**Native American Community Academy UbD 2.0**

|  |  |  |
| --- | --- | --- |
| **Stage 1 Desired Results** *What are your unit objectives and outcomes?* | | |
| BIG IDEAS   * Equivalence | ***Transfer*** | |
| *Students will be able to independently use their learning to…*  Find an equivalent form of a problem that is easier to solve. | |
| ***Meaning*** | |
| ENDURING UNDERSTANDINGS   1. Two things joined with an equal sign (=) are equivalent to each other. 2. Multiplying or dividing anything by any form of ONE keeps it equivalent even if changes the form. 3. Using a different but equivalent form of something often makes it more useful. | ESSENTIAL QUESTIONS   1. How can we make sure two expressions are equivalent to each other? 2. What are the tools we can use to change an expression into a more useful equivalent form? |
| ***Acquisition*** | |
| *As a result of this unit, students will know…*   * What it means to say two expressions are equivalent * Why using a different form of an expression can make it more useful * What’s so great about the number 1 and how to use it to make life easier | *As a result of this unit, students will be able to…*   * Rewrite expressions and equations while maintaining equivalence * Substitute equivalent expressions in order to solve equations * Add, subtract, multiply and divide algebraic fractions (rational expressions) * Use rules of exponents to simplify expressions |
| COMMON CORE STATE STANDARDS  **Standards and Benchmarks Common Core State Standards (CCSS)**  **Mathematical Practices for Algebra:**  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.  4. Model with mathematics.  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.  **The Real Number System (N-RN)**   1. Rewrite expressions involving radicals and rational exponents using the properties of exponents.   **Seeing Structure in Expressions (A-SSE):**  Interpret the structure of expressions   1. Interpret expressions that represent a quantity in terms of its context.   a. Interpret parts of an expression, such as terms, factors, and coefficients.  b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret P*(1+*r*)n *as the product* *of P and a factor not depending on P.*   1. Use the structure of an expression to identify ways to rewrite it. *For example, see x*4 – *y*4 *as* (*x*2)2 – (*y*2)2, *thus recognizing it as a difference of squares that can be factored as* (*x*2 – *y*2)(*x*2 + *y*2).   Write expressions in equivalent forms to solve problems   1. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.   a. Factor a quadratic expression to reveal the zeros of the function it defines.  b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.  c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression* 1.15t *can be* *rewritten as* (1.151/12)12*t* ≈ 1.01212t *to reveal the approximate equivalent* *monthly interest rate if the annual rate is 15%.*  Rewrite rational expressions   1. Rewrite simple rational expressions in different forms; write *a*(*x*)/*b*(*x*) in the form *q*(*x*) + *r*(*x*)/*b*(*x*), where *a*(*x*), *b*(*x*), *q*(*x*), and *r*(*x*) are polynomials with the degree of *r*(*x*) less than the degree of *b*(*x*), using inspection,   **Creating Equations (A-CED)**  **Create equations that describe numbers or relationships**   1. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm’s law V =IR to highlight resistance R.* | | |

|  |  |
| --- | --- |
| **Stage 2 – Evidence** *How will you assess student learning?* | |
| **Evaluative Criteria** | **Assessment Evidence** |
| Did it work? Do the equivalent forms of an equation yield the same solution? How can you prove it?  Students will be evaluated based on their ability to rewrite an algebraic equation in an equivalent form and demonstrate that it is equivalent.  Also, they will be asked to choose a form of a task that makes it easiest to complete, and will need to explain WHY the equivalent form they chose made the task easier to accomplish. | SUMMATIVE PERFORMANCE TASK(S)  Students will do a presentation (group or individual) of a solution to a realistic problem, showcasing their use of equivalent forms and/or systems of equations. They can choose to represent their findings in a poster presentation, a computer aided graphic presentation, or a write-up including narrative and graphs. |
| Ability to articulate thinking and justify results. | FORMATIVE ASSESSMENT   * Impromptu class presentations throughout the quarter * Cold calling on a daily basis to check understanding * Posters of important concepts * Learning logs to assess how well they understand each section’s essential understandings. * Group quizzes |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Stage 3 – Learning Plan** *What lessons will you teach, and what skills will students master, as a result of this unit?* | | | | | | |
| **Topical EU/EQ**  **For Lesson** | **Unit EU/EQ Alignment** | **Formative Assessment of Lesson** | **Unit Modifications** | **Activities to Support the Lesson** |
| EU: Two things are equivalent if they have equal value.  EQ: How can I tell if two expressions are equivalent | EU 1  EQ 1 | Share solutions to the pattern.  Learning log | Generally: Fewer problems for the slow ones, more for the fast ones. More direct suggestions for those who need it. | QFT: Equivalent Forms – come up with questions.  Extend a pattern and find a way to make a rule for it.  Compare rules that different groups came up with and prove equivalence. |
| EU: Modeling equations can help you find equivalent forms.  EQ: How can I rewrite it? | EU 3  EQ 1, 2 | Have each team present a different strategy as closure. |  | Graph lines and come up with different equations for them depending on how you calculate it.  Use area models and diamond problems to factor; use substitution; notice patterns like difference of squares. |
| EU: Positive integer exponents indicate repeated multiplication  EQ: How can I rewrite an exponential expression? | EU 3  EQ 1, 2 | Game from Math = Love |  | Various activities from internet sources |
| EU: Negative integer exponents indicate repeated division WHICH IS THE SAME AS repeated multiplication by the reciprocal  EQ: Why are those the same? | EU 2, 3  EQ 1, 2 | Group teaching |  | Various activities and practice from internet sources |
| EU: Multiplying and dividing by one changes the form but not the value.  Any fraction with equal numerator and denominator is equal to one.  EQ: What form of one will be useful for rewriting a particular expression? | EU 2, 3  EQ 1, 2 | Ink-Pair-Share on what they know about one.  Learning log to assess individual 2322understanding. |  | Simplifying rational exponential expressions |
| EU: Rational expressions work like fractions.  EQ: How do you multiply and divide rational expressions? | EU 1, 2  EQ 1, 2 | Presentations of strategies for simplifying before multiplying or dividing complex expressions. |  | Have students teach how to multiply and divide fractions. |
| EU: You need common denominators to add or subtract fractions. 3 sandwiches + 2 pizzas is 5 MEALS.  EQ: How can I find the easiest common denominator? | EU 1, 2  EQ 1, 2 | Cold call for understanding of the EU.  Learning log  Time for a quiz on equivalent forms of quadratics. |  | Articulate the use of the “giant one” to create common denominators. |