# NJDOE MODEL CURRICULUM PROJECT

| CONTENT AREA: Mathematics | GRADE: 6 | UNIT #3 | UNIT NAME: Expressions |
|---|---|---|---|

| STUDENT LEARNING OBJECTIVES | | CORRESPONDING CCSS | |
|---|---|---|---|
| **1** | Use mathematical language to identify parts of an expression. | 6.EE.2 | Read, write, and evaluate expressions in which letters stand for numbers.<br>a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*<br>b. 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. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms*.<br>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*). For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.* |
| **2** | Write and evaluate numerical expressions involving whole number exponents. | 6.EE.1 | Write and evaluate numerical expressions involving whole number exponents. |
| **3** | Read, write, and evaluate expressions in which letters stand for numbers (Including formulas that arise from real-world contexts). | 6.EE.2 | Read, write, and evaluate expressions in which letters stand for numbers.<br>a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*<br>b. 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. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms*.<br>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*). For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.* |

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| **4** | Apply the properties of operations to generate equivalent expressions (Including the distributive property; for example, *express 36 + 8 as 4(9 + 2) and y + y + y = 3y*. | 6.EE.3<br><br>6.NS.4 | Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*<br><br>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. For example, express 36 + 8 as 4 (9 + 2). |
| **5** | Identify when two expressions are equivalent; for example, *Are the two expressions equal? 81 + 18 and 9(9 + 2).* | 6.EE.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). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.* |
| **6** | Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12. | 6.NS.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. For example, express 36 + 8 as 4 (9 + 2). |

**Major Content** **Supporting Content** **Additional Content** (Identified by PARCC Model Content Frameworks). ***Bold type indicates grade level fluency requirements.*** *(Identified by PARCC Model Content Frameworks).*

## Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. **Construct viable arguments and critique the reasoning of others.**
   SLO 5 Listen to arguments of others about the equivalence of two expressions and decide if they make sense. Ask useful questions to clarify.
4. **Model with mathematics.**
   SLOs 1, 2, and 3 Use expressions that arise from real-world context
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. **Look for and express regularity in repeated reasoning.**

***Bold type identifies possible starting points for connections to the SLOs in this unit.***

# Greater Brunswick Charter School Curriculum

**Grade level:** 6 **Subject:** Math **Unit #:** 3

| Day | Topic | SLO | Learning Objectives | Essential Questions | Suggested Student Activities | | Possible Resources |
|---|---|---|---|---|---|---|---|
| | | | | | Whole Group | Small Group / Stations | |
| 1 | Algebraic Expressions | | To determine foundational knowledge of expressions | *What do I already know? When will I use this?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath p.426-428 |
| 2 | Structures of expressions | 1 | To identify and use parts of expressions | *Which mathematical terms match up to parts of an expression?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath p.429-431 |
| 3 | Exponents | 2 | To use exponents to describe values | *How can I write a long multiplication problem in a shortened way?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath 6.1 p.433-440 |
| 4 | Expressions with only numbers | 2 | To use math operation symbols to make and evaluate expressions | *How can I use math rules to evaluate long expressions?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath 6.2 p.441-447 |
| 5 | Expressions with variables | 1, 3 | To include variables for unknown or changing quantities in an expression | *How can using a variable make my expression mean so much more?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath 6.3 p.449-455 |
| 6 | Expressions | 1, 2, 3 | To consolidate new learning in the chapter | *Instead of using the Inquiry Lab on p.457, considering using the reflection pages from the sections just completed to review content and intervene for those struggling.* | | • Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath p.432, 440, 448, 456 |
| 7 | Writing expressions | 3 | To write math expressions to represent words. | *How can I make expressions from words to make it easier to solve a problem?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath 6.4 p.461-467 |
| 8 | Writing expressions | 3 | To write math expressions to represent words. | *How can I make a movie in my mind help me see what is needed in a problem?* | *Completing the Act It Out activity may help students understand the value of visualizing a scenario when trying to solve it. This is possibly best as a whole group activity.* | | GlencoeMath p.469-472 |

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| | | | | | **Whole Group** | **Small Group / Stations** | |
| 9 | Writing and using operations in expressions | | | | | • Independent practice<br>• Intervention as needed<br>• i-Ready | GlencoeMath p.468, 472 |
| 10 | • Review<br>• Assessment | | | | | Assessment | |
| 11 | Greatest common factor | 6 | To find the greatest common factor of two numbers under 100 using prime factorization | *How can I find the largest factor that is common to two numbers?* | *Seeing two numbers as separate terms will help in the upcoming activities.*<br>*I encourage you to use separate division ladders for each number then identify all the prime factors at the end that are common.* | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | KhanAcademyExplanation<br>MathIsFunTediousMethod<br>PoorYTFactorTreeEx<br>BetterfromVirtualNerd<br>UsingDivisionLadders<br>ShorterDivisionLadders<br>WorksheetsYouMake |
| 12 | Least Common Multiple | 6 | To find the least common multiple of two numbers | *How can I find the least common multiple of two numbers by using prime factorization?*<br>*Remember, the only reason to use LCMs is to save the need to reduce at the end of the problem. Many people find it easier to use the greatest multiple then reduce at the end.* | *I encourage you to use separate division ladders for each number then identify all the prime factors at the end that are common and use each once, then include ALL the other factors to find the LCM. Separate division ladders don't require to THINK about COMMON factors until you see them at the end. Any factor can be used to complete each ladder.* | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | LengthyDivisionLadderVid<br>ConciseDivLadMethodVid<br>LCMWorksheetsYouMake |
| 13 | Greatest common factor | 6 | To find the greatest common factor of two numbers under 100 using prime factorization | *Why is the GCF always smaller than the starting numbers?* | *Repeat each lesson so students obtain a CLEAR understanding of the difference between the two concepts.* | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | WorksheetsYouMake |
| 14 | Least Common Multiple | 6 | To find the least common multiple of two numbers | *Why is the LCM always larger than the starting numbers?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | LCMWorksheetsYouMake |

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| | | | | | **Whole Group** | **Small Group / Stations** | |
| 15 | Assessment | 6 | | | | • Assessment | |
| 16 | Evaluating expressions | 4, 5 | To use properties to evaluate expressions. | *How can I simplify expressions?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath 6.5 p.473-479 |
| 17 | Distributive property | 4 | To describe why the distributive property works. | *Why doesn't it make any difference if I multiply before or after I combine two numbers?* | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath p.481-484 |
| 18 | Distributive Property | 4 | To use the distributive property to simplify expressions and find common factors in terms. | • *How can I simplify an expression that has parentheses?*<br>• *How can I write an expression for two factors when two terms have a common factor?* | *Focus on the second objective. It is often the more difficult for students to see.* | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath 6.6 p.485-491 |
| 19 | Factoring | 4 | To find common factors in multiple terms | *How can I write an expression for two factors when two terms have a common factor?* | *Another day to practice this concept, difficult for many students.* | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath p.493-494 |
| 20 | Simplifying expressions with multiple terms | 3, 4, 5 | To simplify expressions to determine equivalency | • *What properties can I use to simplify expressions?*<br>• *How can I recognize the different terms to ensure I simplify correctly?* | Focus on the identification of terms –> that they are separated by + or – signs. | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | GlencoeMath 6.7 p.495-500 |
| 21 | Simplifying expressions with multiple terms | | | | | • Lesson & Guided practice<br>• Independent practice<br>• Intervention<br>• i-Ready | More practice from:<br>Math-Aids<br>HomeSchoolMath<br>Math-Drills (Scroll down to 7, 8) |
| 22 | • Review<br>• Assessment | | | | | Assessment | |

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Word Wall Candidates

| | | | | |
|---|---|---|---|---|
| Algebraic | Expression | Associative Properties | Base | Exponent |
| Coefficient | Term | Commutative Properties | Evaluate | Perfect square |
| Variable | Like terms | Distributive Property | Factoring | Powers |
| Constant | Equivalent expressions | Identity Properties | | |

Authentic Application

Your Goal: To create a number trick and provide the appropriate expression for it. An example of a number trick is here. Of course, you cannot use that one.

Your Role: Creator and purveyor of the number trick.

Your Audience: Anyone you meet.

The Situation: Your team must create a number trick that is comprised of at least eight steps and uses addition, subtraction, multiplication, division, and exponents. Your trick must always end with the same number with which it started or always end with the same number regardless of the starting number.

The Product: You provide:

- The trick as a list of statements describing mathematical steps that must be taken.
- The trick as a mathematical expression

Success criteria: Rubric score 0 to 12.

| Score | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Number of steps to complete the trick | 4 steps | 6 steps | 8 steps | 9 or more steps |
| Operations used | All operations are used at least once | All operations are used at least once while multiplication and division are each used at least twice | All operations are used at least once while multiplication and division are each used twice and exponents are used for the remainder of the operations. | All operations are used at least twice. |
| Function of the trick | The number trick almost works and there is only one mathematical error in the trick that causes it to fail. | The number trick works, but a calculator is needed to complete it. | The number trick works and can be accomplished with pencil and paper math. | The number trick is easy to do with mental math. |