

**Richmond Public Schools**  
Curriculum Framework  
*Grade 8*

<b>Strand: Number and Number Sense</b>	
<b>8.1 The student will compare and order real numbers.</b>	
<b>Suggested Pacing</b>	
Fourth Nine Weeks – 4 Instructional Days (including common assessment)	
<b>Related Standards</b>	
<b>Spiral Down</b> <b>7.1</b> The student will <ul style="list-style-type: none"><li>a) investigate and describe the concept of negative exponents for powers of ten;</li><li>b) compare and order numbers greater than zero written in scientific notation;</li><li>c) compare and order rational numbers;</li></ul> <b>6.2</b> The student will <ul style="list-style-type: none"><li>a) represent and determine equivalencies among fractions, mixed numbers, decimals, and percents; and</li><li>b) compare order positive rational numbers.</li></ul> <b>6.3</b> The student will <ul style="list-style-type: none"><li>a) identify and represent integers;</li><li>b) compare and order integers; and</li><li>c) identify and describe absolute value of integers.</li></ul> <b>5.2</b> The student will <ul style="list-style-type: none"><li>a) represent and identify equivalencies among fractions and decimals, with and without models; and</li></ul>	<b>Spiral Up</b> <b>A.1</b> The student will <ul style="list-style-type: none"><li>a) represent verbal quantitative situations algebraically; and</li><li>b) evaluate algebraic expressions for given replacement values of the variables.</li></ul>

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<p>b) compare and order fractions, mixed numbers, and/or decimals in a given set, from least to greatest and greatest to least.</p> <p>4.3 The student will</p> <p>c) compare and order decimals</p>	
<b>Essential Questions</b>	<b>Common Misconceptions</b>
<p><b>How can different forms of rational numbers be compared and ordered?</b> <i>Numbers can be represented as decimals, fractions, percents, and in scientific notation. It may be useful to choose one form, and convert all rational numbers into that form.</i></p> <p><b>What is the density property?</b> <i>The density property states that between any two real numbers lies another real number.</i></p> <p><b>What is any number raised to the zero power?</b> <i>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.</i></p>	<ul style="list-style-type: none"> <li>● Students find it difficult to list numbers in a designated order.</li> <li>● Students have trouble converting mixed numbers to decimals.</li> <li>● Negative fractions: Some students believe the negative sign applies to both the numerator and denominator.</li> <li>● Students have trouble converting a decimal percent to decimal form. Ex. 2.5% to 0.025</li> <li>● Concept of any number raised to zero exponent is 1.</li> </ul>
<b>Understanding the Standard</b>	<b>Essential Knowledge and Skills</b>
<ul style="list-style-type: none"> <li>● Real numbers can be represented as integers, fractions (proper or improper), decimals, percents, numbers written in scientific notation, radicals, and <math>\pi</math>. It is often useful to convert numbers to be compared and/or ordered to one representation (e.g., fractions, decimals or percents).</li> <li>● Proper fractions, improper fractions, and mixed numbers are terms often used to describe fractions. A proper fraction is a</li> </ul>	<p><b>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to</b></p> <ul style="list-style-type: none"> <li>● 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,</li> </ul>

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<p>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., <math>3\frac{5}{8}</math>). Fractions can have a positive or negative value.</p> <ul style="list-style-type: none"> <li>• 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 <i>density property</i> but the concept allows for a deeper understanding of the set of real numbers.</li> <li>• Scientific notation is used to represent very large or very small numbers.</li> <li>• 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., <math>3.1 \times 10^5 = 310,000</math> and <math>3.1 \times 10^{-5} = 0.000031</math>).</li> <li>• 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.</li> </ul>	<p>radicals, and <math>\pi</math>. Radicals may include both positive and negative square roots of values from 0 to 400. Ordering may be in ascending or descending order.</p> <ul style="list-style-type: none"> <li>• 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.</li> </ul>
<b>Vocabulary</b>	<b>Instructional Activities Organized by Learning Objective</b>
<p>Real numbers  Integers  Proper fractions  Improper fractions  Decimals</p>	<p><b>Virginia Department of Education</b>  <u>Ordering Numbers</u> – Lesson Plan</p> <p><b>Textbook</b>  <i>Virginia Pre-Algebra, ©2012, Glencoe/McGraw-Hill</i></p>

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<p>Percent Scientific notation Radicals Denominator Numerator Mixed number Density property Power of 10 Exponent of 0 Undefined Ascending Order Descending Order</p>	<ul style="list-style-type: none"> <li>● Fractions and Decimals, page(s) 123 – 129</li> <li>● Fractions, Decimals and Percents, page(s) 341 – 346</li> <li>● Scientific Notation, page(s) 507 - 512</li> </ul> <p><b>Notes</b></p> <ul style="list-style-type: none"> <li>● <a href="#">Comparing and Ordering Numbers</a></li> </ul> <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>● <b>Print</b> <i>Virginia Coach</i>, NEW SOL Edition, Grade 8, Mathematics Lesson 1 – page 8 (Scientific Notation) Lesson 4 – page 23 (Compare and Order Real Numbers)</li> <li>● <b>Technology-based</b> <ul style="list-style-type: none"> <li>○ <i>Explorelarning.com (Gizmos)</i> – <a href="#">Comparing and Ordering Decimals, Fraction, Decimal, Ordering Percents, Fractions, and Decimals Greater Than 1, Rational Numbers, Opposites, Absolute Value</a>(in part) – Interactive Skill Review *<i>Sign-in required</i></li> </ul> </li> </ul> <p><b>Station Activities</b></p> <ul style="list-style-type: none"> <li>● MathLib - Have students complete problems related to comparing and ordering that will then create a story.</li> <li>● Task Cards - Have students complete problems in small groups Think-Pair-Share.</li> <li>● Conceptual Bingo</li> <li>● <a href="#">Comparing and Ordering Fractions - hands on</a></li> <li>● <a href="#">Ordering Rational Numbers Sort</a></li> </ul> <p><b>Support Activities:</b></p>
<b>Assessment</b>	
<p><b>RPS PowerSchool Unit Test – RPS 8.1 Common Assessment</b> Test ID #:</p> <p><b>Formative Assessments</b> White Board Checks Kahoot.it Plickers Exit Tickets Graphic Organizers Venn Diagrams</p>	

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	<ul style="list-style-type: none"> <li>● Matching Activity - Have students match fractions, decimals, percents, and scientific notation cards and then order them from least to greatest.</li> <li>● Scientific Notation Paper Chain - Have students make a paper chain to compare and order numbers written in scientific notation.</li> </ul>
<b>Cross-Curricular Connections</b>	<b>Differentiations</b>
<p><b>Science</b>          Students can compare and order the distances between planets; Students could find the mass, distance, or size of planets, moons, or organisms, then order them in ascending or descending order.</p> <p><b>History</b>          Students can order important historical dates on a “timeline”</p>	<ul style="list-style-type: none"> <li>● Matching cards: use different color cardstock to print fractions (decimals, percents, &amp; scientific notation).</li> <li>● Provide students with a number line and sticky notes, so they can convert numbers and order on number line.</li> <li>● Have students turn number line vertically and use the sticky notes to order on the number line.</li> <li>● Have students relate converting percents to decimal form and discuss its relationship to money.</li> </ul>