

Appendix 1: Implementing Teaching Strategies

CCSS.MATH.CONTENT.5.NBT.A.1- Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.

This standard addresses one of the most fundamental parts of place value understanding. Students begin using this idea as far back as first grade when they begin to add and subtract numbers. However, most students still come into fifth grade not knowing why they carry a one to the tens place or how they get ten more when borrowing in subtraction. In this unit, we will go back to the basics with a fourth/fifth grade level activity of “Fusing Dots”, originally created by research mathematician James Tanton. This activity will help students to understand the basic concepts we typically teach in the lower grades with a bag of base ten blocks.

CCSS.MATH.CONTENT.5.NBT.A.2- Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

We will address this standard as an outcome of our “Fusing Dots” activity. Students should gain understanding from this activity that enables them to see that a digit in each place value is worth ten times more in value from one place value to the next (when moving to the left). Students should also see that when moving to the right the value of our digits decrease, becoming 1/10 of the value it originally was worth. With this, we will discuss the idea that when we see 10^2 we are talking about the value of ten times itself or 100. Students will make connections to “Fusing Dots” noticing that when we move two place values over from the radix (decimal point), we are moving over a value of ten times ten for the following column. This leads us to the hundreds place value. The same will happen if we move 10^3 times or ten times ten times ten place values. Students will see that we end up in the thousands place value. With these examples, it is intended that students eventually recognize the pattern represented by the zeros in these numbers.

CCSS.MATH.CONTENT.5.NBT.A.3.A- Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.

Students will be asked to show numbers in different ways including expanded, standard, and written forms. Students will be encouraged to use what they have learned about place value to dissect numbers in order to assist them in making comparisons between the values of numbers.