Question/Answer Follow-up from TeachFest Summer Academy: Math Tasks

These questions emerged as themes after we looked over Parts A, B, and C of the product you're working on. These excellent questions tell us that you are thinking about the right stuff! Unfortunately, there are no easy answers to the questions, though. The answers will come as you transform, implement, and revise tasks. Selecting worthwhile tasks involves numerous decisions you must make based on the mathematics content you are teaching, your learning goals, and your students. Make a decision and then try it out, reflect, and revise. Partnering up with a colleague as you try it out, reflect, and revise is crucial!

Questions about task creation or adaptation:

When should I give the task? At the beginning, middle or end of a unit?

- ❏ This depends on the goal of presenting the task in the first place. Here are some things you may want to consider….
  - ❏ Begin with the math! Articulate the mathematical ideas you want students to learn as a result of the lesson. Think in terms of mathematical concepts, not skills. Describe the math, not the student behavior.
  - ❏ Consider your students. What do your students know or understand about this topic at this time? Be sure the mathematics you identified in the task includes something new or at least slightly unfamiliar to your students. At the same time, be certain your objectives are not out of reach.
- ❏ We might want to launch a unit and see what students already know, or we may want to teach a bit about a topic and then present a task to expand on or refine understanding, or we may want to present a task at the end to help students solidify their understanding or connect to other topics. See Purposes of a Tasks below.
- ❏ It's perfectly within the realm of possibility that a unit will have more than one task.

How will the teacher connect multiple solution paths?

- ❏ Be on the look out for an e-mail with directions for a TeachFest Connecticut: Summer Academy follow-up recording on Task Implementation.
- ❏ For now, be sure to work out the task in multiple ways and predict what the student work might look like. Articulate for yourself (and of course bounce your ideas off a partner!) how the multiple solution paths or multiple solutions are connected.

Should the task incorporate real-world situations?

- ❏ It might. If a real-world situation makes sense, use it! If not, forcing one in can seem contrived and might draw attention from the math we want students to work on.
- ❏ Remember the shift to rigor requires a balance of conceptual understanding, procedural skill and fluency, and application.
- ❏ Think about other possible structures for the task that might stimulate interesting student work or discussion. Remember Professor Boaler's question about a figure: "How do you see it growing?" That was certainly not a real-world task, but definitely engages students in reasoning mathematically.

Questions related to students and student work

How should students be grouped to work on a task?

- ❏ This depends on the structure of the task. Are students asked to construct and defend an argument? Are they being asked to connect their solution method to that of other students? Questions like this will help you decide that, but this is usually an implementation question that we'll address in the Task Implementation recording.

What about differentiation? What prior knowledge will students need?

- ❏ One of the most exciting features of using tasks is that there is an "entry point" for everyone that sets them off to think and reason at their own level.
- ❏ On the other hand, one of the most difficult features of crafting a task is creating such an entry point. It may take a few revisions to find the right one, so try something and then make changes based on what you learn.
- ❏ Consider using parallel tasks. Parallel tasks are designed to meet the needs of students at different developmental levels, but get at the same big idea and the tasks are close enough in context that they can be discussed simultaneously. For more information and examples on parallel tasks check out *Good Questions: Great Ways to Differentiate Mathematics Instruction* by Marian Small.

What will student work look like? How should students organize their work? How will students make connections?

- ❏ These questions are very important because during the implementation of the task, you'll need to decide how to sequence the presentation and discussion of student work. It's also why working out the task in several different ways is integral to this process.
- ❏ You could ask students to use a particular format or you could let them choose their own. You'll just have to give it your best shot, and revise the task if you need to.
- ❏ Work out the task yourself, have colleagues work it out, give it to a sample of students. Basically, get all the information you can about what students might do to see if there is something you and they can learn from, or if the task needs a bit more structure.
- ❏ Student-made connections could be part of the task, or they could come during a whole class discussion.

How will I assess student work?

- ❏ Giving a grade puts tasks more in the assessment or "performing time" category. Remember that the intention of these tasks is to promote "learning time."
- ❏ We don't recommend constructing a rubric for the grading of work produced from the task. You may want to make a sheet to record anecdotal observations you see and hear as students work, or use a structured check-list to note how different students approached the task. IPads and other recording devices are useful tools to collect and record information as students work. Remember the point is not about performance, but learning for both your students and you! As a teacher you are learning about your students' knowledge, understanding, and approaches to help you make instructional decisions as you watch and listen to students working on the task.
- ❏ You might plan to give a Formative Assessment before or after students work on the task. These are a feature of every lesson plan that will be available on the LearnZillion site, so you'll be able to find many examples.

Purposes of task:

1. ***Impasse:*** Students can begin work, but will reach a point where they realize they need some missing information to move forward. At a strategic point during the work, the teacher needs to present some instruction. Maybe students use previous knowledge and intuition to make a conjecture, and the teacher then formalizes the conjecture. In the *Glasses Task*, we would not expect students to guess or even derive the volume formula. At some strategic point in the implementation we would need to present the formula and connect it to what students have discussed about the glasses.

2. ***Connections:*** The purpose of the task is to elicit or notice connections among topics or representations. In middle school, students are often asked to present information in tables, graphs, or equations. A task can be built to elicit how these representations are connected. Or, a task might involve area and perimeter, and students are asked how changes in one measure affects the other.

3. ***Apply Knowledge in a New Way:*** The task requires students to apply something they've already studied in a new way so as to expand on, and/or refine understanding. For example, students have already developed an understanding that equations can be used to represent mathematical and real-world scenarios. You may develop a task that expands on this understanding as students recognize the same mathematical and real-world scenario could be represented with equivalent equations that may shed new light on the scenario.