**Domain: Statistics and Probability Standard Code: SP3 Teacher Name: Michelle,Becky, Heidi, and Heidi**

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?) | Students will be able to recognize that a measure of center for a numerical data set summarizes all its values with a single number, while a measure variation describes how its values vary with a single number. |
| * 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? | **Expectations:** Students will be engaged and be able to show and explain their thought process while  following the task.  **Materials/Resources/Tools:**  Math Journal  Task Worksheet  Pencil  Calculator  Document Camera/Chart Paper for Debrief  **Groups:**  Students will work on parts 1 and 2 independently and parts 3 and 4 with a small group.  **Recording:**  Students will record information on task sheet and in math journal.  (Glue task sheet into math journal when finished.) |
| 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:** (Optional) Show Disneyland slideshow at the following website:  <http://disneyland.disney.go.com/attractions/>  Read the top paragraph on task worksheet to lead students into the task.  (This is an introductory lesson to standard 3. Be very brief in your launch so they can discover more on their own.) |

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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 know? * What information are you given? * How did you get this answer? * What are you trying to figure out? * Are there other possible answers? * How do you know? * Can you relate this to something you’ve learned before? |
| 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? | **Part 1**   * What does the table tell you? * What order of operation would you use to figure out the difference?   **Part 2**   * How could you organize the information to find the middle number?   **Part 3**   * Which rides have the same amount of wait time? Is there one wait time that has more rides?   **Part 4**   * Does your answer make sense?   **Extensions:**   * If you pay $96 for a ticket and you are at Disneyland from 8 am to 4 pm, how much does each minute cost? How much does it cost you to stand in line for each of the 13 rides?Are you paying more to ride or more to wait? |

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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? | **Debrief: The Sharing and Discussing the Task:**  Have different students present each part of the task starting with students that have a more basic understanding and move to students who have a more complex understanding of the concept.  For each part of the task ask the following questions.   * Is there a mathematical term that describes the answer? * What does the term mean? (As a teacher, decide where and how you want your students to record the vocabulary.)   **What will you see or hear that lets you know that all students in the class understand?**   1. Students asking questions 2. Students observing others’ work 3. Students coming up with extensions and connected learning. |



**Disneyland Wait Times**

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| **Attraction** | **Average Wait Times** |
| Autopia | 25 minutes |
| Big Thunder Railroad | 20 minutes |
| Dumbo | 30 minutes |
| Haunted Mansion | 10 minutes |
| Indiana Jones | 40 minutes |
| It’s a Small World | 10 minutes |
| Jungle Cruise | 10 minutes |
| Matterhorn | 25 minutes |
| Peter Pan | 35 minutes |
| Pirates of the Caribbean | 15 minutes |
| Space Mountain | 60 minutes |
| Splash Mountain | 45 minutes |
| Star Tours | 90 minutes |

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**Disneyland: Is it Worth the Wait?**

What is the longest line you’ve waited in and what was it for? Was it worth the wait?

Your family’s going to Disneyland. You have been given the wait times for some popular attractions.

**Part 1:**

Which ride has the shortest wait time?

Which ride has the longest wait time?

What is the difference between the wait times?

**Part 2:**

If you were to ride the attractions from shortest wait time to longest wait time, which attraction would you ride in the middle?

Create a visual to show how you found your answer.

**Part 3:**

Your wait time would be the same if you went on which rides?

Which wait time had the most rides?

**Part 4:**

If you went on all 13 rides one time, how much total time did you spend in line?

What was the average wait time?

Your friend told you he waited in line for the Matterhorn for 40 minutes. Who is lying, Disneyland or your friend? Explain.