Richmond Public Schools

Curriculum Framework

Grade 6

Strand: Number and Number Sense
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. (6.2a and b)
Suggested Pacing
Second Nine Weeks- 8 instructional days

Related Standards	
3.2 The student will a) name and write fractions and mixed numbers represented by a model; b) represent fractions and mixed numbers with models and symbols; and c) compare fractions having like and unlike denominators, using words and symbols (>, <, =, or ≠), with models.	**6.1** The student will investigate relationships between quantities using ratios, and will use appropriate notations such as a/b, a to b, and a:b.
4.2 The student will a) compare and order fractions and mixed numbers, with and without models; b) represent equivalent fractions; and c) identify the division statement that represents a fraction, with models and in context **4.3** The student will c) compare and order decimals; and d) given a model, write the decimal and fraction equivalents.	**7.1** The student will a) investigate and describe the concept of negative exponents for powers of ten; b) compare and order numbers greater than zero written in scientific notation;* c compare and order rational numbers;* **8.1** The student will compare and order real numbers.

4.5 The student will a) determine common multiples and factors, including least common multiple and greatest common factor. **5.2** The student will a) represent and identify equivalencies among fractions and decimals, with and without models; and b) compare and order fractions, mixed numbers, and/or decimals in a given set, from least to greatest and greatest to least.	
Essential Questions	**Common Misconceptions**
6.2a ● How can a model help show the relationship between equivalent fractions, decimals, and percents? ● When shopping, how can knowing the equivalent form of a fraction, decimal and percents help when calculating a price? Traveling? ● When is it best to use a fraction? When is it best to use a decimal? When is it best to use a percent? ● What is the relationship between rational numbers and their location on the number line? **6.2b** ● How can you demonstrate that one percent is greater than another? (Example: 58% is greater than 55.8%) ● How can I determine whether a number is equivalent to, greater than, less than another number?	Students still look at fractions as two different whole numbers instead of one rational number. Students do not understand place value. For example, " 0.03" students will read this decimal as 3/10 instead of 3/100. Decimals are two independent sets of whole numbers separated by a decimal point. This often leads to incorrectly ordering decimals. For example, to think that 0.67 is bigger than 0.8

● How can knowing where ¼, ½ and ¾ are located on a number line help me find the approximate location of other numbers on the number line? ● How can we tell if two rational numbers are equal? ● How do I explain the meaning of a fraction and its numerator and denominator, and use my understanding to represent and compare fractions? ● What are the possible comparisons of any TWO numbers? ● How is it possible to compare/order numbers that are represented in different formats?	
Understanding the Standard	**Essential Knowledge and Skills**
● 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 58(58 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.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ● 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)

- 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% = 30100 = 310 ; 139% = 139100).
- Percents can be expressed as decimals (e.g., 38% = 38100 = 0.38; 139% = 139100 = 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., 35 = 610 = 60100 = 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 13 is shown below using each of the three models.

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

- 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)

• The set of rational numbers includes the set of all numbers that can be expressed as fractions in the form ab 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: 25, 0.275, 14, 82, 75%, 225, 4.59. • 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., 358). • Strategies using 0, 12 and 1 as benchmarks can be used to compare fractions. • Example: Which is greater, 47 or 39? 47 is greater than 12 because 4, the numerator, represents more than half of 7, the denominator. The denominator tells the number of parts that make the whole. 39 is less than 12 because 3, the numerator, is less than half of 9, the denominator, which tells the number of parts that make the whole. Therefore, 47 > 39. • When comparing two fractions close to 1, use the distance from 1 as your benchmark.	

- Example: Which is greater, 67 or 89? 67 is 17 away from 1 whole. 89 is 19 away from 1 whole. Since,19 < 17, then 67 is a greater distance away from 1 whole than 89. Therefore, 67 < 89.

Some fractions such as 18, have a decimal representation that is a terminating decimal (e. g., 18=0.125) and some fractions such as 29, have a decimal representation that does not terminate but continues to repeat (e. g., 29 = 0.222…). 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 0.2.

Vocabulary

ratio	improper fraction
mixed number	simplify
decimal	percent
ascending	compare
comparison	rational numbers
tenths	area model
hundredths	thousandths
denominator	numerator

Instructional Activities Organized by Learning Objective

Textbook
Eureka:

Eureka Grade	Module	Topic	Lesson(s)
6	1	D	24-25

Virginia Math Connects, Course 1, ©2012, Glencoe/McGraw-Hill
page(s) 210 -213 (Percents as Fractions)
214 – 217 (Fractions as Percents)
218 – 221 (Percents and Decimals)
227 – 241 (Compare and Order Fractions, Decimals, and Percents)
Extra Practice page –EP 9 – 11 Lessons 4-1, 4-2, and 4-3

Notes
6.2 Fractions, Decimal and Percent Interactive Notes

Resources
- Print

repeating decimal	terminating decimal
convert	order
thousandths	proper fraction

Assessment

Coach book, 6th Grade Virginia Gold Edition
6.2a – page(s) 20 – 25 (also includes ratios)
6.2b and 6.2c 12 - 19
6.2d - page(s) 26 – 32

Eureka - Fractions, Decimal, Percent Lesson 1
- Technology-based

Interactive Sites for Education: Fractions
Study Jams: Decimals, Fractions, and Percent Equivalents
Gizmos: Fraction, Decimal, Percent (Area and Grid Models)

Station Activities
See SOL 6.2 Folder for additional activities

Cross-Curricular Connections

Fraction, decimal, and percent scenarios can be embedded into everyday scenarios that students encounter.For example, students can calculate their own grade on a quiz by converting the fraction to a decimal then a percent. Another example is having students calculate statistics for their favorite sports team or player.

Tiered Differentiations

Suggested manipulatives: number lines, base ten blocks, fraction bars, fraction circles, pattern blocks, square tiles, grid paper.

- When ordering and comparing positive rational numbers, give students ample time to use benchmarks, number lines and pictorial representations before having them convert to the same representation.
- Using the digits 5, 6, 7, and 8, construct as many true fractions sentences as possible,
- Use the internet, newspapers and magazines to connect the real world to equivalent fractions, decimals, and percents
- Use statistics from major and minor league sports to make comparisons.

	• Clothesline activity- create cards with varying rational numbers. Hand students a card and have them place the card on a clothesline in the front of the room. • Encourage the use of 0 ½ 1 as a reference point for placement. • Create a card matching game. Students need to match the equivalent fraction, decimal, and picture (include - area, set, and length model).