Unpacked South Dakota State Mathematics Standards

Purpose: In order for students to have the best chance of success, standards, assessment, curriculum resources, and instruction must be aligned in focus, coherence, and rigor. Unpacked standards documents are intended to help align instruction to the focus, coherence, and rigor of the South Dakota State Mathematics Standards. The standards have been organized in clusters as they are not so much built from topics, but rather woven out of progressions. Not all content in a given grade is emphasized equally in the mathematics standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting standards will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

Domain: Numbers and Operations in Base Ten	Grade Level: 4

4.NBT.A Cluster: Generalize place value understanding for multi-digit whole numbers

This cluster focuses the learners to extend their understanding of place value to 1,000,000. They develop an understanding of relationships among places in a number and use that understanding when reading and writing numbers up to 1,000,000. Learners will use place value understanding in order to compare numbers. Previous work with rounding numbers is extended to rounding numbers to any given place and using rounding to estimate in real-life situations.

**This is a MAJOR cluster. *Students should spend the large majority of their time (65-85%) on the major work of the grade. Supporting work and, where appropriate, additional work should be connected to and engage students in the major work of the grade.*

4.NBT.1 - Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that the 7 in 700 is 10 times greater than the 7 in 70 because 700 ÷ 70 = 10 and 70 x 10 = 700.

4.NBT.2 - Read and write multi-digit whole numbers.
    a. Read and write multi-digit whole numbers using base-ten numerals (standard form), number names (word form), and expanded form.
    b. Compare two multi-digit numbers based on values of the digits in each place, using <, >, and = symbols to record the results of comparisons.

4.NBT.3 - Use place value understanding to round multi-digit whole numbers to any place.

Aspects of Rigor: (Conceptual, Procedural, and/or Application)

Conceptual Understanding	*Procedural Fluency*	*Application*
Understand that a digit in one place represents 10 times more than the place to its right. **(4.NBT.1)**		
Understand the difference between standard, word, and expanded forms. **(4.NBT.2a)** Understand greater than, less than, and equal to when comparing numbers. **(4.NBT.2b)**	Read and write numbers using standard, word, and expanded forms. **(4.NBT.2a)** Use symbols (>, <, or =) when comparing numbers. **(4.NBT.2b)**	
Understand how place value helps round numbers. **(4.NBT.3)**		

Enacting the Mathematical Practices - Evidence of Students Engaging in the Practices

1. **Make sense of problems and persevere in solving them.**
2. **Reason abstractly and quantitatively.**
   - Realize rounding numbers can be useful in solving problems and making sure their answers are reasonable.
3. **Construct viable arguments and critique the reasoning of others.**
   - Justify thinking about rounding.
4. **Model with mathematics.**
   - Use place value charts and number lines to recognize patterns.
5. **Use appropriate tools strategically.**
6. **Attend to precision.**
   - Read and write number to 1,000,000 correctly.
7. **Look for and make use of structure.**
   - Use commas when writing numbers to 1,000,000.
8. **Look for and express regularity in repeated reasoning.**
   - Recognize patterns and make generalizations for working with larger numbers and for comparing numbers.

Vertical and Horizontal Coherence and Learning Progressions

Previous Learning Connections	*Current Learning Connections*	*Future Learning Connections*
Multiply one-digit whole numbers by multiples of ten **(3.NBT.3)**	Interpret a multiplication equation as a comparison **(4.OA.1)(4.OA.2)**	Recognize that in a multi-digit number, a digit in one place represent 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.**(5.NBT.1)**
Represent and solve problems involving multiplication and division within 100 **(3.OA.1–4, 7)**	Multiply a whole number up to four digits by a one-digit whole number, and multiply two two-digit numbers using strategies based on place value **(4.NBT.5)**	
Understand the relationship between multiplication and division and fluently multiply and divide within 100 **(3.OA.5–6)**	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value **(4.NBT.6)**	Explain patterns in the numbers of zeros of the product when multiplying a number by powers of 10 **(5.NBT.2)**
Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones **(2.NBT.1)**		Read, write, and compare decimals to thousandths.**(5.NBT.3)**
Compare two fractions with the same numerator or the same denominator. Record the results of comparisons with the symbols >, +, or < **(3.NF.3)**	Compare two decimals to hundredths by reasoning about their size. Record the results of comparisons with the symbols >, <, or = and justify the conclusions. **(4.NF.7)**	Understand ordering and absolute value of rational numbers. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. **(6.NS.7)**
Read and write numbers to 1,000 using base-ten numerals, number names and expanded form **(2.NBT.3)**	Solve multi-step word problems and assess the reasonableness of answers using mental computation and estimation strategies including rounding **(4.OA.3)**	Write an inequality of the form x > c or x < c **(6.EE.8)**
Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons. **(2.NBT.4)**		Use place value understanding to round decimals to hundredths **(5.NBT.4)**
Use place value understanding to round two-digit and three-digit numbers to the nearest 10 and 100 **(3.NBT.1)**		

- Value
- Place,
- Place value
- Greater than
- Less than

- Equal to
- ‹, ›, =
- Comparisons/compare
- Round
- Estimate

- Base-ten numerals (standard from)
- Number name (written form)
- Expanded form
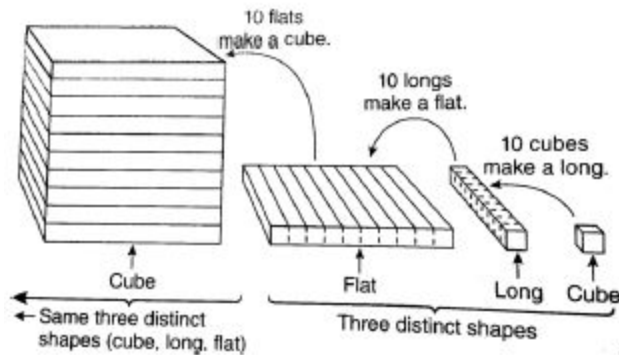
Relevance, Explanations, and Examples:

4.NBT.1

Each digit in the number 78 becomes one hundred times as much as its original value. The 8 ones becomes 8 hundreds. The 7 tens becomes 7 thousands.

Thousands	Hundreds	Tens	Ones
		7	8 ×100
7	8	0	0

- Explore patterns that involve moving digits to different places in a given numeral
- Investigate patterns associated with the answers obtained to problems such as the following:

  7×10
  7×100
  $7 \times 1,000$
  $7 \times 10,000$

  Relate the findings to patterns on the place value chart and using concrete models as shown below.

10 flats make a cube.

10 longs make a flat.

10 cubes make a long.

Cube   Flat   Long   Cube

← Same three distinct shapes (cube, long, flat)   Three distinct shapes

With every three places, the shapes repeat.

4.NBT.2 - Emphasis should be placed on the meaning of quantities.The statements are read from left to right (for example, 15,000 < 28,000 is read fifteen thousand is less than twenty-eight thousand).

Compare 7,975 and 7,925 using a double number line.
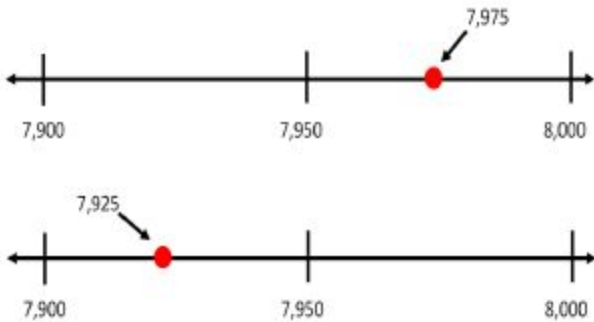
7,925 is closer to the left of the number line than 7,975. So 7,975 is greater than 7,925. Or 7,975 > 7,925.

4.NBT.2a
Expanded form is writing the number in an addition sentence: 285 = 200 + 80 + 5.
*Written form* means 285 is two hundred eighty-five.
Standard form can be 2 hundreds, 8 tens, 5 ones or also 1 hundred, 18 tems, and 5 ones. Let the students explore this.

4.NBT.3 Rounding to the unit represented by the place farthest to the left is typically easier for learners and often sufficient for practical purposes. Rounding to the unit represented by a place in the middle of a number may be more difficult for learners as the surrounding digits can be distracting. For example, it may be easier for a learner to round 478,235 to 500,000 rather than to 480,000. Learners should have experience rounding multi-digit numbers to various places.

4.NBT.3 Example:
Round 368 to the nearest hundred. This will either be 300 or 400, since those are the two hundreds before and after 368. Draw a number line, subdivide it as much as necessary, and determine whether 368 is closer to 300 or 400. Since 368 is closer to 400, this number should be rounded to 400.

**Round Multi-Digit Numbers
(round to nearest thousands)**
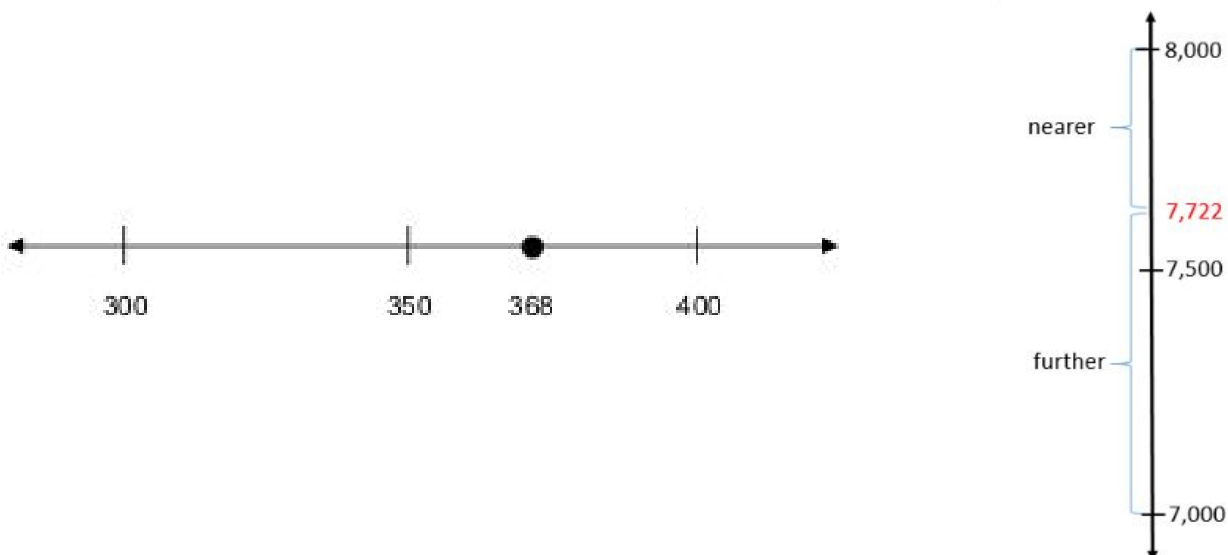
Achievement Level Descriptors	
Cluster: **Generalize place value understanding for multi-digit whole numbers**	
Concepts and Procedures	***Level 1:*** Students should be able to read and write multi-digit whole numbers less than or equal to 1,000 using base-ten numerals, number names, and expanded form; compare multi-digit numbers up to 1,000 using <, >, and =; and round multi-digit whole numbers up to 1,000 to any place.
	Level 2: Students should look for and use repeated reasoning to generalize place value understanding to be able to read and write multi-digit whole numbers less than or equal to 100,000 using base-ten numerals, number names, and expanded form; compare multi-digit numbers up to 100,000 using <, >, and =; and round multi-digit whole numbers up to 100,000 to any place.
	Level 3: Students should be able to select the appropriate operation (multiplication or division) within 100 to solve one-step problems involving measurement quantities of single-digit whole numbers and determine the unknown number in a division equation relating three whole numbers. They should be able to interpret the meaning of whole number quotients of whole numbers. (What do students need to understand in order to select the operation - conceptual understanding)
	Level 4:.