

Visualizing Math with STELLA – Q&A

Q: *How are students assessed after working with STELLA models - do they then do 'paper' exams with calculators?*

Diana Fisher: Yes, after students work with STELLA models, I do paper and pencil questions, with students using calculators. Below are explanations about how I assess.

For a linear model, I would describe a situation that should be modeled using a linear growth or a linear decay structure. I expect the students to draw the correct structure, label each icon, and place the correct value in each icon. They then have to write the corresponding linear equation.

For exponential models I do the same thing. From a problem description, students are to decide whether the problem represents exponential growth or exponential decay. They then have to draw the correct diagram, label the components, and place the correct value in each component. Then they have to write the corresponding exponential equation. What I really like about this approach is that the STELLA diagram can only contain the growth or decay rate, whereas the equation will have to translate the growth or decay value into a 'multiplier' involving a value greater than one or less than one. It really makes the students think about the actual 'rate' of change.

Later in the year, I will give a story scenario (problem description) and students will have to decide if it is linear or exponential, growth or decay, draw the correct diagram, etc.

For quadratics, since the diagram is a little more complicated, I give them a blank diagram and ask them to label the diagram, place the correct values in the icons, and write the quadratic equation.

For problems involving a combination of functions I will give a problem description very similar to what we studied in a problem in the lab, say the drug model involving a therapy that requires shots given every 4 hours. I would provide a grid and tell the students the half-life of the drug and ask them to sketch an appropriate graph for the situation. I have also given graphs, like ones representing the shot therapy, and asked students why the initial peaks of the first three shots increase, or why the peaks of the last three shots do not increase.

It is quite possible to ask students both specific/numeric questions and conceptual questions about their modeling experience, using paper and pencil tests. The focus is always on identifying the type of function (once they have studied more than one type), whether it is growth or decay, what each component should represent, etc.

I could create assessments that require students to build additional models – but I have enough trouble getting my classes into the school computer lab as it is. So I tend to use lab days to allow students to gain experience building models as their initial experience with different functions or concepts.

Note: This is not how I assess students in the modeling course. The objective is different in the modeling course. In the math courses the focus is always on reinforcing the mathematical concepts.

Q: How do I get a copy of the lessons that were presented?

A: A copy of the T-shirt lesson is one of the sample lessons available on the ise systems web site at the following link:

http://www.iseesystems.com/community/downloads/tutorials/stella_sample_lessons.aspx

The drug lessons come from Diana's book titled *Lesson in Mathematics: A Dynamic Approach*, also available on the ise systems web site at

http://www.iseesystems.com/store/college_university/MathBook.aspx