

#529, Wilson, Algebra 1: From Perspiration to Perseverance

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3 Main Strategies to Move Students from “Don’t Get It” to “Done Got It”

1) “Rich, high-quality tasks have the power to create a foundation for more sophisticated ideas and support an understanding that goes beyond how to why” (Robert Ronau, 2014, p. 8).

2) Use higher rigor questioning types such as Reversibility, Flexibility, and Generalizations. “Reversibility questions are those that have the capacity to change the direction of students’ thinking. They often give students the solution and require them to create the corresponding problem. A flexibility question can be one of two types: it can ask students to solve a problem in more than one way, or it can ask them to compare and contrast two or more problems or determine the relationship between or among concepts and skills. Generalization questions also come in two types: they ask students to look at multiple examples or cases and find a pattern or make observations, or they ask them to create a specific example of a rule, conjecture, or pattern” (Robert Ronau, 2014, p.9).

Teachers can also use Lake County Schools, Florida *Rigor in the Math Classroom through the Implementation of the 8 Standards for Mathematical Practice* rubric which highlights by standard what high rigor should look like for teacher input, task, student output, question stems, and writing stems.

3) Hands-on strategies to promote productive dispositions about mathematics

Reference

Ronau, Robert, Dan Meyer, and Terry Crites. *Putting Essential Understanding of Functions into practice in Grades 9-12*. Putting Essential Understanding into Practice Series. Reston, Va.: National Council of Teachers of Mathematics, 2014.

Overview of Algebra 1 Hands-on Strategies Highlighted in the Session

Function Find F-IF.7

This card game gives the students the opportunity to practice interpreting functions and identifying appropriate graphs.

Protocol - Groups of 4

Materials: Deck of 24 cards with functions and 24 cards with corresponding graphs for functions.

Three variations to play the game: 1) Lay all of the graph cards face down. Deal out function cards to each player. First player picks a card to see if it is a match, if so they lay down their pair. If it is not a

match they turn it back face down for second player's turn. The winner is the player with the most cards. 2) Play like Rummy 3) Play like Memory

Slope Dance F-IF.7

Participants will learn to dance the moves for positive slope, negative slope, slopes of zero, and undefined.

Float Like a Butterfly F-IF.7

Protocol – Individual

Create a 4 page mini-flip book of animated graphics of a butterfly flapping its wings as it moves around the coordinate grid by using translations with alterations of a , h , and k .

Function Dance Fun F-IF.7

Participants will learn to dance the moves for alterations of a , h , and k in graphs of absolute value, quadratic functions, and exponential functions.

Sweet Systems A-REI.6

Protocol – Shoulder Partner

Count the number of M & Ms for each color in your bag. Then substitute in your counts to find the total for each line and record your answers. Next, solve your systems. Discuss with your table why your solutions work even though you have different starting counts from your table partners.

Hidden Treasure A-REI.6

This is a graphing activity that will develop the concepts of systems of equations.

Linear Inequality Picture A-REI.12

Protocol - Individual

Make a picture graph out of at least 10 inequalities by sectioning the picture into 5 different frames with two inequalities in each frame. Then give the inequalities and their colors for each frame along with the solution for each frame.

Comet Cremator F-IF.7

Protocol – Shoulder Partner

Player A designs a graph that will cremate as many comets (points) as possible and gives the function for the graph. Player B retaliates in like fashion. The winner is high scorer after 5 minutes or three rounds.

Define the Line F-IF.7, A-REI.6

Protocol - Stand up and find a partner, partner A ask partner B for a generalization, partner B explains, partner A records, partner B signs name signifying record is right, reverse rolls, and continue with another partner.