Lesson Title: Linear equations
Unit Title: Slope and Y-intercept
Teacher Candidate: Griselda Madrigal
Subject, Grade Level, and Date: Math, 10th grade, Oct. 22, 2014

Placement of Lesson in Sequence
This is the second lesson linear equations
Central Focus and Essential Questions
The central focus and purpose for this learning segment is to understand the components of a linear equation specifically the slope and y-intercept. Students will learn how the slope and y-intercept affects a graph.
Content Standards
Math.CCSS.Math.Content.8.F.B.4: Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Learning Outcomes	**Assessment**
SWBAT: • Determine the slope and y-intercept (linear equation) of a graphed linear function • Explain what a slope and y-intercept mean in terms of their graph • Explain the changes that occur to a graph when the slope and y-intercept change (ex: a negative slope would make the graph decline from left to right)	The formative assessment will begin with students working in groups to visualize how the slope and y-intercept affect a linear equation. They will be doing so by using *Wolfram Demonstration Project Lines: Two Points* http://demonstrations.wolfram.com/LinesTwoPoints/. They will be in pairs of two and will be given a worksheet to complete. This worksheet will give instructions on what the y-intercept and slope of the linear function will be. They are to plot first the y-intercept and then figure out the next point according to the slope in order to create the linear function (Learning Target #3). This will assess their reasoning and procedural fluency on how they got their second point as well as their conceptual understanding of slope (rise over run). This program will then show them the line and how it moves as they pick their points as well as give them the linear equation in y=m*x*+b format assisting their conceptual understanding on how a slope and y-intercept make a linear equation. They will then answer questions assessing both their reasoning and conceptual understanding such as, "what if the slope was -4 instead of 4, how would that change the graph of the linear function?" (Learning Target #2). This worksheet will be the formative assessment and I will also be assessing them informally as I walk around observing their discussions with their partner and reasoning for their answers. During my observation I will occasionally ask students to elaborate on their reasoning and give them alternative scenarios to

	promote deeper thinking and elicit their problem solving skills (learning Target #2). After completing their group worksheet, students will be informally assessed once again individually. They will navigate to http://funbasedlearning.com/algebra/graphing/lines/ where they will play a game *Line Gem1* where they must choose the correct linear equation that will go through the most gems in order to get the most points possible (Learning Target #1). I will be observing the linear equations to monitor that they are indeed the linear equations that would collect the most gems. I will also be asking question such as, "why didn't you pick this one" (another linear equation) not necessarily because they picked the wrong one, but to reassure myself that they didn't pick it out of randomness. Another question that will be asked is "what if you picked this equation rather than the one picked?" This game will allows student to get practice on finding the y-intercept and the slope needed to conclude the correct linear equation as well as give me the opportunity to assess their reasoning/problem-solving skills.

Learning Targets	**Student Voice**
• I can determine the slope and y-intercept by looking at the graph of a linear function • I can explain the effects of different slopes and y-intercepts on a linear equation. • I can find a second point of a linear equation given a point and the slope of a linear equation • I can give the definitions of slope and y-intercept • I can explain what a slope and y-intercept signify according to a given graph or linear equation	The learning target will be on the board and discussed at the beginning of class and referred back to at the end of class. They will be asked to write down on a sheet of paper if they thought the lesson was effective in helping them meet their learning targets and if not explain why, what they learned, and what they found confusing (exit task). Students will also be asked randomly throughout the period to explain how they reach an answer.

Prior Content Knowledge and Pre-Assessment

Academic Language Demands		
Vocabulary & Symbols	**Language Functions**	**Precision, Syntax & Discourse**
• Slope (m) = rise over run • y-intercept (b)= where the line crosses	• Students will explain how they determined the y-intercept and slope • Students will be able to	**Mathematical Precision:** Students will communicate their solutions using correct terminology referring to "b" as

the y axis • y=mx+b	explain what a slope and y-intercept are in terms of their linear equation or graph • Students will be able to explain how they found the second point given the first point and the slope of a linear equation	the y-intercept (where the line crosses the y axis) and "m" as the slope and rise over run. **Syntax:** Students will explain how they reached a second point given the y-intercept (first point) and the slope by using the definition of slope; rise over run. Students must be able to pick the correct linear equation given points on a graph that it must pass. Students must also be able to explain their reasoning for picking that equation using terms such as slope and y-intercept. **Discourse:** Students will explain their answer using mathematical language in their groups and then when asked to individually.

Language Target	**Language Support**	**Assessment of Language Target**
• I can describe how I found the slope (m) and y-intercept (b) from a given graph (linear function) • I can give the definitions of slope and y-intercept • I can explain what a slope and y-intercept signify according to a given graph or linear equation	• Explain the definitions of slope and y-intercept and show how to find them visually (conceptual understanding & procedural fluency) • Give alternative explanations and examples to students that are having a difficult time grasping the concepts (conceptual understanding) • Be walking around the classroom to provide assistance to students who need it • One on one time with students with	I will be assessing their language targets through my observations of their discussions with their partners and reasoning of their answers. I will also assess this through their answers on the worksheet. I will be looking for usage of proper terminology in both the worksheet and through discussions with their partners as wells discussions between me and the student. These discussions will take place while they are working with their partners as well as when they are playing the online *Line Gem 1* game.

	exceptionalities • Working in groups will allows students to also get help from their partner (cooperative learning).	

Lesson Rationale (Connection to previous instruction and Objective Standards) First the students were introduced to the concepts of functions earlier in the year. Then the students learned to solve equations and inequalities. The students now have been introduced to the term slope through rate of change as well as through the distance between two points. In this lesson the students will be introduced to y-intercepts and slopes as components of a liner equation. They will be building their understanding of slope (rise over run) from their previous understanding of slope (rate of change). They will be given examples on how to conclude a y-intercept and a slope from a given graph. They will then get the chance to visualize the changes that occur to a linear equation as the slope and the y-intercept change and practice finding slopes and y-intercepts in a fun matter (*Line Gem 1).*

Differentiation, Cultural Responsiveness and/or Accommodation for Individual Differences
In order to accommodate for gaps in mathematics capabilities amongst the students, they will get a chance to work with and listen to their peers on how they came to their answer. They will be receiving feedback from their peers as well as from me. Feedback from both me and their peers/partner will allow students to get a better conceptual understanding on linear equations. I will be walking around to help those who need it. I will be providing alternative explanations to students who continue to be confused and address and correct misunderstandings students may have. I will be checking student's work and confirming their answers and/or steering them towards the answer. I will also checking that they are taking the proper steps. I will be asking them questions as I walk by to check their understanding and reasoning. I will also have some one on one time with students in need of extra helps. My next lesson plan will be based on how well they seem to understand today's lesson. For example, if they seem to be confused with the concepts my following lesson plan will be going over the same material and finding an alternative activity that may help the students better understand.

.

Materials – Instructional and Technological Needs (attach worksheets used)
Students will need the worksheet given, a writing utensil, and computers that will be provided.

Teaching & Instructional Activities			
Time	**Teacher Activity**	**Student Activity**	**Purpose**
15 min	Elicit discussion of what students think slopes and y-intercepts are. This will be followed by explaining the definitions of slope and y-intercept through use of visuals (graph) and examples. This will also be when the learning target will be discussed	Engage in class discussion. Take notes and ask questions.	See what students know about slopes and y-intercepts. For students to become familiar with new concept

20 min	Give students time to work with partners to complete worksheet and observe their conversations and be available to give alternative explanations	Work in a group to complete worksheet and use *Wolfram demonstration Project Line: Two Points.*	Peer-assess and better understand the concepts
10min	Observe students play *Line Gem* and clarify and errors as well as assess conceptual understanding	Play *Line Gem* to practice what they have learned in today's lesson	For student to get practice in identifying the y-intercept and the slope of a linear equation in a fun matter
5 min	Exit Task	Exit Task	Student voice their opinion on how the lesson went, what they learned and what they still need help with to reach the learning targets.