*COMP Summer 2016 – Middle Grades Thursday, June 23, 9:45 – 11:30*

*Materials: Letter Vessels handouts, graph paper*

Yesterday, we looked at graphs of motion, including distance-time, speed-time, and velocity-time graphs. Today, we will do some work with pouring and filling containers starting with letter vessels.

* Give teachers the Letter Vessels – Part 1 handout. Briefly describe the task. Then ask teachers to work independently for 10 minutes. After independent work time, ask teachers to share with others at their table, and then continue their work as needed. Be sure to find the time required for the other three vessels to fill!
* After checking, ask teachers to share their strategies for determining the times, especially the challenging ones (V, A, and S). What make these vessels more challenging?
* Give teachers the Letter Vessels – Part 2 handout. (\*Ask them to change “minutes” to “seconds” on the horizontal axis of the graph.) Work independently and then share with a partner. When ready, discuss as a whole group.

*If time …*

* On graph paper, draw the graph of height vs. time for other letter vessels. Try a challenging one!

*COMP Summer 2016 – Middle Grades Thursday, June 23, 12:00 – 1:15*

*Materials: bottles (2 per group), graph paper, colored pencils, cups of water, graduated cylinders, pipettes, rulers, Bottle Filling handouts.*

This morning, we analyzed the filling of letter vessels and graphs of height vs. time. In this task, the graph of height vs. time would be the same as the graph of what other pair of variables? (height and volume) This afternoon, we will do some bottle filling and construct graphs of height vs. volume.

* Give teachers the Bottle Filling – Part 1 handout. Briefly describe the task. Encourage teachers to measure as accurately as possible. When we measure the height of the water in the bottle, should we measure from the table top? (\*Note: If a bottle does not quite hold 240 ml, just stop when it is full. If a bottle holds more than 240 ml, just stop at 240 ml.)
* Ask teachers to work in small groups to complete the first part of the task. Draw your predicted graphs in one color and the actual graphs in another color.
* When each group is finished, give them the Bottle Filling – Part 2 handout. Ask them to work independently first, and then discuss their responses as a table group.

*\*Before the break, collect the graphs and bottles from each group.*

*COMP Summer 2016 – Middle Grades Thursday, June 23, 1:30 – 2:45*

*\*During the break, hang the graphs (labeled 1, 2, 3, …) on the wall and display the bottles (labeled A, B, C, …) on a table under the graphs.*

* Ask teachers work independently to analyze the graphs and match each graph with a bottle.
* Share matching with your table group. Do you all agree?
* Ask each table group to reveal their graph/bottle pairs with the whole group.
* Discuss the questions on the Part 2 handout. What features of the graphs helped you match them with the correct bottles? Where any graphs surprising?
* Show teachers the Pouring and Filling Applet. A link is on the COMP website. Give teachers time to use the applet. Then discuss.

*If extra time …*

* Go back to the Letter Vessels handout. On graph paper, draw the graph of height vs. time for other letter vessels. Try a challenging one! Share graphs if time allows.