

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

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Strand: Measurement and Geometry	
<p><b>6.4 The student will recognize and represent patterns with whole number exponents and perfect squares.</b></p> <p><b>7.1 The student will</b></p> <p><b>d) determine square roots of perfect squares*</b></p> <p><b>*On the state assessment, items measuring this objective are assessed without the use of a calculator.</b></p>	
Suggested Pacing	
Related Standards	
Spiral Down: 5th Grade: <ul style="list-style-type: none"> <li>• SOL 5.18</li> </ul>	Spiral Up: 8th Grade: <ul style="list-style-type: none"> <li>• SOL 8.3a, b</li> </ul>
Essential Questions	Common Misconceptions
<ul style="list-style-type: none"> <li>• What is the pattern?</li> <li>• How do you describe the pattern?</li> <li>• How can the patterns be used to make predictions?</li> <li>• How can I represent a number written in exponential form in expanded form and the reverse?</li> <li>• How does understanding place value help with understanding exponent patterns?</li> </ul>	<ul style="list-style-type: none"> <li>• Exponents: add factors, instead of multiplying factors</li> <li>• Perfect Squares: multiplying times 2 instead of the base times itself</li> <li>• Square Roots: understanding that perfect squares and square roots are opposites</li> </ul>
Understanding the Standard	Essential Knowledge and Skills
SOL 6.4: <ul style="list-style-type: none"> <li>• The symbol • can be used in grade six in place of “x” to indicate multiplication.</li> <li>• In exponential notation, the base is the number that is multiplied, and the exponent represents the number of times the base is used as a factor. In <math>8^3</math>, 8 is the base and 3 is the exponent (e.g., <math>8^3 = 8 \cdot 8 \cdot 8</math>).</li> </ul>	SOL 6.4: <ul style="list-style-type: none"> <li>• Recognize and represent patterns with bases and exponents that are whole numbers.</li> <li>• Recognize and represent patterns of perfect squares not to exceed <math>20^2</math>, by using grid paper, square tiles, tables, and calculators.</li> </ul>

# Richmond Public Schools

## Curriculum Framework

### Grade 6 Honors (6/7)

- Any real number other than zero raised to the zero power is 1. Zero to the zero power ( $0^0$ ) is undefined.
- A perfect square is a whole number whose square root is an integer (e.g.,  $36 = 6 \cdot 6 = 6^2$ ). Zero (a whole number) is a perfect square.
- Perfect squares may be represented geometrically as the areas of squares the length of whose sides are whole numbers (e.g.,  $1 \cdot 1$ ,  $2 \cdot 2$ ,  $3 \cdot 3$ , etc.). This can be modeled with grid paper, tiles, geoboards and virtual manipulatives.
- The examination of patterns in place value of the powers of 10 in grade six leads to the development of scientific notation in grade seven.

SOL 7.1d:

- A perfect square is a whole number whose square root is an integer. Zero (a whole number) is a perfect square. (e.g.,  $36 = 6 \cdot 6 = 6^2$ ).
- A square root of a number is a number which, when multiplied by itself, produces the given number (e.g.,  $\sqrt{121}$  is 11 since  $11 \cdot 11 = 121$ ).
- The symbol  $\sqrt{\quad}$  may be used to represent a non-negative (principal) square root. Students in grade 8 mathematics will explore the negative square root of a number, denoted  $-\sqrt{\quad}$ .
- The square root of a number can be represented geometrically as the length of a side of a square.
- Squaring a number and taking a square root are inverse operations.

- Recognize powers of 10 with whole number exponents by examining patterns in place value.

SOL 7.1d:

- Identify the perfect squares from 0 to 400. (d)
- Determine the positive square root of a perfect square from 0 to 400. (d)

#### Vocabulary

SOL 6.4:

Exponents	Perfect Squares	Whole Numbers
Bases	Scientific Notation	

SOL 7.1d:

#### Instructional Activities Organized by Learning Objective

Textbook

Notes

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Exponents	Perfect Squares	Whole Numbers	Resources <ul style="list-style-type: none"> <li>● Print</li> <li>● Technology-based</li> </ul>
Bases			
<b>Assessment</b>			Station Activities
<b>Cross-Curricular Connections</b>			<b>Tiered Differentiations</b>