***Lesson Plan Template for G4\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

Adapted from: Smith, Margaret Schwan, Victoria Bill, and Elizabeth K. Hughes. “Thinking Through a Lesson Protocol: Successfully Implementi ng 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?) | * The area of two-dimensional shapes can be used to find the surface area of the three-dimensional shape. * Understanding surface area using nets can be used in real world contexts. (wrapping presents) |
| 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? | As students use box measurements to wrap a birthday present, students may discover the formula to figure surface area. Students will create a net of their box by opening the box. Cut off the flaps that glue the box together. Draw the shape in their journal.  Box per pair of students  ½ inch graph paper  Journals  Poster paper, markers, scissors  Pairs in small groups  Record in math journals.  Trace net to create poster.  Share information on poster. |
| How will you introduce students to the activity so as to provide access to *all*  students while maintaining the cognitive demands of the task? | Select three boxes from student boxes to display at the front of the class. Next week is Susie’s birthday. How much wrapping paper will you need to wrap her present? Students predict which box will take the most wrapping paper to wrap.  Have groups name which box their group selected.  TASK: With your partner, use your box to make a net and figure out the surface area using the ½ inch graph paper.    Have students share idea of what a net is.  Students will measure the net with ½ inch graph paper and record measurements to the nearest line.  Students share ideas of surface area. Record surface area of each face. |

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| 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? | Which box did your group predict would take the most wrapping paper?  Describe what the net looks like. How many parts are there?  Explore net with vocabulary such as faces, edge, vertices, etc.  Can you show me your idea?  What’s the next step?  Using the net, can you figure the surface area of the box?  Which section of the net will you measure first with the graph paper?  Is there anything else you need to do?  After sketching the net, calculate the surface area and observations in journal then create a poster. |
| 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? | Scaffold down.  Choose a student to explain to another students.  Explain what you have done so far.  Verify your work using a second strategy.  What if your box is half that size, what would the surface area be?  What is the box was twice as big?  What if the box was ¾ the size? |

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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? | When some of the students have completed the poster, meet at the carpet for debriefing.  Select students to share the net.  Select different students to present the surface area of their box.  Select students to share their poster.  What discoveries did you make?  Did anyone make a different discovery?  Which group had the box that will use the most wrapping paper?  Will you need the same amount of wrapping paper as the surface area or will you need more?  What strategy did you use to find the surface area of a box half that size? Twice that size? Or ¾ the size?  After discussion, students return to groups to continue working. |

G4

Use your box to make a net and figure out the surface area using the ½ inch graph paper to the nearest line. How much wrapping paper would you need? Draw and record in your math journal.