Common Core State Standards for Mathematics
Domain: Linear, Quadratic, and Exponential Models
Construct and Compare Models (F-LE.1-4)
Level: High School

Score 4.0	**In addition to Score 3.0, in-depth inferences and applications that go beyond instruction to the standard. The student will:**		**Example Activities**
			Allow the students to regroup into their original pairings from the activity in SCORE 2.0. Require the students to re-evaluate the sorting that they created and allow them to re-sort at this point now that they have been directly taught the content. Students are now asked the same questions as to what they think are characteristics of Exponential, Quadratic, and Linear functions. Their individual responses can be used as a formative assessment. Lastly, each pair is to create an exponential function and create a table, graph and verbal description for their function.
	3.5	In addition to score 3.0 performance, in-depth inferences and applications with partial success.	
Score 3.0	**The student will:** • recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another (F-LE.1c) • construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (including reading these from a table) (F-LE.2) • observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or as a polynomial function (F-LE.3) • express as a logarithm, the solution to $ab^{ct} = d$ where a, c and d are numbers and the base b is 2, 10 or e; evaluates using technology (F-LE.4) **The student exhibits no major errors or omissions.**		Disease Spread Simulation: The teacher will explain the procedures for the simulation game. Every student in the class is assigned a unique number that they are to keep private until the interaction component. The students will participate in three timed rounds of "interactions". An interaction consists of the students selecting peers in the class to "interact" with by exchanging numbers. The students are to record the number of each person that they interact with between rounds 1, 2, and 3 separately. Once the "interactions" have been completed within the three rounds the teacher reveals the number of the initial "infected" number. The teacher asks students to look within their records for round one and determine if they interacted with the "infected" number. The teacher creates a large chart that represents the numbers of the "infected" participants from each round beginning with the initial "infected" number. The process is repeated for each round. The quantity of "infected" students is then graphed by round on the Cartesian plane (an exponential graph will result). The teacher will then use a simultaneous response method in order to require all students to answer the following questions: 1. What type of rate of change is evident from the simulation graph? 2. Compare the rate of change in the simulation graph to

			the rate of change of the linear parent function (provide visual of linear parent function for students)? 3. Compare the rate of change in the simulation graph to the rate of change of the quadratic parent function (provide visual of quadratic parent function for students)? 4. Describe the differences between the rate of change of linear, quadratic, and exponential functions. 5. Based on the experiment, what can be predicted if the simulation was done school wide?
	2.5	No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content	

Score 2.0	**There are no major errors or omissions regarding the simpler details and processes as the student will:**
	• recognize or recall specific vocabulary, such as:
	  ○
	• perform basic processes, such as:
	  ○ distinguish between situations that can be modeled with linear functions and with exponential functions (F-LE.1)
	  ○ prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals (F-LE.1a)
	  ○ recognize situations in which one quantity changes at a constant rate per unit interval relative to another (F-LE.1b)
	  ○ observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically or as a polynomial function (F-LE.3)
	
	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.
			Teacher prepares cards that contain a table, graph, equation, and verbal description of multiple linear, quadratic and exponential functions. The first task for students is to match each function to its corresponding table, graph and verbal description. The teacher will perform a formative check for each pair to ensure they have correctly matched each function to its corresponding table, graph and verbal description and provide students with feedback. The second task for students is to identify the rate of change for each function grouping, again the teacher will perform a formative check to ensure accuracy and provide students with feedback. Lastly, the students will sort the function families. At this point the students are not to be given guidance as to how to sort, they should sort based on whatever pattern they see. Using their own sorting pattern each pair must make a prediction as to what they think are characteristics of Exponential, Quadratic, and Linear functions. The teacher should provide no clarification at this point. (this activity will be further referenced in the activity for SCORE 4.0)

	1.5	Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content	
Score 1.0	**With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.**		
	0.5	With help, a partial understanding of the 2.0 content but not the 3.0 content	
Score 0.0	**Even with help, no understanding or skill demonstrated.**		