

MATH 9 LESSON PLAN	
DATE: October 18, 2013 PERIOD: 1 TOPIC: 3.1 Encountering Perfect Squares	
	NOTES
Learning Objectives: <ul style="list-style-type: none"> Investigate perfect squares and square roots using Geo-boards. 	
Outcomes & Indicators: Activity to Recall Prior Knowledge <u>Outcome N8.1:</u> Demonstrate understanding of the square and principle square root of whole numbers concretely or pictorially and symbolically. [CN, ME, R, T, V] <u>Indicator C:</u> Determine if specific numbers are perfect squares through the use of different types of representations and reasoning, and explain the reasoning. Using that Prior Knowledge to Introduce: <u>Outcome N9.1:</u> Demonstrate (concretely, pictorially, and symbolically) understanding of powers with integral bases (excluding base 0) and whole number exponents including: -representing using powers -evaluating powers -powers with an exponent of zero -solving situational questions. [C, CN, PS, R, T] <u>Indicator A:</u> Demonstrate the difference between the exponent and base of a power by representing two powers with exponent and base interchanged (e.g., 2^3 and 3^2 or 10^3 and 3^{10}) using repeated multiplication or concrete models and describe the result.	Note: This lesson is to enforce the concepts of perfect squares and square root that students learned in grade 8, so we can approach the exponent concepts in grade 9 with understanding.
Knowledge/Skills: <i>Students will understand.../Students will be able to...</i> <ul style="list-style-type: none"> Students will understand the concrete meaning of a perfect square number. 	

<ul style="list-style-type: none"> • Students will be able to find the square root of perfect squares without a calculator • Student will be able to recognize the relationship between the area of a square and the length of the side of the square • Students will be able to determine if specific numbers are perfect squares through the use of geoboards. 	
<p>Materials & Resources</p> <ul style="list-style-type: none"> • Manipulatives: Geoboards for all students (both concrete or on the iPad-students can choose) • “Perfect Squares INTRO” sheet on the projector • Handout for each student • Activity Idea taken from and modified: Illuminations http://illuminations.nctm.org/LessonDetail.aspx?ID=L832 	
<p>Learning Plan: Set (15 minutes)</p> <ul style="list-style-type: none"> • Objective of today: Look in more detail what it means for a number to be a perfect square, for a number to be a non-perfect square and square roots of perfect numbers. • Bring up the “Perfect Squares INTRO” sheet on the projector <ol style="list-style-type: none"> 1. Brainstorm: What characteristics determine if a quadrilateral is a square. EQ1 2. Discuss the idea of a unit length on a geo-board: it is the distance between two horizontal or two vertical pegs. 3. Go through the 5 questions relating to the two squares on the geo-board. **Area** make sure to use units² 4. Accept all answers but do not give any right or wrong hints <p>Development (35 minutes)</p> <ul style="list-style-type: none"> • Have students get into pairs of their choice. • Once they are in pairs, have one student come up to me to get worksheets and let me know who they are working with while the other student gets either an iPad or geoboard for the pair to work on. • Intro on how to use geoboards (ipad and concrete) 	<p>Essential Questions:</p> <p>EQ1: What characteristics determine a square?</p> <p>EQ2: If you know the length of a square how can you determine its area?</p> <p>EQ3: If you know the area of a square, how can you determine its side length?</p>

<ul style="list-style-type: none"> • Intro on how to fill out their sheet (first row of chart completed as a class) • Students will work on the “Encountering Perfect Squares” worksheet. <p><u>Closure (10 minutes)</u></p> <ul style="list-style-type: none"> • Bring the class back together as a whole for a small group discussion regarding the activity. • Focus on #2, #4 EQ2 , #5 EQ3 • Go back to the “Perfect Squares INTRO” sheet on the projector and clear up some misconceptions from the set 	
<p>Assessment: <i>Formative/Summative</i></p> <ul style="list-style-type: none"> • Activity Sheet • Encountering Perfect Squares Blog 	