**North East School Division Planning Organizer**



**Mathematics 6 - 9**

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| **Stage 1 – Begin With the End in Mind** | | |
| **Big Ideas** (What do we want students to remember 40 years from now?) | | |
| |  |  | | --- | --- | | **Processes** | | | Communication | Connections | | Reasoning | Technology | | Visualization | Problem Solving | | Mental Math and Estimation | |   Powers are a mathematical convention made up to show repeated multiplication. They are also often used so express very large/small numbers. Their properties lead to more efficient ways to do calculations. They’re used in many formulas in science, construction and design. | | |
| **Outcomes** (Circle the verbs or skills, underline the nouns or noun phrases) | | |
| **Strands are: Number (N), Patterns & Relations (P), Shape & Space (SS) and Statistics & Probability (SP)**  **N 9.1 Demonstrate (concretely, pictorially, and symbolically) understanding of powers with integral bases (excluding 0) and whole number exponents including:**   * **representing using powers** * **evaluating powers** * **powers with an exponent of zero** * **solving situational problem** | | |
| **Understandings** (from unwrapped outcomes, **Why** or howit connects to more information) | **Essential Questions** (Questions for deeper understanding that address the ideas and issues students need to think about throughout the unit) (p. 14) (p.20) (Enduring understandings from “unpacked” outcomes in relation to big ideas) | |
| * Powers are used to represent repeated multiplication. * Exponents are included in the order of operations. * Patterns in powers can be used to explain and validate exponent laws. | * What is a power? * Why is the order of operations important? * What patterns develop when the base remains the same but we change the exponents? * What rules or laws can we devise about powers? | |
| **Students need to know:** (**What** concepts and **how** do students need to know from the outcomes?) (What key knowledge and skills will students acquire as a result of this outcome?) (What is the approximate level of Bloom’s Taxonomy of thinking skills?) (outcomes p. 10) | **And be able to do:**(What should they eventually be able to do as a result of such knowledge and skill?) (Indicators, p. 33) | |
| * Vocabulary – power, base, exponent * Powers represent repeated multiplication * How to use a calculator to find the standard form of a power * Vocabulary – Standard form * the importance of brackets * Vocabulary – order of operations (BEDMAS) * **Prerequisite Skill:** operations with integers * Powers using the same base create patterns. * Vocabulary: Zero Exponent Law * When a power is evaluated as +/- (multiplication of integers) * Multiplication facts (mental math) * Exponent Laws * Vocabulary: pwr of a pwr, pwr of a product, pwr of a quotient * Adding/subtracting integers (mental math) | | * Demonstrate the difference between the exponent and base of a power by representing 2 powers with exponent and base interchanged using repeated multiplication or concrete models and describe the result. * Predict which of 2 powers represents the great quantity, explain the reasoning, and verify using technology. * Analyze the role of brackets in powers by using repeated multiplication and generalize the strategies for evaluating powers involving brackets. * Justify why a, a , must equal 1. * Predict whether the value of a given pattern will be positive or negative. * Evaluate powers with integral bases and whole number exponents with or without the use of technology * Generalize, using repeated multiplication to represent powers, the exponent laws of powers * Apply the exponent laws to expressions involving powers and determine the quantity represented by the expression, with or without the use of technology. * Prove by contradiction that there are not exponent laws for adding/subtracting powers even with the same base. * Describe and apply strategies for evaluating sums or differences of powers. * Analyze a simplification of an expression involving powers for errors. |