Unit 1 - The Number System

Content Area: **Mathematics**
Course(s):
Time Period: **September**
Length: **6-8 weeks**
Status: **Published**

Unit Overview

Unit 1 focuses on content from the **Number System** (NS) domain and addresses the following grade 8 standards: 8.NS.1, 8.NS.2, 8.EE.1, 8.EE.2, 8.EE.3, 8.EE.4.

The Mathematical Practices embedded throughout the unit are:

1. Make sense of problems and persevere in solving them.
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.

Essential Questions

"Why is it helpful to write numbers in different ways?"

"How can you determine if a number is a rational number?"

"How can I write repeated multiplication using powers?"

"How can I use the properties of integer exponents to simplify algebraic and numeric expressions?"

"How does the Product of Powers law apply to finding the power of a power?"

"How are negative exponents and positive exponents related?"

"How is scientific notation useful in the real world?"

"How does scientific notation make it easier to perform computations with very large or very small numbers?"

"Why would I need to use square roots and cube roots?"

"How can I estimate the square root of a non-perfect square?"

How are real numbers different from irrational numbers?"

Content

Rational Numbers

Powers and Exponents

Multiply and Divide Monomials

Powers of Monomials

Negative Exponents

Scientific Notation

Computer with Scientific Notation

Roots

Estimate Roots

Compare Real Numbers

Skills

Simplify real number expressions using integer exponents and laws of exponents.

Use scientific notation to write large and small numbers and vice versa.

Estimate square and cube roots and use them to solve problems.

Make reasonable estimates of roots to compare expressions.

Assessments

Self-Check Quiz

Chapter Tests

Online Standardized Test Practice

Chapter Project

Teacher Observation

Lessons/Learning Scenarios

Glencoe Math Course 3 Text

Chapter 1 Lessons 1-10

Standards

CCSS.Math.Content.8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions.
CCSS.Math.Content.8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
CCSS.Math.Content.8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
CCSS.Math.Content.8.EE.A.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
CCSS.Math.Content.8.NS.A.1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
CCSS.Math.Content.8.NS.A.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).

Resources
Glencoe Math, Course 3, McGraw-Hill, 2013

graphing calculator