WAUCONDA SCHOOL DISTRICT 118
UNIT PLANNING ORGANIZER

Subject: Honors Algebra II

Unit: 5 Rational Exponents and Radical Functions

Pacing: 13 days

STAGE 1 – DESIRED RESULTS

Essential Questions:
- **What are the essential rules when performing basic operations and simplification of square roots?**
- **Why might using rational exponents be more efficient?**
- **What are inverse functions and what do they do?**

Big Ideas:
- **A function can be created from existing parent functions using transformations and algebraic modeling.**
- **Radical expressions can be written and simplified in an equivalent form using rational exponents.**
- **Inverse relationships can be utilized to solve radical equations.**
- **Radical equations can be solved by isolating the radical and squaring both sides of the equation. This process may introduce extraneous solutions.**

CCSS (Priority Standards):
- **N-RN.1&2 Extend the properties of exponents to rational exponents.**

1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3)3 = 5(1/3)3 to hold, so (51/3)3 must equal 5.

2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

- **A.SSE.2 Use the structure of an expression to identify ways to rewrite it.**

- **F.BF.4 Find inverse functions.**

b. (+) Verify by composition that one function is the inverse of another.

c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.

- **F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (★)**

b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

- **A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.**

1.

STAGE 2 – EVIDENCE

Concepts (What students need to know)	Performance Tasks (What students will be able to do)	21st Century Skills
● nth Roots ● Properties of Exponents ● Function Operations & Composition of Functions ● Inverse Functions ● Graphing Square Roots & Cube Roots ● Solving Radical Equations	● To evaluate the nth root of real numbers using radical notation. ● To evaluate the nth root of real numbers using rational exponent notation ● To evaluate and simplify expressions involving powers ● To evaluate and simplify expressions involving rational powers. ● To perform operations with functions including power functions. ● To find the inverse of a function, to determine if two functions are inverses, and to determine if an inverse is a function. ● To describe the translations of a square or cube root function from a given function. ● To graph square root and cube root functions. ● To state domain and range for square root and cube root functions ● To solve equations containing radicals or rational exponents.	

Common Formative/Summative Assessments:
- ➢ · Unit 5 Quiz: Rational Exponents & Functions Operations
- ➢ · Unit 5 Test: Rational Exponents & Radical Functions

Interim Assessments (Informal Progress Monitoring checks):
  ➢

Modified Common Assessments:

Modified Interim Assessments:

Suggested Resources/Materials/Informational Texts

Suggested Research-based Effective Instructional Strategies

Identifying Similarities and Differences - The ability to break a concept into its similar and dissimilar characteristics allows students to understand (and often solve) complex problems by analyzing them in a more simple way. Teachers can either directly present similarities and differences, accompanied by deep discussion and inquiry, or simply ask students to identify similarities and differences on their own. While teacher-directed activities focus on identifying specific items, student-directed activities encourage variation and broaden understanding, research shows.

Summarizing and Note Taking - These skills promote greater comprehension by asking students to analyze a subject to expose what's essential and then put it in their own words. According to research, this requires substituting, deleting, and keeping some things and having an awareness of the basic structure of the information presented.

Cues, Questions, and Advance Organizers Cues - Questions, and advance organizers help students use what they already know about a topic to enhance further learning. Research shows that these tools should be highly analytical, should focus on what is important, and are most effective when presented before a learning experience

Cooperative Learning - Research shows that organizing students into cooperative groups yields a positive effect on overall learning. When applying cooperative learning strategies, keep groups small and don't overuse this strategy-be systematic and consistent in your approach.

Reinforcing Effort and Providing Recognition - Effort and recognition speak to the attitudes and beliefs of students, and teachers must show the connection between effort and achievement. Research shows that although not all students realize the importance of effort, they can learn to change their beliefs to emphasize effort.

Taken from: *Marzano's Nine Instructional Strategies for Effective Teaching and Learning*

Academic Vocabulary/ Word Wall	Enrichment/Extensions/ Modifications
Essential Vocabulary: *nth* **Root** **Radical Sign** **Index** **Radicand**	

Rational Exponent Notation **Radical Notation** **Exponent Properties** **Composition** **Domain** **Inverse Function** **Inverse Notation** **Vertical Line Test** **Horizontal Line Test** **Extraneous Solutions**	