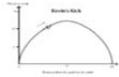
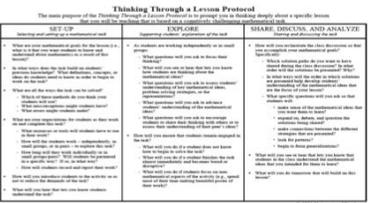


**Algebra 1 - Quadratics**  
**Professional Development**  
**Facilitators Notes**

<p style="text-align: center;">Algebra I Professional Development Quadratics</p> 	<p style="text-align: center;"><b><u>Algebra 1 Professional Development Quadratics</u></b></p> <p>Welcome!</p>	<p>The Algebra 1 PD for Quadratics is divided into 6 modules that can be introduced in a 6-hour period or in six 1-hour sections.</p> <p>The purpose of this set up is for flexible use at schools and LD professional development opportunities.</p>
<p>Module 1 Outcomes</p> <p>Module 1 Outcome</p> <ul style="list-style-type: none"> <li>▶ Participants will experience a rigorous Algebra I concept task</li> </ul> 	<p>Outcomes: <i>Participants will experience a rigorous Algebra 1 concept task</i></p>	<p>You can remind participants that all concept tasks and lessons can be found on the Math website.</p> <p><a href="http://Lausd.net/math">Lausd.net/math</a></p>
<p>Task</p>	<p><u>Bend it like Beckham</u> – every participant gets a copy of the task</p> <p>Ask participants to:</p>	<p>Make copies for all participants Chart paper for keeping track of discussion</p>

<p><b>“Bend it Like Beckham”</b></p> <p><b>Bend it like Beckham</b></p>  <p>Andre, Juana, Kevin and Emilio go to a soccer day at the L.A. Galaxy's training field at the Home Depot Center. The coach has a computer and video system that can track the height and distance of their kicks. All four soccer players are practicing on-field kicks, away from the goal.</p> <p>Andre goes first and takes a kick starting 12 yards out from goal. His kick reaches a maximum height of 17 yards and lands 48 yards from the goal.</p> <p>Juana goes next and the computer gives the equation of the path of her kick as <math>y = -x^2 + 24x - 24</math>, where <math>y</math> is the height of the ball in yards and <math>x</math> is the horizontal distance of the ball from the goal line in yards.</p> <p>After Kevin takes his kick, the coach gives him a printout of the path of the ball.</p>  <p>Finally Emilio takes her kick but the computer has a problem and can only give her a partial table of data points of the ball's trajectory.</p> <p><b>Emilio's table</b></p> <table border="1"> <thead> <tr> <th>Distance from the goal line in yards</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> </tr> </thead> <tbody> <tr> <td>Height in yards</td> <td>0</td> <td>4.7</td> <td>8.75</td> <td>12.2</td> <td>15</td> <td>17.2</td> <td>18.75</td> <td>19.7</td> <td>19.9</td> <td>19.7</td> <td>18.75</td> </tr> </tbody> </table> <p>The computer is still not working but Andre, Juana, Kevin and Emilio want to know who made the best kick.</p> <p>Help them decide by using what you know to find (a) Whose kick went the highest? (b) Whose kick went the longest? Be prepared to explain your answer and support your reasoning.</p> <p><small>© 2014 Algebra 1 Standards of Mathematical Practices, Operations and Algebraic Thinking, and an extension of the Algebra 1 Standards of Mathematical Practices. This document is for personal use only. All rights reserved. No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage or retrieval system, without permission in writing from the publisher.</small></p>	Distance from the goal line in yards	0	1	2	3	4	5	6	7	8	9	10	Height in yards	0	4.7	8.75	12.2	15	17.2	18.75	19.7	19.9	19.7	18.75	<p>Read for context, (2 min) Discuss and chart answers</p> <p>Read for vocabulary, (2 min) Discuss and chart answers</p> <p>Analyze for math content and non-math content vocabulary (2 min) Discuss and chart answers</p> <p>Ask participants: <i>How does this process of reading with different purpose help the students understand the task and have access to the mathematics?</i></p> <p>Give participants time to work through the problem.</p>	<p>Participants experience all the steps students need to take to make the task accessible for all students.</p>
Distance from the goal line in yards	0	1	2	3	4	5	6	7	8	9	10															
Height in yards	0	4.7	8.75	12.2	15	17.2	18.75	19.7	19.9	19.7	18.75															
<p><b>“Bend it Like Beckham”</b></p> <p>Share, Discuss, and Analyze:</p> <ul style="list-style-type: none"> <li>▶ Whose kick went the highest?</li> <li>▶ Whose kick went the longest?</li> <li>▶ Be prepared to share your solution with the group</li> </ul> 	<p>After working through the problem (as a whole group) Share/discuss/analyze</p> <p>Ask participants the following questions: <i>Whose kick went the highest?</i> <i>Whose kick went the longest?</i> <i>Be prepared to explain your solution with the group</i></p> <p>Chart responses</p>																									

<p>“Bend it Like Beckham”</p> <p>Group discussion:</p> <p>How do we make the mathematics accessible to all students?</p> <p>How can the four access strategies:</p> <ul style="list-style-type: none"> <li>▪ graphic organizers</li> <li>▪ cooperative groups</li> <li>▪ academic language development</li> <li>▪ instructional conversations</li> </ul> <p>be more explicitly embedded in the lesson?</p> 	<p>Group Discussion:</p> <p><i>How to make mathematics accessible to all students?</i></p> <p><i>How can the four access strategies:</i></p> <ul style="list-style-type: none"> <li>• <i>graphic organizers</i></li> <li>• <i>cooperative groups</i></li> <li>• <i>academic language development</i></li> <li>• <i>instructional conversations</i></li> </ul> <p><i>be more explicitly embedded in lesson?</i></p>	<p>4 access Strategies:</p> <p>Graphic Organizers</p> <p>Cooperative Groups</p> <p>Academic Language Development</p> <p>Instructional Conversations</p>
<p>Module 2 Outcomes</p> <p>Module 2 Outcome</p> <ul style="list-style-type: none"> <li>▶ Participants will work with the Thinking Through a Lesson Protocol (TTLP) to plan the implementation of the task in the classroom</li> </ul> 	<p><i>“Participants will work through the Thinking Through a Lesson Protocol to plan implementation in their classrooms.”</i></p> <p>Give participants some time to read through the TTLP</p>	<p>Make sure all participants have a copy of the TTLP.</p>
<p>Thinking Through a Lesson Protocol</p> 	<p>Share copies of the TTLP</p> <p>Have a short discussion about findings-</p> <p>How can they use the TTLP when planning to deliver task/lesson</p>	
	<p>Ask participants:</p> <p><i>How will they <b>set up</b> the lesson?</i></p>	<p>Video is available on math website</p>

<p>Thinking Through a Lesson Protocol</p> <ul style="list-style-type: none"> <li>▶ How will we <i>set up</i> the lesson?</li> <li>▶ How will the students <i>explore</i> the concept?</li> <li>▶ How will the students <i>share, discuss, and analyze</i> their solutions?</li> </ul> 	<p><i>How will the students explore the concept?</i></p> <p><i>How will the students share, discuss and analyze their solution?</i></p>	
	<p>When is the best time to use the Concept Task</p> <ul style="list-style-type: none"> <li>- Participants should know that the tasks might be used at the introductory, middle of end of a concept.</li> <li>- There are other concept task available on the math website</li> </ul>	
<p>Planning for Implementation: Thinking Through a Lesson Protocol</p> <ul style="list-style-type: none"> <li>▶ Read through the lesson and discuss how the TTLP was used to design it.</li> <li>▶ What instructional strategies could be added to the lesson that would contribute to increased access for all learners? <ul style="list-style-type: none"> <li>▪ EL</li> <li>▪ SEL</li> <li>▪ Gifted</li> <li>▪ SWD</li> </ul> </li> </ul> 	<p>Share the concept lesson with the participants. Give them some time to read through it. Remind them to look at it through the lens of the TTLP. (10 min)</p> <p><i>Read through the lesson and discuss how the TTLP was used to design it.</i></p> <p><i>What instructional strategies could be added to the lesson that would contribute to increase access to mathematics for all learners: SEL, EL, Gifted, Sp. Ed., and SWD</i></p>	

Module 3  
Outcomes

Module 3  
Outcome

- ▶ Participants will learn about explicit strategies that foster the development of academic language



Outcomes:

*Learn explicit strategies that foster the development of academic language*

Compare and Contrast

Using the Language of Comparison and Contrast  
Compare and Contrast T-CHART

List the things that are similar or the same for  $2x + 10x + 9$  and  $2x^2 + 9x + 4$  on one side of the T-Chart and things that are different on other side.

Compare	Contrast

Secondary Mathematics, © 2000



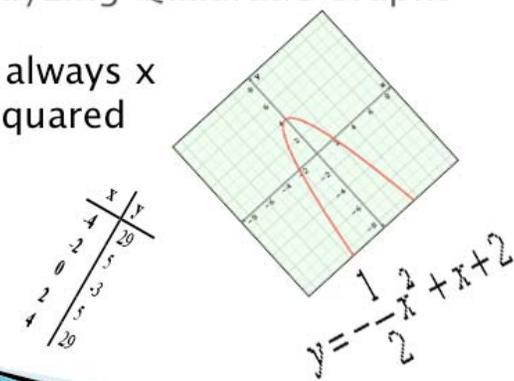
Compare and Contrast T-Chart

Ask participants to do activity

Need copies of Compare and Contrast T-chart for all participants

<p>Compare and Contrast</p> <p>How will this activity support the academic language development for your students?</p> <p>What questions can you ask to engage students with this activity?</p> 	<p>Ask participants:</p> <p><i>How will this activity support the academic language development of your students?</i></p> <p><i>What questions can you ask to get kids engaged in the activity?</i></p>	
<p>Using the Language of Compare and Contrast</p> 	<p>Comparison Listening and Speaking Activity</p> <p>Give some time for the participants to read through the handout</p> <p>Make sure that every one chooses a partner for the activity.</p> <p>Discuss their findings:</p> <p>How will you use with your students? What do you need to modify or add? Why is this activity important? When can you use this activity with future lesson?</p>	<p>Pass out the handout: “Listening &amp; Speaking”</p> <p>Remind participants that the level of scaffold depends on the need of their students. Some students will not need all the sentence starters because they have better language skills. It is important to be aware of the EL level of the students if they have them in their class.</p>
	<p>Contrast Listening and Speaking Activity</p> <p>Give some time for the participants to</p>	



<p>Module 4 Outcomes</p> <p>Module 4 Outcome</p> <ul style="list-style-type: none"> <li>▶ Participants will gain an increased understanding of strategies that increase students' access to core mathematics content</li> </ul>	<p>Outcomes:</p> <p><i>Gain an increase understanding of strategies that increase students access to core mathematics content.</i></p>	
<p>Analyzing Quadratic Graphs</p> <p>y is always x squared</p> 	<p>Quadratic Functions Graph Match Activity</p>	<p>Need copies of Quadratic Functions Graph Match Activity for all participants</p> <p>Make sure to copy and cut the two activity sheets. Cut apart the graphs, tables, descriptions and symbolic representations. Give each group an envelope with the pieces, copy of blank answer grid and glue/tape.</p>
	<p><i>Take the cards out of your envelope and spread them out on your table. Match together the verbal</i></p>	

<p>Analyzing Quadratic Graphs</p> <p>Take the cards out of your envelope and spread them out on your table.</p> <p>Match together the verbal descriptions, tabular representations, graphs, and symbolic representation.</p> 	<p><i>representations, tabular representations, graph and symbolic representations.</i></p>	
<p>Analyzing Quadratic Graphs</p> <p>In a small group, discuss what helped you to identify the members of each set?</p> <p>Each group will then share one set of four representations and explain how they identified the members of that set.</p> 	<p><i>In a small group, discuss what helped you identify the members of each set?</i></p> <p><i>Each group will then share one set of four representations and explain how they identify the members of that set.</i></p> <p>Ask participants:</p> <p>What questions can you ask students to expand their explanations and thinking?</p>	
	<p><i>How does this activity enrich the students' understanding of different quadratic representations?</i></p> <p><i>How might you use a similar type of activity in a different unit of study?</i></p>	

### Analyzing Quadratic Graphs

How does this activity enrich the students' understanding of different quadratic representations?

How might you use a similar type activity in a different unit of study?

### Analyzing Quadratic Graphs

#### COMPARING GRAPHS 1

Set 1

$y = x^2$   
 $y = 2x^2$   
 $y = 3x^2$   
 $y = 4x^2$   
 $y = 5x^2$

Tables

x	y	x	y	x	y	x	y	x	y

$y = x^2$     $y = 2x^2$     $y = 3x^2$     $y = 4x^2$     $y = 5x^2$

### Analyzing Quadratic Graphs

Each group will receive one of the comparing graphs sheet.

Each member of the group will be receiving a blank transparency, a different colored marker, and a piece of graph paper.

Each person in the group will graph one of the equations on a transparency—your group will have a total of five different graphs.

### Analyze Quadratic Graphs

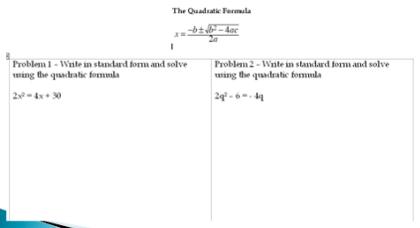
Make copies of the Comparison Graph sheets to give one to each group  
Pass transparencies, markers, and graph paper.

#### Directions:

*Each group will receive one of the Comparing Graphs sheet.*

*Each member of the group will be receiving a transparency, a different color marker, and a piece of graph paper.*

*Each person in the group will graph one of the equations on a transparency – your group will have a total of five*

	<i>different graphs.</i>	
<p>Analyzing Quadratic Graphs</p> <p>Now that your group has graphed each equation, layer your transparencies.</p> <p>What do you notice?</p> <p>What is causing this to happen?</p> <p>Generate two more equations which illustrate that you know what is causing the changes to occur.</p>	<p>Now that you group has graphed each equation, layer your transparencies.</p> <p>What do you notice?</p> <p>What is causing this to happen?</p> <p><b>Generate two more equations that illustrate the same effect.</b></p>	
<p>Module 5 Outcomes</p> <p>Module 5 Outcome</p> <ul style="list-style-type: none"> <li>Participants will learn explicit instructional conversations strategy that foster the development of academic language that increase students' access to core mathematics content</li> </ul>	<p>Outcomes:</p> <p><i>Participants will learn explicit instructional conversations strategy that foster the development of academic language that increase students' access to core mathematics content.</i></p>	
<p>The Quadratic Formula</p> 	<p>The Quadratic Formula</p>	<p>Make sure every participant has a copy of the Quadratic Formula activity</p>

## Academic Language Development

### Strategy:

- ▶ *Instructional Conversation (Listening/ Speaking)*

#### Mathematically Speaking!

Write your name and your partner's name.

Person #1 explains how to solve the first problem to person #2. Person #2 should mark a tally mark on the chart each time a vocabulary word is used. Encourage your partner to keep on talking until he or she has used all the target words. Then person #2 should explain how to solve the second problem while #1 marks on the chart.

Mathematics Vocabulary	#1	#2
coefficient		
discriminant		
formula		
identify		
opposite		
quadratic		
radical		
roots		
second degree polynomial		

## Academic Language Development - Instructional Conversations

## "Mathematically Speaking..."

- ▶ **Instructional Conversation**
  - The instructional conversation activity is used for *review or guided practice*. Student pairs are formed. Target vocabulary words are written on the IC chart in the left column. The 2 students write their names across the top. One student explains half of the completed task or a given problem to the other student as he or she tallies on the chart each time a target word is used in the explanation. Students keep talking until all target words have been used. The other student then takes a turn doing the same.

## Mathematically Speaking

## Academic Language Development

- How can this strategy modeled be used with other concepts in this unit?
- What changes do you foresee in your students' understanding after utilizing these strategies?
- How can this strategy specifically address EL needs?
- How will you make time in your day-to-day lessons to incorporate these strategies?

## Academic Language Development Discussion Questions:

- *How can this strategy modeled be used with other concepts in this unit?*
- *What changes do you foresee in your students' understanding after utilizing these strategies?*
- *How can this strategy specifically address EL needs?*
- *How will you make time in your day-*

	<p><i>to-day lessons to incorporate these strategies?</i></p>	
<p>Module 6 Outcomes</p> <p>Module 6 Outcome</p> <ul style="list-style-type: none"> <li>▶ Participants will become familiar with the Comprehensive Assessment Program for Mathematics</li> </ul>	<p>Outcomes:</p> <p><i>Participants will become familiar with the Comprehensive Assessment Program for Mathematics.</i></p>	<p>Need: Internet access Computers for participants</p> <p>Introduce all the assessments for mathematics that are available to monitor student progress and assess their level of proficiency in the course/grade level.</p>
<p>Periodic Assessments</p> <ul style="list-style-type: none"> <li>▶ There are Periodic Assessments for grades Kinder through Geometry.</li> <li>▶ Blueprints available for PA's on the math website under Instructional Guide</li> <li>▶ Elementary: <ul style="list-style-type: none"> <li>• There are 3 PA's – each PA assesses the standards in the Instructional Blocks found in the Mathematics Instructional Guide</li> </ul> </li> <li>▶ Secondary: <ul style="list-style-type: none"> <li>• There are 3 PA's – each PA assesses the standards in the first three units of the Mathematics Instructional Guide</li> </ul> </li> </ul>	<p>Periodic Assessments</p>	
<p>Progress Monitoring Assessments</p> <ul style="list-style-type: none"> <li>▶ There are PMA's for each of the grades and/or courses that have Periodic Assessments.</li> <li>▶ There are two types of PMA's: <ul style="list-style-type: none"> <li>• Ready-Made Assessments – assess 1 or 2 standards with 4 to 10 questions</li> <li>• Create your own assessment</li> <li>• There are answer sheets available to get your assessment scores on CORE K12</li> </ul> </li> </ul>	<p>Progress Monitoring Assessments</p>	

<p><b>Diagnostic Assessments</b></p> <ul style="list-style-type: none"> <li>Grade 5 Diagnostic <ul style="list-style-type: none"> <li>All grade 5 students will take this assessment at the end of the year.</li> <li>Data from this assessment will be used to decide the intervention students will need in grade 6 if any.</li> </ul> </li> <li>Grade 8 Diagnostic <ul style="list-style-type: none"> <li>All students enrolled in Algebra Readiness in the Spring semester will take this assessment.</li> <li>Data from this assessment will be used to decide the intervention students will need in grade 9 if any.</li> </ul> </li> </ul> 	<p>Diagnostic Assessments</p>	
<p><b>End-of-Course Examinations</b></p> <p><b>Algebra 1</b></p> <ul style="list-style-type: none"> <li>The Algebra 1 End-of-Course Examination will be cumulative.</li> <li>Items may test a student's knowledge on any of the 25 California Algebra 1 Standards (see the Mathematics Framework for California Public Schools, 2007).</li> <li>These include standards that would be taught during Algebra 1A and Algebra 1B.</li> <li>The assessment will consist of 40 multiple choice items and four constructed response items. Students will answer two of the four constructed response items.</li> </ul> <p><b>Geometry</b></p> <ul style="list-style-type: none"> <li>The Algebra 1 End-of-Course Examination will be cumulative.</li> <li>Items may test a student's knowledge on any of the 25 California Algebra 1 Standards (see the Mathematics Framework for California Public Schools, 2007).</li> <li>These include standards that would be taught during Geometry 1A and Geometry 1B.</li> <li>The assessment will consist of 30 multiple choice items and four constructed response items. Students will answer two of the four constructed response items.</li> </ul> 	<p>End-of-Course Examinations</p>	
<p><b>Assessment Information and Data</b></p> <ul style="list-style-type: none"> <li><a href="http://www.lausd.com/math">www.lausd.com/math</a></li> <li><a href="http://www.lausd.net">www.lausd.net</a> <ul style="list-style-type: none"> <li>Offices <ul style="list-style-type: none"> <li>Periodic Assessment Program Office</li> </ul> </li> </ul> </li> <li>CORE K12 <ul style="list-style-type: none"> <li><a href="https://lausd.corek12.com">https://lausd.corek12.com</a></li> </ul> </li> <li>MyData</li> <li>DSS</li> </ul> 	<p><b>Assessment Information and Data</b></p> <ul style="list-style-type: none"> <li>visit the different sites to show participants what is available and how to access the materials and/or data.</li> <li>If possible: computers should be accessible for participants to access their own data.</li> </ul> <p>This is the WHAT, now we need to talk about the SO WHAT? And NOW WHAT?</p> <p>-What is the data telling us about our students' progress?</p>	<p>Take participants through the different sites that have information on Periodic Assessments, Progress Monitoring Assessments, Diagnostic Assessments, and End-of-Course.</p> <p>Chart answers</p>

	<ul style="list-style-type: none"><li>- How do we use this information to plan for intervention and enrichment?</li><li>-What does the data tell us about our teaching?</li><li>- How are our EL, SEL, SWD and Gifted students doing?</li><li>- What are you already using to inform your instruction and how are you using it?</li></ul>	
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