**SCUSD Common Core Mathematics Lesson Planning Guide**

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| Unit Title: The Coordinate Plane  Lesson: applying the algebraic formula to solve geometric problems | Approx. time:  45 min | CCSS-M Standards: G-GPE 4, 5, 7  Supporting standard A-CED1, 2, 3  Math practices MP1, MP2, MP3, MP4, MP5, MP6, MP7 |
| A. **Focus and Coherence**  Students will know that mathematics extends across the algebra and geometry domains  Students will be able to draw a diagram from written information and apply geometry and algebra concepts to solve mathematical problems  Student prior knowledge: students will need to be familiar with the coordinate plane, the distance formula and the relationship between slope and perpendicular and parallel lines.  Which math concepts will this lesson lead to? Application to interpretation of word problems, setting up of linear equations and solving linear equations | | B. **Evidence** of Math Practices  *What will students produce when they are making sense, persevering, attending to precision and/or modeling, in relation to the focus of the lesson?*  Students will draw a diagram to interpret the word problem and create linear equations. Students will then answer the questions posed and justify their answers from their previous knowledge. |
| Essential Question(s) How can we use algebraic formula to solve geometric problems? | | |
| Formative Assessments: As the lesson proceeds check that the diagram is correct for all students, then check that the students have set up the correct linear equations | | |
| Anticipated Student Preconceptions/Misconceptions. Students may not plot the (x, y) coordinates correctly, students may confuse the slope and the y intercept for finding the slope of a line. | | |
| Materials/Resources  Teacher question, paper and pens, graph paper | | |
| C. **Rigor**: Conceptual Understanding, Procedural Skills and Fluency, and Application  *What are the learning experiences that provide for rigor? What are the learning experiences that provide for evidence of the Math Practices? (Detailed Lesson Plan)*  Warm Up – Find the equation of the line that passes through the points (2, 3) and (5, 7)  Explain how the idea of slope or linear equations can be related to or used in another field not directly related to mathematics. An example might be the chef needs to know the weight of a roast to know its cooking time. Write about other examples you can think of.  Where might you need to apply the knowledge of intersecting perpendicular lines outside the classroom?  How could you apply this information to a real world situation?  Why do you think that we study parallel and perpendicular lines? (Mathematicians use models to explain the real world to make future predictions).  For this exploration pen and paper are needed. An extension would be to use compasses and graph paper and find the answer from a different perspective using the distance formula.  Lesson  Archaeologists have started a dig for remains of statues of the Olmay tribe, believed to have inhabited the area. They have laid out a grid 20 yards by 20 yards in the area where they found two statues belonging to the tribe. The Olmay always set out their statues in the shape of a square. Within the grid they laid out, the two statues they found were at points A (8,2) and B (2,10). After much searching, a third statue was found outside their grid. The archaeologists extended their grid to include the third statue. The third statue was found at the point C (-6,4).   1. Use math and words to justify if it is reasonable for the archaeologists to assume that the three statues they found are all part of the same square. 2. Given your answer from (a), where should the archaeologists start the search for the next statue? Support your answer with mathematics.   Transition from the exploration to the mathematics would occur by looking at the equation of a line passing through one of the original points and perpendicular to the original line. Students would draw the perpendicular intersecting lines using protractor and ruler and then find the equation of the new line and compare the slopes of the two lines.  This lesson would be the culmination of two weeks work of explorations of slope and distance formula before attempting this problem.  Students would be given a series of different problems with the same underlying concepts over many lessons to expose them to thinking outside the square and apply their learning  Closure –Studentsshare their work with the class, including the strategies the group used and the answer they obtained. After all groups have shared then ask students to take notes on the strategy they thought the best to solve this problem  **Suggested Homework/Independent Practice-**  Students could explore an alternative solution to the problem using the distance formula and graph paper and compasses (or geometer sketch pad). | | |