***Lesson Plan Template RP3b***

Adapted from: Smith, Margaret Schwan, Victoria Bill, and Elizabeth K. Hughes. “Thinking Through a Lesson Protocol: Successfully Implementing High-Level Tasks.”

*Mathematics Teaching in the Middle School 14* (October 2008): 132-138.

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| **PART 1: SELECTING AND SETTING UP A MATHEMATICAL TASK** | |
| What are your mathematical goals for the lesson? (i.e., what do you want  students to know and understand about mathematics as a result of this lesson?) | Ratios and Proportional Relationships: 3b |
| What are your expectations for students as they work on and complete this task?   What resources or tools will students have to use in their  work that will give them entry into, and help them reason through, the task?   How will the students work—  independently, in small groups, or in pairs—to explore this task?   * How will students record and report their work? | Data set-visually represent their data culminating with a tables, t-chart, tape diagram, equations, or double number line diagram.  graph paper, pencils, markers, rulers, chart graph paper  Start independently, Share with a partner  Using paper, share with the class |
| How will you introduce students to the activity so as to provide access to *all*  students while maintaining the cognitive demands of the task? | Launch: Begin lesson by discussing with students the different types of cars their families own.  Give them the scenario with their families’ car data, allow them to visually display any method:  Your family has just purchased a mini-van. The minivan travels at 28 miles per gallon. How far will the minivan travel with 2 gallons of gas? 3 gallons of gas? 4 gallons of gas? 15 gallons of gas?  Your family is planning a trip to Disneyland. The trip will require you to drive 840 miles one way. How many gallons of gas will be required to reach Disneyland? For the round trip?  The minivan broke down. You rent a Prius which will require 14 gallons to return home. What is the ratio of miles per gallon for the Prius?  Extension: Pick a destination of your choice to travel to that is farther than Disneyland.(New York, Disneyworld, the Alamo, Washington D.C.) Next pick a vehicle and find its mpg. Find how much gas will be used to travel there and how much it will cost at $3.50 per gallon. |

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| **PART 2: SUPPORTING STUDENTS’ EXPLORATION OF THE TASK** | |
| As students work independently or in small groups, what questions will you ask to—   help a group get started or make progress on the task?   focus students’ thinking on the  key mathematical ideas in the task?   assess students’ understanding of  key mathematical ideas, problem- solving strategies, or the representations?   advance students’ understanding  of the mathematical ideas? | -What do you think?  -How will you organize the information?  - Can your parents or peers glance at that and understand?  -Why did you put that there?  -Why did you choose that method?  -Is there another way you could have displayed that?  -Can you explain that to me?  -That is interesting  Frustrated Students:  How can she *visually* organize gas usage data?  -Do you see any patterns in the table? How can you explain the pattern?  Can you prove that?  Extensions:  Is there another way you could display that?  Is there anything you could do to make your visual easier to understand? |
| How will you ensure that students remain engaged in the task?   What assistance will you give or what questions will you ask a  student (or group) who becomes  quickly frustrated and requests more direction and guidance is  solving the task?   What will you do if a student (or group) finishes the task almost  immediately? How will you  extend the task so as to provide additional challenge? | Frustrated Students:  Short Debrief during Explore with students to analyze progress and make plans for continuing task.  Extension:  Bring in extension questions to encourage further exploration of task. |

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| **PART 3: SHARING AND DISCUSSING THE TASK** | |
| How will you orchestrate the class discussion so that you accomplish your mathematical goals?   Which solution paths do you want to have shared during the  class discussion? In what order will the solutions be presented? Why?   What specific questions will you ask so that students will—  1. make sense of the  mathematical ideas that you want them to learn?  2. expand on, debate, and question the solutions being shared?  3. make connections among the different strategies that are presented?  4. look for patterns?  5. begin to form generalizations?  What will you see or hear that lets you know that *all* students in the class  understand the mathematical ideas that  you intended for them to learn? | Have students share in this order-(ish):  -list info.  -finding the ratios  -double number line diagraph,  - tape diagram  -bar graph  **- charts/tables and ratio equations (this is the goal)**  Questions:  -Who else did that?  -Who else did it that way?  -What did you like about that?  -Can you explain what you did?  -Can you explain what they did?  -How is that method similar?  -How is that method different?  -Which method would you use next time?  -How can you use this to justify your interventions?  **Assessment**  use the data provided to create a visual display  Students will begin independently and then work with a partner to share before sharing with the whole class.  Connect the advantages or disadvantages of different displays.  All students will exhibit an understanding of ratio equations. |