**EE.9 “Water Money”**

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 solve a real-world problem using 2 variables and examine the relationship in order to write an equation. |
| 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?   * How will students record and report their work? | Blank paper  Graph paper  Jar/container  Money - $5, $1 and quarters |
| How will you introduce students to the activity so as to provide access to *all*  students while maintaining the cognitive demands of the task? | I have decided to save my money for *Water For Sudan*. I already have $5. If I deposit $2.75 each week, how much money will I have raised in 6 weeks?  \*\*\*Note\*\*\* This task will be used with Linda Sue Park’s novel *A Long Walk To Water*. |

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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? | Possible solutions: $5 + 2.75 + 2.75 + 2.75 + 2.75 + 2.75 + 2.75 = $21.50  Equation: y = 2.75x + 5  Model Drawing:  Money  Saved $21.50   1. 2c.75 \* 6 = 16.5 2. 16.5 + 5 = 21.5   After 6 weeks I have saved $21.50.  Table:   |  |  | | --- | --- | | **x = Week**  2.75  2.75  2.75  2.75  2.75  2.75  $5 | **y = $** | | 0  1  2  3  4  5  6 | 5  7.75  10.5  13.25  16  18.75  21.5 |   Graph:  Number line  ­­­ 2.75 2.75 2.75 2.75 2.75 2.75  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  5 7.75 10.5 13.25 16 18.75 21.5 |
| 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? | What do you know?  What are you trying to figure out? Can you draw a picture of this?  Can you prove your answer?  Could you create a formula that would allow you to figure out how much money I have saved on a given week? |

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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? | Before participants begin sharing strategies say, “Make sure you pay attention because I will call on someone to explain the strategy that was shared in their own words.”  The following is a suggested progression to present students work:   1. Money/manipulatives, repeated addition, or a number line 2. Model Drawing 3. Table 4. Graph   How far did you go over from point to point?  How far did you go up from point to point?  Introduce idea of slope and rise over run.  How are the table and the graph similar? How are they different?   1. Equation   Sample questions to ask during the discussion:  Can you explain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_’s strategy in your own words?  Did anyone solve it the same way?  Which way is more efficient?    Now I want to set a class goal to raise $1000 for *Water For Sudan*. If we each have $21.50 set aside to begin our fundraising. How much money do we each have yet to save to reach our goal? If the fifth grade class is also going to raise $1000 for *Water For Sudan*, how much money does each fifth grader need to save to reach their goal?  Answer 1.) $1000/number of students - $21.50  Answer 2.) $1000/number of students |