

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: Operations and Algebraic Thinking		Grade Level: 5
5.OA.A Cluster: Write and interpret numerical expressions.		
Students begin exploring parentheses within order of operations. Using real world problems, students discover that placement of parentheses impacts the meaning of the expression.		
<p>**This is an ADDITIONAL cluster. <i>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.</i></p>		
<p>5.OA.1 Use and explain parentheses, in numerical expressions, and evaluate expressions with these symbols.</p>		
<p>5.OA.2 Write simple expressions that record calculations with numbers to represent real world problems, and interpret numerical expressions without evaluating them. (For example, express the calculation "add 8 and 7, then multiply by 2" as $2 \times (8 + 7)$). Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.)</p>		
Aspects of Rigor for Student Learning: (Conceptual, Procedural, and/or Application)		
Conceptual Understanding	Procedural Fluency	Application
Understand the use of parentheses, expressions inside parentheses/brackets must be completed first when solving the equation. (5.OA.1)	Apply rules and solve problems for orders of operations (not to include exponents ¹). Solve problems and equations that employ parentheses. (5.OA.1)	
Understand where to use parentheses ² to write numerical expressions to represent real world problems. (5.OA.2)		Interpret real world problems and write it as a numerical expression. (5.OA.2)
Enacting the Mathematical Practices - Evidence of Students Engaging in the Practices		
<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. <ul style="list-style-type: none"> ● As students apply rules for order of operations, they should explain their reasoning to others. 4. Model with mathematics. 5. Use appropriate tools strategically. <ul style="list-style-type: none"> ● (optionally) Students could use scientific calculators (those that follow order of operations) to explore order of operations. 6. Attend to precision. <ul style="list-style-type: none"> ● Students use appropriate vocabulary to describe their work with parenthesis and order of operations. 		

7. Look for and make use of structure.

- As students explore order of operations and apply the rules in a variety of situations, they look for patterns and the structure of expressions.
- Students understand and apply calculations of all multiplications and divisions before additions and subtractions within an expression.
- Students will make generalizations about the order of operations and grouping symbols and apply these rules to writing and solving expressions that include more than one operation and/or grouping symbols.

8. Look for and express regularity in repeated reasoning.

Vertical and Horizontal Coherence and Learning Progressions

<u>Previous Learning Connections</u>	<u>Current Learning Connections</u>	<u>Future Learning Connections</u>
In previous grades students learned to fluently add and subtract within 1,000 (3.NBT.2) and student have started to recall from memory products of two 1-digit numbers. (4.OA.1.B)	Students are using knowledge of parentheses as a building block for order of operations.	Students will perform arithmetic operations following the order of operations with and without parentheses, including those involving whole number exponents. (6.EE.2.D) Students will apply the properties of operations to generate equivalent expressions with an emphasis on the distributive property. (6.EE.3)

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

- order of operations
- parentheses (brackets and braces for assessment)
- expressions

Relevance, Explanations, and Examples:

Although 5th grade students work with powers of 10, they do not use it in the context of order of operations. Parentheses, brackets, and braces are assessed but not included in standard.

Achievement Level Descriptors

Cluster: Write and interpret numerical expressions.

Concepts and Procedures	Level 1: Students should be able to evaluate numerical expressions that have either parentheses, brackets, or braces.
	Level 2: Students should be able to write and evaluate numerical expressions having two non-nested sets of parentheses, brackets, or braces.
	Level 3: Students should be able to write, evaluate, and interpret numerical expressions having any number of non-nested sets of parentheses, brackets, or braces.
	Level 4: