Richmond Public Schools

Curriculum Framework

Grade 8

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Strand: Number and Number Sense	
8.2 The student will describe the relationships between the subsets of the real number system.	
Suggested Pacing	
Second Nine Weeks – 5 Instructional Days (including common assessment)	
Related Standards	
Spiral Down **6.3** The student will a) identify and represent integers	**Spiral Up** **No Algebra I Spiral*
Essential Questions	**Common Misconceptions**
How are the real numbers related? *Some numbers can appear in more than one subset, e.g. 4 is an integer, a whole number, a counting, or natural number and a rational number. The attributes of one subset can be contained in whole or in part in another subset.*	• Students do not recognize that real numbers can belong to more than one subset. • Students need more practice comparing and contrasting subsets of real numbers i.e. Venn Diagrams. • Students should practice comparing subset expressed as verbal statements.
Understanding the Standard	**Essential Knowledge and Skills**
• The subsets of real numbers include natural numbers (counting numbers), whole numbers, integers, rational and irrational numbers. • Some numbers can belong to more than one subset of the real numbers (e.g., 4 is a natural number, a whole number, an integer, and a rational number). The attributes of one subset can be contained in whole or in part in another subset. The relationships between the subsets of the real number system can be illustrated using graphic organizers (that may include, but not	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Describe and illustrate the relationships among the subsets of the real number system by using representations (graphic organizers, number lines, etc.). Subsets include rational numbers, irrational numbers, integers, whole numbers, and natural numbers.

be limited to, Venn diagrams), number lines, and other representations. • The set of natural numbers is the set of counting numbers {1, 2, 3, 4...}. • The set of whole numbers includes the set of all the natural numbers and zero {0, 1, 2, 3…}. • 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. • 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, 75%, and $4.\overline{59}$. • The set of irrational numbers is the set of all nonrepeating, nonterminating decimals. An irrational number cannot be written in fraction form (e.g., π, $\sqrt{2}$, 1.232332333…). • The real number system is comprised of all rational and irrational numbers.	• Classify a given number as a member of a particular subset or subsets of the real number system, and explain why. • Describe each subset of the set of real numbers and include examples and non-examples. • Recognize 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 a nonzero rational number and an irrational number is irrational.
Vocabulary	**Instructional Activities Organized by Learning Objective**
Set Subset Real Number System Real Number Whole Number Integer	**Virginia Department of Education** Organizing Numbers – Lesson Plan **Textbook** *Virginia Pre-Algebra, ©2012, Glencoe/McGraw-Hill* • Rational Numbers, page(s) 130 – 135(in part)

Natural Number
Irrational Number
Rational Number
Terminating Decimal
Repeating Decimal
Counting Number
Non-example

Assessment

RPS PowerSchool Unit Test – RPS 8.2 Common Assessment
Test ID#:

Formative Assessments
White Board Checks
Kahoot.it
Plickers
Exit Tickets
Graphic Organizers
Venn Diagrams

- The Real Number Systems, page(s) 565 – 570(in part)

Notes
- The Real Number System

Resources
- **Print**
  Virginia Coach, NEW SOL Edition, Grade 8, Mathematics
  Lesson 3 – page 18 (Real Numbers)

- **Technology-based**
  - *Exchange.Smarttech.com (SmartBoard)* – Classifying Real Numbers – SMART Notebook Lesson **SMART Board required*
  - *Youtube.com* – Number Types (Math Song) – Instructional Resource
  - *Quia.com* – Rags to Riches – Review game

Station Activities
- Sort - Have students sort cards with real numbers into their appropriate subgroups.
- Carousel - Have students walk around the class and answer questions about real numbers posted around the classroom.
- Foldable - Have students create a foldable, describing characteristics, providing examples, and relationships.
- Integers Sorting Activity

Cross-Curricular Connections

English
Have students write a summary to explain how the food chain is similar to the real number system.

Differentiations

- Use different colors of paper to help students distinguish the different subsets of numbers or use paint swatches.
- Use Venn Diagrams to explain vocabulary terms and show how subsets are related. Have students create their own Venn Diagram to show how subset are related.

Music Have students create a song or skit about the real number system. **Art** Have students create a 3-D model of the real number system using objects such as bags, boxes, etc… (things that nest)	• Use different sized shoe boxes and have students label the box based on characteristics of subsets. (i.e. Natural numbers box will fit into Whole numbers box) • Write subsets as headings on whiteboard and have students use sticky notes to write what subsets fit within the heading.