Understand the place value system (Standards 5.NBT.1–4).
Standard 5.NBT.3 Read, write, and compare decimals to thousandths.
a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form. For example, 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000).
b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Key Elements: Decompose numbers into their place values using multiplication to show their relationships to each other. Based off of the understanding of relationships between place values compare decimal numbers with standard symbols. 4th grade only uses whole numbers so this will be the students' first introduction into decimals.

Area Model: An area model can be used to represent numerical relationships within a given number while also providing conceptual understanding between comparing two numbers. When numbers get too large it may be challenging to represent these numbers clearly or using an area model. This model, if used to represent the wholes and fractional pieces, can make clear the ideas behind expanded form with powers of ten and comparing.

Number Line: Comparing on a number line often seems like a simple task; the farther along the number line (to the right) the larger the number. However, to fully appreciate and understand how to compare on a number line means to understand that the wholes are the main markings, which are subdivided into tenths. This pattern continues with further place values. The benefit of the number line in this regard is that it builds an understanding of the numbers and how much the place values relate to each other.

Note: Many of these can be shown using common manipulatives such as base ten blocks, unifix cubes, or other place value tools. The challenges with these is helping the students understand that the representations can be flexible, and may be hard for many to accept a new meaning for that given object. An object that is easy to use for a number line may be a meter stick, which is a real-world context that can be easily drawn upon.

Other Representations: In most instruction related to place value very rarely are visual tools utilized to their full extent, if at all. Most representations for expanded form and comparing are done with the common digits of 0 to 9. This requires students to understand such notations as the decimal point and that each digit is just part of a single number, which can be broken into it's parts (mostly their place values).

To make the most of this type of common representation a good conceptual foundation must be there, otherwise most comparisons end up as rules and therefore produce more errors. Making the connection to these ideas, representations, and common notations is fundamental to a student being able to knowledgeably use numbers.

Expanded Form With Powers of Ten

It should be noted that expanded form with powers of ten is different notation than what the students will have been used to from previous years. In fourth grade the students will have done expanded form as: 7,319 as 7,000 + 300 + 10 + 9. With powers of ten this number would be broken up to show the place values and the multiplicative relationship of the accompanying digit. For example: 7,319 as (1,000 x 7)+(100 x 3)+(10 x 1)+(1 x 9). The powers of ten expanded form notation also can be used with decimal numbers as well (as can regular

expanded form, it just won't be discussed here). In example: 8.437 is (1 x 8)+($^{1}/_{10}$ x 4)+($^{1}/_{100}$ x 3)+($^{1}/_{1,000}$ x 7).

The intent of expanded form is so that a student can see the relationship between the place values and the associated digit. This skill is useful for when students may be doing work within algebra and calculus. Expanded form with powers of ten can also be a tool in helping students understanding of 5.NBT.1 and 5.NBT.2 which build an understanding of our base ten system and the relationship between the place values.