Grade 8 Math Unit 7

Canterbury Public Schools

Subject	Math
Grade Level	8
Unit Title	**Exponents and Scientific Notation**
Unit Goals	1. **Extend Exponent Rules**: Understand and apply the properties of exponents (multiplication, division, and power of a power) to generate equivalent numerical expressions, extending from whole-number exponents to all integer exponents. 2. **Work with Base-Ten and Powers:** Use powers of 10 to understand, compare, and compute with large and small numbers. 3. **Master Scientific Notation:** Understand the definition of scientific notation, convert numbers to and from scientific notation, and use it to estimate and represent very large or very small quantities. 4. **Perform Operations with Scientific Notation:** Compute (multiply, divide, add, and subtract) with numbers expressed in scientific notation. 5. **Interpret Orders of Magnitude:** Use exponents to understand orders of magnitude and compare quantities.
Pacing (# of weeks)	4 - 5 weeks
Standards	8.EE.A.1,8.EE.A.3, 8.EE.A.4, 8.NS.A.1, 8.NS.A.2,
Content/Conceptual Knowledge (know)	Laws of exponents Scientific notations Square roots and cube roots Rational vs irrational numbers Order of magnitude
Skills (be able to do)	• Simplify expressions with integer exponents using exponent rules (product, quotient, power). • Recognize that any non-zero number to the power of 0= 1 and that negative exponents represent reciprocals or repeated division. • Rewrite numbers in scientific notation and standard decimal form. • Compare and estimate very large or small quantities using powers of 10. • Multiply, divide, add, and subtract numbers written in scientific notation. • Critique and identify common mistakes in applying exponent rules • Represent very large and very small numbers on a number line.
Essential Questions	• How can we use exponent rules to simplify numerical and algebraic expressions? • What does a zero or negative exponent mean? • How does scientific notation allow us to represent and compare extremely large or small numbers?

<table>
<tr><td></td><td>

- How do we perform operations (multiplication, division, addition, subtraction) using scientific notation?
- When is it appropriate to use scientific notation instead of standard decimal notation?

</td></tr>
<tr><td>Enduring Understandings</td><td>Exponents and scientific notation provide efficient ways to represent and analyze quantities
Irrational numbers extend the number system beyond fractions and decimals</td></tr>
<tr><td>Vocabulary</td><td>Exponent, base, power, scientific notation, standard form, irrational number, rational number, square root, cube root</td></tr>
<tr><td>Common Learning Experiences</td><td>Notice and wonder with large and small quantities
Card sorts
real -world problem solving
Number line estimation activities</td></tr>
<tr><td>Assessments</td><td>Assessment Map
<table>
<tr><th>Type</th><th>Level</th><th>Assessment Detail</th></tr>
<tr><td>Practice</td><td>Knowledge</td><td>Classwork & Homework</td></tr>
<tr><td>Formative</td><td>Skill</td><td>Daily Cool Downs</td></tr>
<tr><td>Summative</td><td>Product</td><td>Unit Checkpoints & Tests</td></tr>
</table>
</td></tr>
<tr><td>Student Resources</td><td>Place value charts
Number lines
calculator</td></tr>
<tr><td>Teacher Resources</td><td>Anchor charts
assessments</td></tr>
</table>