

## Lesson Plan Template

<b>Grade:</b> 8		<b>Subject:</b> Math 8-Chapter 6 Square Roots and Pythagorean Theorem 6.1 and 6.3B Finding Square Roots and Cube Roots	
<b>Materials:</b> Pre and Post assessment forms, notes packets		<b>Technology Needed:</b> Chromebooks, projector	
<b>Instructional Strategies:</b> <input type="checkbox"/> Direct instruction <input type="checkbox"/> Peer teaching/collaboration/cooperative learning <input type="checkbox"/> Guided practice <input type="checkbox"/> Visuals/Graphic organizers <input type="checkbox"/> Socratic Seminar <input type="checkbox"/> PBL <input type="checkbox"/> Learning Centers <input type="checkbox"/> Discussion/Debate <input type="checkbox"/> Lecture <input type="checkbox"/> Modeling <input type="checkbox"/> Technology integration <input type="checkbox"/> Other (list)		<b>Guided Practices and Concrete Application:</b> <input type="checkbox"/> Large group activity <input type="checkbox"/> Hands-on <input type="checkbox"/> Independent activity <input type="checkbox"/> Technology integration <input type="checkbox"/> Pairing/collaboration <input type="checkbox"/> Imitation/Repeat/Mimic <input type="checkbox"/> Simulations/Scenarios <input type="checkbox"/> Other (list) Explain: Practice problems in notes packet will be worked on as a whole class. Students will work on the book assignment, either independently or with a partner.	
<b>Standard(s)</b> <u>8.EE.2</u> Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$ , where $p$ is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes.		<b>Differentiation</b> <b>Below Proficiency:</b> Students will receive extra guidance and one-on-one help during worktime. Students may not need to complete all of the practice problems in the notes packet, but at least 2 from each section of practice problems, 4 in the last section. <b>Above Proficiency:</b> Students should respond when questions are asked and answer questions. Students can help others classmates and complete the assignment with little, if any, assistance. <b>Approaching/Emerging Proficiency:</b> Students will work through assignment, asking questions when confusions arise. <b>Modalities/Learning Preferences:</b> Students can work independently or with a partner or small group.	
<b>Objective(s)</b> Students will define square and cube roots, squared and cubed numbers, and perfect squares and cubes. Student will calculate square and cube roots and evaluate expressions involving square and cube roots. <b>Bloom's Taxonomy Cognitive Level:</b> Remembering, Analyzing			
<b>Classroom Management- (grouping(s), movement/transitions, etc.)</b> Students will be instructed to take out Chromebooks to complete the pre-assessment at the beginning of class. When students finish the pre-assessment, they need to put away their Chromebook and come grab the chapter 6 notes packet, then wait quietly for the rest of the class to finish the pre-assessment. Once all Chromebooks are put away, lesson 6.1 and 6.3B can start. After the lesson has been taught, students can begin work on the book assignment. When there is 10 minutes left of class, students should take their Chromebooks back out and complete the post-assessment.		<b>Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.)</b> Students will know the classroom routine of entering the classroom and finding their assigned seats. When Chromebooks are in use, students should be on task and not misusing the Chromebooks. Pre- and Post-Assessments are to be completed independently. During notes, students should be engaged and focused. During work time, students can work with a partner or independently while staying on task.	
<b>Minutes</b>	<b>Procedures</b>		
<b>20</b>	<b>Set-up/Prep:</b> Create Google Forms of pre- and post-assessments Create chapter 6 notes packet		
<b>10-15</b>	<b>Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.)</b> Greet students as they come into class. Take attendance. “For today’s lesson, we are going to be doing a pre-assessment to see what you already know. And after the lesson, we will take a post-assessment to see what you learned. These are not graded, but they will be used by me.” “For right now, take out your Chromebooks and go to classroom, there is a pre-assessment Google Form posted. There are 6 questions. Answer to the best of your ability. If you don’t know, make your best guess. When you have submitted it, put away your Chromebook and come grab the chapter 6 notes packet, and fill in the table that I will have projected.” *Wait for all Chromebooks to be put away before beginning the notes for the lesson. “So, we just finished chapter 5 which was geometry and polygons. Starting today, we are moving into chapter 6. This chapter will be working with square roots and the Pythagorean Theorem. Unlike last chapter, we won’t be seeing a lot of shapes, but we will be working with triangles and exponents. What does ‘squared’ mean to you? If you don’t know what that is, no worries, we will be learning it all in this chapter.” “By the way, calculators are going to be very useful in this chapter, so take out your calculators.”		

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<b>45-50</b>	<p><b>Explain: (concepts, procedures, vocabulary, etc.)</b> Go through 6.1 and 6.3B notes (pages 1-3 in notes packet)</p> <p><b>**see filled in chapter 6 notes packet for all examples and work**</b></p> <p>Students will fill in table on page 1 Students fill in first 4 definitions of vocab words: Square Root Perfect Square Radical Sign Radicand</p> <p><u>*As students find definitions, review the pre-assessment data to determine the content that needs the most focus and which content was well-known</u></p> <p>*discuss squared and cubed, vocab words, and symbols *emphasize importance of the perfect squares and cubes table → memorization pop quiz next week on first 20 square roots and first 7 cubed roots *discuss positive and negative square roots: both possible answers and what is being asked for in the practice problems and homework</p> <p>“Why can’t we have <math>\sqrt{-25}</math>?” → can’t take any number multiplied by itself and get a negative</p> <p>Practice Problems: Start with problems 1-4 (give about 1 minute for students to do these before going over the answers) Then do #5, and regroup after doing that one to explain 6-8</p> <p>For 6-8, provide the two rules for taking square roots of fractions: 1) reduce the fraction 2) take square root of numerator and denominator separately “For square roots of decimals, you’ll definitely want to use your calculators.” *may need to help students figure out how to do square roots on the calculator “Rule of thumb: if you’re given a fraction, your answer will be a fraction. If you’re given a decimal, your answer will be a decimal.” Let students do problems 6-8 for about 2 minutes, then go over answers. Fully reduce answers.</p> <p>For 9-16, explain that students will need to use Order of Operations (PEMDAS) and reinforce the fraction rules for square roots. Do #9 together, then let students complete the rest independently. (Give them about 7-8 minutes to do these problems before going over answers.)</p> <p>“Are there any questions about square roots or any of the problems we just did?” “Okay, now we are going to move to page 3 which is talking about cube roots and perfect cubes.”</p> <p>Students will copy down definitions of 2 vocab words: Cube Root Perfect Cube</p> <p>Refer back to table to complete first 4 examples. Discuss 4<sup>th</sup> example that has a negative under the radical sign. Explain that we can take cube roots of negatives, unlike square roots. Let students do practice problems 1-5. *Don’t do #6. Emphasize that students should be using the table to help them and to pay attention to the sign (positive or negative).</p> <p>Go through practice problems 7 and 8 about volume. Do #7 together, then let students do #8.</p> <p>“Any questions on how we did any of these problems?”</p> <p>“There is a book assignment posted on Google Classroom, get started on that. At about 10:00, I will stop you and we will do the post-assessment.”</p>
<b>15-20</b>	<p><b>Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)</b></p> <p>Students will do book assignment that is posted on Classroom: Page 234 #’s 1-23, 26-28, 35-39 Teacher will walk around room to answer any questions and check for student understanding while monitoring student progress.</p>
	<p><b>Review (wrap up and transition to next activity):</b> At <u>9:55</u>, have students wrap up and take out Chromebooks.</p>

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<b>10</b>	<p>“You should have gotten through most of the book assignment and gotten some practice with square roots. Now we are going to take a post-assessment. It is very similar to the pre-assessment we took at the beginning of class. Again, answer to the best of your ability and submit when you’re done.”</p>	
<p><b>Formative Assessment: (linked to objectives)</b>  <b>Progress monitoring throughout lesson- clarifying questions, check- in strategies, etc.</b>            Clarifying questions during lesson to check for student understanding and reviewing of material.            “How did you get that answer? What was your thought process?”            “Why do we find area like this? Volume?”            During work time of the book assignment, teacher will walk around and answer student questions and check for understanding through observation and asking students questions about the assignment.</p> <p><b>Consideration for Back-up Plan:</b>            If students have the same confusions throughout the lesson, regroup as a class and reteach that specific concept to clarify and resolve confusion.            If students finish early and have free time, they can work on Dreambox and missing work.            If running low on time, do post-assessment before doing 6.3b notes.</p>	<p><b>Summative Assessment (linked back to objectives)</b>  <b>End of lesson:</b>            Post-Assessment Google Form</p> <p><b>If applicable- overall unit, chapter, concept, etc.:</b>            Unit test will be given at conclusion of the unit.</p>	
<p><b>Reflection (What went well? What did the students learn? How do you know? What changes would you make?):</b></p> <p>The pre-assessment allows me to see responses immediately and see what content needs the most focus during the lesson. The transition from the pre-assessment to notes is smooth and allows time to look at the data coming in.</p> <p>A few things I would do differently or forgot to do during the lesson:            -should have addressed how to input square roots and squares into the calculator, I didn’t realize they had never done this before            -should have explained why negative square roots aren’t possible before seeing negative cube roots            -I think area should have been discussed in the notes with the squaring and square roots because volume was addressed with the cubes. Area wasn’t in the given notes packet, so I would include it in a new notes packet for the future.            -should have better explained how to use the table in the notes packet</p> <p>It makes more sense to wait to take the post-assessment until the next class period, so students have a chance to process the new information.</p> <p>Students may need more guidance with order of operations as this is part of some of the problems. A quick review of order of operations should suffice in the future.</p>		