Richmond Public Schools
Curriculum Framework
Grade 7 Honors (7/8)

Strand: Measurement and Geometry

8.1   **The student will compare and order real numbers.**
7.1   **The student will**
        b) compare and order numbers greater than zero written in scientific notation;*
        c) compare and order rational numbers;*

Suggested Pacing

Related Standards	

Spiral Down:
5th Grade:
   ● SOL 5.2b
6th Grade:
   ● SOL 6.2b
   ● SOL 6.3a-c
	Spiral Up:

Essential Questions	Common Misconceptions
● How can we locate rational numbers on a number line? ● What strategies are used to convert rational numbers into equivalent forms? ● How do I use concrete materials and drawings to understand and show understanding of fractions?	● Converting between fractions/decimals/percents: students get confused about when to perform which steps (ie. move the decimal right or left when converting from decimal to percent or numerator divided by denominator, which number goes first)

Understanding the Standard	Essential Knowledge and Skills
SOL 8.1: ● Real numbers can be represented as integers, fractions (proper or improper), decimals, percents, numbers written in scientific notation, radicals, and π. It is often useful to convert numbers to be compared	SOL 8.1: ● Compare and order no more than five real numbers expressed as integers, fractions (proper or improper), decimals, mixed numbers, percents, numbers written in scientific notation, radicals, and π.

and/or ordered to one representation (e.g., fractions, decimals or percents).

- Proper fractions, improper fractions, and mixed numbers are terms often used to describe fractions. A proper fraction is a fraction whose numerator is less than the denominator. An improper fraction is a fraction whose numerator is equal to or greater than the denominator. An improper fraction may be expressed as a mixed number. A mixed number is written with two parts: a whole number and a proper fraction (e.g., $3\frac{5}{8}$). Fractions can have a positive or negative value.

- The density property states that between any two real numbers lies another real number. For example, between 3 and 5 we can find 4; between 4.0 and 4.2 we can find 4.16; between 4.16 and 4.17 we can find 4.165; between 4.165 and 4.166 we can find 4.1655, etc. Thus, we can always find another number between two numbers. Students are not expected to know the term *density property* but the concept allows for a deeper understanding of the set of real numbers.

- Scientific notation is used to represent very large or very small numbers.

- A number written in scientific notation is the product of two factors: a decimal greater than or equal to one but less than 10 multiplied by a power of 10 (e.g., $3.1 \times 10^5 = 310{,}000$ and $3.1 \times 10^{-5} = 0.000031$).

- Any real number raised to the zero power is 1. The only exception to this rule is zero itself. Zero raised to the zero power is undefined.

- The set of rational numbers includes the set of all numbers that can be expressed as fractions in the form $\frac{a}{b}$ where a and b are integers and b does not equal zero. The decimal form of a rational number can be expressed as a terminating or repeating decimal. A few examples of rational numbers are: $\sqrt{25}$, $\frac{1}{4}$, -2.3, 82, 75%, $4.\overline{59}$.

- Rational numbers may be expressed as positive and negative fractions or mixed numbers, positive and negative decimals, integers and percents.

- Proper fractions, improper fractions, and mixed numbers are terms often used to describe fractions. A proper fraction is a fraction whose numerator is less than the denominator.
  An improper fraction is a fraction whose numerator is equal to or greater

Radicals may include both positive and negative square roots of values from 0 to 400. Ordering may be in ascending or descending order.

- Use rational approximations (to the nearest hundredth) of irrational numbers to compare and order, locating values on a number line. Radicals may include both positive and negative square roots of values from 0 to 400 yielding an irrational number.

- SOL 7.1b, c:

  - Convert between numbers greater than 0 written in scientific notation and decimals. (b)

  - Compare and order no more than four numbers greater than 0 written in scientific notation. Ordering may be in ascending or descending order. (b)

  - Compare and order no more than four rational numbers expressed as integers, fractions (proper or improper), mixed numbers, decimals, and percents. Fractions and mixed numbers may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place. Ordering may be in ascending or descending order. (c)

than the denominator. An improper fraction may be expressed as a mixed number. A mixed number is written with two parts: a whole number and a proper fraction (e.g., $3\frac{5}{8}$). Fractions can be positive or negative.

- Equivalent relationships among fractions, decimals, and percents may be determined by using concrete materials and pictorial representations (e.g., fraction bars, base ten blocks, fraction circles, colored counters, cubes, decimal squares, shaded figures, shaded grids, number lines and calculators).

- Negative numbers lie to the left of zero and positive numbers lie to the right of zero on a number line.

- Smaller numbers always lie to the left of larger numbers on the number line.

SOL 7.1b,c

- Percent means "per 100" or how many "out of 100"; percent is another name for hundredths.

- A percent is a ratio in which the denominator is 100. A number followed by a percent symbol (%) is equivalent to that number with a denominator of 100 (e.g., $\frac{3}{5}$ = $\frac{60}{100}$ = 0.60 = 60%).

- Scientific notation should be used whenever the situation calls for use of very large or very small numbers.

- A number written in scientific notation is the product of two factors — a decimal greater than or equal to 1 but less than 10, and a power of 10

  (e.g., 3.1×10^5= 310,000 and 2.85×10^{-4} = 0.000285).

- The set of integers includes the set of whole numbers and their opposites, {…-2, -1, 0, 1, 2…}. Zero has no opposite and is neither positive nor negative.

Vocabulary	Instructional Activities Organized by Learning Objective
SOL 8.1:	Textbook

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Fraction	Decimal	Percent
Proper Fraction	Improper Fraction	Mixed Number
Real Number	Scientific Notation	Exponent
Base Number	Radical	Pi (π)

SOL 7.1b,c:

Compare	Order	Scientific Notation
Ascending	Descending	Negative
Positive		

Notes

Resources
- Print
- Technology-based

Station Activities

Assessment

Cross-Curricular Connections	**Tiered Differentiations**