

Students then reason about the size of multi-digit numbers and locate them on number lines. To do so, they need to consider the value of the digits. They also compare, round, and order numbers through 1,000,000. They also use place-value reasoning to add and subtract numbers within 1,000,000 using the standard algorithm.

Throughout the unit, students relate these concepts to real-world contexts and use what they have learned to determine the reasonableness of their responses.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 5 - Multiplicative Comparison and Measurement

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.
- 4.OA.A.1: Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 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.
- 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.
- 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.
- 4.MD.A.1: Know relative sizes of measurement units within one system of units including km, m, cm; 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), ...
- 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.
- 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.
- 4.NF.B.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- 4.NF.B.4.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?

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.

- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Whether measuring liquids, weights, distance, or time, understanding multiplicative relationships helps us to better visualize, estimate, comprehend, and respond to the questions how much, how many, how long, or how far.	• How does understanding the multiplicative relationships between measurements help us in our daily lives?
Students will know... • The relative size of meters and centimeters • The multiplicative relationship between kilometers and meters • The multiplicative relationships between liters and milliliters, and kilograms and grams • The multiplicative relationship between pounds and ounces • The multiplicative relationships between units of time	**Students will be able to...** • Represent multiplicative comparison situations using objects and drawings. • Interpret different representations of multiplicative comparison (situations, diagrams, and equations). • Represent and solve multiplicative comparison problems, including those involving unknown factors. • Represent and solve multiplicative comparison problems with larger numbers. • Multiply or divide to solve one- and two-step problems involving multiplicative comparison. • Write, represent, and solve multiplicative comparison problems involving “10 times as many.” • Express meters in terms of centimeters. • Express kilometers in terms of meters.

	• Express liters in terms of milliliters, and kilograms in terms of grams. • Solve multi-step problems that involve multiplicative comparison and measurement with whole numbers. • Express pounds in terms of ounces. • Express hours in terms of minutes and seconds. • Solve multi-step problems that involve multiplicative comparison and measurement with whole numbers and fractions. • Use multiplicative comparison and unit conversion to solve multi-step problems about weight and capacity (in pounds, ounces, gallons, quarts, and cups). • Use multiplicative comparison and unit conversion to solve multi-step problems about length (in yards, feet, inches). • Solve problems involving the perimeter of rectangles using multiplicative comparison. • Solve problems involving perimeter using multiplicative comparison and addition or subtraction of fractions (including mixed numbers).
Key Vocabulary: multiplicative, relationships, comparisons, unknown, mixed numbers, units, conversion, solve, multi-step, weight, capacity, perimeter, length, represent, interpret, diagrams, equations, factors, centimeters, meters, grams, kilograms, liters, milliliters, pounds, ounces, gallons, cups, quarts, yards, feet	
Assessment Evidence	
Performance Tasks: Students solve a multiplicative comparison problem. They may write an equation or draw a diagram to help support their thinking. Students choose correct conversion statements for metric and standard units. Students choose a correct conversion statement between inches and feet. Students reason about the perimeter and side lengths of different rectangles. Students complete a table converting pounds to ounces. Students examine an incorrect unit conversion. Students compare two quantities given in different metric units, deciding which is larger and then calculating the difference.	**Other Evidence:** Various checkpoints throughout the unit for the following: • Analyze, describe, and represent multiplicative comparison situations. • Solve one-step and two-step problems involving multiplicative comparison. • Convert from larger units to smaller units within a given system of measurement. • Solve multi-step problems involving multiplicative comparison and measurement.

	• Understand the relative sizes of kilometers, meters and centimeters, liters and milliliters, kilograms and grams, and pounds and ounces.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
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- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

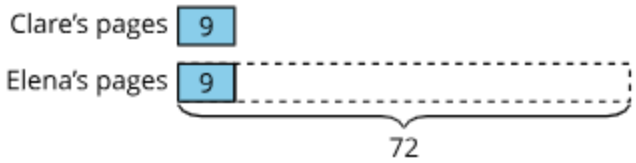
    - ***Students interpret, represent, and solve multiplicative comparison problems using an understanding of the relationship between multiplication and division. They use this thinking to convert units of measure within a given system from larger to smaller units.***

In this unit, students make sense of multiplication as a way to compare quantities. They use this understanding to solve problems about measurement.

In earlier grades, students related two quantities and made additive comparison, where the key question was "How many more?" Here, they make multiplicative comparison, in which the underlying question is "How many times as many?" For example, if Mai has 3 cubes and Tyler has 18 cubes, we can say that Tyler has 6 times as many cubes as Mai does.

Initially, students reason using concrete manipulatives and discrete images. Later, they reason more abstractly, using tape diagrams and equations. Comparative language such as "_____ times as many (or much) as ____" is emphasized, offering students opportunities to attend to precision as they communicate mathematically (MP6).

Write a multiplication equation to compare the pages read by Elena and Clare. Use a symbol to represent the unknown.



Next, students use the idea and language of multiplicative relationships to learn about various units of length, mass, capacity, and time, and to convert from larger units to smaller units within the same system of measurement. For example, they describe 1 kilometer as 1,000 times as long as a meter. Students then use their new knowledge to solve measurement problems.



Elena's frisbee went 3 times as far as Clare's did.
Andre's frisbee went 4 times as far as Tyler's did.

How far did Elena and Tyler throw the frisbee?

student	distance
Han	17 yards
Lin	$51\frac{1}{2}$ feet
Clare	$21\frac{1}{3}$ feet
Andre	22 yards 2 feet
Elena	
Tyler	

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 6 - Multiplying and Dividing Multi-digit Numbers

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

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

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.

- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...

- Fluency is being efficient, accurate, and flexible with strategies.
- Flexible methods of computation involve grouping numbers in strategic ways.
- Multiplication and division are inverse operations.
- The context of a problem can help determine the strategy to use when solving.

Essential Questions:

- What is fluency?
- How are multiplication and division related?
- How can I strategically determine which strategy to use while solving various multiplication and division problems?

Students will know...

- Responses to math problem must be assessed for reasonableness
- There are similarities and differences between algorithms that use partial-products and the standard algorithm for multiplication
- We can use our understanding of place value and operations to explain and extend patterns of numbers
- There are multiple ways to solve a math problem

Students will be able to...

- Analyze and describe number and shape patterns.
- Analyze, describe, and generate patterns that follow a given rule.
- Analyze patterns represented visually and numerically.
- Use numbers, words, and the idea of factors and multiples to describe and extend patterns in the features of rectangles.
- Analyze and describe patterns in numbers that follow a rule.
- Multiply two-digit and one-digit whole numbers using place value understanding and properties of operations.
- Multiply three- and four-digit numbers using place value understanding and properties of operations.
- Multiply 2 two-digit numbers using place value understanding and properties of operations.

	• Multiply multi-digit whole numbers by one-digit numbers using an algorithm that uses partial products. • Multiply 2 two-digit numbers using an algorithm that uses partial products. • Make sense of the standard algorithm for multiplication. • Multiply multi-digit numbers using strategies based on place value and the properties of operations. • Reason about division of two- and three-digit numbers in situations involving equal-size groups. • Reason about division of two- and three-digit numbers in situations involving factors and multiples. • Reason about division of two- and three-digit numbers in situations involving area of rectangles. • Divide two-digit numbers by one-digit divisors using base-ten blocks. • Divide two- and three-digit by one-digit numbers using base-ten diagrams. • Analyze ways of using and recording partial quotients to divide multi-digit numbers. • Find whole-number quotients and remainders using an algorithm that uses partial quotients. • Interpret the result and remainder of division in situations. • Represent and solve problems that involve finding whole-number quotients and remainders. • Interpret products, quotients, and remainders in terms of a situation. • Solve multi-step problems in ways that make sense to students. • Solve multi-step problems involving measurement conversions, perimeter, and area. • Solve multi-step problems involving the four operations. • Assess the reasonableness of responses.
Key Vocabulary: fluency, multiplication, division, strategy, product, quotient, multi-step problems, algorithm, reasonableness, analyze, interpret, solve, reason, divide, remainders, whole-numbers, divisors, digits, partial products, extend, patterns, result	

Assessment Evidence	
Performance Tasks: Students evaluate statements about a sequence of multiples of 3. Students estimate the value of the product of a four-digit number and a one-digit number. Students find products of a one-digit and four-digit number and two two-digit numbers. Students may draw a diagram to show partial products or they may write equations or they may arrange their calculations vertically. Students find quotients of three- and four-digit numbers by a one-digit divisor. They may use diagrams or vertical calculations, or they may add multiples and work their way up to the number. Students perform multiplication and division to solve problems about the same context. They can use any method to calculate. Students use division to solve a problem where they need to interpret the remainder. Students solve a multi-step problem about tiling a rectangle with squares of different sizes.	**Other Evidence:** Various checkpoints throughout the unit for the following: ● Generate a number or shape pattern that follows a given rule. ● Identify apparent features of a number pattern that were not explicit in the rule itself. ● Multiply a whole number of up to four digits by a one-digit whole number, and 2 two-digit numbers using strategies based on place value and the properties of operations. ● Divide numbers of up to four digits by one-digit divisors to find whole-number quotients and remainders, using strategies based on place value, properties of operations, and the relationship between multiplication and division. ● Use the four operations to solve problems that involve multi-digit whole numbers and assess the reasonableness of answers.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

    - ***Students multiply and divide multi-digit whole numbers using partial products and partial quotients strategies, and apply this understanding to solve multi-step problems using the four operations.***

In this unit, students extend their knowledge of multiplication and division to find products and quotients of multi-digit numbers.

In grade 3, students learned that they could find the value of a product by decomposing one factor into smaller parts, finding partial products, and then combining them. To support this reasoning, they used base-ten diagrams (decomposing two-digit factors into tens and ones) and area diagrams (decomposing one side length into smaller numbers). Here, students use those understandings to multiply up to four digits by single-digit numbers, and to multiply a pair of two-digit numbers.
Students begin by describing features of geometric and numerical patterns using ideas and language related to multiplication and multiplicative relationships (such as factors, multiples, double, and triple).
Next, students reason about products of multi-digit numbers. They transition from using diagrams to using algorithms to record partial products. Students learn that they can multiply the factors by place value, one digit at a time, and then organize the partial products vertically. Here are two ways to show partial products for 3419 x 8.

$$\begin{array}{r} 3,419 \\ \times \quad 8 \\ \hline 72 \\ 80 \\ 3,200 \\ +\ 24,000 \\ \hline \end{array} \qquad \begin{array}{r} 3,419 \\ \times \quad 8 \\ \hline 24,000 \\ 3,200 \\ 80 \\ +\ 72 \\ \hline \end{array}$$

Later, students divide dividends up to four-digit by single-digit divisors. Students see that it helps to decompose a dividend into smaller numbers and find partial quotients, just as it helped to decompose factors and find partial products.
They also recognize that sometimes it is most productive to decompose a dividend by place value. For instance, to find $465 \div 5$, we can divide each 400, 60, and 5 by 5.

$$\begin{aligned} 400 \div 5 &= 80 \\ 60 \div 5 &= 12 \\ 5 \div 5 &= 1 \\ \hline 465 \div 5 &= 93 \end{aligned}$$

$$\begin{array}{rl} \boxed{93} & \\ 1 & \\ 12 & \\ 80 & \\ 5\overline{)465} & \\ -\ 400 & 5 \times 80 \\ \hline 65 & \\ -\ 60 & 5 \times 12 \\ \hline 5 & \\ -\ 5 & 5 \times 1 \\ \hline 0 & \end{array}$$

Students encounter various ways to record the division process, including an algorithm that records partial quotients in a vertical arrangement.

At the end of the unit, students apply their expanded knowledge of operations to solve multi-step problems about measurement in various contexts—calendar days, distance, and population.
Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 7 - Angles and Angle Measurement

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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.MD.C.5: Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement
- 4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- 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.
- 4.MD.C.5.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 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
- 4.MD.C.5.b: An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
- 4.MD.C.6: Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
- 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 problems, e.g., by using an equation with a symbol for the unknown angle measure.
- 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.
- 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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.

- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Angles are measured in the context of a central angle of a circle. • A 360º rotation about a point makes a complete circle. • Angles are composed of smaller angles. • An angle measure is a fraction of circular arc between the points where the two rays intersect the circle	• How are angles applied in the context of a circle? • What is the relationship of an angle to a straight line? • What is the relationship of an angle to a circle? • How can an addition or subtraction equation be used to solve a missing angle measure when the whole angle has been divided into two angles and only one measurement is given?
Students will know...	**Students will be able to...**
• Angles are formed when two rays share a common endpoint; the common endpoint of the rays is called a vertex • Angles are measured in units called degrees • A protractor is a tool used to measure angles • There are 360 degrees in a circle • One degree is 1 /360 of a circle • Angles can be decomposed into unit angles (n degrees is n one-degree angles) • A straight angle has a measurement of 180 degrees • A right angle has a measurement of 90 degrees • An acute angle has a measurement between 1 and 89 degrees • An obtuse angle has a measurement between 91 and 179 degrees	• Identify the components of an angle and the number of degrees in a circle • Use visuals and language to show the relationship between the components of an angle to a circle (i.e. the center of the circle is the endpoint of the rays of the angle) • Measure angles in whole-number degrees using a protractor • Sketch angles of a specified measure • Use diagrams, manipulatives and equations to show that angle measure is additive • Solve addition and subtraction problems to find unknown angles on a diagram of adjacent angles (non-overlapping angles)

Key Vocabulary: Degrees, Intersect, Acute Angle, Angle, Central Angle, Circle, End-point, Obtuse Angle, One-degree angle, Protractor, Ray, Right Angle, Vertex, Straight angle

Assessment Evidence

Performance Tasks:
Students identify two segments in a drawing and analyze the angles made by the lines containing those segments. Students evaluate claims about angles that make right angles and full circles. Students identify different types of angles in a diagram. Students find the measure of an angle using an image of a protractor. Students find the measure of an angle using the facts that there are 360 degrees in a full circle and that angle measure is additive. Students construct two angles of given measures and then use these angles to define a third angle and find its measure. Students find the measure of angles made by clock hands.

Other Evidence:
Various checkpoints throughout the unit for the following:

- Draw and identify points, lines, rays, segments, and parallel and intersecting lines in geometric figures.
- Recognize that angles are formed wherever two rays share a common endpoint and identify angles in two-dimensional figures.
- Recognize that angles can be measured in degrees, and can be found using addition and subtraction.
- Use a protractor to measure and draw angles, and recognize that perpendicular lines meet or cross at a right angle.
- Draw and identify acute, obtuse, right, and straight angles in two-dimensional figures.
- Write equations to represent angle relationships and reason about and find unknown measurements.

Learning Plan

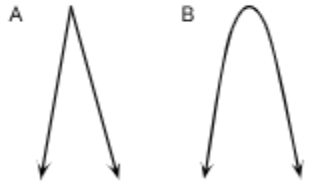
- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

- ***Students learn to draw and identify points, rays, segments, angles, and lines, including parallel and perpendicular lines. Students also learn how to use a protractor to measure angles and draw angles of given measurements, and identify acute, obtuse, right, and straight angles in two-dimensional figures.***

In this unit, students deepen and refine students' understanding of geometric figures and measurement.

In earlier grades, students learned about two-dimensional shapes and their attributes, which they described informally early on but with increasing precision over time. Here, students formalize their intuitive knowledge about geometric features and draw them. They identify and define some building blocks of geometry (points, lines, rays, and line segments), and develop concepts and language to more precisely describe and reason about other geometric figures.

Jada says figure A shows an angle, but figure B does not. Do you agree?



Students analyze cases where lines intersect and where they don't, as in the case of parallel lines. They learn that an angle is a figure composed of two rays that share an endpoint.

Later, students compare the size of angles and consider ways to quantify it. They learn that angles can be measured in terms of the amount of turn one ray makes relative to another ray that shares the same vertex.

Students come to see that a 1-degree angle is $1/360$ of a full turn or full circle and can be used to measure angles. They use a protractor to measure angles in whole-number degrees.

Students also learn that angles are additive. When an angle is composed of multiple non-overlapping parts, the measure of the whole is the sum of the angle measures of the parts. These insights enable students to classify angles (as acute, obtuse, right, or straight) and to solve problems about missing angle measurements in concrete and abstract contexts.

How many degrees is each marked angle on the clock? Show your reasoning.

A



B



Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 8 - Properties of Two-Dimensional Shapes

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 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 along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.
- 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.
- 4.NF.B.3.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.
- 4.NF.B.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- 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.
- 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 problems, e.g., by using an equation with a symbol for the unknown angle measure.
- 4.NF.B.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 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.

- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...	**Essential Questions:**
• Shapes can be classified by properties of their lines and angles. • Patterns are generated by following a specific rule.	• What characteristics or attributes help identify two-dimensional shapes? • What strategies can be used to find rules for patterns and what predictions can the pattern support?
Students will know...	**Students will be able to...**
• Points, lines, line segments, rays, right angles, acute angles, obtuse angles, perpendicular lines, parallel lines can be identified within 2-dimensional figures • A line of symmetry for a two-dimensional figure is a line across the figure such that the figure can be folded along the line into matching parts	• Draw points, lines, line segments, rays, right angles, acute angles, obtuse angles, perpendicular lines, and parallel lines • Classify 2-dimensional figures based on the presence or absence of parallel or perpendicular lines and right, acute or obtuse angles • Identify and classify triangles. • Label the categories of triangles (right triangles, scalene, isosceles) • Recognize a line of symmetry for a two-dimensional figure as a fold-line, where the figure can be folded into matching parts • Determine whether a figure has one or more lines of symmetry and draw lines of symmetry • Given a pattern, identify the rule and extend the pattern and also identify apparent features of a pattern that follows a given rule, which are not explicit in the rule itself • Generate a pattern that follows a rule
Key Vocabulary: End points, Equal to, Greater than, Less than, Parallel, Perpendicular, Polygon, Right, Sides, Symmetry, Acute, Angle,	

Hexagon, Line segment, Lines, Obtuse, Octagon, Pentagon, Plane (two-dimensional) figures, Point, Quadrilaterals, Ray, Rectangle, Rhombus, Right triangle, Square, Triangle

Assessment Evidence

Performance Tasks:
Students identify right triangles. Students examine right triangles from the point of view of symmetry. Students use the properties of rhombuses, squares, and rectangles to decide if given shapes belong to these categories. Students evaluate statements about quadrilaterals. Students identify all lines of symmetry for different quadrilaterals including a rectangle, a parallelogram, and a rhombus. Students construct different quadrilaterals with a fixed perimeter.

Other Evidence:
Various checkpoints throughout the unit for the following:

- Classify triangles (including right triangles), parallelograms, rectangles, rhombuses, and squares based on the properties of their side lengths and angles.
- Identify and draw lines of symmetry in two-dimensional figures.
- Solve problems involving unknown side lengths, perimeter, area, and angle measurements using the known attributes and properties of two-dimensional shapes.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
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- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

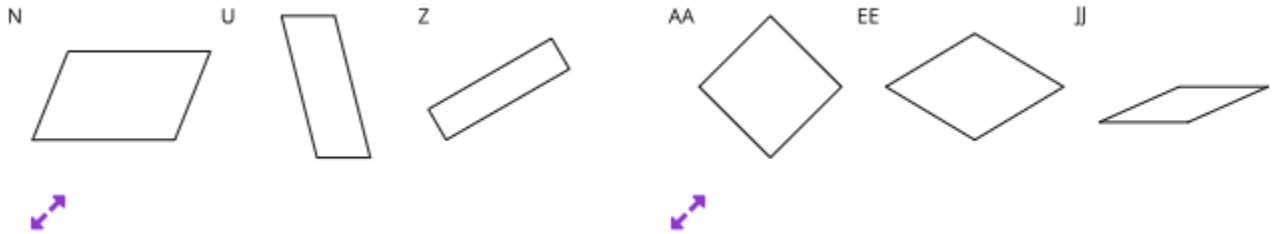
    - ***Students classify triangles and quadrilaterals based on the properties of their side lengths and angles, and learn about lines of symmetry in two-dimensional figures. They use their understanding of these attributes to solve problems, including problems involving perimeter and area.***

In this unit, students deepen their understanding of the attributes and measurement of two-dimensional shapes.

Prior to this unit, students learned about some building blocks of geometry—points, lines, rays, segments, and angles. They identified parallel and intersecting lines, measured angles, and classified angles based on their measurement. Here, they apply those insights to describe and reason about characteristics of shapes.

In the first half of the unit, students analyze and categorize two-dimensional shapes—triangles and quadrilaterals—by their attributes. They classify two-dimensional shapes based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Students also learn about symmetry. They identify line-symmetric figures and draw lines of symmetry.

Quadrilaterals N, U, and Z are parallelograms. *Quadrilaterals AA, EE, and JJ are rhombuses.*



Write 4–5 statements about the sides and angles of the quadrilaterals in each set.
Each statement must be true for all the shapes in the set.

The second half of the unit gives students opportunities to apply their understanding of geometric attributes to solve problems about measurements (side lengths, perimeters, and angles).

Included in this unit are three optional lessons that offer opportunities for students to strengthen and extend their understanding of symmetry and other attributes of two-dimensional shapes.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits

Unit 9 - Putting it All Together

Desired Results - Goals, Transfer, Meaning, Acquisition

Established Goals:

- 4.NF.A.1: Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × 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.
- 4.NF.B.3.a: Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- 4.NF.B.3.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 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.
- 4.NF.B.3.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.
- 4.NF.B.3.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.
- 4.NF.B.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- 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. For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.
- 4.NF.C.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.
- 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.
- 4.NBT.B.4: Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- 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.
- 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.

- 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.
- 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.
- 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.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 ÷ 70 = 10 by applying concepts of place value and division.
- 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.
- 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. 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.

Vision of A Learner Attributes: Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

- TCC4(3-5): I can use what I’ve learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
- DE1(3-5): I can listen to my friends and respect their opinions.
- TI2(3-5): I can choose appropriate resources to complete projects or tasks.
- TI3(3-5): I can ask for help after making independent attempts to solve a problem.
- P2(3-5): I can persevere through difficult tasks because I have a growth mindset and understand that mistakes are part of the learning process and present opportunities for growth.
- AA1(3-5): I can consider various strategies and then choose which one works best for me.
- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
- AA4(3-5): I can be open to other ideas to grow my thinking.

Understandings: Students will understand that...

- We can create our own strategies for math warm-ups that will help us prepare for lessons by using our prior knowledge.

Essential Questions:

- How can we utilize our learning to develop strategies that get us ready to practice and apply our math skills?

Students will know...	Students will be able to...
• Fractions and mixed numbers can be compared by reasoning about equivalence. • There are different methods for subtracting multi-digit numbers • The reasonableness of a solution can be determined by using mental strategies and estimation. • Number talks can be used to show our understanding of addition, subtraction, multiplication, and division.	• Solve problems involving addition and subtraction of fractions. • Solve problems involving multiplication of a fraction by a whole number. • Add and subtract fractions and mixed numbers with like denominators. • Solve and create word problems involving addition and subtraction of fractions referring to the same whole. • Subtract multi-digit numbers using the standard algorithm. • Multiply multi-digit numbers using strategies based on place value and the properties of operations. • Divide up to four-digit numbers by single digit numbers using place value strategies. • Use the four operations to solve word problems involving multiplicative comparison. • Interpret remainders in word problems involving division. • Solve multi-step word problems using the four operations. • Write and solve multi-step word problems using the four operations. • Analyze and write estimation problems. • Analyze numbers, expressions, geometric figures, and computations, and identify their shared and unique features. • Create a Which One Doesn't Belong set of items with both shared and unique features. • Apply understanding of addition, subtraction, multiplication, and division to create a Number Talk activity.
Key Vocabulary: fractions, mixed numbers, compare, reason, equivalence, methods, strategies, multi-digit numbers, reasonableness, number talks, features, expressions, geometric figures, multi-step, remainders, interpret, denominators, numerators, multiplicative comparison	
Assessment Evidence	
Performance Tasks: The items in the assessments focus on the major work of the grade, fluencies of the grade, and also include at least one in depth problem	**Other Evidence:** Various checkpoints throughout the unit for the following:

that provides a context where students apply key ideas they have learned over the year: Students use their understanding of place value to compare the value of the same digit in different places in a number. Students locate a number on two number lines where the outer tick marks are labeled. Students identify numbers in expanded form and compare numbers using > and <. Students round a number to the nearest ten-thousand, thousand, and hundred. Students solve a multiplicative comparison problem that requires multiplying a four-digit number by a one digit number. Students solve a two-step story problem which requires multiplying 2 two-digit numbers and then adding a number to the product. Students divide a four-digit number by a one-digit number to solve a word problem. Students identify fractions equivalent to a given fraction. Students compare fractions and decimal numbers. Students plot decimals and decimal fractions on the number line. Students subtract mixed numbers which they read from a line plot. Students identify sums of fractions that are equal to a given fraction. Students find a whole number multiple of a fraction and a difference of a whole number and a fraction in context. Students add and subtract fractions with no explanation required. Students perform addition and subtraction within 1,000,000 using the standard algorithm. Students solve a word problem about liquid volume using fractions. Students solve problems about the distance from the earth to the moon.	• Solve problems involving fraction equivalence and operating with fractions. • Add, subtract, multiply, and divide multi-digit numbers using place value understanding. • Solve problems involving measurement comparison. • Review the major work of the grade by creating and designing instructional routines.

Learning Plan

- TCC4(3-5): I can use what I've learned and apply it to new experiences.
- CCE1(3-5): I can demonstrate respectful behavior by actively listening to others and asking questions to get everyone involved.
- CCE2(3-5): I can use feedback to improve my own learning and help others improve their learning.
- CCE3(3-5): I can participate in class by using my active listening skills, offering feedback, asking questions, and supporting my peers.
- CCE4(3-5): I can effectively share my thinking in a variety of ways, including verbal explanations, drawings, models, or written essays depending on the purpose and audience.
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- AA2(3-5): I can reflect on my learning and the learning of others to help me choose a successful strategy.
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    - ***Students consolidate and solidify their understanding of various concepts and skills related to major work of the grade. They also continue to work toward fluency goals of the grade.***

In this unit, students revisit major work and fluency goals of the grade, applying their learning from the year.

In Section A, students reinforce what they learn about comparing fractions, adding and subtracting fractions, and multiplying fractions and whole numbers. In Section B, they strengthen their ability to add and subtract multi-digit numbers fluently using the standard algorithm. They also multiply and divide numbers by reasoning about place value and practice doing so strategically.

Here are the times of the runners for two teams.
Which team won the relay race?



runner	Diego's team, time (seconds)	Jada's team, time (seconds)
1	$10\frac{25}{100}$	$11\frac{9}{10}$
2	$11\frac{40}{100}$	$9\frac{8}{10}$
3	$9\frac{7}{10}$	$9\frac{84}{100}$
4	$10\frac{5}{100}$	$10\frac{60}{100}$

In Section C, students practice making sense of situations and solving problems that involve reasoning with multiplication and division, including multiplicative comparison and interpreting remainders. In the final section, students review major work of the grade as they create activities in the format of the warm-ups routines they have encountered throughout the year (Estimation Exploration, Number Talk, and Which One Doesn't Belong?).

The sections in this unit are standalone sections, not required to be completed in order. Within a section, lessons can also be completed selectively and without competing prior lessons. The goal is to offer ample opportunities for students to integrate the knowledge they have gained and to practice skills related to the expected fluencies of the grade.

Teacher Resources: Imagine Learning Classroom, Kendall Hunt Illustrative Math Site, Teacher Resource Books, Center Kits