

Englewood on the Palisades Charter School

Mathematics Curriculum

Grade 4

Aligned With the 2023 New Jersey Student Learning Standards

The Vision for Mathematics Education in New Jersey

A New Jersey education in Mathematics builds quantitatively and analytically literate citizens prepared to meet the demands of college and career, and to engage productively in an information-driven society. All students will have access to a high-quality mathematics education that fosters a population that:

- leverages data in decision-making and as a lens for discussing, analyzing, and responding to practical questions.
- persists to make sense of and model problems arising in everyday life, society, and the workplace.
- thinks critically and strategically to assess quantitative relationships and to solutions to complex problems.
- employs precise reasoning and constructs viable arguments to deduce conclusions, recognize false statements and assess peers' reasoning.
- interprets, evaluates and critiques the mathematics embedded in social, scientific and commercial systems, as well as the claims made in the private and public sectors.
- communicates precisely when conveying, representing, and justifying both qualitative and quantitative perspectives.

(NJ DOE, 2024)

Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

Standard	Mathematically Proficient Students ...
1. Make sense of problems and persevere in solving them	start by explaining to themselves the meaning of a problem and looking for entry points to its solution. check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?”
2. Reason abstractly and quantitatively	make sense of quantities and their relationships in problem situations.
3. Construct viable arguments and critique the reasoning of others	understand and use stated assumptions, definitions, and previously established results in constructing arguments.
4. Model with mathematics	apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later.
5. Use appropriate tools strategically	are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations.
6. Attend to precision	try to communicate precisely to others.
7. Look for and make use of structure	look closely to discern a pattern or structure

8. Look for and express regularity in repeated reasoning	notice if calculations are repeated, and look both for general methods and for shortcuts.
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(NJ DOE, 2024)

New Jersey Legislative Statutes and Administrative Code Mathematics

Amistad Law: *N.J.S.A. 18A 52:16A-88*

[Radical Math](#): includes lessons on topics for social justice in mathematics
[African American Mathematician Bios](#)

Holocaust Law: *N.J.S.A. 18A:35-28*

<https://www.bbc.com/future/article/20191031-hilda-geiringer-mathematician-who-fled-the-nazis>

LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*

<https://prideinstem.org/>
[LGBTQA+ Mathematician Bios](#)
<https://www.ngpf.org/blog/math/math-monday-celebrating-disabled-mathematicians/>
[Mathematicians with Disabilities](#)

Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*

<http://www.ams.org/about-us/diversity>
<https://mathematicallygiftedandblack.com/>

Standards in Action: <i>Climate Change</i>
New Jersey became the first state in the nation to include climate change across content areas with the adoption of the 2020 New Jersey Student Learning Standards (NJSLS). The goal of inclusion of climate change education implementation is to foster generations of New Jersey students that can analyze, question, interpret, to think independently, and bring critical deduction to fulfill, and to lead in jobs created by burgeoning industries of the future green economy.
Suggestions for how to incorporate climate change examples into math instruction will be noted in green text throughout the units.

Math Curriculum

Grade Four

This fourth grade math curriculum aligns with the 2023 New Jersey Student Learning Standards (NJSLS) and provides a solid foundation for learners. Instruction should be flexible and adaptable to meet the individual needs and learning styles of the students.

Instruction in grade four focuses broadly on three critical areas:

- developing understanding and accuracy and efficiency, 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.

Domains and Cluster Areas

- **Operations and Algebraic Thinking**
 - Use the four operations with whole numbers to solve problems.
 - Gain familiarity with factors and multiples.

- Generate and analyze patterns.
- **Number and Operations in Base Ten**
 - Generalize place value understanding for multi-digit whole numbers.
 - Use place value understanding and properties of operations to perform multi-digit arithmetic.
- **Number and Operations - Fractions:**
 - Extend understanding of fraction equivalence and ordering.
 - Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
 - Understand decimal notation for fractions and compare decimal fractions.
- **Measurement**
 - Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
 - Geometric measurement: understand concepts of angle and measure angles.
- **Data Literacy**
 - Organize data and understand data visualizations.
 - Represent and interpret data.
- **Geometry**
 - Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Emphases are given at the cluster level. Refer to the New Jersey Student Learning Standards for Mathematics for the specific standards that fall within each cluster. Even though the clusters have different levels of emphasis, this does not mean that standards

can be omitted. All standards must be included in instruction throughout a grade level to ensure that students will be prepared for instruction at higher grade levels.

Indicator	Type	Cluster Heading
4.OA.A	M	Use the four operations with whole numbers to solve problems
4.OA.B	S	Gain familiarity with factors and multiples
4.OA.C	A	Generate and analyze patterns
4.NBT.A	M	Generalize place value understanding for multi-digit whole numbers
4.NBT.B	M	Use place value understanding and properties of operations to perform multi-digit arithmetic
4.NF.A	M	Develop understanding of fractions as numbers
4.NF.B	M	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers
4.NF.C	M	Understand decimal notation for fractions, and compare decimal fractions
4.M.A	S	Solve problems involving measurement and conversion of measurement from a larger unit to a smaller unit

4.M.B	A	Geometric Measurement: Understand concepts of angle and measure angles
4.DL.A	A	Organize data and understand data visualizations
4.DL.B	S	Represent and interpret data
4.G.A	A	Draw and identify lines and angles, and classify shapes by properties of their lines and angles

Key: M — Major, S — Supporting Clusters, A — Additional Clusters

Required Fluencies in Grade 4:

- 4.NBT.B.4 Add and subtract within 1,000,000

(NJDOE, 2024)

Grade 4 Units and Pacing	
Unit 1: Factors and Multiples	2 weeks
Unit 2: Fractions	4 weeks
Unit 3: Extending Operations to Fractions	4-5 weeks
Unit 4: From Hundreths to Hundred-Thousandths	5 weeks
Unit 5: Multiplicative Comparison and Measurement	4 weeks
Unit 6: Multiplying and Dividing Multi-digit Numbers	6 weeks
Unit 7: Angles and Angle Measurement	4 weeks

Unit 8: Properties of Two-dimensional Shapes	3 weeks
Unit 9: Integrating Math Skills	3 weeks
Total Number of Weeks:	35-36 weeks

Unit 1: Factors and Multiples

Unit Goal: Students represent and solve multiplication problems through the context of picture and bar graphs that represent categorical data.

Duration: 2 weeks

Essential Questions:

- What distinguishes prime numbers from composite numbers?
- What is the relationship between factors and multiples?
- How can we identify factors and multiples of a given whole number?
- What role do factors and multiples play in mathematical operations and problem-solving?
- In what ways do factors and multiples influence the dimensions and area of a rectangle?
- What geometric properties are associated with rectangles and their factors and multiples?
- How does fluency in multiplication within 100 facilitate finding factor pairs and multiples of numbers?
- What strategies can be employed to efficiently find factor pairs and multiples of a given number?

Enduring Understandings:

- Prime numbers are natural numbers greater than 1 that have exactly two distinct positive divisors: 1 and themselves.
- Composite numbers are natural numbers greater than 1 that have more than two positive divisors.
- Factors of a whole number are other whole numbers that can divide it evenly without leaving a remainder.
- Multiples of a whole number are obtained by multiplying it by other whole numbers.
- Factors and multiples of the side lengths of a rectangle directly impact its dimensions and area.
- Fluency in multiplication within 100 allows for efficient calculation of factor pairs and multiples of numbers.

- The relationship between multiplication and division helps in determining factor pairs and multiples by recognizing the inverse relationship between the operations.

Key NJSLS Strands:

- **4.OA.A** Use the four operations with whole numbers to solve problems
 - **4.OA.A.3** Solve multi-step 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. *Climate Change Example: Students may, knowing that energy and fuels are derived from natural resources and that their uses affect the climate, use the four operations to solve multi-step word problems posed with whole numbers, having whole-number answers and that are based on energy, fuels, and natural resources.*
- **4.OA.B** Gain familiarity with factors and multiples
 - **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** Generate and analyze patterns
 - **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.

Interdisciplinary Connections

- **NJSLSA.R1** Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
- **NJSLSA.R9** Analyze and reflect on how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

- **RL.4.1** Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
- **RF.4.4** Read with sufficient accuracy and fluency to support comprehension.
- **3-5-ETS1-1** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

21st-Century Skills

- **9.1.2.CR.1** Recognize ways to volunteer in the classroom, school and community

Career Ready Practices

- **CRP 4** Communicate clearly and effectively and with reason while working in groups.
- **CRP 11** Use technology to enhance productivity.

Technology Integration

- **TECH.8.1.2** All students will use digital tools to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
- **TECH.8.1.2.A.CS2** Select and use applications effectively and productively.
- **TECH.8.2.2.C** The design process is a systematic approach to solving problems.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
Determine if a number is prime or composite. Explain what it means to be a factor or a	Understand Factors and Multiples: Multiples of a Number Factor Pairs	Formative Assessments: Diagnostic Assessment Mid-topic Checkpoint	Materials: Inch tiles	composite number factor pair of a whole number

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.	Prime and Composite Numbers Multiplication Practice Find Factor Pairs and Multiples: More Multiples Find Factors and Multiples Mondrian's Art	Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	Centimeter Grid Paper - Standard Glue or tape Inch tiles Scissors Tools for creating a visual display Grid paper Card Sort: Area Centimeter cubes Card Sort: Multiplication Coins Index cards Paper Two-color counters Colored pencils, crayons, or markers Glue or tape	multiple of a number prime number
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			Rulers or straightedges Sticky notes Activities: Factor Rainbow Factorization Trees Multiples Bingo Factor Pairs Memory Game Prime or Composite Sorting Factorization Race Multiplication Relay Mentor Texts: <i>Amanda Bean's Amazing Dream</i> by Cindy Neuschwander <i>The Multiplying Jar</i> by Emily Jenkins	
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Students with IEPs and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u>
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[Movematics \(dyscalculia.org\)](http://dyscalculia.org)

Follow all the IEP/504 plan modifications

Allow extra time to complete assignments or tests

Guided notes and/or scaffold outline for written assignments

Work in a small group

Solidify and refine concepts through repetition

Allow answers to be given orally or dictated

Use multi-sensory teaching approaches

Utilize assistive technology and materials

Use large print books, Braille, or books on CD (digital text)

Text to speech/audio recorded selections

Amplification system as needed

Leveled texts according to ability

Fine motor skill stations embedded in rotation as needed

Modified or constrained spelling word lists

Provide anchor charts with high frequency words and phonemic patterns

Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while

	exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u> Work toward longer passages as skills in English increase Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers Guided notes and/or scaffold outline for written assignments Provide students with English Learner leveled readers Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. After students share responses, use multimodal examples to show the meaning of 5 in the 5-frame. Point to each square and count to 5. Invite students to chorally read numbers

	1–5 aloud. Invite students to use gestures as they count their collections aloud.
Accelerating Students	<u>Accelerating Students Guide</u> Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum Organize and offer flexible small group learning activities Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations Propose interest-based extension activities Expose students to beyond level texts.

Unit 2: Fractions

Unit Goal: 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.
Duration: 4 weeks
Essential Questions:

- Why is it important to compare fractions as representations of equal parts of a whole or of a set?
- Why is it important to understand and be able to use equivalent fractions in mathematics or in real-life situations?
- How does my understanding of whole number computations help me understand computation of fractions and mixed numbers?
- How are fractions and decimals related?
- How can we use drawings to show the relationship between the numerator and the denominator?
- How are fractions and decimals related?

Enduring Understandings:

- Fractions are numbers that represent equal parts of whole units.
- Equivalent fractions represent the same part of a whole.
- Fractions with different numerators and denominators can be compared by reasoning about their size.
- Two fractions that represent the same part of the same whole are equivalent.
- The same fractional amount can be represented by an infinite set of different but equivalent fractions.
- One way to compare two fractions that are parts of the same whole is by comparing each to a benchmark fraction such as $\frac{1}{2}$.
- When two fractions have the same denominator, the fraction with the greater numerator is greater.
- When two fractions have the same numerator, the fraction with the less denominator is greater.
- A decimal is another way to represent a fraction.

Key NJSLS Strands:

- **4.NBT.B** Use place value understanding and properties of operations to perform multi-digit arithmetic.
 - **4.NBT.B.4** With accuracy and efficiency, 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.NF.A** Extend understanding of fractions equivalence and ordering.
 - **4.NF.A.1** Explain why a fraction is equivalent to a fraction 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 $\frac{1}{2}$. 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.

Interdisciplinary Connections
● RI.4.1 Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text. ● RF.4.4 Read with sufficient accuracy and fluency to support comprehension. ● RL.4.7 Make connections between specific descriptions and directions in a text and a visual or oral representation of the text. ● 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ● 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
21st-Century Skills
● 9.2.4.A.1 Identify reasons why people work, different types of work, and how work can help a person achieve personal and professional goals.
Career Ready Practices
● CRP 8 SW utilize critical thinking to make sense of problems and persevere in solving problem solving problems. ● CRP 11 SW use technology to enhance productivity by accessing various online skill based websites.
Technology Integration

- **TECH.8.1.2** All students will use digital tools to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
- **TECH.8.1.2.A.CS2** Select and use applications effectively and productively.
- **TECH.8.2.2.C** The design process is a systematic approach to solving problems.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
Make sense of fractions with denominators 2, 3, 4, 5, 6, 8, 10, and 12 through physical representations and diagrams. 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 $\frac{1}{2}$ and 1. Use visual	Size and Location of Fractions: Representations of Fractions Same Denominator or Numerator Same Size, Related Sizes Fractions on Number Lines Relate Fractions to Benchmarks Equivalent Fractions Equivalent Fractions on the Number Line Explain Equivalence Use Multiples to Find Equivalent Fractions	Formative Assessments: Diagnostic Assessment Mid-topic Checkpoint Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects	Materials: Fraction Strips Straightedges Tools for creating a visual display Tape (painter's or masking) Rulers or straightedges Sticky notes Colored pencils Paper clips Activities: Fraction Pizza	common denominator composite number denominator equivalent fractions factor pair of a whole number multiple of a number numerator prime number

representations or a numerical process to reason about fraction comparison.	Use Factors to Find Equivalent Fractions Fraction Comparison: Ways to Compare Fractions Use Equivalent Fractions to Compare Fraction Comparison Problems Common Denominators to Compare Compare and Order Fractions	Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	Equivalent Fractions Matching Game Fraction Number Line Decimal Fraction Conversion Fraction Benchmark Comparisons Fraction Art Project Mentor Texts: <i>Fraction Fun</i> by David A. Adler <i>The Hershey's Milk Chocolate Fractions Book</i> by Jerry Pallotta <i>Full House: An Invitation to Fractions</i> by Dayle Ann Dodds <i>Fraction Actions</i> by Loreen Leedy	
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			<i>“Give Me Half!”</i> by Stuart J. Murphy <i>The Doorbell Rang</i> by Pat Hutchins <i>Apple Fractions</i> by Jerry Pallotta	
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Modifications and Accommodations	
Tier II and III Strategies	Small group instruction (Tier II) ● Explicit instruction ● Schema-based instruction ● Use visuals ● Use manipulatives ● Use a multi-sensory approach ● Guided notes and/or scaffold outline for written assignments ● Introduce key vocabulary before lesson ● Lesson taught again using a differentiated approach Small group or Individual instruction (Tier III) ● Intensive instruction ● Practice fact retrieval ● Lesson taught again using a differentiated approach ● Allow answers to be given orally or dictated ● Use visuals / Anchor Charts
Students with IEPs and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u> <u>Movematics (dyscalculia.org)</u>

	Follow all the IEP/504 plan modifications Allow extra time to complete assignments or tests Guided notes and/or scaffold outline for written assignments Work in a small group Solidify and refine concepts through repetition Allow answers to be given orally or dictated Use multi-sensory teaching approaches Utilize assistive technology and materials Use large print books, Braille, or books on CD (digital text) Text to speech/audio recorded selections Amplification system as needed Leveled texts according to ability Fine motor skill stations embedded in rotation as needed Modified or constrained spelling word lists Provide anchor charts with high frequency words and phonemic patterns Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner.
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	Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u> Work toward longer passages as skills in English increase Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers Guided notes and/or scaffold outline for written assignments Provide students with English Learner leveled readers Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. Invite students to use gestures as they count.
Accelerating Students	<u>Accelerating Students Guide</u>

	Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum Organize and offer flexible small group learning activities Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations Propose interest-based extension activities Expose students to beyond level texts.
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Unit 3: Extending Operations to Fractions

Unit Goal: Students learn that a fraction a/b is a product of a whole number a and a unit fraction $1/b$, or $a/b = a \times 1/b$, and that $n \times a/b = (n \times a)/b$. Students learn to add and subtract fractions with like denominators, and to add and subtract tenths and hundredths.
Duration: 4-5 weeks
Essential Questions: • What is the relationship between a fraction and its components, the numerator and denominator? • How can we represent a fraction as a product of a whole number and a unit fraction? • Why is it important to understand the relationship between multiplication and fractions? • How does the distributive property apply when multiplying a whole number by a fraction? • What strategies can we use to add and subtract fractions with like denominators?

- How do tenths and hundredths relate to fractions, and how can we add and subtract them effectively?
- What real-world scenarios involve adding and subtracting fractions or decimal fractions, and how can we apply these operations to solve problems?

Enduring Understandings:

- A fraction a/b can be represented as a product of a whole number a and a unit fraction $1/b$, emphasizing the relationship between the numerator, denominator, and the whole.
- Multiplying a whole number by a fraction involves multiplying the whole number by the numerator and keeping the denominator unchanged, demonstrating the distributive property of multiplication over addition.
- Multiplication of a whole number by a fraction can be expressed as $n \times a/b = n \times a/b$, illustrating how the operation extends the concept of repeated addition to fractions.
- Adding and subtracting fractions with like denominators involves combining or subtracting the numerators while keeping the denominator unchanged, maintaining the relationship between parts and wholes.
- Understanding the relationship between tenths, hundredths, and fractions allows for seamless addition and subtraction of decimal fractions, emphasizing the place value system and the concept of equivalence.
- The ability to add and subtract fractions and decimal fractions is essential for solving real-world problems involving measurements, money, and other quantitative data, demonstrating the practical applications of mathematical operations.

Key NJSLS Strands:

- **4.NF.A** Extend understanding of fractions equivalence and ordering.
 - **4.NF.A.1** Explain why a fraction is equivalent to a fraction 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.A.3** Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
 - **4.NF.A.3.a** Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

- **4.NF.A.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.
 - **4.NF.A.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.A.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** Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
 - **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 $1/b$.
 - **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.
 - **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.
- **4.NF.C** Understand decimal notation for fractions and compare decimal fractions.
 - **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.
- **4.NBT.B** Use place value understanding and properties of operations to perform multi-digit arithmetic.
 - **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.DL.B** Represent and interpret measurement data
 - **4.DL.B.1** Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
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Recognize that $n \times a/b = (n \times a)/b$. Represent and explain that a fraction a/b is a multiple of $1/b$, namely $a/b = a \times 1/b$. Represent and solve problems involving multiplication of a fraction by a whole number. 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.	Equal Groups of Unit Fractions Representations of Equal Groups of Fractions Patterns in Multiplication Equal Groups of Non-Unit Fractions Equivalent Multiplication Expressions Problems with Equal Groups of Fractions Fractions as Sums Addition of Fractions Differences of Fractions The Numbers in Subtraction Subtract Fractions Flexibly Sums and Differences of Fractions Fractional	Formative Assessments: Diagnostic Assessment Mid-topic Checkpoint Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments	Materials: Expressions and Diagrams Paper Chart paper Measuring cups Card Sort: Twelfths Tools for creating a visual display Colored pencils Sticky notes Card Sort: Less Than, Equal to, or Greater Than 1 Coins Rulers (inches) Sticky notes Blank paper Rectangular bar models	common denominator composite number denominator equivalent fractions factor pair of a whole number mixed number multiple of a number numerator prime number
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Reason about equivalence to add tenths and hundredths. Reason about equivalence to solve problems involving addition and subtraction of fractions and mixed numbers.	Measurements on Line Plots Problems about Fractional Measurement Data An Assortment of Fractions Tenths and Hundredths, Together Sums of Tenths and Hundredths Lots of Fractions to Add	Cumulative/Benchmark Assessments	Fraction tiles Activities: Fractional Pizza Party Fractional Recipe Fractional Bar Models Fractional Arrays Line Plots with Fractions: Measurement Data Line Plot Fractional Line Plot Interpretation Addition and Subtraction of Fractions and Mixed Numbers Fractional Recipe Conversions Fractional Word Problems	
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			Reasoning about Equivalence for Decimals Decimal Fraction Equivalence Decimal Fraction Addition and Subtraction Mentor Texts: <i>Fraction Fun</i> by David A. Adler <i>The Hershey's Milk Chocolate Fractions Book</i> by Jerry Pallotta <i>Full House: An Invitation to Fractions</i> by Dayle Ann Dodds <i>Fraction Action</i> by Loreen Leedy <i>"Give Me Half!"</i> by Stuart J. Murphy	
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			<i>The Doorbell Rang</i> by Pat Hutchins <i>Apple Fractions</i> by Jerry Pallotta	
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Students with IEPs and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u> <u>Movematics (dyscalculia.org)</u> Follow all the IEP/504 plan modifications Allow extra time to complete assignments or tests Guided notes and/or scaffold outline for written assignments Work in a small group Solidify and refine concepts through repetition Allow answers to be given orally or dictated Use multi-sensory teaching approaches Utilize assistive technology and materials Use large print books, Braille, or books on CD (digital text) Text to speech/audio recorded selections Amplification system as needed
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	Leveled texts according to ability Fine motor skill stations embedded in rotation as needed Modified or constrained spelling word lists Provide anchor charts with high frequency words and phonemic patterns Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u> Work toward longer passages as skills in English increase Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers Guided notes and/or scaffold outline for written assignments

	Provide students with English Learner leveled readers Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. After students share responses, use multimodal examples to show the meaning of 5 in the 5-frame. Point to each square and count to 5. Invite students to chorally read numbers 1–5 aloud. Invite students to use gestures as they count their collections aloud.
Accelerating Students	<u>Accelerating Students Guide</u> Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum Organize and offer flexible small group learning activities Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations Propose interest-based extension activities Expose students to beyond level texts.

Unit 4: Place Value

Unit Goal: 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.

Duration: 5 weeks

Essential Questions:

- How do we read and write numbers in decimal notation, and what is the significance of the decimal point?
- How does understanding place value help us compare and order numbers in decimal notation?
- What strategies can we use to extend our understanding of place value to multi-digit whole numbers and decimals?
- How do we determine the value of each digit in a multi-digit whole number or decimal?
- What methods can we use to add and subtract within 1,000,000, and how does place value play a role in these operations?
- How can we apply our understanding of place value and decimal notation to real-world situations and problem-solving?

Enduring Understandings:

- Numbers in decimal notation consist of a whole number part and a fractional part separated by a decimal point, with each digit representing a specific value based on its position.
- Place value is essential for understanding the relative value of digits within a number and for comparing and ordering numbers accurately.
- Extending place value understanding to multi-digit whole numbers and decimals involves recognizing patterns and relationships between digits and place values.
- Each place value position in a multi-digit number or decimal represents a power of 10, with the value of each digit determined by its position relative to the decimal point.
- Addition and subtraction within 1,000,000 require an understanding of place value to regroup or borrow across place values and accurately compute the sum or difference.
- The ability to read, write, compare, and perform operations with numbers in decimal notation is essential for interpreting and solving real-world problems involving measurements, money, and data analysis.

Key NJSLS Strands:

- **4.NF.C** Understand decimal notation for fractions and compare decimal fractions.

- **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.
- **4.NF.C.6** Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $\frac{62}{100}$; 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** Generalize place value understanding for multi-digit whole numbers.
 - **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 30 is ten times 3 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.A.3** Use place value understanding to round multi-digit whole numbers to any place.
- **4.NBT.B** Use place value understanding and properties of operations to perform multi-digit arithmetic.
 - **4.NBT.B.4** With accuracy and efficiency, add and subtract multi-digit whole numbers using the standard algorithm.
- **4.NF.B** Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
 - **4.NF.B.3** Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.
 - **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.

Interdisciplinary Connections

- **RL.4.7** Make connections between specific descriptions and directions in a text and a visual or oral representation of the text.

- **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

21st-Century Skills

- **9.4.5.CT.1** Identify and gather relevant data that will aid in the problem-solving process.
- **9.2.5.CAP.3** Identify qualifications needed to pursue traditional and non-traditional careers and occupations.
- **9.4.5.CI.4** Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.

Career Ready Practices

- **CRP 8** Utilize critical thinking to make sense of problems and persevere in solving problem solving problems.
- **CRP 11** Use technology to enhance productivity by accessing various online skill based websites.

Technology Integration

- **TECH.8.1.2** All students will use digital tools to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
- **TECH.8.1.2.A.CS2** Select and use applications effectively and productively.
- **TECH.8.2.2.C** The design process is a systematic approach to solving problems.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
Represent, compare, and order decimals to the hundredths by reasoning about their	Decimals with Tenths and Hundredths: Decimal Numbers	Formative Assessments: Diagnostic Assessment	Materials: Place Value Manipulatives	common denominator denominator.

size. Write tenths and hundredths in decimal notation. 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.	Equivalent Decimals Decimals on Number Lines Compare and Order Decimals Compare and Order Decimals and Fractions Place-value Relationships through 1,000,000: How Much is 10,000? Numbers Within 100,000 Beyond 100,000 Same Digit, Different Value Ten Times As Much Large Numbers on a Number Line Compare, Order, and Round: Compare Multi-digit Numbers Order Multi-digit Numbers	Mid-topic Checkpoint Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments	Colored pencils Card Sort: Diagrams of Fractions & Decimals Base-ten blocks Build Numbers (1-5 Digit Cards) 10-by-10 Square Grids Large Numbers (4 to 6 digits) Materials from a previous activity Number cards 0–10 Stickers Sticky notes 0-700,000 number line Grid paper 0-9 Digit Cards	composite number denominator equivalent fractions factor pair of a whole number mixed number multiple of a number numerator prime number
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	Multiples of 10,000 and 100,000 The Nearest Multiples of 1,000, 10,000, and 100,000 Round Numbers Apply Rounding Standard Algorithm to Add and Subtract Compose and Decompose to Add and Subtract Add and Subtract Within 1,000,000 Zeros in the Standard Algorithm Solve Problems Involving Large Numbers	Cumulative/Benchmark Assessments	Activities: Decimal Comparison Games Decimal Number Line Writing Tenths and Hundredths in Decimal Notation Fraction to Decimal Matching Decimal Place Value Chart Number Line Race Number Chart Puzzle Place Value Flip Book Number Line Games Round the Room Standard Algorithm Practice	
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			Partner Practice With Addition and Subtraction Mentor Texts: How Much Is a Million? by David M. Schwartz The Greedy Triangle by Marilyn Burns Sir Cumference and All the King's Tens by Cindy Neuschwander Marvelous Math: A Book of Poems by If You Made a Million by David M. Schwartz The Grapes of Math by Greg Tang Math Curse by Jon Scieszka and Lane Smith	
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Students with IEPs and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u> <u>Movematics (dyscalculia.org)</u> Follow all the IEP/504 plan modifications Allow extra time to complete assignments or tests Guided notes and/or scaffold outline for written assignments Work in a small group Solidify and refine concepts through repetition Allow answers to be given orally or dictated Use multi-sensory teaching approaches Utilize assistive technology and materials Use large print books, Braille, or books on CD (digital text) Text to speech/audio recorded selections Amplification system as needed Leveled texts according to ability Fine motor skill stations embedded in rotation as needed Modified or constrained spelling word lists Provide anchor charts with high frequency words and phonemic patterns Students might need guidance as to what actions happen during partner work time. Invite
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	students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u> Work toward longer passages as skills in English increase Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers Guided notes and/or scaffold outline for written assignments Provide students with English Learner leveled readers Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. After students share responses, use multimodal examples to show the meaning of 5 in the

	5-frame. Point to each square and count to 5. Invite students to chorally read numbers 1–5 aloud. Invite students to use gestures as they count their collections aloud.
Accelerating Students	<u>Accelerating Students Guide</u> Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum Organize and offer flexible small group learning activities Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations Propose interest-based extension activities Expose students to beyond level texts.

Unit 5: Multiplicative Comparison and Measurement

Unit Goal: 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.

Duration: 4 weeks

Essential Questions:

- How does understanding the relationship between multiplication and division help us solve multiplicative comparison problems?
- What strategies can we use to interpret and represent multiplicative comparison problems effectively?
- How can we apply our understanding of multiplication and division to convert units of measure from larger to smaller units within a given system?
- Why is it important to recognize when to multiply or divide in order to solve problems involving unit conversion?
- In what ways do real-world scenarios involve multiplicative comparison and unit conversion, and how can we apply mathematical reasoning to solve them?

Enduring Understandings:

- Multiplicative comparison problems involve comparing quantities by scaling one quantity in relation to another using multiplication or division.
- Understanding the relationship between multiplication and division allows us to effectively interpret and represent multiplicative comparison problems, enabling us to identify the unknown quantity in a given scenario.
- Unit conversion involves changing the size of a measurement from one unit to another within the same system, which can be accomplished by multiplying or dividing by a conversion factor.
- Recognizing when to multiply or divide in unit conversion scenarios depends on whether we are scaling up to larger units (multiply) or scaling down to smaller units (divide), highlighting the inverse relationship between multiplication and division.
- Applying mathematical thinking to real-world scenarios involving multiplicative comparison and unit conversion allows us to make informed decisions and solve practical problems related to measurements, distances, quantities, and more.

Key NJSLS Strands:

- **4.NBT.B** Use place value understanding and properties of operations to perform multi-digit arithmetic.
 - **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** Use the four operations with whole numbers to solve problems

- **4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
- **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 multi-step 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. *Climate Change Example: Students may, knowing that energy and fuels are derived from natural resources and that their uses affect the climate, use the four operations to solve multi-step word problems posed with whole numbers, having whole-number answers and that are based on energy, fuels, and natural resources.*
- **4.NF.B** Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
 - **4.NF.B.4** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- **4.M.A** Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
 - **4.M.A.1** Know relative sizes of measurement units within one system of units including km, m, cm; mm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
 - **4.M.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. *Climate Change Example: Students may, knowing that energy and fuels are derived from natural resources and that their uses affect the climate, use the four operations to solve word problems related to the use of natural resources and involving distance, time, liquid volume, and/or the mass of objects.*
 - **4.M.A.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

Interdisciplinary Connections				
● RL.4.7 Make connections between specific descriptions and directions in a text and a visual or oral representation of the text. ● RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. ● 4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth’s features.				
21st-Century Skills				
● 9.4.5.CT.1 Identify and gather relevant data that will aid in the problem-solving process. ● 9.2.5.CAP.3 Identify qualifications needed to pursue traditional and non-traditional careers and occupations. ● 9.4.5.CI.4 Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global.				
Career Ready Practices				
● CRP 4. Communicate clearly and effectively and with reason while working on groups on the Solve and Share portion of the lesson. ● CRP 11 Use technology to enhance productivity.				
Technology Integration				
● TECH.8.1.2 All students will use digital tools to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. ● TECH.8.1.2.A.CS2 Select and use applications effectively and productively.				

Skills	Instructional Topics	Assessment	Resources	Vocabulary
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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.	Multiplicative Comparison: Times as Many Interpret Representations of Multiplicative Comparison Solve Multiplicative Comparison Problems Solve Multiplicative Comparison Problems with Large Numbers One- and Two-step Comparison Problems Ten Times as Many Measurement Conversion: Meters and Centimeters Meters and Kilometers Grams and Kilograms, Liters and Milliliters Multi-step Measurement Problems Pounds and Ounces Hours, Minutes, and	Formative Assessments: Diagnostic Assessment Mid-topic Checkpoint Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments	Materials: Connecting cubes Number cubes Times as Many Recording Mat Scissors Tape Centimeter Grid Paper - Standard Containers of different sizes Paper clips Rulers (centimeters) Yardsticks Pipe cleaners Rulers (inches) Index cards Sticky notes Activities: Scenario Cards and Real-World Examples	common denominator composite number denominator equivalent fractions factor pair of a whole number mixed number multiple of a number numerator prime number rounding
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	Seconds Multi-step Measurement Problems with Fractions Weight and Capacity Measurements Length Measurements Compare Perimeters of Rectangles More Perimeter Problems	Cumulative/Benchmark Assessments	for Analyzing, Describing, and Representing Multiplicative Comparison Situations Problem-solving Task Cards for Solving One-Step and Two-Step Problems Involving Multiplicative Comparison Math Story Problems Measurement Conversion Practice Hands-on Measurement Activities Real-World Problem Scenarios for Solving Multi-Step Problems Involving Multiplicative Comparison and Measurement	
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			Project-Based Learning Measurement Sort Measurement Conversion Games Mentor Texts: <i>How Many Feet in the Bed?</i> by Diane Johnston Hamm <i>Measuring Penny</i> by Loreen Leedy <i>How Big Is a Foot?</i> by Rolf Myller <i>The Best Of Times</i> by Greg Tang <i>Multiplying Menace: The Revenge of Rumpelstiltskin</i> by Pam Calvert	
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Students with IEPS and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u> <u>Movematics (dyscalculia.org)</u> Follow all the IEP/504 plan modifications
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	Allow extra time to complete assignments or tests Guided notes and/or scaffold outline for written assignments Work in a small group Solidify and refine concepts through repetition Allow answers to be given orally or dictated Use multi-sensory teaching approaches Utilize assistive technology and materials Use large print books, Braille, or books on CD (digital text) Text to speech/audio recorded selections Amplification system as needed Leveled texts according to ability Fine motor skill stations embedded in rotation as needed Modified or constrained spelling word lists Provide anchor charts with high frequency words and phonemic patterns Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner.
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	Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u> Work toward longer passages as skills in English increase Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers Guided notes and/or scaffold outline for written assignments Provide students with English Learner leveled readers Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. After students share responses, use multimodal examples to show the meaning of 5 in the 5-frame. Point to each square and count to 5. Invite students to chorally read numbers 1–5 aloud. Invite students to use gestures as they count their collections aloud.

Accelerating Students	<u>Accelerating Students Guide</u> Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum Organize and offer flexible small group learning activities Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations Propose interest-based extension activities Expose students to beyond level texts.
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Unit 6: Multiplying and Dividing Multi-Digit Numbers

Unit Goal: 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.
Duration: 6 weeks
Essential Questions: • How do partial products and partial quotients strategies help us multiply and divide multi-digit whole numbers? • What are the advantages of using partial products and partial quotients strategies compared to traditional algorithms? • How can we apply our understanding of partial products and partial quotients to solve multi-step problems involving multiplication and division?

- In what real-world scenarios are multiplication and division of multi-digit numbers necessary, and how can we use mathematical strategies to solve them?
- How does understanding the relationship between multiplication and division help us choose appropriate strategies for solving multi-step problems involving the four operations?

Enduring Understandings:

- Partial products and partial quotients strategies provide alternative methods for multiplying and dividing multi-digit whole numbers, allowing for flexibility and efficiency in problem-solving.
- Understanding the principles behind partial products and partial quotients strategies enables students to visualize the steps involved in multiplication and division, leading to a deeper comprehension of these operations.
- Applying partial products and partial quotients strategies to solve multi-step problems involving the four operations allows students to break down complex problems into manageable steps and efficiently find solutions.
- Mastery of partial products and partial quotients strategies enhances students' problem-solving skills and prepares them to tackle real-world scenarios that require multiplication and division of multi-digit numbers.
- Recognizing the connections between multiplication and division helps students make informed decisions about which strategy to use when solving multi-step problems, promoting a more holistic understanding of mathematical operations.

Key NJSL Strands:

- **4.M.A** Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
 - **4.M.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. *Climate Change Example: Students may, knowing that energy and fuels are derived from natural resources and that their uses affect the climate, use the four operations to solve word problems related to the use of natural resources and involving distance, time, liquid volume, and/or the mass of objects.*
 - **4.M.A.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
- **4.NBT.A** Generalize place value understanding for multi-digit whole numbers.
- **4.NBT.B** Use place value understanding and properties of operations to perform multi-digit arithmetic.
 - **4.NBT.B.4** With accuracy and efficiency, 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** Use the four operations with whole numbers to solve problems
 - **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 multi-step 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. *Climate Change Example: Students may, knowing that energy and fuels are derived from natural resources and that their uses affect the climate, use the four operations to solve multi-step word problems posed with whole numbers, having whole-number answers and that are based on energy, fuels, and natural resources.*
- **4.OA.B** Gain familiarity with factors and multiples
 - **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** Generate and analyze patterns
 - **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.

Interdisciplinary Connections
● NJSLSA.R7 Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words. ● RL.4.4 Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in literature. ● RL.4.7 Make connections between specific descriptions and directions in a text and a visual or oral representation of the text. ● 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ● 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. ● 3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.
21st-Century Skills
● 9.1.5.FP.5 Illustrate how inaccurate information is disseminated through various external influencers including the media, advertisers/marketers, friends, educators, and family members.
Career Ready Practices
● CRP 4 Communicate clearly and effectively and with reason while working on groups on the Solve and Share portion of the lesson. ● CRP 11 Use technology to enhance productivity.
Technology Integration
● TECH.8.1.2 All students will use digital tools to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. ● TECH.8.1.2.A.CS2 Select and use applications effectively and productively.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
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	Features of Patterns: Patterns that Grow Patterns that Repeat From Visual Patterns to Numerical Patterns Numerical Patterns Multi-digit Multiplication: Products Beyond 100 Multiply Two-digit Numbers and One-digit Numbers Multiply Three- and Four-digit Numbers by One-digit Numbers Multiply 2 Two-digit Numbers Recording Partial Products: One-digit and Three- or Four-digit Factors Using Algorithms with Partial Products: 2	Formative Assessments: Diagnostic Assessment Mid-topic Checkpoint Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments	Materials: Pattern blocks Grid paper Tools for creating a visual display Sticky notes Base-ten blocks Inch tiles Activities: Pattern Exploration Pattern Creation Patterns that Repeat Pattern Recognition Pattern Art From Visual Patterns to Numerical Patterns Visual to Numerical Translation Pattern Graphing	common denominator composite number denominator dividend equivalent fractions factor pair of a whole number mixed number multiple of a number numerator prime number remainder rounding

involve multi-digit whole numbers and assess the reasonableness of answers.	Two-digit Numbers Partial Products and the Standard Algorithm Solve Problems Involving Multiplication Multi-digit Division: Situations Involving Equal-size Groups Situations Involving Factors and Multiples Situations Involving Area Base-ten Blocks to Divide Base-ten Diagrams to Represent Division Divide with Partial Quotients Division With and Without Remainders Interpret Remainders in Division Situations Problem Solving with Large Numbers: Different Ways to Solve	Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	Multiplication Scavenger Hunt Real-world Multiplication Multiplication Bingo Interactive Games Multiplication Relay Race Math Stations Multiplication Challenge Recording Partial Products: One-digit and Three- or Four-digit Factors Partial Products Practice Use Algorithms with Partial Products Partial Products and the Standard Algorithm Problem-solving Tasks	
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	Problems Problems About Perimeter and Area Solve Problems with Many Operations Assess the Reasonableness of Solutions		Solve Problems Involving Multiplication Real-world Problem-solving: Math Journals Multi-digit Division Division Arrays Division Games Factor and Multiple Sort Factor and Multiple Puzzles Area Models Real-world Area Problems Base-ten Blocks to Divide Base-ten Division Hands-on Division Activities Base-ten Diagrams to Represent Division	
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			Division Diagrams Interactive Whiteboard Demonstrations Divide with Partial Quotients Partial Quotients Practice Peer Collaboration Division With and Without Remainders Remainder Exploration Real-world Division Problems Interpret Remainders in Division Situations Remainder Analysis Problem Solving with Large Numbers Problem-solving Stations Math Talks	
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			Problems About Perimeter and Area Perimeter and Area Challenges Geometric Explorations Solve Problems with Many Operations Multi-step Problem-solving TasksError Analysis Assess the Reasonableness of Solutions Solution Justification Mentor Texts: <i>Sold! A Mathematics Adventure</i> by Bryn Barnard and Nathan Zimelman <i>Rabbits Rabbits Everywhere: A Fibonacci Tale</i> by Ann McCallum <i>The King's Chessboard</i>	
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			by David Birch <i>A Remainder of One</i> by Elinor J. Pinczes <i>The Great Divide: A Mathematical Marathon</i> by Dayle Ann Dodds	
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Students with IEPs and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u> <u>Movematics (dyscalculia.org)</u> Follow all the IEP/504 plan modifications Allow extra time to complete assignments or tests Guided notes and/or scaffold outline for written assignments Work in a small group Solidify and refine concepts through repetition Allow answers to be given orally or dictated Use multi-sensory teaching approaches Utilize assistive technology and materials Use large print books, Braille, or books on CD (digital text)
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	Text to speech/audio recorded selections Amplification system as needed Leveled texts according to ability Fine motor skill stations embedded in rotation as needed Modified or constrained spelling word lists Provide anchor charts with high frequency words and phonemic patterns Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u> Work toward longer passages as skills in English increase Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive

	technology, and peers Guided notes and/or scaffold outline for written assignments Provide students with English Learner leveled readers Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. After students share responses, use multimodal examples to show the meaning of 5 in the 5-frame. Point to each square and count to 5. Invite students to chorally read numbers 1–5 aloud. Invite students to use gestures as they count their collections aloud.
Accelerating Students	<u>Accelerating Students Guide</u> Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum Organize and offer flexible small group learning activities Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations

	Propose interest-based extension activities Expose students to beyond level texts.
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Unit 7: Angles and Angle Measurement

Unit Goal: 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.

Duration: 4 weeks

Essential Questions:

- What are the basic geometric elements, such as points, rays, segments, angles, and lines, and how do they relate to each other in two-dimensional space?
- How can we distinguish between different types of angles, including acute, obtuse, right, and straight angles, within geometric figures?
- What properties define parallel and perpendicular lines, and how can we identify them in geometric shapes?
- How do we use a protractor to accurately measure angles, and how can this skill be applied in geometric constructions and problem-solving?
- In what ways do geometric concepts such as points, lines, and angles contribute to our understanding of shapes, patterns, and spatial relationships?

Enduring Understandings:

- Points, rays, segments, angles, and lines are fundamental geometric elements that form the building blocks of two-dimensional figures, and understanding their properties and relationships is essential for geometric reasoning.

- Acute angles measure less than 90 degrees, obtuse angles measure more than 90 degrees but less than 180 degrees, right angles measure exactly 90 degrees, and straight angles measure 180 degrees.
- Parallel lines are lines in the same plane that never intersect, while perpendicular lines intersect at right angles. These relationships can be identified within geometric figures and used to analyze spatial configurations.
- Using a protractor allows us to accurately measure angles and draw angles of given measurements, facilitating precise geometric constructions and calculations.
- Geometric concepts such as points, lines, angles, and their relationships provide a framework for understanding and analyzing shapes, patterns, and structures in both mathematical and real-world contexts.

Key NJSLS Strands:

- **4.G.A** Draw and identify lines and angles, and classify shapes by properties of their lines and angles
 - **4.GA.A.1** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
 - **4.GA.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.NBT.B** Use place value understanding and properties of operations to perform multi-digit arithmetic.
 - **4.NBT.B.4** With accuracy and efficiency, 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.MD.C** Geometric measurement: understand concepts of angle and measure angles.
 - **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.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 $\frac{1}{360}$ 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.

Interdisciplinary Connections

- **RF.4.4** Read with sufficient accuracy and fluency to support comprehension.
- **RI.4.7** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
- **RI.4.2** Determine the main idea of a text and explain how it is supported by key details; summarize the text.

21st-Century Skills

- **9.1.5.CR.1** Compare various ways to give back and relate them to your strengths, interests, and other personal factors.

Career Ready Practices

- **CRP 4** Communicate clearly and effectively and with reason.
- **CRP 8** Utilize critical thinking to make sense of problems and persevere in solving independent practice problems.
- **CRP 11** Use technology to enhance productivity.

Technology Integration

- **TECH.8.1.2** All students will use digital tools to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
- **TECH.8.1.2.A.CS2** Select and use applications effectively and productively.
- **TECH.8.2.2.C** The design process is a systematic approach to solving problems.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
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	Points, Lines, Segments, Rays, and Angles: How Would You Describe These Figures? Points, Lines, Rays, and Segments Two or More Lines Points and Lines All Around What is an Angle? The Size of Angles: Compare and Describe Angles The Size of Angles on a Clock The Size of Angles in Degrees Use a Protractor to Measure Angles Angle Measurement and Perpendicular Lines Use a Protractor to Draw Angles	Formative Assessments: Diagnostic Assessment Mid-topic Checkpoint Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments	Materials: Chart paper Index cards Rulers or straightedges Illustrated Word Wall Card Sort: Angles Paper Protractors Colored pencils Index cards Pattern blocks Origami paper Activities: Figure Riddles Drawing Challenge Figure Identification Scavenger Hunt: Explore the classroom	acute angle angle equivalent fractions intersecting lines line obtuse angle parallel lines perpendicular lines point prime number ray remainder right angle segment or line segment straight angle vertex

two-dimensional figures. Write equations to represent angle relationships and reason about and find unknown measurements.	Angle Analysis: Types of Angles Find Angle Measurements Reasoning about Angles Guess the Figure	Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	for points and lines and take a photo or sketch them Angle Exploration Angle Sorting Clock Angles Activity The Size of Angles in Degrees Angle Measurement Task Cards Use a Protractor to Measure Angles Protractor Practice Perpendicular Hunt Around the Classroom/School Use a Protractor to Draw Angles Angle Drawing Challenge Angle Identification Game	
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			Angle Problem-solving Tasks Reasoning about Angles Angle Debate Mentor Texts: <i>The Boy Who Loved Math: The Improbable Life of Paul Erdos</i> by Deborah Heiligman <i>If You Hopped Like a Frog</i> by David M. Schwartz <i>Math Curse</i> by Jon Scieszka and Lane Smith <i>What's Your Angle, Pythagoras?</i> by Julie Ellis <i>The Case of the Missing Vertex (Math Adventures)</i> by Tommy Greenwald	
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			<i>Lines, Lines, Lines!</i> (MathStart 3) by Pam Holden <i>Lines, Rays, and Angles</i> by Laine Falk <i>The Greedy Triangle</i> by Marilyn Burns <i>Sir Cumference and the Great Knight of Angleland</i> by Cindy Neuschwander <i>Amanda Bean's Amazing Dream</i> by Cindy Neuschwander	
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Students with IEPs and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u> <u>Movematics (dyscalculia.org)</u> Follow all the IEP/504 plan modifications Allow extra time to complete assignments or tests Guided notes and/or scaffold outline for written assignments Work in a small group Solidify and refine concepts through repetition
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	Allow answers to be given orally or dictated Use multi-sensory teaching approaches Utilize assistive technology and materials Use large print books, Braille, or books on CD (digital text) Text to speech/audio recorded selections Amplification system as needed Leveled texts according to ability Fine motor skill stations embedded in rotation as needed Modified or constrained spelling word lists Provide anchor charts with high frequency words and phonemic patterns Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u> Work toward longer passages as skills in English increase

	Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers Guided notes and/or scaffold outline for written assignments Provide students with English Learner leveled readers Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. After students share responses, use multimodal examples to show the meaning of 5 in the 5-frame. Point to each square and count to 5. Invite students to chorally read numbers 1–5 aloud. Invite students to use gestures as they count their collections aloud.
Accelerating Students	<u>Accelerating Students Guide</u> Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum Organize and offer flexible small group learning activities

	Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations Propose interest-based extension activities Expose students to beyond level texts.
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Unit 8: Properties of Two-dimensional Shapes

Unit Goal: 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.	
Duration: 3 weeks	
Essential Questions: • How do the properties of side lengths and angles determine the classification of triangles and quadrilaterals? • What are the different types of triangles and quadrilaterals, and how do their properties differ? • How do lines of symmetry contribute to the classification and understanding of two-dimensional figures? • In what ways can our understanding of the attributes of triangles and quadrilaterals help us solve problems involving perimeter and area? • How do geometric properties and classifications help us describe and analyze the characteristics of shapes in our environment?	
Enduring Understandings: • The classification of triangles and quadrilaterals is based on the properties of their side lengths and angles, including the relationships between their sides and angles.	

- Triangles can be classified by their side lengths as scalene, isosceles, or equilateral, and by their angle measures as acute, obtuse, or right. Quadrilaterals can be classified by their side lengths and angles as squares, rectangles, parallelograms, rhombuses, trapezoids, or kites.
- Lines of symmetry divide two-dimensional figures into halves that are mirror images of each other. Identifying lines of symmetry helps us understand the symmetrical properties of shapes and visualize their geometric structure.
- Understanding the attributes of triangles and quadrilaterals allows us to solve problems involving perimeter and area by applying formulas and geometric principles. For example, the perimeter of a triangle is the sum of its side lengths, while the area of a quadrilateral can be calculated using formulas such as base times height or length times width.
- Geometric properties and classifications provide a framework for describing and analyzing shapes in our environment, enabling us to recognize patterns, make predictions, and solve real-world problems related to spatial relationships and measurements.

Key NJSLS Strands:

- **4.G.A** Draw and identify lines and angles, and classify shapes by properties of their lines and angles
 - **4.G.A.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.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.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.NF.B** Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
 - **4.NF.B.3** Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
 - **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.M.A** Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
 - **4.M.A.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
- **4.M.B** Geometric measurement: understand concepts of angle and measure angles

- **4.M.B.6** 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** Use place value understanding and properties of operations to perform multi-digit arithmetic.
 - **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.

Interdisciplinary Connections

- **NJSLSA.R7** Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- **RL.4.4** Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in literature.
- **RL.4.7** Make connections between specific descriptions and directions in a text and a visual or oral representation of the text.
- **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

21st-Century Skills

- **9.4.5.CT.1** Identify and gather relevant data that will aid in the problem-solving process.

Career Ready Practices

- **CRP 4** Communicate clearly and effectively and with reason while working on groups on the Solve and Share portion of the lesson.

- **CRP 11** Use technology to enhance productivity.

Technology Integration

- **TECH.8.1.2** All students will use digital tools to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
- **TECH.8.1.2.A.CS2** Select and use applications effectively and productively.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
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.	Side Lengths, Angles, and Lines of Symmetry: Ways to Look at Figures Ways to Look at Triangles Ways to Look at Quadrilaterals Symmetry in Figures All Kinds of Attributes Ways to Find Unknown Length Symmetry in Action Ways to Find Angle Measurements	Formative Assessments: Diagnostic Assessment Mid-topic Checkpoint Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments: Topic/Unit Assessments Constructed Response Questions	Materials: Protractors Rulers Sticky notes Index cards Tools for creating a visual display Shape Cards Scissors Paper Two Symmetrical Figures Straightedges	acute angle angle intersecting lines line line of symmetry obtuse angle parallel lines perpendicular lines point prime number ray right angle

		Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	Activities: Shape Scavenger Hunt Shape Art Triangle Classification Triangle Hunt Quadrilateral Sorting Quadrilateral Art Project Symmetry Exploration Symmetry Design Challenge Attribute Sort Attribute Challenge Measuring Mystery Measurement Relay Mirror Reflections Symmetrical Movements	right triangle segment line segment straight angle symmetry vertex
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			Angle Exploration Angle Hunt Mentor Texts: <i>Shapes, Shapes, Shapes</i> by Tana Hoban <i>Triangle</i> by David A. Adler <i>The Greedy Triangle</i> by Marilyn Burns <i>Swirl by Swirl: Spirals in Nature</i> by Joyce Sidman <i>Measuring Angles</i> by Chris Woodford	
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Students with IEPs and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u> <u>Movematics (dyscalculia.org)</u> Follow all the IEP/504 plan modifications Allow extra time to complete assignments or tests Guided notes and/or scaffold outline for written assignments Work in a small group
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	Solidify and refine concepts through repetition Allow answers to be given orally or dictated Use multi-sensory teaching approaches Utilize assistive technology and materials Use large print books, Braille, or books on CD (digital text) Text to speech/audio recorded selections Amplification system as needed Leveled texts according to ability Fine motor skill stations embedded in rotation as needed Modified or constrained spelling word lists Provide anchor charts with high frequency words and phonemic patterns Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u>

	Work toward longer passages as skills in English increase Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers Guided notes and/or scaffold outline for written assignments Provide students with English Learner leveled readers Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. After students share responses, use multimodal examples to show the meaning of 5 in the 5-frame. Point to each square and count to 5. Invite students to chorally read numbers 1–5 aloud. Invite students to use gestures as they count their collections aloud.
Accelerating Students	<u>Accelerating Students Guide</u> Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum

	Organize and offer flexible small group learning activities Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations Propose interest-based extension activities Expose students to beyond level texts.
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Unit 9: Integrating Math Skills

Unit Goal: 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.
Duration: 3 weeks
Essential Questions: • How do the concepts and skills we've learned throughout the year connect and build upon each other? • What strategies can we use to consolidate and solidify our understanding of key grade-level concepts? • How does fluency in foundational skills support our ability to complete more complex mathematical tasks? • What evidence can we provide to demonstrate our mastery of the major work we've done this year? • How can we apply what we've learned to solve real-world problems and communicate mathematical ideas effectively?
Enduring Understandings: • Mastery of grade-level concepts and skills requires ongoing practice, review, and application in various contexts. • Connections between different mathematical concepts deepen our understanding and ability to solve complex problems. • Fluency in foundational skills, such as basic operations and number sense, provides a solid foundation for mathematical reasoning and problem-solving.

- Consistent effort and perseverance are essential for consolidating and solidifying understanding of major grade-level concepts.
- The ability to communicate mathematical ideas clearly and justify solutions enhances mathematical understanding and prepares students for future learning.

Key NJSLS Strands:

- **4.OA.A** Use the four operations with whole numbers to solve problems
 - **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 multi-step 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. *Climate Change Example: Students may, knowing that energy and fuels are derived from natural resources and that their uses affect the climate, use the four operations to solve multi-step word problems posed with whole numbers, having whole-number answers and that are based on energy, fuels, and natural resources.*
- **4.OA.B** Gain familiarity with factors and multiples
 - **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** Generate and analyze patterns
 - **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.NF.A** Extend understanding of fractions equivalence and ordering.

- **4.NF.A.1** Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{c}{d}$ 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 $\frac{1}{2}$. 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.A.3** Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.
 - **4.NF.A.3.a** Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
 - **4.NF.A.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.
 - **4.NF.A.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.A.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** Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
 - **4.NF.B.4** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
- **4.NF.C** Understand decimal notation for fractions and compare decimal fractions.
 - **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.
 - **4.NF.C.6** Use decimal notation for fractions with denominators 10 or 100.
- **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** Generalize place value understanding for multi-digit whole numbers.

- **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 by applying concepts of place value and division.
- **4.NBT.B** Use place value understanding and properties of operations to perform multi-digit arithmetic.
 - **4.NBT.B.4** With accuracy and efficiency, 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.G.A** Draw and identify lines and angles, and classify shapes by properties of their lines and angles
 - **4.GA.A.1** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Interdisciplinary Connections

- **RI.4.1** Refer to details and examples in a text and make relevant connections when explaining what the text says explicitly and when drawing inferences from the text.
- **RF.4.4** Read with sufficient accuracy and fluency to support comprehension.
- **RL.4.7** Make connections between specific descriptions and directions in a text and a visual or oral representation of the text.
- **3-5-ETS1-1.** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- **3-5-ETS1-2** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

21st-Century Skills

- **9.4.5.CI.3** Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity.

Career Ready Practices
● CRP 4 Communicate clearly and effectively and with reason while working on groups on the Solve and Share portion of the lesson. ● CRP 11 Use technology to enhance productivity.
Technology Integration
● TECH.8.1.2 All students will use digital tools to access, manage, evaluate and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge. ● TECH.8.1.2.A.CS2 Select and use applications effectively and productively.

Skills	Instructional Topics	Assessment	Resources	Vocabulary
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	Add, Subtract, and Multiply Fractions Sums and Differences of Fractions Stories with Fractions Whole-number Operations Another Look at the Standard Algorithm Multiplication of Multi-digit Numbers What's the Quotient?	Formative Assessments: Diagnostic Assessment Mid-topic Checkpoint Lesson Quizzes Lesson Self-assessment Teacher Observations Class Discussions Classwork/ Homework Exit Slips/Google Form Summative Assessments:	Materials: Grid paper Tools for creating a visual display Activities: Fraction Pizza Party Fraction Story Problems Number Line Challenge Algorithm Exploration	acute angle angle common denominator composite number denominator dividend equivalent fractions factor pair of a whole number

instructional routines.	Solve Problems with Multiplication and Division Solve Multiplicative Comparison Problems Solve Problems with Multiplication and Division Create Word Problems Estimation Exploration Which One Doesn't Belong?	Topic/Unit Assessments Constructed Response Questions Projects Cumulative Tests Performance Assessments Alternate and Benchmark Assessments: Progress Monitoring Assessments Cumulative/Benchmark Assessments	Area Model Activity Division Dice Game Real-world Problem-solving Multiplicative Comparison Scenarios Create Word Problems Word Problem Writing Estimation Stations Which One Doesn't Belong Puzzles Mentor Texts: <i>Fraction Fun</i> by David A. Adler <i>Math Curse</i> by Jon Scieszka and Lane Smith <i>How Big is a Foot?</i> by Rolf Myller <i>The Doorbell Rang</i> by Pat Hutchins	intersecting lines line line of symmetry mixed number multiple of a number numerator obtuse angle parallel lines perpendicular lines point prime number ray remainder right angle right triangle rounding segment or line segment
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				straight angle symmetry vertex
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Students with IEPs and 504 Plans	<u>Universal Design for Learning and Access for Students with Disabilities</u> <u>Movematics (dyscalculia.org)</u> Follow all the IEP/504 plan modifications Allow extra time to complete assignments or tests Guided notes and/or scaffold outline for written assignments Work in a small group Solidify and refine concepts through repetition Allow answers to be given orally or dictated Use multi-sensory teaching approaches Utilize assistive technology and materials Use large print books, Braille, or books on CD (digital text) Text to speech/audio recorded selections Amplification system as needed Leveled texts according to ability
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	Fine motor skill stations embedded in rotation as needed Modified or constrained spelling word lists Provide anchor charts with high frequency words and phonemic patterns Students might need guidance as to what actions happen during partner work time. Invite students to discuss what it looks like when they are working with their partner while exploring the connecting cubes. Generate a list of shared expectations for partner work. Invite students to plan a strategy before they begin working. If time allows, invite students to share their plan with a partner. Some students may benefit from feedback that emphasizes effort and time on task. For example, moving counters in the squares of the 5-frame or filling the 5-frame with one counter in each square.
Multi-language Learners	<u>Mathematical Language Development and Access for English Learners</u> Work toward longer passages as skills in English increase Use visuals Introduce/highlight key vocabulary before lesson Teacher models reading aloud daily Provide peer tutoring Utilize translation supports including bilingual dictionary, translation device, assistive technology, and peers Guided notes and/or scaffold outline for written assignments Provide students with English Learner leveled readers

	Support recommended by the grade specific “can do” list outlined by WIDA, including Key Uses Edition and Descriptor Name Charts Create a visual display of what students want to do or make with the connecting cubes. As students share ideas, include a drawing or annotation to illustrate connections. After students share responses, use multimodal examples to show the meaning of 5 in the 5-frame. Point to each square and count to 5. Invite students to chorally read numbers 1–5 aloud. Invite students to use gestures as they count their collections aloud.
Accelerating Students	<u>Accelerating Students Guide</u> Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles) Provide options, alternatives and choices to differentiate and broaden the curriculum Organize and offer flexible small group learning activities Provide whole group enrichment explorations Teach cognitive and methodological skills Use center, stations, or contracts Organize integrated problem-solving simulations Propose interest-based extension activities Expose students to beyond level texts.

(NJDOE, 2024)

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References

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