**Lesson Title: You Bakin’ Me Crazy with these Functions**

**Unit Title: Functions**

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**Subject, Grade Level, and Date: 8th Grade Mathematics on July 21, 2017 12:00-12:50pm**

**Placement of Lesson in Sequence and Lesson Rationale**

This is the project in the Algebra Expression Unit focusing on functions, students have worked with constructing a function to model and graph a linear relationship between two quantities.

**Central Focus and Purpose**

 This lesson is a formative assessment for students to construct functions and graphs in order to model linear relationships between quantities. In this activity students will create a poster including multiple representations of a function they created with their food truck. Students will connect the relationship of the function they created and their graph on the poster they present.

**CCSS.MATH Content and Practice Standards**

8.F.B.4, 8.F.B.5, MP.4

**Prior Content Knowledge and Pre-Assessment**

Prior to this assessment, students experienced formulating functions based on real life application problems, and have a general knowledge of substituting numbers and variables and solving an equation. Students know how to construct graphs in relation to a function they created.

**Learning Target(s) and Plan for Clarifying Intending Learning**

I can generalize equations in slope-intercept form in scenarios depicting number of food items sold in profit to your food truck.

I can explain that my solution is correct through my presentation of my food truck poster

I can graph my food truck items in relationship to items sold

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| **Strategy for using assessments to guide student learning** |
| The assessment cycle will be, students will create a project based learning assignment in groups of four. Students will propose ideas about their food truck, as well as, create equations, graphs and representations in their small groups. While the students are proposing their ideas, the teacher will be walking around monitoring the groups. Then the students will be creating a visual representation of their food truck ideas in poster format, which will be presented through an oral report in front of the class. After all the presentations, the teacher will hold a class discussion to review and answer any misconceptions. Finally, students will complete an exit slip individually to end the unit. |
| **Success Criteria** (criteria for interpreting student success of the learning target) | **Plan for providing feedback and students’ monitoring of their own learning** |
| Students will be completing an exit slip answering the following questions. What does each variable of your function represent? How does each variable contribute to the problem? How do you make sense of your equation using the graph you’ve created? The exit slip is worth 50 points, and your group presentation is also worth 50 points. There will be two Rubrics, one for your group presentation, and one for your individual exit slip. Combining scores for the overall grade for the unit.  |  The teacher will give each group written and oral feedback on their posters using the rubric as a guide. During student learning, the teacher will monitor each group individually, checking for understanding and redirecting if needed. |

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| **Academic Language Demands** |
| **Language Function** | **Vocabulary & Symbols** | **Secondary Language Demand** |
| Students will explain how they developed their formulas.Students will explain how each representation relates to each other.     | Math Terms: variable, formula, equation, function  | **Mathematical Precision:**  Students must have at least 3 different variables in their function related to the different food items they will present for their food truck. **Syntax:**Students must set their food truck formula equal to the cost of number of items bought in the food truck.**Discourse:** Each group of students will be able to create their own problem and form a solution by creating a function. Students will identify patterns in order to create their functions and graph their results. These findings will be presented in poster format in front of class on the final day of the unit. |

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| **Language Support** (instructional and assessment strategies) |
| **Language Instruction** | **Guided Practice** | **Independent Practice** |
| Students will follow stem sentences provided by their teacher before their presentations. The teacher will model using the stem sentences, for example “ variable a is a donut, variable b is a muffin, and so on” | While the students make their food truck poster, students will practice their explanations of their equations and how their equations are represented. The students will present to the class and the teacher after constructing their explanations. | Students will present and explain their posters to the class. Student will also, write up an exit slip of their own knowledge of their functions they created.  |

**Differentiation, Cultural Responsiveness, and Accommodation for Individual Differences**

To accommodate for the differences in mathematical ability and understanding, students will work in groups of four to create and explain their functions and explain how their equations represent each variable. For their exit slip, students will work individually to access each student’s ability to understand how to create an equation, as well as, use the equation to graph, and to show the representation of each variable. The “Five E” lesson plan is used to help students model their learning, and the worksheet included is used to help guide the groups in each step to creating their poster.

**Materials – Instructional and Technological Needs** (attach worksheets used)

6 poster boards, markers, graphing paper, computers, exit slip, food truck worksheet

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| **Instructional Plan** (detailed explanation for thing the lesson) |
| **Pacing** | **Teacher Activities** | **Student Activities** |
|  10 Minutes |  **Engage - Whole Class***\*Explain while handing out the worksheet, “You Bakin’ Me Crazy with these Functions.” Students desks will already be formed in groups of four. The teacher will have rearranged students into the group preferences they prefer each student to be in. There are 6 groups of 4.*Engage students in a fun conversation asking what their favorite genre of food is. Do they like Mexican, American, Italian food? Ask students to discuss this question for 2 minutes on their favorite foods within the group. Pick on three students to tell the class what their favorite food is. Afterwards, explain to students they will now be able to create a food truck of their desires. Students can choose whatever food they dream of and put it in their food truck and design a poster to go with. *\*Students will be instructed to follow the prompt of the worksheet to complete the assignment. There will be a rubric attached to the back of the worksheet so students know exactly what is to be expected to receive full credit.* |  Each student must think of their three favorite food items or favorite food genre. Students will discuss this idea with their group and some students will answer this questions in front of class.  |
|  10 Minutes | **Explore - Groups/ Whole Class***Explain*, in any type of food industry the number of items purchased must be calculated to find the total cost of the products that you want to buy. Take, for example, a coffee shop. If you walked into a coffee shop and had only ten dollars to spend, how many lattes can you buy if each cup cost three dollars? Have students work on the problem individually and then talk within the group the answer they had found. Ask two groups to explain their answer and how they got it. |  Given the coffee question, answer how many lattes can be bought with ten dollars and explain how the answer was found within the group. |
|  10 Minutes |  **Explain - Whole Class**Looking at the previous coffee question that was given, ask if students can see a pattern? Can students form a function based on this scenario? If students were given a larger number such as 167 dollars could they represent the question using an equation? Keep asking questions until a student can explain the function of how this problem can be represented and why this equation works. |  Write A for the amount of money you have and C for the number of lattes bought. Explain how the function you found works and justify that it works for all numbers of coffee cups and different amounts of dollars. |
| Day 1: 20 Minutes Day 2:50 Minutes | **Elaborate - Groups**Review the worksheet, *“You Bakin’ Me Crazy with these Functions.”* with students. Compare the examples that were just explained in class with the work that will be done in the food truck activity. Ask students of the similarities and dissimilarities within both of the activities. Explain that students will be answering every question on the worksheet before decorating their poster. Review students’ worksheet once completed before they move onto representing their data on the poster. Day Two: Students will continue working on their worksheet and beginning their posters. | **In groups for the final 20 minutes and the following day**Create, test, and discuss different formulas for the food truck idea that you create. After you have finished the worksheet, ask the teacher to look over your work before moving onto representing your information on your poster. Remember: the poster must include the answer to each question from the worksheet on the poster and the poster must be legible. |
| Day 3:35-40 Minutes15-10 Minutes  | **Evaluate - Whole Class 35-40 Minutes**Each group of students will present their food truck poster to the entire class. They will stand and explain their group’s formula, solution to first customer scenario, and graph. This poster is worth half f the project’s grade.**During the final 15-10 minutes** Students will individually complete an exit slip that is worth the other half of the project’s grade. | **Group Assessment**Each group uses the correct reasoning and communication skills as well as correctly represents the graph of the function created. The grading scale of this project will be on the back of the worksheet for students to view and practice on. **Individual Assessment**After each group’s presentation is complete, students will answer the following questions and hand in to the teacher by the end of class: When considering the food truck you created, answer the following questions:What does each variable of your function represent? How does each variable contribute to the problem? How do you make sense of your function using the graph you’ve created? |

Poster

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| CATEGORY | **4** | **3** | **2** | **1** |
| **Content**  | All questions from the worksheet are presented organized and clear on the poster. | Almost all questions from the worksheet are presented organized and clear on the poster. | Some questions from the worksheet are presented organized and clear on the poster. | The poster is not relevant to the worksheet. |
| **Use of Class Time** | Used time well during each class period. Focused on getting the project done. Never distracted others. | Used time well during each class period. Usually focused on getting the project done and never distracted others. | Used some of the time well during each class period. There was some focus on getting the project done but occasionally distracted others. | Did not use class time to focus on the project OR often distracted others. |
| **Accuracy** | Students were able to explain how they found the formula and justify that it works for their food truck idea. | Students were able to explain how they found the formula but was not able to justify the function properly. | Students were able to explain how they found the formula. | Students were not able to explain how they found the formula nor justify that it works for their food truck idea. |

Exit Slip

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| CATEGORY | **4** | **3** | **2** | **1** |
| **Variables** | Student was able to identify each variable within the function. | Student was able to identify two variables within the function. | Student was able to identify one variable within the function. | Student was not able to identify any variables within the function. |
| **Variable Contribution** | Student was able to accurately explain how each variable of the function contributed to the problem and use an example. | Student was able to explain how variables of the function contributed to the problem. | Student was able to somewhat explain how some but not all variables of the function contributed to the problem. | Student was not able to explain how each variable of the function contributed to the problem. |
| **Graphing** | Student was able to accurately connect the graph to the function and explain using examples of how the two connect to one another. | Student was able to accurately connect the graph to the function. | Student was somewhat able to connect the graph to the function. | Student was not able to accurately connect the graph to the function. |

You Bakin’ me Crazy with these Functions!

Congratulations! You’ve just opened your own food truck. Pick three items you will specialize in your food truck.

 1.

 2.

 3.

Now you must choose 3 different prices for your food items.

 1.

 2.

 3.

Represent each food item with an equation. Remember to have different variables for each food item. Using those equations represent each function in a graph. Graphing using different colors for each food item.

 1.

 2.

 3.

Combine the equations you made above into one equation.

 1.

You have your first customer, she has $250 to spend for her work party. She request all three specialties for her work party and wants to use the full amount of $250. What is the best way to represent this problem. Explain in words what each variable means in relation to the equations.

 1.

Using your last equation, create a graph that shows a visual representation of how your first customer’s money was spent. You must utilize the full amount of the money, if not, close to the full amount of money.

Using the information above, create a poster explaining your business and how each specialty item is represented in respect to the profit of your business.

First Destination Exit Slip

When considering the food truck, you created, answer the following questions:

What does each variable of your function represent? How does each variable contribute to the problem? How do you make sense of your function using the graph you’ve created?