Intervention Math 8

Course Number: 2845

Course Level: Intervention

Grade: 8

Time/Credit: 1 year/ 47 minutes daily

Development Date: Fall 2025 - Summer 2026

School Board Approval:

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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K – 12 Mathematics Program Learning Principles

Teaching and Learning Principles:

1. Teaching mathematics for understanding requires providing experiences that stimulate students' curiosity and build confidence in investigating, problem solving, and communicating (speaking, reading, writing, representing, and listening).
2. Differentiated instruction addresses student strengths, interests, and learning styles.
3. Instruction should be appropriately paced to make the curriculum accessible to all students.
4. High expectations with strong support from teachers, parents and administrators motivate all students to achieve excellence in mathematics.
5. To create new understanding, students must be actively engaged in learning experiences designed to connect to their prior knowledge.
6. Presenting new ideas within rich and meaningful contexts helps learners to transfer and use knowledge meaningfully.
7. Making connections both within and outside of school helps learners to transfer and use knowledge meaningfully.
8. The learning process is enhanced when new ideas are presented using manipulatives, computers, calculators, and real-time data collection devices.
9. Teacher collaboration and reflection enrich learning experiences for students.
10. Assessment is an ongoing process that guides instruction and monitors student progress to include mastery of mathematics content and higher-level thinking skills.

Documents Considered:

(2000). Principles and Standards for School Mathematics. Reston, VA: National Council of Teachers of Mathematics.

Kilpatrick, J., Swafford, J., & Findell, B. (2001). *Adding It Up: Helping Children Learn Mathematics.* Washington, DC: National Academy Press.

Marzano, R., & Pickering, D. (1997). *Dimensions of Learning.* Alexandria, VA: Association for Supervision and Curriculum Development; Aurora, CO: Mid-continent Regional Educational Laboratory.

Tomlinson, Carol Ann. (1999). *The Differentiated Classroom: Responding to the Needs of All Learners.* Alexandria, VA: Association for Supervision and Curriculum Development.

Zemelman, S., Daniels, H., & Hyde, A. (1998). *Best practice: New standards for teaching and learning in America's schools*. Portsmouth, NH: Heinemann.

Mathematics Program Enduring Understandings

Students will understand that:

The Nature of Mathematics

- Mathematics is a language of carefully defined terms and symbols.
- Mathematics is used to make informed decisions about problems in everyday life.

Numbers and Operations

- There are multiple representations for any number.
- Numbers are classified and compared within our number system.
- Depending on the situation, calculations may be done using mental math or paper-and-pencil calculations using a variety of mathematically sound algorithms.
- Estimates help determine the reasonableness of an answer.
- Expressions are simplified using a predetermined order of operations.

Measurement

- Measurements collected using any tools (except for counting) are estimates with an accepted level of error.
- All measurements consist of exactly three parts: number, unit, and precision.
- Changing one linear dimension in a figure with two or three dimensions will have a different effect on the figure's perimeter, circumference, area, or volume.

Geometry

- Points, lines, and planes are the building blocks of geometry.
- Each geometric figure has a specific naming convention.
- Postulates, theorems, definitions, and properties are used to:
  - justify reasoning in a direct proof.
  - establish relationships involving two and three-dimensional figures.
- Logical thinking and critical reasoning skills are important aspects of problem solving.
- A shape's characteristics (dimensionality, side measures, angle measures, faces, edges, area, perimeter, and volume) are used for identification.
- The Pythagorean Theorem and trigonometric ratios are used to find missing quantities in right triangles.
- Concepts of congruency and similarity are used to relate and compare 2 and 3- dimensional figures.

Algebraic Concepts

- Algebraic rules and properties determine how expressions are simplified and how equations are solved.
- Problems involving a constant rate of change can be modeled using proportional reasoning.

- Algebraic expressions, equations, inequalities, and functions (linear, absolute value, quadratic, polynomial, exponential, and logarithmic) are used to model relationships between quantities in real-world situations.
- Patterns and functions can be generalized and represented using verbal models, tables, equations, and graphs.
- Systems of equations are solved both graphically and algebraically and are used to model real-life problems.

Data Analysis and Probability

- Data is collected, organized, and displayed for analysis.
- Interpretations and predictions about data are influenced by the method that data is collected and displayed.
- Probability is used to make informed predictions and inferences.

Mathematics Program Essential Questions

The Nature of Mathematics

- What characteristics make mathematics a language?
- When is the correct solution not the answer to a problem?

Numbers and Operations

- How do you know that an answer is reasonable?
- Why are there different number systems?
- How do you determine when to calculate with pencil and paper, find an estimate, or use a calculator?
- What does it mean to be simplified?
- Is there more than one way to simplify an expression?

Measurement

- What does it mean to be accurate?
- How do you measure?
- How does changing a dimension effect a figures length, area, and volume?

Geometry

- Why do all statements need justification?
- What is the logical progression of statements in a proof?
- How are figures classified?
- How do you name a geometric figure and why are standard naming conventions important?
- Why are points, lines, and planes so important in Euclidean geometry?
- How and when is the Pythagorean Theorem used?
- What do similarity and congruency statements tell you about polygons?

Algebraic Concepts

- What does solve mean?
- Is your solution always the appropriate answer to a problem?
- How do expressions and equations differ?
- What makes a relationship linear?
- How can a line be used to make predictions?
- When is it necessary to use a system of equations?
- Why would you represent a pattern/function in different ways?

Data Analysis and Probability

- What is the purpose of collecting data?
- How is data used or abused?
- How do we make predictions based on probability?

Math Intervention 8 Overview

Desired Results

Course Description: This course is designed for students who would benefit from additional support to meet grade-level standards in mathematics. It focuses on reinforcing foundational skills and addressing learning gaps to build confidence and competence in core concepts.

Prerequisite: None

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Math Intervention 8 Pacing Guide

Course Overview	Days
Semester 1A – Unit 1	25
Semester 1B – Unit 2	21
Semester 1C – Unit 3	35
Semester 1 – Total Days	**81**
Semester 2A – Unit 3, Cont.	12
Semester 2B – Unit 4	14
Semester 2C – Unit 5	18
Semester 2D – Unit 6	29
Semester 2 – Total Days	**73**
Beginning of Year Activities/Review/Remediation	5
IXL Screener Arena	6
Flex Days – Field Trips, Snow Days, Half Days, Assemblies, School Activities, etc.	12
PSSA Testing – 1 Day for ELA, 2 Days for Math	3
Total Days	**180**

Semester 1A – 25 Days	
Unit 1 – Transformational Geometry	
Aligned with Modules 1 and 2	
Grade 8, Mission 1, Topic A – Rigid Transformations	
Lesson 2: Naming the Moves	1
Lesson 3: Grid Moves	1
Lesson 4: Making the Moves	1
Foundational Lessons: G*7M7 Lesson 6: Recognize that four side lengths do not determine a unique quadrilateral, but that three side lengths can determine a unique triangle.*	1
Lesson 5: Coordinate Moves	1
Lesson 6: Describing Transformations	1
Foundational Lessons: *G6M7 Lesson 15: Plot points on the coordinate plane to make polygons, and solve problems about vertical and horizontal distance between points. • For additional support, G6M7 Lessons 11, 14-15.*	1
Flex and Progress Check #1	2
Grade 8, Mission 1, Topic B – Properties of Rigid Transformations	
Lesson 7: No Bending or Stretching	1
Lesson 8: Rotation Patterns	1
Foundational Lessons: G*7M7 Lesson 8: Compare and contrast triangles that share three common measures of angles or sides, and determine whether they are identical copies or different triangles.*	1
Grade 8, Mission 1, Topic C - Congruence	
Lesson 11: What is the Same?	1
Lesson 12: Congruent Polygons	1
Foundational Lessons: G*8M1 Lesson 7: Compare measurements of sides and angles on a shape before and after rigid transformations.*	1
Mid – Mission & End – of – Mission Assessment – Topic C – Progress Check #2 (Remove D, E)	2
Grade 8, Mission 2, Topic A – Dilations	
Lesson 4: *Dilations on a Square Grid*	1
Foundational Lessons: *G7M1 Lesson 5: Describe how scale factors of 1, less than 1, and greater than 1 affect the size of a scaled copy, and explain how scaling can be reversed using reciprocal scale factors.*	1
Grade 8, Mission 2, Topic B – Similarity	
Lesson 6: Similarity	1
Lesson 7: Similar Polygons	1
Lesson 9: Side Length Quotients in Similar Triangles	1
Foundational Lessons: *G7M1 Lesson 2: Identify corresponding parts and determine the scale factor between two figures.*	1

End of Mission Progress Check #3 (Use topic B questions)	2

Semester 1B – 21 Days	
Unit 2 – Linear Equations and Applications	
Aligned with Module 3	
Grade 8, Mission 4, Topic B – Linear Equations in One Variable	
Lesson 3: Balanced Moves	2
Lesson 4: More Balanced Moves	2
Lesson 5: Solving Any Linear Equation	2
Foundational Lessons: *G7M6 Lesson 9: Solve equations of the form px + q = r and p(x + q) = r that involve negative numbers. For additional support, G7M6 Lessons 7-9.*	1
Flex and Progress Check #1	2
Lesson 6: Strategic Solving	2
Foundational Lessons: *G7M6 Lesson 10: Decide between and use two common approaches for solving an equation of the form p(x + q) = r: expanding using the distributive property, or dividing each side by p.*	1
Lesson 7: All, Some, or No Solutions	2
Lesson 8: How Many Solutions	2
Lesson 9: When Are They the Same?	2
Foundational Lessons: G*7M6 Lesson 11: Use tape diagrams to translate verbal descriptions of situations into an equation of the form px + q = r or p(x + q) = r, and solve the resulting equation to determine an unknown quantity in the situation.*	1
Mid Mission Assessment: Topics B (Only) – Progress Check #2	2

Semester 1C – 35 Days	
Unit 3 – Relationships and Functions	
Aligned with Modules 5 and 6	
Grade 8, Mission 3, Topic A – Proportional Relationships	
Lesson 1: Understanding Proportional Relationships	1
Lesson 2: Graphs of Proportional Relationships	1
Lesson 3: Representing Proportional Relationships	1
Foundational Lessons: *G7M2 Lesson 12: Interpret and compare two related proportional relationships on the same graph. For additional Support, G7M2 Lessons 10-11.*	
Lesson 4: Comparing Proportional Relationships	1
Foundational Lessons: G7M2 Lesson 14: Represent a proportional relationship in four different ways.	
Flex and Progress Check #1	2
Grade 8, Mission 3, Topic B – Representing Linear Relationships	
Lesson 5: Introduction to Linear Relationships	1
Lesson 6: More Linear Relationships	1
Lesson 7: Representations of Linear Relationships	1
Lesson 8: Translating to y = mx + b	1
Foundational Lessons: *G7M4 Lesson 3: Calculate and interpret the scale factor and constant of proportionality for a proportional relationship.*	
Mid-Mission Assessment: Topics: A & B - Progress Check #2	2
Grade 8, Mission 3, Topic C – Finding Slopes	
Lesson 9: Slopes Don't Have to be Positive	1
Lesson 10: Calculating Slope	2
Lesson 11: Equations of All Kinds of Lines	1
Foundational Lessons: *G8M2 Lesson 11: Write an expression for the slope of a line using the quotient of the vertical and horizontal side lengths of a slope triangle. For additional Support, G8M2 Lesson 10*	
Grade 8, Mission 3, Topic D – Linear Equations	
Lesson 12: Solutions to Linear Equations	1
Lesson 13: More Solutions to Linear Equations	1
Foundational Lessons: *G8M2 Lesson 12: Write an equation for a line and use line equations to determine if a point is on a line.*	
End-of-Mission Assessment: (Eliminate Topic E) – Progress Check #3	2
Grade 8, Mission 5, Topic A – Input & Output	
Lesson 1: Inputs and Outputs	1
Lesson 2: Introduction to Functions	1
Foundational Lessons: *G7M6 Lesson 11: Find unknown values in relationships, and interpret them as proportional and not proportional*	
Grade 8, Mission 5, Topic B – Representing and Interpreting Functions	

Lesson 3: Equations for Functions	2
Lesson 4: Tables, Equations, and Graphs of Functions	2
Flex and Progress Check #4	2
Lesson 5: More Graphs of Functions	1
Lesson 6: Even More Graphs of Functions	1
Lesson 7: Connecting Representations of Functions	1
Foundational Lessons: *G7M2 Lesson 14: Represent a proportional relationship in four different ways. For additional Support, G7M2 Lessons 10-12.*	
Grade 8, Mission 5, Topic C – Linear Functions and Rates of Change	
Lesson 8: Linear Functions	1
Lesson 9: Linear Models	1
Foundational Lessons: *G8M3 Lesson 7: Interpret the slope and vertical intercept in context, and write equations that represent linear relationships. For additional Support, G8M3 Lessons 5-6.*	
Mid-Mission Assessment Progress Check A-C Progress Check #5	2

Mid-Year Movement

Semester 2A – 12 Days	
Unit 3, Cont. – Relationships and Functions	
Aligned with Modules 5 and 6	
Grade 8, Mission 4, Topic C – Systems of Linear Equations	
Lesson 10: On or Off the Line?	1
Lesson 11: On Both of the Lines	1
Foundational Lessons: *G8M3 Lesson 12: Determine pairs of values that satisfy or do not satisfy a linear relationship using an equation or graph.*	
Lesson 12: Systems of Equations	1
Lesson 13: Solving Systems of Equations	1
Flex & Progress Check #1	2
Lesson 14: Solving More Systems	2
Lesson 15: Writing Systems of Equations	2
Foundational Lessons: *G8M4 Lesson 6: Use different strategies for solving linear equations in one variable based on their features or structures.*	
End-of-Mission Assessment - Topic C, Progress Check #2	2

Semester 2B – 14 Days	
Unit 4 – Statistics and Probability	
Aligned with Modules 8 and 9	
Standards – Based Intervention **8th grade Core Standard:** CC.2.4.8.B.1 Students acquire the knowledge and skills needed to: Analyze and/or interpret bivariate data displayed in multiple representations. · CC.2.4.8.B.2 Students acquire the knowledge and skills needed to: Understand that patterns of association can be seen in bivariate data utilizing frequencies.	
Grade 8, Mission 6, Topic A – Does This Predict That?	
Lesson 1: Organizing Data	1
Lesson 2: Plotting Data	1
Foundational Lessons: *G5M6 Lesson 9: Generate two number patterns from given rules, plot the points, and analyze the patterns.*	
Grade 8, Mission 6, Topic B - Associations in Numerical Data	
Lesson 3: What a Point in a Scatter Plot Means	1
Lesson 4: Fitting a Line to Data	1
Foundational Lessons: *G6M7 Lesson 13: Interpret the meaning of points on a coordinate plane to solve real-world problems.*	
Lesson 5: Describing Trends in Scatter Plots	1
Flex and Progress Check #1	2
Lesson 6: The Slope of a Fitted Line	1
Lesson 7: Observing More Patterns in Scatter Plots	1
Lesson 8: Analyzing Bivariate Data	1
Foundational Lessons: *G8M3 Lesson 7: Interpret the slope and vertical intercept in context, and write equations that represent linear relationships.*	
Grade 8, Mission 6, Topic C - Associations in Categorical Data	
Lesson 9: Looking for Associations	1
Lesson 10: Using Data Displays to Find Associations	1
Foundational Lessons: *G6M3 Lesson 16: Find the percentage that C is of B by computing C/B · 100.*	
End-of-Mission, Topics A – C, Progress Check #2	2

Semester 2C – 18 Days	
Unit 5 – Real Numbers and Pythagorean Theorem	
Aligned with Modules 10 and 11	
Standards – Based Intervention **8th grade Core Standard:** CC.2.1.8.E.1 Students acquire the knowledge and skills needed to: Distinguish between rational and irrational numbers using their properties. · CC.2.1.8.E.4 Students acquire the knowledge and skills needed to: Estimate irrational numbers by comparing them to rational numbers. · CC.2.3.8.A.3 Students acquire the knowledge and skills needed to: Understand and apply the Pythagorean Theorem to solve problems.	
Grade 8, Mission 8, Topic B – Side Lengths and Areas of Squares	
Lesson 3: Rational and Irrational Numbers	1
Lesson 4: Square Roots on the Number Line	1
Lesson 5: Reasoning about Square Roots	1
Foundational Lessons: *G7M4 Lesson 5: Use decimals to describe increases and decreases.*	
Mid – Mission Progress Check #1	2
Grade 8, Mission 8, Topic C – The Pythagorean Theorem	
Lesson 6: Finding Side Lengths of Triangles	1
Lesson 8: Finding Unknown Side Lengths	1
Lesson 9: The Converse of the Pythagorean Theorem	1
Lesson 10: Applications of the Pythagorean Theorem	1
Foundational Lessons: *G4M4 Lesson 14: Define and construct triangles from given criteria. Explore symmetry in triangles*	
Lesson 11: Finding Distances in the Coordinate Plane	1
Foundational Lessons: *G6M7 Lesson 14: Use coordinates to find distances and reflections on the coordinate plane.*	
Flex and Progress Check #2	**2**
Grade 8, Mission 8, Topic D – Side Lengths and Volumes of Cubes	
Lesson 12: Edge Lengths & Volumes	1
Lesson 13: Cube Roots	1
Foundational Lessons: *G6M1 Lesson 17: Use exponents to express the area of a square and volume of a cube.*	
Grade 8, Mission 8, Topic E – Decimal Representation of Rational & Irrational Numbers	

Lesson 14: Decimal Representation of Rational Numbers	1
Lesson 15: Infinite Decimal Expansions	1
Foundational Lessons: *G6M5 Lesson 11: Use long division to divide whole numbers that result in a quotient with a decimal.*	
End-of-Mission, Topics C – E, Progress Check #3	2

Semester 2D – 29 Days
Unit 6 – Exponents, Scientific Notation & Volume
Aligned with Modules 12 and 13
Standards – Based Intervention **8th grade Core Standard:** CC.2.3.8.A.1 Students acquire the knowledge and skills needed to: Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems. · CC.2.3.8.A.3 Students acquire the knowledge and skills needed to: Understand and apply the Pythagorean Theorem to solve problems. · CC.2.2.8.B.1 Students acquire the knowledge and skills needed to: Apply concepts of radicals and integer exponents to generate equivalent expressions.

Grade 8, Mission 7, Topic A – Exponent Review	
Lesson 1: Exponent Review	1
Foundational Lessons: *G5M1 Lesson 3: Use exponents to name place value units, and explain patterns in the placement of the decimal point.*	
Grade 8, Mission 7, Topic B – Exponent Rules	
Lesson 2: Multiplying Powers of 1	1
Lesson 3: Powers of Powers of 10	1
Lesson 4: Dividing Powers of 1	1
Flex & Progress Check #1	2
Lesson 5: Negative Exponents with Powers of 10	1
Lesson 6: What About Other Bases?	1
Lesson 7: Practice with Rational Bases	1
Lesson 8: Combining Bases	1
Foundational Lessons: *G6M6 Lesson 13: Decide if expressions are equal by evaluating expressions and understanding what exponents mean. • For additional support, G6M6 Lessons 12-13.*	
Mid-Mission, Topics A – B, Progress Check #2	2
Grade 8, Mission 7, Topic C - Scientific Notation	
Lesson 9: Describing Large and Small Values Using Powers of 10	1
Lesson 12: Applications of Arithmetic with Powers of 10	1

Foundational Lessons: *G6M6 Lesson 15: Evaluate expressions with a variable, an exponent and another operation, and determine whether a given value is a solution to an equation. • For additional support, G6M6 Lessons 14-15.*	
Lesson 13: Definition of Scientific Notation	1
Lesson 14: Multiplying, Dividing, and Estimating with Scientific Notation	1
Lesson 15: Adding and Subtracting with Scientific Notation	1
Foundational Lessons: *G8M7 Lesson 4: Generalize the exponent rule and write equivalent exponential expressions of division expressions with a base of 10.*	
End-of-Mission Progress Check #3 (exclude topic D)	2
Grade 8, Mission 5, Topic D - Cylinders and Cones	
Lesson 11: Filling Containers	1
Lesson 12: How Much Will Fit (Optional)	1
Lesson 13: Volume of a Cylinder	1
Lesson 14: Finding Cylinder Dimensions	1
Lesson 15: Volume of a Cone	1
Lesson 16: Finding Cone Dimensions	1
Foundational Lessons: *G7M3 Lesson 8: Explain how the area of a circle and its circumference are related to each other, and know and use the formula for area of a circle. • For additional Support, G7M3 Lessons 6-7.*	
Grade 8, Mission 5, Topic E - Dimensions and Spheres	
Lesson 20: Volume of a Sphere	1
Lesson 21: Cylinders, Cones, & Spheres	1
Foundational Lessons: *G7M1 Lesson 6: Describe how the area of a scaled copy is related to the area of the original figure and the scale factor that was used.*	
End-of-Mission, Topics D – E, Progress Check #4 (Eliminate scaling)	2

Acceptable Evidence

- Progress Monitoring: Exit tickets, mid-mission assessments, and end-of-mission assessments
- Growth: Progress toward meeting individualized goals
- Productivity: Independent lessons completed each week

Course Grading: The final course grade is calculated as follows:

- Each marking period grade counts for 25% of the student's final course grade.

Additional remediation in grade-level or prerequisite standards and content will be provided when the teacher determines that a student has not yet mastered the necessary content. Enrichment

opportunities will also be provided for students who demonstrate understanding more quickly than their peers.

Required and Supplementary Texts/Software

Zearn Math

- Sharma, S. (2025). *Zearn Math*. Zearn.

IXL Math

Calculator Recommendation

The secondary mathematics department of Central Bucks School District recognizes calculators as valuable tools for learning in the mathematics classroom.In certain advanced courses, graphing calculators with specific capabilities are important for daily classroom performance and are required for Advanced Placement assessments. While no specific brands are endorsed, there are restrictions on the types of calculators allowed on certain classroom assessments and final exams. Calculators that perform operations with variables, such as the TI-89, TI-92, and HP49G, are not permitted on district assessments or final exams, even though they may be allowed on some national assessments. Teachers have discretion regarding whether these calculator types may be used for classroom-related purposes.

Unit 1: Transformational Geometry

Mission 1: Rigid Transformations and Congruence
Mission 2: Dilations, Similarity, and Introducing Slope

Desired Results

Essential Questions:

- How can we describe and classify different types of transformations (translations, rotations, reflections, and dilations)?
- What information determines how a figure changes under a transformation, including center and scale factor?
- How do transformations affect size, shape, and orientation, and which properties are preserved?
- What does it mean for two figures to be congruent or similar, and how are these ideas connected to transformations?
- How can corresponding sides and angles be used to justify whether figures are congruent or similar?
- How can transformations help us generate, compare, and reason about geometric figures?

Enduring Understandings:

Students will understand how to…

Mission 1, Topic A: Rigid Transformations
- Lesson 2: Naming the Moves
- Lesson 3: Grid Moves
- Lesson 4: Making the Moves
- Lesson 5: Coordinate Moves
- Lesson 6: Describing Transformations

Mission 1, Topic B: Properties of Rigid Transformations
- Lesson 7: No Bending or Stretching
- Lesson 8: Rotation Patterns

Mission 1, Topic C: Congruence
- Lesson 11: What is the Same?
- Lesson 12: Congruent Polygons

Mission 2, Topic A: Dilations
- Lesson 4: Dilations on a Square Grid

Mission 2, Topic B: Similarity

- Lesson 6: Similarity
- Lesson 7: Similar Polygons
- Lesson 9: Side Length Quotients in Similar Triangles

Knowledge:

Mission 1 Vocabulary

alternate interior angles, angle of rotation, area, center (of rotation), clockwise, congruent, coordinates, corresponding, counterclockwise, direction, distance, image, intersect, line of reflection, measure, measurement, midpoint, opposite, parallel, perimeter, plane, point, polygon, preserve, reflection, rigid transformation, right angle, rotate, rotation, segment, sequence of transformations, slide, straight angle, symmetry, tessellation, transform, transformation, translate, translation, transversal, turn, vertex/vertices, vertical angles, x-axis, y-axis

Mission 2 Vocabulary

approximate, center of a dilation, dilation, dilate, equation of a line, estimate, midpoint, quotient, radius, scale factor, scaled copy, scaling, similar, similarity, slope, slope triangle, x-coordinate, y-coordinate

Skills:

Mission 1:

Topic A – Rigid Transformations

- Lesson 2: Describe the movement of shapes using the terms “clockwise,” “counterclockwise,” “translations,” “rotations,” and “reflections” of figures.
- Lesson 3: Draw the image of a figure that results from a translation, rotation, and reflection on a grid.
- Lesson 4: Use the terms translation, rotation, and reflection to precisely describe transformations and explain a sequence of transformations that takes one figure to its image.
- Lesson 5: Apply transformations to points on a coordinate plane and name the coordinates of points in the image of a transformation.
- Lesson 6: Apply a sequence of transformations to points on a coordinate plane and determine whether the order of a sequence of transformations has an effect on the image.

Topic B – Properties of Rigid Transformations

- Lesson 7: Compare measurements of sides and angles on a shape before and after rigid transformations.

- Lesson 8: Rotate a line segment 180 degrees around its midpoint, a point on the segment, and a point not on the segment, and generalize the outcomes of rotating a segment 180 degrees around different points.

Topic C – Congruence

- Lesson 11: Determine whether two shapes are congruent by considering their area and perimeter and using rigid transformations.
- Lesson 12: Use rigid transformations to decide whether or not two figures are congruent.

Mission 2:

Topic A – Dilations

- Lesson 4: Dilate polygons on a square grid using the origin as the center of dilation and a given scale factor, and use coordinates to describe points on the original polygon and the image.

Topic B – Similarity

- Lesson 6: Apply a sequence of transformations to one figure to get a similar figure, and use a sequence of transformations to explain why two figures are similar.
- Lesson 7: Understand that similar polygons have congruent corresponding angles and proportional side lengths.
- Lesson 9: Calculate unknown side lengths in similar triangles using the scale factor between similar triangles and understand that the quotients of pairs of side lengths in similar triangles are equal.

Standards:

Previous Standards:

- CC.2.1.6.D.1 – Understand ratio concepts and use ratio reasoning to solve problems.
- CC.2.2.6.B.1 – Apply and extend previous understandings of arithmetic to algebraic expressions.
- CC.2.3.6.A.1 – Apply appropriate tools to solve problems involving area, surface area, and volume.
- CC.2.1.7.D.1 – Analyze proportional relationships and use them to model and solve real-world problems.
- CC.2.2.7.B.1 – Apply properties of operations to generate equivalent expressions.
- CC.2.3.7.A.2 – Visualize and represent geometric figures and describe the relationships between them.

8th Grade Core Standards:

- CC.2.3.8.A.2 – Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions, and apply formulas to determine the volumes of cones, cylinders, and spheres.
- CC.2.2.8.B.2 – Demonstrate an understanding of rational and irrational numbers, and represent and compare quantities expressed in scientific notation.

Acceptable Evidence

Assessments focus on the big ideas of mathematics and allow students to demonstrate their understanding across multiple modalities through a thoughtful balance of software- and paper-based experiences. All assessments are designed to fit into the classroom model and allocated time, and to enhance – rather than distract from – instruction.

Acceptable evidence:
Lesson Components:

- Warm-up
- Fluency
- Guided Practice
- Independent Practice
- Wrap-up

Formative/Summative Assessments:

- **Daily lesson – level assessments:** Lesson – level assessments are embedded into the curriculum and occur as part of recommended daily core instructional time, not in addition to it.
    - **The Tower of Power (Digital)**
        - The Tower of Power is a scaffolded assessment, administered automatically at the end of each Independent Digital Lesson. The Tower of Power is focused on the content of a single lesson and allows students to demonstrate their new understanding. If students make a mistake, they receive real-time remediation at the point of misconception, allowing them to correct their understanding and continue through the assessment. Each Tower of Power contains two to four stages of problems that increase in complexity and decrease in scaffolding as students progress. The problems in each stage are carefully designed to focus on the big ideas of each lesson, mirroring the progression of learning students have just completed. Students must successfully complete 100% of the Tower of Power before moving on to their next Independent Digital Lesson. Since the Tower of Power is software-based, teachers can access a report that lets them know if a student is struggling with the daily digital assessment, allowing them to adjust instruction as needed.

    - **Exit Ticket (Paper)**

        - The Exit Ticket is a paper assessment that is also focused on the content of a single lesson but is less scaffolded than the Tower of Power. The Exit Ticket is optional and can be administered after the completion of each Independent Digital Lesson, providing teachers with a second data point that they can use to monitor daily learning. The Exit Ticket determines if the student transferred their learning from the Independent Digital Lesson to a less scaffolded, open-response item that requires them to show their thinking and work by drawing models, writing explanations, or both. Since Exit Ticket problems are designed to highlight the big mathematical idea of each lesson, or a piece of it, we do not recommend editing them for content.
- **Mission – Level Assessments/Progress Monitoring:** Mission-level assessments with scoring guidance and detailed rubrics are used for consistency and fidelity of program management. Mid-Mission and End-of-Mission assessments are assessments administered roughly halfway through the Mission and at the conclusion of the Mission respectively.
    - Mid-Mission & End-of-Mission
        - Paper assessments consist of open-response items that require students to show their work or explain their thinking in a variety of ways, including drawing models and writing explanations, similar to an Exit Ticket. Some assessment items highlight a student's understanding of a big mathematical idea, while others focus on students' procedural fluency. Each part of any multi-step problem has a clear objective, is aligned with the explicit expectations of the target standards, and allows teachers to identify whether students are struggling with the foundational math concept or the multi-step aspect of the problem.
    - Optional Practice
        - Includes problems from current lessons along with a mix of topics from previous lessons.

Summative Assessment/Progress Checks:
Mission 1:

- Progress Check #1
- Mid-Mission Assessment & End-of-Mission Assessment: Topics A – C, Progress Check #2

Mission 2:

- End-of-Mission Assessment: Topic B, Progress Check #3

Suggested Learning Experiences and Instruction

- Students will build on prior knowledge of geometry, measurement, and scale factors to understand how plane figures can be transformed and compared.
- Students will identify, describe, and apply translations, rotations, reflections, and dilations, including the key features that define each transformation.

- Students will use precise mathematical language (e.g., corresponding points, corresponding sides, image) to describe transformations on and off the coordinate plane.
- Students will explain that rigid transformations preserve distance and angle measure, and use sequences of these transformations to determine congruence.
- Students will describe the properties of dilations, including how angle measures are preserved and side lengths are scaled by a factor.
- Students will determine whether figures are similar by identifying sequences of transformations, including dilations, and justify their reasoning.
- Students will apply properties of transformations and similarity to reason about geometric relationships, including triangles, slope, and linear relationships.

Differentiation/Intervention/Enrichment Options:

- Students will benefit from predictable lesson structures (Warm-Up, Concept Exploration, Wrap-Up) that reduce cognitive load and allow them to focus on the math.
- Students will be supported through a progression from concrete to abstract learning, helping them build understanding using examples, visuals, and symbols over time.
- Students will have opportunities to think independently and then collaborate, allowing them to build confidence and deepen understanding with peer and teacher support.
- Students will be engaged through real-world contexts and applications, which make math meaningful and provide an entry point for diverse learners.
- Students will access content through multiple means (aligned with UDL principles), increasing accessibility for multilingual learners, students with disabilities, and those with unfinished learning.
- Students should receive structured supports and scaffolds embedded throughout lessons to ensure all learners can access and participate in mathematical thinking.

For Language Development:

- Students will benefit from explicit instruction and repeated exposure to key mathematical vocabulary, helping them build confidence in using academic language.
- Students will be supported through structured discussion routines (e.g., Think-Pair-Share) that include sentence frames and conversation starters to guide participation.
- Students will engage in meaningful math conversations where they explain their thinking, listen to others, and build on shared ideas.
- Students will be supported by the use of multiple languages when appropriate, allowing them to process mathematical ideas in their first language to deepen understanding.
- Students will access learning through visual supports, models, and teacher-created displays that capture and reinforce important language and concepts.
- Students should participate in structured language routines (such as clarifying responses, comparing strategies, and refining ideas) that strengthen both mathematical reasoning and language development.

For Learners Who Require Further Intervention:

- Students will be supported through built-in, just-in-time scaffolds within digital lessons that connect new learning to prior knowledge and address gaps as they arise.
- Students will receive adaptive support during lessons through visual and conceptual models that strengthen understanding of key mathematical ideas.
- Students will benefit from ongoing diagnostic tools (like the Tower of Power) that identify areas of struggle and provide immediate, targeted support ("Boosts").
- Students should receive additional foundational lessons when needed, helping them build essential skills connected to grade-level content.
- Students will access learning through personalized assignments that allow them to move between grade-level work and targeted support seamlessly and without stigma.
- Students will benefit from teacher monitoring and data reports that guide instructional decisions and provide deeper interventions when necessary.

Unit 2: Linear Equations and Applications

Mission 4: Linear Equations (Topic B only)

Desired Results

Essential Questions:

- How can linear equations be written and solved to represent real-world situations?
- What do different types of solutions (no solution, one solution, infinitely many solutions) tell us about an equation?
- How do we interpret the meaning of a solution in the context of a problem?
- What does it mean to be a solution to a system of equations?
- How are equations, tables, and graphs connected when representing linear relationships?
- How can graphs be used to find and interpret solutions to systems of equations?

Enduring Understandings:

Students will understand how to…

Topic B: Linear Equations in One Variable

- Lesson 3: Balanced Moves
- Lesson 4: More Balanced Moves
- Lesson 5: Solving Any Linear Equation
- Lesson 6: Strategic Solving
- Lesson 7: All, Some, or No Solutions
- Lesson 8: How Many Solutions
- Lesson 9: When are they the same?

Knowledge:

Mission 4 Vocabulary

algebraically, coefficient, common denominator, constant term, distribute, distributive property, equation, expression, factor, infinitely many solutions, linear equation, like terms, no solution, one solution, ordered pair, representation, solution of an equation, solution of a system of equations, substitute, substitution, systems of equations, term, variable

Skills:

Topic B: Linear Equations in One Variable

- Lesson 3: Solve linear equations in one variable, including equations with the distributive property or variables on both sides, by performing balanced moves
- Lesson 4: Solve linear equations in one variable by performing balanced moves, including equations with variables on both sides that involve the distributive property and/or combining like terms

- Lesson 5: Solve linear equations in one variable, including equations with the distributive property, variables on both sides, and fractions, by performing balanced moves
- Lesson 6: Use different strategies for solving linear equations in one variable based on their features or structures
- Lesson 7: Solve linear equations with different numbers of solutions and determine whether there is one solution, no solution, or infinitely many solutions
- Lesson 8: Determine the number of solutions a linear equation has using its structure and describe features of equations with one solution, no solution, or infinitely many solutions
- Lesson 9: Write an equation with one variable to represent a situation with two equal conditions and interpret the solution

Standards:

Previous Standards:

- CC.2.1.6.D.1 – Understand ratio concepts and use ratio reasoning to solve problems.
- CC.2.2.6.B.1 – Apply and extend previous understandings of arithmetic to algebraic expressions.
- CC.2.3.6.A.1 – Apply appropriate tools to solve problems involving area, surface area, and volume.
- CC.2.1.7.D.1 – Analyze proportional relationships and use them to model and solve real-world problems.
- CC.2.2.7.B.1 – Apply properties of operations to generate equivalent expressions.
- CC.2.2.7.B.3 – Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and graphical representations.

8th Grade Core Standards:

- CC.2.2.8.B.3 – Use numbers expressed in the form of a single digit multiplied by an integer power of 10 to estimate very large or very small quantities, and express how many times as much one is than the other.

Acceptable Evidence

Assessments focus on the big ideas of mathematics and allow students to demonstrate their understanding across multiple modalities through a thoughtful balance of software- and paper-based experiences. All assessments are designed to fit into the classroom model and allocated time, and to enhance – rather than distract from – instruction.

Acceptable evidence:
Lesson Components:

- Warm-up
- Fluency
- Guided Practice

- Independent Practice
- Wrap-up

Formative/Summative Assessments:

- **Daily lesson – level assessments:** Lesson – level assessments are embedded into the curriculum and occur as part of recommended daily core instructional time, not in addition to it.
    - **The Tower of Power (Digital)**
        - The Tower of Power is a scaffolded assessment, administered automatically at the end of each Independent Digital Lesson. The Tower of Power is focused on the content of a single lesson and allows students to demonstrate their new understanding. If students make a mistake, they receive real-time remediation at the point of misconception, allowing them to correct their understanding and continue through the assessment. Each Tower of Power contains two to four stages of problems that increase in complexity and decrease in scaffolding as students progress. The problems in each stage are carefully designed to focus on the big ideas of each lesson, mirroring the progression of learning students have just completed. Students must successfully complete 100% of the Tower of Power before moving on to their next Independent Digital Lesson. Since the Tower of Power is software-based, teachers can access a report that lets them know if a student is struggling with the daily digital assessment, allowing them to adjust instruction as needed.

    - **Exit Ticket (Paper)**
        - The Exit Ticket is a paper assessment that is also focused on the content of a single lesson but is less scaffolded than the Tower of Power. The Exit Ticket is optional and can be administered after the completion of each Independent Digital Lesson, providing teachers with a second data point that they can use to monitor daily learning. The Exit Ticket determines if the student transferred their learning from the Independent Digital Lesson to a less scaffolded, open-response item that requires them to show their thinking and work by drawing models, writing explanations, or both. Since Exit Ticket problems are designed to highlight the big mathematical idea of each lesson, or a piece of it, we do not recommend editing them for content.

- **Mission – Level Assessments/Progress Monitoring:** Mission-level assessments with scoring guidance and detailed rubrics are used for consistency and fidelity of program management. Mid-Mission and End-of-Mission assessments are assessments administered roughly halfway through the Mission and at the conclusion of the Mission respectively.
    - Mid-Mission & End-of-Mission
        - Paper assessments consist of open-response items that require students to show their work or explain their thinking in a variety of ways, including drawing models and writing explanations, similar to an Exit Ticket. Some

assessment items highlight a student's understanding of a big mathematical idea, while others focus on students' procedural fluency. Each part of any multi-step problem has a clear objective, is aligned with the explicit expectations of the target standards, and allows teachers to identify whether students are struggling with the foundational math concept or the multi-step aspect of the problem.

- Optional Practice
  - Includes problems from current lessons along with a mix of topics from previous lessons.

Summative Assessment/Progress Checks:

- Progress Check #1
- Mid-Mission Assessment: Topic B Progress Check #2

Suggested Learning Experiences and Instruction

- The student will write and solve linear equations in one variable using algebraic methods.
- The student will represent problem situations with equations, define variables clearly, and interpret solutions in context.
- The student will use diagrams, tables, graphs, and equations to model and solve linear relationships.
- The student will solve linear equations with exactly one solution, no solution, or infinitely many solutions and explain what each means.
- The student will connect the idea of balance in hanger diagrams to algebraic strategies for solving equations.
- The student will write and solve systems of linear equations in two variables and explain what it means for a pair of values to be a solution to the system.
- The student will analyze graphs of linear equations to determine whether a system has one solution, no solution, or infinitely many solutions.

Differentiation/Intervention/Enrichment Options:

Students will benefit from predictable lesson structures and a progression from concrete to abstract learning that supports sense-making and reduces cognitive load.

- Students will engage in both independent thinking and collaboration, building confidence and deepening understanding with peer and teacher support.
- Students will access content through real-world contexts and multiple modalities (aligned to UDL), ensuring meaningful and accessible entry points for diverse learners.
- Students will be supported with embedded scaffolds and structured tools (e.g., guided notes, graphic organizers, checklists) to promote access, participation, and independence.

- Students will utilize accessible design features and assistive technologies (e.g., clear visuals, text-to-speech) to support understanding and engagement.
- Students will learn in flexible, supportive environments with opportunities to use manipulatives, adjust pacing, and revisit content as needed.

For Language Development:

Students will benefit from explicit instruction and repeated exposure to key mathematical vocabulary, helping them build confidence in using academic language.

- Students will be supported through structured discussion routines (e.g., Think-Pair-Share) that include sentence frames and conversation starters to guide participation.
- Students will engage in meaningful math conversations where they explain their thinking, listen to others, and build on shared ideas.
- Students will be supported by the use of multiple languages when appropriate, allowing them to process mathematical ideas in their first language to deepen understanding.
- Students will access learning through visual supports, models, and teacher-created displays that capture and reinforce important language and concepts.
- Students should participate in structured language routines (such as clarifying responses, comparing strategies, and refining ideas) that strengthen both mathematical reasoning and language development.

For Learners Who Require Further Intervention:

Students will be supported through built-in, just-in-time scaffolds within digital lessons that connect new learning to prior knowledge and address gaps as they arise.

- Students will receive adaptive support during lessons through visual and conceptual models that strengthen understanding of key mathematical ideas.
- Students will benefit from ongoing diagnostic tools (like the Tower of Power) that identify areas of struggle and provide immediate, targeted support (“Boosts”).
- Students should receive additional foundational lessons when needed, helping them build essential skills connected to grade-level content.
- Students will access learning through personalized assignments that allow them to move between grade-level work and targeted support seamlessly and without stigma.
- Students will benefit from teacher monitoring and data reports that guide instructional decisions and provide deeper interventions when necessary.

Unit 3: Relationships and Functions

Mission 3: Linear Relationships
Mission 4: Linear Systems (Topic C, Only)
Mission 5: Functions (Topics A – C)

Desired Results

Essential Questions:

- How can we use inputs and outputs to determine whether a relationship is a function?
- What makes a relationship linear, and how is it different from a proportional relationship?
- How are slope, rate of change, constant of proportionality, and vertical intercept connected in linear functions?
- How can we represent and interpret functions using tables, graphs, and equations?
- How does the graph of a linear equation show all of its solutions, and what do features like slope and intercept tell us?
- How can we describe and compare linear functions, including whether they are increasing, decreasing, or related through transformations?

Enduring Understandings:

Students will understand how to…

Mission 3, Topic A: Proportional Relationships

- Lesson 1: Understanding Proportional Relationships
- Lesson 2: Graphs of Proportional Relationships
- Lesson 3: Representing Proportional Relationships
- Lesson 4: Comparing Proportional Relationships

Mission 3, Topic B: Representing Linear Relationships

- Lesson 5: Introduction to Linear Relationships
- Lesson 6: More Linear Relationships
- Lesson 7: Representations of Linear Relationships
- Lesson 8: Translating to $y = mx + b$

Mission 3, Topic C: Finding Slopes

- Lesson 9: Slopes Don't Have to be Positive
- Lesson 10: Calculating Slope
- Lesson 11: Equations of all kinds of lines
- Lesson 12: Solutions to Linear Equations
- Lesson 13: More Solutions to Linear Equations

Mission 5, Topic A: Input & Output

- Lesson 1: Inputs and Outputs
- Lesson 2: Introduction to Functions

Mission 5, Topic B: Representing and Interpreting Functions

- Lesson 3: Equations for Functions
- Lesson 4: Tables, Equations, and Graphs of Functions
- Lesson 5: More Graphs of Functions
- Lesson 6: Even More Graphs of Functions
- Lesson 7: Connecting Representations of Functions

Mission 5, Topic C: Linear Functions and Rates of Change

- Lesson 8: Linear Functions
- Lesson 9: Linear Models

Mission 4, Topic C: Systems of Linear Equations

- Lesson 10: On or Off the Line?
- Lesson 11: On Both of the Lines
- Lesson 12: Systems of Equations
- Lesson 13: Solving Systems of Equations
- Lesson 14: Solving More Systems
- Lesson 15: Writing Systems of Equations

Knowledge:

Mission 3 Vocabulary

combination, constant of proportionality, constant rate, constraint, equation, horizontal intercept, horizontal line, initial (value or amount), intersection point, label, linear relationship, productive, rate of change, relate, represent, scale, set of solutions, slope, solution to an equation with two variables, variable, vertical intercept, vertical line, x-intercept, y-intercept

Mission 5 Vocabulary

approximate range, approximation for π, base (of a cylinder or cone), cone, cube, cubic centimeter, cylinder, depends on, dependent variable, dimension, function, functional relationship, hemisphere, independent variable, input, linear function, mathematical model, output, piecewise linear function, prediction, radius, rectangular prism, sphere, three-dimensional, volume

Skills:

Mission 3, Topic A: Proportional Relationships

- Lesson 1 Create appropriate graphs and equations for proportional relationships by finding a constant of proportionality.

- Lesson 2 Compare graphs that represent proportional relationships using differently scaled axes. Use the graph of a proportional relationship to find the constant of proportionality and an equation that represents the relationship.
- Lesson 3 Find the rate of change of a proportional relationship given the graph, equation, table, or situation.
- Lesson 4 Compare the rates of change of proportional relationships presented in multiple ways.

Mission 3, Topic B: Representing Linear Relationships

- Lesson 5: Find the rate of change of a linear relationship by figuring out the slope of the line representing the relationship. Determine if a linear relationship is proportional or non-proportional by looking at its graph.
- Lesson 6: Interpret the slope and vertical intercept of a graph of a real-world situation.
- Lesson 7: Interpret the slope and vertical intercept in context, and write equations that represent linear relationships.
- Lesson 8: Create and compare equations that represent linear relationships with the same rate of change but different initial values.

Mission 3, Topic C: Finding Slopes

- Lesson 9: Create and interpret a graph of a line representing a linear relationship with a non-positive rate of change.
- Lesson 10: Calculate the slope of any line given the coordinates of two points on the line.
- Lesson 11: Write equations for vertical and horizontal lines, given the graph or a situation in which one variable does not vary and the other can take any value.

Mission 3, Topic D: Linear Equations

- Lesson 12: Determine pairs of values that satisfy or do not satisfy a linear relationship using an equation or graph.
- Lesson 13: Calculate the solution to a linear equation given one variable, and determine whether a point is a solution to an equation of a line.

Mission 5, Topic A: Input & Output

- Lesson 1: Use rules to find the output for a given input in an input-output table. Find rules that apply to multiple input-output pairs.
- Lesson 2: Define a function and determine if an input-output relationship represents a function.

Mission 5, Topic B: Representing and Interpreting Functions

- Lesson 3: Create an equation that represents a function rule, and calculate the output of a function for a given input using an equation in two variables.
- Lesson 4: Connect equations and graphs of functions by interpreting points on a graph. Determine whether a graph represents a function.
- Lesson 5: Use graphs of functions to analyze a context and interpret what is happening over intervals of input values.

- Lesson 6: Sketch and interpret graphs given the context of a real world situation.
- Lesson 7: Interpret multiple representations of functions, including graphs, tables, and equations.

Mission 5, Topic C: Linear Functions and Rates of Change

- Lesson 8: Understand that any linear function can be represented by an equation in the form y = mx + b, where m and b are the rate of change and initial value of the function, respectively.
- Lesson 9: Use linear functions to model real-world situations and make predictions. Determine the reasonableness of the mathematical model by comparing your predictions to the actual data.

Mission 4, Topic C: Systems of Linear Equations

- Lesson 10: Determine a point that satisfies two equations, using tables or graphs. Interpret points that lie on one, both, or neither line on a graph of two equations.
- Lesson 11: Create a graph that represents two linear relationships in context, and interpret the point of intersection.
- Lesson 12: Solve a system of equations graphically or algebraically. Understand that finding the solution to a system means finding values of the variables that make both equations true at the same time.
- Lesson 13: Solve a system of equations, and identify the number of solutions it has.
- Lesson 14: Calculate values that are a solution for a system of equations using substitution.
- Lesson 15: Create a system of equations that represents a situation and interpret the solution in context.

Standards:

Previous Standards:

- CC.2.1.6.D.1 – Understand ratio concepts and use ratio reasoning to solve problems.
- CC.2.2.6.B.1 – Apply and extend previous understandings of arithmetic to algebraic expressions.
- CC.2.3.6.A.1 – Apply appropriate tools to solve problems involving area, surface area, and volume.
- CC.2.1.7.D.1 – Analyze proportional relationships and use them to model and solve real-world problems.
- CC.2.2.7.B.1 – Apply properties of operations to generate equivalent expressions.
- CC.2.2.7.B.3 – Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and graphical representations.
- CC.2.2.7.C.1 – Apply and extend previous understandings of operations with fractions to operations with rational numbers.

- CC.2.2.7.C.2 – Interpret and apply properties of operations to multiply and divide rational numbers.

8th Grade Core Standards:

- CC.2.3.8.A.1 – Analyze and solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
- CC.2.2.8.B.2 – Demonstrate an understanding of rational and irrational numbers, and represent and compare quantities expressed in scientific notation.
- CC.2.2.8.B.3 – Use numbers expressed in the form of a single digit multiplied by an integer power of 10 to estimate very large or very small quantities, and express how many times as much one is than the other.
- CC.2.2.8.C.1 – Use rational and irrational numbers to solve real-world and mathematical problems.
- CC.2.2.8.C.2 – Apply properties of operations to generate equivalent numerical expressions involving rational and irrational numbers.

Acceptable Evidence

Assessments focus on the big ideas of mathematics and allow students to demonstrate their understanding across multiple modalities through a thoughtful balance of software- and paper-based experiences. All assessments are designed to fit into the classroom model and allocated time, and to enhance – rather than distract from – instruction.

Acceptable evidence:
Lesson Components:

- Warm-up
- Fluency
- Guided Practice
- Independent Practice
- Wrap-up

Formative/Summative Assessments:

- **Daily lesson – level assessments:** Lesson – level assessments are embedded into the curriculum and occur as part of recommended daily core instructional time, not in addition to it.
    - **The Tower of Power (Digital)**
        - The Tower of Power is a scaffolded assessment, administered automatically at the end of each Independent Digital Lesson. The Tower of Power is focused on the content of a single lesson and allows students to demonstrate their new understanding. If students make a mistake, they receive real-time remediation at the point of misconception, allowing them to correct their understanding and continue through the assessment. Each Tower of Power contains two to four stages of problems that increase in

complexity and decrease in scaffolding as students progress. The problems in each stage are carefully designed to focus on the big ideas of each lesson, mirroring the progression of learning students have just completed. Students must successfully complete 100% of the Tower of Power before moving on to their next Independent Digital Lesson. Since the Tower of Power is software-based, teachers can access a report that lets them know if a student is struggling with the daily digital assessment, allowing them to adjust instruction as needed.

- **Exit Ticket (Paper)**
  - The Exit Ticket is a paper assessment that is also focused on the content of a single lesson but is less scaffolded than the Tower of Power. The Exit Ticket is optional and can be administered after the completion of each Independent Digital Lesson, providing teachers with a second data point that they can use to monitor daily learning. The Exit Ticket determines if the student transferred their learning from the Independent Digital Lesson to a less scaffolded, open-response item that requires them to show their thinking and work by drawing models, writing explanations, or both. Since Exit Ticket problems are designed to highlight the big mathematical idea of each lesson, or a piece of it, we do not recommend editing them for content.

- **Mission – Level Assessments/Progress Monitoring:** Mission-level assessments with scoring guidance and detailed rubrics are used for consistency and fidelity of program management. Mid-Mission and End-of-Mission assessments are assessments administered roughly halfway through the Mission and at the conclusion of the Mission respectively.
  - Mid-Mission & End-of-Mission
    - Paper assessments consist of open-response items that require students to show their work or explain their thinking in a variety of ways, including drawing models and writing explanations, similar to an Exit Ticket. Some assessment items highlight a student's understanding of a big mathematical idea, while others focus on students' procedural fluency. Each part of any multi-step problem has a clear objective, is aligned with the explicit expectations of the target standards, and allows teachers to identify whether students are struggling with the foundational math concept or the multi-step aspect of the problem.
  - Optional Practice
    - Includes problems from current lessons along with a mix of topics from previous lessons.

Summative Assessment/Progress Checks:
Unit 3:

- Progress Check #1
- Mid-Mission Assessment: Mission 3, Topics A-B – Progress Check #2

- End-of-Mission Assessment: Mission 3, Topics C-D – Progress Check #3
- Progress Check #4
- Mid-Mission Assessment: Mission 5, Topics A-C – Progress Check #5

Cont., Unit 3:

- End-of-Mission Assessment: Mission 4, Topic C – Progress Check #6

Suggested Learning Experiences and Instruction

- Students will analyze and connect multiple representations (tables, graphs, and equations) of proportional and linear relationships.
- Students will determine and interpret the constant of proportionality and rate of change in context.
- Students will represent linear relationships using graphs, tables, and equations, and explain how these representations are connected.
- Students will compare proportional and non-proportional relationships and justify their reasoning using graphs and equations.
- Students will select and use appropriate tools (e.g., graph paper, tables, equations) to model and solve real-world problems involving linear relationships.
- Students will interpret slope and intercepts in context, including situations with positive and negative rates of change.
- Students will solve and interpret systems of linear equations, making connections between graphical, tabular, and algebraic solutions.

Differentiation/Intervention/Enrichment Options:

- Students will benefit from predictable lesson structures and a progression from concrete to abstract learning that supports sense-making and reduces cognitive load.
- Students will engage in both independent thinking and collaboration, building confidence and deepening understanding with peer and teacher support.
- Students will access content through real-world contexts and multiple modalities (aligned to UDL), ensuring meaningful and accessible entry points for diverse learners.
- Students will be supported with embedded scaffolds and structured tools (e.g., guided notes, graphic organizers, checklists) to promote access, participation, and independence.
- Students will utilize accessible design features and assistive technologies (e.g., clear visuals, text-to-speech) to support understanding and engagement.
- Students will learn in flexible, supportive environments with opportunities to use manipulatives, adjust pacing, and revisit content as needed.

For Language Development:

- Students will benefit from explicit instruction and repeated exposure to key mathematical vocabulary, helping them build confidence in using academic language.

- Students will be supported through structured discussion routines (e.g., Think-Pair-Share) that include sentence frames and conversation starters to guide participation.
- Students will engage in meaningful math conversations where they explain their thinking, listen to others, and build on shared ideas.
- Students will be supported by the use of multiple languages when appropriate, allowing them to process mathematical ideas in their first language to deepen understanding.
- Students will access learning through visual supports, models, and teacher-created displays that capture and reinforce important language and concepts.
- Students should participate in structured language routines (such as clarifying responses, comparing strategies, and refining ideas) that strengthen both mathematical reasoning and language development.

For Learners Who Require Further Intervention:

- Students will be supported through built-in, just-in-time scaffolds within digital lessons that connect new learning to prior knowledge and address gaps as they arise.
- Students will receive adaptive support during lessons through visual and conceptual models that strengthen understanding of key mathematical ideas.
- Students will benefit from ongoing diagnostic tools (like the Tower of Power) that identify areas of struggle and provide immediate, targeted support ("Boosts").
- Students should receive additional foundational lessons when needed, helping them build essential skills connected to grade-level content.
- Students will access learning through personalized assignments that allow them to move between grade-level work and targeted support seamlessly and without stigma.
- Students will benefit from teacher monitoring and data reports that guide instructional decisions and provide deeper interventions when necessary.

Unit 4: Statistics and Probability

Mission 6: Associations in Data

Desired Results

Essential Questions:

- How can scatter plots help us identify patterns and relationships between two variables?
- What does the strength and direction of an association (positive, negative, or none) tell us about a data set?
- How can we distinguish between linear and non-linear relationships in bivariate data?
- How do clusters and outliers influence how we interpret data and draw conclusions?
- How can a fitted line (line of best fit) be used to model data and make predictions, and how accurate are those predictions?
- How can different representations (scatter plots, two-way tables, and bar graphs) help us understand both numerical and categorical data?

Enduring Understandings:

Students will understand how to…

Mission 6, Topic A: Does This Predict That?

- Lesson 1: Organizing Data
- Lesson 2: Plotting Data

Mission 6, Topic B: Associations in Numerical Data

- Lesson 3: What a point in a scatter plot means
- Lesson 4: Fitting a line to data
- Lesson 5: Describing trends in scatter plots
- Lesson 6: The slope of a fitted line
- Lesson 7: Observing more patterns in scatter plots
- Lesson 8: Analyzing Bivariate Data

Mission 6, Topic C: Associations in Categorical Data

- Lesson 9: Looking for associations
- Lesson 10: Using data displays to find associations

Knowledge:

Mission 6 Vocabulary

attribute, bar graph, categorical data, cluster, data display, fitted line, independent variable, linear association, linear model, negative association, no association, nonlinear association, numerical

data, outlier, overpredict, positive association, predict, relative frequency, scatter plot, segmented bar graph, two-way (frequency) table, underpredict, dependent variable

Skills:

Mission 6, Topic A: Does this Predict That?

- Lesson 1: Organize data, describe patterns, and make predictions using tables and scatter plots.
- Lesson 2: Create a scatter plot from a table of data and describe the trend of the data.

Mission 6, Topic B: Associations in Numerical Data

- Lesson 4: Use a model to predict values for data and identify outliers on a scatter plot.
- Lesson 5: Draw a linear model to fit data in a scatter plot, and say whether data in a scatter plot has a positive or negative association (or neither).
- Lesson 6: Use the slope of a line fit to data in a scatter plot to say how the variables are connected in real-world situations.
- Lesson 7: Describe features of data on scatter plots, including "linear" and "nonlinear association" and "clustering" using informal language.
- Lesson 8: Analyze a set of data to determine associations between two variables, and interpret features of a scatter plot with a line of fit, including outliers, slope of the line, and clustering.

Mission 6, Topic C: Associations with Categorical Data

- Lesson 9: Calculate relative frequencies and describe associations between variables using a relative frequency table.
- Lesson 10: Create relative frequency tables, bar graphs, and segmented bar graphs from frequency tables to find associations among variables, and interpret the associations in context.

Standards:

Previous Standards:

- CC.2.1.6.D.1 – Understand ratio concepts and use ratio reasoning to solve problems.
- CC.2.1.7.D.1 – Analyze proportional relationships and use them to model and solve real-world problems.
- CC.2.2.6.B.1 – Apply and extend previous understandings of arithmetic to algebraic expressions.
- CC.2.2.7.B.1 – Apply properties of operations to generate equivalent expressions.
- CC.2.2.7.C.1 – Apply and extend previous understandings of operations with fractions to operations with rational numbers.
- CC.2.2.7.C.2 – Interpret and apply properties of operations to multiply and divide rational numbers.
- CC.2.4.7.B.1 – Draw, construct, and describe geometrical figures and describe the relationships between them.

- CC.2.4.7.B.2 – Apply and extend previous understandings of geometry to solve problems involving scale drawings and geometric figures.

8th Grade Core Standards:

- CC.2.4.8.B.1 – Apply knowledge of angle relationships and transformations to solve problems.
- CC.2.4.8.B.2 – Understand and apply the Pythagorean Theorem to solve problems involving right triangles.

Acceptable Evidence

Assessments focus on the big ideas of mathematics and allow students to demonstrate their understanding across multiple modalities through a thoughtful balance of software- and paper-based experiences. All assessments are designed to fit into the classroom model and allocated time, and to enhance – rather than distract from – instruction.

Acceptable evidence:

Lesson Components:

- Warm-up
- Fluency
- Guided Practice
- Independent Practice
- Wrap-up

Formative/Summative Assessments:

- **Daily lesson – level assessments:** Lesson – level assessments are embedded into the curriculum and occur as part of recommended daily core instructional time, not in addition to it.
    - **The Tower of Power (Digital)**
        - The Tower of Power is a scaffolded assessment, administered automatically at the end of each Independent Digital Lesson. The Tower of Power is focused on the content of a single lesson and allows students to demonstrate their new understanding. If students make a mistake, they receive real-time remediation at the point of misconception, allowing them to correct their understanding and continue through the assessment. Each Tower of Power contains two to four stages of problems that increase in complexity and decrease in scaffolding as students progress. The problems in each stage are carefully designed to focus on the big ideas of each lesson, mirroring the progression of learning students have just completed. Students must successfully complete 100% of the Tower of Power before moving on to their next Independent Digital Lesson. Since the Tower of Power is software-based, teachers can access a report that lets them know if a student is struggling with the daily digital assessment, allowing them to adjust instruction as needed.

    - **Exit Ticket (Paper)**

        - The Exit Ticket is a paper assessment that is also focused on the content of a single lesson but is less scaffolded than the Tower of Power. The Exit Ticket is optional and can be administered after the completion of each Independent Digital Lesson, providing teachers with a second data point that they can use to monitor daily learning. The Exit Ticket determines if the student transferred their learning from the Independent Digital Lesson to a less scaffolded, open-response item that requires them to show their thinking and work by drawing models, writing explanations, or both. Since Exit Ticket problems are designed to highlight the big mathematical idea of each lesson, or a piece of it, we do not recommend editing them for content.

- **Mission – Level Assessments/Progress Monitoring:** Mission-level assessments with scoring guidance and detailed rubrics are used for consistency and fidelity of program management. Mid-Mission and End-of-Mission assessments are assessments administered roughly halfway through the Mission and at the conclusion of the Mission respectively.
    - Mid-Mission & End-of-Mission
        - Paper assessments consist of open-response items that require students to show their work or explain their thinking in a variety of ways, including drawing models and writing explanations, similar to an Exit Ticket. Some assessment items highlight a student's understanding of a big mathematical idea, while others focus on students' procedural fluency. Each part of any multi-step problem has a clear objective, is aligned with the explicit expectations of the target standards, and allows teachers to identify whether students are struggling with the foundational math concept or the multi-step aspect of the problem.
    - Optional Practice
        - Includes problems from current lessons along with a mix of topics from previous lessons.

Summative Assessment/Progress Checks:
Unit 4:

- Progress Check #1
- End – of – Mission Assessment – Progress Check #2

Suggested Learning Experiences and Instruction

- Students will represent and analyze bivariate data using scatter plots, identifying patterns and trends in real-world contexts.
- Students will interpret points on a scatter plot and explain what they represent about the relationship between two variables.
- Students will describe the type and direction of associations (positive, negative, none, linear, non-linear) between two variables.

- Students will create and use fitted lines to model data and make predictions, then compare predicted values to actual data.
- Students will identify and interpret outliers and explain their impact on the overall data set.
- Students will organize and analyze categorical data using two-way tables and calculate relative frequencies to identify associations.
- Students will represent categorical data using bar graphs and segmented bar graphs to compare groups and draw conclusions.

Differentiation/Intervention/Enrichment Options:

- Students will benefit from predictable lesson structures and a progression from concrete to abstract learning that supports sense-making and reduces cognitive load.
- Students will engage in both independent thinking and collaboration, building confidence and deepening understanding with peer and teacher support.
- Students will access content through real-world contexts and multiple modalities (aligned to UDL), ensuring meaningful and accessible entry points for diverse learners.
- Students will be supported with embedded scaffolds and structured tools (e.g., guided notes, graphic organizers, checklists) to promote access, participation, and independence.
- Students will utilize accessible design features and assistive technologies (e.g., clear visuals, text-to-speech) to support understanding and engagement.
- Students will learn in flexible, supportive environments with opportunities to use manipulatives, adjust pacing, and revisit content as needed.

For Language Development:

- Students will benefit from explicit instruction and repeated exposure to key mathematical vocabulary, helping them build confidence in using academic language.
- Students will be supported through structured discussion routines (e.g., Think-Pair-Share) that include sentence frames and conversation starters to guide participation.
- Students will engage in meaningful math conversations where they explain their thinking, listen to others, and build on shared ideas.
- Students will be supported by the use of multiple languages when appropriate, allowing them to process mathematical ideas in their first language to deepen understanding.
- Students will access learning through visual supports, models, and teacher-created displays that capture and reinforce important language and concepts.
- Students should participate in structured language routines (such as clarifying responses, comparing strategies, and refining ideas) that strengthen both mathematical reasoning and language development.

For Learners Who Require Further Intervention:

- Students will be supported through built-in, just-in-time scaffolds within digital lessons that connect new learning to prior knowledge and address gaps as they arise.

- Students will receive adaptive support during lessons through visual and conceptual models that strengthen understanding of key mathematical ideas.
- Students will benefit from ongoing diagnostic tools (like the Tower of Power) that identify areas of struggle and provide immediate, targeted support ("Boosts").
- Students should receive additional foundational lessons when needed, helping them build essential skills connected to grade-level content.
- Students will access learning through personalized assignments that allow them to move between grade-level work and targeted support seamlessly and without stigma.
- Students will benefit from teacher monitoring and data reports that guide instructional decisions and provide deeper interventions when necessary.

Unit 5: Real Numbers and Pythagorean Theorem

Mission 8: Pythagorean Theorem and Irrational Numbers

Desired Results

Essential Questions:

- How can square roots and cube roots be represented and interpreted in mathematical expressions and on the number line?
- What is the difference between rational and irrational numbers, and how can we recognize each?
- How can we approximate irrational numbers and represent them using rational numbers?
- How does the Pythagorean Theorem describe relationships between side lengths in geometric figures?
- How can we use the Pythagorean Theorem to solve problems in two and three dimensions?
- How are numerical, algebraic, and geometric representations connected when solving problems involving roots and right triangles?

Enduring Understandings:

Students will understand how to…

Mission 8, Topic B: Side Lengths and Areas of a Square

- Lesson 3: Rational and Irrational Numbers
- Lesson 4: Square roots on the Number Line
- Lesson 5: Reasoning about Square Roots

Mission 8, Topic C: Pythagorean Theorem

- Lesson 6: Finding Side Lengths of Triangles
- Lesson 8: Finding Unknown Side Lengths
- Lesson 9: The Converse of the Pythagorean Theorem
- Lesson 10: Applications of the Pythagorean Theorem
- Lesson 11: Finding Distances in the Coordinate Plane

Mission 8, Topic D: Side Lengths and Volume of Cubes

- Lesson 12: Edge Lengths & Volumes
- Lesson 13: Cube Roots

Mission 8, Topic E: Decimal Representation of Rational and Irrational Numbers

- Lesson 14: Decimal Representation of Rational Numbers
- Lesson 15: Infinite Decimal Expansions

Knowledge:

Mission 8 Vocabulary

converse of the Pythagorean Theorem, cube root, decimal approximation, decimal representation, diagonal, edge length, hypotenuse, infinite decimal expansion, irrational number, legs, Pythagorean Theorem, rational number, repeating decimal, right triangle, square (of a number), square root, square root symbol

Skills:

Mission 8, Topic B: Side Lengths and Areas of Squares

- Lesson 3: Comprehend the term "rational number" to mean a fraction or its opposite, and "irrational number" to mean a number that is not rational, and identify examples of each.
- Lesson 4: Find a decimal approximation for square roots, and locate its approximation on the number line.
- Lesson 5: Identify the two whole number values that a square root is between.

Mission 8, Topic C: Pythagorean Theorem

- Lesson 6: Comprehend the term "Pythagorean Theorem" as the equation $a^2 + b^2 = c^2$, where a and b are the lengths of the legs and c is the length of the hypotenuse of a right triangle.
- Lesson 8: Calculate unknown side lengths of a right triangle by using the Pythagorean Theorem.
- Lesson 9: Determine whether a triangle with given side lengths is a right triangle using the converse of the Pythagorean Theorem.
- Lesson 10: Use the Pythagorean Theorem to solve problems within a context.
- Lesson 11: Calculate the distance between two points in the coordinate plane by using the Pythagorean Theorem.

Mission 8, Topic D: Side Lengths and Volumes of Cubes

- Lesson 12: Comprehend the term "cube root of a" and the notation $\sqrt[3]{a}$ to mean the side length of a cube with a volume of a cubic units.
- Lesson 13: Determine the whole numbers that a cube root lies between.

Mission 8, Topic E: Decimal Representation of Rational and Irrational Numbers

- Lesson 14: Write fractions as terminating or repeating decimals and understand that every number has a decimal expansion.
- Lesson 15: Write a repeating decimal as a fraction.

Standards:

Previous Standards:

- CC.2.1.6.E.1 – Apply and extend previous understandings of arithmetic to algebraic expressions.
- CC.2.1.7.E.1 – Apply and extend previous understandings of operations with rational numbers.
- CC.2.1.7.E.2 – Use properties of operations to generate equivalent expressions.
- CC.2.2.7.B.1 – Apply properties of operations to generate equivalent expressions.
- CC.2.2.7.C.1 – Apply and extend previous understandings of operations with rational numbers.
- CC.2.2.7.C.2 – Apply properties of operations to multiply and divide rational numbers.
- CC.2.3.7.A.1 – Solve real-world and mathematical problems involving area, surface area, and volume.

8th Grade Core Standards:

- CC.2.1.8.E.1 – Apply properties of integer exponents to generate equivalent numerical expressions.
- CC.2.1.8.E.4 – Interpret expressions and equations by viewing one or more of their parts as a single entity.
- CC.2.2.8.B.1 – Apply properties of irrational numbers to approximate and locate them on a number line.
- CC.2.3.8.A.3 – Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres and relate volume to functional relationships.

Acceptable Evidence

Assessments focus on the big ideas of mathematics and allow students to demonstrate their understanding across multiple modalities through a thoughtful balance of software- and paper-based experiences. All assessments are designed to fit into the classroom model and allocated time, and to enhance – rather than distract from – instruction.

Acceptable evidence:

Lesson Components:

- Warm-up
- Fluency
- Guided Practice
- Independent Practice
- Wrap-up

Formative/Summative Assessments:

- **Daily lesson – level assessments:** Lesson – level assessments are embedded into the curriculum and occur as part of recommended daily core instructional time, not in addition to it.
    - **The Tower of Power (Digital)**
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demonstrate their new understanding. If students make a mistake, they receive real-time remediation at the point of misconception, allowing them to correct their understanding and continue through the assessment. Each Tower of Power contains two to four stages of problems that increase in complexity and decrease in scaffolding as students progress. The problems in each stage are carefully designed to focus on the big ideas of each lesson, mirroring the progression of learning students have just completed. Students must successfully complete 100% of the Tower of Power before moving on to their next Independent Digital Lesson. Since the Tower of Power is software-based, teachers can access a report that lets them know if a student is struggling with the daily digital assessment, allowing them to adjust instruction as needed.

- **Exit Ticket (Paper)**
  - The Exit Ticket is a paper assessment that is also focused on the content of a single lesson but is less scaffolded than the Tower of Power. The Exit Ticket is optional and can be administered after the completion of each Independent Digital Lesson, providing teachers with a second data point that they can use to monitor daily learning. The Exit Ticket determines if the student transferred their learning from the Independent Digital Lesson to a less scaffolded, open-response item that requires them to show their thinking and work by drawing models, writing explanations, or both. Since Exit Ticket problems are designed to highlight the big mathematical idea of each lesson, or a piece of it, we do not recommend editing them for content.

- **Mission – Level Assessments/Progress Monitoring:** Mission-level assessments with scoring guidance and detailed rubrics are used for consistency and fidelity of program management. Mid-Mission and End-of-Mission assessments are assessments administered roughly halfway through the Mission and at the conclusion of the Mission respectively.
  - Mid-Mission & End-of-Mission
    - Paper assessments consist of open-response items that require students to show their work or explain their thinking in a variety of ways, including drawing models and writing explanations, similar to an Exit Ticket. Some assessment items highlight a student's understanding of a big mathematical idea, while others focus on students' procedural fluency. Each part of any multi-step problem has a clear objective, is aligned with the explicit expectations of the target standards, and allows teachers to identify whether students are struggling with the foundational math concept or the multi-step aspect of the problem.
  - Optional Practice
    - Includes problems from current lessons along with a mix of topics from previous lessons.

Summative Assessment/Progress Checks:
Unit 5:

- Mid – Mission Assessment – Topic B – Progress Check #1
- Progress Check #2
- End – of – Mission Assessment – Topics B – E – Progress Check #3

Suggested Learning Experiences and Instruction

- Students will compare the areas of squares using grid models and explain how area relationships connect to the Pythagorean Theorem.
- Students will decompose and rearrange shapes to demonstrate geometric proofs of the Pythagorean Theorem.
- Students will estimate and calculate side lengths and areas of squares on a coordinate grid using square root relationships.
- Students will define and distinguish between rational and irrational numbers and represent them on a number line.
- Students will approximate irrational numbers (e.g., √2, π) using rational numbers and plot their locations on a number line.
- Students will apply the Pythagorean Theorem to find missing side lengths in two- and three-dimensional figures.
- Students will use cube roots to determine unknown edge lengths of cubes and connect volume to side length.

Differentiation/Intervention/Enrichment Options:

- Students will benefit from predictable lesson structures and a progression from concrete to abstract learning that supports sense-making and reduces cognitive load.
- Students will engage in both independent thinking and collaboration, building confidence and deepening understanding with peer and teacher support.
- Students will access content through real-world contexts and multiple modalities (aligned to UDL), ensuring meaningful and accessible entry points for diverse learners.
- Students will be supported with embedded scaffolds and structured tools (e.g., guided notes, graphic organizers, checklists) to promote access, participation, and independence.
- Students will utilize accessible design features and assistive technologies (e.g., clear visuals, text-to-speech) to support understanding and engagement.
- Students will learn in flexible, supportive environments with opportunities to use manipulatives, adjust pacing, and revisit content as needed.

For Language Development:

- Students will benefit from explicit instruction and repeated exposure to key mathematical vocabulary, helping them build confidence in using academic language.

- Students will be supported through structured discussion routines (e.g., Think-Pair-Share) that include sentence frames and conversation starters to guide participation.
- Students will engage in meaningful math conversations where they explain their thinking, listen to others, and build on shared ideas.
- Students will be supported by the use of multiple languages when appropriate, allowing them to process mathematical ideas in their first language to deepen understanding.
- Students will access learning through visual supports, models, and teacher-created displays that capture and reinforce important language and concepts.
- Students should participate in structured language routines (such as clarifying responses, comparing strategies, and refining ideas) that strengthen both mathematical reasoning and language development.

For Learners Who Require Further Intervention:

- Students will be supported through built-in, just-in-time scaffolds within digital lessons that connect new learning to prior knowledge and address gaps as they arise.
- Students will receive adaptive support during lessons through visual and conceptual models that strengthen understanding of key mathematical ideas.
- Students will benefit from ongoing diagnostic tools (like the Tower of Power) that identify areas of struggle and provide immediate, targeted support ("Boosts").
- Students should receive additional foundational lessons when needed, helping them build essential skills connected to grade-level content.
- Students will access learning through personalized assignments that allow them to move between grade-level work and targeted support seamlessly and without stigma.
- Students will benefit from teacher monitoring and data reports that guide instructional decisions and provide deeper interventions when necessary.

Unit 6: Exponents, Scientific Notation & Volume

Mission 7: Exponents and Scientific Notation

Mission 5: Volume (Topics D & E)

Desired Results

Essential Questions:

- How do exponent rules, including zero and negative exponents, extend our understanding of powers?
- What patterns and properties explain how exponent operations work and why they are consistent?
- How is the base-ten system represented using powers of 10?
- How does scientific notation help us represent, compare, and understand very large and very small numbers?
- What is order of magnitude, and how does it help describe the scale of quantities?
- How can exponent rules be applied to simplify expressions and solve real-world problems?
- How can volume formulas be compared and generalized across different shapes?
- How do changes in dimensions (like height or radius) impact the volume of a figure?

Enduring Understandings:

Students will understand how to…

Mission 7, Topic A: Exponent Review

- Lesson 1: Exponent Review

Mission 7, Topic B: Exponent Rules

- Lesson 2: Multiplying powers of 10
- Lesson 3: Powers of powers of 10
- Lesson 4: Dividing powers of 10
- Lesson 5: Negative Exponents with powers of 10
- Lesson 6: What about other bases?
- Lesson 7: Practice with Rational Bases
- Lesson 8: Combining Bases

Mission 7, Topic C: Scientific Notation

- Lesson 9: Describing large and small values using powers of 10
- Lesson 12: Applications of arithmetic with powers of 10
- Lesson 13: Definition of scientific notation
- Lesson 14: Multiplying, Dividing, and estimating with scientific notation
- Lesson 15: Adding and Subtracting with Scientific Notation

Mission 7, Topic D: Cylinders and Cones

- Lesson 11: Filling Containers
- Lesson 12: How much will fit (optional)
- Lesson 13: Volume of a cylinder
- Lesson 14: Finding cylinder dimensions
- Lesson 15: Volume of a Cone
- Lesson 16: Finding cone dimensions

Mission 5, Topic E: Dimensions and Spheres

- Lesson 20: Volume of a Sphere
- Lesson 21: Cylinders, Cones, & Spheres

Mission 5, Topic D: Cylinders and Cones

- Lesson 11: Filling Containers
- Lesson 12: How much will fit (optional)
- Lesson 13: Volume of a cylinder
- Lesson 14: Finding cylinder dimensions
- Lesson 15: Volume of a Cone
- Lesson 16: Finding cone dimensions

Mission 5, Topic E: Dimensions and Spheres

- Lesson 20: Volume of a Sphere
- Lesson 21: Cylinders, Cones, & Spheres

Knowledge:

Mission 7 Vocabulary

base (of an exponent), billion, evaluate, expanded, exponent, factor, integer, multiple of, negative exponent, positive exponent, power, powers of 10, powers of powers, reciprocal, repeated multiplication, scientific notation, square (of a number), trillion, zero exponent

Mission 5 Vocabulary

base (of a cylinder or cone), cone, cube, cubic centimeter, cylinder, dimension, hemisphere, radius, rectangular prism, sphere, spherical, three-dimensional, volume

Skills:

Mission 7, Topic A: Exponent Review

- Lesson 1: Compare quantities using expressions that represent repeated multiplication, and comprehend that repeated division of a number is equivalent to repeated multiplication by its reciprocal.

Mission 7, Topic B: Exponent Rules

- Lesson 2: Generalize the exponent rule $10^n \cdot 10^m = 10^{n+m}$ and write equivalent exponential expressions of multiplication expressions with a base of 10.
- Lesson 3: Explain and use a rule for raising a power of 10 to a power, that $(10^n)^m = 10^{n \cdot m}$.
- Lesson 4: Generalize the exponent rule $10^m / 10^n = 10^{n-m}$ and write equivalent exponential expressions of division expressions with a base of 10.
- Lesson 5: Generalize the exponent rule $10^{-n} = 1 / 10^n$ and write equivalent exponential expressions involving negative exponents.
- Lesson 6: Generalize exponent rules for bases other than 10, and use exponent rules to write equivalent exponent expressions for any nonzero base.
- Lesson 7: Use an appropriate exponent rule to rewrite an expression with a single, positive exponent.
- Lesson 8: Generalize a process for multiplying expressions with different bases having the same exponent.

Mission 7, Topic C: Scientific Notation

- Lesson 9: Describe large and small numbers as multiples of powers of 10.
- Lesson 12: Use exponent rules and powers of 10 to solve problems in context.
- Lesson 13: Identify numbers written in scientific notation, and rewrite numbers written in different forms in scientific notation.
- Lesson 14: Multiply and divide numbers in scientific notation, and use scientific notation and estimation to compare quantities.
- Lesson 15: Add and subtract numbers in scientific notation.

Mission 5, Topic D: Cylinders and Cones

- Lesson 11: Gather data of the heights of certain cylinders as a function of volume, graph the relationship, and compare the rates of change of the functions.
- Lesson 12: Estimate the volumes of various containers using different units of measure and explain the reasoning.
- Lesson 13: Calculate the volume of a cylinder.
- Lesson 14: Calculate the value of one dimension of a cylinder and explain the reasoning.
- Lesson 15: Find the volumes of cones and cylinders given their radii and heights, and compare the volumes of a cylinder and cone with the same radius and height.
- Lesson 16: Calculate the value of one dimension of a cone and explain the reasoning.

Mission 5, Topic E: Dimensions and Spheres

- Lesson 20: Find the volume of a sphere given its radius, and explain the relationship between the volumes of a sphere, cone, and cylinder with the same radius and height.
- Lesson 21: Find the volumes of cylinders, cones, spheres, and rectangular prisms.

Standards:

Previous Standards:

- CC.2.1.6.E.1 – Apply and extend previous understandings of arithmetic to algebraic expressions.
- CC.2.1.7.E.1 – Apply and extend previous understandings of operations with rational numbers.
- CC.2.2.7.B.1 – Apply properties of operations to generate equivalent expressions.
- CC.2.2.7.C.1 – Apply and extend previous understandings of operations with rational numbers.
- CC.2.2.7.C.2 – Apply properties of operations to multiply and divide rational numbers.
- CC.2.3.7.A.1 – Solve real-world and mathematical problems involving area, surface area, and volume.
- CC.2.3.7.A.2 – Visualize and represent geometric figures and describe the relationships between them.

8th Grade Core Standards:

- CC.2.1.8.E.1 – Apply the properties of integer exponents to generate equivalent numerical expressions.
- CC.2.2.8.C.1 – Use rational and irrational numbers to solve real-world and mathematical problems.
- CC.2.2.8.C.2 – Apply properties of operations to generate equivalent numerical expressions involving rational and irrational numbers.
- CC.2.3.8.A.1 – Analyze and solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

Acceptable Evidence

Assessments focus on the big ideas of mathematics and allow students to demonstrate their understanding across multiple modalities through a thoughtful balance of software- and paper-based experiences. All assessments are designed to fit into the classroom model and allocated time, and to enhance – rather than distract from – instruction.

Acceptable evidence:

Lesson Components:

- Warm-up
- Fluency
- Guided Practice
- Independent Practice
- Wrap-up

Formative/Summative Assessments:

- **Daily lesson – level assessments:** Lesson – level assessments are embedded into the curriculum and occur as part of recommended daily core instructional time, not in addition to it.
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- **Mission – Level Assessments/Progress Monitoring:** Mission-level assessments with scoring guidance and detailed rubrics are used for consistency and fidelity of program management. Mid-Mission and End-of-Mission assessments are assessments administered roughly halfway through the Mission and at the conclusion of the Mission respectively.
    - Mid-Mission & End-of-Mission
        - Paper assessments consist of open-response items that require students to show their work or explain their thinking in a variety of ways, including drawing models and writing explanations, similar to an Exit Ticket. Some assessment items highlight a student's understanding of a big mathematical idea, while others focus on students' procedural fluency. Each part of any multi-step problem has a clear objective, is aligned with the explicit

expectations of the target standards, and allows teachers to identify whether students are struggling with the foundational math concept or the multi-step aspect of the problem.

- Optional Practice
  - Includes problems from current lessons along with a mix of topics from previous lessons.

Summative Assessment/Progress Checks:
Unit 6:

- Progress Check #1
- Mid – Mission Assessment – Mission 7, Topics A & B – Progress Check #2
- End – of – Mission Assessment – Mission 7, Topics A – D – Progress Check #3
- End – of – Mission Assessment – Mission 5, (no scaling) – Progress Check #4

Suggested Learning Experiences and Instruction

- Students will apply exponent rules (including zero and negative exponents) to simplify expressions and explain their meaning.
- Students will analyze patterns in powers of 10 to justify exponent rules for multiplication, division, and powers of powers.
- Students will represent, compare, and interpret very large and very small numbers using powers of 10 and scientific notation.
- Students will perform operations with numbers in scientific notation and use order of magnitude to reason about scale.
- Students will model and analyze the relationship between height and volume in cylinders using tables, graphs, and equations.
- Students will calculate volume and determine missing dimensions for cylinders, cones, and spheres, explaining their reasoning.
- Students will compare volumes of different three-dimensional figures and recognize relationships between their formulas (e.g., cone vs. cylinder).

Differentiation/Intervention/Enrichment Options:

- Students will benefit from predictable lesson structures and a progression from concrete to abstract learning that supports sense-making and reduces cognitive load.
- Students will engage in both independent thinking and collaboration, building confidence and deepening understanding with peer and teacher support.
- Students will access content through real-world contexts and multiple modalities (aligned to UDL), ensuring meaningful and accessible entry points for diverse learners.
- Students will be supported with embedded scaffolds and structured tools (e.g., guided notes, graphic organizers, checklists) to promote access, participation, and independence.

- Students will utilize accessible design features and assistive technologies (e.g., clear visuals, text-to-speech) to support understanding and engagement.
- Students will learn in flexible, supportive environments with opportunities to use manipulatives, adjust pacing, and revisit content as needed.

For Language Development:

- Students will benefit from explicit instruction and repeated exposure to key mathematical vocabulary, helping them build confidence in using academic language.
- Students will be supported through structured discussion routines (e.g., Think-Pair-Share) that include sentence frames and conversation starters to guide participation.
- Students will engage in meaningful math conversations where they explain their thinking, listen to others, and build on shared ideas.
- Students will be supported by the use of multiple languages when appropriate, allowing them to process mathematical ideas in their first language to deepen understanding.
- Students will access learning through visual supports, models, and teacher-created displays that capture and reinforce important language and concepts.
- Students should participate in structured language routines (such as clarifying responses, comparing strategies, and refining ideas) that strengthen both mathematical reasoning and language development.

For Learners Who Require Further Intervention:

- Students will be supported through built-in, just-in-time scaffolds within digital lessons that connect new learning to prior knowledge and address gaps as they arise.
- Students will receive adaptive support during lessons through visual and conceptual models that strengthen understanding of key mathematical ideas.
- Students will benefit from ongoing diagnostic tools (like the Tower of Power) that identify areas of struggle and provide immediate, targeted support (“Boosts”).
- Students should receive additional foundational lessons when needed, helping them build essential skills connected to grade-level content.
- Students will access learning through personalized assignments that allow them to move between grade-level work and targeted support seamlessly and without stigma.
- Students will benefit from teacher monitoring and data reports that guide instructional decisions and provide deeper interventions when necessary.