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Exponents and Scientific Notation Unit

LAP 5 Reflection

This lesson had a fantastic start! I felt like for the first time in a few days we actually had an entire period of good math. Half the class was missing because they were doing a performance for another Spanish class, which ended up working well because it left me with a group of students who really benefitted from getting more attention in a smaller group – Danni, Kenzie, Gen, Luis, Edward, Gina, and Felix. I put the students in pairs with people they liked but would still be productive with, and we got right down to work. The starter immediately helped expose misconceptions. For example, Gina initially said that 6 x 10^8 was 200,000,000 times bigger than 3 x 10^8. When I restated her answer and emphasized the word “times,” she immediately realized that that didn’t make sense and changed her answer to 2.

The next five problems I gave them did a nice job of getting them familiar with comparing numbers with the same exponents and then transitioning to numbers with different exponents. Danni’s partner Gen went to the nurse for most of the period so I ended up sitting with him as he solved the problems. He did an incredible job! He came up with his own method in which he wrote out the two numbers in standard notation (one below the other) and crossed out all the pairs of zeroes he could. Then he figured out how many more zeroes the smaller number needed to match the number of zeroes in the larger number, and multiplied the quotient of the non-zero numbers by that power of 10. Students came to the board to show the different methods they used to solve the problems, and Danni was the only one who got the third problem right, which prompted him to show his method to the class. He then wanted to solve the remaining two problems on the board, which I allowed. I rarely see him so excited and willing to share with the class – it was a great moment! After all the students had gone, I showed them my method of comparison using the exponents of the tens (the quotient rule!). I also showed them that if you write out all of the tens as a fraction/division problem, you can just cancel them out. I was glad I saved my methods until after this activity, for it allowed my students to develop their own methods first, which I always think is important.

When I gave my students the first sheet of comparisons, they were confused with the decimals since our previous activities had dealt with whole numbers. Next time I teach this, I will incorporate a few decimals into the earlier problems so that they are more used to working with them. I showed them on the board that they could do the same comparison methods with decimals. I also told them that in the real world most numbers are decimals, not whole numbers, so what they’re doing now is much more realistic. Danni was having trouble using his method with decimals and I started to show him that he could still use it, but he gave up and went to the bathroom.

As students worked to compare the different numbers on the worksheet, I saw them starting to understand why exponent rules are helpful. When I went over to help Gina, she was getting confused trying to use Danni’s method to solve the problems, so I suggested she use the quotient rule method I had shown the class. After working through a few problems with her, she admitted that that method was a lot easier. Throughout this entire unit, Gina had been adamant that she hated exponents, so this was huge coming from her! Kenzie had a similar realization.

The next day after we did Team Love, students worked on a starter that compared Danni’s method to my method, since I wanted to further validate his engagement and mathematical thinking. Unfortunately, Danni was absent that day, but it pushed the rest of the class to think more deeply about what it meant to multiply and divide a number by a power of ten. Students spent the rest of the class and the first half of the next class finishing the two comparison sheets. As we went over the answers to the second sheet as a class, I made sure to emphasize what those comparisons meant in terms of the real-world contexts, which kept the students engaged. Since I had left it up to the students to choose three different pairs of numbers to compare, students were eager to share their different comparisons with the class, which led to some rich discussion.