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.*

<table>
<tr><td colspan="2">Domain: Numbers and Operations in Base Ten</td><td>Grade Level: 5</td></tr>
<tr><td colspan="3">5.NBT.B Cluster: Perform operations with multi-digit whole number and with decimals to hundredths.

Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit multiplication. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and justify their reasoning in writing. They compute products and quotients of decimals to hundredths place.</td></tr>
<tr><td colspan="3">**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.5 Fluently multiply multi-digit whole numbers using an algorithm, including but not limited to the standard algorithm.

5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Explain the calculation by using equations, rectangular arrays, illustrations, area models, or other representations based on place value.

5.NBT.7 Use the four operations with decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; justify the reasoning used with a written explanation.
a. Add and subtract decimals
b. Multiply and divide decimals.</td></tr>
<tr><td colspan="3">Aspects of Rigor for Student Learning: (Conceptual, Procedural, and/or Application)</td></tr>
<tr><td>Conceptual Understanding</td><td>Procedural Fluency</td><td>Application</td></tr>
<tr><td></td><td>Multiply multi-digit whole numbers. (5.NBT.5)

Use multiple strategies including traditional algorithm. (5.NBT.5)</td><td></td></tr>
<tr><td>Explain calculations using equations or models that represent understanding of division. (5.NBT.6)[1,2]</td><td>Find whole number quotients of whole numbers with four-digit dividends and two-digit divisors. (5.NBT.6)

Use multiple strategies to solve division problems. (5.NBT.6)</td><td></td></tr>
<tr><td>Justify reasoning with written</td><td>Use the four operations with decimals</td><td></td></tr>
</table>

explanation. **(5.NBT.7.a,b)** Understand how place value affects how to use the four operations. **(5.NBT.7a,b)**[3, 4, 5, 6, 7]	to the hundredths. Use models or drawings. **(5.NBT.7.a,b)**	

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

1. **Make sense of problems and persevere in solving them.**
    - Students make sense of problem solving using the relationship between addition and subtraction, and between multiplication and division.[8]
2. **Reason abstractly and quantitatively.**
    - Student think quantitatively as they apply the standard algorithm in multiplication.
3. **Construct viable arguments and critique the reasoning of others.**
    - Students justify their calculations with written explanations.
4. **Model with mathematics.**
    - Students will use place value, the properties of operations, concrete models or drawings.
5. **Use appropriate tools strategically.**
    - Students will use area models, number line, partial products.
6. **Attend to precision.**
7. **Look for and make use of structure.**
    - Students make use of place value structure.
8. **Look for and express regularity in repeated reasoning.**

Vertical and Horizontal Coherence and Learning Progressions

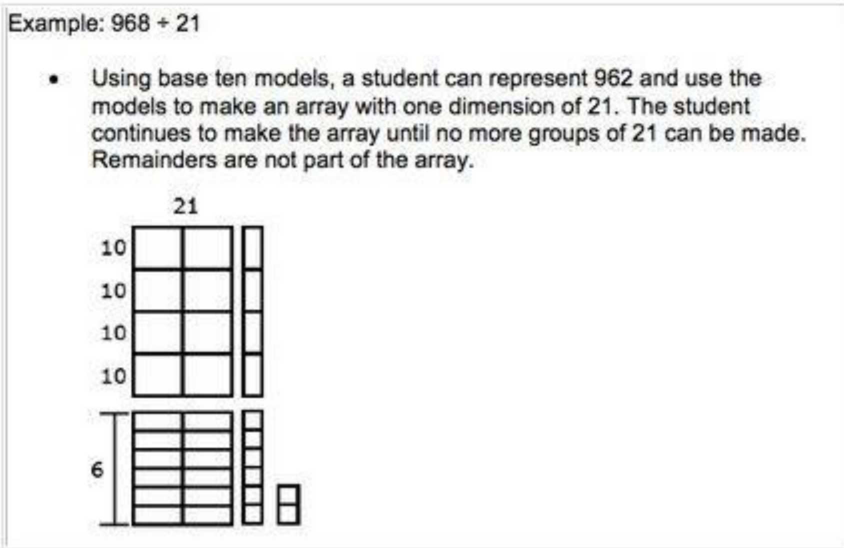
Previous Learning Connections	***Current Learning Connections***	***Future Learning Connections***
Students in 4th grade are required to use place value understanding and properties of operations to perform multi-digit arithmetic. **(4.NBT.4,5,6)**	Students will understand the place value concept that 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. **(5.NBT.1,2)** Students will apply and extend their previous understandings of multiplication and division to multiply and divide fractions. **(5.NF.1,3,4,6,7)** Students will convert customary and metric measurement units within a given measurement system. **(5.MD.1)**	Students will be required to fluently add, subtract, multiply, and divide decimals using the standard algorithm. **(6.NS.2,3)**

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

- Standard algorithm
- Quotient
- Dividend
- Divisor
- Calculation
- Rectangular array
- Operation
- Hundredths
- Area model

Relevance, Explanations, and Examples:

1



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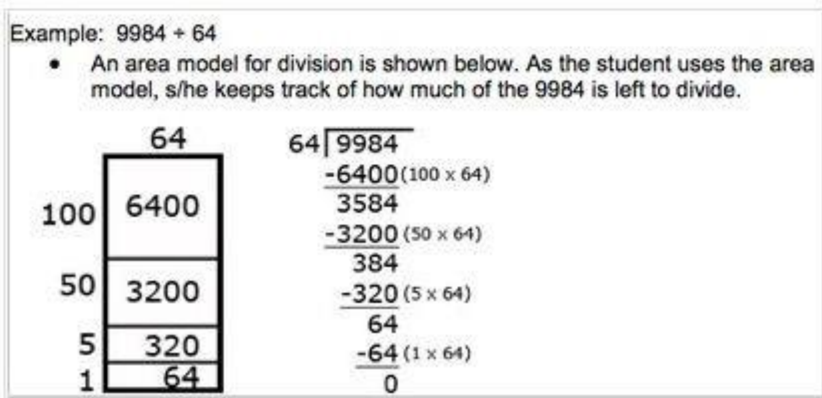

[3] Like base-ten units must be added and subtracted, so students need to attend to aligning the corresponding places correctly (this also aligns the decimal points).

[4] Before students consider decimal multiplication more generally, they can study the effect of multiplying by 0.1 and by 0.01 to explain why the product is ten or a hundred times as small as the multiplicand. For example, a tenth times a tenth is a hundredth, so 3.2 x 7.1 will have an entry in the hundredths place.

[5] As with decimal multiplication, students can first examine the cases of dividing by 0.1 and 0.01 to see that the quotient becomes 10 times or 100 times as large as the dividend. For example, students can view 7 ÷ 0.1 = ☐ as asking how many tenths are in 7.

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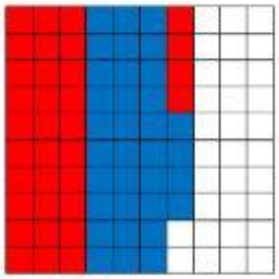
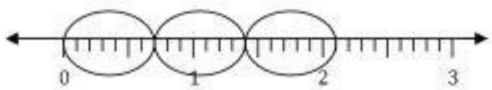
2.) $0.34 \times 2 = 0.68$



3. $0.7 \times 3 = 2.1$



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Achievement Level Descriptors	
Cluster: Perform operations with multi-digit whole number and with decimals to hundredths.	
Concepts and Procedures	***Level 1:*** Students should be able to multiply one- and two-digit whole numbers and find whole number quotients of whole numbers with up to three-digit dividends and one-digit divisors, using arrays or area models. They should be able to perform the four operations on decimals to the tenths and a whole number, e.g., 1.3 X 7.
	Level 2: Students should be able to multiply three- and four-digit whole numbers; find whole number quotients of whole numbers with up to three-digit dividends and two-digit divisors; and perform the four operations on decimals to the tenths or on decimals to the hundredths and a whole number, e.g., 3.42 x 12.
	Level 3: Students should be able to fluently multiply multi-digit whole numbers using the standard algorithm, find whole number quotients of whole numbers with up to four-digit dividends and two-digit divisors, and perform the four operations on decimals to the hundredths. They should be able to relate the strategy to a written method and explain the reasoning used.
	Level 4: