Unit 3: Numeric and Algebraic Expressions

Content Area: **Mathematics**
Course(s):
Time Period: **November**
Length: **4-5 weeks**
Status: **Published**

Essential Questions

- How can I use exponents and the order of operations to evaluate a numerical expression?
- How can I write and evaluate algebraic expressions to represent a situation?
- How can I simplify expressions to generate equivalent expressions?

Enduring Understandings

- A whole-number exponent can be used to represent repeated multiplication of a number.
- Any number can be written as its prime factorization. The greatest common factor (GCF) is the greatest factor that two or more whole numbers have in common. The least common multiple (LCM) is the smallest multiple that two or more non-zero whole numbers have in common.
- There is an agreed upon order in which operations are carried out in a numerical expression.
- Algebraic expressions use variables to describe situations in which some of the information is not known. Parts of expressions can be described using words such as term, coefficient, product, and factor.
- The value of an algebraic expressions can be found by replacing the variables with given numbers and doing the calculation that results.
- The distributive property and other properties of operations are used to identify and write equivalent expressions.
- Algebraic expressions can be simplified using the properties of operations to combine like terms and generate equivalent expressions.

Critical Knowledge & Skills

Vocabulary

Base

Evaluate

Exponent

Power

Composite Number

Factor Tree

Greatest Common Factor (GCF)

Least Common Multiple (LCM)

Prime Factorization

Prime Number

Numerical Expression

Algebraic Expression

Coefficient

Term

Variable

Substitution

Equivalent Expressions

Like Term

Simplify

Learning Objectives

- 3-1: Understand and Represent Exponents
    - Write expressions using whole-number exponents to represent real-world and mathematical problems
    - Evaluate expressions with whole-number exponents
- 3-2: Find Greatest Common Factor and Least Common Multiple
    - Find the prime factorization of a whole number
    - Find the GCF and the LMC of two whole numbers
    - Use the GCF and Distributive Property to add
    - Use the GCF and the LCM to solve problems
- 3-3: Write and Evaluate Numerical Expressions
    - Evaluate expressions using the order of operations
    - Insert grouping symbols in a numerical expressions to affect the value of the expressions
- 3-4: Write Algebraic Expressions
    - Write an algebraic expressions to model a problem
    - Write an algebraic expressions from a word phrase
    - Use precise mathematical language when identifying parts of an expression
- 3-5: Evaluate Algebraic Expressions

- Evaluate algebraic expressions, including those with whole numbers, decimals, and fractions.

- 3-6: Generate Equivalent Expressions
  - Write equivalent algebraic expressions
  - Identify equivalent algebraic expressions
  - Justify whether two expressions are equivalent

- 3-7: Simplify Algebraic Expressions
  - Use properties of operations to simplify algebraic expressions by combining like terms

Resources

- Lesson Resources
  - Student Edition
  - Additional Practice Workbook
  - Teaching Resources
    - Reteach to Build Understanding, Additional Vocabulary Support, Build Mathematical Literacy, Enrichment
  - Digital Lesson Courseware
    - Today's Challenge, Visual Learning Animation Plus, Key Concepts, Additional Examples, 3-Act Mathematical Modeling, Online Practice powered by MathXL for School, Virtual Nerd Video Tutorials, Animated Glossary, Digital Math Tools, Online Math Games

- Topic Resources
  - Student's Edition
    - Review What You Know, Build Literacy in Mathematics, Mid-Topic Checkpoint and Performance Task, Topic Review, Fluency Practice Activity, STEM Project
  - Digital Topic Support for Students
    - Math Practice Animations, STEM Project, 3-Act Mathematical Modeling Lesson

Standards

Standards for Mathematical Content

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

Standards for Mathematical Practices

CCSS.Math.Practice.MP1	Make sense of problems and persevere in solving them.
CCSS.Math.Practice.MP2	Reason abstractly and quantitatively.
CCSS.Math.Practice.MP3	Construct viable arguments and critique the reasoning of others.
CCSS.Math.Practice.MP4	Model with mathematics.
CCSS.Math.Practice.MP5	Use appropriate tools strategically.
CCSS.Math.Practice.MP6	Attend to precision.
CCSS.Math.Practice.MP7	Look for and make use of structure.
CCSS.Math.Practice.MP8	Look for and express regularity in repeated reasoning.

INTERDISCIPLINARY CONNECTIONS

Career Readiness, Life Literacies, & Key Skills (CLKS)

Career Readiness, Life Literacies, and Key Skills Practices describe the habits of the mind that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. These practices should be taught and reinforced in all content areas with

increasingly higher levels of complexity and expectation as a student advances through a program of study.

Practices:

Act as a responsible and contributing community members and employee

Attend to financial well-being

Demonstrate creativity and innovation

Utilize critical thinking to make sense of problems and persevere in solving them

Model integrity, ethical leadership and effective management

Use technology to enhance productivity increase collaboration and communicate effectively

Work productively in teams while using cultural/global competence

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option

9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.

9.4.8.IML.2: Identify specific examples of distortion, exaggeration, or misrepresentation of information.

9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b). • 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.

9.4.8.TL.3: Select appropriate tools to organize and present information digitally

Computer Science & Design Thinking (CS & DT)

Computing Systems

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

Data & Analysis

People use digital devices and tools to automate the collection, use, and transformation of data.

8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with

the devices.

8.2.8.NT.1: Examine a malfunctioning tool, product, or system and propose solutions to the problem.

NJSLS Companion Standards Grades 6-8

RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.