**Lesson Plan: Grade 8 (Session 1, October 2013)**

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| Unit Title: Functions  Lesson: 1 of 4 | Approx. time:  90 minutes | CCSS-M Standards: **8.F.1** Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.  **8.F.2** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). |
| A. **Focus and Coherence**  Students will know the meaning of a function by describing the relationship between the number of knots and the length of the rope.  Students will be able to identify a function by describing the relationship that exists between two quantities of the function. Students will able to represent the functional relationship using a variety of representations.  Student prior knowledge: Graph points on a coordinate plane  Which math concepts will this lesson lead to? Meaning of a functional relationship, connection between the four representations of a functional relationship | | B. **Evidence** of Math Practices  *What will students produce when they are making sense, persevering, attending to precision and/or modeling, in relation to the focus of the lesson?* |
| **Essential Question(s)**  What is a functional relationship?  How can functional relationships be represented? | | |
| **Formative Assessments**  Creation of a table of values that represent the number of knots and the corresponding length of the rope  Translation of the table of values to sets of ordered pairs  Plotting of ordered pairs  Estimation of the size of each knot – connection to the context of the problem  Connection between the various representations and the context of the problem | | |
| **Anticipated Student Preconceptions/Misconceptions**  - Disconnect between the symbolic notation and the context of the problem | | |
| **Materials**/Resources  Piece of rope for each pair of students, ruler or tape measure, recording sheet | | |
| C. **Rigor**: Conceptual Understanding, Procedural Skills and Fluency, and Application  *What are the learning experiences that provide for rigor? What are the learning experiences that provide for evidence of the Math Practices? (Detailed Lesson Plan)*  **Warm Up** -  Graph the ordered pairs on a coordinate plane. Be prepared to explain how you knew where to plot each point.  **, , ,**  **Lesson** –   1. Students read the task individually. Then one partner explains the task to the other partner who listens for accuracy and validates or clarifies as needed. Write a brief description of the task in the verbal section of the rule of 4 sheet. 2. Student pairs complete the task, recording their information on a rule of 4 sheet. 3. Strategic Sharing of work and answers to questions. Ask why isn’t the size of the knot exactly the same each time? 4. Student pairs complete the framed sentence. Have students share their sentences with another pair for feedback and potential revision. 5. Ask the question: If the length of the rope is a function of the number of knots, which is the independent variable and which is the dependent variable? 6. Label the table, with independent, dependent. Then use the table information to create ordered pairs – add label *x and y* to the table. 7. Student pairs graph the sets of ordered pairs after determining an appropriate interval and scale. 8. Ask the question: What do you notice about the plotted points? Lay your pencil along the plotted points. What does it look like?   **Closure** –   1. How do the different representations communicate the information about the relationship between the knots and the length of the rope? 2. How would you define a functional relationship or a function?   (A function is a rule that uniquely defines how the first or independent variable affects the second or dependent variable).  **Suggested Homework/Independent Practice-**  Each of the following is a function. Choose 3 of the following and express the relationship for each in functional terms.   1. The total cost and the number of McDonald’s extra value meals purchased 2. The cost of filling a car with gas 3. The number of miles a car can travel if the gets 23 miles per gallon 4. Marc is an avid cyclist and is training to be a professional bicycle racer. The total number of miles he rode his bicycle if he averages 19 miles per hour. 5. The amount earned while babysitting at the rate of $4.25 per hour. | | |