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2019 Technology Integration Workshop

Unit Title:Graphing Linear Equations

Grade Level: 9th grade

Subject Area: ***Math***

Duration/Length/Number of class periods: ***2 weeks (please note: adjust your pace to the rate at which your students are learning the material. 2 weeks is a rough estimate)***

Description: *This unit will teach your students about characteristics of linear equations in slope-intercept and point-slope form, as well as direct variations. Students will use what they learn to solve problems in various contexts.*

Established Goals:
MN math standards (2007):
8.2.2.1
8.2.2.2
8.2.2.3
8.2.4.3
9.2.1.3

What Enduring Understandings are desired?

Essential Understanding 1: Functions are relationships between two quantities in which each input is associated with a unique output.

Essential Understanding 2: Functions can be modeled in a variety of ways (tables, equations, graphs, etc.)

Essential Understanding 3: Characteristics of function models can provide information about the relationship between two quantities.

What Essential Questions will be considered?

- What does the rate of change say about the relationship between two quantities?
- How does the constant in an equation affect the graph of the equation?
- How are equations, graphs, and tables related?

Students will know / be able to:

- Calculate rate of change in various contexts (from a table, graph, two given points, etc).
- Model a linear relationship using an equation in *slope-intercept form, point-slope form, or a direct variation.*
- Transition between the various forms of a linear equation.
- Model a linear relationship with a graph.

Description *Units must include at least one of each formative, summative, introductory activity and learning activity. Check the appropriate box; one per row.*	Formative	Summative	Introductory Activity	Learning Activity	Student Technology Used	Teacher Technology Used	ISTE Standards
Desmos skyline picture creation project: (Authentic Performance Task) **IB Assessment Rubric**: Criterion A (Knowing and Understanding) Description: Students will create a perspective drawing of a cityscape, and then use Desmos to recreate the image. Students will be required to show evidence of the equations and domain restrictions used to create their cityscape.		x			x	x	3
Lesson 1: Slope calculation practice Description: Students will be given direct instruction on how to calculate slope/rate of change given two input-output pairs. They will then be given the opportunity to practice. Formative Assessment: Exit Ticket	x			x			
Lesson 2: Direct variation activity on Desmos (marble slides) Description: Students will play a game on Desmos that requires them to create one or more direct variation equations to beat a "level." The complexity of the task increases as they progress through the levels.			x		x	x	
Lesson 3: Direct variation practice Description: Students will be given direct instruction on direct variation (how to use an input-output pair to find "m", how to use the equation to find other input-output pairs, how to solve problems in various contexts involving direct variation, etc.), as well as time to practice working with problems in various contexts. Formative assessment: Exit Ticket	x			x			
Lesson 4: Slope-intercept form activity on Desmos (marble slides)			x		x	x	

Description: Students will play a game on Desmos that requires them to create one or more equations in *slope-intercept form* to beat a "level." The complexity of the task increases as they progress through the levels.							
Lesson 5: Slope intercept form practice Description: Students will be given direct instruction and practice time on equations in slope-intercept form, using features of the equation to draw conclusions about the graph, creating an equation in slope intercept form to model a linear relationship, and using the equation to make predictions. Formative assessment: Exit Ticket	x			x			
Lesson 6: Point-slope form activity on Desmos Description: Students will play a game on Desmos that requires them to create one or more equations in *point-slope form* to beat a "level." The complexity of the task increases as they progress through the levels.			x		x	x	
Lesson 7: Point-slope form practice Description: Students will be given direct instruction and practice time on equations in point-slope form, using features of the equation to draw conclusions about the graph, creating an equation in point-slope form to model a linear relationship, and using the equation to make predictions. Formative assessment: Exit Ticket	x			x			
Lesson 8: Parallel Lines activity on Desmos Description: Students will be given a set of equations with the same slope to graph on desmos, and be asked to draw a conclusion about the relationship between the slope of an equation and whether or not it will be parallel to the graph of a second equation.			x		x	x	
Lesson 8: Two-point perspective drawing Description: Students will be shown a tutorial on creating a two-point perspective sketch of a cityscape. Students will practice this on their own for the remaining portion of the hour. https://www.youtube.com/watch?v=yNq78n02fMQ&t=124s			x		x	x	
Lesson 9: Introduce the Cityscape Project Description: Introduce the cityscape project, make the expectations clear (i.e. equations and domain restrictions used must be printed out and turned in, domain and range of the coordinate plane they're allowed to use, etc), and… - model how to create a two-point sketch of a building on Desmos, *specifically noting that you want lines to be almost parallel, not exactly parallel.*		x				x	

- model how to turn off the axis' and grid in the background when you want to see what your cityscape looks like so far.							

Materials, tools and resources: Chromebooks, Desmos, teacher created flipcharts and worksheets
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Additional credit given to