Richmond Public Schools
Curriculum Framework
Grade 6 Honors (6/7)

Strand: Measurement and Geometry

6.2   **The student will**
      a) represent and determine equivalencies among fractions, mixed numbers, decimals, and percents;* and
      b) compare and order positive rational numbers.*
 	
      *On the state assessment, items measuring this objective are assessed without the use of a calculator.
 7.1   **The student will**
      c) compare and order rational numbers;*

Suggested Pacing

Related Standards

Spiral Down:
 4th Grade:
    ● SOL 4.4 d
    ● SOL 4.5 c
    ● SOL 4.6 b
 5th Grade:
    ● SOL 5.4
    ● SOL 5.5
    ● SOL 5.6
	Spiral Up:
	 8th Grade:
	    ● SOL 8.4

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? ● How can I explain how changing the size of the whole affects the size or amount of a fraction?	● Converting mixed fractions to improper fractions: students get confused about when and what numbers to multiply and add ● 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 6.2:

- Fractions, decimals and percents can be used to represent part-to-whole ratios.

  - Example: The ratio of dogs to the total number of pets at a grooming salon is 5:8. This implies that 5 out of every 8 pets being groomed is a dog. This part-to-whole ratio could be represented as the fraction $\frac{5}{8}$ ($\frac{5}{8}$ of all pets are dogs), the decimal 0.625 (0.625 of the number of pets are dogs), or as the percent 62.5% (62.5% of the pets are dogs).

- Fractions, decimals, and percents are three different ways to express the same number. Any number that can be written as a fraction can be expressed as a terminating or repeating decimal or a percent.

- 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, number lines, colored counters, cubes, decimal squares, shaded figures, shaded grids, or calculators).

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

- A number followed by a percent symbol (%) is equivalent to a fraction with that number as the numerator and with 100 as the denominator (e.g., 30% = $\frac{30}{100}$ = $\frac{3}{10}$; 139% = $\frac{139}{100}$).

- Percents can be expressed as decimals (e.g., 38% = $\frac{38}{100}$ = 0.38; 139% = $\frac{139}{100}$ = 1.39).

- Some fractions can be rewritten as equivalent fractions with denominators of powers of 10, and can be represented as decimals or percents (e.g., $\frac{3}{5}$ = $\frac{6}{10}$ = $\frac{60}{100}$ = 0.60 = 60%). Fractions, decimals, and percents can be represented by using an area model, a set model, or a measurement model. For example, the fraction $\frac{1}{3}$ is shown below using each of the three models.

SOL 6.2:

- Represent ratios as fractions (proper or improper), mixed numbers, decimals, and/or percents. (a)

- Determine the decimal and percent equivalents for numbers written in fraction form (proper or improper) or as a mixed number, including repeating decimals. (a)

- Represent and determine equivalencies among decimals, percents, fractions (proper or improper), and mixed numbers that have denominators that are 12 or less or factors of 100. (a)

- Compare two percents using pictorial representations and symbols (<, ≤, ≥, >, =). (b)

- Order no more than four positive rational numbers expressed as fractions (proper or improper), mixed numbers, decimals, and percents (decimals through thousandths, fractions with denominators of 12 or less or factors of 100). Ordering may be in ascending or descending order. (b)

SOL 7.1 c:

- 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)

- Percents are used to solve practical problems including sales, data description, and data comparison.

- 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 positive rational numbers are : $\sqrt{25}$, 0.275, $\frac{1}{4}$, 82, 75%, $\frac{22}{5}$, $4.\overline{59}$.

- Students are not expected to know the names of the subsets of the real numbers until grade eight.

- 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., $3\frac{5}{8}$).

- Strategies using 0, $\frac{1}{2}$ and 1 as benchmarks can be used to compare fractions.

  - Example: Which is greater, $\frac{4}{7}$ or $\frac{3}{9}$? $\frac{4}{7}$ is greater than $\frac{1}{2}$ because 4, the numerator, represents more than half of 7, the denominator. The denominator tells the number of parts that make the whole. $\frac{3}{9}$ is less than $\frac{1}{2}$ because 3, the numerator, is less than half of 9, the denominator, which tells the number of parts that make the whole. Therefore, $\frac{4}{7}$ > $\frac{3}{9}$.

- When comparing two fractions close to 1, use the distance from 1 as your benchmark.

  - Example: Which is greater, $\frac{6}{7}$ or $\frac{8}{9}$? $\frac{6}{7}$ is $\frac{1}{7}$ away from 1 whole. $\frac{8}{9}$ is $\frac{1}{9}$ away from 1 whole. Since,

$\frac{1}{9} < \frac{1}{7}$, then $\frac{6}{7}$ is a greater distance away from 1 whole than $\frac{8}{9}$. Therefore, $\frac{6}{7} < \frac{8}{9}$.

- Some fractions such as $\frac{1}{8}$, have a decimal representation that is a terminating decimal
  (e. g., $\frac{1}{8} = 0.125$) and some fractions such as $\frac{2}{9}$, have a decimal representation that does not terminate but continues to repeat (e. g., $\frac{2}{9} = 0.222\ldots$). The repeating decimal can be written with ellipses (three dots) as in 0.222… or denoted with a bar above the digits that repeat as in $0.\overline{2}$.

SOL 7.1c:

- 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 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).

Vocabulary	Instructional Activities Organized by Learning Objective
SOL 6.2	Textbook

Fraction	Mixed Number	Decimal
Proper Fraction	Improper Fraction	Simplest Form
Rational Numbers	Terminating Decimals	Repeating Decimals
Percent	Square Root	

Textbook

Notes

Resources
- Print

SOL 7.1c		

Compare	Order	Positive
Negative	Ascending	Descending

- Technology-based

Station Activities

Assessment

Cross-Curricular Connections	**Tiered Differentiations**