Date: November 8, 2007

To: Teacher

Re: Observations from interview with Student A

Content of Interview
During my interview with A, I had her perform and explain several math problems involving decimals. I was interested to see how much she understood about place value and if she could use her knowledge about place value to explain how she approached problems involving decimals. The first task asked how many one dollar bills you can get for a ten dollar bill, and then how many dimes you can get for ten dollars. For the next task, I asked A to order eleven numbers (1.42, .63, 5, .5, .05, .02, .6, .50, 1, .678, and .61) and explain how she decided on her order. Then I asked if she could come up with a number between .6 and .61. Lastly, I asked her if she could do the multiplication problem .3 x .7 and explain both the algorithm she used and why the product, .21, is smaller than either of the numbers she multiplied.

A was confident and calm throughout the interview. She explained her solutions very thoroughly and was able to effectively communicate her ideas and methods. At the end of the interview, A told me she thought it was fun and I think she enjoyed working on problems that were challenging or different for her. She struggled with her reasoning on the last problem (why the solution to the problem .3 x .7 was smaller than the multiplicands), but she tried to think about it from different perspectives and represent her answer in different ways for almost ten minutes! A had a great attitude and was very willing to try all of the tasks I put before her.

Assertion #1
A comfortably reads, writes, interprets and compares decimals in the tenths and hundredths places, which is a fourth grade content expectation (N.ME.4.18). She can also relate these decimals to money and explain the relationships between digits in the ones, tenths and hundredths places (N.ME.04.15, N.ME.05.08). We worked with a couple numbers in the thousands place, and Amelia seemed comfortable with these as well. A correctly ordered all of the decimals I provided her and explained that "when you have decimals, the number that is first is the tenths place and then the second place is the hundredths place and the third place is the thousandths place. When you're in whole numbers, hundreds is more than tens, but with decimals, tenths is more that hundredths, so even if you had .0578, .5 would still be bigger because it's like saying 5000 is bigger than 578." She knew that .5 and .50 were the same number and correctly explained that "if you add zeros on, it will still be the same, but if you add zeros before something, it will actually change the number."

When I asked A if there was a number between .6 and .61, she said "probably." I asked if she could think of one, she struggled for a minute and told me that she couldn't. But when I reminded her of what she had told me about adding zeros on to the end of decimals, she saw that "you could think of it as 600 and 610, so you just have to think of something between 0 and 10." She wrote down .601. Continuing on this point, I asked if she could now think of a number that was greater than zero, but less than any other number on the list we were using. She quickly responded with "0.0005" and explained that, "when you add the zero before the number, it makes the number smaller. If I added more than one zero, because we only have one zero in these, the number will be smaller."

Assertion #2

A correctly uses the standard algorithm for multiplying decimals and is developing an understanding of why the algorithm works. In the Everyday Math curriculum, students are not taught the standard algorithm (count the decimal places, multiply the decimals like they are whole numbers, place the decimal in the product) until 6th grade. The Michigan GLCE's state that students should be able to multiple a decimal by a whole number in fourth grade and a decimal by another decimal in sixth grade. A is already using the standard algorithm to multiply a decimal by another decimal! She approached the problem with ease and succinctly explained the algorithm. "I take out the two decimals and make a little note to remind myself how many decimal places there are. I just do the math problem without the decimals and then put in the decimal. I did two decimal places because I took out two. But if it was .3 by 7, it would be 2.1 instead of .21."

When I asked A why she got a smaller number when she multiplied the two numbers together, she explained the algorithm to me again. "I had to put the decimal place it two spaces, so it makes the number smaller." I wanted to see if she could explain the concept behind multiplying decimals, so I asked if she could think of a way to represent the math – .7 x .3 = .21 – to a younger student who hadn't learned the procedure she used yet. She thought of using base 10 blocks to represent seven tenths three times, which give you "21 tenths" she explained. The problem she was actually showing was .7 x 3 = 2.1 (or "21 tenths"). In her attempts to explain the math, she showed that she knew multiplication was repeated addition and tried to show that you could take .7 three times or .3 seven times to get .21. Since the math curriculum so far has only focused on multiplying a decimal by a whole number, her interpretation of the problem makes sense. She hasn't yet seen or learned about multiplying numbers between 0 and 1, so her thinking about these concepts and their relationships to other multiplication problems is still developing.