MRS. GAWLIK/MRS. CACHIA Lesson Outline

Grade/Subject: 8th Grade Mathematics Monday, September 8, 2014

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| **Content Objective:**  I can demonstrate comprehension of a Ti84 graphing calculator by completing a graphing calculator scavenger hunt worksheet. | **Language Objective:**  I can write to answer questions about the functions of a Ti84 graphing calculator using a graphing calculator scavenger hunt worksheet. |
| **Visuals, Materials, & Text**  **TEXT:** None  **VISUALS:** Ti84 Scavenger Hunt Worksheet  **MATERIALS:** Ti84 Calculators and scavenger Hunt worksheet (one for each student) | |
| **Content Objective:**  I can demonstrate knowledge of content specific vocabulary words by completing a graphic organizer using a graphic organizer | **Language Objective:**  I can write to answer write to define content specific vocabulary using a graphic organizer. |
| Visuals, Materials, & Text  TEXT: Thinking with Mathematical Models  VISUALS: None  MATERIALS: Graphic Organizer worksheet (one for each student) | |
| **Wrap up/Ticket Out**   * Today I learned… | |

MRS. GAWLIK/MRS. CACHIA Lesson Outline (TWO DAYS)

Grade/Subject: 8th Grade Mathematics **Tuesday, September 9, 2014/Thursday September 11, 2014**

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| **Content Standard:**   * 8.F.3 Interpret the equation as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. | **ELP Standard:**  English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics. |
| **Content Objective:**  I can demonstrate comprehension of slope by determining whether a function is linear or nonlinear by representing data patterns using models, graphs, tables, word descriptions, and algebraic expressions. | **Language Objective:**  I can/student will orally describe the relationship between bridge length and bridge thickness using content specific vocabulary by conducting the hands-on experiment, Bridge Thickness and Strength, Problem 1.1 on pages 8-9. |
| **Key Vocabulary:**  Independent and Dependent variable, linear relationship  **HOTS (Questions):**   * Why is it important that the ends of the bridge always overlap the books by 1 inch? (All of the bridges must be suspended in the same way.) * Where should you place the cup? (In the center of the bridge) * How should you add the pennies? (Carefully, using the same technique each time.) * Should you reuse a paper bridge after it has collapsed? (No; once a bridge has collapsed, the paper is structurally different from unused paper strips and would give different results.) * Do you need to fold the paper strips the same way every time? (Yes; to get good results from an experiment, you need to keep everything consistent as possible.) | **Content Specific: (Graphing the Data from the Experiment)**   * Which is the independent variable and which is the dependent variable? (Thickness is the independent variable and should be on the horizontal axis. Breaking weight is the dependent variable and should be on the vertical axis.) * What patterns do you see in the data? (The data appear to be almost linear.)   **General Terms: (Data collection for experiment)**   * What does it mean for a bridge to “collapse”? Students need agree on a definition so that the groups can compare their results, students will need to judge the collapse of a bridge in the same way. * How should your data compare to the data of the other groups in the class? (If they did experiment in the same way, results should be similar.) |
| **Visuals, Materials, & Text**  TEXT: Thinking with Mathematical Models Text  VISUALS: Virtual Bridge Experiment  MATERIALS: Data and graphs, ACE lab sheet 1ACE, Centimeter Grid Paper lab sheet, Two books of the same thickness, small paper cups, 50 pennies per group, 11x4 ½ inch strips paper | |

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| **TASKS**  **Activating Prior Knowledge**  **(Processes, Stems, and Scaffolds)**   * Have you ever walked across a shaky bridge and wondered if it would hold your weight? * Do you get nervous when a car, bus, or train you’re in crosses a high bridge? * How do you suppose bridge designers know which materials and designs will give a bridge the strength it needs?   **Building Vocabulary and Concept Knowledge**  **(Processes, Stems, and Scaffolds)/**  **Structured Conversation and Writing**  **(Processes, Stems, and Scaffolds)** | **Reviews & Checks for Understanding**  **(Response Signals, Writing, Self-Assessment, Student Products, etc.)**  Listen to student responses to questions, walk around and observe experiments, make sure students are bending the paper correctly and placing cup in correct area of the bridge. |
| **Wrap up/Ticket Out**   * Today I learned… | |

MRS. GAWLIK/MRS. CACHIA Lesson Outline

Grade/Subject: 8th Grade Mathematics Wednesday, September 10, 2014

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| **Content Objective:**  I can demonstrate knowledge of previously learned math concepts by completing the Star Math formative assessment. | **Language Objective:**  I can write to answer questions of previously leaned math concepts using the Star Math formative assessment program. |

MRS. GAWLIK/MRS. CACHIA Lesson Outline

Grade/Subject: 8th Grade Mathematics Wednesday, September 10, 2014

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| **Content Standard:**   * 8.F.3 Interpret the equation as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. | **ELP Standard:**  English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics. |
| **Content Objective:**  I can demonstrate comprehension of slope by determining whether a function is linear or nonlinear by representing data patterns using models, graphs, tables, word descriptions, or algebraic expressions. | **Language Objective:** I can orally describe the pattern between bridge strength and bridge length using content specific vocabulary by conducting the hands-on experiment, Bridge Length and Strength, Problem 1.2 on pages 10-11. |
| **Key Vocabulary:**  Independent and Dependent variable, linear relationship, inverse relationship  **HOTS (Questions):**   * How do you think the length of a bridge is related to its strength? (The longer the bridge, the weaker it is.) * Are longer bridges stronger or weaker than shorter bridges? (weaker) * What do you think will happen in this experiment? (Less weight will probably be needed to collapse the bridge as length increases.) * Where should you place the cup? (In the center of the bridge) * How should you add the pennies? (Carefully, using the same technique each time.) * Should you reuse a paper bridge after it has collapsed? (No; once a bridge has collapsed, the paper is structurally different from unused paper strips and would give different results.) * Do you need to fold the paper strips the same way every time? (Yes; to get good results from an experiment, you need to keep everything consistent as possible.) | **Content Specific: (Graphing the Data from the Experiment)**   * You are using materials similar to the materials you used before. What are the variables this time? (Length and breaking weight) * What do you think the data will look like? What shape do you think the graph will have? (The graph will probably show breaking weight decreasing as length increases). * Which is the independent variable and which is the dependent variable? (Length is the independent variable and should be on the horizontal axis. Breaking weight is the dependent variable and should be on the vertical axis.) * As bridge length increases, what happens to the number of pennies the bridge can support? (it decreases) * AS bridge length decreases, what happens to the number of pennies the bridge can support? (It increases) * What shape or patterns do you see in the data? (The data is not linear and the lines curved. appear to be almost linear.)   **General Terms: (Data collection for experiment)**   * What does it mean for a bridge to “collapse”? Students need agree on a definition so that the groups can compare their results, students will need to judge the collapse of a bridge in the same way. * How should your data compare to the data of the other groups in the class? (If they did experiment in the same way, results should be similar.) |
| **Visuals, Materials, & Text**  TEXT: Thinking with Mathematical Models Text  VISUALS: Virtual Bridge Experiment  MATERIALS: ACE lab sheet 1ACE: Exercise 14-17 (1 per student) Centimeter Grid Paper Lab sheet, Two books of the same thickness, small paper cups, 50 pennies per group, 4 ¼ - inch strips of paper with lengths 4,6,8, 9, and 11 inches. | |

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| **TASKS**  **Activating Prior Knowledge**  **(Processes, Stems, and Scaffolds)**   * Discuss student findings about bridge length and thickness from Problem 1.1.   **Building Vocabulary and Concept Knowledge**  **(Processes, Stems, and Scaffolds)**   * Problem 1.2 (Bridge Length and strength) A-D pages 10-11.   **Structured Conversation and Writing**  **(Processes, Stems, and Scaffolds)**   * **Homework Application Question 1 a-c p15** | **Reviews & Checks for Understanding**  **(Response Signals, Writing, Self-Assessment, Student Products, etc.)**  Listen to student responses to questions, walk around and observe experiments, make sure students are bending the paper correctly and placing cup in correct area of the bridge. |
| **Wrap up/Ticket Out**   * Today I learned… | |