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:. Operations and Algebraic Thinking</td><td>Grade Level: 1</td></tr>
<tr><td colspan="3">1.OA.B Cluster: Understand and apply properties of operations and the relationship between addition and subtraction

Learners continue to be exposed to a variety of strategies that will help them be successful while adding and subtracting. First, learners must recognize patterns found in addition and subtraction (commutative, associative, and additive identity). Once the patterns or concepts are recognized, teachers introduce the formal property names, but learners are not required to use them. Also, learners recognize the relationship between addition and subtraction equations and use what they know to convert subtraction problems to addition problems to help find the solution.</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.

1.OA.3 Apply commutative, associative and additive identity properties of operations as strategies to add. (Students need not use formal terms for these properties.) Examples: If 8+3=11 is known, then 3+8=11 is also known. (Commutative property of addition.) To add 2+6+4, the second two numbers can be added to make a ten, so 2+6+4=2+10=12. (Associative property of addition.) 8+0=8 (Additive Identity property)

1.OA.4 Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.</td></tr>
<tr><td colspan="3">Aspects of Rigor: (Conceptual, Procedural, and/or Application)</td></tr>
<tr><td>Conceptual Understanding</td><td>Procedural Fluency</td><td>Application</td></tr>
<tr><td>Recognize the relationship between equations taught through the commutative, associative, and additive identity properties. (1.OA.3)

The teacher formalizes the learners' ideas by writing down learners' noticings in the form of conjectures. (1.OA.3)

Teachers name the properties AFTER the learners familiarize themselves with the patterns. (1.OA.3)</td><td>Apply the relationships/patterns they noticed while solving addition equations. (1.OA.3)</td><td></td></tr>
<tr><td>Recognize the relationship between addition and subtraction and represent this relationship using tools that make</td><td>Use the strategy of transforming subtraction equations into addition equations to help them solve the</td><td></td></tr>
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sense to them such as objects, tens frames, part-part-whole, number lines, etc. **(1.OA.4)** Recognize the relationship between addition and subtraction and use addition to solve subtraction problems. **(1.OA.4)**	original subtraction problems. (10-8=__ change to 8+ __ = 10) **(1.OA.4)**	

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

1. **Make sense of problems and persevere in solving them.**
    - Solve addition and subtraction equations and word problems
    - Make sense of equality
    - Conjecture about patterns when decomposing numbers, making tens and adding and subtracting
    - Use models, pictures and concrete objects to solve problems
2. **Reason abstractly and quantitatively.**
    - Compare quantities using the equal sign
    - Write equations to solve word problems
    - Flexibly use properties of operations (but do not have to name them)
3. **Construct viable arguments and critique the reasoning of others.**
    - Share conjecture about patterns noticed by students as a foundation for understanding properties of operations
    - Explain reasoning for your solution
    - Listen to others share their solution strategies, trying to understand another way of thinking (possibly trying that strategy on another problem)
4. **Model with mathematics.**
    - Writing equations that represent the action of the word problems
    - Think about whether or not their answer makes sense
    - Be willing to try more than one strategy to solve a problem
5. **Use appropriate tools strategically.**
    - Use tools to make sense of a concept or to solve a problem
    - Think about which tool would work best
    - Try more than one tool if needed
6. **Attend to precision.**
    - Working toward using the equal sign consistently and appropriately
    - Talk to each other about their math ideas using math language
    - Try to be accurate with their problem solving
    - Developing fluency within 10
7. **Look for and make use of structure.**
    - Counting on and counting back
    - Looking for patterns when adding and subtracting
    - Understanding the purpose of the equal sign
8. **Look for and express regularity in repeated reasoning.**
    - Decomposing numbers to make friendlier combinations such as making tens
    - Choosing strategies that work well for them
    - Working on fluency when adding and subtracting within 10

Vertical and Horizontal Coherence and Learning Progressions

Previous Learning Connections	***Current Learning Connections***	***Future Learning Connections***
Kindergarten learners develop the understanding that addition means putting together and subtraction means taking apart. They can represent and solve word problems within 10. **(K.OA.2)**	First grade learners use patterns that they notice such as place value understanding and properties of operations to add and subtract within 100. They are working to become fluent adding and subtracting within 10 as they use strategies that make	Second grade learners use place value understanding and properties of operations to add and subtract within 100 using up to four 2-digit numbers. Learners explain their reasoning and why strategies work. When they use concrete models, drawings and place

	sense to them. Learners are able to explain the reasoning behind the strategies used. **(1.NBT.4)**	value strategies, students are exploring addition and subtraction within 1000. **(2.NBT.5-9)**

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

- Addend
- Missing addend
- Total
- Part-part-whole

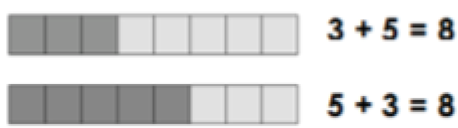
Relevance, Explanations, and Examples:

NOTE: 1.OA.3,"relationships" and "patterns" can be interchanged; learners notice "patterns" and the teacher helps them name those patterns so they begin to see how they can be used.

Conjecture: a statement believed to be true (for what we know about numbers so far) based on what learners notice

Properties (pictures from the Utah Unpacked Standards):

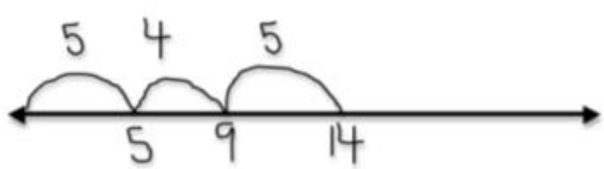
Commutative:



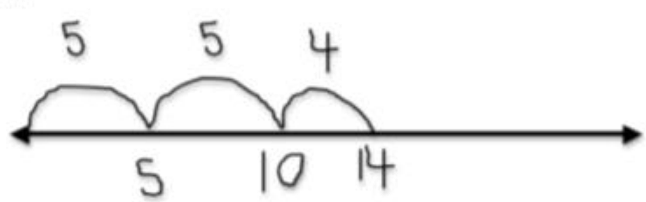
Associative:

Number Line: $\square = 5 + 4 + 5$

Student A: First I jumped to 5. Then, I jumped 4 more, so I landed on 9. Then I jumped 5 more and landed on 14.



Student B: I got 14, too, but I did it a different way. First I jumped to 5. Then, I jumped 5 again. That's 10. Then, I jumped 4 more. See, 14!



Additive Identity:
Adding zero to any number (8+0=8)

Part-part-whole (many times number bonds are used to teach what numbers (parts) make up the total (whole):