

Unit 4: Relationships in Geometry

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **7 weeks**
Status: **Published**

Standards

INTERDISCIPLINARY CONNECTIONS: NEW JERSEY STUDENT LEARNING STANDARDS FOR ELA, SOCIAL STUDIES, SCIENCE AND/OR MATHEMATICS

MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
MA.6.NS.B.2	Fluently divide multi-digit numbers using the standard algorithm.
MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MA.6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
MA.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.1.G.A	Reason with shapes and their attributes.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.
MA.6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.6-8.DA

Data & Analysis

NEW JERSEY STUDENT LEARNING STANDARDS: CAREER READINESS, LIFE LITERACIES AND KEY SKILLS

PFL.9.1.2. FI.1

Differentiate the various forms of money and how they are used (e.g., coins, bills, checks, debit and credit cards).

New Jersey Student Learning Standards: Content Area

Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

SOC.5-8.1.1.1

Construct timelines of the events occurring during major eras including comparative events in world history for the different civilizations.

Unit Rationale

This unit is designed to support students in relationships in geometry. Students will understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane. They will recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. Students will draw polygons in the coordinate plane given coordinates for the vertices and apply these techniques in the context of solving real-world and mathematical problems. Students will compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. Students will find the area of right triangles and other triangle by composing them into rectangles. Students will represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Finally, students will find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism.

Essential Questions

How do mathematicians locate rational ordered pairs on the coordinate plane?

How do mathematicians solve problems by graphing and identifying polygons in the coordinate plane

How do mathematicians find the perimeter and area of polygons on the coordinate plane?

How do mathematicians find the areas of parallelograms, trapezoids, triangles, and composite figures?

How do mathematicians locate rational ordered pairs on the coordinate plane.

How do mathematicians use nets to find surface area?

How do mathematicians find the volume of a rectangular prism?

How do mathematicians write equations to solve problems involving volume of rectangular prisms?

Pre-Assessment

Module 11: Polygons on the Coordinate Plane "Are You Ready?" pg 340

Module 12: Area of Triangles and Special Quadrilaterals "Are You Ready?" pg 376

Module 13: Surface Area and Volume "Are You Ready?" pg 412

Benchmark Assessments

Into Math Benchmark BOY, MOY, and EOY growth measure.

SUMMATIVE/END-OF-UNIT ASSESSMENTS

Module 11: Module 11 Test Form A and Form B

Module 12: Module 12 Test Form A and Form B

Module 13: Module 13 Test Form A and Form B

Instructional Plan

Module 11

Module 11: POLYGONS ON THE COORDINATE PLANE

Lesson 11.1

Student Learning Intentions (SLI) WALT: (We are learning to...)	11.1 We are learning to locate rational ordered pairs on the coordinate plane.
Student Learning Strategies	Identify Ordered Pairs on a Coordinate Plane Use Directions to Find Points on a Coordinate Plane
Success Criteria	I can plot a point with rational number coordinates and locate its reflection over the x- or y-axis, and I

	can use absolute value to find the distance between points with same x- or y-coordinate.
Formative Assessment (drives instructional decisions)	Turn and Talk (pg 341, 342, 343) Check Understanding (pg 342) Exit Ticket (pg TM 346)
Activities and Resources	Warm-Up: Activate Prior Knowledge (TM 341B) Mini-Lesson: Spark Your Learning (pg 341) Build Your Understanding (pg 342-343) Guided Practice: Check Understanding (pg 345) Independent Practice: On Your Own (pg 347-348)
Suggested Modifications	Plan for Differentiated Instruction (TM pg 341C)

MA.6.NS.C.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
MA.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Lesson 11.2

Student Learning Intentions (SLI) WALT: (We are learning to...)	11.2 We are learning to solve problems by graphing and identifying polygons in the coordinate plane.
Student Learning Strategies	Draw a Polygon to Represent the Garden Draw a Rectangle of Given Perimeter
Success Criteria	I can graph polygons on a coordinate plane, classify them, and identify a vertex that completes a specified polygon.

Formative Assessment (drives instructional decisions)	Turn and Talk (pg 349-351) Check Understanding (pg 352) Exit Ticket (pg TM 354)
Activities and Resources	Warm-Up: Activate Prior Knowledge (TM 349B) Mini-Lesson: Spark Your Learning (pg 349) Build Your Understanding (pg 350-352) Guided Practice: Check Understanding (pg 353-354) Independent Practice: On Your Own (pg 355-356)
Suggested Modifications	Plan for Differentiated Instruction (TM pg 349)

MA.6.NS.C.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Lesson 11.3

Student Learning Intentions (SLI) WALT: (We are learning to...)	11.3 We are learning to find the perimeter and area of polygons on the coordinate plane.
Student Learning Strategies	Estimation Visual Model
Success Criteria	I can find the perimeter and area of polygons in the coordinate plane.
Formative Assessment (drives instructional decisions)	Turn and Talk (pg 357-359) Check Understanding (pg 360) Exit Ticket (pg TM 362)

Activities and Resources	<p>Warm-Up: Activate Prior Knowledge (TM 357B)</p> <p>Mini-Lesson: Spark Your Learning (pg 351) Build Your Understanding (pg 357-360)</p> <p>Guided Practice: Check Understanding (pg 361)</p> <p>Independent Practice: On Your Own (pg 363-363)</p>
Suggested Modifications	Plan for Differentiated Instruction (TM pg 357C)

MA.6.NS.C.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
MA.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
MA.6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.
MA.6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Module 12

Module 12: AREA OF TRIANGLES AND SPECIAL QUADRILATERALS

Lesson 12.1

Student Learning Intentions (SLI) WALT: (We are learning to...)	12.1 We are learning to find the areas of parallelograms and trapezoids.
Student Learning Strategies	<p>Draw a Model to Find the Area</p> <p>Use a Grid to Find the Area</p>
Success Criteria	I can use formulas to find areas of parallelograms and trapezoids

Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 377, 378) Check Understanding (pg. 380) Exit Ticket (TM pg. 382)
Activities and Resources	Warm Up: Activate Prior Knowledge (TM pg.377) Mini-Lesson: Spark Your Learning (TM pg. 377) Build Understanding (p. 378-380) Guided Practice: Check Understanding (pg. 380) Independent Practice: On Your Own (pg. 383) Exit Ticket (TM pg. 382) Teacher Resources Into Math Teacher Edition Module 12 & Online Resources
Suggested Modifications	Plan For Differentiated Instruction (TM pg 377C)

MA.6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
MA.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real- world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Lesson 12.2

Student Learning Intentions (SLI) WALT: (We are learning to...)	12.2 We are learning to find the area of triangles.
Student Learning Strategies	Apply Area Formulas and Estimation Apply Area Formulas and Guess and Check
Success Criteria	I can use a formula to find the area of a triangle.

Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 385, 386) Check Understanding (pg. 388) Exit Ticket (TM pg. 390)
Activities and Resources	Warm Up: Activate Prior Knowledge (TM pg. 385A) Mini-Lesson: Spark Your Learning (TM pg. 386) Build Understanding (p. 386-387) Guided Practice: Check Understanding (pg. 389) Independent Practice: On Your Own (pg. 391) Exit Ticket (TM pg. 390) Teacher Resources Into Math Teacher Edition Module 12 & Online Resources
Suggested Modifications	Plan For Differentiated Instruction (TM pg 385C)

MA.6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
MA.6.NS.C.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Lesson 12.3

Student Learning Intentions (SLI) WALT: (We are learning to...)	12.4 We are learning to find the area of composite figures.
Student Learning Strategies	Estimation Guess and Check
Success Criteria	I can find the area of a composite figure by breaking

	it into familiar figures.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 401, 402) Check Understanding (pg. 403) Exit Ticket (TM pg. 405)
Activities and Resources	Warm Up: Activate Prior Knowledge (TM pg. 401) Mini-Lesson: Spark Your Learning (TM pg. 401) Build Understanding (p. 402-403) Guided Practice: Check Understanding (pg. 404) Independent Practice: On Your Own (pg. 405) Exit Ticket (TM pg. 404) Teacher Resources Into Math Teacher Edition Module 12 & Online Resources
Suggested Modifications	Plan For Differentiated Instruction (TM pg 401C)

MATH.6.RP.A.3.c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
MA.6.NS.B.2	Fluently divide multi-digit numbers using the standard algorithm.
MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.1.G.A.2	Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

Module 13

Module 13: SURFACE AREA AND VOLUME

13.2

Student Learning Intentions (SLI) WALT: (We are learning to...)	13.2 We are learning to find the volume of a rectangular prism.
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Student Learning Strategies	Use a Formula to Find Volume and Convert Units Use a Model to Find Volume and Convert Units
Success Criteria	I can use the formulas $V = \ell wh$ or $V = Bh$ to find the volumes of rectangular prisms with fractional edge lengths.
Formative Assessment (drives instructional decisions)	Turn and Talk (pg.421) Check Understanding (pg.423) Exit Ticket (TM pg 424)
Activities and Resources	Warm Up: Activate Prior Knowledge (TM pg. 421B) Mini-Lesson: Spark Your Learning (TM pg. 421D) Build Your Understanding (pg.422-423) Guided Practice: Check Understanding (pg.423) Independent Practice: On Your Own (pg.424) Exit Ticket (TM pg.424) Teacher Resources Into Math Teacher Edition Module 13 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 422C)

MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

13.3

Student Learning Intentions (SLI) WALT: (We are learning to...)	13.3 We are learning to write equations to solve problems involving volume of rectangular prisms.
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Student Learning Strategies	Use a Formula to Find Volume and Convert Units Use a Model to Find Volume and Convert Units
Success Criteria	I can use equations to solve volume problems in which the volume or an edge length of a rectangular prism is unknown.
Formative Assessment (drives instructional decisions)	Turn and Talk (pg.427) Check Understanding (pg.553) Exit Ticket (TM pg 404)
Activities and Resources	Warm Up: Activate Prior Knowledge (TM pg. 427B) Mini-Lesson: Spark Your Learning (TM pg. 427D) Build Your Understanding (pg427-428) Guided Practice: Check Understanding (pg.428) Independent Practice: On Your Own (pg.429) Exit Ticket (TM pg.429) Teacher Resources Into Math Teacher Edition Module 13 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 551C)

MA.6.EE.A.1

Write and evaluate numerical expressions involving whole-number exponents.

MA.1.G.A.1

Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

MA.1.G.A.2

Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

MA.6.EE.A.2c

Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

13.1

Student Learning Intentions (SLI) WALT: (We are learning to...)	13.1 We are learning to use nets to find surface area.
Student Learning Strategies	Write Expressions for Pairs of Identical Faces

	Write an Expression for All Six Faces
Success Criteria	I can use nets to find the surface area of prisms and pyramids.
Formative Assessment (drives instructional decisions)	Turn and Talk (pg.413) Check Understanding (pg.416) Exit Ticket (TM pg 418)
Activities and Resources	Warm Up: Activate Prior Knowledge (TM pg. 413B) Mini-Lesson: Spark Your Learning (TM pg. 413D) Build Your Understanding (pg.414-415) Guided Practice: Check Understanding (pg.416) Independent Practice: On Your Own (pg.417) Exit Ticket (TM pg.413) Teacher Resources Into Math Teacher Edition Module 13 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 413C)

MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.