Unit 3: Numerical and Algebraic Expressions

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

Unit Rationale

This unit is designed to support student's understanding of expressions, equations and inequalities. Students begin to recognize that situations involving repeated multiplication can be represented by writing the factor as a base and the number of repeated factors as the exponent. Students will write and evaluate numerical expressions involving whole-number exponents. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.Evaluate expressions at specific values of their variables. Apply properties of operations to generate equivalent expressions. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. Students construct one-variable equations to represent equalities presented in a real-world context, including additive and multiplicative relationships. Students will apply their experience with equations and expressions to understand the definition of an inequality. Students will identify which variable is the dependent variable and which is the independent variable in a given situation. Students will use variables to represent two quantities in a real-world problem that change in relationship to one another. Finally students will 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.

Essential Questions

How do mathematicians write and find the value of expressions involving exponents?

How do mathematicians write and evaluate numerical expressions?

How do mathematicians write an algebraic expression to represent a situation?

How do mathematicians interpret and evaluate an algebraic expression?

How do mathematicians identify and generate equivalent expressions?

How do mathematicians add, subtract, and factor linear expressions with rational coefficients?

How do mathematicians write an equation to represent a situation?

How do mathematicians solve equations that contain addition and subtraction?

How do mathematicians solve equations that contain multiplication and division?

How do mathematicians write and use one-step equations to represent situations and solve problems?

How do mathematicians write and graph inequalities to represent real-world situations?

How do mathematicians solve one-step equations that involve negative integers, fractions, and decimals?

How do mathematicians represent an equation in a table or graph?

How do mathematicians write an equation given a verbal description of a relationship?

How do mathematicians write an equation using a table or graph?

Standards

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

	Analyzing and Interpreting Data
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.

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.6-8.8.1.8.AP.1	Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.

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

	Money comes in different values, forms, and uses.
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).
TECH.9.4.2.CI	Creativity and Innovation

Pre-Assessment

Module 8: Numerical and Algebraic Expressions "Are You Ready?" pg 232

Module 9: Solve Problems Using Equations and Inequalities "Are You Ready?" pg 272

Module 10: Real-World Relationships Between Variables "Are You Ready?" pg 312

Module 8

Module 8: Numerical and Algebraic Expressions

Lesson 8.1

Student Learning Intentions (SLI) WALT: (We are learning to…)	8.1 We are learning to write and find the value of expressions involving exponents.
Student Learning Strategies	Use a Table to Represent Repeated Multiplication Use a Tree Diagram to Represent Repeated Multiplication
Success Criteria	I can write exponential expressions to represent repeated-multiplication situations, and I can find the value of an exponential expression.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 313-316) Check for Understanding (p. 316)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 313B) & Spark Your Learning (p. 313) **Mini-lesson:** Build Understanding (p. 314-316) **Guided Practice:** Check Understanding (p. 317) **Independent Practice:** On Your Own (p. 319-320) & Exit Ticket (TM p. 318) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 313C)

MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.

Lesson 8.2

Student Learning Intentions (SLI) WALT: (We are learning to…)	8.2 We are learning to Write and evaluate numerical expressions.
Student Learning Strategies	Use Numerical Expressions to Find the Cost Per Adult Use Guess-and-Check
Success Criteria	I can write numerical expressions to represent situations, identify terms in expressions, and use the order of operations to evaluate expressions.

Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 239-241) Check for Understanding (p. 242)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 239B) & Spark Your Learning (p. 239) **Mini-lesson:** Build Understanding (p. 240-242) **Guided Practice:** Check Understanding (p. 242) **Independent Practice**: On Your Own (p. 243) & Exit Ticket (TM p. 244) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 239C)

MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
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.7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts.
MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.6.EE.A.2b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.

Lesson 8.5

Student Learning Intentions (SLI) WALT: (We are learning to…)	8.5 We are learning to identify and generate equivalent expressions.
Student Learning Strategies	Estimation
Success Criteria	I can use properties of operations to generate and identify equivalent algebraic expressions.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 261 & 263) Check for Understanding (p. 263)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 261B) & Spark Your Learning (p. 261) **Mini-lesson**: Build Understanding (p. 261-263) **Guided Practice:** Check Understanding (p. 264) **Independent Practice**: On Your Own (p. 267) & Exit Ticket (TM

	p. 266) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 261C)

MA.6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
MA.6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

Lesson 8.4

Student Learning Intentions (SLI) WALT: **(We are learning to…)**	8.4 We are learning to interpret and evaluate an algebraic expression.
Student Learning Strategies	Estimation
Success Criteria	I can evaluate an algebraic expression for given values of the variables.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 253, 254) Check for Understanding (p. 255)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 253B) & Spark Your Learning (p. 253) **Mini-lesson**: Build Understanding (p. 253-255) **Guided Practice:** Check Understanding (p. 256) **Independent Practice**: On Your Own (p. 259) & Exit Ticket (TM p. 258) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 253C)

MATH.6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams,

or equations.	
MATH.6.RP.A.3.d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
MATH.6.EE.A.2.a	Write expressions that record operations with numbers and with letters standing for numbers.
MATH.6.EE.A.2.c	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).

Lesson 8.3

Student Learning Intentions (SLI) WALT: (We are learning to…)	8.3 We are learning to write an algebraic expression to represent a situation.
Student Learning Strategies	Use Numerical Expressions to Solve Use an Area Model to Solve
Success Criteria	I can write algebraic expressions to represent situations and I can identify variables, coefficients, and constants.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 247, 248) Check for Understanding (p. 249)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 247B) & Spark Your Learning (p. 247) **Mini-lesson:** Build Understanding (p. 248-249) **Guided Practice:** Check Understanding (p. 250) **Independent Practice:** On Your Own (p. 251) & Exit Ticket (TM p.250) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 247C)

MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
MATH.6.EE.A.2.c	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.6 | Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. |

Module 9

Module 9: Solve Problems Using Equations and Inequalities

MA.6.NS.A.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
MA.6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
MA.6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
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.

Lesson 9.3

| Student Learning Intentions (SLI) WALT: (We are learning to…) | 9.3 We are learning to solve equations that contain multiplication and division. |
| Student Learning Strategies | Evaluate Expressions to Construct a Solution
Use a Model to Construct a Solution |

Success Criteria	I can solve one-step multiplication and division equations by applying the same operation to both sides.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 287, 288, 289) Check for Understanding (p. 290)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 287B) & Spark Your Learning (p. 287) **Mini-lesson:** Build Understanding (p. 288-289) **Guided Practice:** Check Understanding (p. 290) **Independent Practice:** On Your Own (p. 293) & Exit Ticket (TM p. 292) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 287C)

MA.6.EE.A.2a	Write expressions that record operations with numbers and with letters standing for numbers.
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.

Lesson 9.4

Student Learning Intentions (SLI) WALT: (We are learning to…)	9.4 We are learning to write and use one-step equations to represent situations and so
Student Learning Strategies	Use a model to construct a solution. Estimation.
Success	I can solve problems by writing and solving one-step equations.

Criteria	
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 295) Check for Understanding (p. 296)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 295B) & Spark Your Learning (p. 295) **Mini-lesson:** Build Understanding (p.295-296) **Guided Practice:** Check Understanding (p. 297-298) **Independent Practice:** On Your Own (p. 299-300) & Exit Ticket (TM p. 298) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 295C)

MA.6.NS.A.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
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.

Lesson 9.2

Student Learning Intentions (SLI) WALT: (We are learning to…)	9.2 We are learning to solve equations that contain addition and subtraction.
Student Learning Strategies	Write Equations to Construct a Solution Use a Model to Construct a Solution
Success	I can solve one-step addition and subtraction equations by applying the same operation to

Criteria	both sides.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 279, 280, 281) Check for Understanding (p. 282)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 279B) & Spark Your Learning (p. 279) **Mini-lesson:** Build Understanding (p. 280-282) **Guided Practice:** Check Understanding (p. 283) **Independent Practice:** On Your Own (p. 285) & Exit Ticket (TM p. 284) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 279C)

MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
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.

Lesson 9.1

Student Learning Intentions (SLI) WALT: (We are learning to…)	9.1 We are learning to write an equation to represent a situation.
Student Learning Strategies	Use a Variable and an Expression to Show Equality Use Examples to Show Equality

Success Criteria	I can write an equation to model a situation and determine whether a given value is a solution of an equation.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 273, 274) Check for Understanding (p. 275)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 271B) & Spark Your Learning (p. 273) **Mini-lesson:** Build Understanding (p. 273-275) **Guided Practice:** Check Understanding (p.276) **Independent Practice:** On Your Own (p. 277) & Exit Ticket (TM p. 276) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 271C)

Lesson 9.5

Student Learning Intentions (SLI) WALT: (We are learning to…)	9.5 We are learning to write, graph and solve inequalities to represent real-world situat
Student Learning Strategies	Estimation Use models to construct inequalities.
Success Criteria	I can solve a one-step equation with negative integers, fractions, and decimals.

Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p.301, 302) Check for Understanding (p. 303)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 301B) & Spark Your Learning (p. 301) **Mini-lesson:** Build Understanding (p. 301-303) **Guided Practice:** Check Understanding (p. 304) **Independent Practice:** On Your Own (p. 307-308) & Exit Ticket (TM p. 306) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 301C)

MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MA.7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
MA.6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
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 10

Module 10: Real-World Relationships Between Variables

Lesson 10.3

Student Learning Intentions (SLI) WALT: (We are learning to…)	10.3 We are learning to write an equation using a table or graph.
Student Learning Strategies	Use Subtraction and Division to Calculate Averages Use a Table to Relate Sizes of Part

Success Criteria	I can use a table or graph to write an equation for a linear relationship.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 327, 328, 329) Check for Understanding (p. 329)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 327B) & Spark Your Learning (p. 327) **Mini-lesson**: Build Understanding (p. 327) and Step it Out (p.328-329) **Guided Practice:** Check Understanding (p. 329) **Independent Practice**: On Your Own (p.333-334) & Exit Ticket (TM p. 331) Teacher Resources: Into Math Teacher Edition Module 10 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 327C)

MA.6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
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.2	Write, read, and evaluate expressions in which letters stand for numbers.
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.A.3	Apply the properties of operations to generate equivalent expressions.
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 10.1

Student Learning Intentions (SLI) WALT:	Student Learning Intentions (SLI) WALT: (We are learning to…)	10.1 We are learning to represer a table or graph.

(We are learning to…)		
Student Learning Strategies	Student Learning Strategies	Use Subtraction and Division to C... Averages Use a Table to Relate Sizes of Pa...
Success Criteria	Success Criteria	I can make a table to represent the... real-world relationship, and I can g... ordered pairs from the table.
Formative Assessment (drives instructional decisions)	Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 313 & 314,... Check for Understanding (p. 316)
Activities and Resources	Activities and Resources	**Warm-up:** Activate Prior Knowledge (T... Your Learning (p. 313) **Mini-lesson:** Build Understanding (p. 31... **Guided Practice:** (p. 317-318) **Independent Practice:** On Your Own (p.... Ticket (TM p. 318) Teacher Resources: Into Math Teacher... Online Resources
Suggested Modifications	Suggested Modifications	Plan for Differentiated Instruction (TM...

MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
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 10.2

Student Learning Intentions (SLI) WALT: (We are learning to…)	10.2 We are learning to write an equation given a... verbal description of a relationship.
Student Learning Strategies	Use Subtraction and Division to Calculate Averages Use a Table to Relate Sizes of Part

Success Criteria	I can make a table to represent the equation for a real-world relationship, and I can graph the ordered pairs from the table.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 321, 322) Check for Understanding (p. 322)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 321B) & Spark Your Learning (p. 321) **Mini-lesson**: Build Understanding (p. 321) and Step it Out (p 322) **Guided Practice:** Check Understanding (p. 322) **Independent Practice**: On Your Own (p. 3323) & Exit Ticket (TM p. 326) Teacher Resources: Into Math Teacher Edition Module 10 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 321C)

MA.6.RP.A.2	Understand the concept of a unit rate a/b associated with a ratio $a{:}b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.
MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
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.

Benchmark Assessment

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

Summative/End of Unit Assessments

Module 8: Module 6 Test Form A and Form B (TM p. 270A)
Module 9: Module 7 Test Form A and Form B (TM p. 310A)
Module 10: Module 8 Test Form A and Form B (TM p. 336A)