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: Number and Operations Base Ten	Grade Level: 5

5.NBT.A Cluster: Understand the place value system

The student will understand the place value concept that the number to the left is 10 times larger and the number to the right is 10 times smaller, will use exponents to express powers of 10 and can understand the patterns of zeros and decimal placement related to powers of 10. Students will compare the values of decimals and understand concepts of rounding.

**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.*

5.NBT.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.

5.NBT.2 Explain and apply patterns in the number of zeros of the product when multiplying a number by powers of 10. Explain and apply patterns in the placement of the decimal point with respect to the values of the digits in the product or the quotient, when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

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, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
   b) Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and, < symbols to record the results of comparisons.

5.NBT.4 Use place value understanding to round decimals to any place.

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

Conceptual Understanding	*Procedural Fluency*	*Application*
Understand that place value affects the value of the number. **(5.NBT.1)**		
Understand why multiplying by a power of 10 shifts the digits of a whole number or decimal that many places to the left. **(5.NBT.2)**	Use patterns in the number of zeros and the placement of the decimal point when multiplying and dividing by powers of 10. **(5.NBT.2)** Use whole number exponents to denote powers of 10. **(5.NBT.2)**	
	Use base-ten numerals, number	

	names, and expanded form to read and write decimals to thousandths place. **(5.NBT.3a)**	
	Use conceptual understanding of place value to compare decimals to the thousandths using >, =, and < to record comparison. **(5.NBT.3b)**	
Understand value of digits depends on its place. **(5.NBT.4)**	Round decimals to any place. **(5.NBT.4)**	

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.**
   - Students will apply abstract and quantitative reasoning when using exponent notation.[3]
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics.**
   - Students will use models and quantitative reasoning to understand the relationship between adjacent place values in both whole numbers and decimals.
   - Using models students reinforce conceptual understanding of individual places as well as the magnitude of a number across place values on both sides of the decimal point.
5. **Use appropriate tools strategically.**
   - Students may use a place value chart to assist with place value understanding.
6. **Attend to precision.**
   - Students will use precision when writing exponent notation.
7. **Look for and make use of structure.**
   - Students will connect the written notation of exponents to the structure of place value.
8. **Look for and express regularity in repeated reasoning.**

Vertical and Horizontal Coherence and Learning Progressions

Previous Learning Connections	*Current Learning Connections*	*Future Learning Connections*
In the 3rd grade, students learned to multiply one-digit numbers by 10. **(3.NBT.3)** Students also learned to round two-digit and three-digit numbers to the nearest 10 and 100. **(3.NBT.1)** In the 4th grade, students read, wrote, and compared the value of multi-digit numbers **(4.NBT.2)** and rounded the multi-digit numbers to any place up to 1,000,000. **(4.NBT.3)** Additionally, students learned to recognize that a digit to the left of another digit is 10 times what it represents in the place value to its right **(4.NBT.1)** and could compare the value of decimals to the hundredths place. **(4.NF.7)**	Students will add, subtract, multiply and divide whole numbers and decimals to the hundredths. **(5.NBT.5,6,7)** Students will use powers of 10 when converting within the metric unit system. **(5.MD.1)**	In the 6th grade, students will extend their knowledge of exponents to include numerical expressions involving whole-number exponents, not just powers of 10. **(6.EE.1)** Students will extend their understanding of <, >, = to write inequalities. **(6.EE.8)** Fifth grade is the last grade level in which rounding is specifically addressed. Rounding may be used to support problem solving in various standards in future grade levels.

Vocabulary (Key Terms Used by Teachers and Students in this Cluster):

● Exponent ● equal to (=) ● greater than (>)	● powers of 10 ● Round ● Tenths	● expanded form ● word form

● less than (<)	● Hundredths
● place value	● Thousandths

Relevance, Explanations, and Examples:

It is not expected that student understand all exponents. They just need to understand that, for example, 10 x 10 x 10 or 1,000 can also be written as 10^3.

254.78<u>2</u> - the underlined digit is not 2, but instead 0.002.

Achievement Level Descriptors

Cluster: Understand the place value system

Concepts and Procedures	**Level 1:** Students should be able to read and write decimals to the thousandths using base-ten numerals, number names, and expanded form and round decimals to the hundredths.
	Level 2: Students should be able to use repeated reasoning to understand 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. They should be able to explain patterns in numbers of zeros and/or placement of a decimal point when a number is multiplied or divided by 10.
	Level 3: Students should be able to use whole number exponents to denote powers of 10; use repeated reasoning to understand and explain patterns in numbers of zeros and/or placement of a decimal point when a number is multiplied or divided by powers of 10; read, write, and compare two decimals to the thousandths using base-ten numerals, number names, and expanded form, using >, =, and < to record the results of the comparison; and round decimals to any place.
	Level 4: Students should be able to combine multiplying by powers of 10, comparing, and rounding to highlight essential understandings.