My Experiences in a Faculty Mentoring Network for Mathematical Modeling

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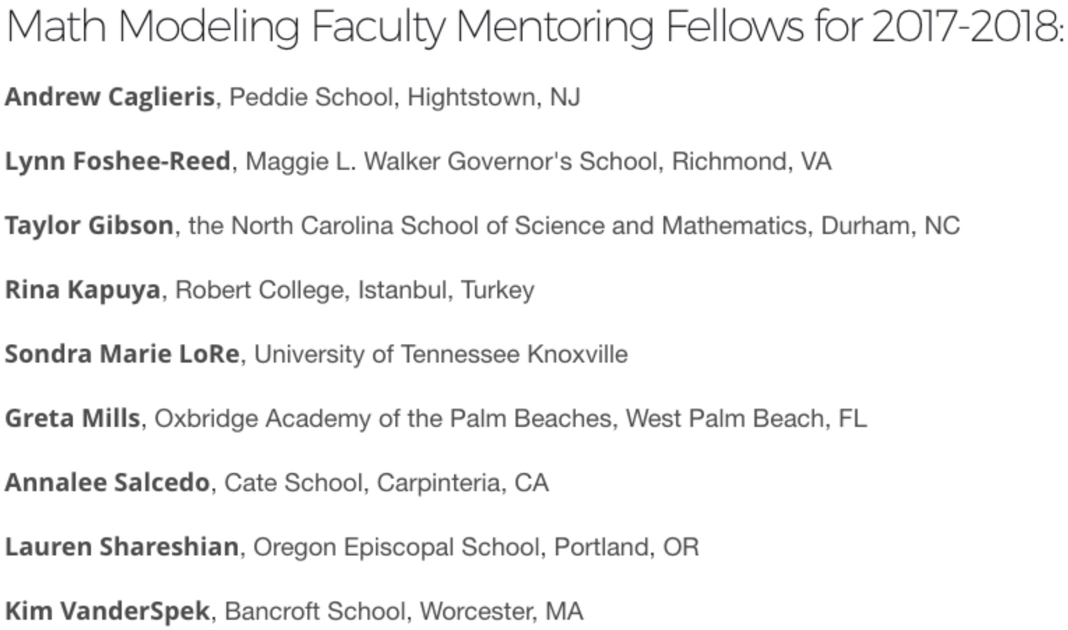
The Mathematical Modeling Faculty Mentoring Network

- Inaugural sessions Fall 2017-Spring 2018
- Met every two weeks online
- High school & university instructors discussed implementing math modeling instructional approaches and materials
- In the spring, these teachers committed to helping at least one other colleague to incorporate math modeling into their curriculum.

Fall Highlight: Making faculty connections

- Size matters
- NCTM collaborations



Math Modeling Faculty Mentoring Fellows for 2017-2018:

Andrew Caglieris, Peddie School, Hightstown, NJ

Lynn Foshee-Reed, Maggie L. Walker Governor's School, Richmond, VA

Taylor Gibson, the North Carolina School of Science and Mathematics, Durham, NC

Rina Kapuya, Robert College, Istanbul, Turkey

Sondra Marie LoRe, University of Tennessee Knoxville

Greta Mills, Oxbridge Academy of the Palm Beaches, West Palm Beach, FL

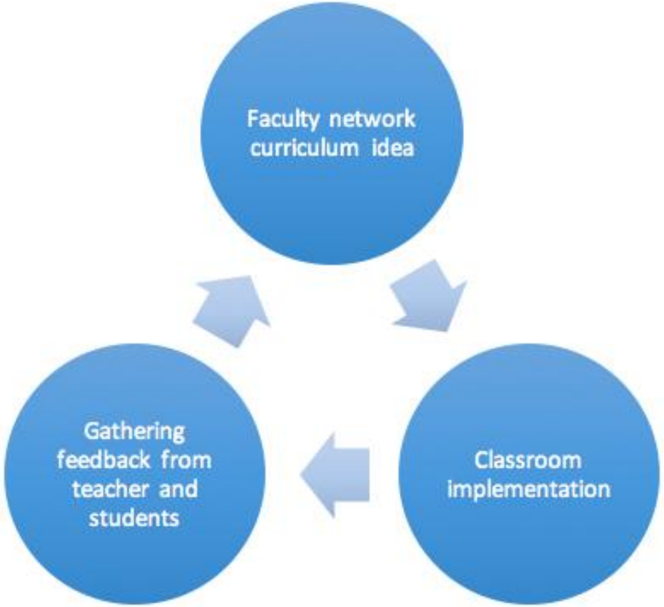
Annalee Salcedo, Cate School, Carpinteria, CA

Lauren Shareshian, Oregon Episcopal School, Portland, OR

Kim VanderSpek, Bancroft School, Worcester, MA

Spring highlight: Curricular design & collegiality

- Collaboration with Karen Seder, a 6th grade pre-algebra teacher
- Math modeling curriculum ideas evolved:



Faculty network curriculum idea

Classroom implementation

Gathering feedback from teacher and students

Phase 1: Someone introduces a problem

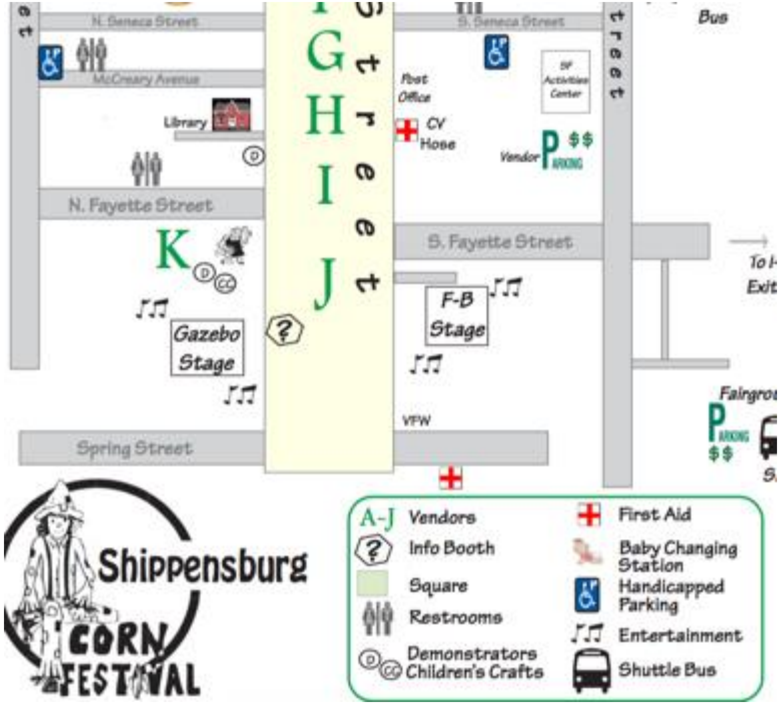
Each year on the last Saturday in August , Shippensburg , Pennsylvania's downtown main streets close to vehicular traffic and transform into a huge street fair; the Shippensburg Corn Festival. The Corn Festival typically hosts more than 250 crafts and antique vendors as well as dozens of food booths. In an attempt to understand the impact of the Corn Festival on the local community , the Corn Festival Committee would like an estimate of the number of people who attend the annual event.

-Ben Galluzzo

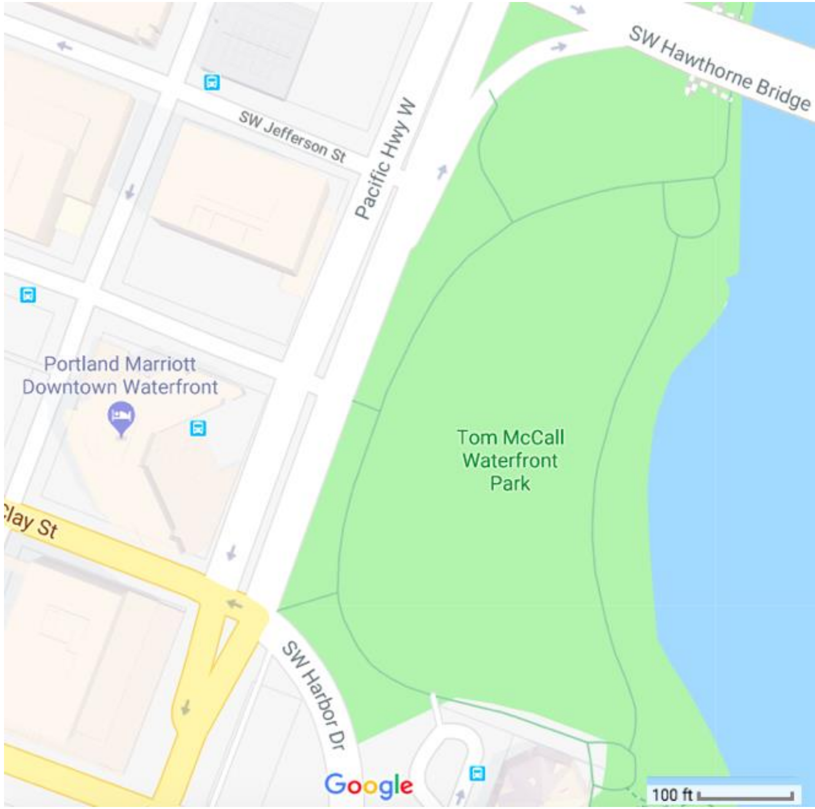
Phase 2: Forum Discussion

- What courses would this work well in?
- What questions do you envision students asking during this activity?
- What types of solutions do you expect to see?
- How would you help students when they get stuck?
- What supplemental materials should be given?

The original Shippensburg materials



Phase 3: Personalizing the materials
A Portland Update



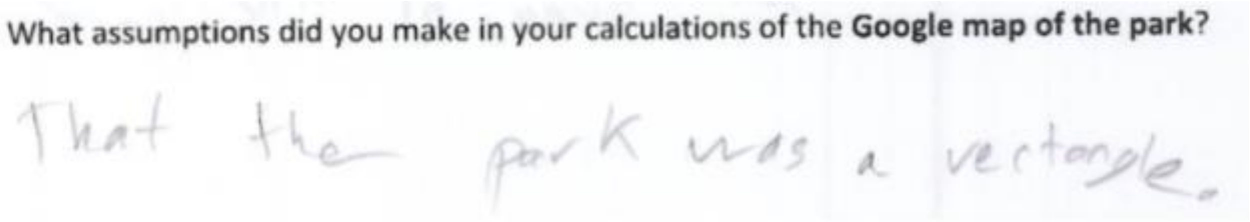
Phase 4: Give the problem to students

Which problems did the 6th graders do this year in this cross-collaboration?

- Population problem
- A simplified fuel efficiency problem (GAIMME)
- Linear expressions money game (Amplify Math)
- Maximizing lemonade stand profits (Robert Kaplinsky)

Phase 5: Solicit Student Reflections

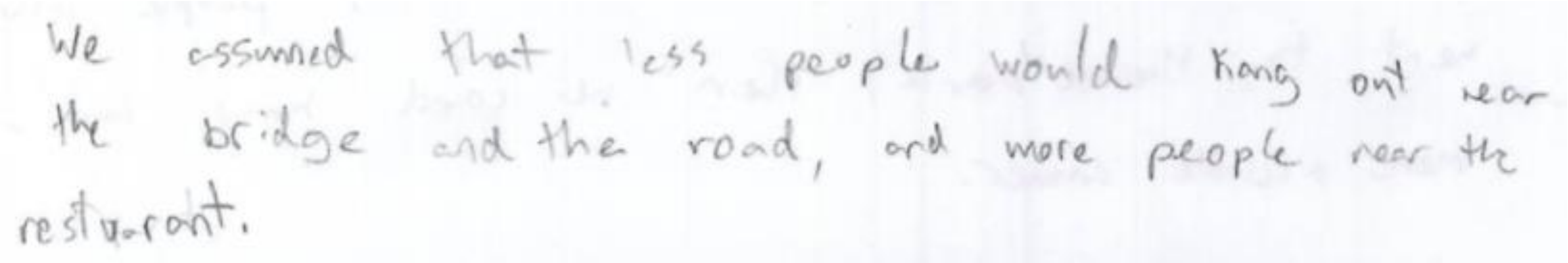
Assumptions varied in complexity level from the more simple...



What assumptions did you make in your calculations of the Google map of the park?

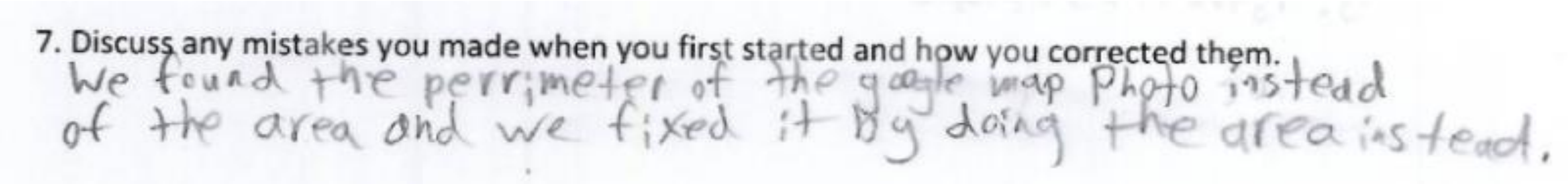
That the park was a rectangle.

To the more complex...



We assumed that less people would hang out near the bridge and the road, and more people near the restaurant.

Asking students to reflect on their mistakes

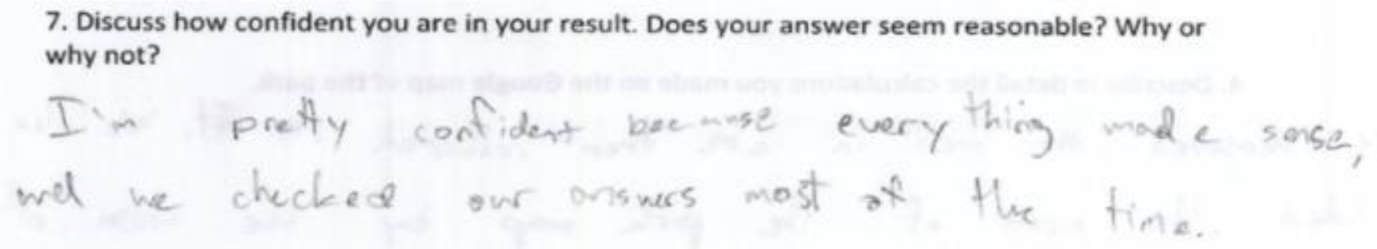


7. Discuss any mistakes you made when you first started and how you corrected them.

We found the perrimeter of the google map Photo instead of the area and we fixed it By doing the area instead.

Asking students to assess their solution

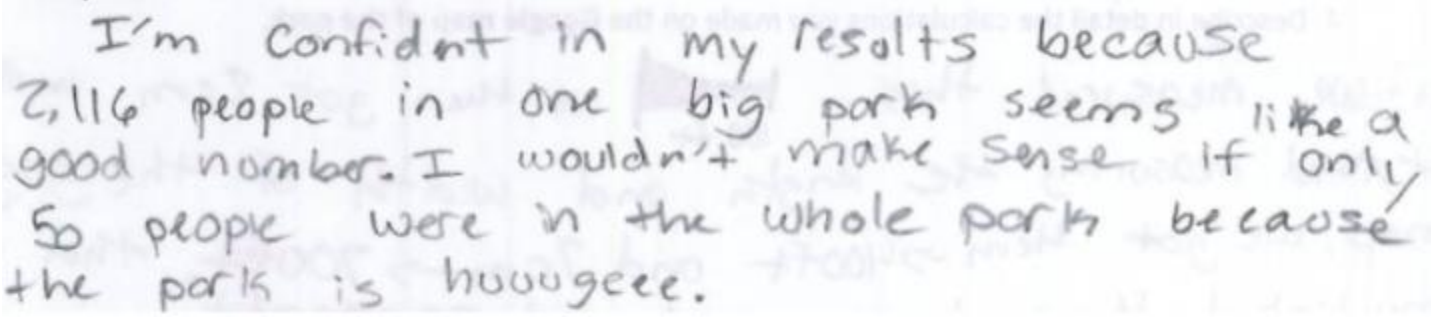
Low quality justification....



7. Discuss how confident you are in your result. Does your answer seem reasonable? Why or why not?

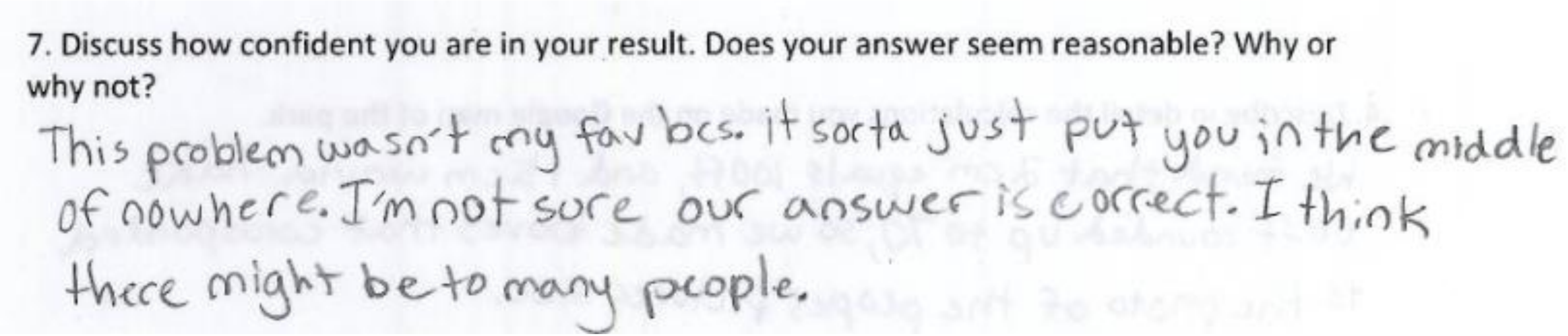
I'm pretty confident because everything made sense, wel we checked our answers most of the time.

High quality justification...



I'm Confidnt in my results because 2,116 people in one big park seems like a good nomber. I wouldn't make sense if only 50 people were in the whole park because the park is huuugeee.

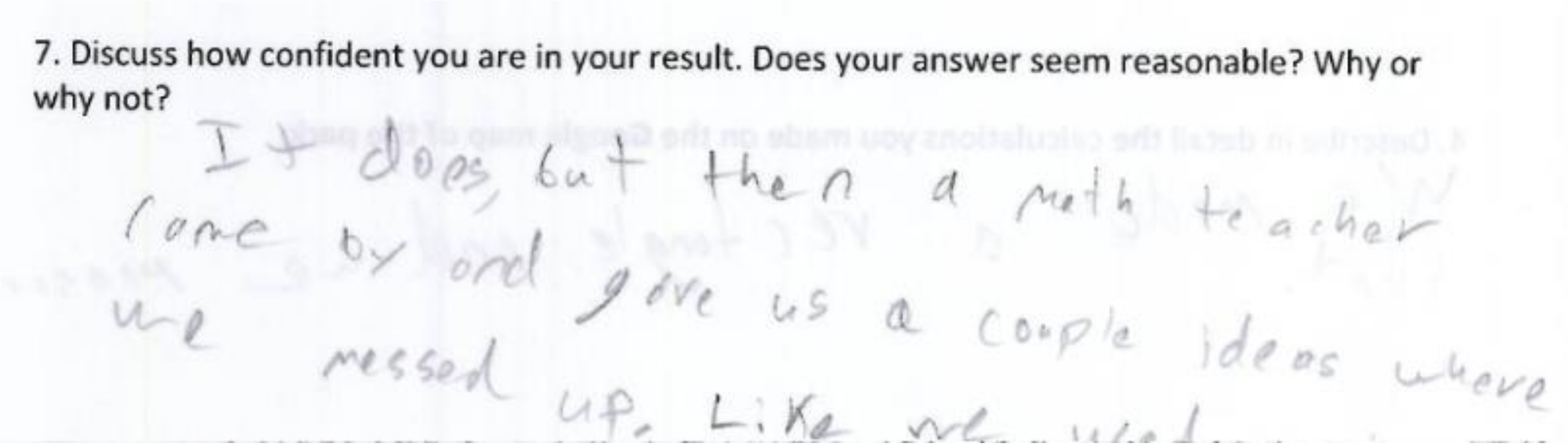
Modeling problems are challenging for students!



7. Discuss how confident you are in your result. Does your answer seem reasonable? Why or why not?

This problem wasn't my fav bcs. it sorta just put you in the middle of nowhere. I'm not sure our answer is correct. I think there might be to many people.

Modeling problems are challenging for teachers!



7. Discuss how confident you are in your result. Does your answer seem reasonable? Why or why not?

It does, but then a math teacher came by and gave us a couple ideas where we messed up. Like we

Phase 6: Solicit teacher reflections

Karen Seder, 6th grade pre-algebra teacher

What has been the most challenging for students?

- “To think critically about their work and articulate mathematically why their thinking works or doesn’t work beyond the really concrete.”

- “For some of the kids the ambiguity is hard but with just a tap you can nudge them a little bit and they are willing to jump back in again.”

What has been most challenging as the teacher?

- “Weighing exactly how much help to give them and when to give it.”
- “Being able to get to each group as needed. Not being sucked into one group for half the period.”
- “The pacing – different groups are at different spots. One group was already doing reflection by end of class while others were still brainstorming – some of the wagons are still on the trail they haven’t made it to the campsite yet.”

What were the highlights?

- “Having the students see that math is useful in real life with problems they can understand or situations they have experienced.”

- “The discussions were rich – the back and forth, talking, debating. “

- “The most open ended problems like the population problem were the best because there were multiple ways to approach them and kids felt more comfortable getting different answers.”

What were the highlights?

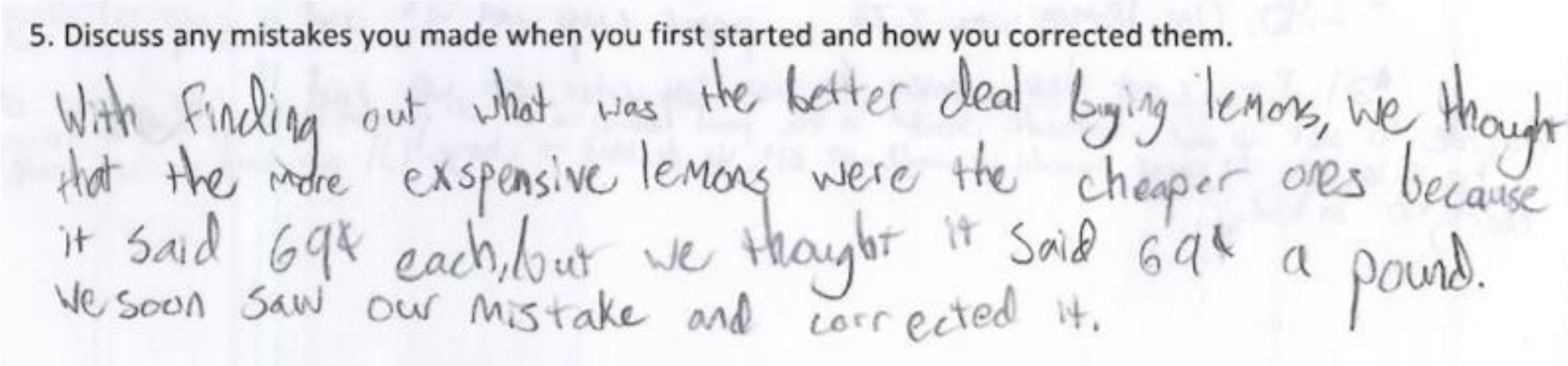
- “It wasn’t in the notes”: having the students wrestle with understanding where the connection is between something they don’t immediately know how to approach and something they do know.

- “Students who weren’t always the leaders on traditional class days were the ones that came up with interesting observations.”

- Having two teachers in one classroom: “I think we should just work together more.”

How did the kids improve by the end of the year?

- Diving in and being okay with ambiguity
- Reflecting on mistakes

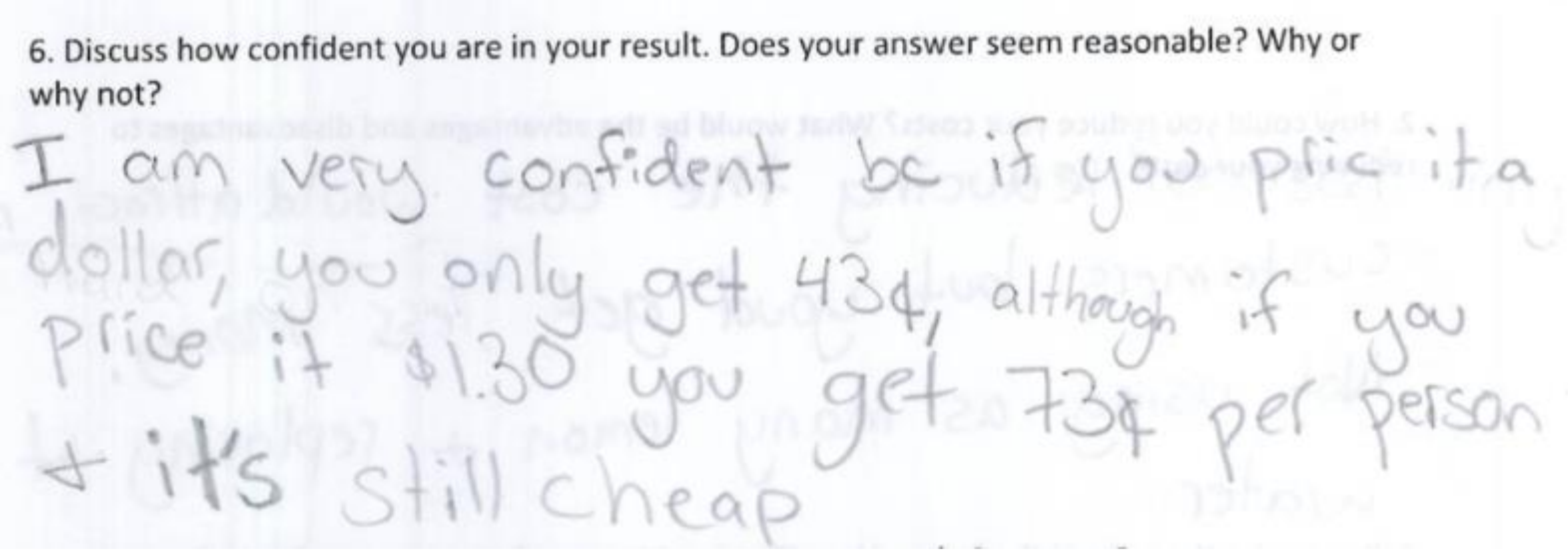


5. Discuss any mistakes you made when you first started and how you corrected them.

With Finding out what was the better deal buying lemons, we thought that the more exspensive lemons were the cheaper ones because it said 69¢ each, but we thought it said 69¢ a pound. We soon saw our mistake and corrected it.

What did they still need more work on?

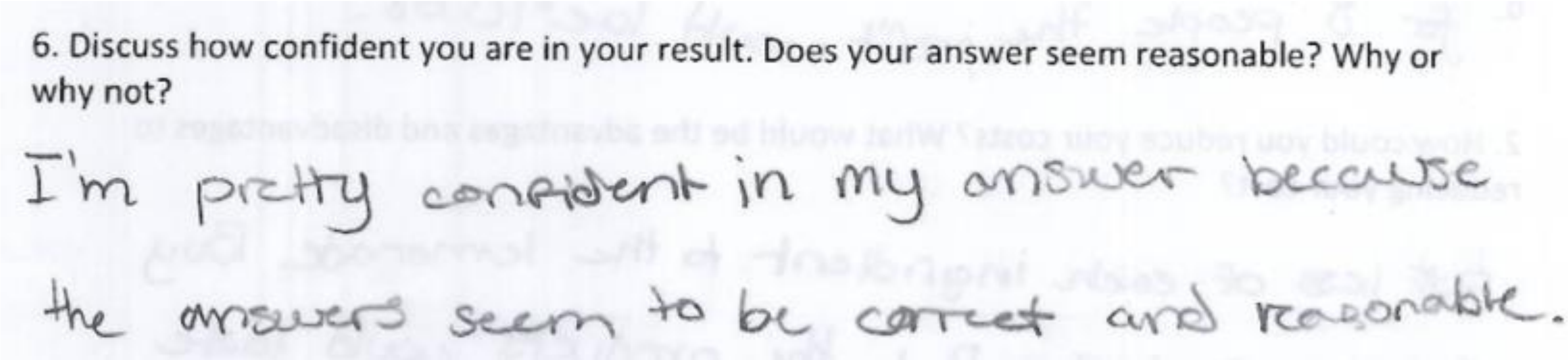
Justifying their conclusions.
We were hoping to get more like this…



6. Discuss how confident you are in your result. Does your answer seem reasonable? Why or why not?

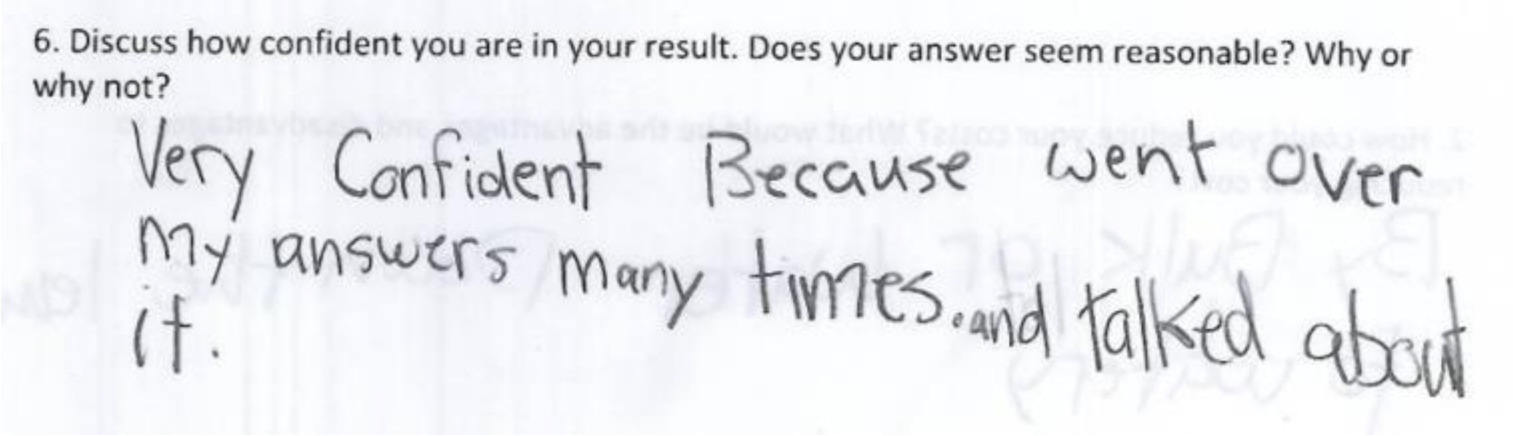
I am very confident bc if you pric it a dollar, you only get 43¢, although if you price it $1.30 you get 73¢ per person & it's still cheap

But most of them were like this...



6. Discuss how confident you are in your result. Does your answer seem reasonable? Why or why not?

I'm pretty confident in my answer because the answers seem to be correct and reasonable.



6. Discuss how confident you are in your result. Does your answer seem reasonable? Why or why not?

Very Confident Because went over
My answers many times.and talked about
it.

Phase 7: Iteration and revision

- Bring back suggestions to the Faculty Math Modeling Network
- Incorporate better scaffolding into the curriculum for the following year
- Karen’s feedback:

“The students struggled most with being critical of their own work. Next year, let’s do training on how to be more critical. We need to model for them what the discussion session should look like. We’ll provide several write-ups and ask the students: Could you understand this person’s logic? Could you reproduce their results? Remind them that what we’re looking for is similar to the discussion section of their science lab reports that they are used to doing.”

Thanks!

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