

**Richmond Public Schools**  
**Department of Curriculum and Instruction**  
**Curriculum Pacing And Resource Guide – Unit Plan**



**Course Title/ Course #: Pre-Algebra Math 8**

**Unit Title/ Marking Period # (MP): Square Roots/MP 2**

**Start day: 64**

**Meetings (Length of Unit): 4 Days**

<b><i>Desired Results ~ What will students be learning?</i></b>
<b><u>Standards of Learning/ Standards</u></b>
8.5 a) The student will determine whether a given number is a perfect square; and b) Find the two consecutive whole numbers between which a square root lies.
<b><u>Essential Understandings/ Big Ideas</u></b>
How does the area of a square relate to the square of a number? The area determines the perfect square number. If it is not a perfect square, the area provides means for estimation.  Why do numbers have both positive and negative roots? The square root of a number is any number which when multiplied by itself equals a the number. A product, when multiplying two positive factors, is always the same as the product when multiplying their opposites (e.g. $7 \times 7 = 49$ and $-7 \times -7 = 49$ ).
<b><u>Key Essential Skills and Knowledge</u></b>
<ul style="list-style-type: none"><li>• Identify the perfect squares from 0 to 400.</li><li>• Identify the two consecutive whole numbers between which the square root of a given whole number from 0 to 400 lies.</li><li>• Define a perfect square.</li><li>• Find the positive or positive and negative square roots of a given whole number from 0 to 400.</li></ul>

## Vocabulary

Square Root  
Perfect Square  
Consecutive  
Whole Number  
Radical

## *Assessment Evidence ~ What is evidence of mastery? What did the students master & what are they missing?*

### Assessment/ Evidence

Mulligan Checkpoint 8.5  
Mulligan Checkpoint 8.5  
Interactive Achievement  
HCPS Mini Quizzes

Students need to be able to tell you what the difference between a perfect square and not perfect square is (can be an exit ticket).

Students need to know how to find the length of a side of the area is given. \*\*Big misconception is that students will divide the area by 4 (perimeter) instead of finding the square root of the area).

Students should be able to put square roots on a number line.

## *Learning Plan ~ What are the strategies and activities you plan to use?*

### Learning Experiences/ Best Practice

Discovery activity:

Divide the class in groups: give each group 4 perfect squares to draw along with grid paper. Ask them to illustrate a square that has an area of \_\_\_\_\_. While walking around, make sure students are creating squares and not rectangles. Have students find the length of all the sides of their rectangles. Have the students write down what the relationship is between the length of the side and the area.

Have the groups share their drawings and discuss their answers. This activity leads to what perfect squares are.

Discovery activity:

In groups, have students try to create a square with an area of \_\_\_\_\_. Give them non-perfect squares (smaller ones so they aren't drawing a lot). As you walk around see what students are drawing-asking them questions why they cannot do it. When all students see that it cannot be done, have a discussion why. Then have students add "squares" or take off "Squares" so that they can *make* a perfect square. Have students make note of how many squares they added or took off to do this. Have students share their strategies. Bring back the last activity to see if students can guess what the square root of their number is. (**Example:** if students were given

square root of 18. They should have either taken off 2 squares to create a square of 16 units or added on 7 squares to create a square of 25. Students may be able to guess that the square root of 18 must be between 4 and 5). This lesson needs a lot of questioning from the teacher in order for students to discover this. See if they can do more examples and discuss.

Use a vocabulary graphic organizer for the following words: Square root, perfect square, consecutive.

Have students practice estimating square roots without a calculator, then they can check their work using the calculator.

Using yarn/string/rope, etc... and clothes-pins, create a number line across your room that has whole numbers 1-20. Give each student square root problem ( $\sqrt{56}$ ) on a sticky note or index card. Have them properly place their numbers on the number between two consecutive whole numbers. Make sure they place it appropriately closer to one of the numbers.

Complete the Gizmo for square roots.

### **Technology Integrations**

Gizmo  
Educational Games-under resources  
Compass Learning  
Allen Teachers  
Brain Pop  
Khan Academy

### **Resources**

#### **Text**

Glencoe Pre-Algebra pages:  
553-554 (Perfect Squares and Square Roots Lab)  
555-560 (Squares and Square Roots)

Mulligan Math in Minutes 8.5  
SOL Coach Book Va Edition: pages 50-54

#### **Technology**

Gizmo-[Square Roots](#)-Interactive Instructional Resource  
Compass Learning-<https://www.thelearningodyssey.com> - M8017, M8020, 8066,

**Virginia Department of Education**

VDOE-[Square Roots and Perfect Squares](#)-Lesson Plan

**Other Sites**

HCPS-[Square Roots](#) Instructional materials, practice page, assessments

Illuminations-[Equations of Attack](#)-Lesson Plan

[Stained Glass](#)-Lesson Plan

Educational Blog-[Discovering Squares](#)-Lesson

Learn Alberta-[Square Root Activity](#)

**Cross Curricular Connection**

English-Have students explain how they placed their numbers on the number line, using complete sentences.