Unit 1a-Real Numbers

Content Area: **Math**
Course(s): **Math 8 Gen Ed**
Time Period: **Marking Period 1**
Length: **Wk 2-6 Envisions Mathematics Topic 1**
Status: **Published**

Essential Questions

- What are real numbers?
- How are real numbers used to solve problems?

Big Ideas

- Work with radicals and integer exponents.
- Know that there are numbers that are not rational, and approximate them by rational numbers.

Cross Curricular Integration

Integration area: Science

MS-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

MS-ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Activity: Students will represent the depletion rate of natural resources in a table and graph. They will explore other natural resources and describe their uses, depletion rates, and impact on the environment. Students will write a report focusing on the sustainability of a natural resource.

Enduring Understandings

The Number System

8.NS.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.

8.NS.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., π2). For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.

8.NS.3 Understand that the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of nonzero rational numbers and an irrational number is irrational.

Expressions and Equations

8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32 × 3–5 = 3–3 = 1/33 = 1/27.

8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number.

8.EE.2a Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.

8.EE.2b Simplify numerical radicals, limiting to square roots (i.e non perfect squares) For example, simplify 8 to 22

8.EE.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. For example, estimate the population of the United States as 3 times 108 and the population of the world as 7 times 109, and determine that the world population is more than 20 times larger.

8.EE.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.

CSDT Technology Connection

8.1.8.DA.1: Organize and transform data collected using computational tools to make it usable for a specific purpose

Mathematical Practices Focus

1. Make sense of problems and persevere in solving them. Lesson 2, 3, and page 65
2. Reason abstractly and quantitatively. Lesson 1, 3, 4, 5, 7, and page 65
3. Construct viable arguments and critique the reasoning of others. Lesson 2, 3, 4, 5, 6, 7, 8, 9,10, and page 65
4. Model with mathematics. Lesson 3, 6, and page 65
5. Use appropriate tools strategically. Lesson 9
6. Attend to precision. Lesson 1, 5, 7, 8, 10
7. Look for and make use of structure. Lesson 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and page 65
8. Look for and express regularity in repeated reasoning. Lesson 2, 4, 5, 9, and page 65